Economic and Institutional Factors Affecting the Performance of the Graduated Mortgage Loan Repayment Scheme Used by Medium-Scale Sugarcane Farmers in KwaZulu-Natal

by

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DECLARATIONS

I hereby certify that, unless specifically indicated to the contrary in the text, this thesis is the result of my own original work.

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As Research Supervisor, I agree/~~do not agree~~ to submission of this thesis for examination.

Senior Lecturer Mark Andrew Gower Darroch — Date: 30/5/2003

ABSTRACT

Private sector sugar millers and Ithala Development Finance Corporation (Ithala) implemented a graduated mortgage loan repayment scheme in the 1995/96 sugarcane production-season to try and improve access to farmland by aspirant commercial farmers in KwaZulu-Natal. By March 2001, the scheme had financed 106 "medium scale farmers" (MSFs), 99 of whom were still in the scheme (one loan had been repaid from own funds, and another six from the proceeds of life insurance policies).

The first aim of this study was to analyse factors affecting whether or not the MSFs were current or in arrears on loan repayments as at 31 March 2001. A logit model based on full information for 83 MSFs shows that the estimated probability of a MSF being current on loan repayments was higher for clients with higher levels of average annual gross turnover relative to loan size, and for clients with access to substantive off-farm income. This suggests that farm size (proxied by annual farm gross turnover) does matter when policymakers in South Africa consider future similar schemes designed to improve access to commercial farmland by people that previously could not buy farmland. Smaller-sized, creditworthy farms with loan sizes that are relatively low compared to the expected average annual gross income may also be viable. Access to off-farm income could also be considered as a criterion in selecting potential farmers for future similar schemes, as it helps to provide additional liquidity to fund future operations and debt repayments, and can reduce leverage levels.

The second aim was to conduct personal interviews with the 99 MSFs between July and September 2001 in order to identify what aspects of the scheme could be improved for new members. Responses from 88 of these MSFs show that 68% of them would opt to first rent land before purchasing, while 78% of them recognize, or

have experienced, the cash flow problem associated with land purchase. Most of the MSFs felt that long-term sugarcane supply agreements constrain enterprise diversification, and that the quality of mentorship that they currently received was not satisfactory. Industry players could consider leveraging donor funding for empowerment projects to improve the quality of future mentorship programmes. There is also some scope for Ithala to improve the client-lender relationship by better clarifying the structure of the graduated repayments, sending loan statements on time, and helping clients to interpret loan statements. Growers perceive the need for a coordinator to monitor, and advise on how to improve, their financial performance - this could be a new commercial service opportunity. Using an independent valuer to conduct farm valuations may also be necessary to avoid perceptions of bias in the value of farms offered for sale by the millers.

A logit model of the MSFs' preferences for first renting land before purchase shows that new growers joining this scheme, or similar schemes for other farm products, with relatively less liquidity and less farming experience should be given the choice to rent land with an option to purchase. The preference for first renting by most of the surveyed MSFs could indicate that many very highly leveraged MSFs still experience cash flow stress despite the interest rate subsidy. A second policy implication, therefore, is that the current subsidy level, which reduces the effective starting interest rate level to about ten per cent relative to a typical five per cent current return on land, could be increased to promote access to farmland markets. Alternatively, loan terms in the next round of the scheme could be changed to require higher proportions of own equity (lower leverage levels), or to permit the deferral of principal payments, or to permit the purchase of smaller farms by creditworthy, part-time farmers. Another strategy to improve liquidity is to advise growers to limit family drawings in the early years after farmland purchase.

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INTRODUCTION

Land reform has been accorded a high priority in South Africa (SA) as a means of promoting political stability (van Zyl, 1994; Nieuwoudt and Vink, 1995; van Zyl *et al.*, 1996; Lyne and Darroch, 1997; Nieuwoudt *et al.*, 1998). The challenge for policymakers, commercial farmers, agribusinesses and researchers is to find appropriate ways of *implementing* land reform. One innovative financing scheme for this purpose was introduced in 1996 to help redistribute commercial sugarcane farmland owned by sugar millers to previously disadvantaged, aspirant black farmers in KwaZulu-Natal.

These "medium-scale farmers" (hereafter referred to as MSFs) had limited capital to buy sugarcane farms (ranging from 55 to 216 hectares in area) offered by the sugar millers, and so had to borrow most (up to 95 per cent) of the funds needed to acquire the land. This was likely to cause liquidity problems for these highly leveraged farmers due to differences in the compensation required by lenders and the form of returns to land that the MSFs purchased. Lenders would require loan repayments (principal plus interest) in cash, of which part is a real return and part is an inflation premium to compensate them for the expected loss in purchasing power of their debt claim (Barry *et al.*, 1995). The MSFs, however, would experience part of their return as a current cash return, and part as capital gain on land. The result is a financing gap, as there is insufficient cash from land earnings in the early years to meet the debt payments. This gap is expected to close over time as nominal returns to land rise in line with anticipated inflation and as the new owners adjust to operating their farms.

To help manage the financing gap, the sugar millers invested 18 per cent of the capital from land sold to the MSFs at market-related prices with Ithala Development Finance Corporation (Ithala) to fund a finite interest-rate subsidy on mortgage loans that Ithala made to the MSFs to buy the land. The MSFs thus pay a sliding scale of interest, starting low but gradually rising to the market interest rate after seven years as farm earnings are expected to improve and subsidy funds are used up (Simms, 1997). The gradual rise in annual loan repayments is hence intended to improve the viability of the MSFs in the early years after land purchase. Van den Heever (2002) attributes the absence of defaulters in the graduated mortgage loan scheme, to date, in part to this interest rate subsidy.

Ithala also has a cession on MSF cane deliveries to sugar mills and so can recover loan repayments directly from a sugar miller before the farmer is paid for cane deliveries. The cession helps Ithala to remove some of the risk of possible non-repayment of loans. At the start of each cane-cutting season, the cession per ton of sugarcane delivered to the mill is fixed by dividing the grower's required annual loan repayment by the grower's estimate of the seasonal volume of sugarcane that will be delivered. The cession per ton cannot be adjusted by the miller, and hence for Ithala Bank, during the season without the grower's consent. The borrower, therefore, falls into arrears if his/her actual cane deliveries are less than the estimated volume that was used to set the cession. Successful loan repayment performance over time by these emerging growers is critical to the viability of the current, and any future, graduated mortgage loan repayment scheme.

The first aim of this study, therefore, is to identify financial, economic and/or institutional factors that may determine whether the MSFs were current or in arrears on their loan repayments as at 31 March 2001. This will help to identify what grower characteristics to target in later such land transfers, thereby increasing the likelihood that the MSFs will be commercially viable over the long-term. Policymakers, commercial farmers, agribusinesses and financiers can use this information to help them develop mechanisms that could be used to facilitate meaningful land redistribution in SA. At present, 20 per cent of the MSFs are in arrears on their graduated repayments, although this figure would rise to 30 per cent if some loans had not been rescheduled in 2001 (van den Heever, 2002).

Past studies of this graduated mortgage loan repayment scheme have (1) explained how the scheme operates (Simms, 1997); and (2) discussed how to manage the problem of random variations in MSF cash-flows that affect repayment ability, and facilitative problems such as difficulties in setting up financial information systems, training and contractor services (Lyne and Darroch, 1997). The sugar millers, Ithala and the South African Cane Growers' Association (SACGA) indicate that further evaluation of the scheme's performance is needed, in order to identify what aspects of the scheme can be improved. This would help these players to *better implement* another round of commercial farmland transfers to new MSFs in future seasons.

The second aim of this study, therefore, is to report the results of a survey conducted in 2001 to document the current MSFs' perceptions of the graduated mortgage loan repayment scheme, and to use this information to identify what aspects could be improved. Together with the results of the loan repayment analysis, this may increase

the likelihood that the new MSFs will be commercially viable over the long-term. The results could also help to inform policy decisions about whether or not to use similar schemes to fund access by previously disadvantaged people to other types of farming and/or agribusiness ventures. The third aim of this study is to develop and estimate a logit model of factors determining the MSFs' preferences for renting farmland, as initial analysis of their survey responses indicated that 68 per cent of the MSFs surveyed would have preferred to first lease land before purchasing. This model will identify some reasons for these preferences that could also help to inform recommendations for improving the later rounds of sugarcane farm transfers, and potential similar schemes for other types of farming and/or agribusinesses.

Chapter 1 gives an overview of the SA sugar industry, describes historical trends in sugar production and sugar prices, and shows how the graduated mortgage loan repayment scheme works, using a typical MSF's schedule of annual repayments. Chapter 2 reviews past theoretical and empirical research on factors affecting loan repayment by farmers, key rural finance issues, and the determinants of land leasing decisions. Chapter 3 describes the study areas in KwaZulu-Natal where the MSFs are situated, the survey method used to elicit the MSFs' perceptions of the scheme, and some key characteristics of the MSFs surveyed used in the study. Chapter 4 outlines socio-economic characteristics of these MSFs. Chapter 5 describes a conceptual model, and presents empirical estimates, of the factors affecting the loan repayment status of the MSFs. Chapter 6 reports the MSFs' perceptions of the scheme, and then describes a conceptual model and presents empirical estimates, of factors that determine their preferences for leasing land. A concluding section discusses the management and policy implications of the study results.

CHAPTER 1

OVERVIEW OF THE SOUTH AFRICAN SUGAR INDUSTRY AND THE MECHANICS OF THE GRADUATED MORTGAGE LOAN REPAYMENT SCHEME IN KWAZULU-NATAL

1.1 Industry Structures and Functions

The SA sugar industry has three main structures: the SACGA (representing growers), the South African Sugar Millers Association (representing the millers) and the South Africa Sugar Association (SASA, a body representing both the growers and the millers). The SA sugar industry markets sugar both in the local market and export markets. The Sugar Act (No. 9 of 1978) gives SASA statutory power to divide sugar industry sales proceeds between growers and millers (Wilkinson, 1981). Total annual sales revenue for the industry is made up of local market, export market, and molasses sales revenue. After deducting refining costs, industrial charges and loan repayments, the balance is the "net divisible proceeds" that is split between the SACGA and the sugar millers on the basis of first covering production costs and then dividing according to respective agreed profit entitlements (return on capital). The final growers' price is paid on a Rand price per ton of recoverable value (RV) basis.

Prior to 30 April 2000, growers were paid a price per ton of relative sucrose for their sugarcane crop. The new RV payment system rewards growers on a price per ton of RV that accounts for the non-sucrose and fibre content in delivered sugarcane in addition to the sucrose content. Thus, the RV payment system is more "quality" based, as growers stand to gain by delivering sugarcane with high sucrose content, but low non-sucrose and fibre content (Moor, 2002a). The SA sugar industry is one of the world's leading cost competitive producers of high quality sugar (Singh, 2001;

Funnell, 2002). It is a diverse industry combining the agricultural activities of sugarcane cultivation with the industrial factory production of raw and refined sugar, specialised sugars and a range of by-products, such as methanol.

The industry makes an important contribution to the national economy, given its agricultural and industrial investments (SASA, 2002b), foreign exchange earnings, employment provision, and its linkages with major suppliers, support industries and customers. The author cannot provide exact estimates of capital investments for confidentiality reasons. The industry makes an important contribution to direct employment in cane production and processing, and provides indirect employment for numerous support industries in the three provinces where sugarcane is grown – Kwazulu-Natal, Mpumalanga and the Eastern Cape - in activities such as the fertilizer, fuel, chemical, transport, food and service sectors. Employment within the industry amounts to approximately 85 000 jobs (SASA, 2002a).

1.2 Sugar Production and Sugar Exports

The SA sugar industry currently exports approximately 50 per cent of its total production. The proportion of exported sugar has an influence on the total amount of revenue received by the industry. The amount of sugar exported by the industry increased steadily between the 1995/96 and 2000/01 seasons, before dipping in the 2001/02 season. Figure 1.1 overleaf shows the total tons of sugar produced in the industry, the amount of sugar sold in the export market and the amount of sugar sold in the local market. The export market is increasingly becoming an important market for the SA sugar industry, with over 50 per cent of the crop exported since the 1998/99 season. Sugarcane is a long-term crop with a high capital investment, and a

high proportion of fixed costs (SASA, 2002a) in growing and milling. Therefore, exporting sugar even at relatively low prices has contributed positively towards covering the industry's fixed costs (Ardington, 1981/82: 53-59). Likewise, abandoning these markets would be a retrograde step for the industry because the loss of markets developed over many years would reduce foreign exchange earnings. Increased access into the Southern African Customs Union (SACU) market by Swaziland and other Southern African Development Community (SADC) sugarcane producing countries, which displaced SA sugar, has been one of the reasons for the increase in sugar exports since 2001. Exports also increased due to increased sugarcane production, mainly due to increased area under cane and better quality. A significantly larger proportion of sugar that is exported implies increased exposure to lower prices in world markets.

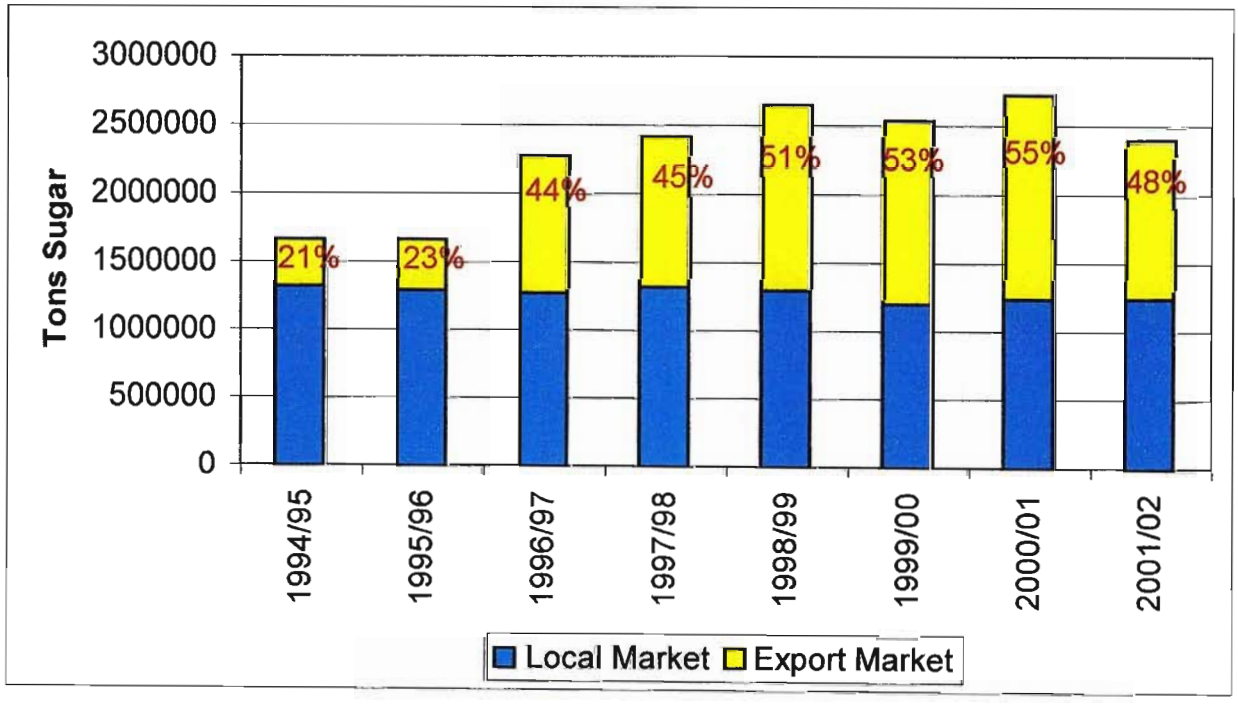

Figure 1.1 Annual SA Sugar Production (tons), 1994/95-2001/02
Source: SASA (2002a).

Due to the single channel export market scheme that SASA operates, and import tariff protection, SASA can practice price discrimination by marketing sugar in the local and export markets at different prices. In order for price discrimination to succeed, sugar must be prevented from being purchased in the (export) markets with the lower price and resold in the (local) market with the higher price (Leftwich, 1979: 273; Parkin, 1992: 327). Further, in order for price discrimination to be profitable, the price elasticity of demand at each price level must differ among the markets. SASA can restrict the quantity of sugar on the local market (price inelastic demand) and increase the quantity sold on the export markets (price elastic demand) and so increase total revenue for the industry (Cleasby, 1991).

Sugarcane yields in the SA sugar industry have been stable at about 50 tons per hectare recently, despite fluctuations in the annual rainfall received by the industry since the early 1990s. Figure 1.2 overleaf indicates the industry's average yield and rainfall since the 1990/91 season, with yields based on the tons of sugarcane per hectare of farmland under sugarcane. The four-year drought conditions from 1990 to 1994 significantly affected the industry's overall average yield, with 1993/94 most affected. There are signs of recovery from the drought years, with record crop production in the 1998/99 and 2000/01 seasons when production well exceeded 2,5 million tons of sugar, mainly due to improved production per hectare under sugarcane, and higher rainfall. Average annual industry rainfall exceeded 1000 mm in the 1995/96, 1997/98, 1999/00 and 2000/01 seasons.

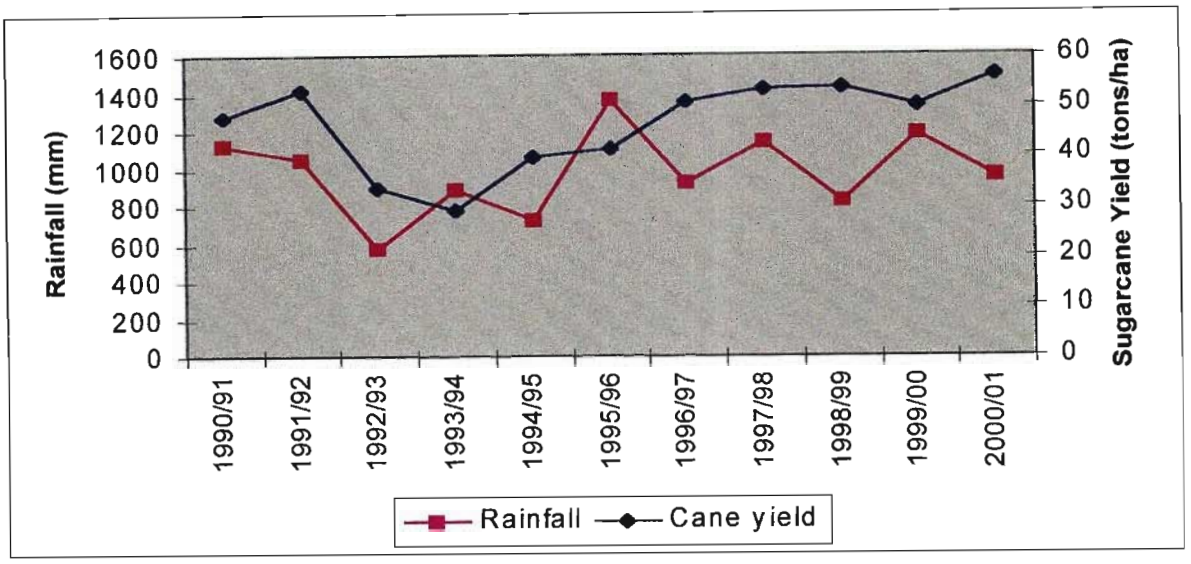

Figure 1.2 Annual Sugar Cane Yields and Rainfall in the SA Sugar Industry, 1990/91-2000/01
Source: SA Sugar Experiment Station.

