Determinants of Financial Inclusion among Agricultural Farmers in Adamawa State, Nigeria

Mohammed Arabo Nuru[1] and Babangida Adamu[2]
Economics Department, Adamawa State University Mubi,
Adamawa
Nigeria
[1]noarab.na@gmail.com [2]adamubabangida92@gmail.com

DOI 10.56201/ijebm.v10.no1.2024.pg212.226

Abstract
Financial inclusion, the ability to access necessary financial services, is substantially low in Adamawa state and particularly among rural farmers. These farmers are mostly faced with inadequate financial resources which are channeled through the formal sector. The study attempts to investigate the likely factors that inhibit agricultural farmers in the state from being financially included. A multi - stage sampling technique was used to obtain data from the sample. Logit regression was used for analysis. The findings revealed that 64.7% of the farmers have formal account and there is high degree of access to ATM and mobile/internet banking among account holders but very low degree of access to formal credit and farm insurance. It was also revealed that farmer's income, literacy level and being a man significantly increase the chances of having access to the components of financial inclusion. However, Age does not significantly determine financial inclusion. The study recommends that financial institutions should be flexible in the way they render financial products and services and make them available at affordable price. Financial literacy outreach should be intensified through schools and other training centers in order to reach the poor farmers in rural areas. Priority should also be given to female farmers in order to bridge the gender gap in access to financial products.

Keywords: *Financial Inclusion, Financial Exclusion, Rural Farmers, Financial Literacy*

Introduction

Financial inclusion refers to the ability of adults to access formal financial products or services at an affordable cost. The Central Bank of Nigeria defines it as a state where adults have easy access to a broad range of formal financial services. Globally, 1.4 billion adults are financially excluded in 2021, with majority living in Asia and Africa. 24% of the global adult population does not have access to formal financial services, with a substantial percentage in developing countries (World Bank, 2012).

Nigeria is among countries with the high percentage of financially excluded adults, with 26% of the adult population financially excluded. According to EFInA (2023) reports, financial exclusion rate in the Northeast is higher than the national average, with Adamawa state recording 44%. Majority of the financially excluded people lives in rural areas and they are mostly farmers and/or

women. This illustrates that there are huge disparities in the data. Despite being a mid-level player in the banking sector, Nigeria lags behind in financial inclusion. Factors such as income, physical access, financial literacy, affordability, and eligibility serve as barriers to financial inclusion (Enhancing Financial Innovation and Access [EFInA], 2023).

The Central Bank of Nigeria launched the National Financial Inclusion Strategy in 2012 to increase access to financial services such as payments, savings, remittances, pension, insurance, and credit at an affordable cost. The strategy aims to reduce financial exclusion from 39.7% in 2012 and targeted 25% in 2024. Key strategies include a simplified know-your-customer framework (KYC Framework), agent banking regulatory framework, national financial literacy framework, consumer protection framework, mobile-payments and "cash-less" policy initiative, establishing linkages between government and microfinance institutions, and introduction of credit enhancement schemes and programs like the Micro, Small and Medium Enterprises Development Fund (MSMEDF) (CBN, 2012).

Financial inclusion entails full access and usage of savings, payments, credit, insurance, and pension. It contributes to agricultural productivity by reducing credit constraints and promoting economic activities for farmers who were previously unable to utilize financial services. Enhanced financial inclusion reduces farmers' indebtedness and encourages faster development of the agricultural sector. Factors contributing to exclusion from the formal financial system include high borrowing and transaction costs, preference for short-term returns, absence of financial services or outlets in certain locations, inability to open accounts due to documentation requirements, adequate collateral, and high account maintenance charges.

The agriculture sector in Nigeria faces challenges such as high risk, complicated credit appraisal procedures, high transaction costs, and lack of understanding. The International Finance Corporation has developed the Nigeria Incentive-Based Risk Management System for Agricultural Lending (NIRSAL) to address these issues and provide technical assistance to banks for lending to agriculture. The Nigerian Bank of Agriculture, the largest development finance institution in Nigeria, is also mandated to lend to agriculture as a preferred sector.

Financial inclusion aims to extend financial services to the unbanked, improving living standards and leading to economic growth. Despite significant improvements in financial viability, profitability, and competitiveness, concerns have been raised that much-needed banking services have not reached a vast segment of the population, especially the underprivileged. The Nigerian government has made financial inclusion a priority, with a target of reaching full inclusion by 2020. This strategy is crucial for the Central Bank of Nigeria's objective of maintaining external reserves and safeguarding the international value of the Naira. Sustainable economic growth and development can only be achieved if all weaker sectors, including agriculture, productive sectors, financial sector, and small-scale industries, are nurtured, well-financed, regulated, supportive, and brought on par with other sectors.

