A Strategic Analysis of Sugar Cane Supplies from a Miller Cum Planter to a Sugar Mill in Kwazulu Natal

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CONFIDENTIALITY CLAUSE

19 June 2003

TO WHOM IT MAY CONCERN

RE: CONFIDENTIALITY CLAUSE

Due to the strategic importance of this research and the sensitive nature of the information it would be appreciated if the contents remain confidential and not be circulated for a period of ten years.

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Hereby declare that the dissertation entitled:

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has not been previously accepted for any degree and is not being currently submitted in candidature for any degree at any University.

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Date 05 July 2003

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ABSTRACT

This is a case study of an irrigated sugar cane Estate owned by the Company that mills sugar cane from the irrigated farms that make up the Estate and also from a wide range of other suppliers. The agricultural land on which the sugar cane is grown is threatened by divestiture in that the Mill could conceivably obtain supplies from other Private Growers and other contracted suppliers who are the potential purchasers of divested land. This is the problem that the research addresses.

The case study addresses this problem by analysing the relationship between a specific sugar mill and its company owned Estate which supplies cane to the Mill, from irrigated sugar cane lands. In other cane growing areas Estate operations have been divested and the cane supplies outsourced to Private Growers. The case study evaluates this management strategy in the particular case of the Heatonville irrigation Estate supplying sugar cane to the Felixton sugar mill, both of which are owned by Tongaat-Hulett Sugar Limited. In 1993 the Company had vertically integrated backwards, and invested in agricultural land in a move to secure strategic cane supplies for the Felixton Mill. The Mill was at that time, and still is, under supplied with sugar cane on an annual basis.

The case study provides a review of the relevant literature in the fields of vertical integration, divestiture and outsourcing which are concepts that can be related to the actions that the Company is taking in selling off significant potions of its agricultural land holdings. An overview of the concepts of marginal cost and marginal revenue are given in order to assist in the understanding of the relationship between the sugar mill and the Company owned Estate.

The research design is guided by five main research questions around which the methodology and data collection processes are focused. These research questions are all related to the research problem. Computer generated budget models are used to evaluate financial and production information, with the assistance of tables and graphs. The specific relationship that the Estate has with the Mill in terms of its financial contribution towards milling revenues is also highlighted as a strategic benefit. A summary of results is presented by answering the specific research questions.

The case study concludes that the Heatonville Miller Cum Planter irrigation operation provides strategic cane supplies to the Felixton Mill, which if outsourced to third parties may be at risk. The case study makes no attempt to generalise findings to other cane growing irrigation schemes. However where similar situations prevail management decisions could well be guided by the findings of this study, given the systematic application of the budget models in each situation.

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

This is a case study of an irrigated sugar cane Estate owned by the Company that mills sugar cane from the irrigated farms that make up the Estate, and also from a wide range of other sugar cane suppliers. The agricultural land on which the sugar cane is grown is threatened by divestiture in that the Mill could conceivably obtain cane supplies from other Private Growers and other contacted suppliers who are the potential purchasers of divested land. This is the problem that this research addresses.

1.2 Background to the Case Study

Tongaat-Hulett Sugar Limited is one of the largest Sugar Milling Companies in South Africa operating five sugar mills in the Kwazulu Natal region, crushing 8.5 million tons of sugar cane to produce 900,000 tons of sugar per annum (The South African Sugar Journal, 2001). Tongaat-Hulett Sugar Limited also owns Mills and Estates in Zimbabwe, Mozambique and Swaziland producing a further 367,000 tons of sugar. As well as being a sugar milling company Tongaat Hulett Sugar also has large land holdings. Currently the Company owns eleven sugar Estates in South Africa, predominantly in the Kwazulu Natal coastal area, totaling approximately 12,400 hectares of sugar cane land producing 700,000 tons of sugar cane per annum. Five years ago the Company owned agricultural land holdings were in excess of 25,000 hectares. As a result of divestiture, predominantly aimed at effective land redistribution, it is expected that in 2004 the land holdings will reduce to approximately 9,500 hectares. The Company owned land holdings are farmed and managed by the Tongaat-Hulett Sugar owned Agricultural Division.

The term used to describe these company farms is "MCP" which means "Miller Cum Planter". This name gives an indication of the relationship between the two entities of milling and farming. However the cane supplies to all Tongaat-Hulett Mills in South

Africa also come from a large body of smaller agricultural companies and private sugar cane growers as well as small-scale growers[1]. Four out of the five Tongaat-Hulett Sugar Mills in Kwazulu Natal have all the grower groups mentioned above in their cane supply areas. However due to divestiture of company owned land it is expected that by 2004 only two of the five mills will have a Miller Cum Planter (MCP) component.

The research in this case study will explore the relationship between one specific mill and the Miller Cum Planter operation that supplies sugar cane to the Mill. However the Private Cane growers making up the largest component of growers supplying sugar cane to the Mill will be included in the study for comparative purposes. The study does not include an evaluation of any of the other grower groups. The small growers are a significant part of the cane supply to the Mill. However they are not evaluated in the case study as they consist of 5000 individual growers farming an average farm size of 2 hectares per grower. Thus they are not considered as potential purchasers of land that the Company would consider divesting, as are the commercial Private Growers. The Small Growers should not be confused with emerging Black growers who purchase farms from the Company as these new farm owners would be included within the Private Grower category as a result of the size of the farms they purchase.

The Mill in question is the Felixton Sugar Mill on the Kwazulu Natal North Coast near Empangeni. This Mill is the largest Mill in South Africa with a capacity to crush 3 million tons of cane per annum producing 295,000 tons of sugar per annum. The entire cane supply area of the Felixton Mill is approximately 38,000 hectares in extent consisting of approximately 19,000 hectares of Private Growers, 10,000 hectares of small growers (consisting of 5000 individual Growers), 6,500 hectares of other company growers that are not millers and 2,500 hectares of irrigated Miller Cum Planter land.

