Determinants of Agricultural Credit Supply in Nigeria (1981-2014)

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ABSTRACT
This work examined the determinants of agricultural credit in Nigeria between 1981 and 2014, using secondary data obtained from the CBN statistical publications. Trend analysis was used to describe the observations about the variables used in the study, which included real interest rate, government expenditure on agriculture, exchange rate and foreign private investment. A multiple regression analysis was used to determine the effects of these variables on the amount of credit supplied to the agricultural sector through the Agricultural Credit Guarantee Scheme Fund (ACGSF) of the federal government. The results indicate that there has been increase in the supply of credit to the agricultural sector under the scheme, especially between 2000 and 2012. The results also indicate that increase in real interest rate and foreign private investment had negative effects on the supply of credit to the agricultural sector, at 10% and 1% levels of significance respectively. Other factors government expenditure on agriculture, and exchange rates were positively related to credit supply at 1% levels of significance, respectively. Agricultural credit supply was also significantly related to agricultural production within the same period of time with a positive coefficient of 3.926 which was significant at 1%. It was recommended that the on-going policies of the federal government aimed at attracting foreign investments be sustained and also the financial institutions need to review their lending rates downwards since the real interest rate was seen to inhibit supply of credit to agriculture.

Keywords: determinants, agriculture, credit and supply.

INTRODUCTION

Agriculture suffers a major setback and since independence, the performance of agriculture in the economy has been on the downward trend. The major setback has been partially attributed to the shortage of capital to finance agricultural investment (Ojo, 2006).

In the past Nigeria operated many agricultural development programmes. Despite all these programmes the performance of the agricultural sector has continually fallen below expectation and the out-put from the agricultural sector is not making a significant impact on the nation's economy.

Nigerian agriculture is essentially traditional and subsistence in nature. Given the requirement of finance in the agricultural sector, very few farmers will have capital of their own to invest in agriculture, most farm families hardly have any savings to plough back into production,

considering the pattern of their income and expenditure, limited access to credit facilities has been implicated as hindrance to the growth and productivity of the agricultural sector (Aliyu, 2010). Thus, the need arises for the provision of credit to the majority of Nigerian farmers.

The importance of credit to agricultural development cannot be over emphasized. Credit enables farmers to advantageously use inputs and factors of production, by granting farmers more access to resources through the removal of financial constraints. The traditional argument for the provision of agricultural credit is that additional capital can be temporarily used to enhance the level of household's productive and physical capital (Eswaram and Kotwal 2006).

The provision of credit will reduce the cost of capital intensive technology and assets relative to family labour. Thus, instead of growing low yield local crops, for example, access to credit may allow an increased use of improved seeds and fertilizers leading to higher crop output per unit of labour and land (Fider et al, 2006). This may in turn encourage the adoption of labour-saving technologies, such as animal in crop production (Zeller, 2007). Carter (2008) argued that credit could lead to efficient resource allocation, increase farmers' technical efficiency and by implication, increase farmers profitability. Quresm, (2007) observed that increase in credit to agriculture will lead to increase food production and farmers income because as the demand for credit increases, farmers output also increases, resulting in improvement in their well-being.

Agricultural credit services are provided by both formal and informal institutions.
The formal sector remains the leading provider of agricultural credit consequent of their poor resource endowment, most farmers are unable to meet the stipulated criteria for formal credit especially that of pledging collaterals for loans, which is a basic requirement for credit transactions with formal financial institutions. As a result, poor farmers are left with no option other than to source credit from informal sources which are regarded as exploitative because they mostly charge higher interest rates, much to the disadvantage of the farmers. In fact, according to World Bank (2000) and (2010), the three most important sources of rural credit to Nigeria are all informal:
Rotating savings and credit associations (ROSCAS) locally known as "adashi" or "esusu"
Family and Friends, commercial banks came fourth, with only eleven percent of the sample rural dwellers sourcing credit from them.

To increase farmers access to credit from the formal sources, the then federal military Government of Nigeria established the agricultural credit Guarantee Scheme Fund (ACGSF) under the agricultural credit guarantee scheme fund decree 1977. The purpose of the fund is to increase the level of bank credit to the agricultural sector through the provision of guarantee in respect of loans granted by any bank for agricultural purposes. As observed by Okon and Nkang (2009), the ACGSF is founded on the credit guarantee principle, designed to overcome the reluctance exhibited by financial institutions towards lending to the disadvantaged borrowers targeted by their scheme, formal financial institutions towards lending to these groups of people, because of stagnant agricultural markets, high production risk and perceived low profitability of family, lack of collateral, and their poor financial recording systems (FAO, 2006).

