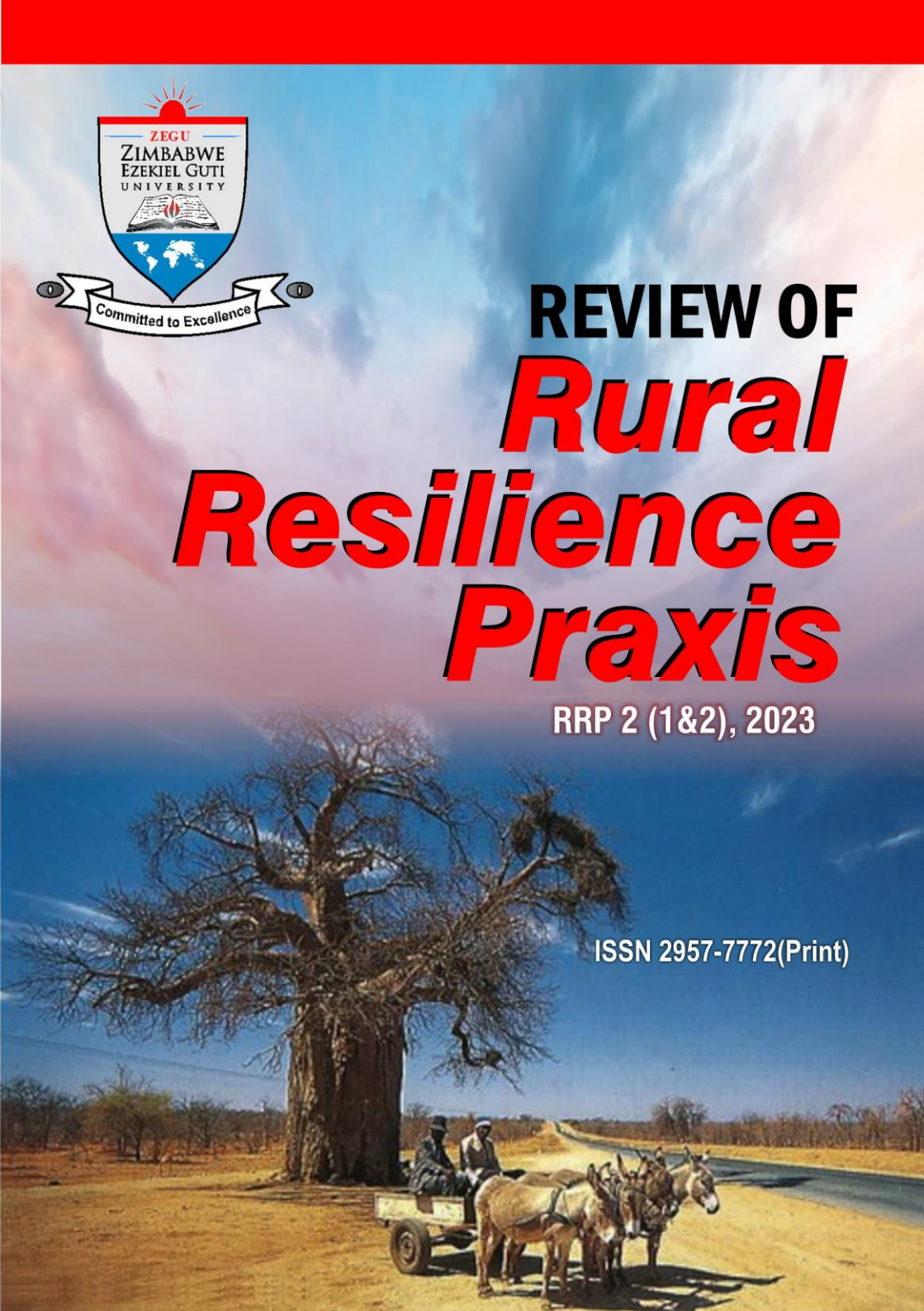
ZEGU
ZIMBABWE EZEKIEL GUTI UNIVERSITY
Committed to Excellence

REVIEW OF Rural Resilience Praxis

RRP 2 (1&2), 2023



ISSN 2957-7772(Print)

REVIEW OF
Rural Resilience Praxis

RRP 2(1&2), 2023

ISSN 2957-7772(Print)

Published by the Zimbabwe Ezekiel Guti University Press
Stand No. 1901 Barrassie Rd,
Off Shamva Road
Box 350
Bindura, Zimbabwe

Typeset by Divine Graphics
Printed by Divine Graphics

SUBSCRIPTION AND RATES
Zimbabwe Ezekiel Guti University Press Office
Stand No. 1901 Barrassie Rd,
Off Shamva Road
Box 350
Bindura, Zimbabwe
Telephone: ++263 8 677 006 136 | +263 779 279 912
E-mail: zegupress@admin.uz.ac.zw
http://www.zegu.ac.zw/press

About the Journal

JOURNAL PURPOSE

The purpose of the *Review of Rural Resilience Praxis is* to provide a forum for disaster risk mitigation, adaptation, and preparedness.

CONTRIBUTION AND READERSHIP

Sociologists, demographers, psychologists, development experts, planners, social workers, social engineers, economists, among others whose focus is that of rural resilience.

JOURNAL SPECIFICATIONS

Review of Rural Resilience Praxis

ISSN 2957-7772(Print)

SCOPE AND FOCUS

As much as the urban territory is increasing by each day, the rural economy, especially in many developing countries, still retains a great proportion of the extractive and accommodation industry. Retaining some space as rural remains critical given the sectors role in providing ecosystem services to both wildlife and humanity. In this light, rural resilience as practice beckons for critical studies especially in the face of the ever-threatening extreme weather events and climate change that then impact on the livelihoods and lifestyles of the rural communities. Review of Rural Resilience Praxis (RRRP) comes in as a platform for critical engagement by scholars, practitioners, and leaders as they seek to debate and proffer solutions of the rural sector as well as trying to champion the philosophy of the right to be rural. The issue of conviviality between the different constituencies of the sectors, compiled with the competing challenges of improving rural spaces while also making the conservation, and preservation debates matter is the hallmark of this platform of criticality. The journal is produced bi-annually.