[1] Small Scale Growers: An Industry term used to describe a large body of predominately Black (African) farmers producing sugar cane on a small scale. The size of farms varies between 0.5 hectares and 30 hectares, the average size being 1.9 hectares in the Felixton cane supply area, which is the case study area.

The Miller Cum Planter operation in question is the Heatonville MCP, which is comprised of two large irrigated Estates totaling 2,464 hectares producing 150,000 tons of sugar cane per annum. It is the only irrigated sugar Estate that Tongaat-Hulett Sugar own in the South African context and is therefore in a unique position.

The Company does own irrigated Estates in other parts of Southern Africa. However the operations in these other African countries are not directly linked to the South African operations. Other sugar mills in the industry, predominantly in the Eastern Transvaal and in the Pongola area are supplied extensively from irrigated sugar cane land. There are close links between the Heatonville Irrigated Miller Cum Planter irrigation operation and a group of 13 Private Growers who also irrigate 1800 hectares in the Heatonville district. Tongaat-Hulett sugar invested in an irrigation scheme in 1993 to provide irrigation water to these private growers as well as to Company owned farms, which it purchased at the time, namely the Heatonville Miller Cum Planter irrigation operation. This was a strategic move to vertically integration backwards into the buying farms in order to secure cane supplies to the Felixton Mill. There are an additional 19 irrigated Private Growers irrigating 3000 hectares in another district not linked to the Heatonville Irrigation Scheme who supply cane to the Felixton Mill.

1.3 Statement of the Research Problem

In recent years there has been a move by the sugar milling companies to divest from sugar growing and concentrate on the core business of sugar milling. This has been the case in the Felixton Mill supply area where MCP operations, which existed prior to the Heatonville irrigation farms being purchased, have been sold to private growers. In other mill areas serving different mills significant parts of the Miller Cum Planter operations have been sold. Divestiture of land has taken many forms and including, on a relatively

large scale the outsourcing of cane growing land to Black Growers[2] as part of the Land Redistribution and Black economic empowerment initiatives.

Other large land holdings have been sold to Private Growers and the cane supply outsourced by agreement. This on the basis that sugar cane milling and not sugar cane growing is the core business of the Company. Milling profits per ton of cane far exceed the growing profits per ton of cane from the Company owned land. In all farm sales the land is sold with a cane supply agreement in place, which commits the purchaser to supply cane to the Company Mill for a number of years depending on the particular situation. Twenty-year cane supply agreements are the most common form although they do differ from mill to mill. In areas closer to Durban divestiture has taken place as a result of cane land being sold to property developers. This land is therefore no longer able to contribute to supplying cane to the Mill.

Thus the specific purpose for this study derives from a research problem, which is the pressure that the sugar company is under to divest and outsource in a move away from vertical integration. The potential divestiture of the irrigated cane at the Heatonville Miller Cum Planter irrigation operation is examined in this case study.

1.4 Specific Context of the Research Problem

The Felixton Mill has a design potential to crush 3 million tons of sugar cane per annum but is currently restricted by Local Area Agreements with the growers to 2.88 million tons. However over the past 6 years the Mill has only managed to crush a maximum of 2.6 million tons causing a significant gap in cane supply resulting in potential profit reductions of more than R50 million per annum. The potential divestiture of Heatonville Estates and the outsourcing of the cane supplies to third parties contains an element of risk given the fact that the Mill requires as much of its current cane supply to remain

[2] Black growers purchasing farms for the purpose of land redistribution are termed Medium Scale Farmers but their size of farm is usually between 80 and 120 hectares placing them in the Private Grower category. They should not be confused with Small Growers whose average farm size is only 2 hectares.

intact as possible. Potential purchasers of the Heatonville Irrigated Miller Cum Planter land may not be able to sustain these cane supplies given the unique character of the cane-growing situation at Heatonville and the production potential of the land that is currently farmed by the Miller Cum Planter. Land farmed by the Miller Cum Planter is not necessarily on a par with the land that Private Landowners irrigate in as far as production potential and therefore financial viability is concerned. The case study investigates the potential for outsourcing and highlights some of the risks involved. This will enable management decisions to be taken given the specific outcomes of the case results.

The specific research questions guiding the study in the context of vertical integration, divestiture and outsourcing are:

i. ***Research Question no I:*** *Is outsourcing of core components of the cane supply chain justifiable given the specific situation of the Heatonville Miller Cum Planter irrigation operation?*
ii. ***Research Question no 2:*** *Will the Felixton Mill continue to benefit from these cane supplies should the Company divest its land holdings at Heatonville?*
iii. ***Research Question no 3:*** *Are continued cane supplies from the Heatonville Miller Cum Planter irrigation operation strategic in the sense that they add value to the sugar company?*
iv. ***Research Question no 4:*** *Is it likely that other grower bodies in this situation will be able to maintain these cane supplies after company divestiture?*
v. ***Research Question no 5:*** *Was the original practice adopted that of backward vertical integration into cane supplies at the Heatonville Miler Cum Planter irrigation operation, justified in light of the research evidence?*

These research questions guide all aspects of the study from the selection of the literature reviewed in the next chapter, the research design, the presentation and analysis of results and the main findings and conclusions.