1.3 Sugar Prices and the Rand:US Dollar Exchange Rate

The value of SA sugar exports in Rands is a function of the prevailing world price for sugar and the Rand:US Dollar (US$) exchange rate at the time of sale. Both the world price and the Rand:US$ exchange rate are extremely volatile, as witnessed by the marked fall in the world price for sugar in the 1999/00 season and the considerable devaluation of the Rand against the US$ in late 2001 (Moor, 2002b). Both of these factors are market driven and are largely beyond the control of SASA. Since the start of the graduated mortgage loan repayment scheme in the 1995/96 season, the Rand has depreciated steadily against the US$. Year on year comparisons indicate that the Rand lost 22,84 per cent of its value against the US$ between April 1997 and March 1998. It depreciated against the US$ by a further 8,43 per cent from April 1998 to March 1999, before again losing value by annual double-digit percentage figures. SASA gains from exporting approximately half of the SA sugar industry's total crop during periods of currency devaluation, as each dollar earned is

converted into more Rands. However, sugar proceeds in the local market are also a function of the world sugar price, which has been markedly unstable. The world market price of sugar fell to a record low of 6,13 USc per pound during March 2000, followed by a recovery to 7,56 USc per pound during March 2001.

Figure 1.3 overleaf shows that, although world sugar prices decreased considerably since the 1997/98 season, the depreciation of the Rand meant that the effective world price in Rand terms is not lower. In other words, the depreciation of the Rand has more than offset the fall in world sugar prices. The negative effect of the depreciating domestic currency is the likely increase in the cost of imported inputs, with fertiliser and chemicals being the main items imported by the SA sugar industry. These increases in input costs will give rise to increased production costs that will, to some extent, offset revenue gains (Moor, 2000b).

1.4 Number of Growers in the SA Sugar Industry

Registered cane growers in SA number more than 50 000, comprising of approximately 2 000 large-scale commercial farmers on freehold property, and approximately 48 000 small-scale growers (SASA, 2002a). The industry produces more than 23 million tons of sugarcane per season from 15 mill areas, with the large-scale growers contributing 72 per cent, the small-scale growers 15 per cent, and the miller-cum planters (MCPs) 13% of total sugarcane production, respectively (SASA, 2002b). The percentage of the total crop produced by the MCPs has declined in recent years, and this trend is likely to continue as these companies sell parts of their sugarcane estates to emerging growers like the MSFs, and concentrate on downstream activities (milling sugar and producing by-products).

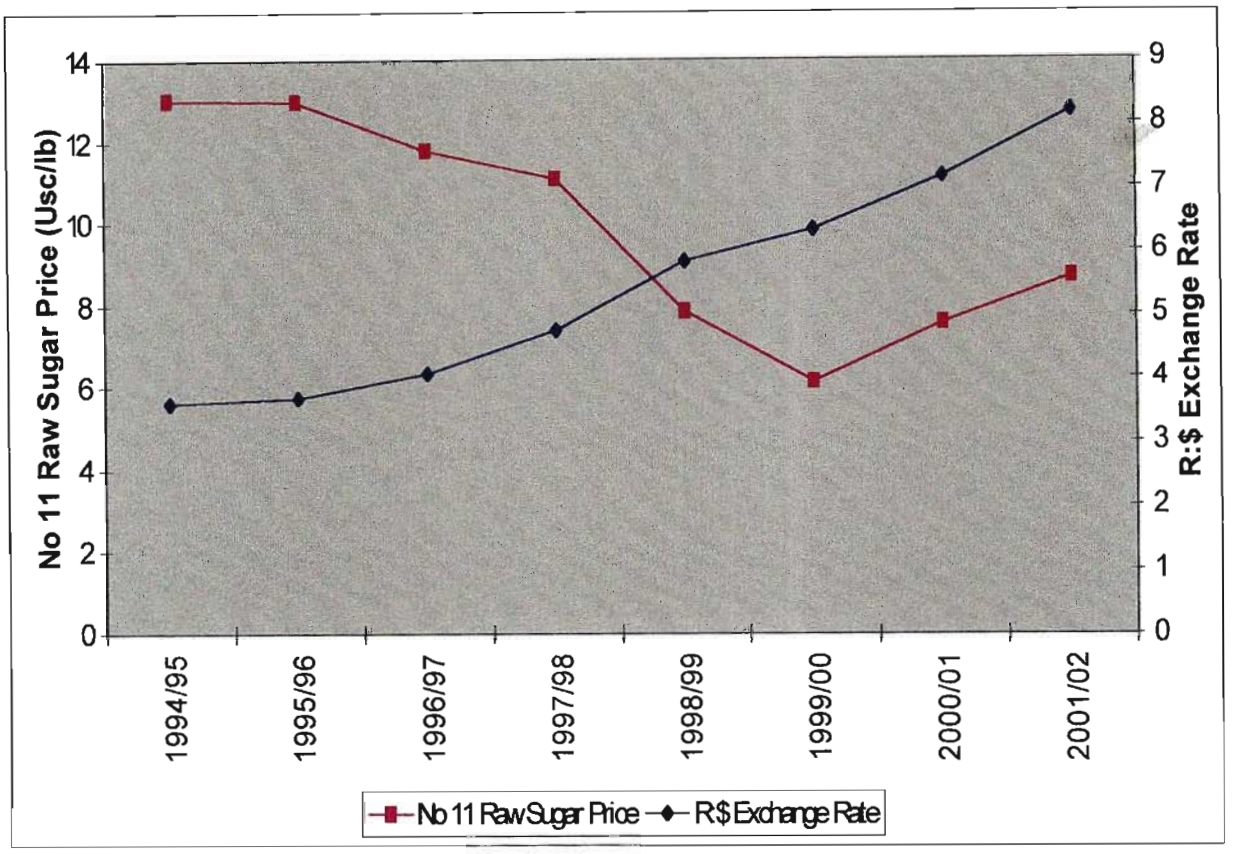

Figure 1.3 Historical Rand: US$ Exchange Rates and World Sugar Prices, 1994/95 – 2001/02
Source: Industrial Affairs, SACGA.

Except for the 1997/98 season, Table 1.1 overleaf shows that from the 1995/96 season onwards, the number of MCPs has been lower than the pre-1995/96 season. The initial group of 11 MSFs entered the industry in the 1995/96 season, and there are currently 99 MSFs using the graduated mortgage loan repayment scheme. The increase in the number of MCPs since the 1998/99 season is partly due to the opening of the Komati mill in 1997. Following this overview of the SA sugar industry, the next section explains how the graduated mortgage loan repayment scheme for the MSFs in KwaZulu-Natal operates. The aim is to show how the graduated loan payments can help the MSFs to manage the cash flow problem associated with the early years of a land purchase.

Table 1.1 Number of Growers in the SA Sugar Industry, 1990/91-2000/01

Season	Registered Growers			Active Growers[4]			Total Registered Growers	Total Active Growers
	SSG[1]	LSG[2]	MCP[3]	SSG	LSG	MCP		
1990/91	33 229	1 697	24	19 485	1 627	24	34 950	21 136
1991/92	41 359	1720	26	21 234	1 670	26	43 105	22 930
1992/93	43 510	1760	27	21 433	1 710	25	45 297	23 168
1993/94	44 991	1849	34	20 816	1 663	27	46 874	22 506
1994/95	49 257	1740	26	23 427	1 556	26	51 023	25 005
1995/96	52 746	1624	24	23 488	1 558	24	54 394	25 070
1996/97	56 370	1643	23	28 890	1 583	23	58 036	30 496
1997/98	52 106	1658	27	27 886	1 601	27	53 791	29 514
1998/99	51 398	1791	17	30 459	1 688	17	53 206	32 164
1999/00	51 439	1723	21	30 370	1 609	21	53 183	32 000
2000/01	50 561	1778	21	29 022	1 605	21	52 360	30 738

Source: The Directorate: Agricultural Statistics (2002) and SACGA.
Notes: [1]SSG refers to small-scale growers; [2]LSG refers to large-scale growers; [3]MCP refers to miller-cum-planter; and [4]Active growers refer to sugarcane farmers that actually delivered cane to a mill in any given season.

1.5 Mechanics of the Graduated Mortgage Loan Repayment Scheme for MSFs in KwaZulu-Natal

As noted in the Introduction, sugar millers in KwaZulu-Natal decided to sell commercial sugarcane land in 1996 to help redistribute such sugarcane farmland to previously disadvantaged aspirant black farmers. This also released capital for the millers to invest in higher-value downstream activities, and helped to promote black economic empowerment. The MSFs have fully exclusive and transferable property rights to their land. The major problems with the project initially were facilitative, involving difficulties in setting up financial information systems, training and

contractor services (Lyne and Darroch, 1997). This suggests that a key focus in similar future projects would be to avoid underestimating the time taken by such 'new' farmers to adapt to the requirements of managing viable commercial farms. The graduated mortgage loan repayment scheme is an attempt to improve market access by emerging, commercial growers who would not qualify for more conventional types of loan finance. In the current scheme, the sugar milling companies have borne all the of the land survey and sub-division costs, while the growers paid registration costs and certain other banking charges. All of the contracting services to establish, maintain, harvest and transport the MSFs' sugarcane crops were initially supplied by the companies. Contractors from previously disadvantaged backgrounds are now well established and have the labour and machinery resources to undertake these operations.

Any MSF that consistently fails to make his/her graduated mortgage loan repayments from year to year is placed under a voluntary management agreement (van den Heever, 2002). Ithala then receives all that grower's sugarcane sales revenue directly from the mill that is supplied. Through the management agreement, a manager is appointed to rehabilitate the farm and is expected to work with the owner of the farm in question. Ithala then pays all farm-related operating costs using the defaulting grower's funds. All of the MSFs in the scheme have mandatory crop insurance to provide liquidity in the event that fires destroy the sugarcane crops. Crop insurance is particularly important from a financial standpoint - it enhances borrowing capacity because it can be assigned to a lender as loan collateral. Crop insurance helps the grower to cope with a major element of risk in crop farming, and if available, it should be considered by all farmers located in areas of high risk of weather

fluctuations (Lee *et al.*, 1980: 244). This is true especially for growers with relatively low own equity - like the study MSFs - that could not withstand a severe loss due to natural calamity if they had to rely solely on own funds to service loans.

1.5.1 The Interest Rate Subsidy on Scheme Mortgage Bonds

Ithala required a down-payment of only ten per cent of the land purchase price as own equity (capital) contribution when the sugar millers sold farms to the MSFs, and the MSFs were expected to operate successfully with such a small contribution. However, the MSFs selected for mortgage bond approval could only contribute about five per cent of the purchase price of land. Ithala's interest rate charged on these mortgage bonds was sixteen and half per cent in the 1995/96 sugarcane season when the first MSFs made their bond repayments (van den Heever, 2002). As noted in the Introduction, cash-flow problems are likely to arise when the MSFs' own equity contribution to the purchase price of land was a mere five per cent. The implication is that a MSF with this relatively small equity contribution may at first have to use a considerable portion of the returns attributed to management and risk for interest payments. That means a more modest life style than what could be afforded on opportunity income (Nieuwoudt and Vink, 1995).

To help overcome the expected cash flow problems, the sugar millers invested 18 per cent of the capital from land sold to the MSFs at market-related prices with Ithala to fund a finite interest-rate subsidy on mortgage loans that Ithala made to the MSFs to buy the land. This generates a sliding scale of interest, starting low but gradually rising to the market interest rate after seven years as farm earnings are expected to improve and subsidy funds are used up (Simms, 1996; 1997). The gradual rise in

annual loan repayments is intended to improve the cash flow and, hence, viability of the MSFs in the early years after buying land. Table 1.2 shows how a MSF's own contribution to mortgage bond interest payments rises from sixty-one to one hundred per cent over six years under the diminishing, finite interest rate subsidy.

Table 1.2 Impact of the Finite, Diminishing Interest Rate Subsidy on a MSF's Own Contribution to Mortgage Bond Interest Payments

Year	Interest Rate Paid by MSF (%)	MSF's Own Contribution to Interest Payments (%)
1996/97	10.1	61
1997/98	11.3	68.5
1998/99	12.4	75
1999/00	13.4	81
2000/01	15.3	93
2001/02	16.5	100

Table 1.3 shows the mortgage loan repayment structure for the particular case of a participating MSF with an R852 412 bond, repayable over 20 years. The interest subsidy falls from thirty-nine per cent (R54 853 out of R140 648 of interest charges) in 1996/97 to zero Rands out of R132 672 of interest charges by 2001/02.

Table 1.3 Mortgage Bond Repayment Schedule for the First Six years for a Selected MSF

Year	Opening Balance	Instalment	Interest Charges	Capital Redemption	Interest Subsidy	Effective[a] Interest Charges
1996/97	R852 412	R147 608	R140 648	R6 960	R54 853	R85 795
1997/98	R845 452	R147 608	R139 500	R8 108	R45 337	R94 162
1998/99	R837 344	R147 608	R138 162	R9 446	R37 304	R100 858
1999/00	R827 898	R147 608	R136 603	R11 004	R21 857	R114 747
2000/01	R816 894	R147 608	R134 787	R12 820	R9 435	R125 352
2001/02	R804 074	R147 608	R132 672	R14 936	R0	R132 672

Note: [a] Effective Interest Charges = Interest Charges – Interest Subsidy.

Renting of land may be an attractive alternative for the MSFs if the net cash inflows to the business associated with land purchasing (despite the interest rate subsidy) are

still lower than those from renting. This happens if the interest rate subsidy is not sufficient enough to reduce loan repayments to the level that a grower is indifferent between leasing and purchasing farmland. Of course, during inflationary times, owner-operators would benefit from capital gains when farmland prices rise.

Table 1.4 overleaf shows how the average mortgage bond graduated repayment schedule for the MSF clients (average initial bond of R878 036 for 20 years) compared with average net farm income (NFI) for these clients since 1996/97. Net farm income is defined as gross farm income less farm operating expenses, where farm-operating expenses exclude foreign factor costs (machinery leasing costs and all loan interest charges). The average area under sugarcane per MSF is 87 hectares, and this area produces 493 tons of RV (quality) per season on average. The NFI figures were estimated from annual NFI as a percentage of gross farm income over 1996-2001 obtained from the SACGA – this figure ranged between twenty-five and thirty-two per cent (Fenwick, 2002).

The interest rate subsidy, on average, helped to keep the effective nominal interest charges below nominal NFI in all but one season (1999/00). This was further compounded by a relatively low sugar price in 1999/00 (see Figure 1.3). In addition, low world prices have contributed to lower annual nominal NFI for the MSFs, on average, since 1996/97, despite the falling Rand: US$ exchange rate. This reflects the potential disruptive impact that income shocks can have on the ability of the MSFs to meet their bond repayments when they are so highly leveraged. Note that the difference between the effective interest charges and estimated NFI becomes smaller towards the end of the five year-subsidy period. The extent of the difference between

the estimated NFI and the effective interest charges depends on a number of factors including sugarcane production (yield stability), sugarcane prices, farm operating costs, and the interest rate.

Table 1.4 Average Mortgage Bond Repayment Schedule Versus Average Net Farm Income of the Sample MSFs for the First Six Years

Year	Balance	Instalment	Interest Charges	Capital Redemption	Effective Interest Charges	Estimated Nominal NFI
1996/97	R878 036	R153 296	R146 069	R7 228	R89 102	R163 484
1997/98	R869 616	R153 296	R144 876	R8 421	R97 791	R145 020
1998/99	R859 806	R153 296	R143 487	R9 810	R104 745	R137 568
1999/00	R848 377	R153 296	R141 868	R11 429	R119 169	R116 788
2000/01	R835 063	R153 296	R139 982	R13 314	R130 183	R150 389
2001/02	R819 552	R153 296	R137 785	R15 511	R137 785	[a]

Note: [a] indicates that statistical data to estimate the NFI are not available for the 2001/02 sugar season.

This overview of the SA sugar industry and the graduated mortgage loan repayment scheme in KwaZulu-Natal shows that the 99 MSFs currently in the scheme make up about six per cent of existing commercial growers. In addition, the MSFs have, on average, apart from the 1999/00 season, generated sufficient annual NFI to meet effective (subsidized) interest charges. This ability has declined as the interest rate subsidy has been phased out and world prices have fallen, implying that cash flows have come under increasing pressure. This is reflected by the twenty per cent arrears figure reported by van den Heever (2002) that was noted in the Introduction.

The next chapter reviews relevant literature that identifies factors that contribute to successful loan repayment, as a basis for developing a model of MSF loan status; key finance issues to put the MSF emerging commercial farmer study into perspective relative to other credit schemes aimed at assisting people in rural areas; and the rationale for why most MSFs preferred to first rent land before purchasing.

CHAPTER 2

REVIEW OF LITERATURE

This chapter reviews relevant literature on agricultural loan repayment performance and land leasing as a basis for developing models of MSF loan repayment status and land leasing preferences. The focus is on loan repayment performance, as improved loan collection rates are crucial to the long-term viability of agricultural financiers. Successful rural financial institutions or agricultural financiers, through financial intermediation, have the necessary capabilities to mobilize resources and to allocate them to preferred uses. Successful financial intermediation is only possible when financiers are able to use some loan collections either for further loan disbursal to new clients, or for investments in sectors other than agriculture (Adams, 1992; Baker and Dia, 1993).

2.1 Agricultural Loan Repayment Performance

Several African studies of agricultural loan repayment performance have estimated the determinants of loan performance with a binary loan outcome – defining borrowers as either current on their loan repayments or in default. Loan repayment was positively related to factors such as the timeliness of loan disbursement, enterprise profitability, the number of supervisory visits by credit officers, having additional sources of income, an established previous loan history, and lower client debt-asset ratios (Kamajou and Baker, 1980; Vogel, 1981; Okorie, 1986; Njoku and Odii, 1991; Vigano, 1993; Lugemwa and Darroch, 1995). Lyne and Ortmann (1992) report that small-scale farmers in the former KwaZulu homeland in SA who had higher levels of off-farm income and who rented in more farmland from other

households were more likely to repay seasonal (working capital) loans. Kuhn and Darroch (1999) studied rural medium-term loan repayment performance in KwaZulu-Natal using multiple loan repayment categories (current, in arrears, and default), and found that first-time borrowers, and clients that have modest loans, smaller own direct equity contributions, and who manage contract ploughing and broiler ventures, tended to default on loan repayments.

In the finance literature, Ohlson (cited by Miller and LaDue, 1989) reported that larger companies are less likely to fail. Mortensen *et al.* (1988) identified the debt-to-asset ratio and the operating ratio (annual production expenses as a proportion of annual gross cash farm income) as indicators of potential loan default by commercial farmers in North Dakota in the US. Miller and LaDue's (1989) comprehensive review of past US studies of agricultural credit assessment shows that business solvency, repayment ability and liquidity are important factors in assessing the quality of commercial farmers as borrowers. Miller and LaDue then identify higher-quality dairy farm borrowers in the state of New York as being more liquid, more profitable and having higher operating efficiency. Aguilera-Alfred and Gonzalez-Vega (1993) used a multinomial logit model to analyze the repayment performance of loans disbursed by a typical developing-country specialized lender in the Dominican Republic. They concluded that borrower characteristics (land tenure status and credit rating by the bank), loan characteristics (restriction on use of borrowed funds) and regulatory instruments (bank's own funds and international targeted funds) most affect client loan repayment. Hardy and Weed (1980) indicated that the ratio of total liabilities: total assets, and the ratio of expected annual loan

repayment: total assets are key determinants distinguishing between current loans and loans in default amongst US commercial farmers.