Guidelines for Authors for the Review of Rural Resilience Praxis

Articles must be original contributions, not previously published and should not be under consideration for publishing elsewhere.

Manuscript Submission: Articles submitted to the *Review of Rural Resilience Praxis*are reviewed using the double-blind peer review system. The author's name(s) must not be included in the main text or running heads and footers.

A total number of words: 5000-7000 words and set in 12-point font size width with 1.5 line spacing.
Language: British/UK English
Title: must capture the gist and scope of the article
Names of authors: beginning with the first name and ending with the surname
Affiliation of authors: must be footnoted, showing the department and institution or organisation.
Abstract: must be 200 words
Keywords: must be five or six containing words that are not in the title
Body: Where the authors are more than three, use *et al.,*
Italicise *et al.*, *ibid.,* words that are not English, not names of people or organisations, etc. When you use several authors confirming the same point, state the point and bracket them in one bracket and in ascending order of dates and alphabetically separated by semi-colon e.g. (Falkenmark, 1989, 1990; Reddy, 2002; Dagdeviren and Robertson, 2011; Jacobsen *et al.*, 2012).

Referencing Style: Please follow the Harvard referencing style in that:
— In-text, citations should state the author, date and sometimes the page numbers.
— the reference list, entered alphabetically, must include all the works cited in the article.

In the reference list, use the following guidelines, religiously:

Source from a Journal

Anim, D.O and Ofori-Asenso, R (2020). Water Scarcity and COVID-19 in Sub-Saharan Africa. *The Journal of Infection*, *81*(2), 108-09.

Banana, E, Chitekwe-Biti, B and Walnycki, A (2015). Co-Producing Inclusive City-Wide Sanitation Strategies: Lessons from Chinhoyi, Zimbabwe. *Environment and Urbanisation*, *27*(1), 35-54.

Neal, M.J. (2020). COVID-19 and Water Resources Management: Reframing Our Priorities as a Water Sector. *Water International*, *45*(5), 435-440.

Source from an Online Link

Armitage, N, Fisher-Jeffes L, Carden K, Winter K *et al*., (2014). Water Research Commission: Water-sensitive Urban Design (WSUD) for South Africa: Framework and Guidelines. Available online: https://www.greencape.co.za/assets/Water-Sector-Desk-Content/WRC-Water-sensitive-urban-design-WSUD-for-South-Africa-framework-and-guidelines-2014.pdf. Accessed on 23 July 2020.

Source from a Published Book

Max-Neef, M. (1991). *Human Scale Development: Concepts, Applications and Further Reflections,* London: Apex Press.

Source from a Government Department (Reports or Plans)

National Water Commission (2004). Intergovernmental Agreement on a National Water Initiative. Commonwealth of Australia and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory. Available online: https://www.pc.gov.au/inquiries/completed/water-reform/national-water-initiative-agreement-2004.pdf. Accessed on 27 June 2020.

The source being an online Newspaper article

The Herald (2020). Harare City Could Have Used Lockdown to Clean Mbare Market. *The Herald*, 14 April 2020. Available online: https://www.herald.co.zw/harare-city-could-have-used-lockdown-to-clean-mbare-market/. Accessed on 24 June 2020.

Smallholder Maize Production, Input Investment, Productivity and Profitability in Ward 1, Chikomba District, Zimbabwe

ARCHEFORD MUNYAVHI[1] AND TANYARADZWA RUKASHA[2]

Abstract

Most of smallholders in Zimbabwe under the leasehold tenure system are beneficiaries of the Fast-Track Land Reform Programme (FTLRP) of 2000. It is generally argued that the leasehold tenure system has unprecedented impact on agricultural production as farmers fail to secure bank loans using leased land as collateral security. This article is premised on a study whose main objective was to determine the impact of leasehold land tenure system on productivity sby mallholder maize farmers. The study was carried out in Ward 1 of Chikomba District in Mashonaland East Province. Descriptive research design and primary data gathered from the randomly selected 87 farmers out of the 673 farmers, using a structured questionnaire, were used for this study. The data gathered was comprehensively analysed using both correlation analysis and regression analysis to achieve the study objectives. The results revealed that the leasehold tenure system limits farmers' access to credit, meaning, therefore, that the leasehold tenure has a negative impact on input investment, maize production and profitability by the smallholder farmers in Chikomba District. The study concludes that the leasehold tenure system has a negative impact on input investment, production of smallholder maize farmers as it discouraged farmers' access to credit, a key factor that determines farmers' input investment and production. The study recommends the Government of Zimbabwe to change the tenure system on smallholder farmers to a more favourable system to improve smallholder farmer input investment, productivity and profitability.