Financial exclusion refers to the inability to access necessary financial services, often due to difficulties with access, conditions, prices, marketing, or self-exclusion. Nigeria is among the

countries with high financial exclusion, particularly in rural areas where farming is the main occupation. Poor financial resources hinder agricultural sector growth, leading to poorer agricultural practices and inadequate crop insurance. Agricultural financing, which provides farmers with financial resources to increase productivity, is driven by financial institutions, but most farmers are financially excluded, denying them access to these policies. This results in stagnant or declining agricultural productivity, inability to realize productivity improvements, and unrealistic government policies.

Financial exclusion can also lead to lower investment due to difficulties in gaining formal or informal credit, which is often exploitative. The lack of broad and easy access to financial services can lead to reduced agricultural productivity and a decline in agriculture's contribution to GDP growth. Therefore, addressing financial exclusion is crucial for agriculture's success. It is against this backdrop that this research intends to determine the level of financial inclusiveness of agricultural farmers in Adamawa state; identify the likely factors that inhibit agricultural farmers in the state from being financially included and examine the relationship between financial literacy and financial inclusion.

This research will inform state and federal governments about the financial inclusiveness of agricultural farmers in Adamawa State, aiding in policy formulation for inclusive growth and development. It will improve daily financial management and reduce informal credit sources. The study will also inform Adamawa State residents about financial exclusion and the need for financial literacy. It will also contribute to existing literature on determinants of financial inclusion. Following this introduction, the rest of the work is therefore organized as follows. The second part comprises of theoretical and empirical literatures. The third part provides some space to the methodology and the fourth part is results and discussion. Finally, the last part will be conclusions and recommendations.

Theoretical and Empirical Literature

Financial inclusion refers to the provision of financial products and services to vulnerable groups at an affordable cost, ensuring fair and transparent access by mainstream institutions (Chakrabarty, 2010). It is influenced by cultural, demographic, and socio-economic factors. The World Bank, United Nations, and Central Bank of Nigeria all define financial inclusion as providing access to credit, insurance, savings, and payments services for all (Migap et al., 2015; Bayero, 2014; Kodan & Chikara, 2013). Financial inclusion is not only accessibility but also the use of a full spectrum of financial services.

Financial exclusion, on the other hand, refers to processes that prevent certain social groups from accessing necessary financial services. Common barriers to financial inclusion include bank requirements, account terms, unemployment, low income, bank charges, lack of physical access, religious beliefs, lack of mobile banking, and lack of financial education (Onaolapo & Odetayo, 2012; Kempson, 2006). Financial literacy, the ability to make informed decisions regarding money use and management, plays a crucial role in facilitating participation in the formal financial sector (Bongomin, Ntayi, Munene & Nabeta, 2016; Chibba, 2009).

The four key pillars of financial inclusion are private sector development, financial literacy, microfinance, and public sector support. Financial sector development is crucial for growth and poverty reduction, but conventional wisdom has been wrong in focusing solely on institutional, regulatory, economic, and related dimensions. Financial inclusion initiatives can proceed simultaneously, although at a much faster pace than conventional financial sector development initiatives. Commercial banks, non-financial private sector, technology, mobile phones, information, and biometric technology are essential for financial inclusion. Financial literacy is crucial for facilitating the informed use of microfinance, promoting participation in the formal financial sector, and addressing mores that guide citizens' conduct in borrowing, spending, saving, and finance. Microfinance has a long and successful record in promoting financial inclusion, engaging both formal sector clients and those outside it. However, it is country-specific and takes time for universal acceptance. Innovative solutions from the private sector are being used to complement traditional microfinance based on the social banking model (Chibba, 2007, 2008a, 2008b).

Financial inclusion strategies are increasingly being implemented in many countries, with initiatives from financial regulators, governments, and the banking industry. Legislative frameworks, such as the US Community Reinvestment Act (1997), France's Law on Exclusion (1998) and the UK's Financial Inclusion Task Force (2005) have been implemented to improve the economic welfare of low-income groups. The Nigerian government has also prioritized financial inclusion, with regulatory reforms like the Central Bank of Nigeria's Micro-finance banking policy (2005) and new funding vehicles. Financial literacy is crucial for the poor, as it helps them become more informed financial decision-makers and educates them on financial issues and choices. Studies have shown a positive association between financial literacy and financial inclusion, suggesting that it influences the level of financial inclusion of poor households, providing greater control over their financial future and choices (Bongomin et al., 2016).

Onaolapo and Odetayo (2012) investigated the causes of financial exclusion in Nigeria and identified strategies for microfinance banks to survive in a global competitive environment. They concluded that micro finance banks can enhance savings in rural areas and survive in a globally competitive environment. Fungđĉovă and Weill (2012) found that higher income, better education, being man and older, and higher education significantly determine the use of formal accounts and formal credits in China. Income and education also significantly determine borrowing in Argentina. In Nigeria, Abdu, Buba, Adamu, and Muhammad (2015) analyzed the drivers of financial inclusion and its gender gap using The Global Findex 2011 dataset. The results showed that age, income quintile 5 (first richest), and education level positively and significantly determine having formal accounts and savings. Traditional factors like old age, being female, and poor income level may reduce the likelihood of being financially included, while youthful age, high income level, and secondary and tertiary education increase the chances of being financially included.

