

The Contribution of Finance to Agricultural Production in Nigeria

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Abstract

Several studies have found a positive correlation between agricultural financing and the performance of the agricultural sector. But fewer efforts have been directed at sieving out the agricultural output that is exclusively associated with the extent of funding. This study aimed to ascertain the actual portion of total agricultural output that could be attributed to agricultural financing in Nigeria. The vector error correction methodology was applied following the nature of data properties. The results showed a positive effect of finance on agricultural output. However, variance decomposition revealed the poor state of agricultural financing with a disproportionate dependence of the sector on natural weather conditions. The case is therefore made for increased funding of agriculture for optimal performance.

Keywords: Agriculture, Finance, Food Security, Nigeria, Sustainable

JEL Classification: Q0, Q1, L6

I. Introduction

In many developing countries, trends in undernourishment are complicated by the nutrition transition, characterised by a shift away from traditional diets towards a more globalised intake pattern that include increased quantities of processed foods, animal products, sugars, fats and (sometimes) alcohol (Popkin and Gordon-Larsen, 2004). For many countries in the middle stages of nutrition transition, continued high rates of food insecurity and under nutrition, combined with increased prevalence of overweight and associated non-communicable diseases, are resulting in a “double burden” of malnutrition. There is real urgency among governments and multilateral agencies to boost food production and this is being pursued with different agricultural models, including the need to migrate to commercial farming in many developing countries.

Commercial agriculture had emerged as a principal factor that distinguished transition economies from the predominantly agrarian ones. Commercial agriculture involves considerable application of modern techniques, including machinery and other farm input. Such capital equipment significantly reduces the number of labour

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1 At the initial stages of commercialisation

per output – implying higher labour and capital productivity – although the extent of the incremental productivity would depend on whether the agricultural sector is in the sunrise or sunset stage of the application of capital, the incremental capital/output ratio being higher in the region of sunrise.

Finance is pivotal in the commercialisation of innovations. In agriculture, finance remains the bedrock for mechanisation – the purchase of machinery, the training to use machinery, the transportation of equipment and produce, the marketing of produce etc – so that it could be taken for granted the positive correlation between agricultural finance and actual agricultural production. Therefore, since the size of agricultural production theoretically a positive function of finance, the coefficient of association between finance and food security must also be positive. Agricultural production also depends on the vagaries of weather. Rainfall in the right volumes would boost output through aiding the decomposition of nutrients and providing fluidity. Sunshine is important for many reasons, including photosynthesis. These dependencies on weather do not diminish the importance of finance for modern farming. The rain would need to be harvested and supplied across the season and channeled appropriately in irrigation facilities and ditto sunshine. However, in economies dominated by traditional agriculture, output is essentially seasonal depending wholly on the clemency of weather and crude farm equipment.

The agricultural sector in Nigeria consists of a mix of modern production and the traditional techniques. The former are the organised enterprises like the Obasanjo farms in Ota, Presco in Edo state and among others, while the latter includes the small farm holdings scattered across the country. It is easy to ascertain how much input in finance that is utilised by the modern farms, but the same cannot be said of the small holdings as they depend mainly on weather conditions. However, available agricultural statistics do not separate the volume of output that is supported by finance from that accruing as a consequence of the effect of other factors. But such a separation would be important in many fronts.

Visibly, such a calculation will make it easier for policy makers to understand, in clear terms, the need to advocate for increased funding of agriculture for greater productivity of the sector. In addition, it would be possible to establish the exact numerical association between extent of financing and expected periodic output. For farmers seeking financial assistance from formal financial intermediaries, the result of this separation would make credit evaluation more transparent and therefore ease access to finance, among others. Therefore, the aim of this paper is to access the relative contribution of agricultural finance to total agricultural output in Nigeria. The

paper reviews the contribution of finance to agricultural production in Section II. Methodological issues are treated in III. Section IV presents econometric estimates, while Section V recommends and concludes.

II. Literature Review

Finance is a key component in every business endeavour required for the establishment and running of the business. It is the life blood of any business. Funds are required for the purchase of capital equipment such as land and building, machinery and other fixed assets as well as working capital. It is worthy of note that with growth in activities in any business, comes increased financial needs and increased access to funding would facilitate expansion. The agric-business involving primarily food production, distribution, processing, marketing is not an exception. Zhang (2007) suggested that deepening financial intermediation may promote economic growth by mobilising more investments, and lifting returns to financial resources, which raises productivity.