Keywords: *land tenure; smallholder farmers; leasehold tenure; tenure security*

[1]Department of Agribusiness and Management, Faculty of Agribusiness and Entrepreneurship (FAE), Marondera University of Agricultural Sciences and Technology (MUAST), Zimbabwe
[2]Department of Agribusiness and Management, Faculty of Agribusiness and Entrepreneurship (FAE), Marondera University of Agricultural Sciences and Technology (MUAST), Zimbabwe

INTRODUCTION

Most developing countries, including those in sub-Saharan Africa, have ignored the central role played by land ownership in any economy (Tatsvarei *et al.*, 2018). Many governments thrive when they give farmers complete land ownership rights under the freehold land tenure systems (Zikhali, 2008). This is because farmers will have access to any form of financial assistance using the land as collateral, thereby increasing productivity. The improved agricultural productivity before the FTLRP was evidence why Zimbabwe was recognised as the breadbasket of the Southern African Development Community (SADC) region (Rukuni *et al.*, 2006). In a bid to avoid some colonial economic systems, Zimbabwe partially abandoned the freehold land ownership system, commonly used by the white minority and mostly adopted the leasehold tenure system (Rukuni *et al.*, 2006; Zikhali, 2008). The leasehold tenure system was supported by Statutory Instrument 12(1) of the Land Acquisition Act, 1992, that empowered most smallholder farmers as a reward for a well-fought liberation struggle (Rukuni *et al.*, 2006). Although the leasehold tenure system empowered smallholder indigenous people, the whole process did not bear the intended fruits as this had a negative effect on financial assistance becaause farmers were left with no collateral to secure loans for farm investment and boosting of the agricultural sector (Paradzayi, 2007; Basera, 2015).

The leasehold tenure system led to reduced farm input investment, productivity and agricultural profitability, especially on maize. This has been evidenced by the agricultural sector contraction magnitude of 30% as the sector was now dominated by smallholder farmers with limited capital (Richardson, 2004). The World Bank (2020) reported that Zimbabwe imported an average of 800 000 tonnes of maize per year to supplement its food reserves despite having many smallholder farmers who always got support from the government in the form of agricultural inputs, among other things. The depleted foreign currency reserves can be attributed to the decrease in productivity of the staple food in Zimbabwe (Ncube, 2021). It is against this background that the study aims to analyse the impact that the leasehold land tenure system has had on agricultural input investment, maize production and profitability in Zimbabwe.

LITERATURE REVIEW

Several studies before this study were conducted to determine the impact of various land tenure systems around the world, and such analyses are determinants of the country and the tools used in the study. For example, Akram *et al.* (2019) investigated agricultural investment differences in terms of soil conservation and wheat productivity of rural households in Punjab, Pakistan. They used cross-sectional data from rural household farmers and applied a multivariate Tobit regression model to determine the farmers' investment preferences and tenancy status. The findings show that farmers with leasehold tenure systems invest more in their soil and have higher productivity than farmers with other tenure statuses and enough evidence that farmers' secure lands rights such as long-term leases, were more productive compared to those with insecure lease forms. This was attributed to the fact that they had greater access to credit by using land as collateral.

Dlamini *et al.* (2011) discovered that food production in Swaziland follows a dualistic model of land tenure, namely the traditional tenure system (TCT) and the title tenure system (TDT). Using data collected from 63 farmers from both TCT and TDT using the desired sampling method, the researchers aimed to empirically determine whether land ownership, as an institution, contributes to the observed differences in maize productivity among Swazi farmers. Data from the Manzini region of Swaziland were collected in 2008 and analysed using descriptive and recursive regression models. The findings revealed that the size of land holdings and maize yields differed between TDT and TCT farming households. Tenure security was found to influence land improvements through credit access and use, whereas education level influenced credit use. The amount of capital used had a positive impact on maize productivity, whereas TCT farmers were limited by finance and land availability. As argued in the findings, farmers in the TDT system were highly mechanised, whereas farmers in the TCT system primarily used livestock to cultivate their land.

As argued by the Economic Commission for Africa (ECA) (2004), land is critical in promoting rural livelihoods in Africa because access to land and security of tenure is the primary means of achieving food security and sustainable development. Until recently, the dominant view in Africa was that

land titling programmes would increase the security of tenure and encourage agricultural investment, resulting in increased growth and development. However, the programmes failed to develop the smallholder agriculture sector because investment expectations were not met.

Nothale (1979) conducted a study in Malawi to determine the effect of the leasehold tenure system on crop profitability and compare it to other tenure systems because Malawi's tenure arrangements provide a diverse range of opportunities for agricultural output and development. Individuals who have complete access to their land and are free to do whatever they want, are more likely to be profitable, as argued in the findings. Again, it appeared that smallholder farmers under lease tenure were unable to increase agricultural productivity prior to the implementation of development projects due to the costs associated with increased inputs and the cost of leasing, hampering the return per unit of land.

Teshome (2014) describes that land in the highlands of Ethiopia is a scarce resource. Sustainable use is affected by both physical and institutional factors. This researcher aimed at investigating farmers' perceptions of tenure systems and their influences on sustainable land management in the Ethiopian North Western highlands. The study used a detailed survey of households and plots in three watersheds using simple descriptive statistics to analyse the perceptions of farmers about land-related factors and profitability based on the leasehold tenure system. A multidimensional probit model was used to analyse a group of SLM practices, considering land-related variables. Results show that the average household in this study managed 4.54 parcels of land in different locations, with an average parcel size of 0.26 hectares. The MVP model analysis indicates that farmers were investing in a combination of practices at the parcel level, considering the substitution and complementarily effects of the practices. The study also found that tenure arrangements influence farmers' investments in sustainable land management practices, leading to increased profitability.

THEORETICAL FRAMEWORK

The research applied an economic perspective from the Evolution Theory of Private Property Rights developed by Neoclassical Economists in the 1970s.

Property rights are social institutions which specify or limit the range of privileges granted to individuals on specific resources such as land and water (Bruce *et al.*, 1993). When it comes to land ownership, these property rights are referred to as land tenure systems.

