S. Afr. J. Agric. Ext.
Vol. 53 No. 6, 2025: 114-154
10.17159/2413-3221/2025/v53n6a21844

(License: CC BY 4.0)

Factors Influencing Profitability of Land Reform Farm Enterprises in the KwaZulu-Natal Province of South Africa

Mkhwanazi, L.V.[1], Sharaunga, S.[2] and Swanepoel J.W.[3]

Corresponding Author: L.V. Mkhwanazi. Correspondence Email: lindokuhlemkhwanazilv@gmail.com

ABSTRACT

Various factors influence the profitability of enterprises owned by land reform farmers. This study aimed to identify the factors influencing the profitability of land reform farm enterprises in KwaZulu-Natal. Data were collected from 262 land reform farmers in KwaZulu-Natal through a structured questionnaire. Using the linear odds model, the study established that production input costs, extension advisory services, training received, household size, labour man-days, and marketing costs have a statistically significant influence on the profitability of land reform farms in KwaZulu-Natal. Household size and marketing costs have a negative effect, whereas production input costs, extension advisory services, training received from government and stakeholders, and labour man-days have a positive effect on profitability. Other variables were not statistically significant. The study concluded that comparing marginal costs and marginal returns to inform farm investment decisions, as well as the provision of extension advisory services and training by government and stakeholders, are indispensable instruments that drive profitability. Utilising family labour to mitigate the impact of household size, reducing marketing costs, and enhancing labour efficiency increases profitability. The study proposes a policy overhaul on training and extension services, prioritising the Key Result Areas (KRAs) for small-scale farmers and land reform farm enterprises.

Keywords: Profitability, Enterprise, Investment, Returns, Land Reform.

[1]PhD Student: University of the Free State, Department of Sustainable Food Systems and Development, Faculty of Natural and Agricultural Sciences, University of the Free State, Bloemfontein, 9300, South Africa. lindokuhlemkhwanazilv@gmail.com, ORCiD ID 0009-0009-3376-1651.

[2]Independent Agricultural Economics Expert, Office Number 1401, 39 Vuna Close, Ridge 8, Durban 4000, South Africa. sharaunga2000@yahoo.com. ORCID ID 0000-0002-3619-2580.

[3]Director: Centre for Sustainable Agriculture; Associate Professor: Department of Sustainable Food Systems and Development, Faculty of Natural and Agricultural Sciences, University of the Free State, Bloemfontein, 9300, South Africa. SwanepoelJW@ufs.ac.za, ORCiD ID 0000-0002-0812-2657.

Vol. 53 No. 6, 2025: 114-154
10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

1. INTRODUCTION

The land reform programme in South Africa is considered the cornerstone in changing the land ownership patterns inherited through the unjust apartheid regime in the country. Land reform is defined as a government programme empowered through legislation that aims to redistribute ownership, claims, and rights to existing farmland in order to benefit impoverished and historically disadvantaged persons and communities by raising their absolute and relative status, power, and income (Lipton, 2009). It mainly results in laws that are enacted to increase the poor's rights to land, thereby reducing poverty (Lipton, 2009; Manenzhe *et al*., 2016). Generally, everyday literature refers to the actions inspired by such legislation as land reform or land reform activities.

In South Africa, the land reform programme was initiated by the government as a post-colonial strategy to correct the wrongs committed during the apartheid era, which led to land being taken from millions of Black people (Phasha & Moyo, 2020). The primary target of land reform initiatives is to help formerly marginalised groups live better lives, not just by placing them on agricultural land, but also by offering them support services (Terblanche, 2011). Ochieng (2020) suggests that land reform has multiple meanings. Some define it as a shift in the agricultural system or the entire range of actions required or preferred to enhance the system or relationships between individuals regarding their land rights (Ochieng, 2020). Lipton (2009) argues that land reform programmes are intended and likely to directly redistribute ownership of, claims on, or rights to current farmland, benefiting people with low incomes.

Land reform encompasses one or more of its three main tiers, namely land redistribution, land restitution, and land tenure reform. Recent literature includes the fourth tier, which is the land administration reform (Netshipale *et al*., 2017; Hull *et al*., 2019; Davies *et al*., 2020). This study focused on land redistribution and restitution, targeting farmers who benefited during acquisition and post-acquisition support for agricultural production. Land transferred for non-agricultural purposes is not included in this study. With the exception of the restitution sub-programme, which is a standing rights-based land transfer process, the South African government has been implementing changes in the redistribution space through the introduction of various sub-programmes as conduits for the programme's implementation. Mphahlele (2023) reckons that most of these sub-programmes were introduced between 1995 and 2010. These sub-programmes are Settlement for Land Acquisition Grant (SLAG), Farm Equity Share Scheme (FES), Land

Redistribution for Agricultural Development (LRAD) and Proactive Land Acquisition Strategy (PLAS).

The Settlement for Land Acquisition Grant (SLAG) was introduced to acquire land primarily for the settlement of people with an income of less than R1500 per month (Claassens, 2017). The people in the SLAG sub-programme were settled in groups through Communal Property Associations (CPAs) and were expected to farm collectively (Binswanger-Mkhize, 2014). The Farm Equity Share Scheme (FES) was introduced, aiming to enable farmers to acquire shares in existing agribusinesses (Mphahlele, 2023). In 2001, Land Redistribution for Agricultural Development (LRAD) was introduced to acquire land for agricultural production (Claassens, 2017; Mphahlele, 2023). In 2006, the Proactive Land Acquisition Strategy (PLAS) was introduced as a mechanism to sustain land acquisition for redistribution purposes (Claassens, 2017; Hall & Kepe, 2017; Mphahlele, 2023). All of these sub-programmes, except PLAS, have since been discontinued due to their failure to meet their objectives (Kirsten *et al*., 2016; Claassens, 2017; Mphahlele, 2023). The continuous enactment of legislation to redefine reform directions is a common practice in countries; hence, it cannot be an isolated case in South Africa (Besley & Burgess, 2000). Hence, South Africa has also been making constant attempts to enact and change laws to address the challenges of land reform, including the sustainability and profitability of the farms.

According to Xaba and Masuku (2013), the profitability of agricultural enterprises is influenced by the selling price, quantity of fertiliser, and distance to the market. The allocation of resources also affects both productivity and profitability (Libago, 2017). The farmers are price takers on both the input cost and the income generated from the produce. This then squeezes the farmer on both sides of the operation (Xaba & Masuku, 2013). Farming remains a lucrative business venture for many due to its ability to generate huge wealth if properly managed, as well as significant losses when the odds are not favourable. When undertaken on a very small scale, Mdoda *et al*. (2022) state that an agricultural business can be started with minimal capital requirements, particularly where land and water are readily available (Mdoda *et al*., 2022). However, Mdoda *et al*. (2022) further caution that South Africa is a water-stressed country, and this has a direct negative impact on farming, its productivity, and profitability.

Notably, the profitability of agricultural enterprises owned by land reform farmers has come under sharp scrutiny. Economically, agriculture remains one of the most fundamental sectors for development in most African developing countries (Phiri *et al*., 2023). It is considered one of the

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

key drivers of the economy, as the country's food security mainly depends on this sector. Where agriculture and land allocation are neglected, acute poverty and inequality are evident (Davies *et al*., 2020). This results in the failure of systems and means of production. In South Africa, Kirsten *et al*. (2016) argue that the failure of land reform farms is evident on social platforms, but there is no empirical evidence to document the reasons for it. Hence, this study aims to consider the factors influencing the profitability of land reform farmers in KwaZulu-Natal (KZN).

2. DEFINITION OF PROBLEM

As already mentioned, land reform in South Africa is a necessity for changing the land ownership patterns and remains central to driving the economy, ensuring sustained food security and reducing rural poverty and inequality. In South Africa, land reform has been characterised by various sub-programmes with several objectives, which have been phased out or modified over the past many years since the programme was introduced and supported through legislation. While land reform objectives involve changing land ownership patterns, many proponents and beneficiaries of land reform associate the acquisition of land with poverty alleviation (see also Ntsiapane et al., 2023 on smallholder wool farmers), quality of life, or livelihood issues, rather than with commercial farming (Kirsten *et al*., 2016).

Since the formation of the Economic Freedom Fighters (EFF), a left-leaning and militant political party in 2013, the South African land issue has been fiercely debated both inside and outside of government (Xaba & Akinola, 2023). Such vociferous engagements have led to two state-led initiatives to evaluate the status quo of land in South Africa: the High-level Panel on the Assessment of Key Legislation and Acceleration for Change, led by former President Kgalema Motlanthe in 2017, and the Presidential Advisory Panel Report on Land Reform and Agriculture in 2019. This highlights the point of political and social dissatisfaction with the slow pace of land reform.

From 2011, the purchase of land by the state (through PLAS) and allocation to leasehold by beneficiaries has become the entirety of the land redistribution sub-programme (Hall & Kepe, 2017). However, Hall and Kepe (2017) argue that while policy improvements are welcome to improve the programme, there are growing trends of elite capture that warrant urgent attention. Evidence from various studies suggest that the land redistribution as a sub-programme has not been at the speed that is intended to deliver the promise of equitable access to land; secondly, the land reform projects are failing to deliver on the promises of sustainable agricultural projects for production, income

generation, food production, employment, food security, poverty alleviation and rural development (Kirsten *et al*., 2016; Davies *et al*., 2020). Binswanger-Mkhize (2014) notes some islands of success in the horticulture space, although they exist in an environment marked by partial or complete failure, with the number of beneficiaries and the size of the land area transferred being very low. The literature on land reform indicates that most land reform projects have failed, with only about 50% of rural land reform projects yielding some benefits to beneficiaries, although these benefits are often quite small (Cousins, 2016; Akinola & Kaseeram, 2021). Akinola and Kaseeram (2021) perceive the general weaknesses of many land reform projects as being the lack of attention to continuities between pre- and post-transfer livelihoods strategies.

