

## Back to the Land: The Impact of Financial Inclusion on Agriculture in Nigeria

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### **Abstract**

Can rural financial inclusion enhance agricultural growth? This study, using annual data over the period 1981-2014 and the ARDL bounds testing approach, captures the long run as well as the short-run dynamics of the relationship between financial inclusion and agriculture in Nigeria. The results show that usage of financial services has significant impacts on agriculture both in the short and the long run, meaning that for sustainable agricultural development in rural areas, improving financial inclusion is critical. On the contrary, access to finance has insignificant impacts on agricultural growth. The message is: While provision of access to finance to rural farmers could have many benefits, it is more important to consider the usage of the finance in the rural settings and its impact on rural outcomes that we care about. There is a need for more traditional and non-traditional financial service providers to go back to the land and innovate in the Nigerian agricultural space in order to boost financial inclusion in Nigeria while also substantially reducing poverty and stimulating agricultural growth.

**Keywords:** Financial Inclusion, Access to Finance, Usage of Financial Products.

**JEL Classification:** E52, Q14, D53.

### **1. Introduction**

“Most of the people in the world are poor, so if we knew the economics of being poor we would know much of the economics that really matters. Most of the world's poor people earn their living from agriculture, so if we knew the economics of agriculture we would know much of the economics of being poor” (Shultz, 1979).

Can rural financial inclusion enhance agricultural growth? Adeola is a peasant farmer from Ekiti in Nigeria. At 39 years, she is her

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family's only breadwinner and responsible for sustaining her senile father and five children. She lives in a mud house, which she cannot use as collateral and cultivates yam, cassava and maize. Her poor family consumes most of the produce, and the little that is not consumed is sold at low prices. Adeola earns \$1200-1500 per annum subject to the weather and her produce. In Nigeria, millions of poor farmers like Adeola live close to poverty and depend on agriculture for their means of sustenance.

The endogenous growth model emphasizes the role of finance. The benefits of an inclusive financial system are decline in the cost of capital, efficient allocation of productive resources, decline in informal sources of credit and expansion in the day-to-day management of finances (Sarma & Pais, 2008; Evans, 2015, 2016; Evans and Adeoye, 2016; Adeola and Evans, 2017a, 2017b; Evans and Lawanson, 2017). Notwithstanding the benefits of financial inclusion, it has been discovered that there are large populations of "people, potential entrepreneurs, small enterprises and others, who are excluded from the financial sector, which leads to their marginalisation and denial of opportunity for them to grow and prosper" (Rakesh, 2006: 1305).

In Nigeria, many lacks access to formal financial services. According to EFINA (2016: 1), in Nigeria in 2012, "34.9 million adults representing 39.7% of the adult population were financially excluded. Only 28.6 million adults were banked, representing 32.5% of the adult population... Billions of Naira circulate through the informal sector and this has a negative impact on the country's economic growth and development... 23.0 million adults save at home. If 50.0% of these people were to save N1,000 per month with a bank, then up to N138 billion could be incorporated into the formal financial sector every year."

The current level of financial inclusion and rural financial system in Nigeria cannot enhance far-reaching development of the rural and agricultural economy because a developed financial system is needed for agricultural investment (which is a key catalyst for job creation), enlarged productivity and higher incomes across the whole economy. For agriculture to significantly enhance the incomes of these rural poor, an eclectic range of financial services and products are necessary to diversify their means of sustenance, lessen hunger, and

eliminate poverty traps (Adeola and Evans, 2017a). For more inclusive social and economic development in rural areas, improving these smallholder farmers' access and usage of financing is critical.

Financial inclusion (both access and usage) is a requisite for agricultural growth. Financial inclusion, or 'banking the unbanked', is an ancillary tool to enable poor farmers to have more sustainable livelihoods. However, the financial service providers may not offer the much-needed financing for agriculture. Financial inclusion in a rural setting can be complex. In rural areas, the challenges of access and usage of financial products are larger than an urban setting. Rural populations are poor, mostly illiterates, more involved in the informal sector and sparsely distributed. For suppliers of financial services in Nigeria, therefore, the cost of rural operations is often too much which, when combined with the low returns and high risks, results in a low supply of financial services.

