Agro-Financing, Institutions and Poverty in Low-Middle income African Countries

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Abstract: The study examined the impact of institutions and agro-financing on poverty reduction in Africa's low- and middle-income countries. Pooled OLS analysis and Random effects method were applied to the data sourced from World Development Indicators (WDI), Food and Agriculture Organization (FAO), Africa Country Policy and Institutional Assessment (CPIA) from 2005 to 2020. Consequently, the study found that institutions, agricultural land, agriculture credit are negatively significant to poverty in low and middle-income African countries. In addition, it showed that technology is negatively significant to poverty reduction in low and middle-income African countries. Other variables included in the model – agricultural employment and crop production. The study concludes that the policymakers in low-middle income African countries should embark on development of quality institutions and proper financing of the agricultural sector in order to bring about reduction of poverty in those countries.

Keywords: Agriculture; Institutions; Poverty; Technology; Credit to Agriculture

JEL Classification: N5

1. Introduction

Africa has the highest poverty rates and limited employment opportunities globally (Human, 2021; Obiakor *et al*. 2021; Obiakor *et al*. 2022: Aderemi *et al*. 2020). Poverty is generally viewed as the condition in which a person or community are limited to the monetary resources and essentials for the lowest living standard. According to statistics, poor people in Africa rise just as the population increases. Therefore, various organizations have put out the meaning of poverty. According to World Bank, any individual living below the current international poverty line set at $1.9 a day is considered poor. Poverty is a distinct deprivation in well-being and comprises many dimensions, including low incomes and the inability to acquire the necessary goods and services for survival with dignity. Significant dimensions of poverty include economic, social, political, psychological, and legal poverty. Poverty can further be broken down into absolute poverty and relative poverty.

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Absolute poverty, which is often synonymous with "extreme poverty or abject poverty," compares income against the amount needed to meet basic needs; it is a condition characterized by severe deprivation of basic human needs (food, shelter, health, education, information safe drinking water, etc.). On the other hand, relative poverty measures a person's inability to meet the minimum standard of living compared to others at the same place and time; it views poverty as social circumstances. Agricultural finance has been said to be the study of financial mediators who provide loanable funds for agricultural production and financial markets in which these intermediaries obtain their loanable funds (Penson and Lins, 1990). As said earlier, the agricultural sector accounts for over 50% of the labor force and a significant percentage of Africa's Gross Domestic Product (Opele *et al.*, 2022: Aderemi *et al.*, 2021: Osabohien *et al.*, 2020; Matthew *et al.,* 2019).

Institutions comprise various factors that determine customs, habits, and different decisions taken by individuals, business entities, organizations, and the state. Institutions include social networks, gender roles, legal systems, politico-administrative systems, and the state. The role of institutions in society is to reduce uncertainty by establishing stable relations between individuals. Institutions are necessary factors for the long-term functioning of economic systems, and institutional boundaries influence the formation and development of various communities and organizations. Institutions have been said to be humanly-devised constraints that structure political, economic, and social interaction, according to North (1991). While 'Institutionalism" is a stable environment of social agreements, norms, contracts, and motives of behavior established in the country (Veblen, 1934). The importance of institutions cannot be overemphasized in this work. Institutions can contribute to the reduction by developing forums, programs, access to arable land that can empower subsistence farmers, and the likes in the development of agricultural activities. Technological innovation and institutions' inputs are recently major contributors to farm productivity and reduction in poverty in Africa.

The contributions of these variables to poverty reduction would be examined proceeding in this literature. The rest of the paper is captured as follows; the next section dwells on literature covering institutions, agricultural finance, and poverty. The third section deals with the data description and methods of analysis, while section four presents' results and discussions of findings. The last section concludes and provides policy implications.