The study on auditing land redistribution projects by North West University highlighted project failures that emanate from inappropriate planning and contextual failures (Kirsten & Machethe, 2005; Claassens, 2017). The key findings of that study were that out of all the land reform projects in the North West province, one third of them were surrounded by conflict which resulted to members losing interest; 55% of projects did not have the necessary requisite implements for production; 27% had inadequate implements while more than 25% of their projects had not produced anything since taking ownership of their land (Kirsten & Machethe, 2005). Davies *et al*. (2020) confirm that giving beneficiaries land without the means to work it is a recipe for failure. This is further confirmed by Khapayi and Celliers (2016), who state that the unavailability of farming implements, such as tractors and machinery, also limits the farmer's productivity. Khapayi and Celliers (2016) confirm that the majority of the farmers use the little money they have to hire these implements when needed. The implements of those who had them were old and of poor quality (Khapayi & Celliers, 2016). These key findings by Kirsten and Machethe (2005), Khapayi and Celliers (2016), and Claassens (2017) suggest an urgent policy trajectory that will point to corrective measures to ensure that future implementations of land reform circumvent such failures. Claassens (2017) argues that the study's findings draw attention to the quality and appropriateness of the type of business plans that formed the basis for project approval. As Kirsten *et al*. (2016) posit, while the South African government has introduced a comprehensive land reform programme to address skewed land ownership patterns, the reality is that many of these land reform projects have failed to reach the level of commercial viability.

Xaba and Roodt (2018) emphasise that what is important in land reform is not just the acquisition of land, but also the provision of a smooth transfer of land ownership, as well as the provision of

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

post-acquisition support services. Kirsten *et al*. (2016) confirm that infrastructure, such as roads, water, and electricity, is essential as part of the support, in addition to land transfer. Kirsten *et al*. (2016) further argue that, although the rate of failure of land reform projects in South Africa is widely reported in the media and on various public platforms, empirical studies systematically evaluating the status of these land reform projects are very limited. Determining the salience of each contributing factor in the high failure rates is necessary to design remedies that enable better-performing programs (Binswanger-Mkhize, 2014). As Davies *et al*. (2020) state, if our interest is in successful land reform, we should be interested in the factors that contribute to its successful implementation.

3. THE CONCEPT OF PROFITABILITY

Broadly considered, the concept of profitability measures the difference between revenue and costs (Chavhunduka, 2016). Although many techniques exist for profit appraisal, the Return on Investment (ROI) is a popular appraisal technique due to its significance in measuring profitability (Wakibia *et al*., 2011). To consider profitability using ROI, it may also be necessary to consider enterprise value and profit margin. An enterprise is a complex, highly integrated system comprising processes, organisations, information, and supporting technologies, with multifaceted interdependencies and interrelationships across their boundaries (Nightingale, 2002). It is a defined scope of economic organisation or activity that returns value to participants through their interaction and contribution (Allen *et al*., 2001).

When it comes to profit, it is generally measured as gross operating surplus (Kilpatrick, 1996). Returns and margins are two terms commonly used to refer to profit (Obasi *et al*., 2016). The gross operating surplus can be expressed as revenue less expenses, but before loan interest is subtracted (Kilpatrick, 1996; Obasi *et al*., 2016; Chavhunduka, 2016). Phiri *et al*. (2023) express ROI as the difference between total sales, also referred to as gross income (GI), and total variable costs. This represents the ratio or balance between the company's gross profit and the level of sales achieved during the same period (Mahdi & Khaddafi, 2020). Mahdi and Khaddafi (2020) note that sales prices have a strong influence on the gross profit margin. The purpose of measuring the gross profit margin is to determine the amount of gross profit that can be obtained from each unit of the product's sale value (Mahdi & Khaddafi, 2020). Finally, the ROI provides a measure of performance of any investment and represents the enterprise's ultimate objective for shareholders (Zamfir *et al*., 2016). ROI reveals how much a particular business makes from the usage of capital (Wakibia *et al*., 2011;

Babatunde *et al*., 2023). While all other instruments can be useful in measuring profitability, ROI remains one of the most commonly used instruments (Zamfir *et al*., 2016). This study identifies factors that have a significant influence (both positive and negative) on enterprise profitability. The study aimed to analyse the impact of key variables on profitability in land reform farm enterprises.

4. RESEARCH METHODOLOGY

In this section, the main process and steps followed to address the study's primary objective are detailed. Section 4.1 This section discusses the conceptual framework for the study. Section 4.2 outlines the empirical approach. Section 4.3 examines the variables and model selection. Section 4.4 describes the methods of data collection. Finally, Section 4.5 presents the data analysis for the study.

4.1. Conceptual Framework

The conceptual framework for factors affecting profitability, as shown in Figure 1, identifies four key characteristics that impact business profitability. The main characteristics are individual [***IC***], household [***HC***], business [***BC***] and financial capital [***FC***] (Tundui & Tundui, 2018). The predictors that influence profitability mainly emanate from these four characteristics. This study confirms that every factor influencing the profitability of a farm business can be traced back to these four characteristics, as displayed in FIGURE 1.

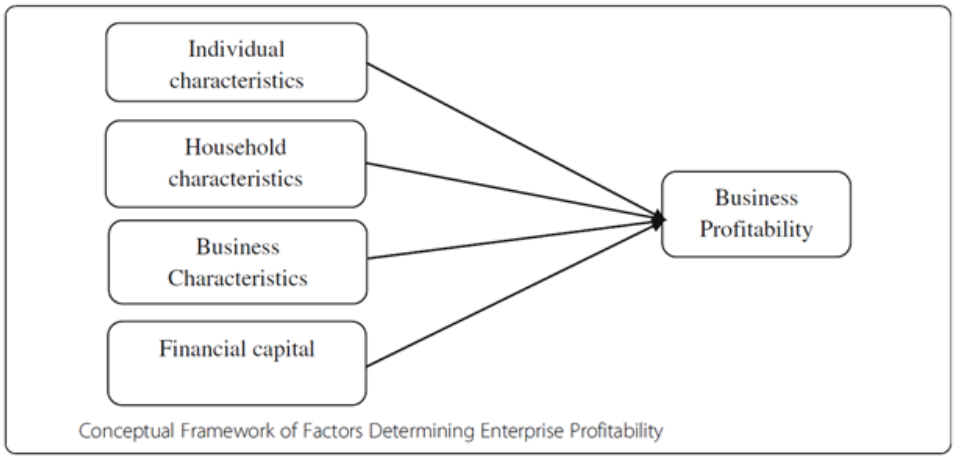

FIGURE 1: Conceptual Framework for Factors Determining Enterprises' Profitability (Source: Tundui & Tundui, 2018)

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

In business, the practice of diversification is crucial for increasing streams of business revenue, thereby enhancing profit [BC]. This also helps reduce hunger and improve other indicators of physical well-being (Rahman & Connor, 2022). Boyce *et al*. (2005) argue that increased variety in product lines may lead to increased income from sales; however, such increased variety may induce some new level of business complexity [BC] and stricter management requirements [IC] (Boyce *et al*., 2005). As a result, while mixed farming is attractive due to the higher income generated from a variety of crops and livestock, Kingwell (2011) argues that mixed farming systems are difficult to manage and require a high level of skill [IC]. Also, decision-making for a mixed farm is a challenging and complex process (Kingwell, 2011). Browne *et al*. (2013) argue that the decision a farmer takes regarding which crops [BC] to cultivate and where, the technology to use, as well as short- and long-term management decisions [IC] will determine the level of profitability for the farm in the near future.

The choice of the mark*et al*so influences the magnitude of profit realised by the farmer [BC] (Xaba & Masuku, 2013; Libago, 2017). Libago (2017) confirms that the gains in profit are often influenced by the market utilised [BC] by the farmer, as prices differ according to type and distance to market. Libago (2017) opine that the National Fresh Produce Markets (NFPM) remain the main channel through which farmers market their vegetable and fruit produce. However, through these channels, the farmers are taken advantage of throughout the transactions since they are unable to negotiate pricing and have weak credit ties [BC] with buyers (Xaba & Masuku, 2013). As a result, many farmers become price takers, as they are indebted to buyers, which reduces their bargaining power and, in turn, reduces their profits (Xaba & Masuku, 2013). When it comes to adopting new and improved production techniques, farmers' level of education [IC] is key (Libago, 2017).

Nyam *et al*. (2022) agree that education [IC] and household size [HC] influence the profitability of farmers. In this regard, a low level of technology adoption and a lack of record-keeping have been associated with a low level of education (Libago, 2017). Bowman & Zilberman (2013) concur that farmers' attitudes [IC], the availability of resources [HC], and their education and knowledge [IC] are particularly crucial in driving profitability. Bowman and Zilberman (2013) further opine that farmers may be risk-averse when it comes to changing crop choices or implementing new agricultural practices [FC]. The decision to maintain lower profits may be due to an inability to fully comprehend the potential results that change can yield.

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

Other factors influencing profitability are the quantity and timing of rainfall [BC], which have a direct impact on the profitability of dryland farming (Browne *et al*., 2013). This is because changes in rainfall affect soil moisture content, pasture, and crop growth, which in turn impact crop yields and livestock production volumes (Browne *et al*., 2013). The price changes [BC] in the factors of production also have significant implications for the farm's profit. The fluctuations take place in both local and international markets (Browne *et al*., 2013). Undoubtedly, the increase in costs of inputs [BC] has a direct impact on the final price paid by the consumer. Such changes and increases initially affect farm-level economics, then spread throughout the entire system (Pannell *et al*., 2014). Farm-level economics [BC] is driven by key factors such as labour, capital, risks, and uncertainties, as well as time-related factors such as interest rates (Pannell *et al*., 2014).

According to Xaba and Masuku (2013), the profitability of vegetable farmers is also dependent on access to credit, selling price, fertiliser quantity [FC] and gender of the farmer [IC]. Xaba and Masuku (2013) concur with Libago (2017) that distance to the market [BC] is a key factor, as farmers pay higher costs for markets located at a greater distance. Xaba and Masuku (2013) further argue that if farmers can reduce transportation costs [BC] and provide commodities or services at a reduced opportunity cost, then market involvement becomes more profitable.

With respect to access to credit, Browne *et al*. (2013) emphasise that start-up finance is an indispensable tool necessary for commercialisation. Hence, credit [FC] is considered a crucial factor in enhancing the farm profitability of agricultural production for resource-poor smallholder farmers (Oyedele *et al*., 2009). Credit enables farmers to afford farm assets as a start-up, generating profit more quickly than they would without access to credit (Xaba & Masuku, 2013). In a study of the profitability of agricultural enterprises by Izekor and Olumese (2010), the lack of adequate capital for investment [FC] was considered the most critical challenge faced by the farmers. Bowman and Zilberman (2013) view that the farmer's choice of crops, farming practices, and desire to invest in new crops or technologies will depend on the farmer's income, resource base, and capacity to obtain credit [FC]. Each of the factors mentioned above is operationalised as a variable that influences the farm's profitability.