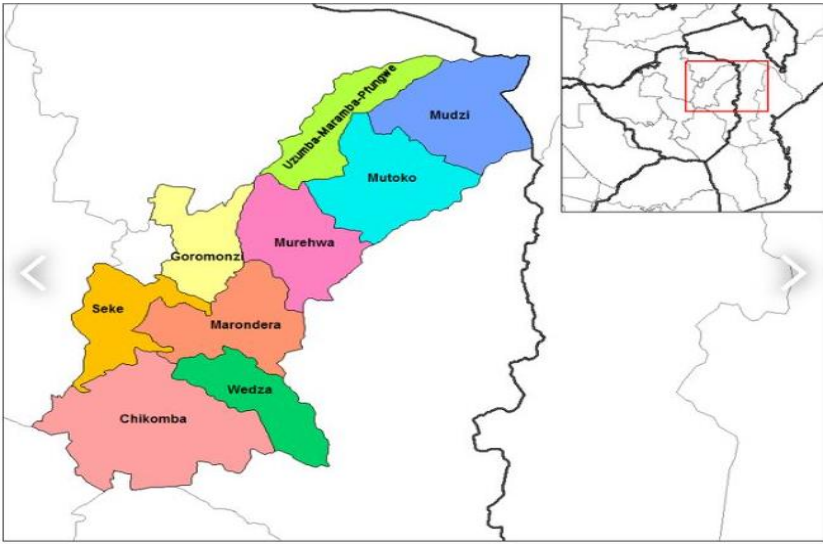
The Neoclassical Economist's point of view emphasizes the importance of property rights in influencing resource allocation decisions, thereby influencing the nation's economic behaviour and performance (Feder and Fenny, 1991). This is also supported by Bruce *et al.* (*ibid.*) who believed that tenure security, in that an individual has full right to a piece of land on an ongoing basis and without interference, motivates one to invest in and improve the land. In the same vein, Deininger *et al.* (2006) contend that both land transferability and tenure security have an impact on investment.

As argued in Rukuni (2000) and Bruce *et al.* (1993), land ownership security is critical, influencing perceptions of a return on labour and capital investment in smallholder farming. In the case of insecure tenure or land ownership, the system reduces investment in agricultural farming activities, reducing potential production and landholders' profits. This idea is supported by Rukuni (2000) who claims that smallholder farmers' inability to obtain loans because they cannot use the land as collateral, prevents them from investing in seeds, fertilisers, chemicals, and other inputs. The end results of the tenure system are then noted in this study on poor economic performance and resource utilisation by smallholder farmers under the leasehold land tenure system.

RESEARCH METHODOLOGY

The research was carried out in the Chikomba District, Mashonaland East Province. With an area of 6 503 km^2 and an estimated population of 120 986 people, Chikomba District includes all tenure systems, including communal, resettlement, leasehold, state land and freehold tenure. The district is located in Agroecological Region III, with an annual rainfall range of 650mm to 800mm. It is dominated by livestock and crop production, both intensive and extensive. Cereal crops (such as maize, sorghum, and finger millet), legumes (such as common beans, sweet potatoes, Irish potatoes, round nuts and groundnuts), horticulture crops (such as vegetable and water melons), and tobacco, are all grown in this area. Maize is the most common cash and cereal

crop grown in Chikomba District across all tenure systems. Cattle, goats, sheep, donkeys and chickens are the main livestock and major sources of income in both large- and small-scale livestock productions.



7

Figure 1: *Mashonaland East Map* (Google Maps, 2021).

AREA SAMPLING AND RESPONDENT SAMPLING

Purposive sampling was used to select the study site resulting in the selection of only one ward (Ward 1) out of the 52 wards in the Chikomba District. The area was chosen on purpose because it is densely populated by smallholder farmers with leasehold tenure. To ensure that both A1 and A2 farmers participated in the study, stratified sampling was used to divide farmers into groups based on the size of their farmlands. This ensured that the study was not skewed by the size of land used by the farmer, given that farmers have different productivity and profitability. Respondents were randomly drawn from each stratum. To avoid bias and ensure that each unit of the strata has an equal chance of being selected in the study, random sampling was then employedusing the leasehold register obtained from the local Agritex officer.

SOURCES OF DATA

Primary and secondary data sources were used. Primary data was collected using structured questionnaires from the randomly sampled 87 smallholder maize farmers out of 673 under leasehold tenure between August and September 2021. Information on input investment, maize production and maize earnings was obtained from a primary data source. SPSS v.22 was used to compile and analyse the data.

DATA ANALYSIS TECHNIQUES

Both descriptive and econometric analysis approaches were used in the study. The influence of the leasehold tenure system on input investment, production and profitability in smallholder maize production was evaluated using the statistical t-test. Because the impacts of other factors on the models were not captured by the student t-test, econometric models were used to analyse the impact of leasehold tenure on investment, maize output and profitability.

RESEARCH TECHNIQUES

The influence of the leasehold tenure system on smallholder maize farmers' input investment was assessed using a multiple regression model adapted from Dube *et al.* (2013). The following equations were used to treat input investment and tenure as an optimising function in the model.

$$\mathbf{C} = \mathbf{f}(\mathbf{X}, \mathbf{TS}) \quad (1)$$

$$\boldsymbol{L} = \boldsymbol{f}(\boldsymbol{X}, \boldsymbol{TS}, \boldsymbol{C}) \quad (2)$$

$$\boldsymbol{I} = \boldsymbol{f}(\boldsymbol{X}, \boldsymbol{L}, \boldsymbol{C}) \quad (3)$$

$$\boldsymbol{Y} = (\boldsymbol{X}, \boldsymbol{L}, \boldsymbol{I}) \quad (4)$$

The endogenous variables *C, L, I* and *Y* denote credit, land improvements, variable inputs, and yield, respectively. The *TS* stands for exogenous tenure security, and the *X* stands for exogenous features of smallholder farmers. Tenure security has also been tweaked to better reflect the tenure system (either leasehold or other tenure systems). The model's tenure system has an indirect influence on smallholder production (Dube *et al.* 2013). Place *et al.* (1993) formulated the following equations:

$$\boldsymbol{L} = \boldsymbol{f}(\boldsymbol{x}, \boldsymbol{TS}, [\boldsymbol{sub}\ \mathbf{1}]) \quad (5)$$

$$\boldsymbol{I} = \boldsymbol{f}(\boldsymbol{X}, [\boldsymbol{sub}\ \mathbf{2}], \boldsymbol{C}) \quad (6)$$

$$\boldsymbol{Y} = (\boldsymbol{X}, \boldsymbol{L}, [\boldsymbol{sub}\ \mathbf{3}]) \quad (7)$$

where *L* stands for maize production land, *I* for commercial inputs (seeds, fertilisers, herbicides, pesticides) and *Y* for yield. *Y* is the continuous endogenous variable, *TS* are exogenous explanatory variables and the *X*s are exogenous explanatory variables included in each equation. The survey data was used to build a multiple regression model to evaluate the effects of tenure on input investment.