Consequently, the Nigerian Government, in a bid to increase financial inclusion in the country, has set an ambitious target of universal financial access by 2020. This ambition has brought many financial inclusion-driven initiatives into the agricultural sector such as Agricultural Credit Guarantee Scheme, Commercial Agricultural Credit Scheme and Nigeria Incentive-Based Risk Sharing System for Agricultural Lending. In 2009, The Central Bank of Nigeria (CBN), as part of its developmental role, partnered with the Federal Ministry of Agriculture and Water Resources and launched the Commercial Agriculture Credit Scheme in order to provide access to finance for Nigeria's agricultural value chain (i.e. production, processing, storage and marketing). In 2016, the Central Bank of Nigeria (CBN), the Bankers' Committee and the Federal Ministry of Agriculture and Rural Development raised a sum of N75billion as loan to Nigerian farmers, under the Nigerian Incentive-Based Risk Sharing in Agricultural Lending. This scheme guarantees 75% loans provided by commercial banks to farmers as part of efforts to marshal financing for Nigerian agribusinesses by integrating end-to-end agriculture value chains (i.e. farmers, input producers, industrial manufacturers, agro processors and agro dealers) with agricultural financing value chains (i.e. managing and pricing for risk, loan product development, loan origination, loan disbursement, and credit distribution).

There are several motivations for this study. Although many studies have evaluated financial inclusion as well as agriculture, to the best knowledge of the researcher, there is no empirical evidence available on the impact of financial inclusion on agriculture. Additionally, analyzing access and usage in a single study will provide deeper insights on whether there are any differences in their impacts on agricultural growth. As well, with the increasing number of initiatives to develop a financially inclusive economy in Nigeria, it would be worthwhile to assess the impact of financial inclusion on the agriculture sector of the Nigerian economy. By situating financial inclusion within the specific context of agriculture, we, therefore, provide solid and insightful evidence for policymakers.

## **2. Theory and Review of Literature**

Financial inclusion is defined as the provision of a wide range of financial services (e.g. loans, savings, deposits, insurance) to the poor who normally do not have access to such services. Financial inclusion can be crucial for the reduction of hunger and poverty (Chaddad, Cook and Heckelei, 2005; Evans and Lawanson, 2017). Financial inclusion is needed throughout the agricultural value chain to achieve broad-based economic growth which can raise incomes for low-income households. As well, diversification out of agriculture is important for economic growth. Access to financial services (including savings and other non-credit products) at the household level enables rural households to meet consumption and social demands (i.e. food, health care, school fees, and funeral expenses) without having to divert financing from investment opportunities (Chaddad et al., 2015; Adeola and Evans, 2017a).

Agricultural value chains tend to have seasonal financial needs due to the nature of crop and livestock maturing, and seasonal restrictions on fishing. In agriculture: “There is a period of investment in producing and then a period of selling within a cycle, which can range from weeks to several years. Farmers are often cash-constrained, limiting their ability to make improvements or upgrades. Firms in the value chain, such as inputs dealers, buyers, traders and processors typically need considerable working capital for inputs, buying crop for onward sale or processing, arranging transport and for other service

costs to produce and reach (distant) markets. With limited or no financial access, value chain actors face a zero-sum game in which investment and improvements at one level (such as production or inputs) can only be made at the expense of investments or improvements at another level (such as processing). As an example, some value chain firms (both buyers and inputs providers) provide advance payments or in-kind loans to producers or traders, limiting the capital available to them for their own investment and expansion. Thus, providing liquidity to such firms can have positive spillover effects for producers as well. Likewise, providing financial access directly to farmers can free up much needed capital for buyers to make the investments needed to expand operations or enter into new markets” (USAID, 2011: 2).