Ogbuagu (2009) has it that it has been assumed that the performance of the agricultural sector is as a result of low government investment in it but the funding of the agricultural sector has been significant. The high cost of some basic farming inputs have substantially reduced the profitability of most agricultural activities leading to significant reduction in the size of farming enterprise more so most Nigeria farmers operate on a small-scale level and are usually unable to purchase sufficient agricultural inputs to help maximize their output. This gave rise to the need for the government to provide the agricultural sector with credit to help them maximize their outputs.

Objectives of the Study

The broad objective of this study will be to evaluate the Determinants of agricultural credit supply in Nigeria. The specific objectives are to:

- examine the trend of credit supply to agriculture over the period under study
- determine the factors that influence credit supply to agriculture
- determine effect of credit supply on agricultural production

METHODOLOGY

The study area is Federal Republic of Nigeria. In terms of boundary the country has its southern limits set by Gulf of Guinea (bights of Benin), inland frontiers shared with Cameron (east), Chad (North East), Niger (north) and Benin (West). Five major geographical divisions: low coastal zones along Gulf of Guinea: succeeded northward by hills and low plateaus: Niger, Broad stepped plateau stretching to north boarder with highest elevations over 1.200 meters: Mountainous zones along eastern border which includes country's highest point (2.042) meters. Nigeria has a tropical climate with variations governed by interaction of moist southwest mansion and dry northeast winds. Mean minimum temperature of 30-320C (South) 3-350C (north.) High humidity in South February-November, June-September. In north, low humidity during dry season. Annual rainfall decrease northwards: about 2.00 millimeters in coastal zones (Niger Delta averages over 3.550 millimeters) 500-1075 millimeters in north.

It is the largest country in sub-Saharan Africa but its population and growth estimation varied widely. World bank estimated 1990 population at 199 million, however 1991 preliminary census figures published in 1992 gave population total of 88.5 million and growth rate in 1990 estimated about 3.3 percent 28 percent of population urban in 2985 (Ukeje 2005). The most important ethnic groups include Hausa/ Fulani in the North, Yoruba in the Southwest and Igbo in the Southeast. The number of languages estimated to 350 to 400. Agriculture represents 39.1 percent of the gross domestic product (GDP) in 1988. In 1989, thirty Four Million hectares or 42 percent of arable land were under cultivation.

Sampling Procedure

The study relied mostly on the use of aggregate secondary data. The study made use of secondary data mainly from various issues of central Bank of Nigeria (CBN) annual reports and statement of account, Statistical Bulletin and National Office of Statistics report.

Analytical Techniques

Objective one was analyzed using line graph and trend analysis. Objectives two and three were analyzed using regression analysis.

Models Specification

The model for objective two is specified as follows in implicit form
$Y_t = f(X_{1t}, X_{2t}, X_{4t}, X_{5t}, U_1)$
Where
Y_t= credit supply to agriculture under the ACGSF (₦)
X_{1t}= Real interest rates (%)
X_{2t}= Government Capital expenditure on agriculture (₦)
X_{4t}= Nominal exchange rate (%)
X_{5t}= Foreign private investment in agricultural secotr (₦)
$U_{1=}$ Error term

For objective three the model is specified as follows:
$Y_t = f(X_{1t}, X_{2t}, X_{3t}, X_{4t} X_{5t}, U_1)$
Y_t= Agricultural Gross Domestic Product (₦)
X_{1t}= Real Interest rates (%)
X_{2t}= Government Capital expenditure on agriculture (₦)
X_{3t}= Value of credit guaranteed on agriculture (₦)
X_{4t}= Nominal exchange rate (%)
X_{5t}= Foreign private investment in Agriculture (₦)
$U_{1=}$ Error term

RESULTS AND DISCUSSIONS

Trend of Credit Supply to the Agricultural Sector (1981 – 2014).
An examination of data obtained for this study shows an appreciably definite pattern in government's financing of the agricultural sector, through the supply of credit to the sector, over the time period under study (1981 – 2014). The graph in Figure 1 shows an increasing trend over certain periods, depicting substantial increase in the supply of credit facilities to farmers for agricultural production purposes.

