REFEREED PAPER

AN ANALYSIS OF FACTORS AFFECTING THE SUSTAINABLE PRODUCTION OF LAND REFORM SUGARCANE GROWERS ON THE NORTH COAST OF KWAZULU-NATAL

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Abstract

The South African Sugar industry has seen 21% of the area under sugarcane being transferred from white commercial growers to previously disadvantaged growers. Their success remains critical to the long-term sustainability of the entire industry as redistribution continues under land reform policies. This study analysed factors that have influence on the sustainability of land reform growers in the north coast region of Kwazulu-Natal, South Africa. A sample of 50 growers was used in the study, which included both Land Redistribution for Agricultural Development (LRAD) recipients and Medium Scale Farmers (MSF) as defined by the industry. The average change in Relative Recoverable Value (RRV) tons per hectare was used as a proxy for sustainability. The main factors considered under this study include grower age, years of farm ownership, short term loans per hectare, production grants received per hectare, levels of outsourced or contracted operations and the extent to which growers are involved in the direct management of the farm (grower living on or off the farm). An Ordinary Least Squares (OLS) regression analysis was used to identify factors that are the key contributors to a land reform grower's ability to increase tons RV per hectare over time. Three of the six variables proved statistically significant, namely, the age of the grower, the level of contractor utilisation and the grant per hectare received.

Keywords: land reform, sugarcane, sustainability, north coast

Introduction

For the South African sugar industry, the land reform programme began and continues on a 'willing seller willing buyer principle'. To-date, the industry has seen 21% of the area under sugarcane being transferred from white commercial growers to previously disadvantaged growers[1]. At its inception (1996) the initial lack of financial support by government resulted in many farms being highly bonded. The recipients of this program were thereafter referred to as Medium Scale Farmers (MSFs). In 2002, the government introduced the Land Reform for Agricultural Development (LRAD) programme, resulting in a sharp increase in the number of land reform growers entering the industry. The purchase by this category of grower, partly funded by the government, also saw medium to high levels of bond debt. The LRAD programme came to an end in 2010, paving the way for the Proactive Land Acquisition Strategy (PLAS). Under the PLAS programme the farm is owned by the state and leased to a land reform beneficiary in return for a rental payment.

[1] Sourced from the South African Sugar Association web page

The land reform programme has been a difficult but necessary transition for the sugar industry, as it has been with most other sectors in South African agriculture. Land reform farmers have and continue to face numerous challenges which have seen production levels fall, mainly due to the difficult economic climate over the past number of years.

In 2010, the Department of Rural Development and Land Reform (DRDLR) introduced the Recapitalisation and Development Programme (RADP). This was mainly aimed at LRAD and PLAS beneficiaries, where each beneficiary received 25% of the farm's purchase price as a grant. Thereafter the approach changed to finance the necessary 'requirements' rather than an arbitrary percentage of the purchase price. In the very same year, the Agribusiness Development Agency (ADA) intensified its assistance to land reform growers through the Comprehensive Agricultural Support Programme (CASP). Through observation, allocation of CASP remains a contentious issue due to the process of selection of beneficiaries, although the bulk of assistance since 2010 has come from the RADP programme.

In light of the different types of land reform growers (in this case MSF and LRAD growers), it is important to identify which attributes have contributed to either their success or failure in improving production. This paper attempts to identify some of these attributes and will hopefully add some light to the policy framework within the South African sugar industry context.

Sampling method

The data include responses from three mill areas in the North Coast region, located north of Durban, KwaZulu-Natal. The data were collected from land reform growers delivering to Maidstone, Gledhow and Darnall sugar mills. The land reform grower categories included in the survey were LRAD growers and MSF or New Freehold Growers (NFG). Proactive Land Acquisition Strategy (PLAS) growers were excluded from the survey due to their low numbers (three) and lack of historical data. Restitution projects were also excluded due to their complex community structures falling beyond the scope of this paper.