4.2. Empirical Approach to the Study

This section outlines the methodology followed in the regression model. Following other studies, Kumbhakar (1994), Adesina and Djato (1997), Kolawole (2006), Izekor and Olumese (2010), Xaba

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

and Masuku (2013) and Libago (2017), the factors that affect the profitability of enterprises as mentioned in section 4.1 were listed and operationalised into variables under TABLE 1.

These variables were further described for notation in the Linear Odds Model. Control variables, such as the farmer's age, gender, and marital status, were included last so that the model prioritises key variables (SmartAfrique, 2020). Dummy variables were recoded to give a mathematical effect to the model. However, Kelley and Bolin (2013) argue that if the analysis is to be successful, not every potential variable that could affect the dependent variable can be included. Hence, some variables that cannot be measured or would have a negligible effect on the model are excluded (Kelley & Bolin, 2013).

4.3. Linear Odds Model to Estimate Profitability

4.3.1. The Variables in the Study

Pienaar and Traub (2015) concur with Kelley and Bolin (2013) that selected variables should have significant discriminating power, which will improve individual performance on the model. They should have a clear relationship to the characteristics that the research is interested in. TABLE 1 provides a list and description of the variables regressed in the model.

TABLE 1: Variables in Linear Odds Model

Variable Name	**Variable Description**	**Notation & Expected sign**	
Dependent Variable (Y)			
Return on Investment (Y_i)	Return on investment in ZAR, expressed as a percentage (ROI%), transformed to a Logit function.	Y_i (LROI)	(+)
Independent Variables (X)			
Land area utilised (X_1)	Size of the farm area in hectares, continuous variable.	Land_utilized_Ha	(+)
Farming experience (X_2)	Farming experience of the farmer in years, continuous variable.	Mangt_Experience	(+)
Education (X_3)	Farmer's level of education in years, continuous variable.	Education_years	(+)
Advisory days (X_4)	Number of days of extension advisory service received per annum, continuous variable.	Advisory_days	(+)

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

Training days (X_5)	Number of days of training received, continuous variable.	Training_days	(+)
Household size (X_6)	Number of persons dependent on farming income, continuous variable.	Household size#	(-)
Labour man-days (X_7)	Labour input in man-days, continuous variable.	Labour_days	(+)
Age (X_8)	Age of the farmer in years, continuous variable.	Age	(-)
Total grant received (X_9)	Total grant funding received in ZAR, continuous variable.	Total_grant	(+)
Chemicals & fuel (X_{10})	Chemicals and fuel costs in ZAR, continuous variable.	Chem+FuelZAR	(-)
Number in entity (X_{11})	Number of persons associated with the legal entity, a continuous variable.	Entity_No#	(-)
Total farm size (X_{12})	Size of the farm in hectares, continuous variable.	Land_size_Ha	(+)
Production inputs cost (X_{13})	Total costs of production inputs in ZAR, continuous variable.	Prod_costs	(-)
Marketing costs (X_{14})	Marketing costs in ZAR, continuous variable.	Marketing_costs	(-)

4.3.2. Model Specification

As already mentioned in Section 3, the Return on Investment (ROI) is widely accepted as a valid method for evaluating investment opportunities against one another or the general performance of any investment (Cloete & Spies, 2013; Zamfir *et al*., 2016). The ROI is instrumental in showing the final production results (De-Pablos-Heredero *et al*., 2018).

The factors influencing the profitability of land reform farm enterprises were analysed using the linear odds model. When analysing data on competing ideas, where there are multiple potential explanations for the link among numerous explanatory variables, regression analysis is occasionally a good fit (Rubinfeld, 2000). Sharaunga & Wale (2013) state that Ordinary Least Squares (OLS) regression can be used to estimate the parameters of an equation that shows the proportion of land allocated to cereal crops (as a fraction of the total arable land) as the dependent variable. However, for a proportion-dependent variable ranging between zero and one, the classical OLS is inappropriate because the prediction can be beyond the zero–one limits (Papke & Wooldridge, 1993; Sharaunga & Wale, 2013). For this reason, the study by Sharaunga and Wale (2013) employed a logit transformation procedure, a method also used by Birkhaeuser *et al*. (1991) and Wale (2010)

(Sharaunga & Wale, 2013). This approach is also applicable to this study, as the dependent variable is a proportion variable with a value ranging from 0 to 100%. The logit transformation procedure was applied to convert the dependent variable (Return on Investment) into a logit variable.

The logit transformation is very useful in rescaling data to make it more understandable and reader-friendly to the average reader (Janzen, 2019). Janzen (2019) confirms that transforming a variable into a logit function does not affect the skewness or linearity of the data, but changes the spread of the numbers. It also provides estimates and the direction of change resulting from the change of one or more variables (Janzen, 2019). In this model, the dependent variable, Return on Investment (expressed as a percentage, ROI%), was transformed into a new variable through a log10 transformation. The Logit Transformation helps reduce the possibility of misleading conclusions produced by data points near 0% or 100% (Marin, 2021).

The model is specified as follows:

Y_i (LROI) $= \beta_0+\beta_1X_1+ \beta_2X_2+ ……..+ \beta_kX_k$ Where;

Y_i = Return on investment expressed as a percentage ;

logit Y_i (LROI)= Log10 of Y_i variable that was transformed from ROI% using a Logit function then employed into a Linear Odds Model;

B_1…….B_k= are regression coefficients associated with X variables in TABLE 1;

X_1……X_k= are values of independent variables in TABLE 1;

β_0 = is the intercept coefficient.

4.3.3. Tests for Variable Reliability

A test for multicollinearity among the variables was performed to assess the sensitivity and specificity of the variables. Gaskin (2024) and DATAtab Team (2024) concur that the results indicate that the model is acceptable if the Tolerance (T) level is not less than 0,1 or the Variance Inflation Factor (VIF) is not greater than 10. The values of the multicollinearity test in Table 2 indicate that no variable has a value of $T < 0.1$ and $VIF > 10$.

TABLE 2: Test for Multicollinearity

Coefficients		
Model	**Collinearity Statistics**	
	Tolerance	**VIF**
Land_size_Ha	0,126	7,918

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

Land_utilized_Ha	0,124	8,078
Mangt_Experience	0,865	1,156
Education_years	0,93	1,075
Advisory_days	0,919	1,088
Training_days	0,832	1,201
Depndents#	0,612	1,634
No_in_entity	0,68	1,47
Prod_costs	0,507	1,973
Labour_days	0,708	1,413
Marketing_cost	0,897	1,115
Age	0,748	1,337
Total_grant	0,827	1,209
Chem+FuelZAR	0,614	1,629
Dependent Variable: LROI		

4.3.4. Suitability of the Model

The model test for fitness was conducted, and the results are displayed in TABLE 3. The Deviance value of 0.271 and the Pearson Chi-square value of 0.271 indicate a relatively good fit model.

TABLE 3: Goodness of Fit Test for Linear Odds Model

Goodness of Fit			
	Value	**df**	**Value/df**
Deviance	46,573	172	0,271
Scaled Deviance	187	172	
Pearson Chi-square	46,573	172	0,271
Scaled Pearson Chi-square	187	172	
Log Likelihood	-135,368		
Akaike's Information Criterion (AIC)	302,736		
Finite Sample Corrected AIC (AICC)	305,936		
Bayesian Information Criterion (BIC)	354,434		
Consistent AIC (CAIC)	370,434		
Dependent Variable: LROI			
Model: (Intercept), Land_utilized_Ha, Mangt_Experience, Education_years, Advisory_days, Training_days, HH_size#, Labour_days, Age, Total_grant, Chem+FuelZAR, No_in_entity, Land_size_Ha, Prod_costs, Marketing_cost			

Vol. 53 No. 6, 2025: 114-154
10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

4.4. Methods of Data Collection

This section discusses the study area, population, sampling method, data collection instruments and data analysis techniques employed in the study.

4.4.1. Study Area

The study focused on the 10 districts of KZN. The districts are Amajuba, Harry Gwala, iLembe, King Cetshwayo, uGu, uMkhanyakude, uMgungundlovu, uMzinyathi, uThukela and Zululand. The study area was considered to be the whole province because the land reform programme is implemented across all districts, and the spread is not uniform across districts. Any reduction would have reduced the sample size, which does not enable proper statistical analysis of the data provided. A smaller sample size would have resulted in validity challenges (Lakshmi & Mohideen, 2013; Sekaran, 2016), as inferences would not be made to the population since the number of assisted land reform enterprises per district significantly differs.

4.4.2. Population

This study considered all land reform farmers in KZN who benefited from redistribution, tenure reform, and restitution programmes, and received acquisition and post-acquisition support from the government, and were using the land for agricultural purposes. Farmers meeting the set criteria were 389.

4.4.3. Sampling of Farmers

The sampling method for this study was purposive sampling. The reason for selecting this sampling method is that the population of land reform beneficiaries in KZN is held by the Department of Agriculture, Land Reform and Rural Development (DALRRD), and information is not publicly available. Additionally, this ensures the researcher is well aware of the study population, as data on farms transferred to land reform beneficiaries has been provided to the researcher upon request by DALRRD in KZN. The farmers were selected to ensure representation of various programmes, i.e., PLAS, LRAD, RLCC, and other programs. The other programmes represent farms that are acquired through joint funding from the state and either a bank loan to the farmer or the farmer's contribution from their own capital. The population of 389 is not a large enough number to allow for more options of sampling, particularly if the data is analysed through statistical tests. Leedy and Ormrod (2005) and Patel and Patel (2019) agree that in purposive sampling, people or other units are chosen for a

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

specific purpose, and that the researcher must justify the appropriateness of the chosen sampling method.

The sample for the study consisted of 262 land reform farmers from the province of KZN, distributed across 10 districts. The sample taken was representative of the total population (67.4%), hence inferences can be made about the total population.

4.4.4. Data Collection Instruments

The data was collected on two levels: primary and secondary data. The initial list of farmers was requested from DALRRD, which included the farmers' information. The farmers who met the qualifying criteria were then selected to form the study population, which totalled 389. The structured questionnaire was divided into five sections: social and demographic, training and experience, marketing and production performance, resources (jobs, machinery, and assets), and financial performance information. The variables were formulated within each category and operationalised to ensure measurability and consistency. As it is challenging to simultaneously optimise internal and external validity, efficacy data from traditional controlled trials are often complemented by evidence from practical trials or observational studies that assess the performance of an intervention under conditions more closely resembling the routine practice of sampled populations (Kennedy-Martin *et al*., 2015). Hence, the structured questionnaire was then piloted to identify shortcomings in the information contained in the form. After piloting and addressing the questionnaire's shortcomings, data were collected from farmers using the revised structured questionnaire.