Oyelami, Saibu, and Adekunle (2017) investigated the determinants of financial inclusion in Sub-Saharan Africa using data from 2004 to 2015 for 26 Sub-Saharan African countries. They used depositors with commercial banks per 1,000 adults and borrowers from commercial banks per 1,000 adults as proxies for financial inclusion. Deposit and lending interest rate, number of ATM

users per 1000 adults and number of internet users per 1000 adults captured supply side factors of financial inclusion, while school enrolment and GDP per capita captured the demand side factors. Panel Autoregressive Distributed Lag (ARDL) was used to analyze the data. The results revealed that financial inclusion in the region is meaningfully influenced by both demand side factors (level of income and literacy) and supply side factors (interest rate and bank innovation proxy by ATM usage). However, using common factors as determinants of financial inclusion for all countries may not be suitable due to the differing structure of financial inclusion among countries.

Methodology

To realize the objectives, data were sourced from the respondents who are farmers via administering questionnaires which covers the objectives of the study. The population comprises of all agricultural farmers in the 21 local government areas of Adamawa state. The state is divided into four zones known as Agricultural Development Projects (ADP) Zones, namely, Zones I, II, III and IV. For ease of access and to make the sample representative, a multistage sampling technique was used in the selection of the farmers. The first stage involved the selection of agricultural zones. The second stage consist of purposive selection of two local government areas from each zone, except zone III where three local government areas were selected because of the large number of local governments in the zone. Finally, 60 farmers were selected from each selected local government which gave a total of 540 respondents from the nine local government areas.

Model Specification

Abdu et al. (2015) model was been adopted. The adopted model is as follows:

$$Fin = \beta_1 + \beta_2 age_i + \beta_2 agesqr_i + \beta_3 gender_i + \beta_4 income_i + \beta_5 edu_i + \mu_i \ldots\ldots\ldots (3.1)$$

The model has been modified to include bank proximity and awareness. The modified model is thus as follows:

$$FIN = \beta_0 + \beta_1 INC_i + \beta_2 LIT_i + \beta_3 GND_i + \beta_4 AGE_i + \beta_5 BNP_i + \beta_6 AWR_i + \mu_i \ldots\ldots\ldots\ldots\ldots (3.2)$$

Where: FIN stands for financial inclusion of the respondent in the study area.

INC = Annual Income of a farmer

LIT = Literacy level of a farmer: 1 = literate (above SSCE), 0 = otherwise (SSCE and below)

GND = Gender of a farmer: 1 = male, 0 = otherwise

AGE = Age of a farmer: 1 = youth age (18 - 41), 0 = otherwise (above 41)

BNP = Proximity of Bank to a farmer: 1 = If there is bank in the area the respondent lives, 0 = if otherwise

AWR = Awareness of a farmer on account opening 1 = If the respondent is aware, 0 = if otherwise

μ_i = Error term

β_0 = Constant

β_1, β_2, β_3, β_4, β_5, β_6= Coefficients of the independent variables

In addition, five components of financial inclusion have been used. The components are access to formal account (ACC), access to ATM (ATM), access to Mobile/Internet banking (MIB), access to formal credit (CRD) and access to farm insurance (INS). Each of these components was run separately on the five factors. The model can be re-specified for each of the components as follows:

$ACC = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \beta_6 AWR + \mu_i$……(3.3a)
$ATM = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \beta_6 AWR + \mu_i$……(3.3b)
$MIB = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \mu_i$……(3.3c)
$CRD = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \mu_i$……(3.3d)
$INS = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \mu_i$……(3.3e)

Where,

ACC = Access to Formal account: 1if the respondent is an account holder, 0 if otherwise

ATM = Access to ATM card: 1 if the respondent is an ATM user, 0 if otherwise

MIB = Access to Mobile/Internet banking: 1 if the respondent is a user of mobile / internet banking, 0 if otherwise

CRD = Access to Formal Credit: 1 if the respondent has accessed formal credit/loan, 0 if otherwise

INS = Access to Farm Insurance: 1 if the respondent has farm insurance, 0 if otherwise

Apriori Expectations

$$\beta_1 > 0;\ \beta_2 > 0;\ \beta_3 <> 0;\ \beta_4 < 0;\ \beta_5 > 0;\ \beta_6 > 0$$

In all the models, Income, Literacy, Bank proximity and Awareness are expected to have positive relationship with the components of financial inclusion. This is because the higher an individual's income the more likely he will be financially included. Also, an educated individual is more likely to be financially included than uneducated. Similarly, the closer an individual is to a bank the more likely he will have access to financial products and services. Likewise, the more aware an individual is the more likely he will access and used financial products and services. Age is expected to have negative relationship with financial inclusion components because the chances of having access to financial products and services are greater among the youths. Gender may have positive or negative relationship, therefore is undecided.