2. Literature Review

2.1. Institutions and Crop Productivity

There have been various views and definitions on institutions depending on the context it is being used in. Rodriguez-Pose (2013) stated that providing a precise description of an institution has been rather tricky as each definition depends on the research topic. Davis and North (1971) stated an institution as fundamentally political, social, and legal ground rules that govern economic and political activity. He further portrayed institutions as humanly devised, constraints that structure political, economic, and social interaction (North, 1991). North restated his institution description in 1994, where he stated it as rules, norms, and customs and their method of enforcement that control human and firm behavior, up until the early 2000s where he eventually settled to define institutions as laws that reduce uncertainty in human interaction (North, 2005). Institutions were further broken down into formal institutions or rules as stated by North, including: constitutions, laws, property rights, and informal institutions or constrains such as: sanctions, taboos, customs, traditions, and codes of conduct (North, 1991). Formal and Informal rules and constrains can be harmonizing, opposing, or overlapping.

Glaeser, La Porta, Lopez-de-Silanes, & Shleifer (2004) examine whether political institutions cause economic progress or if growth and human capital accumulation contribute to institutional reform. The basic OLS estimate was applied using variables like ethnolinguistic fractionalization of the population and ICRG measures of institutional quality. It revealed that human capital is a more fundamental source of growth than institutions. Developing countries rise out of poverty through sound policies, typically followed by dictators, and strengthen their political institutions.

Obinska-Wajda (2016) demonstrates that NIE is a multidisciplinary field that includes economics, law, organization theory, political science, sociology, and anthropology. This study shows New Institutional Economics to adopt three theories – Agency Theory, Property Rights Theory, and Transaction Costs Theory. It then goes over some examples of empirical investigations related to these theories. According to this study, NIE and its views are not merely theoretical assumptions but also have a lot of practical implications.

Agricultural Finance and crop productivity – The agricultural sector plays an essential role in all African economies, contributing to poverty reduction, job development, and diversification (NEPAD, 2014). Agriculture provides a source of revenue to many developing and emerging economies, especially those living in rural areas (Marwa, 2016). According to Penson and Lins (1990), Agricultural finance analyzes financial intermediaries who supply loanable cash for agricultural output and financial markets. These intermediaries receive their loanable funds. The investigation could be broadened to include investigating agriculture's financial structure and farm owners' wealth. Further explained, Agricultural finance involves studying all economic and financial interfaces between agriculture and the rest of the macroeconomy and the impact that national economic policies may have on agriculture's economic performance and individual farm families' financial standing.

3. Methodology

3.1. Data and Model Specification

Data for the study was sourced from the World Development Indicators (WDI) of the World Bank, Food and Agriculture Organization (FAO), and Africa Country Policy and Institutional Assessment (CPIA) from 2005 to 2020. This study focuses on the rising literature on institution-agro-financing interactions and their effects on poverty reduction. This research used variables from the Cobb-Douglas production function to represent the relationship- an offset of the Augmented Solow-Swan model- between agro-financing institutions on poverty reduction in low and middle-income African countries.

$$Q = AK^{\alpha}L^{\beta} \tag{3.1}$$

Above is a representation of the Cobb Douglas production function generated from the Augmented Solow's growth model. This Production function explains how specific inputs impact the output level, Q. The output rises in lockstep with the increase in inputs. The equation also represents a given output of one, implying a constant return to scale. Capital and labor are represented by the letters K and L in the equation, and their elasticities must add up to one. The equation shows how the factors of production, especially labor and capital, directly impact output, but an exogenous variable, 'A' (technological innovation), might explain other aspects.

Equation 3.1 is a non-linear formula that will be linearized using equation 2.

$$lnY = A + \alpha\, lnK + \beta \ln L \tag{3.2}$$

Where Y stands for output (but measured as poverty reduction in this study), A is representing Technology, K represents the capital variables, L stands for labor and resource employment

Equation (3.2) demonstrates that the equation is a linear one.The variables used in this study were submitted into equation 3.2. However, because of the panel design of this project, this research added 'it' and the variables to the equation (3.2) to get equation (3.3).