The result showed that the periods prior to year 2000, agricultural credit financing was low, and almost stagnant. However, with the institution of democracy in the country in 1999, the Federal Government redirected attention to the agricultural sector, bringing some reforms and programmes which were intended to revive the sector. Among this drive was the increased funding of the sector through increase allocation to the Agricultural Credit Guarantee Scheme Fund, and opening up administrative hitches, thereby allowing farmers greater access to the fund. This move can be seen in the steep upward movement in the graph from 2000, which continued till 2009, dropped a little, and steeped up again.

Before this period (1981 to 1999), funding of the agricultural sector was very poor. This corroborates Mogues *et al* (2007) that public spending in the agricultural sector was astronomically low. According to them, less than 2 percent of total federal expenditure was allotted to agriculture during 2001 to 2005; far lower than spending in other key sectors such as education, health, and water, contrasting dramatically with the sector's importance in Nigeria's economy and the policy emphasis on diversifying from oil-based economy, and also far below the 10 percent goal set by African leaders in the 2003 Maputo agreement.

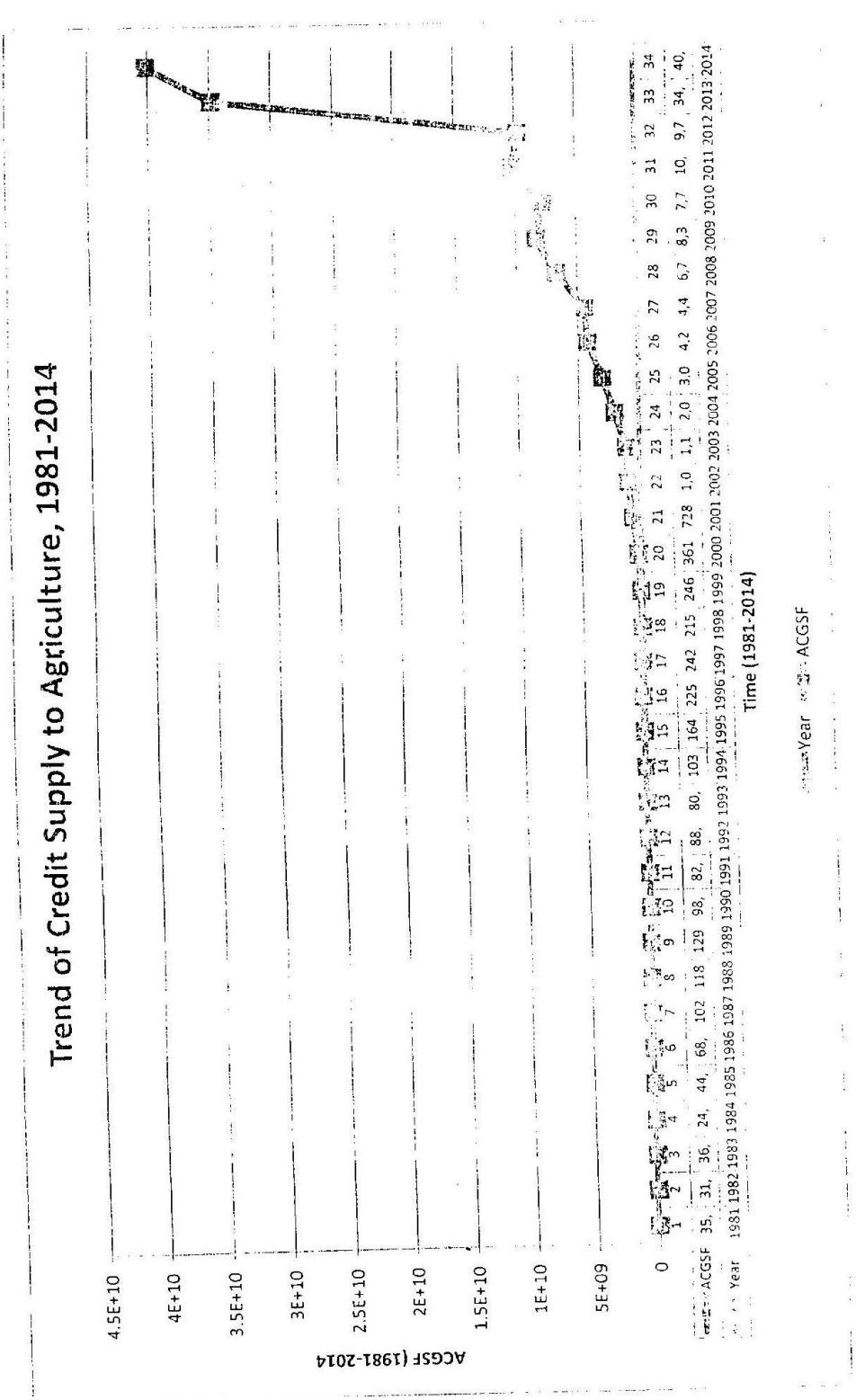

Figure 1: Trend of credit supply to agriculture in Nigeria (1981 – 2014)