Method of Data Analysis

Binary Logit Regression Model was used to estimate equations 3.3a through 3.3e since the assumptions of OLS technique break down because of the discrete and dummy nature of the dependent variable (Greene, 2012). As such, equation for binary logit model can be derived for each of the equations.

$Log\left[\frac{\Pr(ACC_i)}{1-\Pr(ACC_i)}\right] = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \beta_6 AWR + \mu_i$...(3.4a)

Where: $\Pr(ACC_i)$ is the probability that a respondent will have access to formal account, while $1 - \Pr(ACC_i)$ is the probability of otherwise.

$Log\left[\frac{\Pr(ATM_i)}{1-\Pr(ATM_i)}\right] = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \beta_6 AWR + \mu_i$..(3.4b)

Where: $\Pr(ATM_i)$ is the probability that a respondent will have access to ATM, while $1 - \Pr(ATM_i)$ is the probability of otherwise.

$Log\left[\frac{\Pr(MIB_i)}{1-\Pr(MIB_i)}\right] = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \mu_i$……(3.4c)

Where: $\Pr(MIB_i)$ is the probability that a respondent will have access to Mobile/Internet banking, while $1 - \Pr(MIB_i)$ is the probability of otherwise.

$Log\left[\frac{\Pr(CRD_i)}{1-\Pr(CRD_i)}\right] = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \mu_i$……(3.4d)

Where: Pr$(CRD_i)$is the probability that a respondent will have access to formal credit, while $1 -$ Pr (CRD_i) is the probability of otherwise.

$$Log\left[\frac{\Pr\,(INS_i)}{1-\Pr\,(INS_i)}\right] = \beta_0 + \beta_1 INC + \beta_2 LIT + \beta_3 GND + \beta_4 AGE + \beta_5 BNP + \mu_i \ldots\ldots\ldots\ldots\ldots (3.4e)$$

Where: Pr(INS_i) is the probability that a respondent will have access to formal insurance, while $1 -$ Pr(INS_i) is the probability of otherwise.

Results and Discussions

The analysis of the data is based on the number of questionnaires validly filled and successfully returned. Out of the 540 questionnaires distributed to nine selected local governments, 357 were properly filled and returned. Thus, the analysis is based on the 357 valid questionnaires. Moreover, the presentation and analysis of data are done on the basis of the research objectives.

4.1 Distribution of respondents based on Gender, Age and Qualification

Table 4.1: Sex, Age and Educational Qualification of farmers in Adamawa State

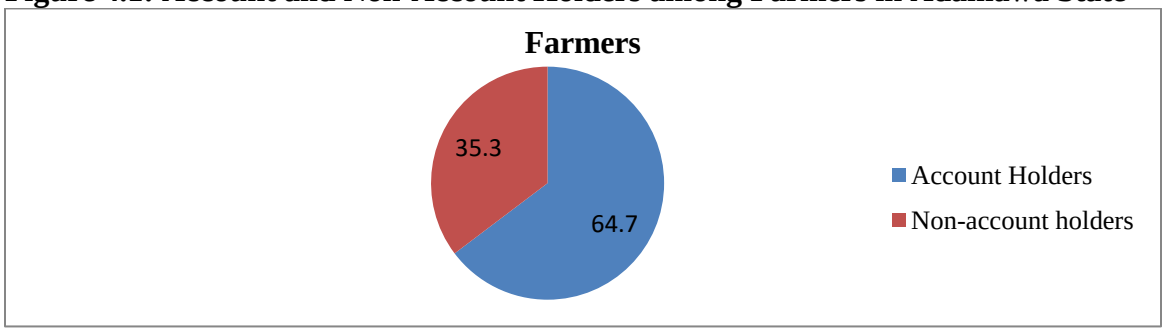
		Frequency	Percentage (%)
GENDER	Male	231	64.7
	Female	126	35.3
	TOTAL	**357**	**100**
AGE	18 – 25	55	15.4
	26 – 33	71	19.9
	34 – 41	82	23
	42 – 49	89	24.9
	Above 49	60	16.8
	TOTAL	**357**	**100**
Highest Qualification	Informal	49	13.7
	Primary School	27	7.6
	SSCE	87	24.3
	Diploma/NCE	147	41.2
	HND/BSc	15	4.2
	MSc	32	9
	TOTAL	**357**	**100**

Source: Field Survey (2023)

Table 4.1 reveals the gender, age and educational qualifications of the respondents with 64.7% male and 35.3% female. This indicates that male engages more in farming than female. In terms of age variation, 58% of the respondents fall within the youth age group (18 – 41) while 42% constitute those who are above 41. This implies that there is much engagement of young people who are strong and energetic in the farming occupation in the state. The highest proportion of the farmers, 41.2%, has Diploma/NCE followed by 24.3% with SSCE and 7.6% with first school leaving certificate. Only 4.2% of the farmers have HND/BSc while 9% has MSc. It also shows that more than half (54.4%) of the sampled farmers have post-secondary education while 13.7% has no formal education.