To mitigate the bias of self-reported data, the farmers provided information on numbers, production records, and all quantifiable data, referencing their previous farm records. In cases where information is provided and cannot be reconciled with the records due to unavailability, industry norms were verified to ensure that the provided information is consistent with the norm. Additionally, information received from the DALRRD, including details on farmer acquisition, farm sizes, and other historical data, was verified. All information provided through the structured questionnaire was then captured in Microsoft Excel format and later transferred to SPSS and the DATATab Online Statistics Calculator for analysis.

Vol. 53 No. 6, 2025: 114-154
10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

4.5. Data Analysis

The primary aim of this study was to identify factors influencing the success and failure of land reform beneficiary farms. The options for econometric models to analyse the variables determining profitability included the Multiple Linear Regression Model, the Log-linear Hazard Model, the Transformed Logit and Linear Odds Model (also known as Generalised Logistic Regression Model). The dependent variable, ROI%, is expressed as a percentage, ranging from 0% to 100%. This variable cannot be measured using Ordinary Least Squares (OLS) because OLS will predict both negative and positive values, and can exceed the 100% limit (Sharaunga & Wale, 2013). Hence, for this study, the linear odds model was employed, as it can accommodate a percentage-dependent variable. Before this model was employed, a Transformed Logit model was used to transform the dependent variable into a Logit variable, as stated in sections 4.3.2 and 4.3.4, which outlined the selection and suitability of the model. The new variable of log ROI was then regressed through the Linear Odds Model.

5. RESULTS AND DISCUSSIONS

5.1. Descriptive Details of Respondents

The sample comprised 61.8% males and 38.2% female farmers (N = 262). Of the total farmers, 87.4% were African, 10.7% were Indian, and 1.9% were Coloured. In terms of marital status, 58.4% were married, 27.1% were single, 10.3% were divorced, and 4.2% were widowed. The mean age of respondents was 46.77 years (SD = 9.91 years). The smallest farm size was 10 hectares, and the largest was 2,247 hectares. The youngest farmer was 24 years old, and the oldest was 72 years old. The average farm size was 351.93 hectares (SD = 246.729 hectares).

TABLE 4: Relationship of ROI with Classified Respondents

Mean & Std. Deviation of ROI %			
Classification	**ROI %**	**Mean ROI %**	**Std. Deviation**
African	229	21,59%	36,77%
Indian	28	53,50%	79,83%
Coloured	5	10,26%	13,49%
Married	153	26,58%	49,00%
Single	71	26,06%	37,39%
Separated/divorced	27	9,87%	16,19%
Widowed	11	28,13%	55,86%
Female	100	28,60%	52,55%

Male	162	22,42%	37,94%
Amajuba	19	14,70%	35,93%
Harry Gwala	18	10,76%	19,96%
iLembe	23	70,58%	85,02%
King Cetshwayo	39	38,92%	55,06%
uGu	26	26,15%	39,16%
uMkhanyakude	15	37,49%	45,95%
uMgungundlovu	43	19,69%	21,41%
uMzinyathi	28	3,99%	7,50%
uThukela	19	5,51%	8,05%
Zululand	32	17,92%	29,92%
Average total	**55,16**	**24,88%**	**38,26%**

In TABLE 4, the mean ROI% for each classification is displayed. By racial demographics, Indians have the highest ROI percentage at 53.50%, followed by Africans and Coloureds with 21.59% and 10.26%, respectively. The ROI% ranges from 26% to 28% across marital statuses, except for separated or divorced individuals, who have the lowest at 9.87%. By gender, females have a higher ROI% than male respondents, with 28.60% and 22.42%, respectively. When considering the districts across the board, the mean ROI% varies significantly, with the iLembe district being the highest at 70.58% and uMzinyathi having the lowest at 3.99%. Across all the classifications, the Standard Deviations vary significantly from the means. The overall mean ROI% across the classes is 24.88% (SD = 38.26%).

TABLE 5: Distribution of Farms by Programme and District

Acquisition of Farms by Programme										
District	**PLAS**		**LRAD**		**RLCC**		**Other**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Amajuba	10	3.8%	0	0%	6	2.3%	3	1.1%	19	7.3%
Harry Gwala	11	4.2%	2	0.8%	3	1.1%	2	0.8%	18	6.9%
iLembe	13	5%	5	1.9%	3	1.1%	2	0.8%	23	8.8%
King Cetshwayo	26	9.9%	5	1.9%	4	1.5%	4	1.5%	39	14.9%
uGu	15	5.7%	1	0.4%	5	1.9%	5	1.9%	26	9.9%
uMkhanyakude	11	4.2%	2	0.8%	2	0.8%	0	0%	15	5.7%
uMgungundlovu	27	10.3%	2	0.8%	9	3.4%	5	1.9%	43	16.4%
uMzinyathi	13	5%	0	0%	9	3.4%	6	2.3%	28	10.7%
uThukela	11	4.2%	3	1.1%	3	1.1%	2	0.8%	19	7.3%
Zululand	18	6.9%	1	0.4%	8	3.1%	5	1.9%	32	12.2%

10.17159/2413-3221/2025/v53n6a21844
(License: CC BY 4.0)

Total	**155**	**59.2%**	**21**	**8%**	**52**	**19.8%**	**34**	**13%**	**262**	**100%**

TABLE 5 presents the distribution of land reform farms in KZN by acquisition programme and district. The highest category is PLAS farms, with 59.2% of the total dataset. The second-highest category is RLCC farms, accounting for 19.8%, followed by LRAD at 8% and other programs, including bank loans and blended finance, at 13%. There are more farms acquired under the uMgungundlovu district, with an overall 16.4%, followed by the King Cetshwayo District with 14.9%. The district with the lowest acquisition rate is uMkhanyakude, at 5.7% of the total sample.

5.2. Findings of the Study

TABLE 6: Model Summary for Linear Odds Model

Omnibus Test		
Likelihood Ratio Chi-square	**df**	**Sig.**
90,489	14	<0,001
Dependent Variable: LROI		
Model: (Intercept), Land_utilized_Ha, Mangt_Experience, Education_years, Advisory_days, Training_days, HH_size#, Labour_days, Age, Total_grant, Chem+FuelZAR, No_in_entity, Land_size_Ha, Prod_costs, Marketing_cost		
Model: Compares the fitted model against the intercept-only model.		

The overall regression model shows that the predictors in TABLE 6 retained a statistically significant model, with a likelihood ratio chi-square of 90,489; $P < 0.001$.

TABLE 7: Test of Model Effects for Linear Odds Model

Tests of Model Effects			
	Type III		
Source	**Wald Chi-square**	**df**	**Sig.**
(Intercept)	**3,677**	**1**	**0,055**
Land_utilized_Ha	**0,244**	**1**	**0,621**
Mangt_Experience	**3,236**	**1**	**0,072**
Education_years	**0,081**	**1**	**0,776**
Advisory_days	**13,402**	**1**	**<0,001**
Training_days	**3,875**	**1**	**0,049**
HH_size#	**5,193**	**1**	**0,023**
Labour_days	**28,22**	**1**	**<0,001**
Age	**0,416**	**1**	**0,519**
Total_grant	**0,003**	**1**	**0,954**

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

Chem+FuelZAR	**1,152**	**1**	**0,283**
No_in_entity	**0,004**	**1**	**0,947**
Land_size_Ha	**0,824**	**1**	**0,364**
Prod_costs	**8,197**	**1**	**0,004**
Marketing_cost	**15,103**	**1**	**<0,001**
Dependent Variable: LROI			
Model: (Intercept), Land_utilized_Ha, Mangt_Experience, Education_years, Advisory_days, Training_days, HH_size#, Labour_days, Age, Total_grant, Chem+FuelZAR, No_in_entity, Land_size_Ha, Prodcost_Ha, Marketing_cost			

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

TABLE 8: Parameter Estimates for Linear Odds Model

Parameter Estimates							
Parameter	**B**	**Std. Error**	**95% Wald Confidence Interval**		**Hypothesis Test**		
			Lower	**Upper**	**Wald Chi-square**	**df**	**Sig.**
(Intercept)	0,602	0,3141	-0,013	1,218	3,677	1	0,055
Land_utilized_Ha	0	0,0004	-0,001	0,001	0,244	1	0,621
Mangt_Experience	-0,016	0,0088	-0,033	0,001	3,236	1	0,072
Education_years	0,004	0,0142	-0,024	0,032	0,081	1	0,776
Advisory_days	0,032	0,0086	0,015	0,048	13,402	1	**<0,001**
Training_days	0,006	0,0033	0,000028	0,013	3,875	1	**0,049**
HH_size#	-0,018	0,008	-0,034	-0,003	5,193	1	**0,023**
Labour_days	0,00005	0,00001	0,00003	0,00007	28,22	1	**<0,001**
Age	0,003	0,0042	-0,005	0,011	0,416	1	0,519
Total_grant	0,00000	0,00000	0,00000	0,00000	0,003	1	0,954
Chem+FuelZAR	0,00000	0,00000	0,00000	0,00000	1,152	1	0,283
No_in_entity	0,001	0,0207	-0,039	0,042	0,004	1	0,947
Land_size_Ha	0	0,0004	-0,001	0	0,824	1	0,364
Prod_costs	0,00002	0,00001	0,00001	0,00003	8,197	1	**0,004**
Marketing_cost	-0,003	0,0008	-0,004	-0,001	15,103	1	**<0,001**
(Scale)	0,249	0,0258	0,203	0,305			
Dependent Variable: LROI							
Model: (Intercept), Land_utilized_Ha, Mangt_Experience, Education_years, Advisory_days, Training_days, HH_size#, Labour_days, Age, Total_grant, Chem+FuelZAR, No_in_entity, Land_size_Ha, Prodcost_Ha, Marketing_cost							
a. Maximum likelihood estimate							

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

5.3. Summary of Findings

A dependent variable, Return on Investment expressed as a percentage (ROI%), was transformed through a logit function to create a new variable, which is a log function of the ROI%, Y_i (LROI). A Linear Odds Model analysis was performed to examine the influence of the Predictor variables: Land area utilised (*Land_utilized_Ha*), Management farming experience (*Mangt_Experience*), Farmer's level of education (*Education_years*), Extension advisory service (*Advisory_days*), Training received from government and stakeholders (*Training_days*), Household size dependent on farm income (HH_size#), Labour man-days (*Labour_days*), Farmer's age (*Age*), Total grant funding received (*Total_grant*), Chemicals and fuel costs (*Chem+FuelZAR*), Number of people in entity (*No_in_entity*), Total farm size (*Land_size_Ha*), Production inputs cost (*Prod_costs*), and Marketing costs (*Marketing_cost*) on the dependent variable logit of Return on Investment Y_i (LROI). TABLE 8 shows the parameter estimates generated through the model, and significant variables at a 0.05 significance level are highlighted in bold.