CHAPTER TWO: REVIEW OF RELEVANT LITERATURE

2.1 Introduction

The literature review explores the theory behind the concepts of vertical integration, divestiture and outsourcing. The advantages and disadvantages are explored with reference to case studies in other businesses not related to the sugar industry. These concepts are pertinent to the case study in that the two largest sugar producing companies in South Africa namely Tongaat-Hulett Sugar Limited and Illovo Sugar Limited, have over the recent past, been divesting of sugar cane land and outsourcing the production and supply of core cane supplies to third parties. In particular the focus of the case study will be on the Tongaat–Hulett Sugar Miller Cum Planter irrigation operation at Heatonville that forms part of the Felixton Mill cane supply. During the period 1991 to 1993, the Heatonville Irrigation project was financed and built by Tongaat-Hulett Sugar Limited and commissioned in November 1993 to start pumping irrigation water to 4,200 hectares of irrigated land. At the time Tongaat-Hulett sugar purchased 2,500 hectares of the total 4,200 hectares (namely the Heatonville MCP) in order to secure cane supplies to the Felixton Mill. This was typical of the theory of vertical integration being put into practice. The case study itself examines vertical integration in the context of outsourcing pressures and divestiture in the sugar cane industry.

2.2 Vertical Integration

"Vertical integration is the extent to which an organisation owns the network of which it is a part" (Pycraft, Singh and Phihlela, 2000:180) and essentially refers to the organisation making the decision of acquiring suppliers and customers. Vertical integration can also be taken down to the level of individual products and services when deciding to manufacture individual components or perform particular services. These functions or services can be purchased in or outsourced from independent service providers.

Vertical integration takes place in two directions depending on whether the firm wishes to gain control by acquiring suppliers or its customers. The strategy of expanding on the supply side is referred to as backward or upstream vertical integration and expanding on the demand side is referred to as forward or downstream vertical integration.

Backward vertical integration allows an organisation to take control of its suppliers often in a move to prevent competitors gaining control of key supply areas. In the sugar industry this topic is highly relevant due to the fact that in past years key sugar supply areas were being lost to the timber companies. "With the buoyant conditions existing in the timber industry as a result of world pulp prices which increased significantly between 1985 and 1990 there was a material expansion of the land under timber with the focus on Natal as a major development area" (Tongaat-Hulett Sugar Limited. Heatonville Irrigation Project Proposal, 1992). In the Felixton Mill supply area in particular a lot of agricultural land was sold to the timber companies who offered high prices for the land. This land would have otherwise had potential to produce sugar cane. This contributed to the fact that the Felixton Mill is now under supplied to the tune of some 300,000 to 600,000 tons of sugar cane per annum. In this context, backward vertical integration would be considered a strategically defensive move to acquire and retain core supplies of raw materials. Forward vertical integration moves an organisation closer to its markets or consumers and allows closer contact with customers. For this reason forward vertical integration is sometimes considered an offensive strategic move.

This case study is concerned primarily with the supply of raw materials (sugar cane) to the Mills and therefore backward integration is more relevant. However it is interesting to note how the industry has changed over the past 7 years. Tongaat-Hulett Sugar (South Africa) used to own and farm in excess of 25,000 hectares of Miller Cum Planter sugar cane land, producing sugar cane for the five South African sugar mills. By April 2004 it is expected that the extent of company owned farms in South Africa will have been reduced to approximately 9500 hectares.

2.2.1 Extent of Vertical Integration

Organisations can have various degrees of vertical integration within each stage of the production chain. Each stage of the chain may be fully owned, partly owned or partly outsourced. Pycraft et al (2000: 182) refer to the "balance" among stages or that the "balance of the part of the network owned by an organisation is the amount of the capacity at each stage in the network and totally satisfies its requirements". Less than full balance in the stages allows each stage to sell its output to other companies or to buy in some of its supplies from other companies. In the case of the Felixton Mill the cane supplies are made up of a balance between Miller Cum Planter, Private commercial growers, other non milling companies and Small Growers as was highlighted in the introduction. The question however remains as to what is the best balance and how is the organisation affected if the right balance is not achieved?

Fully balanced chains (or networks) are more simplistic in nature in that each stage is able to focus on the requirements of the next stage. Having to supply other organisations might not create the focus that is required. The focus on cane quality for delivery to the Mill is one good point in case. The various grower groups supplying cane to the Felixton Mill have a diverse method of crop removal that can create supply and delivery problems for the Mill. In an interview with the Cane Supply Manager at the Felixton Mill it was discovered that the Mill throughput would be more efficient if the number of different modes of transport were reduced to a minimum. At the present time cane is delivered by rail (Spoornet), in large trucks with payloads of 30 tons and in a wide range of small tractor drawn transport rigs.

2.2.2 The Effects of Vertical Integration

Each Mill within the Tongaat Hulett Group operates within a defined yet different set of internal and external factors. The Entumeni Mill near Eshowe for example dose not have a Miller Cum Planter (MCP) operation and in this area the Mill's level of backward vertical integration is minimal. However at the Maidstone Mill near Tongaat on the Kwazulu Natal North Coast there remains nearly 7000 Ha of "strategic" land owned by

the company as part of the Miller Cum Planter Operation. The question that has to be answered is "do the advantages which vertical integration give in an organisations particular set of circumstances match the performance objectives which it requires in order to compete more effectively in its markets?" (Pycraft et al, 2000: 183). Vertical integration, if the above statement is true, will create stability and deliver flexibility, which may well be required more in one Mill area than in another.

There are number of potential advantages and disadvantages to vertical integration which can be outlined as follows:

i. Vertical Integration Affects Quality

In a vertically integrated organisation customers are "internalised" in that one part of the production process supplies the next with its output creating internal customers. This makes the cause of any quality related problem easier to identify and trace than would be the case if these links were owned by outside suppliers. The quality problem solving activity can be focused at the relevant point in the chain using internal resources. These resources may not be available, or affordable to external suppliers, or the supplier may not see them as adding value to their particular operation. There is of course always the danger that the in-house operations are not subject to the commercial arrangement that exists with external suppliers and have less incentive to maintain or improve quality standards. Having internal operations split into operating units accountable for their individual operating margins would improve this situation.

ii. Vertical Integration Affects Speed and Dependability

Pycraft et al (2000: 184) describes how vertically integrated operations can mean a closer synchronisation of schedules which can speed up the throughput of materials and information along a network. In the sugar industry the sheer number of growers, for example the 145 individual growers supplying the Felixton Mill (Felixton Mill Group Board Document No 1, 2003) have their own transport systems creating throughput delays at the mill weighbridges. If the delivery system was owned and controlled by the

Mill one can understand how the supply of cane to the Mill would be made more efficient. These potential advantages can be eroded if the in house customers get low priority compared with the "private" or stand alone customers. There is obviously a need to ensure that the supply chain is managed properly and all customers whether internal or external are treated with the same respect.