With a panel data econometric analysis of agricultural cooperatives’ investment behavior, Chaddad, Cook and Heckelei (2005) examines the presence of financial constraints in US agricultural cooperatives using the cooperative capital constraint hypothesis. The results show that availability of internal funds has significant effects on agricultural cooperatives’ capital expenditures. The results also show that the sensitivity of investment to cash flow is associated with cooperative structural characteristics.

USAID (2011: 1) emphasizes the linkage between the agricultural value chain, the non-farm enterprise, and the rural household. “The seasonal nature of cash needs and sources within these three entities and the fungible nature of cash make it imperative to think holistically about the ways that financial services can improve the efficiency and effectiveness of all three. By doing so, financial service providers and their partners have managed to introduce more flexible products and services that fit the needs of households, enable investment by these households as well as firms in the value chain, and thereby strengthen the competitiveness of value chains—while simultaneously lowering their own risk exposure”.

In India, Das, Senapati and John (2009) found that direct agriculture credit has a positive significant impact on agriculture output and the impact is instantaneous, while indirect agriculture credit has a positive significant impact on agriculture output, but with a year lag. Das et al. (2009) show that agriculture credit is a crucial

factor for agricultural production. On the contrary, Izhar and Tariq (2009) show that, during the post-reform period in India, institutional credit has no significant impact on agricultural production. Two studies, Banerjee Duflo, Glennerster and Kinnan (2014) from India and Karlan and Zinman (2009) from the Philippines show that microcredit has no significant positive impacts on the incidence of productive activities which increase incomes.

In Nigeria, Acha (2012) found that non-bank financial institutions' credit has a significant impact on the manufacturing/agricultural GDP. Obilor (2013) show that the Agricultural Credit Guarantee Scheme Fund and Government fund allocation to agriculture has a significant positive impact on agricultural productivity. Toby & Peterside (2014) show that commercial and merchant banks have dawdled in financing agriculture compared to manufacturing. Between 1981 and 2010, average bank credit to agriculture ranged between 9% and 10% while, to the manufacturing sector, it ranged between 32% and 37%. Toby & Peterside (2014) thus found a significantly weak correlation between commercial bank lending and the contribution of agriculture to GDP as well as a significantly positive correlation between merchant bank lending and agricultural contribution to GDP.

Summarily, many studies support the notion that financial inclusion is needed throughout the agricultural value chain to achieve broad-based economic growth which can raise incomes for low-income households. The effect of financial inclusion on agriculture, however, remains open to question. A number of important related issues have not yet been fully examined in the literature. None of these studies, for example, have addressed whether the usage of financial services has significant impacts on agriculture either in the short or long run. This study fills the gap.

### **3. Data Construction and Methodological Discussions**

#### **3.1 Data**

This study uses annual data over the period 1981-2014. Data for agriculture share of GDP, lending interest rate, broad money, outstanding loans from the financial sector to the agricultural sector and the number of banks in Nigeria are collected from CBN statistical bulletin. Data for GDP per capita is collected from the World

Development Indicators. Following the existing literature on financial inclusion, number of commercial bank branches per 1000 km<sup>2</sup> is used as a measure of access to finance while outstanding loans from the financial sector to the agricultural sector as % of GDP is used as measures of usage.

It is noteworthy that access to financial products and services is not synonymous with usage (Beck & Demirguc-Kunt 2008; Adeola and Evans, 2017a, 2017b; Evans and Lawanson, 2017). While access and usage are accepted measures of financial inclusion, usage is a superior measure. Financial inclusion is beyond access to traditional financial products such as payments, credit, savings and insurance; it encompasses both the breadth and depth of usage. This study, thus, employs both access and usage as measures of financial inclusion.