4.2 Financial Inclusiveness of Farmers in Adamawa State

Figure 4.1: Account and Non-Account Holders among Farmers in Adamawa State



Source: Field Survey (2023)

Figure 4.1 shows the percentage of farmers who own a formal account or otherwise. It reveals that 64.7% of the farmers have a formal account with banks while 35.3% do not. Although, this shows that a larger proportion of the farmers have a formal account but it does not tell whether or not they have access to other financial products. Thus, the degree of their access to and usage of other financial products is further presented below.

Table 4.2: Access to Financial Products among Farmers in Adamawa State

Financial Products	Frequency	Percentage(%) of	
		Account Holders only	All Farmers
Account	231	100	64.7
ATM Card	221	95.7	61.9
Mobile/Internet Banking	204	88.3	57.1
Credit/Loan	47	20.3	13.2
Farm Insurance	58	25.1	16.2

Source: Field Survey (2023)

Table 4.2 shows that 95.7% of account holders among the farmers have access to ATMs while 88.3% have access to mobile/internet banking. This corresponds to 61.9% and 57.1% of all the farmers respectively. This indicates that only 4.3% of the account holders do not have ATM cards and 11.7% do not use mobile/internet banking. This means that there is high usage of ATM and mobile/internet banking among the farmers. The table further shows that, only 20.3% of account holders among the farmers have obtained formal credit or loan while 25.1% have farm insurance.

This is equivalent to 13.2% and 16.2% of the entire farmers in the study area respectively. This indicates that majority of the farmers who have an account, do not have access to formal loan nor farm insurance.

4.3 Factors Hindering Farmers from Financial Inclusion in Adamawa State

Table 4.3: Constraints to Accessing the Components of Financial Inclusion by Farmers

Factors	ACC		ATM		MIB		CRD		INS	
	Freq.	(%)	Freq.	(%)	Freq.	(%)	Freq.	(%)	Freq.	(%)
Bank charges	-	-	1	10	11	41	-	-	-	-
Fear of the risk involved	-	-	3	30	5	19	24	13	15	9
High interest rate	-	-	-	-	-	-	65	35	-	-
Inability to meet requirements	27	21	-	-	-	-	42	23	38	22
Lengthy processes	13	10	-	-	-	-	-	-	16	9
Loans do not match with crop season			-	-	-	-	20	11	-	-
Low income	35	28	-	-	-	-	-	-	-	-
No awareness	14	11	1	10	3	11	-	-	65	38
No bank in the area	20	16	-	-	-	-	-	-	-	-
Religious or cultural belief	8	6	-	-	-	-	32	17	-	-
Transactions are not often	-	-	4	40	6	22	-	-	-	-
Others	9	7	1	10	2	7	1	1	39	23
Total	126	100	10	100	27	100	184	100	173	100

Source: Field Survey (2023)

Table 4.3 revealed the factors hindering farmers from having access to the five (5) components of financial inclusion which are access to account (ACC), access to ATM (ATM), access to mobile/internet banking (MIB), access to formal credit/loan (CRD) and access to farm insurance (INS). Out of the 126 non-account holders, 28% identified low income while 21% identified the inability to meet banks requirements as the reasons for their exclusion. To 16% of the non-account holders, their remoteness to banks is the reason for their exclusion while 11% lack awareness and 10% felt that the processes and procedures for opening an account are lengthy. This indicates that inability to meet requirements and low income are the main reasons that they do not have formal account. This is supported by Kempson (2006) who mentioned some of the common barriers to

financial inclusion, though he is of the view that the reasons could vary from country to country, but there are factors which are common. Moreover, EFInA (2023) reported little or irregular income, lack of proximity to banks and lack of jobs as the predominant barriers to having an account. Among the 27 who do not use mobile/internet banking, 41% identified bank charges as a factor hindering them from accessing mobile/internet banking while 22% felt that their transactions are not often, hence, the use of mobile/internet banking is not necessary.

As reported in table 4.2, majority of the farmers who have an account, do not have access to formal loan nor farm insurance with the percentage standing at 79.7% and 74.9% respectively. The main factor responsible for their inaccessibility of formal loan is high interest. That is, 35% perceived that the interest charged on loans is high, 23% are unable to meet the requirements for accessing formal loan while 17% are constrained by their religious or cultural beliefs. Additionally, 11% felt that the loans release does not match with crop season. As for farm insurance, 38% have no awareness regarding farm insurance, 23% are unable to meet requirements and 9% are afraid of risk. This indicates that high interest, lack of adequate information and rigorous requirements are the main factors hindering access and usage of loan and farm insurance.