Agricultural finance is the acquisition and use of capital in agriculture. It deals basically with the supply of and the demand for funds in the agricultural sector of the economy. USAID (2010) defined rural agricultural finance to include all types of finance available to farmers. It is a field of work in which people aim to improve access to efficient sustainable financial services for the agricultural industry, including farming and all related enterprises. It involves all financial services, including savings, transfers, insurance and loans, input supply, processing, wholesaling and marketing (Meyer, 2011). IFAD (2010) further adds that agricultural finance refers to all those financial services that focus on on-farm activities and agricultural businesses without necessarily targeting poor people. The crucial role of financing in agriculture cannot be overemphasised. The escalating world population is associated with greater pressure on food demand and the demand for agro-products that are input for further production, thus the need for use of more sophisticated methods capable of yielding greater output is essential. Finance in agriculture is as important for improved productivity as technical input can only be purchased and used by farmers if they have required fund at their disposal.

In Africa, a significant proportion of the population live in the rural areas with agriculture as their major preoccupation and financial constraints in agriculture remain prevalent. Finance to the agricultural sector remains costly and inequitably distributed and this limits the ability of small-scale farmers to grow their productivity. According to Nyoro (2002), lack of working capital and low liquidity limit the farmer's ability to purchase productivity enhancing input like seeds, fertilisers and pesticide.

This was supported by Awudu and Huffman (2000) and Kimbaara (2005) stating that the average production efficiency levels are higher among producers who have access to formal credit.

Agricultural credit therefore enhances productivity and promotes standard of living by breaking the vicious cycle of poverty among farmers. Literature abounds on the relationship between agricultural finance and agricultural productivity. Zuberi (1989) asserted that agricultural output was low in developing countries. Using Pakistan as a reference, he attributed this to small holdings, traditional methods of farming, poor irrigation facilities, low or misuse of modern farm technology, among others. This resulted in small income and no saving or small saving. Access to finance therefore, was expected to stimulate farm investment, boosting the use of modern inputs, and augmenting farm production. Since farmers, especially in the rural areas were poor, they found it difficult to save, and funds available through informal financial markets were usually costly, while the commercial banks and other formal sources of funds view the sector as risky for lending. Also, low returns on investment and the long period of pay-back associated with agricultural activities, compared with other non-agricultural activities, limit formal lending. The perceived high risks and long-gestation period is mainly associated to the fact that the sector's output depends on the vagaries of weather.

Iqbal et al., (2003) in their study identified three main factors that contributed to agricultural growth as the increased use of agricultural input, technological change and technical efficiency. Technological change was the result of research and development efforts, while technical efficiency referred to the rate at which new technology was adopted and used more rationally and was affected by the flow of information, better infrastructure, and availability of funds and farmers' managerial capabilities. Higher use and better mix of input also required funds. These funds could come either from farmers' own savings or through borrowings. In less developed countries where savings were negligible, agricultural credit appeared to be an essential input along with modern technology for higher productivity.

Jan et al., (2012) pointed out that other associated reasons for low productivity in agriculture included land fragmentation; lack of managerial skills in farmers, which limited their ability to adopt improved farming practices; and insufficient use of modern technology and input. The latter was a function of the inadequate finance available to the farmers, particularly the smallholders. The matter of enhancing agricultural productivity, therefore, largely depended on inter alia, the availability of finance to farmers.

Saboor et al., (2009) added that the use of modern technology increased demand for credit and resulted in increase in agricultural productivity of small farmers. Access to credit promoted the adoption of yield-enhancing technologies. Adams and Vogel (1990) also supported the argument that most third-world countries studied used credit programmes to promote agricultural output.

Mahmud (2008) and GOB (2009) posited that of all agricultural reform policy interventions aimed at achieving success, the agricultural/rural credit had been considered one of the crucial factors toward sustainable development of the agricultural sector. Abedullah et al., (2009) and Saboor et al., (2009) stated that timely and easy access to credit enables farmers to purchase the required input and machinery for carrying out farm operations and increasing production. Johnson and Cownie (1969) in their study noted that developing countries improved their agricultural output by introducing modern agricultural technology such as chemical fertilisers, recommended seeds, tractors and modern irrigation facilities, among others. But the adoption of such modern agricultural techniques is capital intensive and requires increased financing.

Siddiqi et al., (2004) reported that the flow of credit to farmers had increased demand for input to increase crop production. The elasticity of amount of credit, number of tractors, irrigation, use of chemical fertiliser and pesticides, with respect to agricultural income, indicated that credit (production credit) and tube wells impacted positively on agricultural output.

Audu et al., (2007) stressed the need for agricultural finance, arguing that capital in the form of finance is needed to modernise agriculture because new technologies have to be purchased before they can be used on the farms. They emphasised that farmers' need for finance in consumption and payment for labour during the gestation period of their enterprises. They further argued that inadequate agricultural capital stems from the small size of operations of most farmers, which limited the extent to which savings accrued from surplus output, and consequently stagnated income. Therefore, any system of financial intermediation that would leave a pool of money for investment among farmers would catalyse agricultural production and development.