Improved communications should be possible when customers are internalised through vertical integration. Better forecasting could result in more realistic delivery guarantees. Once again this assumes that a proper customer-supplier relationship exists between the parties.

iii. Vertical Integration Affects Flexibility

Vertical integration provides an organisation with the potential to develop and control new technology whilst at the same time reducing the risk of exposure to competitors. "Forward vertical integration gives the potential for products and services to be developed specifically and more precisely to a customers needs" (Pycraft et al, 2000:184). In a milling situation the internalisation of customers increases volume and delivery flexibility in the supply of cane to the mill. Delivery of cane from a reduced number of suppliers means that the supply of raw cane to the mill can be manipulated to suit the crushing speed of the mill. This is a major benefit in the milling environment, when for example a mill breakdown occurs, the supply of sugar cane can be stopped at short notice through internal communications structures. This has "knock on" effects in as far as cane quality is concerned. Any delay that causes harvested cane to sit on the farms or in transport vehicles reduces the available sugar content of the cane. This then reduces sugar extraction and ultimately reduces company (and cane grower) profits.

iv. Vertical Integration Affects Cost

Vertical integration can provide the potential for sharing of costs especially in as far as research and development is concerned. Arnold, (1998: 843) further points out that in the oil industry the major players tend to be highly vertically integrated. They have down stream exploration subsidiaries, drilling and production companies, refineries,

distribution companies and petrol stations. This reduces the cost not only of research and development but also the cost of search (for external suppliers), contracting, payment collection, advertising, communication and co-ordination of product. Economies of scale and capacity utilisation can be balanced. If profit margins are high in supplier operations it can allow vertically integrated companies to benefit from these profits that would otherwise be lost to suppliers. In the sugar cane industry this is perhaps not the case with milling margins being greater than cane growing margins. However where the supply of cane is not guaranteed backward vertical integration can ensure cane supply from low profit margin cane growing areas. In other words growing margins can be minimal (or even negative) but the value of the cane supply is great in terms of milling profits. The combined profit from this "marginal" cane supply exceeds the total cost of growing and milling even though the cane growing margins are negative. This matter forms an important part of the case study and will be discussed in detail in chapter 3. This situation cannot exist where suppliers are not an integrated part of the total operation due to the fact that they would go out of production and the cane supply would be lost.

Vertical integration can also lead to economies of scale. Having a limited number of internalised production units as opposed to a large number of privately owned suppliers leads to lower cost per unit of output. Arnold (1998: 848) explains that rationalising and consolidating manufacturing capacity at fewer, larger sites can lead to economies of production. Economies in marketing can arise through the use of common distribution and advertising channels. Economies of scale also arise in administration, purchasing and finance.

v. Vertical Integration and Managerial Capability.

Peyrefitte, Golden and Brice (2002: 217) state, "that despite the indeterminate economic outcomes of vertical integration, several managers and researchers have questioned its viability". They suggest in their article entitled "Vertical Integration and Economic Performance: A Managerial Capability Framework" that "a better understanding of the relationship between vertical integration and economic performance may be made by considering the role of managerial capabilities in directing integration". The authors refer

to Harrigan (1985) and Perry (1989) who point out that the complexities of vertical integration as a strategy, its competitive advantages and disadvantages and its internal benefits and costs make forecasting its economic outcomes a difficult task. Despite these uncertainties, executives have questioned the value of vertical integration mainly due to the higher costs associated with the strategy. "This belief is mirrored in the business literature, which continues to suggest that outsourcing adds value to firms beyond that provided by vertical integration" (Kelley, 1995:76). However Peyrefitte et al (2002: 218) propose that a better understanding of the vertical integration-financial performance relationship must be attained. There are always managerial knowledge barriers to vertical integration that have to be overcome and it is suggested by Peyrefitte et al (2002: 219) that top managers must learn new skills to manoeuvre their firms beyond the strategic core. From a Tongaat Hulett Sugar Perspective the strategic core lies within the cane milling operation, as it is this operation that generates the profit and return on investment.

vi. The Strategic Core

The core competence is the company's unique set of intangible resources or skills that represent collective learning within the organisation and give the organisation a competitive advantage for example sugar cane milling. Peyrefitte et al (2002: 219) propose that the "dominant logic of the firm is necessarily compromised in the vertical integration process". In other words the firm's ability to manage a more diversified firm (through vertical integration) is limited by its dominant logic. Understanding this, corporate managers leverage existing knowledge or develop new knowledge in order to manage the integrated firm. Peyrefitte et al (2002: 219) state, "it is the learning capacity of the dominant coalition that determines how successful the vertical integration strategy will be".

Knowledge, which forms part of a firm's intellectual capital, is often viewed as being one of the most important resources a firm has and it is often more efficient to access or leverage knowledge through integration than through market contacts (Walsh,1995: 282). Therefore firms are more inclined to integrate in situations where unexpected opportunities arise or where protection of knowledge is difficult and costly. In other

words vertical integration can be used as a means to protect, absorb and develop organisational knowledge.

vii. Strategic Benefits and Costs

The success of vertical integration depends on the ability of managers to accurately assess the costs and benefits of the strategy (Williamson, 1975). However in the cost analysis the "transaction costs", which are the negotiating, monitoring and enforcement costs involved in buyer-supplier relationships, must be taken into account. Firms benefit from internalisation, as a result of vertical integration, when the transaction costs are reduced. Care must be taken to evaluate the additional costs of an increased bureaucracy in managing intra-firm relations. Bureaucracy costs include the cost of additional control and communication required in a more diverse organisation. It is also expected that higher costs of production could result due to the removal of direct competitive pressure on costs that exist when there are a large number of suppliers.