5.4. Discussions of Study Results

The diagnostic test for the model fit is indicated in TABLE 3. The study's findings show that when all independent variables (X1—X14) are equal to zero, the value of the dependent variable LROI is 0.602. Because this is a positive value, it implies a positive slope. The study found that there is a statistically significant influence of variables Extension advisory service (*Advisory_days*), Training received from government and stakeholders (*Training_days*), Household size dependent on farm income (*HH_size#*), Labour man-days (*Labour_days*), Production inputs cost (*Prod_costs*) and Marketing costs (*Marketing_cost*), [X_4, X_5, X_6, X_7, X_{13} and X_{14}].

The results of the study show that there is statistical significance ($P < 0.001$) in the effect of extension advisory service (Advisory_days) on the profit generated, Y_i (LROI). For every 1-unit increase in the unit of extension advisory service, there is a 0.032 (3.2%) increase in the Return on Investment, Y_i (LROI). This finding is consistent with a study by Van den Berg (2013), as well as Qwabe et al. (2023) and Makamane et al. (2025) who highlighted the importance of extension services, which established that an increase in the frequency of extension advisory visits imparts knowledge and information that leads to increased income generation for farmers, thereby enhancing profits. Agricultural extension services provide information and inputs that enhance human capital, potentially improving rural well-being (Anang *et al*., 2020). This means that

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

extension advisory services must be prioritised in order to enable farmers to learn about efficient and emerging technologies, tactics, and current challenges, so that they can succeed in farming. Farmers get to learn about new varieties of crops, the attractive markets and precision in their current farming ventures. Both education and extension advisory are very critical for farmers in enabling the adoption of new technologies (Oni *et al*., 2011). This result justifies the provision of extension advisory services to farmers as critical, and a lack thereof results in declining profitability on land reform farms. Rahman and Connor (2022) argue that fewer studies have examined the effects of provider type, whether private or public, as well as the frequency (i.e., the number of extension visits) on farm welfare, despite many studies having evaluated the impact of extension services. Most studies treat the presence or absence of extension as a binary variable to test treatment effects (Ragasa & Mazunda, 2018; Rahman & Connor, 2022). According to the findings by Rahman and Connor (2022), there is a significantly different result between farmers who received one extension visit, multiple extension visits, and those who used private provisions as opposed to public sector extension. One area of improvement required in the extension advisory service is consistency and needs-based advisory. Farmers should not be surprised when receiving extension, but rather, it should be well-timed and within schedule, responding to the prevailing challenges at the time, or routinely followed to ensure the sustenance of results.

This study also shows statistical significance (P = 0.049) in the effect of training received by land reform farmers from government and stakeholders (Training_days) on profit generated, Y_i (LROI). For every 1-unit increase in training, the profitability (ROI) changes by 0.006 units (i.e., 0.6%). Additionally, this indicates a positive slope, which signifies a significant contribution of training to profitability. This finding is consistent with those of Libago (2017), who concluded that when training is provided to farmers, profitability increases by 16.4% as a result of the farmers gaining more insights about production. Chauke *et al*. (2013) and Shushu et al. (2024) also found that farmers who did not receive training remain at risk and have no access to new forms of technology in farming, which enables them to access financial services through technology. These farmers only rely on their own assets to generate capital (Chauke *et al*., 2013). This finding also aligns with Rahman and Haider (2023), who concluded that farmers who received training exhibited a significant increase in their farm management knowledge compared to their counterparts who did not receive any training. The delay in training and extension results in significant losses, as farming cannot be paused or suspended (Ellenson & Madhanpall, 2014). The

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

findings of this study are also in line with those of Antwi and Chagwiza (2019), who found that the number of trainings attended by the farmer, along with the average net farm income of the project, had a positive and significant effect on the farmer's ability to save from their proceeds. Borthakur *et al*. (2015) assert that the primary obstacles to farmers' use of new technology are a lack of experienced labour, knowledge, training, and experience.

In a study by Begum *et al*. (2013), training and involvement in farmer associations were found to have a statistically significant influence on farmers' technical efficiency in farming (Begum *et al*., 2013). Serin *et al*. (2009) further contend that where farming requires more labour, as is the case in developing countries, than in industrialised nations, farmers' human capital – including their education and technical training – is increasingly crucial. Importantly, not only is formal education deemed to be influential in farming productivity, but also "on the job" or specific training is an important source of productivity and growth (Serin *et al*., 2009). Moyo (2010) argues that indigenous knowledge is still widely used in agricultural management methods in most African countries and has a significant influence on farmers' decision-making processes. Hence, these can be integrated into transferring knowledge to farmers, as it is information they already know and relate to. As Salami *et al*. (2020) suggest, indigenous knowledge of agriculture remains essential in the production of food for urban residents. Anderson (1997), as cited by Serin *et al*. (2009), suggests that education and training are essential for managing and promoting the changes that farmers need to be sustainable. A speedy resolution of agricultural challenges can be achieved by integrating technological advances, as well as indigenous and conventional methods, to increase productivity (Muthee *et al*., 2019).

Notably, the age factor remains critical in training. While the age of the farmer may be neglected (Manenzhe *et al*., 2016), age remains a critical variable, as training and acquiring commercial skills is a lengthy process that requires the ability to comprehend as one learns (Sihlobo & Nel, 2016). Dagada *et al*. (2015) confirmed the finding of this study, stating that low levels of education necessitated increased training needs to raise the profitability of fruit farmers in Limpopo. Rohani *et al*. (2020) also observed that formal education is more prevalent among the younger generation, while non-formal education, for example, on-farm training, is more suitable for farmers who currently do not pursue formal education due to limitations such as age. Hence, the integration of

both formal and non-formal education bridges the gap between the different age groups in farming, balancing the transfer of skills to all.

This study also found statistical significance in the effect of Household size on farm income (HH_size#), P = 0.028. The coefficient of the Y_i (LROI) changes by -0,018 (-1,8%) for every 1 unit increase in the number of household members dependent on farm income. This finding aligns with the findings by Omiti *et al*. (2009) and Kyaw *et al*. (2018), who confirmed that higher household size reduces farmers' participation in markets. Swanepoel and Van Niekerk (2018) and Swanepoel et al. (2021) similarly found connections between household size, food security, and agricultural participation. Hlatshwayo *et al*. (2021) confirm that an increased household size reduces the total products sent to the market, as more products are allocated for own household consumption as opposed to market supply. The negative coefficient illustrates that as the household size increases, the quantity of goods sold to the market decreases. As a result, larger households would have less produce to provide to the market compared to smaller households (Kyaw *et al*., 2018). This is sed by Mango *et al*. (2014), who confirm that household food security is affected by household size, with larger households experiencing reduced food security. However, Mango *et al*. (2014) conclude that little can be done with household size except to improve household education levels, labour participation, and market information, as reducing household size is impossible. In a study by Hlatshwayo *et al*. (2021), an unexpected outcome emerged where the household size was found to contribute positively to farmers' market participation. This, according to Hlatshwayo *et al*. (2021), is justified when family farms utilise family labour for production, thereby reducing labour costs. The reduced labour costs positively contribute to the aggregate farm returns, thereby raising farm profits.

The study found statistical significance in the effect of Labour man-days (Labour_days) on profitability (P < 0.001). The coefficient of the Y_i (LROI) changes by 0,00005 (0,005%) for every 1 unit increase in the labour man-days. This finding aligns with the study by Asuming-Brempong *et al*. (2013), who confirmed that both land productivity and labour productivity are key determinants of commercialisation in farming. In the study by Asuming-Brempong *et al*. (2013), labour productivity was found to be significant in increasing the value of farm sales, which in turn increases profitability. Also, the farm income and labour productivity were positively correlated (Asuming-Brempong *et al*., 2013). Balancing the efficiency of employed labour is equally critical

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

for a productive farming operation. Farms that can balance the efficiency are found to be more profitable (Deming *et al*., 2019). Among other tasks, farmers also need to determine whether the use of internal labour remains efficient or if they should consider other alternatives, such as contracting. Deming *et al*. (2019) argue that some tasks on the farm can be replaced with machinery, although there are associated costs. However, they also argue that the savings associated with it should be noted (Deming *et al*., 2019). Compared to human labour, contractors generally have larger equipment, which reduces the time spent on tasks (Deming *et al*., 2019). While labour input contributes positively to the farm's profitability, the farmer must also consider the balancing of applicable tasks.

This study also found statistical significance in the effect of production input costs (Prod_costs) with P = 0.004. The coefficient of the Y_i (LROI) changes by 0,00002 (0.002%) for every 1 unit change in costs of production inputs. This finding is not consistent with many studies. For example, Kassali's (2011) finding showed that an increase in the production costs of sweet potato farmers leads to a decrease in the profit generated by farmers. Additionally, Adeyemo *et al*. (2010) found that farmers need to reduce variable production costs to increase their profits. Ideally, this should be done through comparison of marginal costs and marginal revenue to ensure that cost reduction does not negatively affect the returns due to compromised inputs and services on the farm. However, according to Palia and De Ryck (2016), this finding is not unprecedented. Palia and De Ryck (2016) recommend using the unit cost of production performance analysis to identify instances where the unit costs of production of one or more product lines are above or below the average.

Adeyemo *et al*. (2010) and Libago (2017) further mention that, in general, the variable costs of production include labour; hence, a reduction in labour costs greatly results in increased profit margins for farmers. In this study, the finding that increasing production costs raise profits is well integrated with the finding that labour man-days increase the farm's profitability. Hence, with increased precision of labour inputs in production, there will be an increase in production costs, which will lead to a higher increase in profits. This is supported by Tey and Brindal (2015), who contend that different production costs should have varying impacts on farm net incomes. Furthermore, Van den Berg (2013) concurred with this finding, stating that the relatively high production costs are associated with high labour costs on farms operated by the elderly, as they

rely on hired labour due to old age. Kumbhakar (1994) argues that more than 50% of the farms in land reform have an inefficient use of resources, including inputs such as fertiliser, manure, and labour. The costs of inputs include the fertiliser, water, electricity, labour, and costs of purchasing seeds, seedlings, breeding stock, etc. As a result, strengthening the controls on production costs should be informed by the correct application of rates and scales of production inputs.