$$\boldsymbol{I_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \varepsilon}$$

where $\boldsymbol{\beta_{0-10}}$ are parameters to be estimated, X_{1-n} represents a set of explanatory variables that are family size, the labour size used per plot, the experience of the farmer, access to credit, land holding, the land size used for maize production, access to extension training, education level attained by a farmer, amount of fertilisers used, maize seed quantity used and, the herbicides and pesticides. I_i is the total input investment level. The student t-test was used to assess the statistical significance of the hypothesis at 5% of significance.

IMPACT OF THE LEASEHOLD TENURE ON MAIZE PRODUCTION BY SMALLHOLDER FARMERS

To test for maize yields differential under the leasehold tenure and other tenure systems (communal and freehold), the research adopts an econometric production function adapted from Zikhali (2008) asshown:

$$\boldsymbol{YIELDS_i = f(TS_i X_i)} \quad (8)$$

where *yields* is the total quantity of maize produced from each plot holder under the leasehold tenure systems, *TS* represents the dummy variable which is the tenure system and *X* is a vector representing smallholder farmer characteristics. The vector of characteristics includes the family size, labour size used per plot, the experience of the farmer, access to credit, land holding, land size used for maize production, access to extension training, education level attained by a farmer, amount of fertilisers used, maize seed quantity used and, herbicides and pesticides.

The following equation summarises the situation:

$$\boldsymbol{Maize_i = f(TS_i X_i) = Y = (X, L, [sub\ 3])} \quad (9)$$

where *TS* is an exogenous factor influencing maize production in an indirect way through credit, input use and land improvement by smallholder farmers. The research assumes the maize production function is represented by a simple linear regression model that can be simplified as follows;

$$\boldsymbol{M_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \varepsilon} \quad (10)$$

where $\boldsymbol{\beta_{0-12}}$ are parameters to be estimated and $\boldsymbol{\varepsilon}$ is the random, normally distributed, independent error term, with zero mean and constant variance. The student t-test was used to assess the statistical significance of the hypothesis at 5% level of significance.

THE EFFECT OF LEASEHOLD TENURE ON THE PROFITABILITY OF SMALLHOLDER MAIZE FARMERS

To assess the profitability hypothesis of smallholder maize production under the leasehold tenure system in the Chikomba District, the research adopted the gross margin analysis from a study by Katema *et al.* (2017). GM was obtained as shown below

$$\boldsymbol{GM = TR - TVC} \quad (11)$$

where *GM* is the maize gross margin, *TR* is the total revenue from maize of all the farmers and *TVC* is the total variable cost of maize production for all the farmers. If the gross margin value is positive, then it means smallholder maize production under the leasehold tenure is profitable. The study adopted the benefit-cost ratio from a study by Basera, (2015) to measure the profitability of smallholder maize production under the leasehold tenure system. The formula is shown below:

$$\boldsymbol{BCR} = \frac{\sum_{t=0}^{T} \frac{B_t}{(1+r)^t}}{\sum_{t=0}^{T} \frac{C_t}{(1+r)^t}} \quad (12)$$

where $\boldsymbol{B_t}$ is the measure of the benefit value of producing maize for the smallholder farmers at time *t*, $\boldsymbol{C_t}$is the measure of costs of producing maize for the smallholder farmers at time *t*. In this research, all the maize produced was recognised as the benefits and the cost are production costs associated with producing the same quantity of maize, discounted at a 10% interest rate. If the *BCR* is greater than 1, then smallholder maize production under the leasehold

tenure system is profitable, and if it is less than 1, it means smallholder maize production is non-profitable. The student t-test was used to assess the statistical significance of the hypothesis at 5% level of significance.

RESULTS

The first objective of the study considered determining the effect of the leasehold tenure system on input investment. The researcher first performed a point-bisection correlation analysis as the dependent one of the variables, the tenure system was dichotomous. The results of Pearson's Point-Bisection Correlation of 0.234 between the Tenure System and Input Investment are associated with a p-value of 0.003. These findings show that there is a statistically significant ($p<0.05$) correlation between Tenure System and Input Investment. Given these results, it is evident that there exists some positive correlation between the two variables. Multiple regression was used to determine the effect of the leasehold tenure system on input investment based on the data obtained from A1 and A2 farmers in Ward 1, Chikomba District.