For vertical integration to be successful the managerial approach must be adapted to suit the changes in functional activities that accompany this vertical shift. The firm must be re-organised so that advantage can be taken of existing functional knowledge whilst allowing new knowledge to develop. Organisational structures and processes must be designed to smooth interdependencies between operating divisions, perhaps on a more centralised basis. However the potential pitfall is that autonomy and accountability is compromised. Furthermore if divisions are structured as profit centres managers may well undertake behaviours that further divisional (business unit) gain instead of corporate gain. This is most relevant when exploring the nature of the sugar mill with the Miller Cum Planter operations. The research will show that the economics of sugar cane production on these company owned farms has to take into account downstream milling revenue and not only agricultural profit margins.

2.3 Divestiture

Many diversified firms have taken the decision to divest certain of their businesses and focus their resources and attention on a lesser number of core businesses. Thompson and Strickland (2001: 304) state that retrenchment is usually accomplished by divesting businesses:

(i) That have little or no strategic fit with the business that management wants to concentrate on, or

(ii) That are too small to make a sizeable contribution to earnings.

Divesting such businesses frees up resources that can be used for other strategic purposes, for example to reduce debt or expand the remaining businesses, or to make acquisitions that strengthen the company's competitive advantage. Selling Miller Cum Planter sugar farms could theoretically free up financial resources for capital investment in increased milling capacity where milling and not cane growing is seen as the core activity. In instances where business units are unprofitable the reasons for retrenchment are obvious, but even then divestiture must be carefully considered as to what the effect on the core operation will be. In addition long-term industry attractiveness changes with the times and in a country such as South Africa the recent times have seen much change in the political arena. Business has to change and adapt in order to meet the challenges that the new external environment creates. Thompson and Srickland (2001: 305) offer the following statement as a guide to assist with the decision to divest a business: "if we were not in this business today would we want to get in to it now?" When the answer is no then there is probably a case for divestiture. This is a question with high relevance to the case study and one that will be evaluated in chapter 4, the results chapter. If the company did not own the Heatonville MCP irrigation operation would it now want to invest in a similar operation? Another case for divestiture is when the company or business unit owned is more valuable to another business than the existing parent company.

Divestiture can take place in one of two basic forms, selling the business unit outright or spinning the business off as a financially and managerially independent company. In the second option management must decide whether to retain partial ownership or forgo any

ownership interest altogether. When selling the business outright the problem becomes one of finding a buyer and in certain circumstances, the right buyer. If the business unit being disposed of will still be a key supplier of products or services then the choice of buyer becomes vital. In the case of the sugar miller selling of its agricultural business units, which supply the raw sugar cane for milling, the new purchaser is required to maintain cane supplies to the mill by means of a cane supply agreement. In this case it is not only the supply of the raw material from a quantity point of view, but also a quality issue. A reduction in the supply of raw material after divestiture could lead to a reduction in parent company profitability. As Thompson and Strickland (2000: 306) point out, a company considering divestiture should ask the question "For what sort of company would this business be a good fit, and under what conditions would it be viewed as a good deal". The sale price is always an issue and if this cannot be agreed to between buyer and seller then the decision must be made whether to keep the business until a buyer appears, spin it of as a separate company, or accept a lower price. If selling at a lower price enables the supply of raw material to continue then strategically this may be the right choice to make.

2.4 Outsourcing

Thompson and Strickland (2001:182), maintain that over the past ten years many companies have found vertical integration to be so competitively burdensome that they have instead elected to adopt a strategy of "vertical deintegration" or "unbundling". They have elected to concentrate on their core business and focus more narrowly on certain value chain activities and rely on outsiders to perform the remaining chain activities. In other words they have outsourced to external vendors who provide raw materials, support services and other activities historically performed in house. The sale of the Miller Cum Planter farms is a typical example of what Thompson and Strickland are referring to. McIvor (2000: 22) concurs that the growing importance of outsourcing has become a key issue for many organisations. The potential for outsourcing has moved away from those activities that are normally regarded as peripheral to include core (critical) activities, such

as manufacturing and marketing. Cane growing and the supply of raw product to the Mill can be considered a core activity of the Sugar Cane producing companies. In fact in certain instances the entire value chain has been opened up to outside suppliers. Within organisations, outsourcing has been given increasing consideration because of its strategic implications. Thompson and Strickland (2001: 182) sate that outsourcing makes strategic sense when:

i. An activity can be performed better or more cheaply by outside specialists.
ii. The activity is not crucial to the firm's ability to achieve a sustainable competitive advantage and won't hollow out its core competencies, capabilities or technical know how.
iii. It reduces the companies risk exposure to changing technology and or changing buyer preferences.
iv. It streamlines company operations in ways that improve organisational flexibility, cut cycle time, speed decision-making or reduce co-ordination costs.
v. It allows a company to concentrate on its core business and do what it does best.

Often the advantages of keeping value chain activities in house can be maintained by outsourcing and the disadvantages avoided by forging long term co-operative partnerships with key suppliers and thereby tapping into the competitive capabilities developed by these suppliers of raw materials and services. In the past many of these arrangements were short-term in nature with cost of contract being the driving force behind the choice of supplier. However this trend has changed to one of developing alliances and strategic partnerships with fewer highly capable suppliers. Co-operative relationships are replacing contractual, purely price-orientated relationships.