Richard (1990), Khandker and Faruquee (2003) and Khan et al., (2008) provided empirical evidence that institutional agricultural credit played a key role in enhancing farm production. They argued that without doubt, agriculture could be the main medium for improving the socio-economic conditions of the rural people. Waqar et al., (2008) using time series analysis and applying the error correction model for

Pakistan, found that agricultural credit had a positive impact on the gross domestic product and its effect was more pronounced on the agricultural component. The impact of agricultural credit in reducing poverty was significant both in the short and long-run.

Okurut et al., (2005) also supported the importance of credit when they asserted that in the context of developing countries, agricultural credit was an important instrument for agricultural development. Kadidia (2001), in a major review of constraints to agricultural development for Mali, using the Malian National committee of the Partnership to Cut Hunger in Africa, mentioned the lack of financial resources as one of the major constraints to the growth of its agricultural sector. According to the Committee, one of the key strategies to cut hunger in Mali was to strengthen investments in the rural areas through: financing of hydro-agricultural developments; development of non-bank financial institutions; strengthening of private investments (financing mechanisms, development of alternative collateral, funding guarantees, and insurance mechanisms); facilitate access to credit for producers; strengthening decentralised financial systems; promoting medium and long-term credit on favourable terms; and developing insurance mechanisms to help protect producers' revenues and debt relief for producers.

Studies for Nigeria have also confirmed the positive relationship between finance and agricultural productivity. For instance, Nosiru (2010) showed that micro credit enabled farmers to acquire needed input to increase their agricultural productivity. However, the credit obtained by the farmers in the study area did not contribute positively to the level of output. This was as a result of non-judicious utilisation, or diversion of credits obtained to other uses apart from the intended farm enterprises.

Other studies have sought to link improvement in agricultural production to poverty reduction. Maxwell, (2001), noted that poverty remained a predominantly rural problem and agriculture is generally central to rural livelihoods. Some 70.0 per cent of the workforce in sub-Saharan Africa and 67.0 per cent in South Asia are at least partly engaged in agriculture. Therefore, any improvement in rural incomes should – if only by sheer weight of numbers – have a major impact on poverty.

The most useful assessments of the impact on poverty of changes in agriculture are those that followed farming communities' experiences over a long-term period (Lanjouw and Stern, 1998; Hazell and Ramasamy, 1991). These studies showed that agricultural productivity gains have raised rural incomes in two ways: by directly increasing farmers' incomes and, of particular importance to the poorest, by increasing employment opportunities and wages.

DFID (2004) explained that increased agricultural productivity reduced poverty through four transmission mechanisms including: direct and relatively immediate impact of improved agricultural performance on rural incomes; impact of cheaper food for both urban and rural poor; agriculture's contribution to growth and the generation of economic opportunity in the non-farm sector; and agriculture's fundamental role in stimulating and sustaining economic transition, as countries (and poor people's livelihoods) shift away from being primarily agricultural towards a broader base of manufacturing and services. The paper noted that the potential for future poverty reduction through these four transmission mechanisms depends on the extent to which agricultural productivity can be increased where it is most needed. In a similar research work, Bresciani and Valdes (2007) framed their analysis in terms of three key channels that linked agricultural growth to poverty, namely: labour market, farm income and food prices. They provided a theoretical framework for investigating the quantitative importance of those various channels and then reported findings from six country case studies. They concluded that when both the direct and indirect effects of agricultural growth were taken into account, such growth was more poverty-reducing than growth in nonagricultural sectors.

II.1 Trends in Agricultural Finance in Nigeria

In absolute terms, the trend of loans extended to the agricultural sector by commercial banks in Nigeria showed a consistent upward trend over the years (see figure 1)

Figure 1: Loans to Agriculture, Forestry and Fishery Sectors by Banks (1987-2010)