None of the above studies considered factors affecting the long-term mortgage loan repayment performance of highly-leveraged, emerging commercial farmers with land title (well-defined property rights). This study, therefore, tries to partly fill this gap in research and thereby provide information that could help SA policymakers, commercial farmers, agribusinesses and financiers to identify ways of promoting sustained access to commercial farmland by people that were previously denied the opportunity to operate such land.

2.2 Some Key Rural Finance Issues

2.2.1 The Credit-project View versus the Market-performance View of Rural Finance

Many evaluators and designers of rural credit projects view loans as part of a package of productive inputs. These evaluators and designers typically use the number of loans made to target group members as a measure of the success of such programmes (Krafft, 1996; Yabile, 1987). These measures concentrate on borrowers, and project evaluations often report successful results. Individuals who support the credit-project view largely ignore the durability of the credit activity and the well being of the financial system. Concerns about poverty alleviation and promoting economic growth in rural areas in the 1970's resulted in governments formulating credit policies to assist the poor through the provision of a comprehensive set of support services in developing countries (Adams, 1971). Through government

regulations, specialised agricultural lenders were established, or existing lenders coerced, to lend to people in rural sectors.

Loan administration and financial innovations developed by the lenders were, however, mostly cost increasing, rather than cost reducing. The result was that many specialised agricultural lenders were not sustainable, and these credit institutions were characterized by poor loan repayment performance and limited coverage (outreach). Factors contributing to the low rates of loan recovery included poor client screening (information asymmetry), lax supervision, inadequate default management, and the high transaction costs involved in administering many small loans (Yaron, 1992). Some wealthy source is expected to fund these efforts and in many cases credit is viewed as a universal entitlement. Similar to international experience, past government and donor-support credit programmes in SA suffered from high default rates and limited outreach (Kuhn *et al.*, 2000). Empirical studies in the developing regions of KwaZulu-Natal, Lebowa, Venda and KaNgwane found that high transaction costs, low wealth, and poor debt servicing capacity impeded client use of formal credit (Coetzee (1995) and Fenwick and Lyne (1998), cited by Kuhn *et al.*, 2000).

Recognizing the failure of the credit-project approach, an alternative approach to providing access to rural finance – the market performance view - that stressed the development of a *sustainable* financial sector, was formulated (Yaron, 1992). Proponents of the market-performance view contend that the criteria for measuring overall performance of credit projects should include loan recovery rates, the transaction costs of lending, the degree of deposit mobilisation, the number of

individuals with sustained access to formal financial services, and the proportion of lending that comes from deposits/portfolio funds recovered. These measures stress the viability and durability of the financial system and the efficiency therein. Loans are viewed as a commercial source of funding that should be earned by clients through establishing their creditworthiness and should not be used as a disguised grant or a form of patronage (Boakye-Dankwa, 1979; Krafft, 1996). This market-performance view represents the "new view" of rural finance.

2.2.2 Some Features of the Financing of Poor Individuals

Financial markets may transfer income in two ways: through loan default and through concessionary interest rates. Since loan size is usually highly correlated with the levels of assets and income of borrowers, subsidies tied to loans turn out to be a regressive way of helping poor people because the desired income transfer to small borrowers often does not take place (Adams, 1992). Policies that tolerate higher rates of default on small loans than on large loans, or that impose higher interest rates on large loans than on small loans, provide powerful incentives for lenders to avoid making small loans. Past attempts to assist poor people differentially through credit programmes ended up either undermining the financial institution involved and/or largely benefiting individuals who are not poor (Adams, 1992).

Providing rural financial services is relatively costly - small transactions, transportation and information gathering expenses, insurance collateral and uncertainties in farming increase these costs. The great majority of farmers that repay loans subsidise the minority that default, and there is no reason to believe that the latter are any more likely to be poorer, or in other ways more deserving than the

former (Boakye-Dankwa, 1979). Loans not collected are loans that cannot be recycled by the lender to new borrowers. Emerging farmers who might otherwise have had access to credit may be denied credit because those with loans do not promptly repay. The difficulty lies in distinguishing the poor farmer with good intentions, from potential delinquent borrowers that become real defaulters. Emphasis should be on the value or quality of loan service, since it is expected that a system that substantially reduces the loan transaction costs would result in higher repayment.

Financiers are interested in remedies as well as explanations of default. The most complex and time-consuming response to default is sequestration or attachment of property. The default rate is likely to decrease if the default-penalty is enforced, and consequently lending cost decreases. From a lender's perspective, farm operators who were predicted to remain current on debt obligations but who actually default would expose an institution to the greatest potential loss (Mortenson *et al.*, 1988). Agricultural banks probably need to diversify their portfolios to improve risk management – this calls for diversification of lending from agricultural production to the broader objective of financing the full range of the rural sector's needs.

2.2.3 Interest Rates and Lending Costs

Adams (1992) maintains that in addition to the foreign exchange rate, interest rates are the next most important set of prices. Policymakers who insist on sustaining low and, especially, negative real rates of interest on formal financial transactions condemn a formal financial system to perform poorly. Low interest rates discourage savers from making deposits, make it more difficult for lenders to carefully screen

borrowers (leading to adverse selection as clients turn out to be higher than expected credit risks), encourage rent-seeking behaviour in financial markets, undermine the sustainability of financial institutions, and create a system that continually seeks handouts. If financial markets are to be efficient (promote allocation of funds to their highest valued uses), perform equitably, continue to expand, and provide sustained services, positive real rates of interest on loans and deposits are critical. In countries experiencing inflation, this means nominal interest rates must be flexible and rise and fall with inflation to maintain positive real interest rates most of the time.

A commercial bank that makes loans is necessarily concerned about the interest rate it receives and the relative riskiness of the loans. This concern is reflected in the bank's close analysis of an applicant's income prospects, the amount of loan that can be committed, and the amount of collateral required as security for the loan. In credit transactions, the effective interest rate charged by a lender must cover the cost of funds, a risk premium, and loan administration and servicing costs (including profit for the owners or shareholders). Moreover, inflation has an impact on all credit transactions because funds borrowed are in effect repaid over some future time period with "cheaper" rands. Adams and Graham (1981) indicate that interest rates have a very strong influence on lender's behaviour since they make up a large part of a lender's total revenue.

Loan pricing is considered a key managerial control variable and is based on factors both external and internal to the institution. Translated into costs experienced by the lender, loan pricing entails covering the full set of lending costs which includes administrative costs, funding costs, risk-bearing costs, competitive costs and non-

loan costs (Barry *et al.*, 1995: 461-463). Administrative costs include outlays for personnel salaries, documents, equipment, legal services, computers, supplies and other costs involved in running the loan programme. Funding costs cover debt funds (funds purchased in the financial market) and equity funds (the institution's own equity capital). Delinquency and default by the borrower (credit risks), unanticipated variations in the borrower's need for funds (liquidity risks), and the combined effects of other institutional risks are all part of risk-bearing costs. Competitive costs are reflected by the level of competition in the institution's loan market - stronger competition from other lenders would result in lower prices and profits on loans, *ceteris paribus*. Non-loan costs cover services provided by the lender such as technical assistance, business training and financial planning (Barry *et al.*, 1995: 462-463).

2.2.4 The Problem of Imperfect Information in Credit Markets

Any financial intermediary must address its principal-agent problem effectively if it is to survive and become viable (Graham, 1995). In this case, the principal (lender) must be able to design a contract that creates a strong likelihood that the agent (borrower) will honour the obligation to repay. To do this the lender must overcome information problems that limit knowledge about the borrower's honesty and entrepreneurial ability. Both lenders and borrowers incur transaction costs when entering into a credit contract. As noted in section 2.2.3, lender costs consist of three components: the opportunity cost of funds, costs of administration and the losses due to loan default. Borrower costs include the cash costs to obtain the necessary documentation, travel costs, commissions, collateralisation costs, and implicit costs such as the opportunity costs of time and pledging collateral (Adams and Nehman,

1979). Lenders operating in rural financial markets thus need to develop financial technologies that overcome information and incentive problems. Such technologies need to lower both borrower and lender transaction costs in order to improve the financial viability of lenders operating in these markets. Second, the lender must have the capacity to monitor the borrower's behaviour. Finally, the lender must create a contract enforcement mechanism or an incentive environment that ensures loan repayment.

The logit model of MSF mortgage loan repayment performance estimated in this study is intended to provide information on key factors that affect loan repayment. These factors could then be considered by Ithala lending officers in deciding whether or not to approve loans to new applicants in later rounds of the graduated mortgage loan repayment scheme in KwaZulu-Natal. In this way, the study can help Ithala to overcome information problems, and reduce the likelihood of adverse selection (approving loans to borrowers that turn out to be greater credit risks than expected (Barry *et al.*, 1995)), thereby promoting the long-term viability of the scheme.

2.2.5 The Role of the State in Agricultural Financing

Well-functioning institutional arrangements in rural finance markets will lower transaction costs and increase efficiency in economic exchange, and be based on clearly defined property rights and uncomplicated contract enforcement (Barry *et al.*, 1995; Adams, 1992). This in turn is only possible if the correct information is available and the legal system can promote enforcement. Government can indirectly intervene by facilitating transactions between different agents in the economy. In

agrarian communities, local agents have superior information about the expected behaviour of community members (Coetzee, 1994). This information allows them to reduce adverse selection and moral hazard (borrowers take on greater risks during the term of the loan than anticipated by the lender when the contract was established (Barry, *et al.*, 1995)) problems, but they are constrained in their ability to diversify risk and more potential exists for enforcement problems due to close relationships with local power structures. One way to solve this through government action is the linking of external and internal agents, thus solving external agents' information problems and internal agents' risk managing and enforcement problems (Krafft, 1996; Coetzee, 1994).

The next section reviews some literature on the rationale for land leasing rather than land purchase. This provides a basis for developing the model of MSF preferences for leasing land before land purchase that is reported in Chapter 6.

2.3 The Rationale for Leasing Land

Studies in the US, where the proportion of farmland operated under lease arrangements rose from about 35 per cent in 1959 to over 40 per cent in 2000 (Barry *et al.*, 1995; Lundeen *et al.*, 1988; Paterson *et al.*, 2000), show that lessees tend to be younger farmers with limited equity, or well-established farm owners wanting to control more land without increasing their debt. Hattingh and Herzberg (1980) report that in SA it is also mainly farmers who already own land that use leasing to gain control of land. Renting obviously helps the farmer to avoid the cash flow problem associated with the early years of a land purchase that is partly financed with debt. In

contrast to the US and SA rent studies, the 68 per cent of the MSFs surveyed who would prefer to first rent land before land purchase did not previously own land.

Leasing is a means of gaining economic control of the land asset. It is thus a means of financing that enables the manager to control the use of assets belonging to others without making a down-payment, or incurring other ownership obligations. The grower or farm manager thus avoids the lower liquidity in the early years associated with ownership through cash purchase or borrowing. Moss and Erven (2001) report that many US farmers depend on leased farmland to have a business of adequate size and income. Many producers have concluded that they can lower financial risk by controlling resources through rental rather than via mortgage ownership (see Dasgupta *et al.* (1999) for a detailed discussion of the evolution of different types of land lease models). Contributing heavily to the desire to own land is the tax deduction allowed for depreciation of improvements to owned property, and the interest expense deductions on the necessary financing to buy land (Barry *et al.*, 1995). If the agreement is a conditional sales lease (which means that the lessee has or will acquire legal title to the property), the payments under the contract will be considered payments for the purchase of the property, and deductions will be allowed for depreciation and possibly interest expense (Baker and Hayes, 1981:110).

Land values reflect the expected current returns to land from agricultural production, and the expected future changes in those returns. As noted in the Introduction, a land purchase typically does not generate sufficient immediate cash returns to service debt. In contrast, rental fees are more nearly based on current returns from agricultural production and are less likely to cause cash flow problems. It follows

that leasing rather than buying land often results in a stronger cash flow problem. The experience in the US is that the proportion of rented land is generally higher in areas or regions where land values are higher (Moss and Erven, 2001).

Lundeen *et al.* (1988) reported that widespread financial stress in US agriculture in the 1980s, and the associated lower land values (loss of collateral), led to greater emphasis by farmers on farmland leasing. Full tenants who owned no land – 79 per cent of sample farmers in South Dakota and 76 per cent in Nebraska - were individuals that were less than 45 years of age. According to Baron (1985), the motivation to avoid risk encourages many farmers not to purchase farmland and to choose risk-sharing leasing contracts, rather than contracts that assign all the risk to the tenants. When inflation and nominal interest rates are high, traditional mortgage loans amortised with constant repayment of principal plus interest create formidable liquidity problems for emerging growers who cannot make a substantial down-payment on the purchase price of a farm (Nieuwoudt and Vink, 1995; Lyne and Darroch, 1997). Generally, if heavy use of debt financing is assumed, cash flow will be a strong consideration for the decision to lease land (Lundeen *et al.*, 1988).

2.4 Implications for the Context of the Study

The finance literature reviewed in this chapter indicates that this study will partly fill a gap in published research by estimating factors affecting the long-term mortgage loan repayment performance of highly-leveraged, emerging commercial farmers with land title (well-defined property rights). This information can help to identify lending criteria that can be used to promote the viability of future rounds of the graduated mortgage loan repayment scheme – and similar schemes for other types of farming in

SA. The graduated mortgage loan scheme could also be seen as elitist, in that it has limited outreach and has improved access by a total of 106 relatively wealthy emerging farmers to commercial farmland. The farmland in question, however, is of much better quality than the farmland redistributed by past government grant programmes to groups of previously disadvantaged buyers in KwaZulu-Natal since 1995 (Darroch and Lyne, 2002). To put the study in context relative to financing the rural poor and the role of the State, the government could replicate the key principle of the scheme and redirect some cash grant funds into finite, diminishing interest rate subsidy schemes for emerging commercial farmers. The scheme can also be criticized, in relation to the literature review, on the grounds that the interest rate subsidies will be expected to continue in later rounds and so become capitalized into higher land values that make it more difficult for later emerging farmers to buy farmland. This distortion may be less serious than first perceived as the interest subsidies are phased out and not entrenched (Nieuwoudt and Vink, 1995).

The final part of the literature review on the rationale for leasing land concluded that potential cash flow stress associated with heavy use of debt to finance a land purchase may induce farmers to rather lease land. This link will be examined in the empirical model of MSF preferences for leasing land first before renting that is developed in Chapter 6. The next chapter describes the study area, sample survey methodology used to assess MSF perceptions of the graduated mortgage loan repayment scheme, and the statistical techniques used in the study.

CHAPTER 3

STUDY AREA, SURVEY METHOD AND STATISTICAL TECHNIQUES

This chapter describes the study area and survey questionnaire used to elicit MSF perceptions about different aspects of the graduated mortgage loan repayment scheme. Statistical techniques used to assess the loan repayment status and renting preferences of the MSFs are described in section 3.2.

3.1 The Study Area

The study area covers the North Coast, Midlands and South Coast regions of the SA sugar industry. The area was chosen because at the time of the study the MSFs were only situated in these regions. Sugarcane is produced under dryland conditions in all three regions. The sugarcane cutting cycle for the growers on the coastal belt is 12 months, and this cycle ranges from 14 to 24 months for the growers that are situated more inland from the sea (parts of the South Coast and the Midlands). In the Midlands, the MSFs deliver sugarcane to the Eston mill, while the Sezela mill accepts the growers' sugarcane in the South Coast. The MSFs in the North Coast are located around the Maidstone, Gledhow and Darnall mills.

The SA sugar industry extends between latitudes 25°21′ and 31° South, and longitudes 29°54′ and 32°21′ East. The mean annual rainfall for the coastal belt is approximately 1 000 mm, roughly 75 per cent of which falls in the summer months, while the average rainfall for the Midlands is approximately 950 mm. Indications of historical annual rainfall patterns for the three study areas are given in Appendices A, B and C (see pages 93-94 of the dissertation). The mean annual temperature for the

coastal belt is 20.7°C. In the KwaZulu-Natal Midlands the annual mean temperature is approximately 16.6°C (SASA, 1970). Figure 3.1 overleaf shows the sugarcane supply areas of the SA sugar industry along with their respective mills.

3.2 Study Data Collection

The study required socio-economic data that would be useful for explaining the loan repayment status of the MSFs, and a survey for evaluating the MSFs' perceptions of the scheme. Loan status data and client characteristics such as MSF age, education level, gender, mean annual gross farm turnover etc. were obtained from Ithala client records and the SACGA's CANEFARMS book keeping record system. Primary data on MSF preferences were collected by LIMA, a non-government organization that conducted a survey using the questionnaire presented in Appendix E (see pages 95-98 of the dissertation). The survey was administered after amending the questions following a pilot survey of four MSFs undertaken to assess the clarity and intent of the closed and open-ended questions that were presented. The survey intended that LIMA personnel hold personal interviews (census survey) with all 99 of the MSFs in the scheme at the time of the study.

3.2.1 Rationale for the Design of the Survey Questions

Appendix E shows that the survey contained questions and statements that were designed to elicit the MSFs' reasons for buying farmland; preferences for first renting land, for say five years, before buying; perceptions of the cash flow problem associated with land purchases; views on whether the 20-year sugarcane supply agreements constrain enterprise diversification; perceptions about the quality of

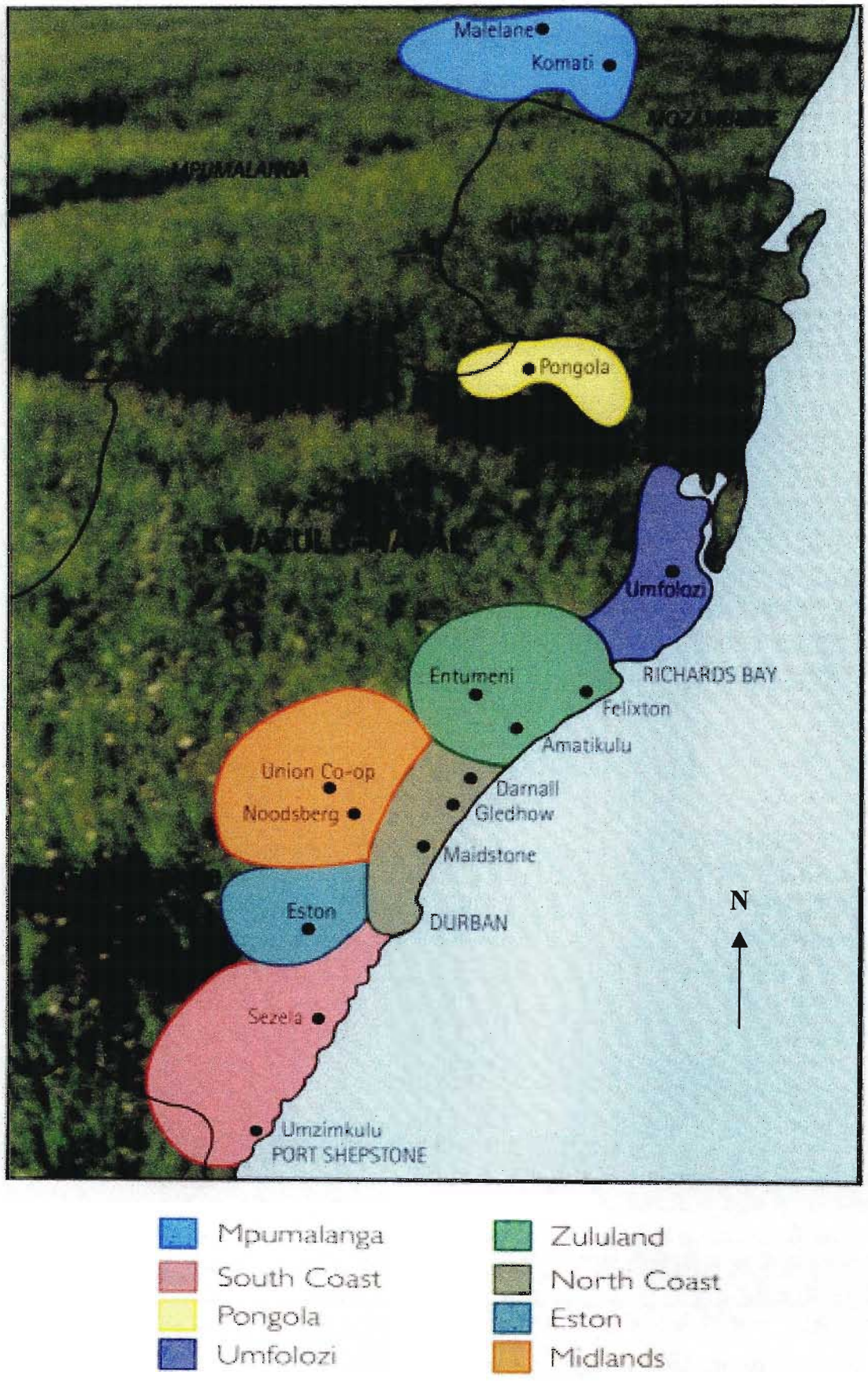

Figure 3.1 Map of the SA Sugar Industry Supply Areas and Mills.
Source : SASA

mentorship received since joining the scheme; views on information given about loan terms, and coordination and farm valuation issues; farm management status (full or part-time); risk management strategies; experience; field replanting operations; source of own contribution to buy land; sources of earnings loss and how to cope with these; and other comments about the scheme.