3.2. Technique of Estimation

3.2.1. Pooled OLS

The Pooled OLS cross-section coefficients represent the average differences between units.

$$E[y_{it}|x_{it}] = y_{it} = x'_{it}\beta + \alpha + \varepsilon_{it} \tag{3.3}$$

As y_{it} may enter through the variance, this is a population-averaged effect. Individual observations are linearly independent. The OLS estimates α and β consistently evaluated. Pooled OLS may not be efficient even if estimation is consistent. This is because the composite error term does not take advantage of autocorrelation. Combining pooled OLS with cluster-consistent standard errors is one technique. However, before dismissing panel methods in favor of pooled OLS, it is necessary to compare the suitability of panel methods vs. pooled OLS.

3.3. Random Effect Model

In random effects, the variance between entities is considered spontaneous and uncorrelated with the independent variable. It is more focused on generating inferences about values distribution than measuring the variations in values between levels. It's also known as a variance factor model because the model parameters are random variables. The random effect model must be utilized if differences between individuals are thought to affect the dependent variable. Compared to the fixed-effect model and the pooled OLS, the random effect model allows the time-invariant variable to be added.

$$Y_{ij} = \mu + U_i + W_{ij} \tag{3.4}$$

Where μ = Average institutional quality among the countries

U_i = Country specific random effect

W_{ij} = Individual specific random effect

3.4. Variables, Sources and Measurements

Agricultural Employment – Agriculture, hunting, forestry, and fishing operations are classified as division 1 (ISIC 2) or 46 categories A-B (ISIC 3), or category A (ISIC 3) in the agriculture sector (ISIC 4) (World Development Indicators).

Agricultural Land – Permanent pasture includes both natural and developed crops that have been used for feed for at least five years (World Development Indicators).

Credit to Agriculture – Access to formal credit is critical to farmers for purchasing inputs such as seeds, fertilizers, plant protection materials or animal feed (Ebere *et al*., 2021)

Institutions – Institutions are the rules of the game that guide human interaction (North, 1991). Using Principal Component Analysis (PCA), this variable has been generated as an indicator for all dimensions of institutional excellence. PCA is a good way to reduce the dimensionality of a dataset while preserving as much statistical variability as possible. The 'Institution' variable includes the following dimensions: Political Stability and Absence of Violence (measuring the variations in an economy's political system attributable to conflict and many other factors). Voice and Accountability (shows the extent of active participation of citizens in voting activities as well as freedom of expression, media, and press), Government Effectiveness (showing quality of civil service and its independence from political pressures, policy formulation and implementation). Regulatory Quality (measures the ability of government to create and implement policies that promote private sector development), Rule of Law (measuring the level of citizen's trust in the judicial structure of the economy and the extent to which the societal rules are respected and adhered to), Control of corruption (this dimension measuring how public power is abused and used for personal gain as well as the effectiveness of the economy's anti-corruption policy and its institutional framework) (World Development Indicators).

Crop Production – Crop production data refer to the actual harvested production from the field or orchard and gardens, excluding harvesting and threshing losses and that part of crop not harvested for any reason. (Food and Agriculture Organization Statistics Division).

Table 3.1. Variable Measurement

S/N	Variable	Label	Measurement	Source
1.	Poverty	POV	Consumption Expenditure per capita (% of GDP)	World Development Indicators (WDI), World Bank 2020
2.	Agricultural Employment	AE	Employment in agriculture (% of total employment)	World Development Indicators (WDI), World Bank, 2020
3.	Agricultural Land	LND	Arable land (hectares)	World Development Indicators (WDI), World Bank, 2020
4.	Credit to Agriculture	CA	Share of total credit to agriculture ($)	Food and Agriculture Organization (FAO), United Nations, 2019
5.	Institutions	INS	PCA	Africa Country Policy and Institutional Assessment (CPIA), World Bank, 2020
6.	Crop Production	CROPP	Gross Per capita production index	Food and Agriculture Organization (FAO), United Nations. 2019
7.	Technology	TECH	Internet users (% of total population)	World Development Indicator (WDI), World Bank, 2019

Source: Researcher's Compilation, 2022

4. Results and Discussions

4.1. Summary Statistics and Correlation Analysis

Having specified the model for this study in the previous chapter, this chapter presents, analyzes, and estimates the data and the results obtained. The chapter also seeks to achieve the objectives of the study, which are to examine the impact of agro-finance on poverty reduction in some low and middle-income countries in Africa, investigate the effect of institutions on poverty reduction in some low and

middle-income countries in Africa, study the effect of increased crop production in agriculture and the impact on poverty reduction in some low and middle-income countries in Africa. The results for the summary statistics are presented in Table 4.1, while the correlation result for the test of multicollinearity is presented in Table 4.2.