### **3.2 The ARDL Bounds Testing Approach**

The ARDL bounds testing approach, as developed by Pesaran, Shin and Smith (2001), has a number of benefits over the Johansen & Juselius (1990) cointegration method:

- i. It is applicable when the variables are a mix of I(0) or I(1).
- ii. It can measure both long-run and short-run effects at once (Bentzen & Engsted, 2001).
- iii. It is appropriate even for a smaller sample size (Ghatak & Siddiki, 2001)

In the ARDL bounds testing approach, the first step is the F-test for the joint significance of the lagged level variables (Saibu, Alenoghena, Evans and Tewogbade, 2016). We assume that  $H_0: \lambda_1 = \lambda_2 = 0$  is the null hypothesis of the non-existence of a long-run relationship against  $H_a: \lambda_1 \neq \lambda_2 \neq 0$  which is the alternative hypothesis of the existence of a long-run relationship. The null is accepted if the calculated F-statistic falls below the lower bound; the null is rejected, if the calculated F-statistic surpasses the upper critical bound.

The second step is the estimation of the short-run and long-run parameters of the error correction model:

The ARDL procedure is implemented thus:

$$\begin{aligned} \Delta AGRICULTURE_t = & \alpha_0 + \sum_{i=0}^q \alpha_1 \Delta AGRICULTURE_{t-i} + \sum_{i=0}^q \alpha_1 \Delta ACCESS_{t-i} \\ & + \sum_{i=0}^q \alpha_1 \Delta USAGE_{t-i} + \sum_{i=0}^q \alpha_1 \Delta MONEY_{t-i} + \sum_{i=0}^q \alpha_1 \Delta INTEREST_{t-i} + \sum_{i=0}^q \alpha_1 \Delta GDPC_{t-i} \\ & + \beta_1 AGRICULTURE_{t-1} + \beta_2 ACCESS_{t-1} + \beta_3 USAGE_{t-1} + \beta_4 MONEY_{t-1} \\ & + \beta_4 INTEREST_{t-1} + \beta_4 GDPC_{t-1} + ECT_{t-1} + \xi_t \end{aligned}$$

where AGRICULTURE is the log of agriculture share of GDP, INTEREST is lending interest rate, MONEY is the log of broad money, GDPC is the log of GDP per capita, ACCESS is the number of commercial bank branches per 1000 km<sup>2</sup> and USAGE is the log of outstanding loans from the financial sector to the agricultural sector as % of GDP. All variables are converted into natural logarithms for two reasons: one, to reduce heteroscedasticity and, two, because a log-linear specification, compared to simple specifications, provide efficient estimates.  $\alpha_0$  is the drift component;  $q$  the maximum lag length;  $\Delta$  the first difference operator; and  $\xi_t$  the white noise residuals. ECT is the error correction term.

#### 4. Empirical Findings

Firstly, since most macroeconomic variables have unit-root processes (Nelson & Plosser, 1982), it is in order to carry out a unit root test. The common unit root tests such as Augmented Dickey Fuller and Phillips Perron tests have the demerit of poor small-sample power often resulting in erroneous unit root conclusions. More powerful unit

Table 1: The Stationarity Test

Variable	KPSS		ERS	
	I(0)	I(1)	I(0)	I(1)
<i>AGRICULTURE<sub>t</sub></i>	0.660	0.215*	168.031	2.292**
<i>ACCESS<sub>t</sub></i>	0.658	0.140*	161.492	2.185**
<i>USAGE<sub>t</sub></i>	0.268*	0.174*	2.354**	1.604*
<i>MONEY<sub>t</sub></i>	0.671	0.153*	532.563	2.967**
<i>INTEREST<sub>t</sub></i>	0.256*	0.272*	11.876	1.900**
<i>GDPC<sub>t</sub></i>	0.453	0.212*	28.750	1.932**

Note: \*\* and \* denote statistical significance at the 5% and 1% level.

root tests such as Kwiatkowski, Phillips, Schmidt, and Shin (KPSS, 1992) and Elliott, Rothenberg, and Stock Point Optimal (ERS, 1996) are therefore used to test for the stationarity of the variables (Table 1).

Results clearly indicate that the variables are a mix of I(0) and I(1). According to Ouattara (2004), the bounds test approach is valid only when the variables are a mix of I(0) and I(1). Therefore, we can safely go ahead with the bounds test.