The survey and descriptive statistics

A total of 50 land reform growers were interviewed and only 38 could be used for the purpose of this research due to a lack of adequate data. This accounts for 36% of the total population of land reform growers in the North Coast region. The population was stratified into three groupings, LRAD growers who received RADP funding, MSFs and LRAD growers who had not received RADP funding. A random sample was then drawn from each stratum. The growers included in the sample had been farming for an average of 11 years with 93% of the sampled growers farming for more than nine years. Restitution farms were excluded from the sample due to the unstable nature of this sector of farms. Data sources include information direct from the growers, the South African Canegrowers' Association (CANEGROWERS) database, the CIPRO[2] database and through direct observation. CANEGROWERS supplied data on the production history for each respondent and a questionnaire was used for collecting data on grower demographics, agronomics and financial status. The CIPRO database was used to obtain information on purchase price and initial bond held against the property.

[2]Sourced from http://www.windeedsearch.co.za/DeedsOffice/Property

The average age of respondent (principal decision maker or farm owner) was 54 years with an average of 11 years as farm owners. Only 18% of the respondents had a tertiary education where the rest had a matric or less. All sampled growers that had a tertiary education did not reside on their farms, mostly due to the nature of their off-farm activities and employment. Sixty-eight percent of the growers began operations as a close corporation (cc) so as to attract a larger LRAD grant (purchase price subsidy), this being determined by the number of members in the cc. The average farm size was 95.1 hectares and all were farming under dry land conditions. Fifty-five percent of respondents had off-farm income in the form of contract work for other farmers and various professional jobs (including accounting, teaching, engineering and nursing). Seventy-four percent of respondents were reliant on contractors for doing some form of on-farm work. This included land preparation, harvest and infield haulage operations. A total of 55% were fully reliant on contractors, where all on-farm activities were outsourced. About 16% of the respondents did not live on their farms, where they either had a supervisor or manager running on-farm operations. Only 15% of the respondents had never accessed grant funding from the LRAD, RADP or CASP programmes.

Out of interest, the top 10 best performing and bottom 10 worst performing growers were further analysed. Table 1 below presents the results of both these categories. Importantly, there were strong contrasts in the age, level of contractor utilisation, and grants received per hectare, all of which support the model results. Further explanation of these variables will follow under research methodology. Interestingly, with only three female respondents, two fell within the top five group of performers.

Table 1: Top and bottom performer averages.

	Age (years)	Use of contractors	Grant (per ha)	Farm size (AUC, ha)	Off-farm income
Top 10	47.30	1.30	R6 038	102.42	0.80
Bottom 10	57.70	2.70	R2 566	94.39	0.20

Research Methodology

An OLS regression model was used to identify factors or attributes of land reform growers that are associated with those that are more improving or maintaining their Relative Recoverable Value (RRV[3]) production level. The hypothetical model below explains the influence of some of these factors:

$$\Delta RRVTONS = f(AGE, EDU, YESFARM, STLOANS, GRANTS, OFFINC, CONTR, ONOFARM) \quad (1)$$

The dependent variable, ΔRRVTONS, is defined as the average change in RRV t/ha produced by the land reform grower. This is calculated as the percentage change in RRV tons produced per hectare. Given that growers also farmed over different time periods, an adjustment was made to their results corresponding to the rainfall they received relative to other growers in the sample in their corresponding years. This adjustment was calculated as a percentage deviation from the average rainfall for the total time period from which the sample was drawn. Several explanatory variables were considered in the analysis. AGE is defined as the owner or principal decision maker's age in years. EDU is defined as the level

[3] RV = recoverable value, a measure of cane quality upon which the South African sugar industry payment system is based.

of education of the principal decision maker on the farm. YESFARM is defined as the number of years the principal decision maker has spent farming on the farm. STLOANS is defined as the R/ha in loans that are less than five years in term, including vehicle and asset finance. GRANTS is defined as the amount in R/ha of grants received. OFFINC is defined as income received from other business activities off the farm. This includes income received from contract work done for other farmers, as well as income received from professional occupations (this can be teaching, nursing and any other professional work). CONTR is included in the model as a dummy variable indicating the level of dependency on contractors. Three operations were considered for the use of contractors, these included land preparation, harvesting and infield haulage operations. Growers using contractors in these various operations were denoted a 1, 2 or 3 if one, two or all three operations were done by a contractor and a 0 for none. ONOFARM is included in the model as a dummy variable represented by 1 for a grower living on his farm and directly involved in the operation and a 0 for otherwise.