4.2. Summary Statistics

The summary statistics presented in Table 4.2 show that the mean percentage for poverty is 84% with minimum values of 44% and maximum values of 110%, respectively. It also shows the following, The mean value for Investment in Agriculture is about $135,433 from 274 observations. This means that some Sub-Saharan African countries invested this amount in agriculture on an average during this period. The minimum and maximum values are $12 and $2,160,084 respectively. The mean value for Agricultural Land is about 8 million hectares from 260 observations. This means that some Sub-Saharan African countries made use of this number of hectares on the average during this period. The minimum and maximum values are 280,000 and 37 billion hectares respectively. The mean percentage for Agricultural Employment is 55% from 285 observations. This that some of the Sub-Saharan African countries employed more than half of the population on average during this time period. The minimum and maximum values are 26% and 80% respectively. The mean percentage for Technology is 9% from 249 observations. This means that some of the Sub-Saharan African countries have low access to technology on an average during this period. The minimum and maximum value are 0.21% and 44% respectively. The mean index for Institutions is about -3.55 from 304 observations. This means that some Sub-Saharan African countries had very poor institutional quality on the average during the time period. The minimum and maximum indexes are about -2.11 and 2.21 respectively. The mean index for Voice and Accountability is about 0.47 from 304 observations. This means Sub-Saharan African countries had relatively poor freedom of voice and low accountability of government on the average during the time period. The minimum and maximum indexes are about 0.13 and 0.79 respectively.

The mean index for political stability is about 0.63 from 304 observation. This means Sub-Saharan African countries had low political stability on the average during this period. The minimum and maximum indexes are about 0.4 and 0.88 respectively. The mean index for government effectiveness is about 0.28 from 304 observations. This means that some Sub-Saharan African countries had ineffective government on the average during the time period. The minimum and maximum indexes are about 0 and 0.63 respectively. The mean index for regulatory quality is 0.57 from 304 observations. This means that some Sub-Saharan African had relatively poor regulatory quality on the average during this period. The minimum and maximum indexes are 0.36 and 0.77 respectively. The mean index for rule of law is 0.49 from 304 observations. This means that some Sub-Saharan African had relatively poor respect for the rule of law on the average during this period. The minimum and maximum indexes are 0.17 and 0.83 respectively. The mean index for control of corruption is about 0.30 from 304 observations. This means that some Sub-Saharan African countries had poor control of corruption on the average during this period. The minimum and maximum are 0.08 and 0.58 respectively. The mean percentage for crop production is about 98% from 278 observations. This means that some Sub-Saharan African countries produced crops of this average during this period. The minimum and maximum values are 55% and 185% respectively.

Table 4.1. Summary Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Poverty	291	83.479	11.66841	44.39	109.53
Credit to Agriculture	274	135432.6	311066.6	12	2160084
Agricultural Land	260	8074120	8022357	280000	3.70e+07
Agricultural Employment	285	55.22389	15.15505	26.21	79.51
Technology	249	8.975121	9.006887	0.2196598	43.83992
Institutions	304	-3.55e-10	1.000001	-2.114779	2.213584
Voice and Accountability	304	0.4758224	0.1748323	0.13	0.79
Political Stability	304	0.6294737	0.1013916	0.4	0.88
Government Effectiveness	304	0.2874013	0.1849792	0	0.63
Regulatory Quality	304	0.5728289	0.0873778	0.36	0.77
Rule of Law	304	0.4924671	0.1524827	0.17	0.83
Control of Corruption	304	0.3056579	0.0951335	0.08	0.58
Crop Production	278	98.19763	18.80989	55.29	185.43

Source: Researcher's Compilation in Stata 15

4.2.1. Correlation Analysis

This analysis was performed on all the independent variables in the specified model to determine whether they could be used in the model. This will be based on correlations between them being at acceptable levels. The table below is the correlation matrix of the regressors.