Table 1: *Multiple Regression Model Coefficients*

Model		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	28.093	39.689		.708	.481		
	Gender	30.424	16.126	.122	1.887	.063	.783	1.277
	Education	15.462	10.863	.086	1.423	.159	.911	1.098
	Labour	7.299	5.229	.097	1.396	.167	.679	1.473
	Experience	-.274	.545	-.034	-.503	.616	.733	1.364
	Family Size	-2.520	2.243	-.085	-1.124	.265	.581	1.721
	Land Used	2.280	2.094	.071	1.089	.280	.769	1.301
	Land Holding	1.479	.642	.163	2.303	.024**	.658	1.520
	Access to extension input	-12.520	14.963	-.052	-.837	.406	.849	1.179
	Extension Training	72.704	16.754	.311	4.339	.000*	.642	1.558
	Other Sources of Income	-11.296	15.758	-.050	-.717	.476	.680	1.472
	Access to Credit	175.884	16.552	.688	10.626	.000*	.787	1.271
	Draft Power	53.896	27.800	.135	1.939	.057	.679	1.474

Key, *, ** denotes 1%, 5% level of significance respectively

Collectively, the regression model is a good fit for the data (F=19.591, p=0.000). Thus, the characteristics of the leasehold tenure system are statistically significant in determining input investment. R-Square of 0.776 shows that 77.6% of the variation in input investment is explained by the model's independent variables representing the leasehold tenure system. The 175.884 coefficient for access to credit implies that when all other variables are held constant, an increase in access to credit by a unit leads to an increase in input investment per hectare by about 176 units. Credit has a significant impact on input investment as indicated by a significant t-statistic (t=10.626, p=0.000) at 5% level of significance. This implies that credit was an important factor required to improve smallholder farmers' input investment under the leasehold tenure system. In addition, it also means that farmers with access to credit had high input investment under the leasehold tenure system.

Secondly, extension training was also significantly impacting maize input investment as indicated by significant t-statistic (t=4.339, p=0.000). The positive coefficient of 72.704 shows that increasing farmer training in maize production leads to an increase in input investment per hectare. This also implies that more extension training should be availed to all smallholder farmers under the leasehold tenure system to increase maize input investments. It also means farmers who had greater access to extension training had higher input investment levels. Lastly, land holding size also appeared to have a statistically significant effect on input investment (t=2.303, p=0.024). Looking at the coefficients, holding all other variables constant, increasing the land holding size of the smallholder farmers by one unit will force input investment to also increase by 1.479 units.

Overall, it is evident from the study results that the tenure system has a positive effect on the input investment of smallholder farmers under the leasehold tenure system. Three variables proved to have a positive impact on input investment, and these are credit, extension training and land holding. However, given that the leasehold tenure system discourages farmers from accessing loans from banks, it thus evident that the leasehold tenure system has a negative impact on input investment as results proved that an increase in credit assistance will increase input investment and decreases input

investment when credit access is limited (a characteristic of a leasehold tenure).

RESULTS ON THE EFFECTS OF LEASEHOLD LAND TENURE SYSTEM ON MAIZE PRODUCTION

Another objective of the study sought to determine the effect of the leasehold tenure system on maize production. The researcher again performed a point-bisection correlation analysis as one of the variables, the tenure system was dichotomous. The results of Pearson's Point-Bisection Correlation of 0.369 between the Tenure System and maize production are associated with a p-value of 0.000. These findings show that there is a statistically significant ($p<0.05$) correlation between Tenure System and maize production. Given these results, it is evident that there exists some positive correlation between the two variables. Multiple regression was used to determine the effect of the leasehold tenure system on maize production based on the data obtained from A1 and A2 farmers in ward 1, Chikomba District.

Table 1: *Multiple Regression Model Coefficients*

Model		Unstandardised Coefficients		Standardised Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.729	.375		1.945	.056		
	Gender	.033	.152	.018	.217	.829	.783	1.277
	Education	.146	.103	.112	1.420	.160	.911	1.098
	Labour	.037	.049	.068	.749	.456	.679	1.473
	Experience	-.001	.005	-.012	-.137	.891	.733	1.364
	Family Size	.019	.021	.087	.877	.384	.581	1.721
	Land Used	.037	.020	-.161	2.870	.017**	.769	1.301
	Land Holding	.009	.006	.144	1.557	.124	.658	1.520
	Access to extension input	.020	.141	.012	.145	.885	.849	1.179
	Extension Training	.365	.158	.217	2.306	.024**	.642	1.558
	Other Sources of Income	.297	.149	.182	1.997	.049**	.680	1.472
	Access to Credit	.793	.156	.430	5.072	.000*	.787	1.271
	Draft Power	.729	.263	.254	1.777	.607	.679	1.474

a. Dependent Variable: Maize Production

Results revealed that the variables included in the model have a collective significance effect (F=9.040, p=0.000). This means that the independent variables are jointly statistically significant in determining maize production. This is supported by an R-Square statistic of 0.615 The R-Square confirmed that 61.5% of the variation in maize production is explained by the model's independent variables representing the leasehold tenure system.

Table 2 results show that four variables; that is, access to credit (t=5.072, p=0.000), extension training (t=2.306, p=0.024), other sources of income (t=1.997, p=0.049), and land used (t=2.870, p=0.017), were statistically significant in explaining the variation in smallholder maize production under the leasehold tenure system. From the findings of the study shown in Table 4.12, the 0.793 coefficient for credit implies that when all other variables are held constant, an increase in access to credit by a unit leads to an increase in maize production per hectare by about 0.793 tonnes, implying a positive effect of credit on maize production.

Secondly, all other variables being constant when farmer extension training increases, maize production per hectare would also increase by 0.365 tonnes. This again implies that more extension training should be availed to all smallholder farmers under the leasehold tenure system to increase maize production given that farmers who had greater access to extension training had higher maize production levels. Moreover, land used also appeared to have a statistically significant effect on maize production, withholding all other variables constant, increasing land used by farmers by one unit would force maize production to rise by 0.037 tonnes. This was due to the fact that land size used for maize production was an important parameter for the production. With an increase in land size used for maize production, farmers could attain higher production levels. This also implies that farmers who used large land sizes had high production levels compared to those who used small land sizes. Lastly, when the farmer increases other sources of finance, maize production will boost by making a subsequent increase in tonnage by 0.297 units.

Overall, it is evident from the study results that the tenure system has a positive effect on maize production by smallholder farmers under the leasehold tenure system. Out of the four variables that have a significant impact on maize production, access to credit had the most significant effect (B=0.793, p=0.000). Given that the leasehold tenure system limits the farmers' access to credit; it therefore, means that the leasehold tenure has a

negative impact on maize production by the smallholder farmers in Chikomba District.