Table 2 shows the results of the bounds test. The calculated F-statistic exceeds the upper critical bound. Therefore, the null is rejected and the alternative hypothesis of the existence of a long-run relationship accepted.

Table 2: Bounds Test

Test Statistic	Value	k	Critical Value Bounds		
F-statistic	7.617667	5	Significance	Lower Bound	Upper Bound
			10%	2.26	3.35
			5%	2.62	3.79
			2.5%	2.96	4.18
			1%	3.41	4.68

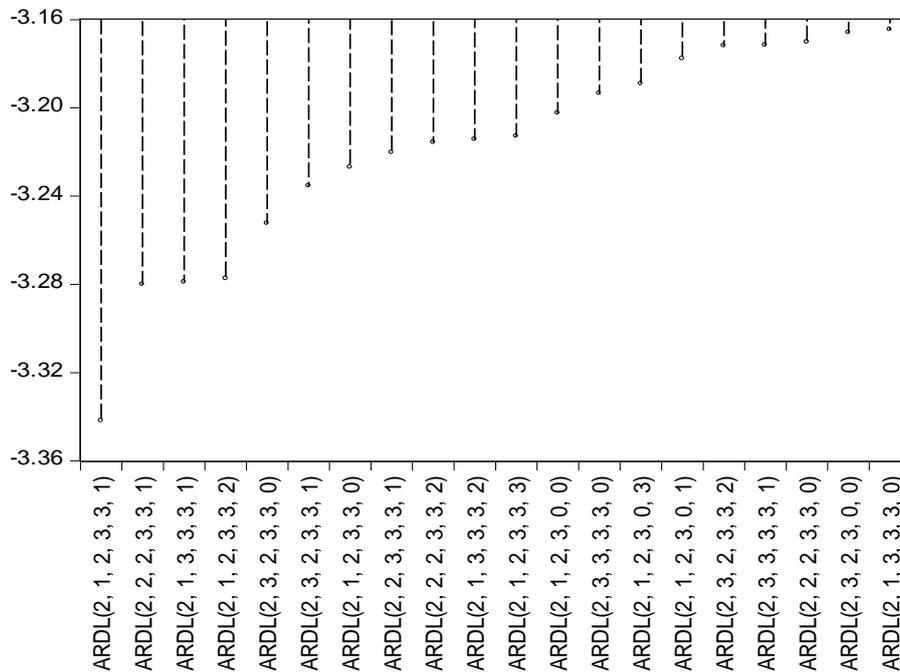


Figure 1: Top 20 Models (based on AIC)

Having established the existence of a long-run relationship, we then used the Akaike Information Criteria (AIC) for the model selection. In total, 2048 ARDL model specifications were considered. An ARDL(2, 1, 2, 3, 3, 1) was finally selected based on the AIC. Figure 1 shows how well some other specifications performed.

The next step is the estimation of the short-run and long-run parameters of the ARDL (2, 1, 2, 3, 3, 1) model. Table 3 shows the results of the long run coefficients for the ARDL (2, 1, 2, 3, 3, 1) model.

**Table 3: Estimated Long Run Coefficients for the ARDL (2, 1, 2, 3, 3, 1) Model**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACCESS	0.555146	0.439755	1.262398	0.2290
USAGE*	0.587164	0.155203	-3.783193	0.0023
MONEY*	0.898635	0.074488	12.064122	0.0000
INTEREST	-0.144392	0.278956	0.517614	0.6134
GDPC*	2.330563	0.439693	-5.300432	0.0001
C	6.699998	1.417426	4.726878	0.0004

Note: \* denote statistical significance at the 1% level.

The error correction representation of the above long run relationship, as shown in Table 4, captures the short-run dynamics of the relationship between financial inclusion and agriculture in Nigeria.