4.4 Estimated Logit Models for Financial Inclusion in Adamawa State

Table 4.4: Estimated regression results for logit models

	ACC	ATM	MIB	CRD	INS
Constant	−6.686***	−6.003***	-3.951***	-4.393***	-3.962***
	(0.984)	(0.880)	(0.473)	(0.665)	(0.632)
Regressors:					
Income	7.01×10^{-6}***	5.23×10^{-6}***	1.59×10^{-6}***	5.76×10^{-7}**	5.67×10^{-7}***
	(1.38E-06)	(1.15E-06)	(5.67E-07)	(2.24E-07)	(2.17E-07)
Literacy	1.581***	1.506***	1.591***	1.542***	0.478
	(0.396)	(0.359)	(0.320)	(0.537)	(0.381)
Gender	1.691***	1.234***	1.351***	0.829*	0.155
	(0.414)	(0.369)	(0.327)	(0.453)	(0.355)
Age	−0.105	0.010	0.322	-0.011	0.337
	(0.414)	(0.375)	(0.327)	(0.343)	(0.307)
Bank Proximity	2.331***	1.959***	2.730***	0.591	1.762***
	(0.476)	(0.438)	(0.402)	(0.597)	(0.637)
Awareness	3.144***	2.922***	-	-	-
	(0.772)	(0.739)			

***Significance at 1% level **Significance at 5% level *Significance at 10% level
Source: Author's computation using EViews 10.

Income (INC) is statistically significant in determining all the components of financial inclusion as indicated by the probability value, and also has the expected positive sign. As income increases, the value of the logit increases perhaps due to the risk of keeping money at home and frequent transactions which may in turn require the use of mobile or internet banking. Also, as farmer's income increases the need for investing more and engaging in large scale farming that may require

insurance increase as well. It is also a fact that high income earners owned formal account than low income earners. This signifies that as farmers' income increase they are more likely to possess an account, obtain an ATM card, use mobile/internet banking, access formal credit and insurance.

Literacy (LIT) is statistically significant at 1% level in determining the components of financial inclusion and positively signed as expected. This indicates that educated farmers are more likely to have a formal account, have ATM card, and have used mobile/internet banking in their transactions, perhaps due to the fact that they are more financially literate. Also, increase in the educational level of a farmer makes him more likely to obtain formal credit/loan perhaps due to the formal education attained. However, the coefficient of literacy against insurance is not statistically significant meaning that it does not determine the odds of having farm insurance. This implies that educational level of a farmer does not make him/her more or less likely to acquire insurance.

Proximity of farmers to banks (BNP) is statistically significant with corresponding probability values of <0.0001.This implies that farmers living in an area where banks are located are more likely to have an account, have ATM card, use mobile/internet banking and access insurance. This is perhaps due to the short distance, short transportation period and low cost of transportation. This implies that proximity of farmers to banks increase their likelihood of having access to of financial inclusion. But Bank Proximity is not statistically significant in determining formal credit as a component of financial inclusion. It indicates that proximity of a farmer to banks does not increase the likelihood of accessing formal credit.

Gender (GND) is statistically significant as indicated by the probability value and has a positive sign. It indicates that male farmers are more likely to have access to financial inclusion. This implies that being male increases the chances of having an account, having an ATM card, using mobile/internet banking in transactions and obtaining formal credit. This is in conformity with the EFInA's report on financial inclusion that men are more financially included than female with figures of 79% for males and 70% for females. However, gender does not increase the odds of having access to insurance because its probability value against insurance is not statistically significant.

Awareness as a factor that determines financial inclusion was tested against two components; access to account and access to ATM card. The result revealed that as farmers' awareness increase their probability of having account and ATM cards increase as well. They are more likely to open account and have ATM cards perhaps due to the informed benefits of having an account and convenience of transacting with ATM cards.

The coefficients of Age as a determinant of access to account, access to ATM, and access to mobile/internet banking, formal credit and farm insurance are not statistically significant, indicating that Age does not increase the likelihood of having access to these components. This implies that Age do not determine the components of financial inclusion as indicated by the probability values.

Summary of Findings

The study reveals that 64.7% of the farmers have formal account while 35.3% do not have a formal account. This indicates that high proportion of the farmers are financially included but the figure is still lagging behind in terms of reaching the National Financial Inclusion Strategy target of reducing the proportion of adults that are financially excluded to 25% by 2024. Financial inclusion does not entail having a formal account alone; there are other components of financial inclusion that are important and whose access and usage vary even among the financially included persons. The study showed that there is high degree of access to ATM and mobile/internet banking among account holders but very low degree of access to formal credit and farm insurance. Only 20.3% and 25.1% of the account holders have access to formal credit and farm insurance respectively.