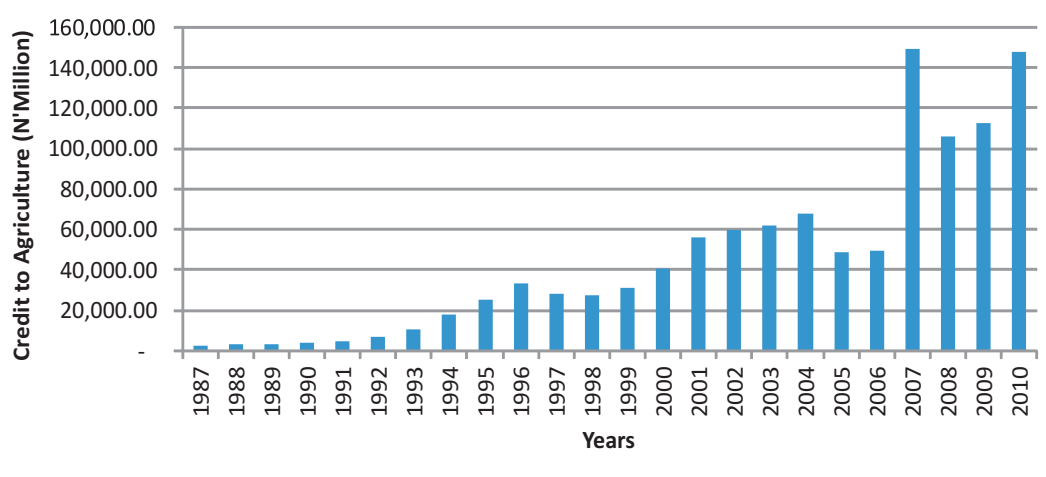
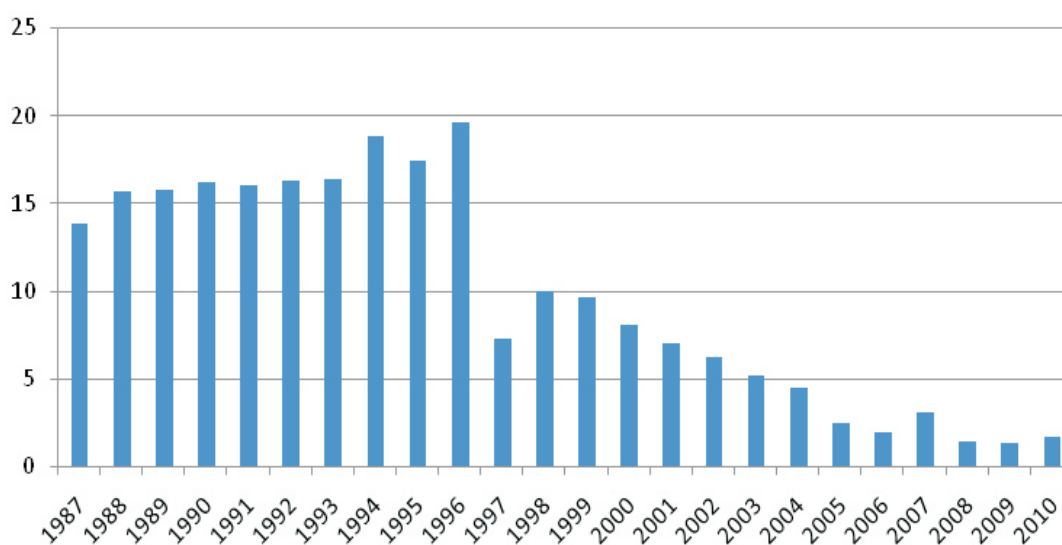


Figure 1 showed a remarkable growth in agricultural credit post-consolidation of Nigeria's banking sector in December 2005. Prior to the banking sector consolidation, agricultural credit was relatively poor fluctuating between ₦2.0 billion to ₦25.0 billion from 1987 to 1995. In 1996, agricultural credit rose significantly to about ₦33.0 billion, but declined to about ₦31.0 billion in 1999. The inception of a democratic governance saw the growth of agricultural credit to about ₦56.0 billion and ₦67.0 billion in 2001 and 2004, respectively. At end-2010, loans to agriculture by commercial banks in Nigeria had increased to ₦148.0 billion.

In terms of percentage of bank loans advanced to the agricultural sector, from the period 1987 to 1996, the agricultural sector received between 13-19 per cent of the total loans by commercial banks. The figure reduced to 7.0 per cent in 1998 and even further to 6.0 per cent in 2002. At end-2010, the figures decreased significantly to 1.7 per cent of total number of bank loans advances.

Figure 2: Agricultural Finance as a Ratio of Total Loans Granted (1987- 2010)



From figure 2, it was visible that the share of agricultural loans in total loans made by the deposit money banks (DMBs) was infinitesimal. Several reasons, including riskiness of the sector, long-payback period, national neglect for the sector and others have been adduced as reasons for the trend. To shore up financing for the agricultural sector, the Central Bank of Nigeria had made some strategic financial interventions. Some of these are discussed below:

II.2 Intervention by the Central Bank of Nigeria

II.2.1 Agricultural Credit Guarantee Scheme Fund (ACGSF)

This scheme was established by the Federal Military Government under the Agricultural Credit Guarantee Scheme Fund Decree 1977 (Decree No. 20) and as amended on 13th June, 1988. Thus, the Agricultural Credit Guarantee Scheme Fund formally started operations in 1978. The Fund is managed by the ACGSF management board and the Central Bank of Nigeria.