CBN Statistical Data 2014

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Determinants of Credit Supply to Agriculture in Nigeria

A regression analysis was performed to ascertain the factors which significantly affect the amount of credit supplied to the agricultural sector in the country, within the period under study. The results presented in Table 1 showed that all the five explanatory variables fitted

into the model had effects on the amount of credit supplied to the agricultural sector and significant at different levels of confidence.

Since this work involved time series data, it became necessary to test for autocorrelation. To test for autocorrelation among the variables included in the model, the Durbin-Watson(DW) statistic was used. The DW is used to test that the residuals from a linear regression or multiple regression are independent. Regression models using time series have the assumption of uncorrelated or independent errors for time series data is often not appropriate. Such error terms are said to be auto correlated. The decision is that if the calculated Durbin-Watson statistic (d) falls within the critical lower and upper d-bounds ($\alpha = 0.01$), then If $d < d_L$ reject H0: $\rho = 0$. If $d > d_U$ accept H0: $\rho = 0$. And If $d_L < d < d_U$, test is inconclusive.

In this case, the computed d-statistic was 1.563 which is higher than the lower bound at $\alpha = 0.01$ ($n = 32$; $k = 5$) of 0.856 and lower than the upper bound of 1.690, the test is inconclusive at 1%. However, at 5% level, d_L and d_U are 1.041 and 1.909 respectively, which also is within the zone of inconclusiveness, in which we cannot rule out autocorrelation. Since its autocorrelation cannot be confirmed at this stage, the diagnostic statistics may be taken to prove that there was no autocorrelation among the variables in the model.

Table 1: Regression Results of Determinants of Credit Supply to Agricultural Sector

	Linear +	Exponential	Semi log	Double log
Constant	-174053.56	7717969.46	9.237	8.611
	(-2.130)**	(1.592)	(23.785)***	(4.683)***
X_{1t}	-77246.62	-267298.54	-0.016	-0.681
	(-1.875)*	(-2.222)**	(-0.806)	(-1.494)
X_{2t}	1435.62	827105.79	0.000	0.284
	(2.905)***	(2.779)***	(0.640)	(2.512)**
X_{4t}	13979.95	219895.35	0.007	0.237
	(2.893)***	(1.299)	(3.229)***	(3.696)***
X_{5t}	-2915.05	-1214711.34	-0.002	0.052
	(-3.380)***	(-1.906)*	(-0.001)	(0.215)
T	337600.64	2507615.06	0.219	1.698
	(5.875)***	(2.738)**	(8.006)***	(4.878)***
F-ratio	30.669***	73.696***	83.328***	67.322***
R^2	86.50	74.00	94.600	93.30
R^{-2}	83.60	68.60	93.400	92.00
D-Watson (DW)	1.563	0.822	1.442	1.187

Source: Computed from data dependent variable = ACGGS F; X_{1t} = Real interest rate; X_{2t}=Government expenditure on agriculture; X_{4t}=Exchange rate; X_{5t}= foreign private investment in agriculture. + indicates lead equation. DW0.01 (n=32. K=6) $D_L = 0.856$; $D_U = 1.690$; D*W*0.05 (n=32, K=6) $D_L = 1.041$; D_U=1.909.
***, **, * indicates significant at 1%, 5%, 10% respectively.

The coefficient of multiple determination (R^2) indicates that the four variables that are significant accounted for about 87% of variations in the dependent variable. The adjusted R^2 value shows that even when all the missed variables are included in the model, they can explain about 84% of the variations in the dependent variable. Furthermore, an F-ratio of 30.669 that is significant at 1% indicates that the specified model was fit to describe the

relationship existing between the independent variables and the dependent variable, therefore sustaining the results (value and signs of the coefficients) as true.