Correlation analysis

A correlation analysis was carried out to measure the degree of linear association between the explanatory variables used in the model. Table 2 presents the results of the correlation matrix. The highest correlation levels are found between OFFINC and CONTR at -0.58, as well as between EDU and ONOFARM at -0.42. The only marginally significant level of correlation was found between YESFARM and GRANTS along with AGE and OFFINC. The other variables showed low levels of correlation.

Table 2. Correlation matrix.

	Age	**Edu**	**Yesfarm**	**Stloans**	**Grants**	**Offinc**	**Contr**	**Onofarm**
Age	1							
Edu	-0.062	1						
Yesfarm	0.113	-0.014	1					
Stloans	0.115	0.138	0.199	1				
Grants	-0.039	0.056	**-0.385**	0.079	1			
Offinc	**-0.340**	0.154	-0.235	0.083	0.303	1		
Contr	-0.051	-0.127	0.299	0.105	-0.238	**-0.581**	1	
Onofarm	0.237	**-0.421**	0.033	-0.067	0.053	**-0.335**	0.068	1

Results and Discussion

The OLS regression analysis was conducted using Microsoft Excel. Given the existence of colinearity between some variables, the model was also run without the EDU or OFFINC variables. No significant difference was found with the coefficients corresponding to any of the significant variables. It was, however, found that the significance of the ONOFARM variable was improved slightly through their inclusion from significance at the 12% level to being within the 10% level of significance. The final regression results are presented in Table 3.

Table 3. Regression model results.

Variable	Regression coefficient	t-statistic	Significance	Definition
Intercept	0.4968	3.3260	***	
AGE	-0.0052	-2.6889	***	Principal decision maker's age
YESFARM	-0.0074	-0.9772	ns	Years on the farm
STLOANS	7.99909E-06	1.2452	ns	Short term loans per ha
GRANTS	1.95762E-05	4.338	***	Accessed grants per ha
OFFINC	-0.0552	-1.3160	ns	Income received from revenue sources outside the farm.
CONTR	-0.0343	-2.386	**	Level of contracting
ONOFARM	-0.0740	-2.0152	*	Grower living on or off farm (1-on farm, 0-off farm)

Number of observations	38
F statistic	7.459
R^2	0.635
Adjusted R^2	0.550

*Significant at the 10% level, **significant at the 5% level, ***significant at the 2% level, ns=not significant.

The data accounts for 63% (R^2=0.635) of the variation of the dependant variable by the explanatory variables. This model may be adequate for predictive purposes as the value of R^2 is greater than 0.50. The null hypothesis of the model is statistically significant at 7.46 and is deemed acceptable (Gujarati, 2003).

AGE has a negative coefficient significant at the 2% level. This shows that an increase in the principal decision maker's age decreases the farmer's ability to improve RV yields.

EDU was excluded from the model due to its low variability. This is reflected in it not being significant at the 80% level. There was also a correlation issue between EDU and ONOFARM which may have influence on the coefficient outcome.

GRANTS has a positive coefficient which is significant at the 2% level. This means that the more grants received by the land reform grower, the higher the likelihood of his being successful in increasing his RV yield. There were only two grants that were considered for the purpose of this research: Recapitalisation and Development Programme (RADP) and Comprehensive Agricultural Support Programme (CASP). This is an indication of the success of government programmes to-date.

Although OFFINC is marginally not significant (at the 20% level), it has a negative coefficient, meaning that a grower is less likely to increase RRV with an increased income received off the farm. There is, however, a strong negative correlation between the use of contractors and income received outside of the farm. A farmer is more likely to use the off-farm income to purchase machinery and equipment, as a result cutting down on using contractors.

