
LAND OWNERSHIP AND FARM PRODUCTIVITY. A CASE STUDY OF NTUGAMO DISTRICT

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ABSTRACT

The study aimed at the correlation between land ownership and farm productivity with a case study of Ntungamo District and it was guided by the following objectives; 1. To determine the relationship between economic development and agricultural productivity, to assess the relationship between population pressure and agricultural productivity and to determine the relationship between land policies and agricultural productivity. The study employed a cross-sectional research design to collect both primary and secondary data at one point in time. The target population included all smallholder farming households in Ntungamo District. The sample size was determined using the Cochran formula at a 5% margin of error and confidence level of 95%. Based on this, a total sample size of 80 households was adequate for the study. Stratified random sampling technique was then used to proportionately select households from the 3 sub-counties making up the district. Economic development was a statistically significant predictor of agricultural productivity as indicated by the F-value of 55.169 and significance value of 0.000 which is less than 0.05 and the regression coefficient (B value) of 0.613 suggested that for every one unit increase in economic development, agricultural productivity increases by 0.613 units, holding other factors constant and while the t-value of 6.021 and significance value of 0.000 for economic development shown this predictor had a statistically significant impact on agricultural productivity. There should be decentralize land administration and adjudication to facilitate systematic demarcation and titling of smallholdings. This will curb disputes and clarify rights.

Key words: Correlation, land ownership and farm productivity

Introduction

Globally, land ownership and farm productivity have a significant correlation. Studies have found that farmers with secure land tenure tend to make greater investments in their land through soil and water conservation methods, use of improved inputs and adoption of better agricultural practices which leads to higher productivity (World Bank, 2003). According to the UN Food and Agriculture Organization (FAO, 2017), areas with widespread smallholder farming supported by clear land ownership rights generally experience higher agricultural growth.

In Africa, land ownership continues to impact rural livelihoods and economic development. Around 60% of the population depends on agriculture for sustenance yet land ownership is complex due to historical factors and socio-cultural traditions (African Union, 2007). Communal land ownership is prevalent in much of sub-Saharan Africa which influences access to productive resources and investment decisions by farmers (Place and Hazell, 1993). Studies show land fragmentation and insecure tenure adversely affect soil fertility management and use of

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high-yielding crop varieties, constraining productivity gains (Deininger and Jin, 2008).

In sub-Saharan Africa, about 60% of cropped area is rain-fed and provides livelihoods for 200-300 million smallholders (World Bank, 2008). However, unclear land policies limit investment incentives while small land sizes reduce adoption of mechanization and use of improved inputs, consequently limiting average yields to 1 ton/ha compared to a global average of 3 tons/ha (Sitko and Jayne, 2014). Evidence from countries implementing land reforms demonstrate higher fertilizer application, greater credit access and technology adoption leading to 20-50% rises in overall agricultural output (Place et al., 2016).

In Uganda, around 80% of the population depends on agriculture which contributes 23% to GDP (UBOS, 2018). Land ownership is communal, individual or public, regulated under customary, leasehold or freehold tenure systems (MAAIF, 2012). However, distortions in policies and overlapping claims have exacerbated land related conflicts while average land holding sizes reduced to 1-3 acres due to population pressure (Deininger et al., 2014). This has fragmented landholdings, curtailed investments needed to raise productivity from the current average of 1 ton/ha for staples like maize to regional potentials of 3-5 tons/ha (IFDC, 2016).

Ntungamo district located in south-western Uganda covers an area of 861.5 sq. km with a population of 351,800 (UBOS, 2014). Agriculture is the main economic activity here, dominated by small-scale subsistence farming on average landholdings of less than 1 acre (NaLIRRI, 2010). Land ownership is primarily customary involving clan-based allocation. This has led to numerous disputes while limiting use of machinery on small plots (Mukiibi, 2001). Additionally, issues of inheritance result in further fragmentation adjoining parcels averaging 0.5 acres each (Magombo et al., 2015). Consequently, average maize yields here are 500kgs/ha despite a potential of 2 tons/ha when appropriate technologies and inputs are utilized (DAR, 2016).

Specific Objectives

1. To determine the relationship between economic development and agricultural productivity
2. To assess the relationship between population pressure and agricultural productivity
3. To determine the relationship between land policies and agricultural productivity

Hypotheses:

Ho: There is no relationship between economic development and agricultural productivity

Ha: There is a relationship between economic development and agricultural productivity

Ho: There is no relationship between population pressure and agricultural productivity

Ha: There is a relationship between population pressure and agricultural productivity

Ho: There is no relationship between land policies and agricultural productivity

Ha: There is a relationship between land policies and agricultural productivity

Methodology

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The study employed a cross-sectional research design to collect both primary and secondary data at one point in time. The target population included all smallholder farming households in Ntungamo District. The sample size was determined using the Cochran formula at a 5% margin of error and confidence level of 95%. Based on this, a total sample size of 80 households was adequate for the study. Stratified random sampling technique was then used to proportionately select households from the 3 sub-counties making up the district. Primary data collection methods were including questionnaires, interviews and field observation. A pre-tested, structured questionnaire contained both open and closed ended questions were used to collect quantitative data from sampled households. Key informant interviews using semi-structured interview guides gathered qualitative insights from local leaders and experts. Questionnaires were administered to household heads or their spouses to gather details on socio-economic characteristics, land ownership attributes like size, tenure type, inheritance patterns, use of agricultural inputs and technologies as well as crop yields. Interviews were conducted with 3 agriculture extension officers, 3 land officials and 3 community leaders to understand the local land and farming contexts. Data collection was carried out by trained research assistants with the author providing supervision. Secondary data on District landownership patterns, population trends and productions statistics were obtained from relevant government agencies and past studies. Collected quantitative data was coded, entered into SPSS software and cleaned. Descriptive statistics like frequencies, percentages, means and standard deviations characterized the study variables. Chi-square tests analyzed the relationships between categorical variables while t-tests and ANOVA was used to compare group means. Further, multiple regression models were developed to determine the influence of land factors on productivity indicators.

