

## CHANGING PERCEPTIONS OF THE RISK ENVIRONMENT FACED BY COMMERCIAL SUGARCANE FARMERS IN KWAZULU-NATAL, SOUTH AFRICA

*R Mac Nicol,  
Masters student,  
University of KwaZulu-Natal,  
Pietermaritzburg, South Africa*

*GF Ortmann  
Professor in Agricultural Economics ,  
School of Agricultural Sciences and Agribusiness,  
University of KwaZulu-Natal, Pietermaritzburg, South Africa.  
[ortmann@ukzn.ac.za](mailto:ortmann@ukzn.ac.za)*

*SRD Ferrer  
Lecturer in Agricultural Economics,  
School of Agricultural Sciences and Agribusiness,  
University of KwaZulu-Natal, Pietermaritzburg, South Africa.*

### Abstract

*This study identifies sources of risk that commercial sugarcane farmers in the province of KwaZulu-Natal (KZN), South Africa, presently perceive to pose the greatest threat to the viability of their businesses. Data obtained in 2006 via structured personal interviews of 76 large-scale sugarcane farmers from a stratified random sample of 110 farmers in two separate mill-supply areas of KZN were used to elicit farmers' perceptions of various sources of risk. The most important risk sources were found to be the threats posed by land reform, minimum wage legislation and the variability of the sugar price, in that order. Land reform and minimum wage legislation did not feature prominently in past studies of KZN farmers during the 1990s. Factor analysis identified additional risk dimensions that exist within the remaining risk sources. Recommendations include that government improve accessibility to information regarding future plans for land and labour policies, and that farmers become more proactive in terms of obtaining information to reduce uncertainty and resultant efficiency barriers.*

*Keywords: commercial sugarcane farmers, land reform, minimum wage legislation*

### Introduction

On average, 22 million tons of sugarcane are produced seasonally in 14 mill supply areas of South Africa, by approximately 50,940 growers (SACGA 2006; SASA 2006). Sugarcane contributes approximately 82% of the income from field crops in the province of KwaZulu-Natal (KZN) (STATSSA 2006), with 72% of the crop planted by large-scale growers, 19% by small-scale growers and nine percent by sugar millers (SACGA 2006). Approximately 87% of the gross farming income earned by South African (SA) sugarcane farmers in 2002 was by producers in KZN (STATSSA 2006).

SA farmers are faced with many challenges attributable to their uncertain and complex decision making environment. In addition to dealing with the deregulation of domestic agricultural markets in the 1990's, farmers have also had to adapt to changes such as a dynamic global economic and trade environment and a dynamic local political environment. More specifically, other challenges that SA farmers are continuing to face include land reform, AgriBEE (Agricultural Black Economic Empowerment in Agriculture), new labour legislation and minimum wages, property taxes, skills levies, uncertain water rights, HIV/Aids, a

volatile exchange rate, and high transport and communication costs (Ortmann 2005). SA sugarcane farmers also had to deal with a highly variable sugar price in recent years (Illovo Sugar 2006). Between January and March 2006 sugar prices averaged 37.43 US cents per kilogram, 91% higher than in the same period in 2005 (FAO, 2006). Following a rise to almost 44 US cents per kilogram in early 2006, the price declined to about 26 US cents per kilogram by November 2006.

SA studies where farm-level data sets were used to identify the perceived importance of multiple risk sources include those by Swanepoel and Ortmann (1993), Bullock *et al.* (1994), Woodburn *et al.* (1995), Stockil and Ortmann (1997) and Hardman *et al.* (2002). These studies identified mainly price and production risks as the most important perceived risk sources, although there was a trend towards the increasing importance of government legislation risks by the late 1990s. This is evident in the study by Stockil and Ortmann (1997) where changing labour laws and land reform policies were found to be the fourth and sixth most important risk sources, respectively. Results of this study are briefly compared to previous studies in South Africa and KZN to analyse farmers' changing risk perceptions. This study will help to identify those sources of risk that are currently perceived to be the most important by large-scale commercial sugarcane farmers in KZN and aims to use factor analysis to examine the dimensions of these perceived risks. This research will facilitate a better understanding of the risks facing commercial sugarcane producers. Findings could assist policy-makers, consultants, extension officers and financial institutions in designing appropriate risk management products and strategies for this group of farmers.