**Table 4: Error Correction Representation of the ARDL(2, 1, 2, 3, 3, 1) Model**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AGRICULTURE(-1))*	0.779191	0.182153	4.277673	0.0009
D(ACCESS)	0.332979	0.310444	-1.072589	0.3030
D(USAGE)**	0.135793	0.053531	-2.536710	0.0248
D(USAGE(-1))*	0.205581	0.063281	3.248700	0.0063
D(MONEY)	0.338242	0.249871	1.353670	0.1989
D(MONEY(-1))	-0.736836	0.446600	1.649877	0.1229
D(MONEY(-2))**	0.679166	0.263828	-2.574276	0.0231
D(INTEREST)	-0.009651	0.114541	-0.084255	0.9341
D(INTEREST(-1))	-0.000241	0.107266	-0.002251	0.9982
D(INTEREST(-2))**	-0.233309	0.101662	-2.294937	0.0390
D(GDPC)	0.594695	0.422649	-1.407067	0.1829
ECT(-1)*	-0.557817	0.119383	-4.672493	0.0004

Notes: - \*\* and \* denote statistical significance at the 5% and 1% level.

- Dependent Variable is D(AGRICULTURE).

Finally, to inspect the stability of the short run and long run coefficients in the model, CUSUM and CUSUMSQ plots are drawn. Figure 2 displays the plot of cumulative sum of recursive residuals while Figure 2 displays the plot of cumulative sum of squares of recursive residuals. Both CUSUM and CUSUMSQ are within the critical bounds of 5 percent. Therefore, it can be safely inferred that the model is structurally stable.