Knowing why the MSFs bought farms (Question 1) – for example, to make a profit solely from farming, to supplement income from non-farm sources, or just to own land – can help to identify whether commercial reasons dominate, implying that such a market-driven land reform scheme could be viable and create sustainable emerging commercial growers. This requires that the growers manage their farms as businesses, and try to produce a consistent supply of sugarcane. Asking growers if they would have chosen to first lease, say for 5 years, before buying land (Question 2) helps to show if the MSFs still experience cash flow stress with the interest rate subsidy in operation, and/or if renting could be a feasible alternative for these, and other, growers with limited own equity. The lease option could give growers that can successfully manage commercial farms time to demonstrate their abilities and to accumulate more substantial own equity for a down-payment when they buy land.

Questions 3 to 8 required that the MSF clients respond to statements about aspects of the scheme on Likert-type scales from one (strongly disagree) to five (strongly agree). Responses to the statement that annual profit from sugarcane farming is low relative to land value (Question 3) indicate the extent to which the MSFs have experienced the relatively low current returns usually associated with the early years after land purchase. This question also helps in Chapter 6 to examine if growers that

more strongly perceive this cash flow problem are more likely to choose to rent land before purchasing. The MSFs' scores for Question 4 reflect their perceptions of whether the 20-year long-term sugarcane supply agreements do constrain opportunities to diversify enterprises. Question 5 evaluates the growers' perceptions of the quality of mentorship services provided by the millers, in order to assess whether these services need to be improved. Such services can improve the MSFs' skills and increase the likelihood that they will generate a more consistent supply of sugarcane to the mills and, hence, a more regular stream of loan repayments.

Question 6 attempts to identify aspects that Ithala could improve by asking growers whether they were clearly informed about key loan terms such as the sugarcane cession, the structure of the graduated payments, when loan statements would be received, and how to interpret loan statements. Only one MSF had previously owned farmland, so it is critical that the MSFs understand these aspects in order to improve their ability to repay loans as required, and to build long-term relationships with Ithala's loan officers. Responses to Question 7 will indicate if future schemes could benefit from having a co-ordinator to monitor, and advise on how to improve, the financial performance of potential beneficiaries. Given that the millers, Ithala and the SACGA individually deal with the MSF growers, a co-ordinator – perhaps any/combinations of these players, or an external institution – could help to focus the players' efforts to enhance the viability of the growers. Question 8 probes whether the MSFs perceive that there is any bias in the valuations of the study farms (as conducted by the sellers).

Questions 9 to 12 deal with aspects of whether the farm is managed on a part-time or full-time basis. This is critical as borrowers with off-farm income (part-time managers) may have supplementary earnings to assist in loan repayments in dry seasons. Responses as to how the MSFs deal with either business or financial sources of risk are covered in Question 13. Risk (income variability) must be managed and it is important for the MSFs to understand how it affects their businesses and how to respond to it. Question 14 records the MSF's past farming, financial and management experience, which may influence their ability to successfully operate their farm businesses and repay loans.

Re-establishment of sugarcane is an important aspect of cane husbandry and/or management, and Question 15 records how many hectares have been replanted by the current MSFs. Newly replanted fields ensure that the production potential of the farm is maintained. Question 16 probes the source of own contribution used by the MSFs when purchasing their farms. If this source is borrowings, this could put pressure on mortgage loan repayments by diverting funds to meet other debts. The MSFs may encounter labour management problems, information shortages and unreliability of contractors among other factors that may negatively impact on farm earnings. Question 17 tries to establish the relative importance of the main factors affecting the MSFs' farm earnings. Questions 18 and 19 deal with how the growers respond to being financially stressed. Finally, questions 20 and 21 are open-ended questions giving the MSFs the opportunity to mention any other concerns not covered in questions 1 to 19. The survey data were collected between July 2001 and September 2001. In addition to the survey of MSFs, the author interviewed personnel from Ithala Bank, the sugar milling companies and the SACGA on a range of issues

including their objectives for getting involved in the scheme, and their perceptions about the scheme.

3.3 Statistical Analysis Methods

Correlation between the independent and explanatory variables, and between the explanatory variables, in the conceptual models described in Chapter 5 and Chapter 6 was tested using the Pearson correlation test. Data processing was performed using the SPSS computer programme (see Klecka, 1975, and Norušis, 1990a; 1990b; 1990c) in order to estimate factors that differentiate between MSF loans that are current and in arrears, and between MSFs who prefer to rent land before purchasing and those who prefer to purchase land outright.

3.3.1 Analytical Tools for Variables with Binary Outcomes

Discriminant analysis and logistic regression are commonly used to estimate the determinants of dependent variables that have binary outcomes, such as loan repayment status that is current or in arrears. Discriminant analysis was not used in this study because some of the potential determinants of loan repayment status, and of the preference for renting land, were dichotomous (see Chapter 5 and Chapter 6). Discriminant analysis requires that, within the groups, variables follow a multivariate normal distribution, with equal covariance matrices (Press and Wilson, 1978; Manly, 1986). Although the violation of this assumption will not necessarily lead to poor results, Press and Wilson (1978) recommend the logistic regression model because of its robustness in respect of the underlying distribution of the independent variables, which need not be multivariate normal.

Logistic regression was, therefore, used to identify factors influencing the probability that a MSF would be current on loan repayments, and that a MSF would prefer to rent land before purchasing. The probit model is another option for this purpose, but logistic regression is preferred in this study because the logistic cumulative density function (cdf) has a simpler algebraic form than the standard normal cdf used in the probit model (Gujarati, 1995).

3.3.1.1 Logistic Regression

Binary choice models assume that individuals are faced with a choice between two alternatives and that the choice they make depends, in part, on the characteristics of the individuals (Pindyck and Rubinfeld, 1981: 274). Multinomial logistic regression, with a three-outcome dependent variable indicating, say, current loans, loans in arrears and loans in default, is not used in this study because there were no cases (MSFs) in the default category at the time of the study. The use of binomial logistic regression is illustrated in this section for the loan status part of this study. Given that P_i is the probability that the ith MSF will be current on graduated mortgage loan repayments, the logit model of loan repayment status for the MSF clients can be expressed in equation (3.1) as follows (see Demaris (1992) and Gujarati (1995) for a summary of the model's statistical properties):

$$\ln [P_i/(1-P_i)] = \beta_0 + \beta_1 X_{1i} + \ldots\ldots + \beta_k X_{ki} + \mu_i \qquad (3.1)$$

where $1-P_i$ is the probability of the ith MSF being in arrears, and $\ln[P_i/(1-P_i)]$ is the *logit* or log odds in favour of the ith MSF being current on loan repayments. The X_k are hypothesized determinants of loan repayment status, while the β_k are the

parameters to be estimated by logistic regression, and n is the number of observations. Maximization of the likelihood function for the logit model is accomplished by non-linear estimation methods (Maddala, 1992: 328). Gujarati (1995), Maddala (1992), and Pindyck and Rubinfeld (1981) discuss the maximum likelihood estimation of the logit model.

3.3.2 Principal Component Analysis

Principal Component Analysis (PCA) can be used to condense the explanatory variables into fewer orthogonal (uncorrelated) variables that are called principal components, or PCs. Highly correlated variables cannot be used in a logistic regression model at the same time due to the problem of multicollinearity. The lack of correlation between the orthogonal variables is a useful property because it means that the indices are measuring different "dimensions" in the data (Manly, 1986: 59). The PCs can be substituted instead of the original (X_k) variables in the derivation of a logit function, thus reducing the dimensionality problem (Jolliffe, 1986: 129).

The PCA technique is used in Chapter 6 in the rent preference part of this study. As the explanatory variables studied in Chapter 6 were measured in differing scales, the PCs were estimated using the correlation matrix. Each variable is initially standardized to have a zero mean and unit variance (Maddala, 1992: 285). This caters for the differences in scales, and thus avoids any undue influence of unit scales on the components (see Jackson, 1991: 65 and Manly, 1986:63). The object of PCA, therefore, is to economize on the number of explanatory variables X_1, X_2, ...,X_k (Manly, 1986: 58) by seeking linear transformations like equation (3.2):

$$PC_i = \alpha_{i1}X_1 + \alpha_{i2}X_2 + \alpha_{i3}X_3 + \ldots\ldots + \alpha_{ik}X_k \qquad (3.2)$$

In this approach, new uncorrelated indices (components) PC_i are constructed that explain as much of the variance in the original data as possible in descending order. The first principal component is a linear function of highly correlated variables that accounts for the greatest possible part of total variance in the data (Jackson, 1991: 10). The coefficients (α_{ik}) indicate the relative importance of each variable in the component. The interpretation of uncorrelated indices must be clearly understandable in order to draw implications from results in which the indices have been used as explanatory variables. The next chapter describes the socio-economic characteristics of the MSFs that were surveyed via the personal interviews during June to September 2001 in order to elicit their perceptions of aspects of the graduated mortgage loan repayment scheme.

CHAPTER 4

SOCIO-ECONOMIC CHARACTERISTICS OF THE MSFs SURVEYED FOR THE STUDY

The survey was intended to interview all 99 MSFs in the graduated mortgage loan scheme as of June 2001. The discussion of MSF characteristics below often refers to a sample size of less than 99 due to incomplete or missing information. Section 4.1 outlines the disbursal of loans by borrower type and loan size. Personal characteristics and demographic profiles of MSF respondents are presented in section 4.2. The source of funding used by the surveyed MSFs for own equity contribution when purchasing the farms is described in section 4.3. The extent of sugarcane area replanting completed by the MSFs since joining the scheme is shown in section 4.4.

4.1 Disbursal of Loans by Borrower Type

The MSFs in the sample are grouped in Table 4.1 by borrower type, loan volume, and average loan size.

Table 4.1 Loan Size by Type of MSF Borrower, 2001 (n=83)

Borrower Type	Number of Loans	% of Loans	Volume of Loans Disbursed (R)	Average Loan Size (R)
Male	73	88	65 018 602	878 630
Female	7	7	5 112 555	852 092
Partnership/CC	3	5	3 345 721	1 115 240
TOTAL	83	100	73 476 878	948 654

Female borrowers account for only seven per cent of the total borrowers, with 88 per cent of borrowers being males, and joint ventures such as a partnership or close corporation (CC) accounting for a very small proportion of the borrowers. The

average loan size is larger for the partnership/CC than for male and female borrowers. Average loan sizes ranging from just above R850 000 to over one million rand indicate that the capital amounts required to purchase the farms on offer from the sugar millers are quite substantial. Table 4.2 below shows that the most frequent loan sizes were in the range of R750 000 to R1 050 000.

Table 4.2 Number of MSF Loans by Size (n=83) (Rands)

Loan Size Range (Rands)	Number of loans (n)
< R600 000	7
R600 001 – R750 000	18
R750 001 – R900 000	20
R900 001 – R1 050 000	20
> R1 050 000	18

All of the individual loans for the MSFs were charged similar interest rates by Ithala, and the average annual mortgage interest rates paid by the MSFs before subsidy are shown in Figure 4.1 overleaf. The mortgage interest rates were constant at 16.5 per cent in 1996 and 1997, before increasing to 17 per cent in 1998. Mortgage interest rates fell below 15 per cent in late 2001. Appendix D (see page 94 of the dissertation) gives monthly mortgage interest rates paid by the MSFs before subsidy from 1996 to 2001.

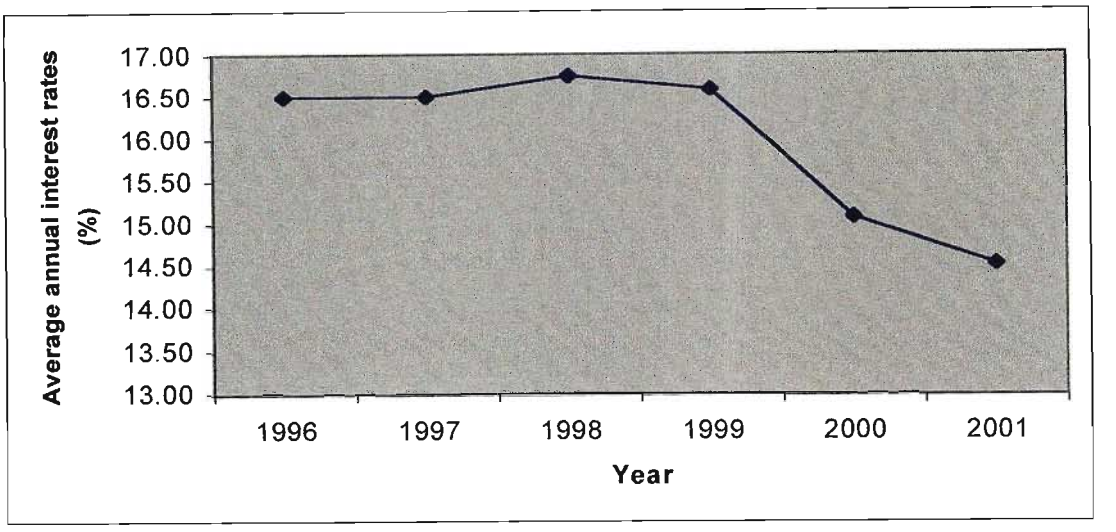

Figure 4.1 Ithala Bank Average Annual Mortgage Interest Rates Before Subsidy, 1996 – 2001
Source: Business Loans Division, Ithala Bank.

4.2 Demographic and Personal Characteristics

Table 4.3 overleaf shows that the sample MSFs in the North Coast and South Coast tend to be slightly younger (average age of 47 years) than the Midlands MSFs (average age of 50 years). The sample MSFs' education levels - captured as a dichotomous variable, equal to 1 for matric education and above, and 0 otherwise - are relatively higher in the South Coast and Midlands compared to the North Coast region. The gender distribution (another dummy variable, where 1 equals male borrowers and 0 represents female borrowers) in the three regions is similar with higher proportions of male growers in all the regions. The MSFs in the Midlands seem on average to have relatively more farming experience compared to the MSFs in the North and South Coast regions. The mean annual farm gross turnover of sample growers is relatively higher on the South Coast, as is the average loan size. Sample MSFs on the North Coast have lower annual farm gross turnover and lower average loan size than MSFs in the other two regions. The sample means for MSF

age, education, access to off-farm income, farming experience, and annual farm gross turnover, for the three regions are not statistically significantly different.

Table 4.3 Personal and Demographic Characteristics of the MSFs in the Three Study Areas, 2001 (n=83)

Characteristics	North Coast (n=45)	South Coast (n=27)	Midlands (n=11)	Significance of differences between sample means		
				$U^{1}_{NC\text{-}SC}$ [2]	$U_{NC\text{-}M}$	$U_{SC\text{-}M}$
Age (years)	47	47	50	0.329^{NS}	1.085^{NS}	0.759^{NS}
Education	0.56	0.67	0.64	0.948^{NS}	0.496^{NS}	0.177^{NS}
Off-farm income	0.47	0.74	0.45	2.437^{NS}	0.072^{NS}	1.662^{NS}
Farming experience (years)	13	11	18	1.040^{NS}	1.746^{NS}	2.326^{NS}
Average Annual Gross Farm Turnover (R)	462 233	537 512	482 223	2.366^{NS}	0.332^{NS}	0.847^{NS}

Note: [1] U is the ratio of the difference of the means to the standard deviation of the difference (Rayner, 1967); NC, SC and M = North Coast, South Coast, and Midlands, respectively.

[2] NS implies that U is not statistically significant.

4.3 Age Distribution of MSF Respondents

There is a lack of younger growers in the current graduated mortgage loan repayment scheme in KwaZulu-Natal. Table 4.4 below shows that there are relatively more growers in the 40 to 60 year age cohorts. The lack of younger growers may be due to their lacking sufficient own equity and experience to purchase farms.

Table 4.4 Age Distribution of MSF Respondents (n=83)

Age (years)	Number of MSFs
< 30	1
> 30 < 40	16
> 40 < 50	38
> 50 < 60	22
> 60	6

4.4 Source of MSF Own Contribution to Purchase Land

Using borrowed funds to finance the deposit for the land purchase may lead to further cash flow problems as the MSF may have to withdraw large amounts of cash from the farm business in order to meet interest charges on *both* the borrowed funds *and* on the farm mortgage bond. Table 4.5 below shows the sources of funds used by the sample MSFs to finance the down-payment on the purchase price of their farms.

Table 4.5 Sources of Funds Used to Finance Down-payments on Land Purchase Price by the Sample MSFs, 2001 (n=83)

Source of funds	Own Savings	Sale of assets	Pension income	Retrenchment package	Loan
% of sample	42%	3%	28%	11%	16%

The largest single source of funds used was own savings, which include savings from contracting services income and farm leasing, followed by pension income. Loans could be from an informal lender, a loan against insurance policies and/or a loan against a house mortgage bond. Two growers used a loan from an informal lender to fund their deposits, but they also had (still have) off-farm employment.