## Data Source

The sample of producers for this study was drawn from a list of commercial sugarcane farmers from two separate mill-supply areas in KZN, namely the Noodsberg mill-supply area in the KZN Midlands and the Umfolozi mill-supply area on the Zululand Coast. Large-scale operations were defined by the South African Cane Growers' Association (SACGA) representatives as those responsible for annual sugarcane deliveries exceeding 10,000 tons. Large-scale producers are studied in this research because they account for 72% of the area planted to sugarcane compared to small-scale farmers who account for only 19% of the total area planted. The remaining 9% is planted by sugar millers (Eweg 2005; SACGA 2006). Size economies and higher average education levels of large-scale farmers result in these farmers using a wider range of risk management strategies (Barry 2003). Therefore, large-scale farmers are better suited to the objectives of this study. Furthermore, land reform policies pose risks to mainly large-scale farmers.

Budgetary constraints due to the personal interview approach limited the maximum size of the sample to 110 respondents. Interviews consisted of structured questionnaires completed in the presence of the main author. Fifty-five farming operations were randomly selected from complete lists of large-scale growers supplied by SACGA regional managers in each mill-supply area. Four responses from the Zululand region were excluded on the grounds that sugar cane contributed less than 30% to gross farm income (GFI). A total of 76 usable responses (38 from each study area) were obtained (69% response rate).

Respondents (principal farm decision-makers) were, on average, 47 years of age and had 22 years of sugarcane growing experience. University degrees were held by 42% of respondents. Average farm size was 417 hectares, with sugarcane contributing 77% to GFI.

Sources of risk as perceived by survey respondents

Respondents were asked to rate sources of risk for their farm businesses, from a list of 14 potential sources, on a Likert-type scale ranging from one to five – where five and one indicate “highly important” or “not particularly important”, respectively. Mean ratings of risk sources are shown in Appendix 1. Respondents could include additional risk sources that they deemed to be important; however, no additional risk sources were included. Respondents were also asked to rank their top five most important risk sources from the list.

The three most important sources of risk as rated by all respondents were land reform, minimum wage labour legislation and crop price variability. These had mean overall ratings on the Likert-type scale of 4.31, 4.14 and 3.68, respectively. The risk sources that were perceived to be the next most important were: changes in input costs (3.56), crop yield variability (3.43), the threat of HIV/AIDS (3.41), changes in the cost of capital items (3.33) and changes in land tax legislation (3.24). Compared to previous SA and KZN studies, these findings confirm that government legislation risks (particularly relating to agrarian reform) have become increasingly important, relative to price and production risks. The remaining sources of risk included in the survey questionnaire (unionisation of labour, variability in interest rates, changing water rights, changing credit availability, farm operator illness or death, and changes in family relationships) received mean overall ratings of less than three, indicating that most respondents regarded them as less than moderately important.

Concerns among respondents regarding the land reform process in South Africa had become more pertinent leading up to the time of this survey, considering threats by the SA government to discard the willing seller, willing buyer principle due to the perceived slow pace of land reform (Farmer's Weekly 2006; Democratic Alliance 2006; Afrol News 2006). Subsequent to the survey, the Restitution of Land Rights Act 22 of 1994 has been changed to allow the Minister of Land Affairs to expropriate land, for the purpose of awarding it to a claimant who is entitled to the restitution of a land right, on behalf of the state without being ordered to do so by the court. Effectively, should negotiations over a new market value for claimed land fail, the government will issue farmers with notices of appropriation allowing a period of 30 days for reconsideration, after which final letters of expropriation will be issued and farmers compensated at government-determined "market values" (Nailana and Gotte 2006).

The Sectoral Determination (an amendment to the Basic Conditions of Employment Act 75 of 1997) required farmers to meet new minimum wage requirements from March 2003 (Department of Labour 2006), creating uncertainty and increasing the costs of managing permanent labour (i.e., those who work more than 27 hours per week). Many survey respondents speculated during the interview process that minimum wage legislation could be extended to include casual labour. Considering the relatively high demand for this form of labour in the sugar industry (during planting and harvesting) (SACGA 2006), respondents perceive the potential higher costs involved to pose the second most important threat to their business' viability. Uncertainties, therefore, may be due to recent changes in land and labour legislation creating expectations that further changes are likely.

Overall, 79% and 75% of respondents included land reform and minimum wage legislation, respectively, in their top five list of risk sources most important to their farm businesses. These two risk sources were considered to pose the greatest threat to farm businesses in both survey areas. Compared to findings of previous studies (Swanepoel and Ortmann (1993); Bullock *et al.* (1994); Woodburn *et al.* (1995); Stockil and Ortmann (1997); Hardman *et al.* (2002)), these risk sources have become more prominent. Crop price variability was included in the top five list by 45% of all respondents. This may be explained by the high degree of fluctuation of the sugar price during the time leading up to the survey. Product price variability was previously found to be among the three most important perceived risk sources by Bullock *et al.* (1994) and Woodburn *et al.* (1995). Changes in input costs (53%) and crop price variability (45%) were, respectively, the fourth and fifth most likely risk sources to be included in the top five list. Compared to Midlands respondents, double the number of respondents from Zululand (67%) included changes in input costs as one of the five most important risks faced by their farm businesses, whereas more than double the number of respondents from the Midlands (47%) included the risk of unionisation of labour in their top five. This is most likely due to respondents in the Midlands region facing threats of labour union strike action shortly prior to the interview process.