Results on the Impact of Leasehold Land Tenure System on Profitability

The last objective of the research was pivoted towards determining the impact of the leasehold tenure system on profitability. To determine the impact of the leasehold tenure system on profitability by smallholder maize farmers, the researcher adopted the gross margin (GM) analysis that was calculated as shown in Table 3 below.

Table 3: *Gross Margin per hectare for Smallholder Maize Farmers (N=81)*

GM/ha	Minimum	Mean	Maximum
Before leasehold	-USD$233.00	US$292.09	US$1310.75
Under leasehold	-US$350.00	US$250.40	US$657.50
Method	Df	Value	Probability
T-test	80	0.7926	0.4319

Results show that both smallholder maize productions under leasehold and before leasehold were profitable with positive average GMs per hectare of $250.40 and $292.09, respectively. The results show that there was an insignificant difference in profits obtained before leasehold tenure and under the leasehold tenure system as indicated by the p-value of 0.4319 and t-value of 0.7926 at 5% level of significance. These results imply that smallholder maize production under leasehold made comparably lower profits than before the tenure was introduced. This was also assessed by BCR shown in Table 4 below.

Table 4: *Benefit Cost Ratio (BCR) of Small Holder Maize Production*

BCR	**Minimum**	**Mean**	**Maximum**
Before leasehold	-1.09	0.39	4.0
Under leasehold	-0.36	0.16	1.37
Method	**DF**	**Value**	**Probability**
T-test	80	1.862	0.056

The results in Table 4 reveal that smallholder maize production was not profitable under both tenure forms and tenure systems as indicated by the mean BCRs of less than 1. Both t-value (t=1.862) and p-value (p=0.056) at 5% level of significance shows insignificant differences in profits obtained in smallholder maize production before leasehold and under leasehold, though the period under leasehold tenure system shows lower profits, suggesting that the leasehold tenure system has a negative impact on profitability as most farmers incur losses under the said tenure.

Therefore, these results imply that smallholder maize farmers in Zimbabwe need to adopt cost-effective ways of maize farming and commercial farming skills to cut costs that enable them to earn profits. This also means reducing the fixed cost associated with land licensing and variable costs such as fertilisers, seeds and pesticides, could boost smallholder maize production and profitability position in a positive way.

DISCUSSION

The study results proved that credit, land holding and extension training were significantly affecting smallholder farmers' maize input investment. This is contrary to research findings by Dube *et al.* (2013) who did similar research on land tenure security and farm investments amongst small-scale commercial farmers in Zimbabwe. Their results indicated that the level of input investment was not significantly affected by credit, extension training, and landholding by farmers among other factors. This study research also shows that input investment was significantly explained by the explanatory variables of the study that is contrary to the findings of Dube *et al.* (*ibid.*), where the model results confirmed the statistical insignificance of the explanatory variables.

On the second objective of this study, the research results proved that land used, extension training, other sources of income and access to credit, were statistically significant in affecting the maize output of smallholder farmers per hectare. This was contrary to the findings of Dube *et al.* (*ibid.*) where both long and medium investment were insignificantly impacting on yields and it was noted that the farm size of land and education had positive significant impacts on the level of yields. This study confirmed that leasehold had negative impact on maize production as indicated by the negative coefficients.

Similar results were reported by Tatsvarei *et al.* (2019) who noted a decrease on production in their studies as farmers were under the leasehold tenure system. The negative change in maize production under the leasehold tenure is attributed to failure by smallholder farmers to maximise their land use, because of lack of adequate funding, agricultural input shortages and limited commercial farming skills, and failure to access financial assistance due to fact that land could not be used as collateral (Mutondi, 2011).

Profitability assessment shows insignificant change under the leasehold tenure system. This was not supportive of the fact that farmers were farming on good fertile soils with good climatic conditions for maize production and had increased land used for maize production, unlike before leasehold. In addition, despite the government prioritising farmers under the leasehold in input provision for maize, unlike before leasehold tenure, farmers remain unprofitable, negatively impacting profitability. Again, when profitability was assessed using BCR, smallholder maize production for both before leasehold and under leasehold, were not profitable, with the leasehold tenure system giving lower values. Similar results were reported by Basera (2015) who posits that maize production by smallholder farmers is not profitable under the leasehold tenure. This is attributed to the fact that the leasehold tenure system is associated with high expenditure under total fixed costs for land taxes and no access to credits by the farmers.

CONCLUSION AND RECOMMENDATIONS

The first objective of the study determined the effect of the leasehold tenure system on input investment. The regression model results show that access to credit, extension training and landholding were statistically significant ($p<0.05$) in explaining the variation in input investment on smallholder maize production under the leasehold tenure system. Credit proved to be the leading factor determining input investment, coinciding with the fact that the leasehold tenure system has limited access to credit from financial institutions as they do not have the required collateral security to offer banks. Overall, this proved that the leasehold tenure system has a negative impact on input investment of smallholder maize farmers.

The second objective of the study sought to determine the effect of the same tenure system, the leasehold, on maize production. A point-bisection correlation analysis results point out that a change in the tenure system from the leasehold system to any other system, will increase maize production, while the production will drop if the tenure system changes back to be leasehold. The results of multiple regression analysis revealed that access to credit (t=5.072, p=0.000), extension training (t=2.306, p=0.024), other sources of income (t=1.997, p=0.049), and land used (t=2.870, p=0.017), were statistically significant in determining maize production. Access to credit appeared to be the most significant variable determining maize production. This variable is associated with a beta value of 0.793, implying that when all other variables are held constant, an increase in access to credit by a unit leads to an increase in maize production per hectare by about 0.793 tonnes, while if the access to credit drops or is zero (as in most leasehold tenure systems), maize production will also drop significantly. This, therefore, again suggests that the leasehold tenure system has a negative effect on maize production.