- **Effect of Real interest rate on agriculture credit supply**

This is the rate at which banks and other financial institutions lend money to investors and other interested parties. When this is high, the cost of sourcing capital for investment is also high. Therefore, interest rate, which has a negative regression coefficient of -77246.62 with credit supply to agriculture, is an indication that when lending rates increase, investors shy away from huge financial involvement. Such reluctance will definitely affect the agricultural sector. Uremadu (2006) sustained that the availability of investible funds is regarded as a necessary starting point for all investments in the economy which will eventually translate into economic growth and development. In Nigeria, according to Nnanna, Englama and Odoko (2004), the level of funds mobilization by banks is quite low due to a number of reasons, ranging from low savings deposit rates to the poor banking habits or culture of the people.

- **Effect of government expenditure on agricultural credit supply**

This variable had a positive coefficient of 1435.62 that was significant at 1%, an indication that government spending in agriculture sector is positively related to credit consumption by the farmers, and by extension increase supply of credit by the government in that sector.
Government spending is referred to as an outflow of resources from government to other sectors of the economy. When a good proportion of this outflow is channeled to the agricultural sector, it sends a positive signal to the private sector about the seriousness of the government about the agricultural sector. This will spur increased private-sector investment in that sector, thereby increasing demand for credit.

Ideba *et al* (2014) pointed out that government expenditure in Nigeria has continued to rise due to the huge receipts from production and sales of crude oil and the increase demand for public goods like roads, communication, power, education and health, among others. Eboh, Oduh and Ujah (2012) advanced various reasons for the relative poor performance of Nigeria's agricultural sector. Among these are interest and foreign exchange rate volatilities, poor infrastructure base, policy inconsistency and unnecessary intervention by the public sector which sends wrong signal to the private sector.

- **Effect of exchange rate on agricultural credit supply**

The exchange rate is the value of our currency (Naira) in terms of other countries' currencies. In this study, exchange rate was against the US Dollar, and it was expectedly found to be positively correlated with agricultural credit supply (β = 13979.95). When the Naira appreciates, the exchange rates fall, and reduce the value of foreign currencies in terms of the Naira. Since investments occur through the financial institutions, and flows from abroad target our local markets, the amount of resources these foreign flows can accumulate reduce, thus discouraging investors from long-term huge investments in the country. This will reduce the purchasing power of the farmers for inputs and machinery. At the inability of equity capital to finance production, farmers will resort to debt financing; with public-to-private sector credit flow as ready refuge. However, in some cases, increased currency value can be a sign of good financial health which stimulates foreign investments. But such investments are usually not in the agricultural sectors since volatility of such nature (i.e. temporary currency appreciation) is not good enough for agricultural enterprises that have gestation periods.

- **Effect of foreign private investment on agricultural credit supply**

When estimated on agricultural gross domestic product, a negative coefficient of -2915.05 which was significant at 1% level. Ayanwale and Bamire (2004) had reported a positive and significant effect of Foreign Direct Investment on firm's productivity of both domestic and foreign firms in the Nigerian Agro/agro allied sector. This increased firm productivity as a result of increased foreign direct investment, will definitely result in increased agricultural output; thereby serving as a catalyst that will spark off a chain of investments.

Foreign capital, if channeled into productive uses, as against consumption, can be highly desirable, as it will bring about the much needed economic growth and development. Osinubi and Amaghionyeodiwe (2010) had outlined the benefits of foreign private investment to include transfer of technology, higher productivity, higher incomes, more revenue for government through taxes, enhancement of balance of payments ability, employment generation, diversification of the industrial base and expansion, modernization and development of related industries.

According to Feldstein (2000), international flows of capital reduce the risk faced by owners of capital by allowing them to diversify their lending and investment. Foreign investment allows for the transfer of technology, particularly in the form of new varieties of capital inputs that cannot be achieved through financial investments or trade in goods and services. Foreign investment can also promote competition in the domestic input market.

However, the arguments against foreign private investment are that it may cause capital flight which may lead to net capital outflow and thus create negative balance of payment difficulties.

Effect of Credit Supply on the Performance of the Agricultural Sector

Results in Table 2 below showed that credit to agricultural sector has a significant effect on agricultural production in Nigeria. The coefficient of simple determination (r^2) value of 92.80% indicates that credit supply to the sector over time, accounts for about 93% of variations in the output from that sector. Since the independent variable has a positive coefficient of 3.926 which is significant at 1% level of confidence, it implies that increased credit to the agricultural sector will lead to increase in agricultural production.
Given the unattractive nature of farming in a subsistence economy like Nigeria, where agriculture is still characterized by low mechanization, high labour intensiveness, low output productivity, poor skills and production inefficiency, it is difficult to drive serious private sector participation in the sector without some form of incentives.
Agricultural enterprises have slower returns on investments when compared with many other investment options. In the presence of competition for investment resources by these options, agriculture loses out. Thus, in order to propel the needed drive towards the agricultural sector, the government initiates and implements policies that encourage lifting agriculture from subsistence to commercial level. This amount of investment will require huge capital base. Since the conventional lending institutions shy away from facilitating credits to agriculture due to its high risk profile, the responsibility to kick-start, and sometimes sustain, commercial agricultural production rests on the government. This the government does through institutional frameworks, among which is the Agricultural Credit Guarantee Scheme. The scheme is found in this study to heavily impact agricultural production over the period studied.