CONTR shows a negative coefficient and is significant at the 5% level. This explains that an increased reliance on contractors decreases the likelihood of increasing RV tons on land reform farms.

ONOFARM has a negative coefficient and is significant at the 10% level. This explains that there is less likelihood of success in increasing RV yields for a grower who is living on the farm. The grower may have a supervisor or farm manager managing the daily operations on the farm who is more experienced or has the necessary expertise required in running day-to-day operations.

YESFARM has a negative coefficient, meaning that a grower that has been on the farm for a longer time period is less likely to have succeeded in increasing the RV tonnage. Although the t-test shows this to be not significant due to its low variability (i.e. the majority of the sample have been farming over similar time periods), it is a concern and an unexpected result. The last non-significant variable is STLOANS, which has a positive coefficient. This is also an unexpected result, although this may indicate that the grower may have financed his own machinery, thus supporting the CONTR results of lower contractor utilisation.

Conclusions and Recommendations

Farming is not an age-specific enterprise, but the results of the regression model show a negative relationship between an increase in age and the ability to farm. The older land reform growers are therefore less likely to succeed in increasing RV tons. The top 10 performing growers have two growers that have a tertiary education, and there is only one grower with a tertiary education in the bottom 10 performing growers. Interestingly, the top 10 best performing land reform growers had an average age of 47 years compared to the average age of 57 years for the bottom 10 growers. This is an indication that for land reform purposes, younger farmers should be considered as beneficiaries as they may have more enthusiasm to engage fully in their farming operations. Young farmers may also be more open to new innovations, technology and advice.

The support that land reform growers are receiving from the government by way of grants proves to have had a positive influence on RV production levels. The top 10 best performing growers have received more grants than the bottom 10 growers. This supports previous work done by Darroch and Mashatola (2003) where government funding remains important for land reform growers since most of them cannot access funding from commercial banks. A more recent study by Langton (2014) also supports this view, where a continuous form of support to farmers is important for increasing their farming efficiencies. It remains unclear as to how long the government is going to support land reform growers. PLAS farms further complicate the situation as they would be limited in their access to commercial funding because they are not the land owners.

Growers' dependency on contractors has a negative effect on their farming business, where an increased use of contractors decreases the growers' likelihood of improving RV yield. This is supported by Nothard *et al.* (2005) where inefficiencies of contractors were found to affect not only their own business but also other stakeholders, including their grower clients as well. It is, however, not a feasible option to suggest that each and every farmer should have his or her own machinery and equipment because of economies of scale. Growers should consider machinery sharing options but, more importantly, remain involved from an

oversight perspective in their farming operations regardless of whether or not they make use of contractors. Additionally, a concern arising from the results of the model indicate the dependency of land reform growers on employment of managers or high level supervisors. In relation to the previous comment, a grower should move away from using outsourced contractors to employment of 'in-house' expertise or management. The results indicate that the most successful growers are not directly involved in managing operations but rather provide an oversight role to their managers, who bring in the necessary farming skills. This may indicate a lack of knowledge transfer within this sector and would necessitate both training and mentoring interventions.

While economies of scale remain an important factor in reducing on-farm costs and therefore profitability, most land reform growers operate on similar sized farms. The top 10 performers had farms that were marginally bigger in size, but the average of 102.41 ha versus 94.39 ha is not envisaged to be a significant factor. This therefore did not show significant results in the regression model but with an average farm size of 95.1 ha for all respondents, there is great concern that land reform growers would face significant diseconomies of scale.

Lastly, eight of the top 10 growers had alternate sources of income in contrast to only two of the bottom ten performing growers. Although this variable was not significant in the model, this may be an indication that growers who are able to maintain or improve cane supply could be reliant on additional forms of income that would release economic pressures on their cane farming businesses. Further examination of this possibility would be necessary.

Despite economic challenges, land reform funding programmes have assisted many growers in their pursuit of improving RV yields. However, with continued reliance on contractors, a lack of expertise and many nearing retirement age, the future remains uncertain for many land reform growers where there may be a lack of or reduction in financial support.

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