4.5 Land Use by MSF Respondents

The average area under cane is 81 hectares, 87 hectares and 109 hectares for the sample MSFs in the North Coast, South Coast and Midlands regions, respectively. The total areas under cane farmed by the sample MSFs are approximately 3 365 hectares, 1 914 hectares and 1 403 hectares for North Coast, South Coast and Midlands, respectively. The cutting cycle in the North Coast is approximately 12 to 14 months. The short cutting cycle is probably due the high prevalence of Eldana

borer in this region (SASA, 1994). The cutting cycle in the South Coast ranges between 12 to 16 months, with most growers cutting when the sugarcane is either 14 months or 16 months old. The Midlands growers cut 18 to 24 month old cane, mainly because Eldana is not a major problem in the region, and due to slower growth rates (colder temperatures). Although the annual rainfall for the Midlands region is slightly lower than the North and South Coast regions (See Appendices A, B and C on pages 93 and 94 of the dissertation), the sugarcane in that region receives almost two years of rainfall since cutting cycle ranges from 18 to 24 months. Further, the Midlands growers require slightly larger areas under cane in order to cut similar tonnes of sugarcane that the coastal growers harvest annually. Cane production in the Midlands region is relatively more stable because cane receives two years of rainfall, but annual yield per hectare is relatively lower owing to the longer cutting cycle.

4.6 Extent of Cane Field Replanting by Respondent MSFs

Re-establishment (replanting) of cane is critical in maintaining consistent production and hence cane supply to the mill. Maintaining relatively young ratoons ensures that attained production levels do not fall far below the farm's potential production given that normal weather conditions persist (Stranack, 2002). None of the sample MSFs that replanted cane since they bought their farms as reported in Table 4.6 has used heat-treated seedcane, even though they perceive such seedcane can improve farm productivity.

Table 4.6 Extent of Cane Replanting by the Sample MSFs, 2001 (n=83)

Region	% of sample MSFs who replanted cane
North Coast (n=47)	77%
South Coast (n=28)	53%
Midlands (n=13)	85%

Although most sample MSFs had replanted sugarcane, the proportion of the replanted area for each farm was lower than the industry recommendation of ten per cent of the area under cane (Stranack, 2002). A relatively large number of growers in the sample that have replanted (36 growers) are based in the North Coast and the Midlands. All of the Midlands growers were settled in the 1996/97 season, while some of the North Coast growers were settled in the 1995/96 season and the rest in 1998/99. Over half of the South Coast growers were settled in the 1999/00 season and this may explain why a low proportion of these growers have replanted compared to the other regions. The recently settled growers may have bought farms with reasonably young cane and/or the sugarcane estates sold to them may have been chosen so that the growers would not have to replant in the early years after purchase. Proportionate annual replanting allows the farm to have relatively younger ratoons which assist in maintaining production potential, because younger ratoons may yield better per hectare than older ratoons, and may be less susceptible to certain diseases (Stranack, 2002). The fall in tons produced per hectare from older ratoons implies increased yield (business) risk for the farm business.

4.7 Risk Management Strategies Used by Respondent MSFs

All of the sample MSF growers have crop insurance that protects against crop loss due to fire, since this insurance was a condition for obtaining finance from Ithala Bank. This removes a major element of business risk in sugarcane farming, but does not deal with other risks – such as variable prices and crop yields. Table 4.7 overleaf shows the risk management strategies that the respondents use when faced with price and/or yield variability or financial risk (variable interest rates and high debt loads) or both. Off-farm investment includes off-farm employment, and credit reserves refer to

overdraft facilities and production loans. Limited enterprise diversification is expected, as the growers are bound by their land sale agreements to keep a fixed area under sugarcane for the 20-year cane supply agreement period. There is generally low usage of the management strategies in all three regions to reduce or manage risk. The MSFs on the South Coast that had diversified were producing vegetables such as cabbages and chillies. The next chapter describes the conceptual model of factors affecting MSF mortgage bond repayment status used in this study, and presents empirical results of the logit model estimated for this purpose.

Table 4.7 Risk Management Strategies Commonly used by the Sample MSFs (n=83)

Risk management strategy	Region[1]	% of sample MSF growers that use the strategy
Off-farm investment	NC (n=47)	36%
	SC (n=28)	46%
	M (n=13)	23%
Cash reserves	NC (n=47)	47%
	SC (n=28)	36%
	M (n=13)	38%
Credit reserves	NC (n=47)	45%
	SC (n=28)	46%
	M (n=13)	31%
Enterprise diversification	NC (n=47)	23%
	SC (n=28)	50%
	M (n=13)	31%

Note: [1] NC, SC and M = North Coast, South Coast, and Midlands, respectively.

CHAPTER 5

CONCEPTUAL MODEL AND EMPIRICAL ANALYSIS OF MSF LOAN REPAYMENT STATUS

This chapter first defines the dependent variable used to identify the loan repayment status of the study MSFs, and then section 5.2 outlines a conceptual model of the factors affecting this status. Section 5.3 discusses the results of the logit model that was estimated to try and identify these factors.

5.1 Loan Repayment Status

Graduated mortgage loan repayment performance by the sample MSFs was monitored *over time* to avoid distortions in delinquency measurement. The annual instalment for each client is raised at the end of each financial year, in this case 31 March for Ithala. Clients fall into arrears if they fail to pay/raise the required mortgage bond repayment amount within 30-90 days of the cut-off date. As explained in the Introduction, this occurs if the borrower's actual sugarcane deliveries are less than his/her estimated seasonal deliveries, because a fixed (cession) repayment amount is set per ton of sugarcane. For example, if Ithala requires a borrower to make an annual repayment (capital redemption plus interest charges) of R100 000 and the borrower's sugarcane delivery estimate is 4 000 tons for the season, Ithala's cession equates to R25 per ton of sugarcane. The borrower will, therefore, be in arrears if his/her actual deliveries are less than 4 000 tons of sugarcane by the end of the season, unless he/she increases the cession per ton charged on the reduced delivery amount in order to cover the required annual repayment of R100 000 in full. The remainder of the income per ton from the reduced cane deliveries would still be available to the grower to fund farm expenses

and family drawings. The reason is that the miller cannot automatically increase the cession per ton of sugarcane actually delivered to compensate for the repayment shortfall without the grower's consent. Ithala's internal credit risk division is notified of any grower accounts that are in arrears for lengthy periods, and this division then institutes legal proceedings to reclaim the funds that are owed.

The repayment status over time of 83 MSF loans with reliable financial and economic data, as at 31 March 2001, was classified as being either current (most instalments over time were paid within 30 days of the cut-off date) or paid in arrears (most instalments over time were paid within 31 to 90 days of the cut-off date). Thirty-six per cent (or 30) of the 83 loans were current, while 64 per cent (53) were deemed to be in arrears. A total of R73 473 288 was disbursed to the sample borrowers, with an average loan size at disbursal of R914 317 and R868 750 for current and in arrears loans, respectively. Initially the logistic regression model was intended to analyse three groups, namely current loans, loans in arrears and loans in default. As there were no loans in default when the study was conducted (van den Heever, 2002), the binomial logit model for two groups of MSF loans - current loans and loans in arrears – was estimated. The dichotomous loan repayment status variable used to classify the sample MSFs was equal to one for current loans, and zero for loans in arrears. The next section specifies and discusses a conceptual model of factors that could determine such loan status.

5.2 Conceptual Model of Loan Repayment Status

As outlined in the discussion of statistical techniques in section 3.3.1, logistic regression was chosen to model the factors that affect MSF loan repayment status.

Given that P_i is the probability that the ith MSF will be current on mortgage loan repayments, the logit model of loan repayment status for the MSFs can be expressed in equation (5.1) as follows:

$$\ln [P_i/(1-P_i)] = \beta_0 + \beta_1 X_{1i} + \ldots\ldots + \beta_k X_{ki} + \mu_i \qquad (5.1)$$

where $1-P_i$ is the probability of the ith MSF being in arrears, and $\ln[P_i/(1-P_i)]$ is the *logit* or log odds in favour of the ith MSF being current on loan repayments. The X_k are hypothesized determinants of loan repayment status, the β_k are the parameters to be estimated, and n is the number of observations (83 clients in this case). Using equation (5.1), the loan repayment status of the ith MSF was estimated as a function of the following k variables:

TURNOVER-TO-LOAN SIZE RATIO (TLSRATIO) = average annual farm gross turnover in Rands (proxy for farm size) relative to loan size;
OFFINC = 1 if the MSF has material sources of off-farm income, and 0 otherwise;
EXP = number of years that a MSF had been farming sugarcane at the time of the study;
EXP^2 = number of years, squared, that a MSF had been farming sugarcane at the time of the study;
AGE = age in years of the MSF at the time of the study;
AGE^2 = age in years of the MSF, squared, at the time of the study; and
EDU = 1 if the MSF had obtained a Matric or higher level of education, and 0 otherwise.

The rationale for selecting these variables as potential determinants of MSF loan repayment status is given in the following paragraphs. Unfortunately, the ratio of own equity contribution to loan size could not be included as an explanatory variable

as there was little variability in this ratio between the growers (their equity contribution was 5 per cent of the loan disbursed if in the North Coast area, and 8 per cent if in the South Coast and Midlands regions). The ratio of annual drawings to annual turnover could not be used as a potential liquidity indicator due to unreliable information about the MSFs' levels of drawings over time (records were incomplete and inaccurate as some growers introduced earlier drawings into the business to pay for operating expenses). Reliable data on asset values and other debt obligations were also not available, so the effect of asset collateral relative to loan size, and debt obligations relative to turnover, on loan repayment performance could not be evaluated. Women constituted only 6 per cent (five farmers) of the sample, and so gender was not considered as a determinant of loan status.

5.2.1 Factors Affecting MSF Loan Repayment Status

Sanderatne (1986) argues that a grower who owns a large farm is usually predisposed to settle his obligations, which, if the capital were borrowed, would include loan repayment. This may be due to the ability to benefit from economies of size and/or scale. Large farms can reduce the average cost per unit of output sold by spreading fixed annual machinery, labour, interest and management costs, and information and transaction costs in the formal credit market, over more revenue. This is implied in Welch's (1978) assertion that larger-size farms have more to gain from lower average cost. Larger-size farms (relatively larger annual gross turnover) may also be those managed by farmers that have the specialist skills (relatively greater ability) required to produce on a larger scale (Pasour, 1981). Management, interest, information and transaction costs are likely to be the most relevant fixed costs for the MSF sample as most of these growers contract out their sugarcane harvesting

operations. Mbowa and Nieuwoudt (1998) reported that smaller sugarcane farms in KwaZulu-Natal (under eight hectares, or farms with a gross annual income of less than R40 000 in 1998 Rands) require significantly more resources to produce a rand's worth of output than do larger farms. The above arguments suggest that there is a positive relationship between TLSRATIO and loan repayment, and that those MSFs with larger average annual gross farm turnover relative to loan size are more likely to be current on their loan repayments. Farm size for the MSF sample, measured by average annual gross turnover, ranged from R271 993 to R942 336, while the TLSRATIO ranged from 0.26 to 1.01, with an average of 0.56.

Off-farm earnings could help to alleviate on-farm liquidity constraints (Barry *et al.*, 1995). Growers with material sources of off-farm income may be able to rely less on drawings from the farm to finance family expenditure, and/or to supplement their limited farm income in low-income (e.g. drought) years in order to repay their loans. Material income refers to reliable average annual gross income from sugarcane contracting earned from about 1 500 tons of sugarcane, or the equivalent earnings from a non-farm job. Consequently, having a substantive amount of off-farm income (OFFINC = 1) is expected to increase the probability that a MSF is current on loan repayments.

The number of years that a borrower has been involved in sugarcane farming can increase the likelihood that he/she can more readily adapt to the challenge of managing a commercial sugarcane farm. Growers with relatively more experience, therefore, could manage their farm operations better than those with less or no farming experience. The conceptual model uses the MSF's farming experience in

years, in linear (EXP) and squared (EXP^2) forms, as proxies for experience, because the positive influence of farming experience on loan repayment is expected to peak at some critical level of years of experience, beyond which additional years of experience are unlikely to markedly increase this effect. This implies a positive, quadratic relationship between years of experience in sugarcane farming and being current on loan repayments. The MSF sample had from two to 36 years of experience in sugarcane farming, with an average of 13 years of experience.

There is no *a priori* economic expectation that applies readily to the age of the grower in relation to loan repayment performance. Baker and Dia (1993), however, report that older borrowers are more likely to be current on loan repayments rather than to have paid with arrears or be in default. The model of MSF loan status proxies the MSF's age in years, in linear (AGE) and squared (AGE^2) forms, to show that the influence of age on loan status is likely to peak at a certain age level (perhaps once the client-lender relationship has been well-established). If the borrower's age is a good proxy for the extent of the lender-customer relationship, this indicates that older borrowers have been able to establish a better relationship with the lender (quadratic relationship between age and loan status). This reasoning may be less applicable in this graduated mortgage loan repayment case as the credit relationship between the MSFs and Ithala Bank personnel has operated only since 1996. The age of the 83 MSFs ranged from 30 to 70 years, with an average age of 47 years.

If education is an allocative input that facilitates the adoption of new technologies, then farm scale offers a benchmark for measuring returns to these allocative skills (Welch, 1978). Growers with relatively higher levels of education are expected to

use better, or more readily adopt, technology such as ripeners, and to employ consultants for advice in areas in which they feel their own management skills are deficient. As long as the expected benefits from the use of consultants and better technology are higher than the expected costs, the growers may continue to use the technology. If the use of technology and consultants can either reduce operating costs or improve productivity, more educated growers (adopters) will be more likely to repay their loans. Loan repayment and EDU are, therefore, likely to be positively related.

5.3 Estimated Logit Model of MSF Loan Repayment Status

The estimated logit model that best approximated the theoretical model in section 5.2 is shown in Table 5.1 overleaf. The signs of the coefficients estimated by the maximum-likelihood method agree with *a priori* reasoning, but only the estimated parameters for TLSRATIO and OFFINC are statistically significant at accepted levels of significance. The probability of the ith MSF being current on graduated mortgage loan repayments, therefore, increases as average annual farm gross turnover increases relative to loan size, and if the client has material sources of off-farm income (additional liquidity). The Pearson correlation coefficient between TLSRATIO and OFFINC is 0.152, and this coefficient was not statistically significant at the ten per cent significance level or below. Given that TLSRATIO and OFFINC were not statistically significantly correlated with the AGE, AGE^2, EXP, EXP^2 or EDU variables, the estimated logit model thus captures the separate effects of these two variables on loan repayment performance. None of the other explanatory variables were statistically significantly correlated with the dichotomous loan status dependent variable. The Pearson correlation coefficients between the dichotomous

dependent variable loan status, and average annual turnover relative to loan size and off-farm income were 0.297 and 0.322, respectively, and both were statistically significant at the one per cent significance level. These statistics suggest that access to substantive off-farm income has relatively more influence on loan status. The results support the past studies reported in Chapter 2 that identified business size and liquidity as being key determinants of farm loan repayment status.

Table 5.1 Coefficient Estimates for the Logit Model of MSF Graduated Mortgage Loan Repayment Status, 2001 (n=83)

Variable	Coefficient estimates
Constant	9.2960
OFFINC	1.0110**
TLSRATIO	3.6080*
AGE	0.2410
AGE^2	-0.0020

Note: ** and * indicate statistical significance at the 5% and 10% levels of probability, respectively.

The MSFs who manage larger farms may benefit from the returns to "lumpy" management, information and transaction costs being scale dependent, and from spreading these and fixed annual interest costs over a larger output. In addition, smaller-size farms able to generate relatively more turnover compared to loan size are more likely to be current on loan repayments. The ability to use off-farm income for family expenditure or to introduce off-farm income into the farm business when there are liquidity problems also can assist in staying current on loan repayments.

An overall correct classification rate of 65 per cent was achieved, with 23 per cent of current loans and 89 per cent of loans in arrears being correctly predicted. These classification results are biased upwards (the extent was not estimated), as the same 83 MSF cases were used to estimate the logit model *and* to assess the model's

classification accuracy. These correct classification rates compare quite well with rates of 62-85 per cent reported in the loan repayment studies described in Chapter 2. Under the null hypothesis that the estimated model of determinants of MSF loan status fits the data perfectly, -2LL (where LL is the log of the likelihood) has a chi-square distribution with N-k degrees of freedom, where N is the number of cases, and k is the number of parameters that are estimated. Given that there are 83 cases and six estimated parameters, the degrees of freedom are 77. The estimated model chi-square value is 100.58, which is the value of -2LL for the current model. The observed significance level (probability between 0.10 and 0.05) for this chi-square statistic indicates that the estimated model does not differ significantly from the "perfect" model. Further logistic regression diagnostics, which included statistics to assess the influence of individual observations on the overall and individual parameter estimates (Hosmer and Lemeshow, 1989), showed no apparent lack of fit.

Attempts to fit two dummy variables to identify possible regional differences in MSF loan status between the three regions were not successful as the estimated coefficients for the dummy variables were again not statistically significant at the ten per cent level of probability or below. This was expected based on Table 4.3 that showed no statistically significant differences between the regional mean values of key personal and demographic characteristics of the sample MSFs. In addition, as noted in section 5.2, there is little difference in the (very high) leverage levels of the sample MSFs. Similar attempts to fit dummy variables to account for the season in which different groups of MSFs joined the scheme as a determinant of MSF loan status also produced coefficient estimates for these dummy variables that were not statistically significant. The next chapter describes the sample MSFs' perceptions

about aspects of the graduated mortgage bond repayment scheme described in Chapter 3. It also presents the conceptual model of the MSFs' preferences for land renting before the purchase of land, and the logit model of determinants of these preferences.

CHAPTER 6

THE MSFs' PERCEPTIONS OF THE GRADUATED MORTGAGE LOAN REPAYMENT SCHEME

Sections 6.1 to 6.6 discuss the sample MSFs' perceptions about the aspects of the graduated mortgage loan repa 4yment scheme described in Chapter 3. Section 6.7 outlines a conceptual model of MSF preferences for leasing land first before purchasing land, and then presents the estimated logit model of factors affecting these preferences. Eighty-eight questionnaires were obtained from the 99 MSFs in the scheme at the time of the survey, representing a relatively good response rate of 89 per cent. This suggests that the survey responses are likely to provide a representative coverage of the perceptions of the MSF growers. Forty-seven of the 88 respondents farmed on the North Coast, there were 28 farmers from the South Coast, and the remaining 14 respondents owned farms in the Midlands region.

6.1 Farmland Purchase and Leasing Issues

The main reason why 42 per cent of the respondents purchased a sugarcane farm was to own land. Another 40 per cent of the respondents purchased land mainly to make a profit from farming. The rest of the sample MSFs bought land mainly to either supplement their income or to run their own business. The sample MSFs seem to be evenly divided between making a profit and owning land as the main aim in purchasing farmland. The slightly higher percentage of MSFs who purchased to own land probably reflects that the MSFs never had an opportunity to own farmland prior to 1994 due to legislation such as the Land Act of 1913 (Graham and Lyne, 1998). Most of the growers (68 per cent) did, however, indicate that given a choice, they would have preferred to *first lease land* before purchasing. The main reasons given

were the need to have cash reserves for a down-payment on the purchase price, and for working capital needs, and the need to gain farming experience. Uncertainty about the viability and/or sustainability of the farms was another reason why these growers would have preferred to lease a farm before purchasing. These MSFs may need time to see whether they can successfully manage their farms, and whether their farms could generate enough funds to sustain the annual (albeit graduated) repayments on a mortgage bond. About 18 per cent of the respondents who would lease first had off-farm income or provided contracting services such as cane harvesting and land preparation. The leasing option could be used to complement future rounds of the MSF sugarcane farmland scheme or other commodity graduated loan repayment schemes. This is pertinent given the 64 per cent arrears figure reported in Chapter 3 as at 31 March 2001, and that 20 per cent of the MSFs are currently in arrears despite having graduated repayments, and this figure could be 30 per cent if some loans had not been rescheduled in 2001. Three of the four sugar miller representatives interviewed believed that leasing of farms to the MSFs for at least 3-5 years, with an option to buy, should not be considered in the next round of land transfers.