The last objective of the research aimed to determine the impact of the leasehold tenure system on profitability. The GM analysis results from this analysis show that smallholder maize production both under leasehold and before leasehold, was profitable with positive average GMs per hectare of $250.40 and $292.09, respectively. However, these results show that there was an insignificant difference (t=0.7926, p=0.4319) in profits obtained before leasehold tenure and under the leasehold tenure system. These results imply that smallholder maize production under leasehold made comparably lower profits than before the tenure was introduced, suggesting that the leasehold tenure system impacted negatively on profitability. On the contrary, the benefit-cost ratios of smallholder maize production before leasehold and under leasehold tenure show that smallholder maize production was not profitable under both tenure systems as indicated by the mean BCRs of less than 1, though the BCR under the leasehold tenure system was lower than that for the period before it was adopted. As a result, these results greatly support the fact that the leasehold tenure system has a negative impact on profitability. Given that the research findings indicate that the leasehold tenure system has a statistically significant negative effect on input investment, maize production and profitability, the study, therefore, recommends the Government of

Zimbabwe to change the tenure system on smallholder farmers to a more favourable system to improve maize productivity and input investment. If the government has to maintain the leasehold system, it is recommended that farmers are offered title deeds or lease documents that makes it possible for farmers to make effective long-term decisions on their respective farms. On the other hand, the research also recommends banks and other financial institutions offer loans to these smallholder farmers given that agriculture is the backbone of the economy, hence supporting agriculture in the form of loans will go a long way in improving the national GDP and general livelihoods. Given that the majority of the farmers are utilising less than five hectares of the leased land, it is also recommended that the government continues to provide farmers with inputs and enact some pieces of legislation that will seize some portion of land that remains unused for some time as this is a prejudice to the state efforts to increase food productivity.

REFERENCES

Akram, M.W. *et al.* (2019). Impact of Land Use Rights on the Investment and Efficiency of Organic Farming. *Sustainability 11,* 7148.

Basera. J. (2015). An Assessment of Smallholder Maize Production and Profitability in Zimbabwe. Available at: https://www.researchgate.net/publication/306015191.

Bruce, J. W. and Migot-Adholla, S.E. (1993). *Searching for Land Tenure Security in Africa.* Dubuque, Lowa: Kendall/Hunt Publishing Company.

Deininger, K. and Jin, S. (2006). Tenure Security and Land-related Investment: Evidence from Ethiopia. *Eur. Econ. Rev. 50,* 1245-1277.

Dlamini, M. B. and Micah B. Masuku, M.B. (2011). Productivity of Smallholder Sugarcane Farmers in Swaziland: The Cases Komati Downstream Development Programme (KDDP) Farmers Association, 2005-2011. *Environment and Natural Resource Research; 2*(4)

Dube, L. and Guveya, E. (2013). Land Tenure Security and Farm Investments amongst Small Scale Commercial Farmers in Zimbabwe. *Journal of Sustainable Development in Africa 15*(5), *2013).*

Economic Commission for Africa (ECA) (2004). Land Tenure Systems and their Impacts on Food Security and Sustainable Development in Africa. In: ECA/SDD/05/09 Addis Ababa.

Feder, G. and Feeny, D. (1991). Land Tenure and Property Rights. Theory and Implication for Development Policy. *World Bank Development Review, 5*, 135-153.

Katema, T. *et al.* (2017). An Analysis of the Profitability of Groundnut Production by Small-holder Farmers in Chegutu District, Zimbabwe. *Journal of Economics and Sustainable Development. 8*,8).

Matondi, P. B. (Ed.) *Forthcoming* (2011), *Inside the Political Economy of Redistributive Land Reforms in Zimbabwe: Case Studies in Mangwe, Shamva and Mazowe Districts, Harare*.

Ncube, M. (2021). The 2021 National Budget Speech; Building Resilience and Sustainable Economic Recovery, Presentment to The Parliament of Zimbabwe. Nov 26, 2020.

Nothale, D. (1979). *Land System and Agricultural Production in Malawi.* Lilongwe: Rural Development Department, University of Malawi.

Paradzayi. C. (2007). 'Land Tenure in Zimbabwe's Post Agrarian Reform', *FIG Weekly 2007-Strategic Integration of Surveying Services*, Hong Kong SAR, China, 13-17 May 2007.

Place, F, and Hazell, P. (1993). Productivity Effects of Indigenous Land Tenure Systems in Sub-Saharan Africa. *American Journal of Agricultural Economics 75 (Feb),*10-19.

Richardson, C. (2004). *The Collapse of Zimbabwe in the Wake of the 2000-2003 Land Reforms.* Lewiston: Edwin Mellen Press.

Rukuni, M., (2000). Land Reform in Zimbabwe: Dimensions of a Reformed Structure. In: Bowyer-Bower and Stoneman, C. (eds.) *Land Reform in Zimbabwe: Constraints and Prospects*. England: Ashgate Publishing Ltd.

Rukuni, M. *et al.* (2006) *Zimbabwe's Agricultural Revolution Revisited.* Harare: University of Zimbabwe Publications.

Tatsvarei, S. *et al.* (2018). Sustainability Crisis of Zimbabwe's Agricultural Land Tenure: A Review, *International Journal of Development and Sustainability, Vol. 7*(6), 1875-1885.

World Bank (2020). Agriculture Subsidies for Better Outcome: Options for Zimbabwe. Washington, DC: World Bank.

Zikhali, P. (2008). *Fast-track Land Reform, Tenure Security and Investments in Zimbabwe.* EfD Discussion Paper 08-23, A Joint Publication of the Environment for Development Initiative and Resources for the Future (www.rff.org), Washington DC.