The study also identified the likely factors that are responsible in hindering farmers from financial inclusion. Inability to meet requirements, low income and remoteness of some farmers to banks are identified as the main factors that hinder them from having a formal account. Other factors include lengthy processes of account opening and lack of information on the account opening. Formal credit and farm insurance are the two financial products that have very low access and usage. This poor access and usage is largely linked to high interest and inability to meet requirements by the farmers. Other contributing factors are fear of risk, religious or cultural beliefs and lack of awareness. Thus, high interest and rigorous requirements are the main factors that hinder access and usage of formal credit and farm insurance. This corresponds to the view of Kempson (2006) who identified high interest and rigorous requirements as some of the reasons why people are financially excluded.

The study revealed that farmers income increase their chances of having access to all the components of financial inclusion. Increase in income may lead to increased transactions such as payments and transfer which is easier with the use of mobile and this in turn increase the use of mobile/internet banking. With higher income farmers are able to engage in large scale farming that might necessitate insurance. Moreover, literacy increases the likelihood of financial inclusion components such as account, ATM card, mobile/internet banking and formal credit. Educated farmers can accommodate bank innovations without difficulty and are more financially literate. The result further shows that male farmers are more likely to have a formal account, ATM card, obtained formal credit, accessed and used mobile/internet banking in their transactions than female farmers. Thus, being a man increases the chances of being financially included.

It was also revealed that as proximity of farmers to banks and awareness increase, they will be more likely to open formal accounts and have ATM cards. This means that living in areas where banks are located and having adequate information determine the accessibility of accounts and ATM cards. It was expected that farmers who live far from banks will be more likely to use mobile/internet banking that those who are closer. But the result indicates that the closer to the banks the farmers are the larger the probability that they use mobile/internet banking. This shows that in using mobile/internet banking there is no difference among farmers who live in areas with banks and areas without banks. However, formal credit is not determined by age and banks proximity. Additionally, increase in proximity of farmers to banks makes them more likely to have farm insurance. Age did not show any significance in determining access to all the components of financial inclusion.

Summary

The study examined the determinants of financial inclusion among agricultural farmers in Adamawa state, Nigeria. The study sought to assess the level of financial inclusion among farmers in Adamawa state. Other objectives include identifying the likely factors that hinder agricultural farmers in the study area from being financially included; and ascertain the relationship between financial literacy and financial inclusion in Adamawa state. The study used multi-stage sampling and obtained primary data from nine local governments selected based on four agricultural zones in the state. Financial inclusion has been expressed in terms of five components which are access to formal account, access to ATM, access to Mobile/internet banking, access to formal credit and access to farm insurance. These components were expressed as functions of income, literacy, gender, age, bank proximity and awareness using Binary Logit model and were analyzed using binary logit regression analysis.

The result indicates that significant portion of the farmers (65%) has formal account. There is high degree of access to ATM and mobile/internet banking among account holders but very low degree of access to formal credit and farm insurance. From the research, it was identified that inability to meet requirements and low income and remoteness from banks are the likely factors that hinder farmers from having a formal account. Formal credit and farm insurance are mostly hindered by high interest and inability to meet requirements by the farmers. Other factors include unavailability of banks in their areas, religious or cultural beliefs and lack of adequate information.

Moreover, the study found out that all the components of financial inclusion have a significant positive relationship with farmer's income. All the components but farm insurance have a significant positive relationship with literacy and gender. Literacy and gender showed an insignificant relationship with farm insurance. Bongomin et al. (2016) also found that financial literacy positively and significantly affects financial inclusion. All the components except formal credit had shown a positive and significant relationship with bank proximity. Formal credit showed an insignificant relationship with bank proximity. All the components showed insignificant relationship with age. Awareness was included in the models for access to formal account and access to ATM respectively, and was found to have a positive and significant relationship.

Conclusion and Recommendations

The findings from the study revealed that significant portion of the farmers (64.7%) has formal account. Access to ATM and mobile/internet banking among account holders is significantly high while access to formal credit and farm insurance is significantly low. The likely factors that hinder farmers from accessing these financial products and services are mainly low income, inability to meet requirements and high interest. Other contributing factors include lack of proximity to banks, fear of risk, religious or cultural beliefs and lack of awareness. The study further established a significant positive relationship between farmers' income and access to financial inclusion. Farmers' literacy and gender also showed a significant positive relationship with financial inclusion; however, access to farm insurance showed an insignificant relationship. Proximity to banks significantly determines financial inclusion but insignificantly determines formal credit. Age does not significantly determine financial inclusion. In particular farmers' awareness significantly determines access to formal account as well as access to ATM. From our study we can draw a number of recommendations as follows.

1. Although substantial percentage of the respondents is financially included, the financial exclusion of 35.3% is still far behind the 2024 National Financial Inclusion Strategy (NFIS) target of reducing financial exclusion to 25%. Efforts should therefore be intensified through different strategies so as to meet the target by the end of year 2024. Priority should be given to female farmers so as to bridge the gender gap in access to financial products.
2. There is need to increase access to a wide range of financial products among farmers to include formal credit and farm insurance. Financial institutions should therefore be flexible in the way they render those financial products and services and make them available at affordable price. Government should encourage lending agencies to prioritize farmers in the rural areas.
3. Financial literacy advocates and policy makers should intensify financial literacy outreach through schools and other training centers in order to reach the poor farmers in rural areas. This will enable them develop financial knowledge and skills towards making wise financial decisions and access financial services. This will go a long way in promoting financial inclusion especially in the rural areas.