The 32 per cent of sample MSFs that preferred land ownership to first leasing felt that they could not invest (e.g. replant old fields) in the farm if they leased because the benefits of their investments may not be fully recovered by the time the lease expires. These growers perceive that improvements made to the farm are irrecoverable and, hence, expect that the lessor will not compensate them for these outlays when the lease expires. They further maintain that funds that they would use to pay rent should be used to fund a down-payment to buy farmland. About 36% of those who preferred outright land ownership either had off-farm income or had been

involved in providing contractor services. Table 4.5 in section 4.4 showed that the sample MSFs funded their down payments (per cent of clients in parentheses) using own savings (42%), asset sales (3%), pension income (28%), retrenchment packages (11%), or other loans (16%).

6.2 Perceptions of the Cash Flow Problem Associated with Land Purchase

The current rate of return on agricultural land operated by commercial farmers in SA is typically relatively low, at about 5 per cent of land value (Nieuwoudt, 1980). About 78 per cent of the respondents felt that annual profit from sugarcane farming was low relative to land value, 7 per cent were uncertain, and 14 per cent did not view annual profit as low relative to land value. These results suggest that most of the respondents can identify with, or have experienced, the pressure placed on cash-flows (liquidity) when very highly-leveraged farmers try to repay debt in the early years after land purchase.

6.3 Long-term Sugarcane Supply Agreements and Enterprise Diversification

The 20-year sugarcane supply agreements are intended to help the millers to obtain a consistent supply of sugarcane in order to better utilize mill capacity. In return, the growers are certain that all of their cane deliveries will be accepted at the mills. About 75 per cent of the sample MSFs felt that these agreements constrain them from diversifying into other farm enterprises. Only 23 per cent felt that this agreement does not constrain enterprise diversification, while one grower was uncertain. Note, however, that all of the MSFs have crop insurance that protects against crop loss due to fire, as this insurance was a condition for obtaining mortgage

finance from Ithala. This removes a major element of business risk in sugarcane farming, but does not deal with other risks – such as variable prices and crop yields. Enterprise diversification was most prevalent amongst the 28 MSFs on the South Coast (14 had diversified into producing vegetables such as cabbages, potatoes and chillies, albeit on a small-scale). Two of the four sugar miller representatives interviewed believed that the long-term sugarcane supply agreements do not constrain the MSFs from diversifying into other enterprises.

6.4 Quality of Mentorship Received

Providing mentorship through advice on the technical aspects of sugarcane production (such as when to apply fertilizer and weedicides, or to replant), identification of problem weeds and opening of firebreaks etc., and other support services such as agronomic extension, and economic and financial advice, can enhance the long-term viability of the MSFs. The focus is on what each mentor and/or extension officer can contribute towards supporting emerging farmers in a distinct but complementary fashion. The mentor brings practical experience, while the extension officer provides not only background, but also the reasons and principles (Street and Kleynhans, 1996; Eckert and Williams, 1995). This implies also developing complementary working relationships between mentorship and extension. Table 6.1 overleaf shows the extent to which the sample MSFs perceive that the quality of the mentorship provided to them by the sugar millers, in different home delivery mill areas, is satisfactory. For reasons of confidentiality, these mill areas cannot be identified by region. Mentorship can be a vital source of knowledge, encouragement and guidance, and if properly structured, can increase the likelihood of the MSFs providing a consistent supply of sugarcane to the millers.

Table 6.1 MSFs' Perceptions of the Quality of Mentorship Provided by Sugar Millers in Different Home Delivery Mill Areas, 2001 (n=88)

Home delivery mill area	% of sample MSFs who strongly agree/agree, are uncertain about, or disagree/strongly disagree, that the quality of mentorship is satisfactory		
	Satisfactory	Uncertain	Not satisfactory
Area A (n=22)	27%	5%	68%
Area B (n=11)	18%	0%	82%
Area C (n=10)	20%	10%	70%
Area D (n=4)	0%	0%	100%
Area E (n=13)	23%	15%	62%
Area F (n=13)	46%	23%	31%
Area G (n=15)	73%	7%	20%

Most of the sample MSFs in five of the seven home delivery mill areas felt that the quality of mentorship provided was not satisfactory. There are marked differences in growers' perceptions in these areas (A to E) compared to those in Area F and Area G. Overall it seems that this is the technical aspect of the MSF graduated mortgage loan repayment scheme that, in particular, needs attention. Some 54 per cent of the sample reported that mentorship is readily available from neighbouring sugarcane growers, while 29 per cent felt that there was no mentorship, and 17 per cent were uncertain.

Improved mentorship can enhance the success of this and future MSF schemes, since some 23 per cent of the MSFs have no experience in agriculture. Ithala's records show that the sample MSFs who had farming experience were estate/assistant managers (mostly with the sugar millers who sold them the farmland), contractors that harvested sugarcane/prepared farmland, or small-scale growers. Successful, sustainable mentorship services require that the programme must be a two way process between the mentor and the MSF, and that both parties are fully committed to the programme. About 86 per cent of the respondents perceive that mentorship

contributes to improved farm productivity. Mentorship alone, however, cannot make the MSFs better sugarcane farmers. Experience in sugarcane farming and the skills acquired by the growers, most critically before they settle on the farms, are also likely to promote grower viability. Three of the four sugar miller representatives and both of the Ithala Bank representatives interviewed believed that the MSFs required mentorship for the first 3-5 years after acquiring their farms. All of these representatives also believed that mentorship should be provided partly by the millers in order to maintain sugarcane supplies to the mills.

6.5 Clarity of Information Concerning Ithala Mortgage Loan Terms

Table 6.2 overleaf shows that most of the sample MSFs in all three regions of KwaZulu-Natal were clearly informed that Ithala has a cession on MSF sugarcane deliveries to the mills and so can directly recover loan repayments before farmers are paid. Between 54 per cent and 62 per cent of respondents also felt that they had been clearly informed about the structure of the graduated mortgage bond loan repayments. Similarly, between 54 per cent and 57 per cent of respondents perceived that their loan statements from Ithala were sent on time. Over 30 per cent of respondents from the North Coast and South Coast regions felt that they were not clearly informed on how to interpret the mortgage bond loan statements sent by Ithala. There appears to be some scope to better clarify the structure of the graduated payments for clients, to send loan statements more timeously (delays of two to three months have been experienced), and to give clients more information on how to interpret loan statements. Improving the quality of the financial services that Ithala provides may improve the client-lender relationship and increase the likelihood that current and future MSFs will honour their loan contracts.

Table 6.2 MSFs' Perceptions About the Information Received on Ithala Mortgage Loan Terms, 2001 (n=88)

Loan terms	Region	% of sample MSFs who perceive that they were clearly informed, or are uncertain, or were not clearly informed, about the Ithala loan terms		
		Clearly informed	Uncertain	Not clearly informed
Cane cession	NC (n=47)[1]	81%	4%	15%
	SC (n=28)	82%	7%	11%
	M (n=13)	85%	0%	15%
The structure of the graduated payments	NC (n=47)	62%	6%	32%
	SC (n=28)	61%	21%	18%
	M (n=13)	54%	15%	31%
Timeliness of loan statements	NC (n=47)	72%	8%	20%
	SC (n=28)	57%	18%	25%
	M (n=13)	54%	8%	38%
How to interpret loan statements	NC (n=47)	55%	4%	41%
	SC (n=28)	57%	11%	32%
	M (n=13)	62%	15%	23%

Note: [1] NC = North Coast, S = South Coast, and M=Midlands.

6.6 Monitoring of MSF Financial Performance, and Land Valuation Issues

Most (93 per cent) of the sample MSFs indicated that there is a need for a co-ordinator to monitor their financial performance, at least for the initial 3-5 years of the scheme, and to advise industry players on how to improve this performance. Growers mainly supported the SACGA or an independent body as co-ordinator on the North Coast, and Ithala and a miller on the South Coast. The Midlands respondents were evenly divided in their choices between Ithala, a miller, and an independent body.

All but three of the MSF respondents perceived that an independent valuer should conduct the valuations of farms sold in a MSF scheme. This may eliminate perceptions of bias in the valuations and promote a good working relationship between the growers, millers and the financier. Two of the four sugar miller

representatives and all of the financier's representatives interviewed believed that an independent valuer should conduct the farm valuations. The next section describes the empirical analysis of the sample MSFs' preferences for renting land before purchasing, using conceptual and logit models of factors affecting these preferences.

6.7 Land Leasing Model

6.7.1 Conceptual Model of MSF Preferences for Land Leasing

The MSFs preferences for land renting before purchasing were defined using a dichotomous dependent variable, equal to one if a grower prefers to rent the land first before purchasing the farm, and zero otherwise. Given that P_i is the probability that the ith sample MSF would choose to first rent land before purchase, the logit model of land renting preference for the MSF clients is shown in equation (6.1) as:

$$\ln [P_i/(1-P_i)] = \beta_0 + \beta_1 X_{1i} + \ldots\ldots + \beta_k X_{ki} + \mu_i \qquad (6.1)$$

where $1-P_i$ is the probability that the ith MSF would prefer not to rent before land purchase, and $\ln[P_i/(1-P_i)]$ is the *logit* or log odds in favour of the ith MSF preferring to rent land before purchase. The X_k are hypothesized determinants of this preference, while β_k are the parameters to be estimated. Using equation (6.1), the probability that the ith MSF would choose to first rent land before purchase was estimated as a function of the following k variables:

PROF = a variable ranging in value from 5 (strongly agree) to 1 (strongly disagree) showing whether the MSF perceives that annual profit from sugarcane farming was low relative to land value,

EDU = 1 if the MSF had obtained a Matric or higher level of education, and 0 otherwise,
OFFINC = 1 if the MSF had material sources of off-farm income, and 0 otherwise,
EQUITY = 1 if the MSF chose to first rent because of a perceived lack of own funds for a more substantial down-payment on the purchase of land, and 0 otherwise,
LAND = land value per hectare of the area under sugarcane on each MSF's farm,
AGE = age in years of the MSF at the time of the study, and
EXP = the MSF's years of experience in sugarcane farming at the time of the study.

As noted above in section 6.2, the current rate of return on agricultural land operated by commercial farmers in SA is typically relatively low, at an average of about 5 per cent of land value (Nieuwoudt, 1980). The obligation to make principal and interest payments over an extended period of time during which sugarcane yields, sugar prices, and production costs vary, clearly involves added financial risks. While these risks can be partly managed by using graduated repayments and/or deferral of payments during adverse years, and by building up equity over time in order to help access more debt, they may still be higher than the risk inherent in shorter-term rental agreements (Willett and Hinman, 1982).

If growers perceive that annual profit is low relative to land value, they may be reflecting experience of, and can probably identify with, the liquidity stress that occurs in the early years after the purchase of farmland. If heavy use of debt financing - like that by the highly leveraged MSFs - is assumed, cash flow will be a strong consideration when land is leased (Willett and Hinman, 1982). It is, however, also likely - given the income tax benefits from deducting interest paid on the mortgage loan, and the long-run appreciation of land value (if the productive capacity is maintained) – that buying land will increase profit and net worth relative to leasing. The choice between renting first and outright purchase, may, therefore, depend upon

the grower's current cash position and his/her attitude toward risk. The already highly leveraged growers who agree/strongly agree that annual profit is low relative to land value may, therefore, have relatively less liquidity and a strong aversion to the additional financial risk associated with borrowing. These growers are likely to prefer to lease farmland before purchasing, implying that PROF may be positively related with the choice to first rent land.

There is no *a priori* economic expectation that applies readily to the link between the grower's level of education and a preference for renting land. Growers with higher levels of education may understand the trade-off between improved cash flow versus less wealth associated with leasing better than do those with less education. A preference for renting land and EDU are, therefore, likely to be positively related.

Off-farm earnings could help to alleviate on-farm liquidity constraints (Barry *et al.*, 1995). Assuming that a grower's medium-term objective after say, five years, is to buy the leased property, it may be critical to try and accumulate enough funds for a mortgage bond down-payment and/or working capital. Growers with material sources of off-farm income are likely to rely less on drawings from the farm to finance family expenditure, and be able to supplement their limited farm income in low-income (e.g. drought) years. These growers could also partly service their farm debt commitments using off-farm funds, and hence, prefer to purchase a farm. There is evidence in many countries that farm investment is not always a farmer's priority, which rather may focus on non-farm investments that are expected to yield additional sources of income (Krafft, 1996). Access to substantive off-farm income (OFFINC =1) may, therefore, decrease the probability that a MSF would prefer to first rent a

farm before purchase. Material income again refers to reliable average annual gross income from sugarcane contracting earned from about 1 500 tons of sugarcane, or the equivalent earnings from a non-farm job.

New entrants into farming and beginning farmers with limited capital are often advised to lease land as a means of controlling a larger area (Kay and Edwards, 1999). A person with farming skills but little capital may also prefer leasing a farm in order to apply those skills (Barnard and Nix, 1979). These actions could help new entrants and beginning farmers to accumulate funds that would be used as their own equity contribution towards the purchase of land. Therefore, the perceived lack of own funds for a more substantial equity contribution, EQUITY, is likely to be positively related to a grower's preference for renting before land purchase. Paterson *et al.* (2000) report that high quality land influences the tenant's choice of whether to cash lease or purchase land. Growers with limited equity may be able to access higher quality (higher value) land more readily via renting than via outright purchase. The MSFs may hence prefer to rent a farm that has higher land values, implying a positive relationship between EQUITY and the choice to first rent before purchase.

There is no *a priori* economic expectation that applies readily to the age of the grower in relation to a preference for renting land. Braverman and Stiglitz (1982), however, state that the leasing of commercial farms is a widespread method of financing for farm operators in the growth stage of their life cycle. Barry *et al.* (1995) report that there is a typical pattern of land control characterized by heavy reliance on leasing by younger operators in the US who may not have enough funds to finance a down-payment if they want to buy a farm. A preference for renting land

and AGE are, therefore, likely to be negatively related. The review of US studies of land renting showed that renting is more frequent amongst younger and well established farmers. This would suggest using both the linear (AGE) and quadratic (AGE^2) variables. It is, however, prudent to omit the quadratic term in this study as none of the MSFs are well established (Lyne, 2003). There is also no *a priori* economic expectation that applies readily to the link between the grower's experience in sugarcane farming and preference for renting land. Growers with relatively more such experience may more readily adapt to the challenge of managing a commercial sugarcane farm and want to own land. Farmers with less experience may prefer to rent before purchase. This suggests a possible negative relationship between the choice to rent before purchase and EXP.

6.7.2 Results of Logit Model of MSF Preferences for Land Leasing

6.7.2.1 Correlation between explanatory variables

Statistically significant collinearity was detected within the set of explanatory variables for the renting preference model (see Table 6.3 overleaf). Multicollinearity was evident from Pearson correlation coefficients between EDU and the two variables AGE and EXP, which were statistically significant at the five and ten per cent levels of probability, respectively. Because collinearity between the explanatory variables may lead to biased parameter estimates (Norušis, 1990b: 53), PCA was used to condense the variables into fewer orthogonal variables, each measuring different dimensions in the data (Manly, 1986:59). Variables with factor loadings greater than 0.5 were used to try and attach an economic interpretation to the PCs (Jolliffe, 1992: 257; Johnston, 1993: 198).

Table 6.3 Correlation Matrix of Socio-economic Characteristics of the Sample MSFs (n=88)

		X_1	X_2	X_3	X_4	X_5	X_6
AGE	X_1	1.000					
EDU	X_2	-0.186*	1.000				
EXP	X_3	0.097	-0.259**	1.000			
OFFINC	X_4	-0.142	0.076	-0.034	1.000		
EQUITY	X_5	0.118	0.128	0.122	0.063	1.000	
PROF	X_6	0.193	0.124	0.105	0.126	0.136	1.000

Note: * and ** denote significance at the 10% and 5% level of probability, respectively (2-tailed).

Given the statistically significant partial (negative) correlation coefficients between AGE and EDU, and between EDU and EXP, a PC was extracted from these variables and defined as an index of grower attributes, GROWATT. This index explained 46 per cent of the variation in these three variables and had estimated coefficients of 0.564, 0.684 and -0.764 for AGE, EXP, and EDU, respectively. This index, therefore, shows that MSFs with higher levels of education tend to be younger and had less sugarcane farming experience. The orthogonal GROWATT variable was substituted for the original AGE, EXP and EDU variables in the logit model of MSF rental preferences, thus averting the collinearity problem (Jolliffe, 1985: 157). As it was expected that both AGE and EXP would be negatively related with the preference to rent, and that EDU is expected to have a positive relationship with preference to rent, GROWATT should have a negative coefficient estimate.

Six of the 88 MSFs surveyed were "uncertain" as to whether they would have chosen to first rent land before purchase. These responses were dropped from the analysis in

order to focus on those 82 growers who had definite opinions. The logit model results estimated by the method of maximum-likelihood given in Table 6.4 below show that EQUITY, PROF and GROWATT explain the preference to first rent land before land purchase. The signs of the estimated coefficients all agree with a *priori* reasoning. These three variables statistically significantly improve the goodness of fit of the model of rental preference at the ten per cent level of probability or below (Norušis, 1990a; 1990b; 1990c). The probability that the ith MSF would prefer to

for more substantial down-payment before purchasing a farm, and the more strongly that grower perceives that annual profit from sugarcane farming is low relative to land value (has experience of the liquidity stress associated with land purchase). In addition, the younger MSFs with less farming experience and higher levels of education may better understand the implications of lease arrangements, and so prefer to lease farms before purchasing. The Pearson correlation coefficient between EQUITY and PROF of 0.005 was not statistically significant at the ten per cent significance level or below. The index GROWATT was also not statistically significantly correlated with either EQUITY or PROF. The estimated logit model thus seems to capture the separate effects of each of these variables on the MSFs' preferences for first renting land prior to purchase.

Table 6.4 Coefficient and -2 Log Likelihood Estimates for the Logit Model of MSF Preferences for Land Renting, 2001 (n=82)

Variable	Coefficient estimates	-2 Log Likelihood (Deviance)	Improvement
EQUITY	10.71***	34.923	34.923***
PROF	2.39**	39.760	4.837**
GROWATT	-0.64*	43.959	4.199**

Note: ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels of probability, respectively.

The estimated logit model correctly classifies 79 per cent of all of the MSFs, with 84 per cent of those that prefer to first rent land, and 70 per cent of the growers that prefer to purchase land outright, being correctly predicted. These classification results are biased upwards (the extent was not estimated), as the same 82 MSF cases were used to both estimate the logit model and to assess the model's classification accuracy. The next section concludes the dissertation by discussing some of the management and policy implications of the analyses of MSF loan status, perceptions about the scheme, and preferences for first renting farmland.

DISCUSSION AND CONCLUSIONS

A logit model of factors affecting MSF loan status, based on full information for 83 MSFs, estimates that higher levels of average annual gross turnover relative to loan size, and access to substantive off-farm income, are key determinants of whether the MSFs were current on loan repayments as at 31 March 2001. The viability of future commercial farmland transfer schemes financed by graduated mortgage loan repayments may, therefore, be promoted if farms with relatively large expected annual gross incomes compared to the size of the disbursed loans are permitted, especially if the potential clients are going to be as highly leveraged as those in the KwaZulu-Natal MSF scheme. Growers that are managing highly leveraged smaller-sized farms are probably less able to benefit from spreading fixed or "lumpy" annual management, information, interest and transaction costs over more farm revenue.