This study also found statistical significance on the effect of marketing costs (*Marketing_cost*), P < 0,001. The coefficient of Yi (LROI) changes by –0.003 (–0.3%) for every 1-unit increase in marketing costs. This finding aligns with Makhura's (2002) research, which found that marketing costs for emerging small-scale farmers have a negative impact on profitability, particularly when farmers lack access to relevant market information. Palia and De Ryck (2016) argue that small-scale farmers are consistently disadvantaged by marketing costs compared to large corporations. Omiti *et al*. (2009) further confirm that distance to the market negatively affects farmers' decisions to participate in the market and the volume of output marketed. Large farming operations can identify areas to focus their marketing efforts based on the volumes and scale of production (Palia & De Ryck, 2016). Again, the finding of this study is confirmed by Hardesty and Leff (2010), who found that significant costs associated with marketing affect profitability, including labour and marketing services. However, Hardesty and Leff (2010) state that significant variations exist between marketing costs across the marketing channels. While the farmers' markets may be considered minimal in terms of costs, the significant labour activity and proper packaging costs do affect the gains received by the farmers through the farmers' markets (Hardesty & Leff, 2010). This finding is confirmed by studies by Kyaw *et al*. (2018) and Asad *et al*. (2019), who found that farmers lack marketing knowledge, resulting in most of their crops being sold at lower prices at the farmgate or in local markets. The cure for marketing challenges is to revive farmer associations, which will increase farmers' bargaining power. Proper training and extension advisory services should target the farmers' challenges, ensuring that critical market information is shared during the visits. Transparency in the marketing system, including charges and compliance statutory fees associated with certain markets, should be emphasised at all times so that farmers consider themselves equal role players in the market.

Lastly, for the study's results to be sound, they must be generalisable in a different environment with similar conditions (Kennedy-Martin *et al*., 2015). This makes the study's contribution to

adding value and solutions to problems elsewhere with similar circumstances (Peters *et al*., 2018). The challenge typically encountered is the resource constraints faced by the implementers of the recommended solutions, which in turn reduces the impact of the implemented recommendations (Peters *et al*., 2018). Furthermore, it is essential to carefully consider the limitations of any intervention before implementing the actual recommendations, in order to achieve the best possible results from the intervention.

6. POLICY IMPLICATIONS

This study recommends that, as a policy position, before providing any financial support that will be controlled by the farmer for operations, training should be provided to maximise the impact of the government's and stakeholders' financial investments.

7. LIMITATIONS OF THE STUDY

Some members of land reform enterprises who wished to participate in the study on farms owned by Trusts and Communal Property Associations (CPAs) withdrew due to fear of victimisation. This prevents the researcher from obtaining valuable information to study the real circumstances on the ground in farming communities. Additionally, farms where allocated farm beneficiaries have passed away and the government is in the process of allocating a new beneficiary cannot be assessed due to a lack of a responsible individual to provide information on farm operations. Some of these farms were managed by interim caretakers to prevent theft and property damage.

Some challenges arose from the availability of farmers, who would often be busy with other farm operations and preferred that the questionnaire be left for them to complete at a later stage. Some of these questionnaires were never returned, which disadvantaged the researcher in eliciting important information that could improve the analysis. However, this incident occurred rarely and does not affect the analysis and inferences of the study. On farms not operated coherently by entities or where enterprise members are in conflict, the information received was sometimes uncoordinated, and when verified, it showed no correlation with the expected norm. In such cases, the information was verified with the respondents to ensure coherence with the industry norms and production standards. The incoherence would mainly emanate from the farming operation not being run optimally. However, these were included in the analysis to provide a comprehensive picture of the status of land reform farms.

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

Due to the geographic spread of farms in areas such as Zululand, Amajuba, and uMzinyathi districts, data collection on some farms can be conveniently conducted based on the proximity of farmers in the same area. In cases where only one farm is located at an outlier location, and the farmer does not have an email address or cannot be reached by phone, the data were not collected due to the spatial dispersion of the area. However, this condition would have no bearing on the findings and inference made since a good representation of the total population was achieved, at 67%.

To address the limitations of the study, future research should consider employing mixed-methods approaches to ensure that a diverse farmer population is reached and that information is collected. This could include digital methods, such as an online questionnaire that respondents can fill out at their convenience using modern technology. This will ensure that even spatially remote areas are accessible, and also that respondents will not be victimised by their peers due to the commotion created by the in-and-out movement of data collectors, drawing attention. Electronic reminders, such as short messages sent to respondents who have not participated in the study, should also be considered to enhance the return rate of the questionnaires. These strategies will enhance future studies and maximise their impact for the betterment of farming communities.

8. CONCLUSIONS

This study concluded that extension advisory services (X4), training received from government and stakeholders (X5), household size (X6), labour man-days (X7), production input costs (X13), and marketing costs (X14) are key factors that influence the profitability of land reform enterprises in KwaZulu-Natal. Any plan that seeks to address the productivity and profitability of land reform enterprises must include the key areas of intervention on these factors for maximum impact.

Skilling farmers through training and extension advisory services will improve their farming skills and business acumen, enabling them to make informed decisions that raise their farm profits and ensure continuous growth on land reform farms. Extension advisory and training encourage farmers to adopt new technology, access financial systems, and also encourage them to save their own funds to continue operations during off-seasons or in the event of disasters. During these trainings, pertinent information about industry changes is communicated, and farmers are able to seek clarification where necessary.

This study also concludes that training and extension advisory services are non-negotiable instruments through which the outlook of small-scale farming can be enhanced. In addition, the government should also strengthen the extension programme to align with the needs of land reform. This is paramount since agriculture strongly depends on seasonality. Hence, any delays in implementing certain activities result in severe losses for the farmer. The challenge is that there appears to be no alignment between the introduction of the land reform programme and the preparation of new farmers, some of whom have never farmed at the scale of production they now operate after benefiting from land reform. This assessment should be made in comparison with international extension and training standards, emulating the best practices from the best-performing countries in training and extension.

The size of the household has a significant impact on the farm's profitability. As stated by other studies, there is little that can be done by adjusting household size. Increased labour man-days and dedication to the farm operations have also shown signs of increasing profitability. Ensuring the regulation of specified man-days for farm operations is useful in circumventing over-compensation of labour and ensuring that costs paid for activities are market-related. Overcompensating beyond the specified rates disadvantages the business, while undercompensating discourages employees (or their family members), and they start to consider other employment opportunities elsewhere to earn better salaries.

The control of production input costs through analysis of unit production costs helps farmers greatly reduce unnecessary costs that do not add value to the business. For example, a sudden reduction in production input costs may reduce the benefits generated by inputs on farm productivity. However, a comparison of marginal costs and marginal returns on operations will enable farmers to make informed decisions about whether to invest in a particular enterprise.

The farmer's level of education is significantly associated with their ability to comprehend abstract texts, read instructions, and apply correct measurements of inputs, as well as forecast production and returns in farming. This promotes operational efficiency and reduces post-harvest losses and resource waste. Furthermore, both formal and informal training are necessary to cater to the diverse needs of different categories of farmers. While literature suggests that farmers' age significantly impacts their ability to learn, integrating technical knowledge with indigenous knowledge systems can substantially reduce the knowledge gap across farming generations. In

addition, elderly farmers will find it easy to relate to indigenous knowledge since they have experienced and lived it. Hence, there needs to be a way to incorporate the indigenous knowledge system into the government's selection criteria for allocation. The current systems only recognise formal qualifications and experience.

In terms of markets, farmers' access to markets is a key factor that enhances their profitability. It is essential to consider the market's efficiency itself. The same can be said for access to credit; while some farmers may be constrained in accessing services to produce their products, some marketers find it easy to provide bridge finance to their suppliers during the off-season to buy inputs and pay for services. Farmers who are constrained from accessing credit often struggle to afford new and improved technology that can help them grow their businesses and produce high-quality products. In this way, marketers themselves will be certain to have a product in the future due to this reliable relationship based on mutual interest. While a lack of access to credit negatively affects profitability, it is crucial to revamp the funding systems to better cater to farmers' needs. Even farmers who may qualify for credit often find that the repayment periods are not suitable for their farming calendar. Hence, receiving credits from mutually beneficial partners reduces the risk of paying exorbitant interest and arrears in the future, based on misunderstandings or miscalculations of incorrect payment terms. This will help farmers establish their own credit record over time.

Lastly, the cost of marketing also drives the profitability of farming enterprises. The study concludes that the marketing factors for land reform farm enterprises need to be considered for transparency. Currently, there is no single unified marketing strategy among the farmers, even those in the same commodity. Each chooses their market based on personal preferences. Additionally, other important aspects, such as road infrastructure, distance to the market, and the availability of the market itself, are key. The costs of marketing are not always clearly defined in terms of their breakdown, including agency fees and the marketer. Due to a lack of resources and transparency in market information, farmers are more price takers than price makers. Participation in the marketing process will enable farmers to make informed decisions about choosing their market, considering factors such as location, pricing, product quality, service quality, and volumes delivered over a specified period.

10.17159/2413-3221/2025/v53n6a21844 (License: CC BY 4.0)

9. RECOMMENDATIONS OF THE STUDY

From the results of this study, the following recommendations are made:

- It is recommended that, where family labour is available, farmers be encouraged to prioritise hiring family members at the appropriate labour task rates to reduce the negative effect of high household size on profitability while creating employment opportunities.
- It is recommended that market engagements between farmers and marketing agents be encouraged to establish relationships that assist resource-constrained farmers. For example, this could involve bridge financing at discounted interest rates for production inputs during off-season, which would guarantee the delivery of the product at the correct time, form, and quality.
- This study recommends a comprehensive overhaul of the training and extension advisory service, incorporating practical Key Result Areas (KRAs) and target areas for land reform enterprises, drawing on knowledge from countries with efficient extension advisory and training support systems.
- It is recommended that further studies investigate the lack of primary producer farmer direct participation in prime agricultural markets, the breakdown of marketing costs, and ways to encourage transparency in marketing information.

10. DISCLOSURE

The authors declare that they have no competing interests in this study.

REFERENCES

ADESINA, A.A. & DJATO, K.K., 1997. Relative efficiency of women as farm managers: Profit function analysis in Côte d'Ivoire. *Agric. Econ*., 16(1): 47-53.

ADEYEMO, R., OKE, J.T.O. & AKINOLA, A.A., 2010. Economic efficiency of small scale farmers in Ogun State, Nigeria. *Tropicultura.*, 28(2): 84-88.