The purpose of the Fund is to provide guarantee in respect of loans granted by any bank for agricultural purposes (including establishment or management of plantation for the production of cash crops, cultivation or production of various crops, animal husbandry, processing of agricultural products as well as farm machinery and hire services) with the aim of increasing the level of bank credit to the agricultural sector. Loans under the scheme include advances, overdrafts and any credit facility.

A CBN internal survey in April 2012, noted that a total of 3,561 loans valued at ₦502.68 million was guaranteed by six (6) DMBs and some Microfinance banks. This brought the number and value of loans guaranteed in the year to 6,108 valued ₦1.34 billion. Cumulatively from inception in 1978, the figure stood at 760, 636 loans valued at ₦53.68 billion. The distribution of number of loans guaranteed by purpose indicated that food crops accounted for 3,384 loans (95.0 per cent), followed by livestock and cash crops which recorded 123 loans (3.5 per cent) and 24 loans (0.7 per cent), respectively. Fisheries, mixed farming and others recorded 15, 1 and 14 loans, respectively.

II.2.2 Agricultural Credit Support Scheme (ACSS)

The Agricultural Credit Support Scheme was established through the initiative of the Federal Government and the Central Bank of Nigeria with the support and participation of the Bankers Committee to finance large ticket agricultural projects with an interest rebate of 6.0 per cent upon timely repayment of the facility. The agricultural processes covered under the ACSS include:

- (a) Establishment or management of plantations;
- (b) The cultivation or production of crops;
- (c) Livestock (animal husbandry, poultry, fishery etc.); and
- (d) Farm machinery and hire services.

The purpose of the ACSS is to develop the agricultural sector of the Nigerian economy by providing credit facilities to farmers at single digit interest rate. This is to enable farmers exploit the untapped potentials of the sector with a view to reducing the cost

of agricultural production, and increase output on a sustainable basis. The expected outcome is a fall in prices of agricultural produce, especially food items, thereby leading to reduction in inflation rate, generate surplus for export, diversify the revenue base and thus, increase foreign exchange earnings for the country. At end-April 2012, no rebate was paid. However, the total rebate paid from inception to end-April 2012 stood at 43 projects valued at ₦872.45 million.

II.2.3 The Commercial Agricultural Credit Scheme

The CACS was established by the CBN in collaboration with the Federal Ministry of Agriculture and Rural Development as part of the developmental role of the CBN. It was funded through the issuance of FGN Bond worth ₦200 billion. The essence of the scheme was to promote commercial agricultural enterprises in Nigeria. The fund was released to the Bank of Industry and made available to DMBs for on-lending to farmers/state governments at single digit interest rate. State Governments could borrow up to N1.0billion for on-lending to farmers' cooperative societies and other areas of agricultural development provided such initiatives/interventions were in line with the set objectives.

So far twenty nine (29) states participated in the scheme. In April 2012, the sum of ₦2.938 billion was released to 3 banks with respect to 3 projects bringing the total to ₦178.269 billion with respect to 227 projects (198 private promoters and 29 State Governments). By value chain 47 per cent of the private projects were for production activities, while 38 per cent were for processing activities. Marketing and storage accounted for 9 per cent and 6 per cent, respectively. For the state sponsored projects, processing accounted for 51 per cent followed by production which accounted for 33 per cent. Other activities shared the remaining 16 per cent.

II.2.4 Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL)

Available statistics revealed that the CBN had approved ₦75 billion for the take-off of Nigerian Incentive-Based Risk Sharing in Agricultural Lending (NIRSAL). It had also guaranteed 75.0 per cent loans provided by DMBs to farmers across the 36 states of the Federation and the Federal Capital Territory as part of concerted efforts to transform the agricultural sector. The guarantee would be issued by the NIRSAL to the farmers in the states and the FCT through commercial banks and other financial institutions.

The initiative (NIRSAL) mobilised financing for Nigerian agribusiness through the use of credit guarantees to address the risks associated with default. It was targeted at

encouraging financial institutions to be more receptive to doing business with agribusinesses. It was aimed at creating greater access to finance through integration of end-to-end agriculture value chains such as input producers, farmers, agro dealers, agro processors and industrial manufacturers with agricultural financing value chains – loan product development, credit distribution, loan origination, managing and pricing for risk, and loan disbursement.

The integration was driven by the NIRSAL's 5 pillars, particularly the Risk Sharing Pillar and the Technical Assistance pillars such as Risk Sharing Facility, ₦45 billion; Insurance Facility, ₦4.5 billion; Technical Assistance Facility, ₦9 billion; Agricultural Bank Rating, ₦1.5 billion; and the Bank Incentive Mechanism, ₦15 billion (CBN, 2011).