It seems, therefore, that farm size does matter for policymakers considering future similar land redistribution schemes. Smaller-sized, creditworthy farms with loan sizes that are relatively low compared to the expected average annual gross income may, however, also be viable. Access to off-farm income could also be used as a criterion when assessing the expected total liquidity of potential farmers in future schemes – their access to sugarcane, or other commodity, farming need not necessarily be determined solely by expected levels of on-farm income. Access to substantive off-farm income helps to provide additional liquidity to fund future operations and debt repayments, and can reduce leverage levels.

Prospective MSFs in a new round of commercial sugarcane farmland transfers, or the beneficiaries of graduated payment schemes for other farm commodities or

agribusinesses, must be informed that the annual returns in farming are typically low relative to land value. This will alert them to the cash flow problem associated with the early years of land purchase, and encourage better farm business liquidity management. Based on survey responses from 88 MSFs, the pros and cons of allowing the MSFs, or other beneficiaries in similar schemes for other farm commodities, to lease farms for a number of years, with an option to purchase, could be considered as a complement to graduated repayment schemes that try to solve client liquidity constraints. Three out of six personnel interviewed from the sugar millers and SACGA representatives indicate that renting prior to land purchase could have benefited the MSFs. Further research is needed to establish whether the millers can afford to change the terms of the 20-year sugarcane supply agreements that most of the surveyed MSFs perceive as a constraint to enterprise diversification.

The viability of clients under a graduated loan repayment scheme or leasing scheme could be enhanced via their commitment to appropriate mentorship relationships. The MSFs in most mill delivery areas perceive that there is a need to improve the quality of mentorship that they currently receive. Mentorship can be provided either by the millers, neighbouring commercial growers, SACGA personnel, SA Sugar Association extension officers, or by a combination of these sources (with one being the facilitator). These institutions and provincial governments could try to access donor empowerment project funding to finance (improved) mentorship programmes that they and/or other institutions, firms, and commercial growers will offer. Under the Land Redistribution for Agricultural Development (LRAD) programme that began in late 2000, funds are now available to finance mentoring. The programme in KwaZulu-Natal has, however, so far failed to meet its mentoring obligations to

LRAD beneficiaries (Lyne, 2003). Concerning loan terms, there is some scope for Ithala to improve the client-lender relationship by better clarifying the structure of the graduated repayments, sending loan statements on time, and helping clients to interpret loan statements.

Sugar industry players need to consider whether or not to appoint a co-ordinator to monitor the financial performance of the MSFs for an initial period, and to advise industry players on how to improve this performance. This could present a new commercial service opportunity for the millers, Ithala, the SACGA, or another independent player. Regarding farm valuations, it seems that using an independent valuer is necessary to avoid perceptions of bias in the values of farms that are offered to new MSF clients, or the beneficiaries of similar schemes for other farm commodities.

The logit model of MSF preferences for renting land estimates that MSFs who more strongly perceive the cash flow problem associated with land purchase, who lack own funds for a down-payment to purchase land, who have higher levels of education, and are younger and have less farming experience, are more likely to opt to rent land before purchasing. One policy implication is that potential growers in the next round of sugarcane MSF farmland transfers, or similar schemes for other farm products, with relatively less liquidity and less farming experience could be given the choice to rent land with an option to purchase later. If leasing with an option to buy is considered, the sugar millers (sellers) may have the incentive to provide mentorship (stipulated via a clause in the lease agreement) in order to increase the likelihood that the farms will provide a consistent supply of sugarcane to the mills.

The preference for renting before purchase by most (68 per cent) of the surveyed MSFs could also indicate that many MSFs still experience cash flow stress despite the interest rate subsidy and some recent loan rescheduling. A second policy implication, therefore, is that the current subsidy terms - which reduce the effective interest rate to a starting level of about ten per cent relative to a typical five per cent current return on land – is not sufficient and could be increased to promote the purchase of commercial farmland by previously disadvantaged individuals. Note too that average nominal net farm income (NFI) per MSF *fell* from 1996/97 to 2000/01, rather than increasing with expected inflation over time as anticipated in the original schedule of graduated payments. Other ways to improve liquidity could involve changing the mortgage loan terms in the next round of the MSF scheme to require higher proportions of own equity (lower leverage levels), target applicants with off-farm income or permit deferral of principal payments. Another strategy to improve liquidity is to advise growers to limit family drawings in the early years after farmland purchase.

The proportion of own equity contributed to buy farmland by nearly all of the MSFs in the current scheme is well below 10 per cent, implying that the MSFs are very highly leveraged. Lenders typically will not advance further credit when debt levels are equal to the equity of the farm – a leverage ratio of 1.0 – which represents an own equity contribution of 50 per cent (Barry *et al.*, 1995). The suggestion of a larger own contribution relative to total farm loan should not be viewed as a way to exclude individuals with little own contribution from land reform projects like the graduated loan repayment scheme. This is because land reform beneficiaries can now receive LRAD grants from the national government when they purchase land. Hence, individuals with relatively little own contribution may be accommodated in land

reform projects through the use of LRAD grants. The MSFs were effectively precluded from government grants by a means test prior to 2001, but now qualify for LRAD grants. Van den Heever (2002) indicates that 11 of the initial 54 LRAD grants made in KwaZulu-Natal during 2002 were awarded to MSFs that will participate in the next round of the graduated repayment scheme.

An area for future research is to canvas the perceptions that staff employed by the sugar millers, Ithala and the SACGA have about how the graduated mortgage loan repayment scheme has performed. This would help to identify any differences between their and the MSFs' perceptions about leasing, sugarcane supply agreement, mentorship, co-ordination, information and land valuation issues. Aspects of particular concern that must be addressed in the next round of MSF farmland transfers, or similar schemes for other farm commodities, can then be identified.

Lyne (2003) indicates that the focus of the graduated repayment scheme on medium-scale farms could be criticized for not including smaller-sized, more affordable farms that were creditworthy. The scheme emphasised medium-scale farms because the millers providing the interest subsidy insisted that the MSFs should be full-time farmers, and because subdivision and transaction costs are largely fixed costs that raise the unit price of land as farm size diminishes. Had part-time farmers capable of financing family drawings and debt repayments partly from non-farm income been considered, a larger number of smaller-sized, creditworthy farms could have been sold, exposing buyers to lower levels of leverage and less financial risk. Smaller farms would also be more feasible if transaction, subdivision and survey costs were lower, or if the borrower augments his or her down-payment with an LRAD grant.

The current MSFs are very highly leveraged, and an understanding of the financing problem of emerging growers with limited own capital is necessary in developing measures for assisting them to become commercial farmers. In South Africa smaller farms in the same area sell for more per hectare than larger farms (Nieuwoudt and Vink, 1995). This may be due to more buyers bidding on smaller farms, fixed improvements being divided over a smaller area, and fewer small farms being put on the market owing to the Subdivision of Agricultural Land Act, 70 of 1970. In terms of this Act, farm owners must obtain permission from the government to subdivide their land. This introduces uncertainty and delays that add to the costs of registering, surveying and transferring affordable parcels of land to aspiring farmers. Act 70 has been rescinded, but President Mbeki has not yet signed the repeal into law (Lyne, 2003). Nieuwoudt and Vink (1995) also point out that there are fewer buyers amongst poorer, limited equity farmers that have sufficient funds to bid for large farms. The implication is that farmers who enter agriculture with very limited equity contributions like the MSFs may at first have to use a significant portion of profits attributed to management and risk for interest payments. This underlines the need to limit family drawings in the early years after purchase.

SUMMARY

Properly implemented land reform has the potential to promote political and economic stability in South Africa (SA). The graduated loan repayment scheme in KwaZulu-Natal is one of the innovative financial schemes designed to promote land reform, whereby sugar millers in KwaZulu-Natal have sold farms to 106 previously disadvantaged individuals (referred to as "medium-scale farmers, or MSFs) since 1996. The MSFs receive a finite, diminishing interest rate subsidy on mortgage loans granted by Ithala for seven years that is designed to alleviate the cash-flow problem normally associated with land purchase in the early years of loan repayments. The MSFs thus pay a sliding scale of interest, starting low but gradually rising to the market interest rate after seven years as farm earnings are expected to improve and subsidy funds are used up. The gradual rise in annual loan repayments is hence intended to improve the viability of the MSFs in the early years after land purchase.

All of the MSFs have full property rights and transferable title deeds to farms that varied in size from 55 to 216 hectares. Less than 40 per cent of the MSFs occupied their farms prior to the 1997/98-sugarcane season. The first aim of this study was to analyse factors affecting whether or not the MSFs were current or in arrears on loan repayments as at 31 March 2001. The second aim of this study was to conduct personal interviews with the MSFs between July and September 2001 in order to identify what aspects of the scheme could be improved in later rounds. Finally, a logit model of factors determining the MSFs' preferences for renting farmland was estimated, as initial analysis of their survey responses indicated that 68 per cent of the MSFs surveyed would have preferred to first lease land before purchasing. Results of these three analyses could help to inform recommendations for improving

the later rounds of MSF sugarcane farm transfers, and potential similar schemes for other types of farming and/or agribusiness.

The literature reviewed as background to these analyses shows that the poor performance of rural financial institutions that targeted credit programmes at the rural poor and used agricultural finance as a vehicle for economic development, led many researchers and policy-makers to seek alternatives to this type of agricultural finance. The resulting "new view" on agricultural finance stressed the development of a *sustainable* financial sector, and contends that the criteria for measuring overall performance of credit projects should include loan recovery rates, the transaction costs of lending, the degree of deposit mobilization, and the proportion of lending that comes from deposits/portfolio funds recovered.

The provision of rural financial services is relatively costly – small transactions, transportation and information gathering expenses, insurance collateral and uncertainties in agriculture increase these costs. Asymmetric information between borrower and lender also creates problems for lenders in differentiating between high and low risk borrowers. Both borrowers and lenders incur transaction costs in accessing and providing financial services: Borrowers face telephonic costs, transport costs to the lending institution, legal fees and the opportunity costs of time. Lender transaction costs include the costs of administering financial services, loan contract enforcement, collecting and disbursing funds, and gathering information.

Controlling administrative costs is critical in achieving financial self-sustainability for lenders, and ultimately determines the interest rate spread required to break-even.

Deposits offer potential borrowers a systematic way of establishing creditworthiness, provide lenders with information that is useful in screening potential borrowers, reduce the need of lenders for funds from donors and government, and also impose more discipline on lending. Loans most often treat the symptoms rather than the causes of problems. Imposing more debt on individuals does not overcome their lack of discipline, their lack of managerial skills, or their lack of high return investment opportunities, that impede economic development.

Credit policies that insist on sustaining low and, especially, negative real rates of interest on formal financial transactions condemn a formal financial system to perform poorly. If financial markets are to be efficient in allocating resources, continue to expand, and provide sustainable services, positive real interest rates on loans and deposits must be charged. In credit transactions, the interest charged by a lender must cover the cost of funds, a risk premium, and loan administration and servicing costs (including profit for the owners or shareholders).

The graduated mortgage loan repayment status of the sample MSFs was monitored *over time* to avoid distortions in delinquency measurement. The annual instalment for each client is raised at the end of each financial year, in this case 31 March for Ithala. Clients fall into arrears if they fail to pay/raise the required mortgage bond repayment amount within 30-90 days of the cut-off date. The repayment status over time of 83 MSF loans with reliable financial and economic data, as at 31 March 2001, was classified as being either current (most instalments over time were paid within 30 days of the cut-off date) or paid in arrears (most instalments over time

were paid within 31 to 90 days of the cut-off date). Thirty-six per cent (or 30) of the 83 loans were current, while 64 per cent (53) were deemed to be in arrears.

A logit model estimated for these 83 MSFs showed that the estimated probability of a MSF being current on loan repayments was higher for clients with higher levels of average annual gross turnover relative to loan size, and for clients with access to substantive off-farm income. This suggests that farm size (proxied by annual farm gross turnover) does matter when policymakers in SA consider future similar schemes designed to improve access to commercial farmland by people that previously could not buy farmland. It also implies that MSFs who manage large farms may benefit from the returns to "lumpy" management, information and transaction costs being scale dependent, and from spreading these and fixed annual interest costs over a larger output. In addition, smaller-sized farms able to generate relatively more turnover compared to loan size are more likely to be current on loan repayments. Access to off-farm income to fund family expenditure, or to introduce into the farm business when there are liquidity problems, also can assist in staying current on loan repayments, and in reducing leverage levels. This enables the MSFs with off-farm income to implement key operations such as the replanting of old sugar-cane fields. Access to substantive off-farm income could, therefore, also be used as a criterion when assessing the expected total liquidity of potential farmers in future schemes – their access to sugarcane, or other commodity, farming need not necessarily be determined solely by expected levels of on-farm income.

Personal interviews with the 99 MSFs in the scheme between July and September 2001 indicated that the main reason why 42 per cent of the respondents purchased a

sugarcane farm was to own land. Another 40 per cent of the respondents purchased land mainly to make a profit from farming, while the rest of the sample MSFs bought land mainly to either supplement their income or to run their own business. The slightly higher percentage of MSFs who purchased in order to own land probably reflects that the MSFs were not able to own land in terms of previous legislation in SA. Most MSFs (68 per cent) did, however, indicate that given a choice, they would have preferred to first lease land before purchasing. The main reasons for this preference were the need to have cash reserves for a down-payment on the purchase price, and for working capital, and the need to gain farming experience. The possibility of leasing the farms for a number of years, with an option to buy, could be considered as a complement to outright purchase in future rounds of the MSF graduated repayment scheme, or similar schemes for other farm commodities.

About 78 per cent of the respondents felt that annual profit from sugarcane farming was low relative to land value, 7 per cent were uncertain, and 14 per cent did not agree with this statement. Thus, potential MSFs must be informed that the annual returns in farming relative to land value are relatively low and can create cash-flow problems in the early years after purchase. This may instil financial discipline (e.g. limiting the level of family drawings) that is critical in managing a farm business. Most of the MSFs felt that the long-term sugarcane supply agreements that they signed when they purchased their farms constrain enterprise diversification. The MSFs in most of the mill delivery areas also perceived that there is a need to improve the quality of mentorship that they currently receive. Industry players could consider leveraging donor funding for empowerment projects to improve the quality of future mentorship programmes. Under the Land Redistribution for Agricultural

Development (LRAD) programme started in late 2000, funds are now available to finance mentoring. The programme in KwaZulu-Natal has, however, so far failed to meet its mentoring obligations to LRAD beneficiaries.

The logit model of MSF preferences for leasing land estimated that the MSFs who more strongly perceive, or have experienced, the cash-flow problem associated with land purchase, who lack substantial own equity, who have high levels of education, and are younger and have less farming experience, are more likely to prefer to rent land before purchasing. A policy implication is that potential growers with relatively less liquidity and less farming experience could be given the choice to rent land with an option to buy in subsequent rounds of the MSF scheme. The preference for first renting by most sample MSFs could indicate that many very highly leveraged MSFs still experience cash-flow stress despite the interest rate subsidy. Another policy implication, therefore, is that the current subsidy level, which reduces the effective starting interest rate level to about ten per cent relative to a typical five per cent current return on land, could be increased to promote access to farmland. Alternatively, loan terms in the next round of the MSF scheme could be changed to require higher proportions of own equity contributions (lower leverage levels) or permit deferral of principal payments or permit the purchase of smaller-sized, creditworthy farms. Another strategy to improve liquidity is to advise growers to limit family drawings in the early years after farmland purchase. Finally, if leasing with an option to buy is considered, a compulsory mentorship programme (required via a clause in the lease agreement) could be entered into between the tenant and landlord in order to increase the likelihood that the farms will provide a consistent supply of sugarcane to the sugar mills and make more regular loan repayments.

REFERENCES

ADAMS, D.W. (1971). Agricultural Credit in Latin America: A Critical Review of External Funding Policy. *American Journal of Agricultural Economics,* Vol 53(2): 163-172.

ADAMS, D.W. (1992). Building Durable Rural Financial Markets in Africa. *African Review of Money, Finance, and Banking,* Vol 1 (1): 5-14.

ADAMS, D.W. & GRAHAM, D.H. (1981). A Critique of Traditional Credit Projects and Policies. *Journal of Development Economics*, Vol 8: 347-366.

ADAMS, D.W. & NEHMAN, G.I. (1979). Borrowing Costs and the Demand for Rural Credit. *The Journal of Development Studies*, Vol 15(2): 165-176.

ARDINGTON, A.J. (1981/82). Chairman's Address, South African Growers' Association. *The South African Sugar Year Book*, SASA, Durban, South Africa:53-59.

AGUILERA-ALFRED, N. & GONZALEZ-VEGA, C. (1993). A Multinomial Logit Analysis of Loan Targeting and Repayment at the Agricultural Development Bank of the Dominican Republic. *Agricultural Finance Review,* Vol 53: 55-64.

BAKER, C. & DIA, B. (1993). Default Management in an Agricultural Lending Program in Ivory Coast. *Savings and Development,* Vol 11(2): 161-179.

BAKER, C.R. & HAYES, R.S. (1981). *Lease Financing: A Practical Guide*. John Wiley & Sons, Inc., New York.

BARNARD, C.S. & NIX, J.S. (1979). *Farm Planning and Control*. 2nd edition. Cambridge University Press, Cambridge.

BARON, D. (1985). Agricultural Leasing in the Cornbelt: Some Recent Trends. *Journal of the American Society of Farm Managers and Rural Appraisers*, Vol 15: 13-17.

BARRY, P.J., ELLINGER, P.N., HOPKIN, J.A. & BAKER, C.B. (1995). *Financial Management in Agriculture*. 5th edition. Interstate Publishers Inc., Danville, Illinois.

BATES, T. & BRADFORD, W. (1979). *Financing Black Economic Development.* Academic Press, New York.

BOAKYE-DANKWA, K. (1979). A Review of the Farm Loan Repayment Problem in Low Income Countries. *Savings and Development*, Vol 3 (4): 235-253.

BRAVERMAN, A. & STIGLITZ, J.E. (1982). Sharecropping and Interlinking of Agrarian Markets. *The American Economic Review*, Vol 72 (4): 695-715.

CLEASBY, R.C.G. (1991). *The Demand for and Supply of Selected South African Agricultural Commodity Exports: Policy Implications*. Unpublished MScAgric thesis. Department of Agricultural Economics, University of Natal, Pietermaritzburg.

COETZEE, G. (1994). Restructuring Rural Finance Institutions. *Agrekon,* Vol 33(4): 220-224.

DARROCH, M.A.G. & LYNE, M.C. (2002). *Helping Disadvantaged South Africans Access the Land Market: Past Performance and Future Policy*. BASIS Brief Number 10. http://www.wisc.edu/ltc/live/basbrief10.pdf. <Accessed on 5 February 2003>

DARROCH, M.A.G. & VAN DER RIET, D.F. (1994). Land Values and Production Deregulation of the South African Sugar Industry. *Agrekon*, Vol 33 (4): 272-274.

DASGUPTA, S., KNIGHT, T.O. & LOVE, H.A. (1999). Evolution of agricultural land leasing models: a survey of literature. *Review of Agricultural Economics*, Vol 21 (1): 148-176.