### Factor Analysis of Risk Sources

All 14 sources of risk initially considered were included in a factor analysis incorporating all sample respondents. The multivariate technique of Principal Component Analysis (PCA) was used to determine the number of factors to be included in the analysis. The main aim of PCA is to reduce the dimensionality of a data set, while retaining as much of the variation present in that data set as possible (Jolliffe 1986, p.1). Principal components were extracted using the covariance matrix. The first seven factors had initial eigenvalues greater than one and collectively explained 78% of the variance in all 14 risk sources. Ten of the 14 risk sources had factor loadings exceeding 0.40 in absolute value in more than one factor and therefore a varimax rotation with Kaiser Normalisation was used in order to obtain factors that are easier to interpret. The rescaled communalities for risk sources all exceeded 0.62 with the exception of that for changes in the cost of capital items (0.565), indicating that most of the variance in the perceived importance of risk sources was accounted for by the first seven common factors (Manly 1986). The first five of the seven factors are shown in Appendix 1 and had interpretations that provide further insight into this analysis. These factors are discussed in this section (risk sources with absolute factor loadings <0.40 are excluded from the equations below):

Factor 1: “Crop Gross Income Index” = (0.926) crop yield variability + (0.781) crop price variability – (0.518) land reform.

Factor 1 indicates that the ratings for crop yield and price variability were positively correlated and displayed a high degree of variability. This factor suggests that respondents who are concerned with price and yield variability are less concerned with the threat posed by land reform and *vice versa*. This may be due to farmers with significant liquidity stress being less concerned about losing their farms to land reform. It may also suggest that some farmers have more confidence in the government’s land reform policies than others. A comparison of group means for this factor indicates that farmers in both regions are similarly concerned with Crop Gross Income variability. The reason that land reform seemed to be more of a concern for respondents from the Midlands (negative mean value) may be explained by a larger proportion of respondents from the Midlands (44.7%) facing land claims in line with the land redistribution program, as compared to respondents from Zululand (9.5%). Mean factor scores for each region were estimated for each factor and comparisons conducted using a two-tailed t-test for independent samples, with equal variances not assumed (Steel and Torrie 1980).

Factor 2: “Macroeconomic and Political Index” = (0.710) changing credit availability + (0.655) changing capital item costs + (0.591) land reform + (0.542) interest rate variability.

Mean factor scores show that Midlands respondents are more concerned with the four “Macroeconomic and Political” risk sources. This can be explained by the larger number of land claims lodged for farmland in this area, and Midlands respondents had relatively more capital investment (e.g., for forestry enterprises) than respondents from Zululand. Forestry enterprises contribute, on average, 22% of gross farm income (GFI) in the Midlands compared to 0.5% in Zululand. Mean factor scores for the two regions are statistically significantly different at the 10% level of probability.

Factor 3: “Legislation Index” = (0.916) land tax legislation + (0.681) minimum wage legislation + (0.432) interest rate variability.

Mean factor scores for the two regions in this factor (which are statistically significantly different at the 5% level of probability) show that the three risk sources with the highest factor loadings are more important to Midlands respondents. This could be due to respondents in the Midlands employing larger labour forces on average, using extra labour capacity mainly for their timber enterprises. The fact that respondents in this area considered the threat of a land tax to be relatively more important than respondents from Zululand could be due to increased familiarity of this issue among Midlands respondents. The higher level of information on land tax issues by Midlands respondents can be attributed to legal precedents involving the initial implementation of this legislation in the region.

**Factor 4:** “Labour and Inputs Index” = (0.929) labour unionisation + (0.526) minimum wage legislation – (0.450) changing input costs.

The negative loading attached to changes in input costs suggests that respondents who are concerned with labour unionisation and minimum wage legislation are less concerned with changes in input costs and *vice versa*. This may be due to substitution between labour and other inputs. Zululand respondents are more concerned with changing input costs due to the more intensive nature of sugarcane farming in the coastal region. Sugarcane is normally harvested annually in the Zululand region compared to every 20 months in the Midlands. Midlands respondents consider minimum wage legislation and the threat of labour unionisation to be relatively more important. This can be attributed to respondents in the Midlands employing larger labour forces on average. Mean factor scores are statistically significantly different at the 1% level of probability.