III. Methodology and Data Analysis

III.1 Methodology

The paper employed the vector error correction mechanism (VECM). The error correction mechanism had emerged as one of the effective contemporary tools for ascertaining the dynamic paths of variables and ability to return to long-run equilibrium (converge) after a shock. The preference for VECM followed Phillips (1991) and Gonzalo (1994) who ascribed better properties to VECM than several other estimating frameworks for long-run relationships. The VECM is preferred for data sets where cointegration is detected. A VECM investigates the long-run and the short-run dynamic co-movements among economic variables.

In a VECM, all variables entered as endogenous in the sense that none was held as dependent variable. In the reduced-form structural equations, the disturbance in the error components of the impulse variable triggered a persistent change in the error process. Then, the impulse response function enabled the isolation of the effects on the error process due to the included variables, while the variance decomposition indicated the contribution of each of the variables to the change in the behaviour of any choice component. Therefore, for the 'true' effects to be traced, particular attention was given to the ordering of the variables in the model. The Cholesky decomposition ranked the variables from the right according to the speed of response to the stimuli. This was the approach adopted in the paper.

A typical VECM model is specified as follows:

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + \dots + \Gamma_{k-1} \Delta Z_{t-k+1} + \pi Z_{t-1} + u_t$$

Where $\Gamma_i = -(I - A_1 - \dots - A_i)$ ($i = 1 \dots k-1$), a matrix representing short-term adjustments and $\Pi = -(I - A_1 - \dots - A_k)$, being a coefficient matrix showing the long-run relationship between the variables in the vector. Z_t is $p \times 1$ vector of stochastic variables integrated of order 1, k is the lag length and v_t is $p \times 1$ Gaussian white noise residual factor.

III.2 Variables

The size of agricultural output depended on the size of input and total factor productivity. Productivity relates to increasing output without proportionate increase in input. Thus, it essentially arises from other factors, including research and development, education extension services, among others. Given the level of development of the Nigerian economy and the paucity of data, it would be difficult to ascertain how much of resources expended on the total productivity factors. The conventional market measure for input into agricultural production included fertilisers, pesticides, energy, feed and seed and livestock – these are intermediate inputs, labour, capital – equipment real estate, inventories. Finance was key for acquiring capital and other modern technologies. Thus, the operating model in this paper could be set as three factor production function of the agricultural sector. The factors included land, labour and finance, being a proxy for capital. Land was measured as the land area cultivated per annum. Labour was measured by the number of labour force employed in the agricultural sector (Al), while finance (Af) was measured by loans made by the banks to the agricultural sector. Given the peculiarities of the Nigerian economy, the exchange rate entered the model to indicate the effect of foreign developments on the import of farm input. The ratio of total agricultural output to all intermediate input, proxied by finance, measured total factor productivity (Prtvty). Total output was measured by total agricultural gross domestic product. Rainfall entered the model with positive expectation for output because agricultural production depended mainly on the vagaries of weather in the country. The irrigation component was subsumed in finance

The *a priori* expectation for land was positive as the postulation was that the more the size of land cultivated, the higher the output. This was with the assumption that intermediate farm input was separated from land. Labour, productivity and finance moved in the same direction as total output, while depreciation of naira increased imported input prices. However, in the computations, land was assumed fixed while rainfall and exchange rate were treated as exogenous variables. The data were sourced from the CBN Statistical Bulletin (various issues) and the website of the National Bureau of Statistics.

III.3 Data Properties

III.3.1 Unit Root Tests

The unit root test indicates whether the included variables are stationary. Agricultural gross domestic product (Agdp), which is used as the measure of agricultural production contains unit root at level. However, the first difference is stationary even at the 99 per cent confidence level. Productivity is stationary at level. Rainfall (RF), exchange rate (xr), and agricultural finance (AF) are stationary at the first difference. However, agricultural finance is stationary at level only within the 95 and 90 per cent confidence levels. The tests were conducted using the Augmented Dickey-Fuller estimates. And the sample period spanned 1980 to 2011.

III.3.2 Test for Cointegration

The Johansen Cointegration test was applied. The test results are found in Table 1

Table 1: Trace Test for Cointegration Result

Unrestricted Cointegration Rank Test (Trace)				
Table 1: Trace Test for Cointegration Result				
Hypothesised No. of CE(s)	Eigen value	Trace Value	0.05 Critical Value	Prob. **
None*	0.869214	145.9745	95.75366	0.0000
At most 1 *	0.813281	101.2224	69.81889	0.0000
At most 2 *	0.678660	64.30307	47.85613	0.0007
At most 3 *	0.605072	39.32744	29.79707	0.0030
At most 4 *	0.368274	18.88830	15.49471	0.0148
At most 5 *	0.329184	8.783719	3.841466	0.0030

Trace test indicates 6 cointegrating eqn(s) at the 0.05 level

* denotes rejecting of the hypothesis at the 0.05 level

** MacKinnon-Haug-Michelis (1999) p-values

The detection of cointegration indicated that there were long-run relationships among the variables and therefore, allowed the application of the vector error correction methodology.