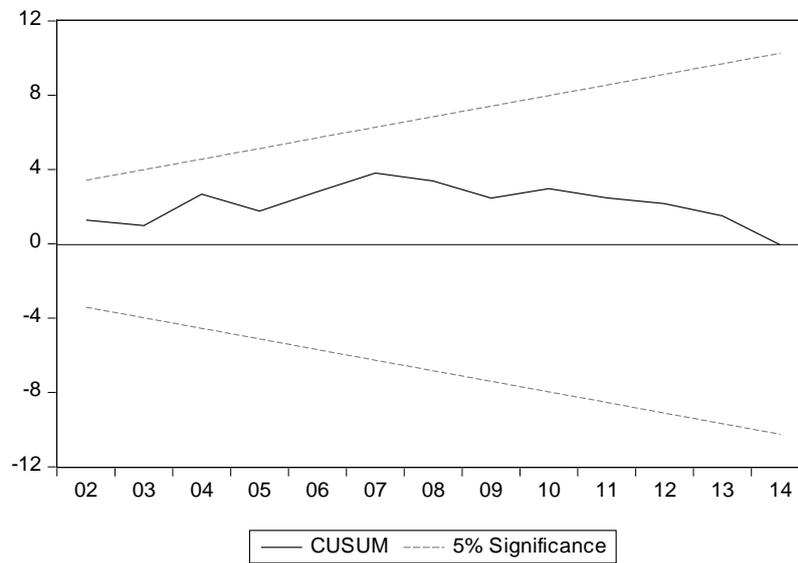


Figure 2: Plot of Cumulative Sum of Recursive Residuals

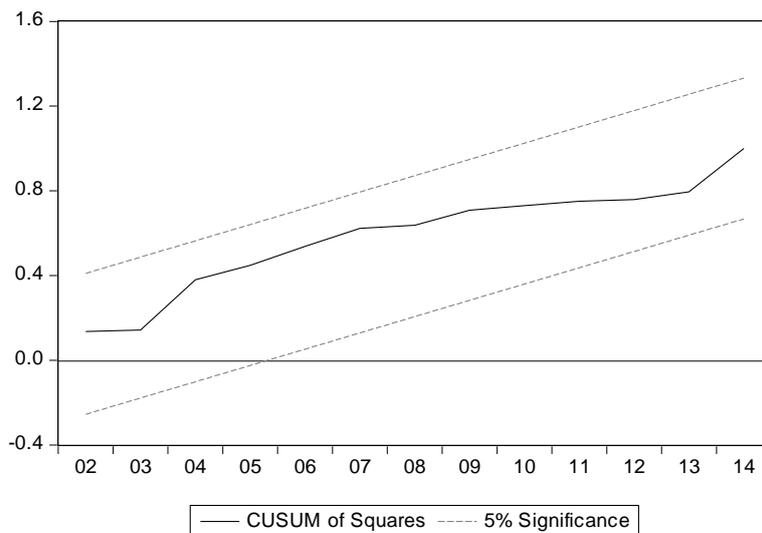


Figure 3: Plot of Cumulative Sum of Squares of Recursive Residuals

The results show that usage of financial services has significant impacts on agriculture both in the short and the long run. In other words, financial inclusions, in the form of usage of financial products, have significant impacts on agricultural growth in Nigeria. This finding is in line with Das et al (2009) which show that agriculture credit is a crucial factor for agricultural production in India; Acha (2012) which found that non-bank financial institutions' credit has a significant impact on the manufacturing/agricultural GDP in Nigeria; and Obilor (2013) which show that the Agricultural Credit Guarantee Scheme Fund and Government fund allocation to agriculture has a significant positive impact on agricultural productivity in Nigeria. On the contrary, the finding conflict with such studies as Izhar and Tariq (2009) which show that, during the post-reform period in India, institutional credit has no significant impact on agricultural production.

A statistically significant positive relationship is found between usage of financial products and agriculture which is logical because increase in the usage of financial services leads to increase in credit which ultimately leads to increase in agricultural production. That is, financial inclusion is an important driver of agricultural growth in Nigeria. For more inclusive social and economic development in rural areas, therefore, improving financial inclusion is critical. Thus, financial inclusion can enable poor farmers to have more sustainable livelihoods.

On the contrary, access to finance has insignificant impacts on agricultural growth both in the short and long run. This is not surprising because the financial service providers in Nigeria not offering the much-needed financing for agriculture. Financial inclusion in a rural setting can be complex. In rural areas, the challenges of access and usage of financial products are larger than an urban setting. Rural populations are mostly illiterates, poor, sparsely distributed and more involved in the informal sector. For suppliers of financial services in Nigeria, therefore, the cost of rural operations is often too much which, when combined with the low returns and high risks, results in a low supply of financial services as well as little access for the farmers. While banks can be of immense benefit to agriculture, they are usually concentrated in the cities far from the

rural farmers. As such, access to financial services for the rural farmers is minimal.

As well, money supply has significant impacts on agriculture both in the short and the long run. In other words, money supply has significant positive impacts on agricultural growth in Nigeria. Thus money supply is not neutral in determining agricultural incomes in Nigeria. Increase in money supply means increase in liquidity for farmers. Since the farmers are more involved in the informal sector, they deal in cash. This explains the significance of liquidity to the agricultural sector in Nigeria. This finding is in line with Dorfman and Lastrapes (1996) which show that money supply shocks have significant positive impacts on the agricultural sector in the United States. Hye (2009) found a long run relationship between money supply and agricultural prices as well as unidirectional causality from money supply to agricultural prices while, on the contrary, Orden (1986) shows that shocks to money supply have little direct impact on agriculture.

GDP per capita has significantly positive impact on agriculture in the long run but not in the short run. The more the income of the farmers, the more their agricultural scope and produce. A reasonable standard of living for the farmers can aid agricultural outcomes. It is also observed that interest rates are not significant in the long run but statistically significant in the short run. Interest rates can have significant impacts on agriculture by influencing the cost of borrowing, investment decisions and the value of the farmlands.

## **5. Summary and Policy Recommendations**

Can rural financial inclusion enhance agricultural growth? This study, using annual data over the period 1981-2014 and the ARDL bounds testing approach, captures the long run as well as the short-run dynamics of the relationship between financial inclusion and agriculture in Nigeria. The results show that usage of financial services has significant impacts on agriculture both in the short and the long run. On the contrary, access to finance has insignificant impacts on agricultural growth both in the short and long run. As well, money supply has significant impacts on agriculture both in the short and the long run. In other words, money supply has significant

positive impacts on agricultural growth in Nigeria. GDP per capita has significantly positive impact on agriculture in the long run but not in the short run interest rates is not significant in the long run but statistically significant in the short run.