4.2.2. Pooled OLS

Pooled OLS is computed to derive an unbiased and consistent estimate of parameters even when time constant attributes are present. It is used as a reference or baseline model for computing the performance of other models.

Table 4.3a. Pooled OLS

Variables	1	2	3	4	5	6	7
Constant	4.8708* (0.000)	5.0732* (0.000)	4.9752* (0.000)	5.4231* (0.000)	5.2880* (0.000)	4.9330* (0.000)	5.0198* (0.000)
Agricultural Land	-0.0583* (0.001)	-0.0395* (0.000)	-0.0425* (0.000)	-0.0394* (0.000)	-0.0381* (0.000)	-0.0454* (0.000)	-0.0390* (0.000)
Credit to Agriculture	0.0058 (0.323)	-0.0110* (0.006)	-0.0114* (0.005)	-0.0063 (0.197)	-0.0114* (0.004)	-0.0095** (0.020)	-0.0113* (0.006)
Agricultural Employment	-0.0021 (0.958)	0.0072 (0.835)	0.0178 (0.592)	-0.0187 (0.631)	0.0176 (0.587)	0.0241 (0.466)	0.0183 (0.584)
Technology	-0.0310* (0.003)	-0.0318* (0.000)	-0.0308* (0.001)	-0.0391* (0.001)	-0.0290* (0.001)	-0.0264* (0.003)	-0.0294* (0.001)
Crop Production	0.0904*** (0.070)	0.0249 (0.602)	0.0378 (0.439)	-0.0197 (0.740)	-0.0193 (0.691)	0.0429 (0.373)	0.0245 (0.610)
Institutions	-0.0343	-	-	-	-	-	-

	*(0.000)						
Voice and Accountability	-	0.0187 (0.319)	-	-	-	-	-
Political Stability	-	-	-0.0632 (0.215)	-	-	-	-
Government Effectiveness	-	-	-	0.0881* (0.006)	-	-	-
Regulatory Quality	-	-	-	-	0.1637* (0.001)	-	-
Rule of Law	-	-	-	-	-	-0.0527** (0.027)	-
Control of Corruption	-	-	-	-	-	-	0.0108 (0.611)
R. Squared	0.4308	0.3287	0.3304	0.3527	0.3608	0.3404	0.3265
Adjusted R. Squared	0.4021	0.3105	0.3122	0.3296	0.3434	0.3225	0.3082
F-Test (Prob)	15.01* (0.0000)	18.04* (0.0000)	18.17* (0.0000)	15.26* (0.0000)	20.79* (0.0000)	19.01* (0.0000)	17.86* (0.0000)

Note: The p-values are in the parentis (), *, *, ***, means that the coefficient is significant at 1%, 5%, and 10% levels respectively, and Agricultural Land, Agricultural Investment, Agricultural Employment, Technology, and Crop Production are in their logarithm forms.

Source: Researcher's Compilation in Stata 15

The model has a goodness of fit which is represented by an R. Squared of $\leq$ 43%. The R. Squared indicates that Agricultural Land, Agricultural Investment, Agricultural Employment, Technology, Crop Production, Institutions, Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption accounts for $\leq$ 43% of the variations in Poverty. The probability of F is 0.0000 which indicates that the variables in the model are jointly significant. The coefficients of Agricultural Land are statistically significant at a 1% level. There exists a negative relationship between the variable and Poverty. This means a unit increase in Agricultural Land, holding other variables constant, will result in a 0.0381 to 0.0583 decrease in Poverty. For instance, if Agricultural Land increases by a single hectare, Poverty will fall by 0.0381 to 0.0583 units. The coefficients of Agricultural Investments are statistically significant at a 1% and 5% level. There exists a negative relationship between the variable and Poverty. This means a unit increase in Agricultural Investments, holding other variables constant, will result in a 0.0095 to 0.0114 decrease in Poverty. For instance, if Agricultural Investments increases by a single dollar, Poverty will fall by 0.0095 to 0.0114 units.