Table 2: Max-eigenvalue Test for Cointegration Result

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesised No. of CE(s)	Eigenvalue	Max-Eigen Statistics	0.05 Critical Value	Prob. **
None*	0.869214	44.75219	40.07757	0.0138
At most 1 *	0.813281	36.91928	33.87687	0.0210
At most 2	0.678660	24.97563	27.58434	0.1041
At most 3	0.605072	20.43914	21.13162	0.0623
At most 4	0.368274	10.10458	14.26460	0.2052
At most 5 *	0.329184	8.783719	3.841466	0.0030

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejecting of the hypothesis at the 0.05 level

** MacKinnon-Haug-Michelis (1999) p-values

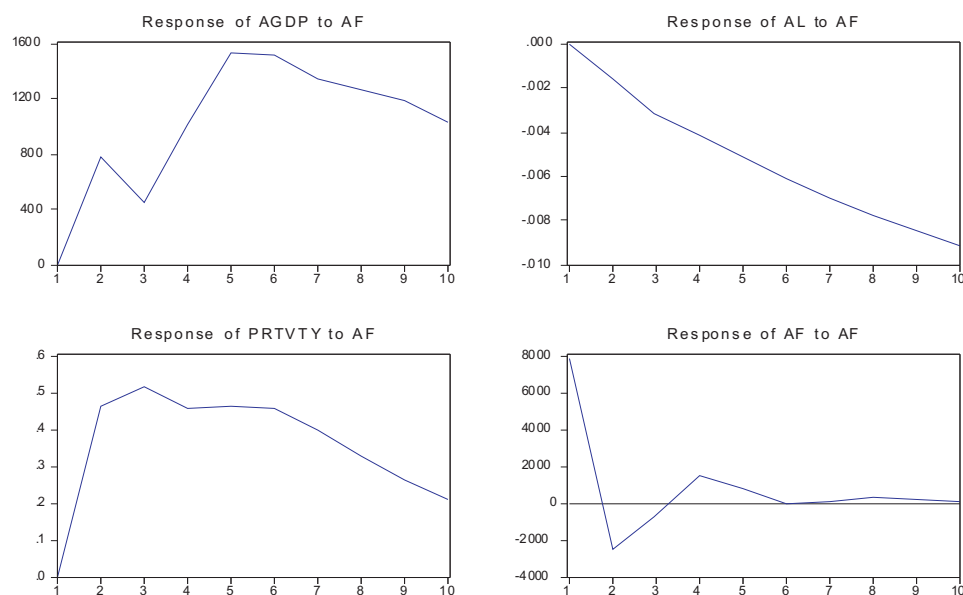
IV. Interpretation of Results

IV.1 Impulse Response Analysis

From the econometric estimations in figure 3, the impulse response function traced the effect of innovations on finance on the volume of agricultural production, and other included variables. The results in chart 3 showed that a one standard deviation innovation on agricultural finance (AF) left agricultural production, labour force employed in the agricultural sector (AI), and agricultural productivity unchanged in the first period. In the second period Agdp increased by 15.5 per cent. This result underscored the fact that finance was an important factor for growing agriculture. The increase was sustained in the third period, but only up to 9.0 per cent. In the fourth and fifth periods, Agdp declined by an average of 10.0 per cent. This was attributed to the more than proportionate pull-down effect of other variables in the model, particularly adverse weather. Agdp showed the same negative change from the seventh to the ninth period. But there were modest improvements in the sixth and tenth periods.