**Factor 5:** “Human Capital and Credit Access Index” = (0.903) HIV/AIDS + (0.512) illness or death of farm operator + (0.469) changes in credit availability.

The fact that illness or death of the farm operator and changes in credit availability occur together in this factor may be due to the effects of the death of the farm operator on borrowing capacity. Mean factor scores were similar for the two study regions. The threat of HIV/AIDS, illness or death of the farm operator and changing credit availability are, therefore, considered equally important by respondents from both areas.

## Discussion and Conclusions

This study shows that the most important risk sources as perceived by large-scale commercial sugarcane farmers in KwaZulu-Natal are the threat of land reform, the uncertainty involved with minimum wage labour legislation and the variability of the sugarcane price, in that order. With the exception of crop price variability, the relative ranking of risk factors differs from those of previous studies. Clearly, this is due to farmers now facing a new set of challenges such as continued land reform, property rates legislation and minimum wage legislation, none of which were perceived by farmers to be important in the past. The fact that the perceived importance of risk sources within dimensions has changed compared to previous studies indicates that current government land and labour legislation in particular are raising levels of uncertainty amongst commercial sugarcane producers.

It is important that the government’s land and labour legislation processes are conducted in as transparent a manner as possible, with improved information made available concerning specific objectives and timeframes, in order to reduce the uncertainty involved in decision making for farmers. For the SA sugarcane industry to remain competitive in a continually globalising market environment, policy makers need to create an enabling business environment that will reduce risk and uncertainty for producers. Although recent developments regarding the land restitution process have offered farmers some certainty regarding the willing seller, willing buyer principle, further uncertainty has been created amongst farmers in terms of the accuracy and reliability of the government’s land valuation process. Government should also consider making labour legislation reform more flexible in order to avoid raising the costs associated with permanent labour to inhibitory levels. This has important implications for levels of unemployment due to the presence of substitutes for permanent labour, such as mechanisation and casual labour. Farmers also need to develop risk management strategies that reduce existing barriers to improved efficiency. To achieve this, farmers require relevant and reliable information; for example, by engaging third parties such as SACGA extension officers and other private consultants and by using published information.

This study has contributed toward ongoing research into risk management amongst commercial sugarcane farmers by describing the changes in perceived risk by a representative sample of sugarcane producers in two regions of the SA sugar industry. It has identified that the threats posed by land reform and minimum wage legislation have become more relevant and are currently perceived to pose the greatest risks to

business viability. Further research could be aimed at quantifying the various responses to these sources of risk, and at identifying the extent to which producers consider multiple sources and responses to risk simultaneously.

### **Acknowledgements**

The authors gratefully acknowledge funding from the National Research Foundation (NRF) in South Africa. The NRF supported this research under the “Making South African firms and farms competitive” project (GUN 2054254). All views, interpretations, recommendations and conclusions expressed in this paper are those of the authors and do not necessarily reflect those of the NRF.

### **References**

- Afrol News, 2006. Renewed Focus on South Africa Land Reform. [Online]. Available from: <http://www.afrol.com/articles/18026> [cited 05 December 2006].
- Barry, P.J., 2003. Major Ideas in the History of Agricultural Finance and Farm Management. Department of Applied Economics and Management, Cornell University, Ithaca, New York.
- Bullock, W.I., Ortmann, G.F. and Levin, J.B., 1994. Farmer characteristics, risk sources and managerial responses to risk in vegetable farming: Evidence from large- and small-scale commercial vegetable farmers in KwaZulu-Natal. *Agrekon*, 33 (3), pp.103-112.
- Department of Labour, 2006. [Online]. Available from: <http://www.lab.gov.org/> [cited 18 March 2006].
- Democratic Alliance, 2006. [Online]. Available from: <http://www.da.org.za/DA/Site/Eng/campaigns/DOCS/DAPOS%20willingbuyer%20seller.doc> [cited 5 December 2006].
- Eweg, M.J., 2005. The changing profile of small-scale ‘sugarcane’ farmers in South Africa. Unpublished paper, South African Sugarcane Research Institute, Mount Edgecombe, South Africa.
- FAO, 2006. Sugar Commodity Note: World sugar prices have increased significantly since FAO’s preliminary forecast in December 2005. [Online] Available from: [http://www.fao.org/ES/ESC/en/20953/21032/highlight\\_108726en\\_p.html](http://www.fao.org/ES/ESC/en/20953/21032/highlight_108726en_p.html) [cited 5 December 2006].
- Farmer’s Weekly, 2006. Officials hatch secret land plan. 13 October 2006, pp.24-27.
- Hardman, P.A., Darroch, M.A.G. and Ortmann, G.F., 2002. Improving cooperation to make the South African fresh apple export value chain more competitive. *Journal on Chain and Network Science*, 2 (1), pp.61-72.
- Illovo Sugar, 2006. Interim Report for the six months ended 30 September 2006, Durban. [Online]. Available from:

<http://www.illovosugar.com/financial/pdf2006/Interim/Interim%20Report.pdf>  
[cited 5 December 2006].