The coefficients of Technology are significant at a 1% level. There exists a negative relationship between the variable and Poverty. This means a unit increase in Technology, holding other variables constant, will result in a 0.0264 to 0.0391 decrease in Poverty. For instance, if Technology increases by a single unit, Poverty will fall by 0.0264 to 0.0391 units. The coefficient of Institutions is significant at a 1% level. There exists a negative relationship between the variable and Poverty. This means a unit increase in Institutions, holding other variables constant, will result in a 0.0343 decrease in Poverty. For instance, if Institutions increases by a single index, Poverty will fall by 0.0343 units. The coefficient of Government Effectiveness is significant at a 1% level. There exists a positive relationship between the variable and Poverty. This means that a unit increase in Government Effectiveness, holding other variables constant, will result in a 0.0881 increase in Poverty. For instance, if Government Effectiveness increases by a single index, Poverty will grow by 0.0881 units.

The coefficient of Regulatory Quality is significant at a 1% level. There exists a positive relationship between the variable and Poverty. This means that a unit increase in Regulatory Quality, holding other variables constant, will result in a 0.1637 increase in Poverty. For instance, if Regulatory Quality increases by a single index, Poverty will grow by 0.1637 units.

The coefficient of Rule of Law is significant at a 5% level. There exists a negative relationship between the variable and Poverty. This means that a unit increase in Rule of Law, holding other variables constant will result in a 0.0527 decrease in Poverty. For instance, if Rule of law increases by a single index, Poverty will fall by 0.0527 units. Agricultural Employment, Voice and Accountability, Political Stability and Absence of Violence, and Control of Corruption are the variables that are not statistically significant in the model, as they all have p-values that are greater than 0.1.

Hausman Test

H_0: Random effects are independent of explanatory variables.

H_1: H_0 is not true.

If the p-value is statistically significant – less than 0.05, we reject the null hypothesis, and the fixed effects model will be adopted for the study. However, if the p-value is not statistically significant – greater than 0.05, we refuse to reject the null hypothesis and the random effects model is used. The figure below explains the decisive processes of the Hausman test. Since the p-value is not statistically significant – greater than 0.05, we refuse to reject the null hypothesis and adopt the random effects model for our analysis

Based on the results of the Hausman test, the random effect model alone would be examined.

4.3. Random Effects Model

The variance between entities is considered to be spontaneous and uncorrelated with the independent variable in random effects. Rather than measuring the differences in values between levels, it is more interested in drawing inferences about the distribution of values. The model parameters are random variables, and it's also known as a variance factor model.

Table 4.3b. Random Effect

Variables	1	2	3	4	5	6	7
Constant	4.4243* (0.000)	4.9154* (0.000)	4.9094* (0.000)	5.0423* (0.000)	4.8243* (0.000)	4.9151* (0.000)	4.9385* (0.000)
Agricultural Land	-0.0342 (0.162)	-0.0755* (0.000)	-0.0737* (0.001)	-0.0852* (0.006)	-0.0744* (0.000)	-0.0775* (0.000)	-0.0780* (0.000)
Credit to Agriculture	-0.0198* (0.003)	0.0013 (0.913)	0.0015 (0.903)	0.0089 (0.579)	0.0003 (0.979)	0.0014 (0.910)	0.0018 (0.882)
Agricultural Employment	0.1025** (0.035)	0.1556*** (0.052)	0.1543*** (0.059)	0.1551*** (0.078)	0.1620** (0.038)	0.1574*** (0.051)	0.1507** (0.044)
Technology	0.0033 (0.794)	-0.0014 (0.901)	-0.0006 (0.957)	-0.0041 (0.734)	-0.0012 (0.911)	-0.0015 (0.894)	-0.0014 (0.903)
Crop Production	0.0686*** (0.068)	0.0083 (0.859)	0.0074 (0.875)	-0.0115 (0.836)	0.0148 (0.754)	0.0097 (0.837)	0.0101 (0.830)
Institution	0.0149* (0.002)						
Voice and Accountability		-0.0015 (0.952)					
Political Stability			0.0302 (0.730)				
Government Effectiveness				-0.0387 (0.592)			
Regulatory Quality					-0.0524 (0.229)		
Rule of Law						-0.0237 (0.625)	
Control of Corruption							-0.0176 (0.514)
Hausman	0.9889						
R. Squared	0.3237	0.2506	0.2453	0.1971	0.2285	0.2690	0.2431
Wald chi2 Prob	726.92* (0.000)	130.96 (0.000)	119.37* (0.000)	117.70* (0.000)	108.57* (0.000)	112.01* (0.000)	113.05* (0.000)