Table2: Regression Result of Effect of Credit Supply on Agricultural Production

	Linear +	Exponential	Semi log	Double log
Constant	7.272	2.416	-42.487	1.292
	(5.244)***	(41.583)***	(-7.521)***	(6.408)***
X_{3t}	4.694E-008	-3.876E-008	3.926	0.055
	(0.170)	(-3.353)***	(5.523)***	(2.187)*
T	1.561	0.062	10.182	0.539
	(16.945)***	(16.091)***	(5.409)***	(8.022)***
F-ratio	355.787***	228.477***	187.364***	167.986
R^2	96.10	94.00	92.80	92.10
R^{-2}	95.80	93.60	92.30	91.50
D-Watson (DW)	1.331	1.142	0.400	0.443

Source computed from data y Agricultural GDP; X_{3t} = Amount of credit under ACGSF. + indicates lead equation.
***, **, * indicates significant at 1%, 5%, 10% respectively.

CONCLUSION AND RECOMMENDATIONS

Supply of credit to agriculture in Nigeria has been on the increase between the periods under study. The trend of credit supply shows an upward and spontaneous increase from certain periods. The study showed that real interest rates, government expenditure in agriculture, exchange rates, and foreign private investment were the factors that determined credit supply to the agricultural sector. Furthermore, credit supply had a significant positive effect on agricultural Gross Domestic Product (GDP).

The ongoing federal government's efforts at attracting foreign investments should be sustained and even taken further and also the financial institutions need to review their lending rates downwards since the real interest rate was seen to inhibit supply of credit to agriculture and also shift attention to small scale agricultural enterprises.

REFERENCES

Aliyu, A. Ammani (2010): An Investigation into the relationship between agricultural production and formal Credit Supply in Nigeria, International Journal of Agriculture and Forestry. Vol. 2, 2012, pp. 46-52.

Ayawele, J.O and Bamire (2004) *The value of credit in the Western Nigeria Agricultural Credit corporation Columbus: Ohio State University*

Carter, (2008) policies and performances of agricultural/rural credit in Bangladesh

CBN, (2010) Central Bank of Nigeria: Conduct of fiscal policy- 2010

Eboh, Oduh and Ujah (2012) Driver and sustainability of agricultural growth in Nigeria.

Eswaram and Kotwal, (2006): the implications of credit constraints for risk behaviour in less developed countries

FAO, (2006): the state of food insecurity in the world 2006.

Fider , (2006): assessing the impacts of conservation in agriculture in farmers.

Feldstein Martin, (2000) "Aspects of global Economic integration: outlook For the future", NBER working papers 7899, National Bureau of Economic Research, Inc.

Ideba E. Ele, Otu W. Ibok, Essien A. Antiaobong, (2014) "Economic Analysis of fish farming in calabar, Cross River State, Nigeria.

Mogues, Carter, Michael R. little, Peter D.; Negatu, workneh (2007) "world Development 35 (5): 8 35-856

Nnanna, England and Odoko (2004) impact of financial deepening and Foreign direct investment in Nigeria.
Ogbuagu, C.S.A, (2009). Nigeria Development Policies and Programmes University of Calabar Press.
Ojo, (2006): determinants of loan acquisition from the financial institutions.
Okon and Ukang, (2009): an assessment of Nigeria's Agricultural Credit Guarantee Scheme Fund.
Osinubi and Amaghionyeodiwe (2010) "foreign private investment and economic Growth in Nigeria", Review of Economics and Business studies, vol 3, issue 1, pp 105-127.
Queresm, (2007): apply skills and knowledge.
Ukeje E. (2005): Modernization small holder Agriculture to ensure food security and gender Empowerment: issues and policies)
Uremadu, (2006): Core determinants of financial savings in Nigeria.
World Bank (2000) and (2010): aging and old age income support.
Zeller, (2007): assessing the impacts of conservation agriculture in farmer.