Jolliffe, I.T., 1986. *Principal Component Analysis*. New York: Springer-Verlag New York Inc..

Manly, B.F.J., 1986. *Multivariate Statistical Methods: A Primer*. Bristol: J.W. Arrowsmith Ltd..

Nailana, K. and Gotte, S., 2006. Expropriation - your questions answered. *AgriReview*, Standard Bank, fourth quarter 2006. [Online].

Available from:

[http://www.standardbank.co.za/za/vgn/images/portal/cit\\_4931/41/47/24740676aGRIq42006.pdf](http://www.standardbank.co.za/za/vgn/images/portal/cit_4931/41/47/24740676aGRIq42006.pdf)  
[cited 23 March 2007].

Ortmann, G.F., 2005. Promoting the competitiveness of South African agriculture in a dynamic economic and political environment. *Agrekon*, 44 (3), pp.286-320.

SACGA, 2006. [Online].

Available from: <http://www.sacanegrowers.co.za>

[cited 14 March 2006].

SASA, 2006. [Online].

Available from: <http://www.sasa.org>

[cited 14 March 2006].

STATSSA, 2002. *Census of commercial agriculture, Report No. 11-02-01 (2002)*. [Online].

Available from:

<http://www.statssa.gov.za/publications/Report-11-02-01/Report-11-02-012002.pdf>

[cited 1 November 2006].

Steel, R.G.D. and Torrie, J.H., 1980. *Principles and Procedures of Statistics, a Biometrical Approach*. 2nd ed., McGraw-Hill Book Company.

Stockil, R.C. and Ortmann, G.F., 1997. Perceptions of risk among commercial farmers in KwaZulu-Natal in a changing economic environment. *Agrekon*, 36 (2), pp.139-156.

Swanepoel, V. and Ortmann, G.F., 1993. Sources and management of risk in extensive livestock farming in the North-Western Transvaal Bushveld. *Agrekon*, 32 (4), pp.196-200.

Woodburn, M.R., Ortmann, G.F. and Levin, J.B., 1995. Sources and management of risk: Evidence from commercial farmers in KwaZulu-Natal. *South African Journal of Economic and Management Sciences*, 17 (summer 1995), pp.46-63.

**Appendix 1: Perceived importance and factor loadings of risk sources, commercial sugarcane farmers in KwaZulu-Natal, South Africa, 2006.**

Risk sources	Mean rating <sup>(a)</sup>	Factors <sup>(b)</sup>				
		1	2	3	4	5
Land reform	4.31	<b>-0.518</b>	<b>0.591</b>			
Labour legislation	4.14			<b>0.681</b>	<b>0.526</b>	
Crop price variability	3.68	<b>0.781</b>				
Changing input costs	3.56				<b>-0.450</b>	
Crop yield variability	3.43	<b>0.926</b>				
HIV/AIDS	3.41					<b>0.903</b>
Changes in capital item costs	3.33		<b>0.655</b>			
Changes in land tax legislation	3.24			<b>0.916</b>		
Unionisation of labour	2.89				<b>0.929</b>	
Variability in interest rates	2.60		<b>0.542</b>	<b>0.432</b>		
Changing water rights	2.26					
Changing credit availability	2.13		<b>0.710</b>			<b>0.469</b>
Farm operator illness/death	1.98					<b>0.512</b>
Changing family relationships	1.79					
<u>Mean factor scores:</u>						
Zululand:		0.146	-0.218	-0.245	-0.360	-0.047
KZN Midlands:		-0.146	0.218	0.245	0.360	0.047
Means comparison (significance) <sup>(c)</sup>		0.207	0.057	0.033	0.001	0.688
			*	**	***	

*Note: (a) Where 1 = “not particularly important” and 5 = “highly important”*

*(b) Only factor loadings >0.40 in absolute value are included.*

*(c) \*, \*\*, \*\*\* indicate means statistically significantly different at the ten, five and one percent levels of probability, respectively.*