There are many reasons why it is costly or cumbersome for a company to maintain the provision of non-core value chains. Creating or sustaining a capability involves a long difficult learning process that is impossible to short-circuit at an acceptable cost. Acquiring suppliers by vertical integration can lead to difficulties being experienced when corporate culture between the parent company and the newly acquired division is diverse or even extreme. This can effect the commitment of the workforce and the trust

developed with customers and suppliers. Acquiring a company may pose legal problems, come with negative perceptions or be costly to reverse if indeed it does not meet expectations. In an uncertain, fast changing market environment, acquiring another firm to gain access to its capabilities is often a less flexible strategic option than a strategic alliance obtainable through outsourcing

2.4.1 The Outsourcing Decision

Jennings (2002: 26) states that "as part of a company's strategic development the outsourcing decision needs to consider a range of contextual factors including: conditions in the final product market, capability, cost of technology and supply market conditions". These factors should be examined in order to structure the outsourcing decision to enable or maintain the competitive advantage. McIvor (2000: 23) refers to the theory of "transaction cost analysis" as the conceptual basis for outsourcing. Williamson (1985) argues that the concept of transaction cost analysis is characterised by:

i. Asset specificity. Transactions which require high investments which are specific to the requirements of a particular value chain relationship.
ii. Uncertainty. Ambiguity as to transaction definition and importance.
iii. Infrequency. Transactions which are seldom undertaken.

The level of customised or specialised equipment involved in the value chain relates to the degree of asset specificity. Where asset specificity and uncertainty is low, and transactions are relatively frequent transactions will tend to be more market related and easier to outsource. High asset specificity and uncertainty lead to transactional difficulties with transactions being internalised (vertical integration). Medium levels of asset specificity lead to bilateral relations in the form of co-operative alliances between organisations (outsourcing). Therefore the two extremes of the sourcing decision are either vertical integration or outsourcing. In other words the company should outsource activities if to perform them internally would require excessive investment in order to get the lowest unit cost.

As has been mentioned before, in the absence of developed external markets, organisations out of necessity have sourced a wide range of upstream and downstream activities in house. As external markets mature and competition increases the strategy of vertical integration is challenged, encouraging organisations to promote the use of outside suppliers beyond that of simply supplying peripheral services to that of supplying core services traditionally provided for in-house. Jennings (2002: 26) gives the following overview: "While outsourcing is a rapidly growing part of the industrial scene, surveys addressing the effects of outsourcing provide mixed conclusions". A report by Shreeveport Management Constancy (1997) based upon 500 of the UK's private and public sector organisations concluded that while 88 percent of respondents believed their business was better off due to outsourcing, such opinions might be based upon limited evidence. Little more than half of the surveyed companies measured the performance of outsourced services to ensure claimed benefits were being achieved. A survey by Lonsdale (1999) concluded that the majority of managers are dissatisfied with the results of outsourcing. In an abstract by McIvor (2000: 22) this sentiment is reinforced and it is stated, "there is evidence to suggest that organisations are not achieving the desired benefits from outsourcing. Outsourcing decisions are rarely taken within a thoroughly strategic perspective with many firms adopting a short term perspective and being primarily motivated by the search for short-term cost reductions". McIvor (2000: 22) reports on a survey carried out by PA Consulting Group that found that only 5 percent of companies surveyed had achieved high levels of benefits from outsourcing. McIvor does not comment on how many companies were surveyed, but the point is made.

2.4.2 Cost Management

Following on from the views expressed by Thompson and Strickland above, Jennings (2002: 26) agrees that cost reduction has been the overriding motive for outsourcing. However he goes on to point out that while the outsourcing contracts traditionally target (and expect) a cost reduction of between 15 and 25 percent, there is an increasing trend for these targets not to be met. Jennings (2002: 26) refers to Embleton and Wright (1998) stating that the level of achieved saving may average 9 percent although a large portion of outsourcing clients may only break even or even find their costs increase. Jennings

(2002) also refers to Alexander and Young (1996), who found that large organisations may find prospective suppliers unable to match their own internal economies of scale and many specialist suppliers may have an effective scale that is no greater than that of their internalised customers. McIvor (2000: 25) also raises the concern that the problem with basing the sourcing decision primarily on the basis of cost is exacerbated by the fact that many companies have inadequate costing systems. The ability to report true variable production costs is a common shortcoming. It may also be the case that when there are relatively few suppliers that dominate the market, cost savings may not be attainable. This makes sense, for in order to allow suppliers to reduce costs and maintain high standards they must have access to superior cost drivers brought about by economies of scale, experience and low cost inputs.

2.4.3 Superior Quality Services

By outsourcing a firm, in theory, should be able to buy in best practice and therefore best quality for any given product, raw material or service. However Jennings (2002: 27) points out that in the absence of fully developed service level monitoring the development of quality may on occasion not be what it is perceived to be. It may also be the case that a lowering of service level and quality may occur requiring the re-development of this service in-house. Jennings (2002: 27) again refers to Alexander and Young (1996) when he states, "the use of external supply can also imply a reduction in the opportunities with which to achieve differentiation through the use of more widely available activities and components".

2.4.4 Flexibility

Outsourcing can enable an organisation to avoid the constraints of their own production capacity. In situations where the supply of products or services is of a seasonal nature the penalties of under utilised in-house resources can be avoided. However care must be taken that the outsourced supplier can cope with seasonality of supply (its peaks and troughs) and remain viable and competitive. Jennings (2002: 27) sites the example of Boeing, where the company, at times, has been unable to meet cyclical increases in the demand for aircraft. Lacking sufficient in-house production capacity Boeing has found

that attempts to increase capacity have resulted in their drawing resources away from the company's suppliers.