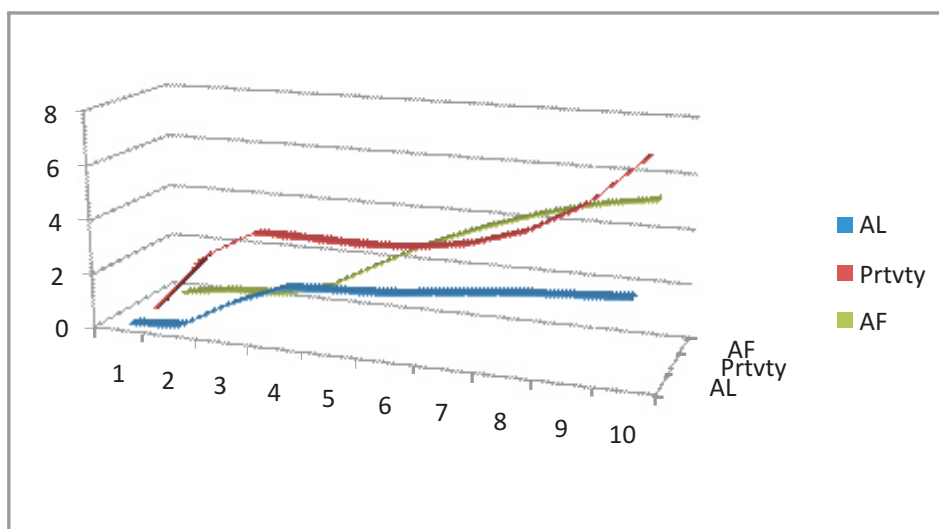
The reaction of labour met the *a priori* expectations, except in the second period. From the third period to the tenth period, the increase in financing consistently reduced the amount of labour input to agricultural production. Theory supported this observation as the injection of capital increased the productivity of labour and hence reduced the number of labour per unit of output. Productivity also showed the same trend. And this should be obvious because the additional financing reduced the unit of labour required for production as productivity was boosted with additional finance.

Figure 3. Response to Cholesky One S.D. Innovations



IV.2 Variance Decomposition

The variance decomposition in table 3 indicated that the relative contribution of each of the included variables to changes in any chosen variable. To determine the fraction of Agdp that was supported by financing, the decomposition of Agdp indicated that in the first period, the behaviour of Agdp was entirely explained by itself. The outcome conformed to logic because the innovation on agricultural finance would only have lagged effect. In the second period, 0.3 per cent of the changes in Agdp were explained by finance. From the third period, the contribution of finance progressively increased, peaking at 5.2 per cent in the tenth period. The contribution of productivity followed a similar pattern from the second period when it contributed 2.2 per cent to total variation of Agdp. Its contribution peaked in the tenth period when it contributed 7.2 per cent. The contribution of labour ranged from 0.1 per cent in the second period to the highest level of 2.9 per cent in the tenth period.

Chart 3: Relative Contributions to Agdp by labour, productivity and finance.

All through the periods of impact, at least 85.0 per cent of all the variations in Agdp were not explained by financing, productivity and employment. The implication of this was that agricultural production in Nigeria depended, largely on the natural developments. This finding accurately mimicked the state of agriculture in the Nigeria. Agricultural financing was weak, so was investment in the sector. Primitive techniques still abound so that productivity was at low ebb. Little wonder therefore, most of the staples and other agricultural produce were imported from abroad.

Table 3: Variance Decomposition of AGDP

Period	S.E.	AGDP	AL	PRTVTY	AY
1	12191.14	100.0000	0.000000	0.000000	0.000000
2	14146.76	97.35131	0.130805	2.216911	0.300972
3	14471.26	95.12398	1.197142	3.294042	0.384835
4	14567.95	93.88427	1.981795	3.269783	0.864148
5	14662.12	92.74310	2.080602	3.228108	1.948186
6	14761.25	91.54804	2.184420	3.297496	2.970042
7	14871.93	90.19237	2.421303	3.634541	3.751787
8	14998.08	88.68461	2.636355	4.270804	4.408228
9	15154.13	86.89021	2.779487	5.404110	4.926197
10	15365.09	84.65420	2.895373	7.203966	5.246456

Cholesky Ordering: AGDP AL PRTVTY AF

V. Conclusion and Recommendation

The paper set out to ascertain the relative contribution of agricultural finance in total agricultural production in Nigeria as the quest for food security rages. Survey of literature indicated a positive correlation between funding agriculture and the sector's performance. This positive correlation between agricultural finance and total output in the agricultural sector was also affirmed in the study. A close observation of the trend of agricultural financing in Nigeria showed that the agricultural sector was grossly disadvantaged in terms of open market financing. This observation was read to have led the CBN to embark upon strategic financial interventions to boost the sector.

A major inference from the study was that, despite the fact that finance was found to aid agricultural production, the relative contribution of finance to total agricultural production in Nigeria was infinitesimal. This finding coincided with the actual situation in the country. More importantly, it was found that farm input, employment, productivity, and finance hardly explained 15.0 per cent of total agricultural output. Therefore, it was easy to conclude that agricultural production in Nigeria depended mainly on the natural resources, especially, weather conditions.

It is, therefore, recommended that financing for agriculture should be boosted for the goal of achieving food security to be met. However, because of the inherent peculiarities of that put the sector at a disadvantage in competitive financing, it is further recommended that the authorities intervene to support the sector directly as distinct from market means.

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