AKINOLA, A.O. & KASEERAM, I., 2021. *Globalization of South African land reform scheme: An interrogation. The new political economy of land reform in South Africa*. Cham: Palgrave Macmillan.

ALLEN, M.L., MCKAY, A. & DE PENNINGTON, A., 2001. Approach to characterizing virtual enterprises. *Proc. SPIE - Int. Soc. Opt. Eng*., 4566: 41-49.

ANANG, B.T., BÄCKMAN, S. & SIPILÄINEN, T., 2020. Adoption and income effects of agricultural extension in northern Ghana. *Sci. Afr.,* 7(1): 219.

ANTWI, M. & CHAGWIZA, C., 2019. Factors influencing savings among land reform beneficiaries in South Africa. *Int. J. Soc. Econ.,* 46(4): 474-484.

ASAD, M., MEHDI, M., ASHFAQ, M., HASSAN, S. & ABID, M., 2019. Effect of marketing channel choice on the profitability of citrus farmers: evidence form Punjab-Pakistan. *Pak. J. Agric. Sci*., 56(4): 1003-1011.

ASUMING-BREMPONG, S., ANARFI, J.K., ARTHUR, S. & ASANTE, S., 2013. Determinants of commercialization of smallholder tomato and pineapple farms in Ghana. *Am. J. Exp. Agric*., 3(3): 606-630.

BABATUNDE, A., DEBORAH, R.A., GAN, M. & SIMON, T., 2023. Economic viability of a small scale low-cost aquaponic system in South Africa. *J. Appl. Aquac*., 35(2): 285-304.

BEGUM, M.E.A., HOSSAIN, M.I. & PAPANAGIOTOU, E., 2013. Technical efficiency of shrimp farming in Bangladesh: An application of the stochastic production frontier approach. *J. World Aquac. Soc*., 44(5): 641-654.

BESLEY, T. & BURGESS, R., 2000. Land reform, poverty reduction, and growth: Evidence from India. *Q. J. Econ*., 115(2): 389-430.

BINSWANGER-MKHIZE, H.P., 2014. *From failure to success in South African land reform*. Minnesota: AgEcon.

BIRKHAEUSER, D., EVENSON, R.E. & FEDER, G., 1991. The economic impact of agricultural extension: A review. *Econ. Dev. Cult. Change*., 39(3): 607-650.

BORTHAKUR, S., MISHRA, P., TALUKDAR, R.K. & BORTAMULY, D., 2015. Scaling the adoption of recommended rice production technologies by the farmers in Assam State. *Indian Res. J. Ext. Educ*., 15(2): 32-37.

BOWMAN, M.S. & ZILBERMAN, D., 2013. Economic factors affecting diversified farming systems. *Ecol. Soc*., 18(1).

BOYCE, J.K., ROSSET, P. & STANTON, E.A., 2005. Land reform and sustainable development. In J.K. Boyce, S. Narain & E.A. Stanton (eds.), *Reclaiming nature: Environmental justice and ecological restoration*. Anthem Press, pp. 127-150.

BROWNE, N., KINGWELL, R., BEHRENDT, R. & ECKARD, R., 2013. The relative profitability of dairy, sheep, beef and grain farm enterprises in southeast Australia under selected rainfall and price scenarios. *Agric. Syst.,* 117: 35-44.

CHAUKE, P.K., MOTLHATLHANA, M.L., PFUMAYARAMBA, T.K. & ANIM, D.F.K., 2013. Factors influencing access to credit: A case study of smallholder farmers in the Capricorn district of South Africa. *Afr. J. Agric. Res*., 8(7): 582-585.

CHAVHUNDUKA, T., 2016. Understanding the diversity of farming systems and assessing the profitability of farming activities of beneficiaries of the Zimbabwe land reform programme: The case of Chegutu district (Ward 12). Doctoral Dissertation, University of Pretoria.

CLAASSENS, A., 2017. *Land reform: Restitution, redistribution and security of tenure*. Pretoria: High Level Panel.

CLOETE, P.C. & SPIES, D.C., 2013. *PR-farm level financial analysis of the wildlife sector in South Africa*. 19th Congress, Warsaw, Poland, 345663. International Farm Management Association.

COUSINS, B., 2016. *Land reform in South Africa is sinking. Can it be saved*? Cape Town: University of Western Cape, PLAAS.

DAGADA, M.C., NESAMVUNI, A.E., TSHIKOLOMO, K.A. & VAN ROOYEN, C.J., 2015. Factors influencing fruit profitability at Tshakhuma and Khumbe Markets, Limpopo Province, South Africa. *J. Agric. Sci*., 7(7): 53.

DATATAB TEAM., 2024. *DATAtab: Online Statistics Calculator. DATAtab e.U. Graz, Austria*. Available from https://datatab.net/. Graz: DATAtab.

DAVIES, R., KOSEC, K., NKONYA, E. & SONG, J., 2020. *Global land reform experiences: A review for South Africa*. Working Paper, 1(98). Southern Africa–Towards Inclusive Economic Development (SA-TIED).

DEMING, J., KINSELLA, J., O'BRIEN, B. & SHALLOO, L., 2019. An examination of the effects of labor efficiency on the profitability of grass-based, seasonal-calving dairy farms. *J. Dairy Sci.,* 102(9): 431-8440.

DE-PABLOS-HEREDERO, C., MONTES-BOTELLA, J.L. & GARCÍA-MARTÍNEZ, A., 2018. Sustainability in smart farms: Its impact on performance. *Sustain*., 10(6): 1713.

ELLENSON, T. & MADHANPALL, A., 2014. *Impact of recapitalisation and development funding in the South African sugar industry*. Mount Edgecombe: South African Sugar Association.

GASKIN, J., 2024. *www.youtube.com/@Gaskination*. Online: James Gaskin.

HALL, R. & KEPE, T., 2017. Elite capture and state neglect: New evidence on South Africa's land reform. *Rev. Afr. Polit. Econ*., 44(151): 122-130.

HARDESTY, S.D. & LEFF, P., 2010. Determining marketing costs and returns in alternative marketing channels. *Renew. Agric. Food Syst*., 25(1): 24-34.

HLATSHWAYO, S.I., NGIDI, M., OJO, T., MODI, A.T., MABHAUDHI, T. & SLOTOW, R., 2021. A typology of the level of market participation among smallholder farmers in South Africa: Limpopo and Mpumalanga Provinces. *Sustain*., 13(14): 7699.

HULL, S., BABALOLA, K. & WHITTAL, J., 2019. Theories of land reform and their impact on land reform success in Southern Africa. *Land*., 8(11): 172.

IZEKOR, O.B. & OLUMESE, M.I., 2010. Determinants of yam production and profitability in Edo State, Nigeria. *Afr. J. Gen. Agric*., 6(4): 205-210.

JANZEN, S., 2019. *Multiple linear regression: Transformations*. Maryland: University of Maryland.

KASSALI, R., 2011. Economics of sweet potato production. *Int. J. Veg. Sci*., 17(4): 313-321.

KELLEY, K. & BOLIN, J.H., 2013. Multiple regression. In T. Teo (ed,), *Handbook of quantitative methods for educational research.* Rotterdam: Sense Publishers, pp. 69-101.

KENNEDY-MARTIN, T., CURTIS, S., FARIES, D., ROBINSON, S. & JOHNSTON, J., 2015. A literature review on the representativeness of randomized controlled trial samples and implications for the external validity of trial results. *Trials.*, 16(1): 1-14.

KHAPAYI, M. & CELLIERS, P.R., 2016. Factors limiting and preventing emerging farmers to progress to commercial agricultural farming in the King William's Town area of the Eastern Cape Province, South Africa. *S. Afr. J. Agric. Ext*., 44(1): 25-41.

KILPATRICK, S., 1996. *Change, training and farm profitability*. A National Farmers Federation Discussion Paper. National Focus, Volume 10.

KINGWELL, R., 2011. Managing complexity in modern farming. *Aust. J. Agric. Econ*., 55(1): 12-34.

KIRSTEN, J. & MACHETHE, C., 2005. *Appraisal of land reform projects in Northwest Province*. Minnesota: AgEcon Search.

KIRSTEN, J., MACHETHE, C., NDLOVU, T. & LUBAMBO, P., 2016. Performance of land reform projects in the North West province of South Africa: Changes over time and possible causes. *Dev. South. Afr*., 33(4): 442-458.

KOLAWOLE, O., 2006. *Determinants of profit efficiency among small scale rice farmers in Nigeria: A profit function approach*. AgEcon Search.

KUMBHAKAR, S.C., 1994. Efficiency estimation in a profit maximising model using flexible production function. *Agric. Econ*., 10(2): 143-152.

KYAW, N.N., AHN, S. & LEE, S. H., 2018. Analysis of the factors influencing market participation among smallholder rice farmers in magway region, central dry zone of Myanmar. *Sustain*., 10(12): 4441.

LAKSHMI, S. & MOHIDEEN, M.A., 2013. Issues in reliability and validity of research. *Int. J. Manag. Res. Rev*., 3(4): 2752.

LEEDY, P.D. & ORMROD, J.E., 2005. *Practical research: Planning and design*. International edn. New Jersey: Pearson Prentice Hall.

LIBAGO, K., 2017. Profitability of sweet potato enterprises in Limpopo Province: A case study of Vhembe District. Doctoral dissertation, University of Venda.

LIPTON, M., 2009. *Land reform in developing countries: Property rights and property wrongs*. London and New York: Routledge Priorities in Development Economics.

MAHDI, M. & KHADDAFI, M., 2020. The influence of gross profit margin, operating profit margin and net profit margin on the stock price of consumer good industry in the Indonesia stock exchange on 2012-2014. *Int. J. Bus. Econ*., 13(3): 153-163.

MANENZHE, T.D., ZWANE, E.M. & VAN NIEKERK, J.A., 2016. Factors affecting sustainability of land reform projects in Ehlanzeni District Mpumalanga Province, South Africa. *S. Afr. J. Agric. Ext.*, 44(2): 30-41.

MANGO, N., ZAMASIYA, B., MAKATE, C., NYIKAHADZOI, K. & SIZIBA, S., 2014. Factors influencing household food security among smallholder farmers in the Mudzi district of Zimbabwe. *Dev. South. Afr*., 31(4): 625-640.

MAKAMANE, A., LOKI, O., SWANEPOEL, J., ZENDA, M. & VAN NIEKERK, J., 2025. Farmers' perceptions on the capacity of extension practitioners on climate change in the Eastern Cape Province of South Africa. Front. Clim., 7: 1534254.