2.4.5 Focus and Diversification

An increase in focus on the firm's core activity is often emphasised as being one of the key benefits to outsourcing in that it reduces the functional scope of an organisation and enables the organisation to be more responsive to changing market conditions. Outsourcing may also encourage the development in economies of scope through product diversification. As a consequence of outsourcing non-core, time consuming supply activities, there is reduced functional complexity and greater focus on the core activity enabling product development and market penetration activities to take centre stage. Jennings (2002: 28) uses the Virgin group of companies as an example, explaining how they use joint ventures and outsourcing which serves to avoid industry entry barriers, lower risk and provide a speedier response to market opportunities. These core activities or core competencies as they are often referred to are not necessarily physical assets. McIvor (2000: 23) argues that, "the real source of competitive advantage is to be found in management's ability to consolidate corporate-wide technologies and production skills into competencies that empower individual businesses to adapt to rapidly changing business opportunities." Core competencies allow the organisation to out compete the competition and must be defended because these resources are fundamental to a company's strategic position.

2.4.6 Loss of Skill and Knowledge

Even though there may be a concern to avoid outsourcing of core activities, the absence of close control over this function can result in the loss of key competencies and critical skills. Innovation may stagnate within an organisation or there may be a leakage of critical knowledge concerning processes and customers, resulting in the creation of potential competitors. Jennings (2002: 28) refers to an article from The Economist (1998) where in the automobile industry for example, the creation of component suppliers has enabled a number of component producers to develop to a stage where they are capable of producing entire motor vehicles. Jennings also refers to an article by Richardson

(1996) where the fashion house, The Gap, used backward integration to transform itself from one of Levi's largest customers to one of its strongest competitors. McIvor (2000: 25) is of the opinion that too many companies have unknowingly relinquished their core competencies by cutting internal investment in what they thought were "cost centres" in favour of outside suppliers. Outsourcing can provide a short cut to cost leadership and a more competitive product but it contributes little in building people-embodied skills needed to sustain future product leadership.

2.4.7 The Supply Environment

The discussion of the supply environment is of utmost importance and relevance to the sugar industry where Milling companies are divesting land holdings and outsourcing the supply of raw materials to private individuals and other companies. Jennings (2002: 30) maintains that outside supply can be based upon a range of relationships from arm's length contracting to long-term relationships. The separate roles of customer and supplier can be replaced by a close relationship as a result of the importance of this relationship in the supply chain. Outsourcing these supply functions may act to reduce waste and improve flexibility and learning. However there may be a lack of awareness of the dangers of outsourcing into a limited supply market where few suppliers are capable of providing a particular good or service to the required standards or volume, or in the required geographical area. This can open the possibility for suppliers to exploit the relationship. "Incomplete contracts, established to provide flexibility in an uncertain environment, may later become a basis for disagreement and opportunistic supplier behaviour". (Jennings, 2002: 30).

Strategic decisions to outsource need to be evaluated from a long-term perspective taking into account trends in the supply market. These would include concentration and location of suppliers, and the switching of costs that now face the customer and supplier organisation into the short, medium and long term. The service capability and financial strength of suppliers, for example potential purchasers of MCP cane farms must be assessed in order to prevent supplier failure. Suppliers need to also understand, or be

educated in the customer organisation's goals, mission and culture so that relationships based on mutual understanding are developed.

2.5 Marginal Cost and Marginal Revenue

This case study makes reference to Marginal Milling Revenue so it is important to review the principles of marginal revenue and marginal costs that guided the present analysis. The topic of marginal cost and marginal revenue is complex and varies from situation to situation and, in this study from sugar mill to sugar mill depending on the cost structures of the individual mill. An explanation of how the Marginal Milling Revenue contribution was determined for this study is included in the research design. However the specifics and mathematics behind the determination of Marginal Milling Revenue are not given in the case study, as this is a complex topic in its own right.

One of the most basic principles of operating a business is to never produce a unit of output that costs more than it brings into the business. In other words the input must add value. Schiller (2000: 461) describes how businesses in striving for the most profitable rate of output need to know what an additional unit of output will bring into the business. That is, how much does it add to the total revenue of the business? The contribution to total revenue of an additional unit of output is called marginal revenue. It is the change in total revenue that occurs when output is increased by one unit. In the case of the sugar producing business the concern would be to evaluate the additional revenue generated by the milling of one unit (ton) of sugar cane. In the calculation of marginal revenue the total revenues received before and after a one unit increase in production are compared.

The aim of the business is to maximise profits not revenue and therefore the costs of production also need to be evaluated. Schiller (2000: 461) explains that the added cost of producing one more unit of output (for example a ton of sugar cane) is its marginal cost. The production costs for producing an output of sugar in the context of the sugar milling company with an MCP operation supplying cane, is the sum of both the costs of farming

and the costs of milling. Revenue on the other hand only results in the selling of the final product, the unit of raw sugar.

Fixed costs (along with variable costs) are a component of any business and include those costs of production that are not varied. Doll (1984: 42) describes fixed costs as being those costs that do not change in magnitude as the amount of the production process changes and are incurred even when production is not undertaken. Outsourcing of those operations, like farming that have high levels of capital invested in land and machinery, reduces the fixed cost burden. Fixed costs are independent of output. Marginal costs of sugar production are the additional costs incurred in the growing and milling of one unit (ton) of sugar cane. Marginal costs rise as the level of production rises but fixed costs remain constant.

The sugar milling company would not want to produce an additional ton of sugar if the marginal cost of that production exceeded the price that the Mill receives for the raw sugar. If this were the case profits would decline. However when the price of the product (raw sugar) exceeds the marginal cost of production an extra unit of input brings in more revenue than it costs to produce. This holds true for the Mill and therefore there is a very strong incentive for the Mill to bring in as many additional units (tons) of sugar cane as it can, design limits taken into account.

CHAPTER THREE: RESEARCH DESIGN

3.1 Introduction

This research is a case study in that it is "an extensive study of a single situation" (White, 2000:39). The case study here is the case of the Heatonville Miller Cum Planter irrigation operation. It is the only case in that the study of the Heatonville Miller Cum Planter and its relationship with the Felixton Mill are complex and extensive. The whole design of the case study is guided by the research problem, which is the pressure that the sugar company is under to divest and outsource in a move away from vertical integration. The problem is derived from the companies' actions in other Mill (cane supply) areas where there has been significant divestiture of Miller Cum Planter land and the production of sugar cane outsourced to third parties. The Heatonville case is supported with the use of a comparison between the economics of Miller Cum Planter operations and that of private commercial growers.