Note: The p-values are in the parenthesis (), *, **, and ***, which means that the coefficient is significant at 1%, 5%, and 10% levels respectively.

The model has a goodness of fit which is represented by an R. Squared of ≤ 32%. The R. Squared indicates that Agricultural Land, Agricultural Investment, Agricultural Employment, Technology, Crop Production, Institutions, Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption account for ≤ 32% of the variations in Poverty. The probability of the Wald chi2 is 0.000 which indicates that variables in the model are jointly significant. The coefficients of Agricultural Land are statistically significant at a 1% level. There exists a negative relationship between the variable and Poverty. This means a unit increase in Agricultural Land, holding other variables constant, will result in a 0.0342 to 0.0852 decrease in Poverty. For instance, if Agricultural Land increases by a single hectare, Poverty will reduce by 0.0342 to 0.0852 units. The coefficients of Agricultural Employment are statistically significant at a 5% and 10% level. There exists a positive relationship between the variable and Poverty. This means a unit increase in Agricultural Employment, holding other variables constant, will result in a 0.1025 to 0.1620 increase in Poverty. For instance, if Agricultural Employment increases by a single percentage, Poverty will grow by 0.1025 to 0.1620 units.

The coefficient of Institutions is statistically significant at a 1% level. There exists a positive relationship between the variable and Poverty. This means a unit increase in Institutions, holding other variables constant, will result in a 0.0149 increase in Poverty. For instance, if Institutions increases by a single index, Poverty will grow by 0.0149 units. Agricultural Investment, Technology, Crop Production, Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption are the variables that are not statistically significant in the model, as they all have p-values that are greater than 0.1.

4.4. Discussions and Implications of Findings

This study was carried out mainly to investigate the relationship between agro-financing, institutions, and poverty reduction in low and middle-income African countries. From the results, it was shown that all the variables met the *a priori* expectation asides from Agricultural Employment, and Crop Production, which showed a negative relationship with poverty reduction. This implies that for low and middle-income countries in Africa, institutions and agro-financing are necessary and for poverty reduction which it has a positive relationship with, as expected from the *a priori* expectations. It was also found that there exists an impact of indicators of institutions on poverty reduction which also aligns with previous studies. The study found the Rule of Law to be significant and positively related to poverty reduction in Africa's low- and middle-income countries. This explains that more respect and adherence to the rule of law by farmers and the government increase poverty reduction. This could be by adhering to the policies put in place by the government to boost productivity. The study found Government Effectiveness to be significant and negatively related to poverty reduction in Africa's low- and middle-income countries. This could be due to the fact that the effectiveness of the government is not high enough to cause a reduction in the level of poverty, as seen in these African countries.

The study found Regulatory Quality to be significant and negatively related to poverty reduction in low and middle-income countries. This explains that the quality of policies concerning the agricultural sector in these countries such as property rights, credit facilities for farmers, etc. are too weak to contribute to poverty reduction. Other non-institutional variables used in the study include Agricultural Land, Agricultural Employment, Credit to Agriculture, Crop Production and Technology. The study found Agricultural Land to be significant and positively related to poverty reduction in Africa's low- and middle-income countries. This is according to *a priori* expectations. This is self-explanatory, as increasing the number of hectares used for agriculture reduces poverty in these African countries. The study found Credit to Agriculture to be significant and positively related to poverty reduction in Africa's low- and middle-income countries. This is according to *a priori* expectations. Increasing credit to agriculture for the development of facilities that aid agricultural activities, purchase of farming machinery, research and development, will reduce poverty in these African countries. The study found Technology to be significant and positively related to poverty reduction in Africa's low- and middle-income countries. This is according to *a priori* expectations. Increasing technological know-how and digital literacy will reduce poverty in these African countries.