DEMARIS, A. (1992). *Logit Modelling: Practical Applications*. Sage University Paper Series on Quantitative Applications in the Social Sciences, 07-086. Sage, Beverly Hills, CA.

ECKERT, J.B. & WILLIAMS, W. (1995). Identifying Serious Farmers in the Former Ciskei: Implications for Small-Scale Farm Research and Land Reform. *Agrekon*, Vol 34 (2): 50-58.

FENWICK, L. (2002). Research Economist, South African Canegrowers' Association. *Personal Communication*. Durban, South Africa.

FUNNELL, C. (2002). The Marketplace: Expectations and Requirements. Proceedings of the South African Sugar Technologists Association Annual Congress, SASTA, Durban, South Africa.

GRAHAM, D.H. (1995). Creating a Sustainable Supply of Financial Services for the Rural Poor: A Challenge for the Agricultural Economics Profession. *Agrekon*, Vol 34(4): 138-145.

GRAHAM, D.H. & LYNE, M.C. (1998). The Cash Flow Problem and Land Redistribution in South Africa: Broadening the Land Market and Economising on Government's Role. *Agrekon*, Vol 38 (Special Issue): 343-352.

GUJARATI, D. (1995). *Basic Econometrics*. 3rd edition. McGraw-Hill, Inc., New York.

HARDY, W.E. & WEED, J.B. (1980). Objective Evaluation for Agricultural Lending. *Southern Journal of Agricultural Economics*, Vol 23: 159-164.

HATTINGH, H.H. & HERZBERG, A. (1980). Ownership or Leasing of Agricultural Land: Production Economic Aspects. *Agrekon*, Vol 19 (2): 1-7.

HOSMER, D.W. & LEMESHOW, S. (1989). *Applied Logistic Regression*. John Wiley & Sons, New York.

JACKSON, J.E. (1991). *A User's Guide to Principal Components: A Wiley-Interscience Publication*. John Wiley & Sons, New York.

JOLLIFFE, I.T. (1986). *Principal Component Analysis*. Springer Series in Statistics, New York.

JOHNSTON, R.J. (1980). *Multivariate Statistical Analysis in Geography: A Primer on General Linear Model*. Longman Group Ltd., New York.

KAMAJOU, F. & BAKER, C.B. (1980). Reforming Cameroon's Government Credit Project: Effects of Liquidity Management of Small Farm Borrowers. *American Journal of Agricultural Economics,* Vol 62(4): 709-718.

KAY, R.D. & EDWARDS, W.M. (1999). *Farm Management*. 4th edition. WCB/McGraw-Hill, Boston.

KLECKA, W.R. (1975). *Statistical Package for the Social Sciences (SPSS)*. 2nd Edition. McGraw Hill, New York.

KRAFFT, N.J. (1996). Agricultural and Rural Finance: Some Thoughts on the Road Ahead. *Agrekon*, Vol 35 (4): 211-217.

KUHN, M.E. & DARROCH M.A.G. (1999). Factors Affecting Rural Medium-Term Loan Repayment: Evidence from a South African Development Finance Institution. In Peters, G. and von Braun, J. (eds). *Food Security, Diversification and Resource Management: Refocusing the Role of Agriculture? International Association of Agricultural Economists (IAAE) Occasional Paper No.8*, Ashgate Publishing Co. Ltd, Aldershot, UK, 1999: 322-328.

KUHN, M.E., DARROCH, M.A.G., ORTMANN, G.F. & GRAHAM, D.H. (2000). Improving the Provision of Financial Services to Micro-Enterprises, Emerging

Farmers and Agribusiness: Lessons from KwaZulu-Natal. *Agrekon*, Vol 39(1): 68-81.

LEE, W.F., BOEHLJE, M.D., NELSON, A.G. & MURRAY, W.G. (1980). *Agricultural Finance*. 7th Edition. The Iowa State University Press, Ames, Iowa.

LEFTWICH, R.H. (1979). *The Price System and Resource Allocation*. 7th Edition. The Dryden Press, Hinsdale, Illinois.

LUGEMWA, W.H. & DARROCH, M.A.G. (1995). Discriminant Analysis of Seasonal Agricultural Loan Repayment by Small-Scale Farmers in Transkei. *Agrekon,* Vol 34(4): 231-234.

LUNDEEN, M., JANSSEN, L. & JOHNSON, B. (1988). Characteristics of and Participants in Farmland Rental Markets. *Journal of the American Society of Farm Managers and Rural Appraisers*, Vol 52 (2): 13-20.

LYNE, M.C. (2003). Professor in Agricultural Economics, University of Natal. *Personal Communication*. Pietermaritzburg, South Africa.

LYNE, M.C. & DARROCH, M.A.G. (1997). Broadening Access to Land Markets: Financing Emerging Farmers in South Africa. *Development Southern Africa*, Vol 14(4): 561-568.

LYNE, M.C. & DARROCH, M.A.G. (2002). Improving Access to Land Markets: Evidence from Emerging Farmers in KwaZulu-Natal, South Africa. In Zeller, M. and Meyer, R.L. (eds). The Triangle of Microfinance: Financial Sustainability, Outreach, and Impact. Published for the International Food Policy Research Institute by Johns Hopkins University Press, Baltimore, USA, 2002: 117-131.

LYNE, M.C. & ORTMANN, G.F. (1992). Evaluation of the KwaZulu Farmer Support Programme. Second interim report. Unpublished report, Evaluation Programme, Centre for Policy Analysis, Development Bank of Southern Africa, Halfway House.

MADDALA, G.S. (1992). *Introduction to Econometrics*. 2nd Edition. MacMillan Publishing Company, New York.

MANLY, B.J.F. (1986). *Multivariate Statistical Methods: A Primer*. 1st Edition. Chapman and Hall, London.

MBOWA, S. & NIEUWOUDT, W.L. (1998). Economies of Size in Sugarcane Production in KwaZulu-Natal. *Development Southern Africa,* Vol 15(3): 399-412.

MILLER, L.H. & LADUE, E.L. (1989). Credit Assessment Models for Farm Borrowers: A Logit Analysis. *Agricultural Finance Review,* Vol 49: 22-36.

MOOR, G.M. (2002a). Enhancing Cane Quality Incentives in the South African Sugar Industry: The Recoverable Value (RV) Cane Payment System. Proceedings of the South African Sugar Technologists Association Annual Congress, SASTA, Durban, South Africa.

MOOR, G. (2002b). Director: Industrial Affairs, South African Canegrowers' Association. *Personal Communication*. Durban, South Africa.

MOSS, L.E. & ERVEN, B. (2001). Managing Landlord-Tenant Relationships: A Strategic Perspective. Ohio State University Extension Fact Sheet. Columbus, USA.

MORTENSON, T., WATT, D.L. & LEISTRITZ, F.L. (1988). Predicting the Probability of Loan Default. *Agricultural Finance Review,* Vol 48: 69-67.

NIEUWOUDT, W.L. (1980). Value and Rent of Farm Land. *South African Journal of Economics*, Vol 48 (4): 389-397.

NIEUWOUDT, W.L., MOOR, G. & BABER, R. (1998). Incentive Distortions in Developing Agriculture in South Africa and Implications for Tenure Reform. In Mundlak, Y. (ed). *Contemporary Economic Issues, Volume 2: Labour, Food and Poverty*. MacMillan Press Limited and the International Economic Association, London.

NIEUWOUDT, W.L. & VINK, N. (1995). Financing of Land Purchase by Small-Scale Farmers. *Development Southern Africa*, Vol 12(4): 509-517.

NJOKU, J.E. & ODII, M.A.C.A. (1991). Determinants of Loan Repayment under the Special Emergency Loan Scheme in Nigeria, a Case Study in Imo State. *African Review of Money, Finance and Banking: Finafrica,* Vol 1: 39-52.

NORUŠIS, M.J. (1990a). *SPSS Reference Guide*. SPSS Incorporated, Chicago.

NORUŠIS, M.J. (1990b). *SPSS Base System User's Guide*. SPSS Incorporated, Chicago.

NORUŠIS, M.J. (1990c). *SPSS Professional Statistics*. SPSS Incorporated, Chicago.

OKORIE, A. (1986). Major Determinants of Agricultural Smallholder Loan Repayment in a Developing Economy: Empirical Evidence from Ondo State, Nigeria. *Savings and Development,* Vol 1(1): 89-98.

PARKIN. M. (1992). *Economics*. 2nd Edition. Addison-Wesley Publishing Company. Ontario, Canada.

PASOUR E.C., Jnr. (1981). A Further Note on the Measurement of Efficiency and Economies of Farm Size. *Journal of Agricultural Economics,* Vol 32(3): 135-146.

PATERSON, B.J., HANSON, S.D. & ROBISON, L.J. (2000). Characteristics of Farmland Leasing in the North Central United States. *Journal of the American Society of Farm Managers and Rural Appraisers*, Vol 65 (2): 72-82.

PINDYCK, R.S. & RUBINFELD, D.L. (1981). *Econometric Models and Economic Forecasts*. McGraw-Hill Inc, New York.

PRESS, S.J. & WILSON, S. (1978). Choosing between Logistic Regression and Discriminant Analysis. *Journal of the American Statistical Association,* Vol 73: 699-705.

RAYNER, A.A. (1967). *A First Course in Biometry for Agriculture Students*. University of Natal Press, Pietermaritzburg, South Africa.

SANDERATNE, N. (1986). The Political Economy of Small Farmer Loan Delinquency. *Savings and Development,* Vol 4: 343-354.

SIMMS, P. (1996). A Financial Model to Fund Land Redistribution in the Sugar Industry of KwaZulu-Natal. *Agrekon*, Vol 35 (4): 252-255.

SIMMS, P. (1997). Land Redistribution in South Africa - Some Practical Lessons. In Bauer, L. (ed). *Proceedings of the 11th International Farm Management Congress of the International Farm Management Association*. International Farm Management Association and The Canadian Farm Business Management Council, Olds, Alberta, Canada.

SOUTH AFRICAN SUGAR ASSOCIATION. (1970). Sugarcane Production Manual. SASA, Durban, South Africa.

SOUTH AFRICAN SUGAR ASSOCIATION. (1994). *Information sheet*. November. SASA, Durban, South Africa.

SOUTH AFRICAN SUGAR ASSOCIATION. (2002a). *Industry Directory*. SASA, Durban, South Africa.

SOUTH AFRICAN SUGAR ASSOCIATION. (2002b). *The South African Sugar Journal*, April. SASA, Durban, South Africa.

SINGH, T. (2001). Energy Conservation: A Management Perspective. Proceedings of the South African Sugar Technologists Association Annual Congress, SASTA, Durban, South Africa.

STRANACK, R.A. (2002). Regional Extension Officer: North Coast Region, South African Sugar Association Experiment Station. *Personal Communication.* Durban, South Africa.

STREET, K. & KLEYNHANS, T.E. (1996). A Formal Mentorship Programme for Emerging Farmers in the Western Cape. *South African Journal of Agricultural Extension*, Vol 24 (2): 39-57.

VAN DEN HEEVER, R. (2002). Portfolio Manager: Agribusiness, Ithala Development Finance Corporation. *Personal Communication.* Durban, South Africa.

VAN ZYL, J. (1994). Farm Size, Efficiency, Food Security and Market-Assisted Land Reform in South Africa. *Agrekon,* Vol 33(4): 156-164.

VAN ZYL, J., KIRSTEN, J. & BINSWANGER, H.P. (1996). *Agricultural Land Reform in South Africa: Policies, Markets and Mechanisms.* Oxford University Press, Cape Town.

VIGANO, L. (1993). A Credit-Scoring Model for Development Banks: An African Case Study. *Savings and Development,* Vol 17(4): 441-479.

VOGEL, R. (1981). Rural Finance Market Performance: Implications of Low Delinquency Rates. *American Journal of Agricultural Economics*, Vol 63(1): 58-65.

WELCH, F. (1978). The Role of Investments in Human Capital in Agriculture. In Shultz, T.W. (ed). *Distortions of Agricultural Incentives.* Indiana University Press, Bloomington.

WILKINSON, A. (1981). Origins and Functions of the South Africa Central Board. *The South African Sugar Journal.* Vol 65: 21-23.

WILLETT, G.S. & HINMAN, H.R. (1982). A Method for Analysing the Farmland Lease or Purchase Decision. *Journal of the American Society of Farm Managers and Rural Appraisers*, Vol 18 (1): 37-45.

YABILE, K.R. (1987). Provision of Liquidity Management: An Incentive to Curb Default in the Ivory Coast's Agricultural Credit Programs. *Savings and Development*: *Finafrica*, Vol 11 (4): 403-422.

YARON, J. (1992). Successful Rural Finance Institutions. World Bank Discussion Paper No. 150. World Bank, Washington.

APPENDICES

APPENDIX A

Monthly Rainfall (mm), 1995-2001: North Coast

Month	1995/96 (mm)	1996/97 (mm)	1997/98 (mm)	1998/99 (mm)	1999/00 (mm)	2000/01 (mm)
April	192	46	100	62	30	68
May	57	24	30	40	51	51
June	73	9	73	1	28	27
July	18	181	48	15	2	26
August	13	15		45	45	44
September	12	16	77	43	95	78
October	115	95	144	65	178	103
November	117	79	240	89	65	121
December	300	51	66	144	249	120
January	219	163	73	107	185	130
February	213	143	190	141	195	135
March	108	79	61	38	111	117
TOTAL	1437	901	1132	790	1234	1020

APPENDIX B

Monthly Rainfall (mm), 1995-2001: South Coast

Month	1995/96 (mm)	1996/97 (mm)	1997/98 (mm)	1998/99 (mm)	1999/00 (mm)	2000/01 (mm)
April	180	60	113	103	24	102
May	34	24	37	41	38	111
June	78	1	216	1	27	8
July	4	204	92	11	3	10
August	13	7	12	86	17	15
September	32	19	106	31	58	80
October	107	150	116	63	293	82
November	80	155	269	112	70	123
December	302	64	75	184	241	147
January	204	142	67	74	275	81
February	153	69	163	162	209	73
March	117	108	139	79	187	51
TOTAL	1304	1003	1405	947	1442	883

APPENDIX C

Monthly Rainfall (mm), 1995-2001: Midlands

Month	1995/96 (mm)	1996/97 (mm)	1997/98 (mm)	1998/99 (mm)	1999/00 (mm)	2000/01 (mm)
April	80	32	71	33	12	44
May	14	21	27	20	30	48
June	63	7	87	0	12	8
July	5	141	36	3	3	3
August	5	6	14	34	5	11
September	26	19	60	24	34	93
October	122	109	88	48	151	60
November	115	98	178	75	50	103
December	365	133	94	92	313	88
January	202	113	163	119	176	78
February	185	65	159	101	111	100
March	112	62	69	45	57	34
TOTAL	1294	806	1046	594	954	670

APPENDIX D

Ithala Bank Mortgage Interest Rates Before Subsidy: MSF Scheme, 1996-2001

Month	1996	1997	1998	1999	2000	2001
January	16.5%	16.5%	16.5%	17%	16%	15%
February	16.5%	16.5%	16.5%	17%	15%	15%
March	16.5%	16.5%	16.5%	17%	15%	15%
April	16.5%	16.5%	16.5%	17%	15%	15%
May	16.5%	16.5%	16.5%	17%	15%	15%
June	16.5%	16.5%	16.5%	17%	15%	15%
July	16.5%	16.5%	17%	17%	15%	15%
August	16.5%	16.5%	17%	16%	15%	14.25%
September	16.5%	16.5%	17%	16%	15%	14%
October	16.5%	16.5%	17%	16%	15%	14%
November	16.5%	16.5%	17%	16%	15%	13.5%
December	16.5%	16.5%	17%	16%	15%	13.5%

APPENDIX E

MEDIUM-SCALE GROWERS' QUESTIONNAIRE

Grower Region:_____ Grower No:_____

PLEASE TICK THE ANSWER THAT YOU AGREE WITH WHERE REQUIRED:

1. Rank the following, in descending order, as reasons for why you purchased a sugarcane farm:

Make a profit from farming	Own land	Supplement income	Other (specify)

2. Given a choice, would you have leased first, for say 5 years, before purchasing your farm?

Yes		No	

Why? _____

_____

_____

3. Annual profit from sugarcane farming is low relative to land value.

Strongly agree	Agree	Uncertain	Disagree	Strongly disagree

4. The long-term sugarcane supply agreement constrains you from diversifying into other farm enterprises.

Strongly agree	Agree	Uncertain	Disagree	Strongly disagree

5. The quality of the following institutional services provided to MSFs is satisfactory:

Institution	Service	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
Tongaat-Hullet	Mentorship					
Illovo	Mentorship					

6. Ithala Bank clearly informed MSF growers about the following loan terms:

Term	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
Cane cession					
The structure of the graduated payments					
Timeliness of loan statements					
How to interpret statements					

7. There is a need for a co-ordinator to monitor the financial performance of the MSFs, at least for the initial 3-5 years, and to advise industry role players on how such performance can be improved.

Strongly agree	Agree	Uncertain	Disagree	Strongly disagree

If Strongly agree or Agree, who, or which organizations, should be co-ordinator, and why?

Who: _____

Why:

_____

8. Farm valuations for the MSF farms should be made by an independent valuer.

Strongly agree	Agree	Uncertain	Disagree	Strongly disagree

9. Do you manage your farm:

Full-time		Part-time	

10. If Part-time in (9), what is the your source of off-farm income?

Own business		Contracting		Other	

11. If you are a part-time or non-resident farmer, who manages the farm in your absence?

Farm manager		Induna		Family member		Nobody	

12. If you are part-time farmer, what is your average annual gross off-farm income (Rands)?

1-25000	25001-50000	50001-100000	100000-150000	> 150000

13. Risk management strategies that you commonly use are:

Strategy	Yes	No
Enterprise diversification		
Off-farm investment		
Crop insurance		
Keep cash reserves		
Keep credit reserves		
Other (specify)		

14. Before you bought the farm, did you have any experience in the following disciplines?

Discipline	Yes	No	Period (years)
Agriculture			
Finance			
Management			

15. How many hectares of replanting have you done annually since you bought the farm?

Season	Replanted fields (ha)	Used heat-treated seedcane	
		Yes	No
1995/96			
1996/97			
1997/98			
1998/99			
1999/00			
2000/01			

16. Own contribution for purchasing the farm was raised through one or a combination of:

Savings	
Sale of assets	
Sale of business	
Pension	
Retrenchment package	
Personal borrowing from family members	
Loan against insurance policy as collateral	
Informal moneylender	
Other (please specify)	

17. Rank the following factors according to how they affect your farm earnings negatively (1 = extremely important, 2 = very important, 3 = important, 4 = less important and 5 = extremely unimportant):

Factors	1	2	3	4	5
Unreliability of contractors					
Labour problems					
Drought					
Falling sugar prices					
Information shortages					
Interest rates					
Other (specify)					

18. If you are in a financial and/or agronomic crisis, would you sell the farm to reduce your losses?

Yes		No	

If no, why?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

19. What would you do to cope with an unanticipated drop in gross farm income?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

20. Are there any other comments that you want to make about aspects of the MSF scheme, or the terms of the MSF scheme, that concern you?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

21. Are there any other comments that you want to make about your experience with SACGA, SASEX, Ithala Bank and Illovo or Tongaat-Hullett, that concern you?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____