Therefore, this study has established financial inclusion is an important driver of agricultural growth in Nigeria. For more inclusive social and economic development in rural areas, therefore, improving financial inclusion is critical. On the contrary, access to finance has insignificant impacts on agricultural growth. The financial service providers in Nigeria are not offering the much-needed financing for agriculture. For suppliers of financial services in Nigeria, the cost of rural operations is often too much which, when combined with the low returns and high risks, results in a low supply of financial services as well as little access for the farmers.

Moreover, while provision of access to finance to rural farmers has many benefits, it is essential to take a step back and consider the fact that usage is of more benefits. While banks may be ready to open new bank accounts for the farmers, they may be unwilling to start lending to them because of the difficulty of identifying the good borrowers. In fact, government-led rural credit programs often failed for the reason that the borrowers are unwilling to repay (Sarkar, 1999; Pradhan, 2013). As this study has established, merely providing access to finance to rural farmers is unlikely to boost agricultural outcomes. It is more important to consider the usage of the finance in the rural settings and its impact on rural outcomes that we care about.

Consequently, for Nigerian rural and agricultural populations to enjoy inclusive financial systems, financial service providers, donors and governments need to understand the needs (i.e. financial behavior and usage) of these rural populations, which is most often different from those of urban populations. The existing microcredit model in Nigeria, both as provided by cooperatives and microfinance institutions (MFIs), has many shortcomings which would need to be eliminated such as rigid repayment schedules and high-frequency instalments. According to Maitra et al. (2014), "Agriculture is a risky business, and most agricultural projects have relatively long gestation lags. For most cash crops, revenues are realized only three or four months after planting, and so if the loans are used for agricultural

working capital, borrowers must find other (costly) ways to keep up with their repayments.” Compulsory requirements such as group meetings and savings would need to be eliminated as well since these have been discovered to dishearten productive borrowers from joining in microcredit.

To intensify rural financial inclusion in Nigeria in a manner that boosts agricultural incomes, one approach is to transform the current microcredit model by building on the existing information in the hands of local agents about rural borrowers’ creditworthiness. These local intermediaries could be recruited to recommend borrowers and paid on the basis of the loan repayment behavior of the recommended borrowers. In turn, this would be an incentive to recommend only bankable borrowers and follow closely their loan repayment. At the same time, these intermediaries could assist farmers in production and marketing, thereby increasing their output and incomes. In order to encourage the use of these loans for agriculture alone, their disbursement and durations must be harmonized with crop cycles.

Trader-Agent Intermediated Lending (TRAIL) schemes, as designed and implemented in West Bengal, India by Maitra et al. (2017) in collaboration with an MFI, should be encouraged. In the TRAIL schemes, a trader/lender/shopkeeper, who has a recognized business and a large customer base within the village, act as the local intermediary. This local intermediary is recruited to recommend borrowers to the MFI and paid on the basis of the loan repayment behavior of the recommended borrowers. The interest rate on the loans is usually less than the average informal market rate. An agent can earn as much as 75% of the loan repayment as his commission. The benefits of the TRAIL scheme are: one, agents would only recommend the more productive and safer borrowers. Two, the scheme provide the rural borrowers an insurance against sudden low crop yields. Three, loans are flexible, the durations match cash crop cycles, and credit lines are related to previous loan repayments.

Moreover, there is a need for more traditional and non-traditional financial service providers to innovate in the Nigerian agricultural space. Considering the enormous potentials provided by the unbanked millions in the rural settings and the declining profitability of more advanced markets, innovation in delivery models, technology and

alliances (i.e. leveraging of existing relationships within the agricultural value chain such as buyers and sellers, co-operatives as well as farmers' associations) can boost agricultural development in Nigeria. These approaches have the potential to boost financial inclusion in Nigeria while also substantially reducing poverty and stimulating agricultural growth.

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