The implications of this findings are that good institutions and high agro-financing reduces poverty in low and middle-income countries in Africa. Supported by findings of previous researchers, results of; Deolalikar et al., (2002), Glaeser et al., (2004), IFC-International Finance Corporation, (2012), Kherallah & Kirsten, (2002), Meijerink & Andrews-speed, (2011), Mishra & Mohapatra, (2017),

Osabohien et al., (2020), Putsenteilo et al., (2020), Shittu, Sc, & Sc, (2002), World Bank, (2011), show that institutions and agro-financing have a positive relationship with poverty reduction. Consequently, to reduce poverty, the development and quality of institutions as well as the strength of agro-financing are vital for these countries.

5. Conclusion and Recommendations

In this section, various policy recommendations would be suggested to relevant stakeholders as well as a guide for possible related research projects. Good institutions are crucial for the reduction of poverty in low and middle-income African countries, high substantial agro-financing is also crucial in the reduction of poverty in low and middle-income African countries. Weak institutions lead to more corrupt and less efficient policies and regulations that are disadvantageous to the reduction of poverty. Thus, it is of uttermost importance that promoting and enhancing agro-financing and institutions should be pursued. The countries studied included Angola, Burkina Faso, Cote d'Ivoire, the Democratic Republic of Congo, Ethiopia, Gambia, Ghana, Guinea-Bissau, Kenya, Mali, Mozambique, Niger, Nigeria, Senegal, Sudan, Tanzania, Togo, Uganda, and Zambia for the period between 2005 to 2020. The panel data analysis was strongly balanced.

Pooled OLS was adopted in this study to come about an unbiased estimate. This study also adopted the random effects model after conducting the Hausman test to control for endogeneity.

6. Recommendations

As a result of findings derived from this study, a few recommendations have been suggested for the government and relevant stakeholders in low and middle-income countries in Africa to promote good institutions and improve agro-financing to reduce poverty in these countries. The recommendations go thus:

i. Arable land should be made more available to farmers by the government, this would encourage farming activities.

ii. The government should develop the quality of institutions in low and middle-income countries in Africa to be able to enact better policies and carryout checks and balances on government activities towards the agricultural sector.

iii. All types of agricultural investment should be encouraged in the public and private sectors by countries. Private gross fixed capital formation, foreign direct investment (FDI), loans and credit facilities, and even farm equipment subsidies are among them.

In conclusion, this study has extensively covered the relationship between agro-financing, institutions, and poverty reduction in low and middle-income countries in Africa. It was discovered that institutions have a significant positive impact on the reduction of poverty in these countries. It was also revealed that credit to agriculture has a significant positive impact on the reduction on poverty in these countries. Technology was proven to also have a significant positive impact on poverty reduction in these countries. However, these dimensions of institutional quality: Government Effectiveness and Regulatory Quality showed a negative relationship, though they were significant. This was explained to be as a result of the ineffectiveness of the government in the agricultural sector and poor regulatory quality.

Agro-financing and Institutions are crucial for the reduction of poverty in these countries as it would enhance farmers and give them access to credit facilities and it would eventually develop the agricultural sector and it would also prevent embezzlement and the existence of poor policies that can contribute to the rise in poverty in these countries. Thus, policymakers, the government and all relevant stakeholders must take the appropriate steps in ensuring proper agro-financing and promoting the quality of institutions to ensure the reduction of poverty across the low and middle-income countries in Africa. The recommendations also place responsibility on government as well as international bodies and agencies to ensure that there is proper financing and the quality of institutions are enhanced across these countries in one of the most crucial sectors in any economy – the agricultural sector – and poverty is reduced.

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