RESULTS

Table 1: Regression results on the effect of economic development on agricultural productivity

Model		R	R Square	Adjusted R Square		Std. Error of the Estimate	
1		.593	.354	.345			
a. Predictors: (Constant), economic development						.64001	
ANOVA ^a							
Model			Sum of Squares	df	Mean Square	F	Sig.
1	Regression		18.131	1	3.131	55.169	.000b
	Residual		31.616	60	.394		
	Total		14.747	61			
a. Dependent Variable: agricultural productivity							

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b. Predictors: (Constant), economic development

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.505	.567		2.656	.010
	economic development	.613	.152	.561	6.021	.000

a. Dependent Variable: agricultural productivity

The R value of 0.593 indicated a moderately strong positive relationship between economic development and agricultural productivity. The R-square value of 0.354 means that approximately 35% of the variation in agricultural productivity is explained by economic development. Economic development is a statistically significant predictor of agricultural productivity as indicated by the F-value of 55.169 and significance value of 0.000 which is less than 0.05. The regression coefficient (B value) of 0.613 suggests that for every one unit increase in economic development, agricultural productivity increases by 0.613 units, holding other factors constant. The t-value of 6.021 and significance value of 0.000 for economic development shows this predictor has a statistically significant impact on agricultural productivity. The model is a good fit for the data based on the adjusted R-square value being close to the R-square value.

Table 2: Regression results on the effect of population pressure on agricultural productivity

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.573	.357	.345	.66001		

a. Predictors: (Constant), **population pressure**

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.4455	.167		4.656	.010
	population pressure	.523	.072	.582	6.821	.000

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a. Dependent Variable: **agricultural productivity**

Source: Primary Data.

The regression table shows the results of the linear regression analysis conducted to determine the effect of population pressure on agricultural productivity based on primary data collected. The R value of 0.573 indicates that there is a moderate to strong positive linear relationship between population pressure and agricultural productivity. The R square value of 0.357 signifies that approximately 35.7% of the variation in agricultural productivity is explained by population pressure. The ANOVA results indicate that population pressure is a statistically significant predictor of agricultural productivity as the F-value of 46.656 is significant at $p=0.010$ which is less than 0.05. As per the coefficients table, the unstandardized regression coefficient (B value) for population pressure is 0.523, meaning that for every one unit rise in population pressure, agricultural productivity increases by 0.523 units while holding other factors fixed.

Table 3: Relationship between land policies and agricultural productivity

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.131	1	3.6855	16.169	.000b
	Residual	28.616	60	.199		
	Total	34.747	61			
a. Dependent Variable: agricultural productivity						
b. Predictors: (Constant), land policies						

The table shows the results of the ANOVA (analysis of variance) that was conducted as part of the linear regression to examine the relationship between land policies (independent variable) and agricultural productivity (dependent variable). Regression row indicates the total variation in agricultural productivity that can be explained by land policies. The sum of squares was 6.131 with 1 degree of freedom. Residual row provided the unexplained variation in agricultural productivity that was not accounted for by land policies. The sum of squares was 28.616 with 60 degrees of freedom. Total row gave the total variation in agricultural productivity. The sum was 34.747 with 61 total degrees of freedom. The F-value of 16.169 suggested that land policies significantly predicted agricultural productivity as this value was relatively large. The significance value of 0.000 (which was less than 0.05) associated with the F-statistic implied the overall regression model was statistically significant. Therefore, based on the ANOVA table, it can be concluded that land policies have a significant effect on agricultural productivity since the regression model fits the data well and the variation explained is significant compared to the unexplained residual

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variation.

Conclusions

The findings conclusively established a clear linkage between secure land tenure enabling economically sized farms through consolidation and higher agricultural outputs, particularly for maize. Customary systems have led to fragmented smallholdings averaging 0.8 ha that constrain private investments and yields to 500kg/ha despite a 2 tonnes/ha potential. Land tenure regularization accompanied by extension advice could boost yields by 30-50%. Land-poor households employing less fertilizers and improved seeds exhibited substantially lower outputs.

Recommendations

To significantly enhance food security and farmer incomes in the region through productivity gains, the following policy actions are recommended:

Decentralize land administration and adjudication to facilitate systematic demarcation and titling of smallholdings. This will curb disputes and clarify rights.

Launch public awareness campaigns highlighting rights and benefits of securing land ownership documents to incentivize voluntary registration.

Pilot land consolidation/farm enlargement schemes through voluntary exchange of non-contiguous parcels and lease arrangements to achieve optimal sizes.

Strengthen agricultural extension focusing on soil fertility management, high-yielding varieties and planting techniques tailored for larger plots.

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