REFERENCES

Abdu, M., Buba, A., Adamu, I. & Muhammad, T. (2015). Drivers of Financial Inclusion and Gender Gap in Nigeria. *The Empirical Econometrics and Quantitative Economics Letters*, *4*(4), 186 – 199.

Bayero, M. A. (2015). Effects of cashless economy policy on financial inclusion in Nigeria: An exploratory study. *Procedia - Social and Behavioral Sciences 172*, 4–56. http://dx.doi.org/10.1016/j.sbspro.2015.01.334

Bongomin, G. O. C., Ntayi, J. M., Munene, J. C. & Nabeta, I. N. (2016). Financial inclusion in rural Uganda: Testing interaction effect of financial literacy and networks. *Journal of African Business*, *17*(1), 106-128. http://dx.doi.org/10.1080/15228916.2016.1117382

Central Bank of Nigeria (2012). National Financial inclusion Strategy. Abuja: Central Bank of Nigeria (CBN).

Chakrabarty, K. C. (2010). Inclusive Growth-Role of financial sector. *Paper presented at the National Finance Conclave*, Bhubaneswar- Orissa, India. November 27th.

Chibba, M. (2007). Monetary policy, governance, and economic development: The Botswana experience. *World Economics 8* (3), 111–129.

Chibba, M. (2008a). Poverty reduction in developing countries: No consensus but plenty of solutions. *World Economics 9*(1): 197–200.

Chibba, M. (2008b). Financial Inclusion and Development: Concepts, Lessons Learned and Key Pillars. Mimeo.

Chibba, M. (2009). Financial inclusion, poverty reduction and the Millennium Development Goals. *European Journal of Development Research 21*, 213 – 230. Retrieved on 5th January, 2018 from http://dx.doi.org/10.1057/ejdr.2008.17

Demirguc-Kunt, A., Klapper, L., Singer, D., and Oudheusden, P. V. (2015). *The Global Findex Database: Measuring Financial Inclusion around the World.* Washington, DC: World Bank.

Enhancing Financial Innovation and Access (EFInA) (2023). Access to Financial services in Nigeria, 2014 Survey. Retrieved on 2nd February, 2018 from https://www.google.com/search?q=EFIna+2023+report+pdf&oq=EFIna+2023+report+pdf&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIKCAEQABiABBiiBDIKCAIQABiiBBiJBdIBCTQ2NTIyajBqN6gCALACAA&client=ms-android-transsion-infinix-rev1&sourceid=chrome-mobile&ie=UTF-8

Fungáčov, Z., and Weill, L. (2012). *Understanding financial inclusion in China.* Helsinki: Bank of Finland, Institute for Economies in Transition (BOFIT).

Greene, W. H. (Ed.). (2012). *Econometric Analysis*. Boston, MA: Pearson/Prentice Hall.

Kempson, E. (2006). Policy level response to financial exclusion in developed economies: Lessons from developing countries. A Paper for Access to Finance: Building Inclusive.

Kodan, A. S. & Chhikara, K. S. (2012). Status of financial inclusion in Haryana: An evidence of commercial banks. *Management and Labour Studies*, *36*, 247.

Migap, J. P., Okwanya, I. & Ojeka, G. (2015). Financial inclusion for inclusive growth: the Nigerian Perspective. *International Journal of Information Technology and Business Management, 37*(1), 1-8.

Oyelami, L. O., Saibu, O. M. & Adekunle, B. S. (2017). Determinants of financial inclusion in Sub-Sahara African countries. *Covenant Journal of Business & Social Sciences (CJBSS), 8*(2), 104-116.

Onaolapo, A. A. & Odetayo, T. A. (2012). Financial inclusion as tools for survival in globally competitive environment: Lessons for Nigerian Microfinance Banks. *American Journal of Business and Management, 1*(4), 241-24.

World Bank. (2015). Financial Inclusion: Achieving Universal Financial Access by 2020 (Overview). www.worldbank.org/en/topic/financialinclusion/brief/achieving-universal-financialaccess-by-2020

World Bank (2022). The Little Data Book on Financial Inclusion 2022. World Bank, Washington , Dc. http://hdl.handle.net/10986/38148

Acknowledgment

The research team wishes to acknowledge the financial support provided by the Tertiary Education Trust Fund (TETFund) through the Institutional Based Research (IBR) grant. The Grant number is TEFT/DR&D/UNI/MUBI/RG/VOL.1. We also thank the Adamawa State University and the Research and Innovation Directorate for their support.