MARIN, M., 2021. *Why we work on log scale with odds ratios*. London: The University of British Columbia.

MDODA, L., OBI, A., CHRISTIAN, M. & JIBA, P., 2022. Profitability of cabbage production by smallholder farmers in the Eastern Cape Province, South Africa. *S. Afr. J. Agric. Ext*., 50(2): 1-25.

MOYO, B.H.Z., 2010. The use and role of indigenous knowledge in small-scale agricultural systems in Africa: the case of farmers in northern Malawi. Doctoral dissertation, University of Glasgow.

MPHAHLELE, R.B., 2023. Evaluating the impact of government support programme on the development of land reform farms in South Africa. Doctoral dissertation, University of the Free State.

MUTHEE, D.W., GWADEMBA, G.K. & MASINDE, J.M., 2019. The role of indigenous knowledge systems in enhancing agricultural productivity in Kenya. *Eastern Afr. J. Contemp. Res*., 1(1): 23–33.

NETSHIPALE, A.J., OOSTING, S.J., RAIDIMI, E.N., MASHILOANE, M.L. & DE BOER, I.J.M., 2017. Land reform in South Africa: Beneficiary participation and impact on land use in the Waterberg District. *NJAS Wageningen J. Life Sci*., 83: 57-66.

NIGHTINGALE, D.J., 2002. *Lean enterprises–a systems perspective*. Available from https://dspace.mit.edu/handle/1721.1/102742

NYAM, Y.S., OJO, T.O., BELLE, J.A. & OGUNDEJI, A.A., 2022. Determinants of profit efficiency among smallholder sheep farmers in South Africa. *Afr. J. Sci. Technol. Innov. Dev*., 14(3): 620-629.

NTSIAPANE, A., SWANEPOEL, J. & NESAMVUNI, E., 2023. Farmer's Perception on Asset–Based Approach in Agriculture: A Case Study of Smallholder Wool Farming in Thaba Nchu and Botshabelo, Free State Province, South Africa. S. Afr. J. Agric. Ext., 51(2): 188-206.

OBASI, P.C., NWAIWU, I.O., KORI, C.O. & TIM-ASHAMA, A., 2016. Evaluation of productivity and profitability of mixed farming enterprises in Imo State, Nigeria. *Sky J. Agric. Res*., 5(4): 056-063.

OCHIENG, C.M.O., 2020. *Rethinking land reform in Africa: New ideas, opportunities, and challenges.* Available from https://dlci-hoa.org/assets/upload/land-documents/20200804042940748.pdf

OMITI, J.M., OTIENO, D.J., NYANAMBA, T.O. & MCCULLOUGH, E.B., 2009. Factors influencing the intensity of market participation by smallholder farmers: A case study of rural and peri-urban areas of Kenya. *Afr. J. Agric. Resour. Econom*., 3(1): 57-82.

ONI, S.A., MALIWICHI, L.L. & OBADIRE, O.S., 2011. Assessing the contribution of smallholder irrigation to household food security, in comparison to dryland farming in Vhembe district of Limpopo province, South Africa. *Afr. J. Agric. Res*., 6(10): 2188-2197.

OYEDELE, G.A., AKINTOLA, J.O., RAHJI, M.A. & OMONONA, B.T., 2009. Credit constrained condition of farm households and profitability of agricultural production in Nigerian agriculture. *J. Agric. Res*., 4(4): 192-201.

PALIA, A.P. & DE RYCK, J., 2016. Improving profitability via cost control with the Cost of Production Performance Package. In *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL conference*, 43.

PANNELL, D.J., LLEWELLYN, R.S. & CORBEELS, M., 2014. The farm-level economics of conservation agriculture for resource-poor farmers. *Agr. Ecosyst. Environ*., 187: 52-64.

PAPKE, L.E. & WOOLDRIDGE, J.M., 1996. Econometric methods for fractional response variables with an application to 401 (k) plan participation rates. *J. Appl. Econom*., 11(6): 619-632.

PATEL, M. & PATEL, N., 2019. Exploring research methodology. *Int. J. Res. Rev*., 6(3): 48-55.

PETERS, J., LANGBEIN, J. & ROBERTS, G., 2018. Generalization in the tropics–development policy, randomized controlled trials, and external validity. *World Bank Res Obs*., 33(1): 34-64.

PHASHA, D. & MOYO, T., 2020. Pre and post-settlement support systems and the failure of some land reform projects in South Africa: implications for planning of land reform in the future. The *5th Annual International Conference on Public Administration and Development Alternatives*, 07 - 09 October, Virtual Conference.

PHIRI, P.T., RUZHANI, F., MADZOKERE, F. & MADUDUDU, P., 2023. Factors affecting the profitability of smallholder broiler production in Mutare district, Manicaland Province, Zimbabwe: A quantile regression approach. *Cogent Econ. Financ*., 11(2): 2242660.

PIENAAR, L. & TRAUB, L.N., 2015. *Understanding the smallholder farmer in South Africa: Towards a sustainable livelihoods classification*. Minnesota: AgEcon Search.

QWABE, Q.N., SWANEPOEL, J.W., VAN NIEKERK, J.A. & ZWANE, E.L., 2023. Nexus between the invisibility of agricultural extension services and rural livelihoods development: Assertions from rural farming communities. S. Afr. J. Agric. Ext., 51(3): 1-20.

RAGASA, C. & MAZUNDA, J., 2018. The impact of agricultural extension services in the context of a heavily subsidized input system: The case of Malawi. *World Dev*., 105: 25-47.

RAHMAN, M.M. & CONNOR, J.D., 2022. Impact of agricultural extension services on fertilizer use and farmers' welfare: Evidence from Bangladesh. *Sustain*., 14(15): 9385.

RAHMAN, M.M. & HAIDER, M.Z., 2023. Does Farmers' Education Affect the Profitability of Shrimp Farming? Evidence from the Coastal Region of Bangladesh. *Khulna Univ. Stud*., 225–239.

ROHANI, S., SIREGAR, A.R., RASYID, T.G., AMINAWAR, M. & DARWIS, M., 2020. The farmer competency that doing partnership systems (Teseng) in beef cattle business at Bone regency, South Sulawesi province, Indonesia. *IOP Conf. Ser.: Earth Environ. Sci*., 492(1): 012148.

RUBINFELD, D.L., 2000. Reference guide on multiple regression. D.L. Rubinfeld (ed.), *Reference manual on scientific evidence*, 3rd edn. Washington, DC: The National Academies Press, pp. 425-469.

SALAMI, R.O., AKAWU, L. & ABUTU, P., 2020. The role of indigenous knowledge in sustainable urban agriculture and urban food security in Minna, Nigeria. *Libr. Philos. Pract*., 3919.

SEKARAN, U., 2016. *Research methods for business: A skill building approach*. New Jersey: John Wiley & Sons.

SERIN, V., BAYYURT, N. & CIVAN, A., 2009. Effects of formal education and training on farmers income. *Eur. J. Soc. Sci*., 7(3): 52-62.

SHARAUNGA, S. & WALE, E., 2013. The disincentive effects of food aid and agricultural policies on local land allocation in developing countries: The case of Malawi. *Dev. South. Afr*., 30(4-5): 491-507.

SHUSHU, G.N.J., MMBENGWA, V.M., SWANEPOEL, J.W. & MANASOE, B., 2024. Impact Assessment of Government Funding for Subsistence, Smallholder Farmers, Communities, and Households on Food Security: An Advice for Extension Services. S. Afr. J. Agric. Ext., 52(2): 111-134.

SIHLOBO, W. & NEL, L., 2016. *Is South Africa's agricultural sector addressing inclusive socio-economic development*? Available from https://www.researchgate.net/publication/343230191_Is_South_Africa's_agricultural_sector_addressing_inclusive_socio-economic_development

SMARTAFRIQUE., 2020. *SMARTAFRIQUE R&D Consults Ltd. is an independent consulting firm and an international think tank*. Lagos: SmartAfrique.

SWANEPOEL, J.W. & VAN NIEKERK, J.A., 2018. The level of household food security of urban farming and non-farming households in the informal settlement area of the Cape Town Metropole in South Africa. S. Afr. J. Agric. Ext., 46(2): 89-106.

SWANEPOEL, J.W., VAN NIEKERK, J.A. & TIRIVANHU, P., 2021. Analysing the contribution of urban agriculture towards urban household food security in informal settlement areas. Dev. South. Afr., 38(5): 785-798.

TERBLANCHE, S.E., 2011. Mentorship a key success factor in sustainable land reform projects in South Africa. *S. Afr. J. Agric. Ext*., 39(1): 55-74.

TEY, Y.S. & BRINDAL, M., 2015. Factors influencing farm profitability. *Sustain. Agric. Rev*., 15: 235-255.

TUNDUI, C.S. & TUNDUI, H.P., 2018. Examining the effect of child labour in the profitability of women owned enterprises: a case of microcredit supported enterprises in Tanzania. *J Glob Entrep Res*., 8(1): 2.

VAN DEN BERG, J., 2013. Socio-economic factors affecting adoption of improved agricultural practices by small scale farmers in South Africa. *Afr. J. Agric. Res*., 8(35): 4490-4500.

WAKIBIA, J. G., OCHIEWO, J. & BOLTON, J.J., 2011. Economic analysis of eucheumoid algae farming in Kenya. *West. Indian Ocean J. Mar. Sci*., 10(1): 13-24.

WALE, E., 2010. How do farmers allocate land for coffee trees? Implications for on-farm conservation and seed technology adoption in Ethiopia. *J. Sustain. Agric*., 34(3): 270-291.

XABA, B.G. & MASUKU, M.B., 2013. Factors affecting the productivity and profitability of vegetables production in Swaziland. *J. Agric. Stud*., 1(2): 37-52.

XABA, M.B. & AKINOLA, A.O., 2023. A reflection on the nexus between South African land reform struggles and the unresolved national question. *Int. J. Afr. Renaiss. Stud*., 18(1): 136-155.

XABA, M.B. & ROODT, M., 2018. *The populist rhetoric around land acquisition in South Africa obscures a number of significant factors on land reform*. Available from https://ujcontent.uj.ac.za/esploro/outputs/journalArticle/The-populist-rhetoric-around-land-acquisition/9912827907691

ZAMFIR, M., MANEA, M.D. & IONESCU, L., 2016. Return on investment–indicator for measuring the profitability of invested capital. *Valahian J. Econ. Stud*., 7(2): 79-86.