The issues of vertical integration, divestiture and outsourcing are found throughout the literature review and provide the framework for the case study. The specific research objectives pertaining to this case are guided by the following research questions:

i. ***Research Question no I:*** *Is outsourcing of core components of the cane supply chain justifiable given the specific situation of the Heatonville Miller Cum Planter irrigation operation?*
ii. ***Research Question no 2:*** *Will the Felixton Mill continue to benefit from these cane supplies should the Company divest its land holdings at Heatonville?*
iii. ***Research Question no 3:*** *Are continued cane supplies from the Heatonville Miller Cum Planter irrigation operation strategic in the sense that they add value to the sugar company?*
iv. ***Research Question no 4:*** *Is it likely that other grower bodies in this situation will be able to maintain these cane supplies after company divestiture?*

v. ***Research Question no 5:*** *Was the original practice adopted, that of backward vertical integration into cane supplies at the Heatonville Miler Cum Planter irrigation operation, justified in light of the research evidence?*

3.2 Methodology and Data Collection

3.2.1 Base Data Collection Model

The first phase of the research involved the collection and evaluation of MCP production and financial information. This was done extensively with the aid of a computer generated budget model the summary of which is shown in Appendix 1, the Heatonville Budget No 1. The process of budgeting starts on the two MCP Estates where the Estate Managers input field data into the budget model to create an Estate budget (Tongaat-Hulett Sugar Limited. Estate Document No 1). The budget model is a standardised model designed by the Agricultural Administration Department that all Estates complete to ensure uniformity between the various Estates. The input data pertaining to work standards, machinery operating standards and level of sores item utilisation has been built up over a number of years. Standards of work, for example the number of man days required to plant a hectare of cane or cut a pre determined unit of sugar cane, have been developed over many years and have become the established company norms. Managers apply these constant standards to a work process (for example harvesting or planting) and match this to a workload, for example the number of hectares or number of tons to harvest. The work process and work loads are also compared to industry and company norms that have been developed over the years. For example it is a standard industry practise to replant 10 percent of the area under cane in any year and it is standard practice to harvest 87 to 92 percent of the area under cane per annum given the particular soil and climatic conditions in the Heatonville area. In other cane growing areas the workloads may be very different depending on the climatic influences. Any change to work load or a standard must be approved by the General Manager of the Agricultural Division, and would only be authorised for an out of the ordinary case.

Once standards and workloads are agreed to between the Estate Managers and the General Manager the costs of the operation, which is the cost of wages, fuels and oils, herbicides and fertilisers are applied to the standards and workloads. In this way Estate budgets can be controlled centrally to ensure conformity to standards and ensure uniformity between Estates. Budgets from all Estates are collated to form the operating budget for the Agricultural Division. It is the General Managers responsibility to review both Estate budgets and Divisional budgets and to make amendments where necessary in order to ensure Divisional standards and requirements are met.

The budget model is built up by means of a very detailed procedure. Each activity of the cane farming operation is evaluated separately on a process (or operation) basis. A process is an operation that is carried out on the sugar cane estate and includes amongst others: underground drainage, planting, weed control operations, crop removal operations and administration processes. The individual costs of these processes are summarised in Appendix 1. This process is not limited to the two Estates making up the 2,464 hectares at the Heatonville MCP, but extends to a further 7,500 hectares of Miller Cum Planter land on the Kwazulu Natal North Coast. However this case study is primarily concerned with the Heatonville MCP.

Although the model is a budget, it is built up using many years of historical data and it is therefore expected that reality, that is actual year-end audited figures, will very closely resemble the budget. However conditions do change during the year especially in as far as crop yields are concerned. Extended periods of dry conditions will reduce Agricultural revenues and these variances in production have to be catered for. Budgets are adjusted on a monthly basis during formal review sessions with Estate and Administrative staff to take into account changing crop conditions. Volumes (tonnage) of cane delivered to the Mill are the biggest driver of the Estate costs and revenue streams. Therefore given a more or less fixed area to farm on an annual basis one can assume that variances in the volume of cane produced and delivered to the Mill will be principally responsible for variances in Estate profitability. Budgeted cots and revenues, as well as the profit before income and tax are shown in the Heatonville Budget Model in Appendix 1.

The sum of each individual process as described above is totalled up and forms the operating budget for the Estates. The budget process is not shown in full detail in this case study as there are approximately 24 individual pages to each Estate and there are two Estates making up the Heatonville MCP.

Below the process total cost line in Appendix 1, there are mini tables showing revenue summaries, MCP Estate profit and bottom line PBIT (profit before income and tax). The revenue mini table shows the different components of MCP revenue. Cane sale revenue is revenue paid by the Miller to the Grower and is derived from the total quantity of cane sent to the Mill for which the grower (MCP in this case) is paid a price which depends on total tonnage delivered and the quality of the cane delivered. A short explanation of how payment for quality is derived follows on later in this chapter. Other revenue consists of rentals, seed cane sales, ash incentive, buying department rebates and sundry revenue. Rentals arise from the fact that some of the MCP buildings are leased to private growers or contractors. Seed cane sales result from the MCP selling fresh cane to other growers for the purpose of replanting. This seed cane is not sent to the Mill for crushing. The ash incentive revenue is a quality based incentive and is determined by the ash percentage in the cane when compared to the average Mill percent ash. Ash is caused by extraneous matter (for example sand and mud), which is mixed in with the cane being sent to the Mill. Ash levels increase with an increasing amount of extraneous matter that is normally picked up by infield cane loading machines. High Ash levels in the cane reduce Mill sugar recoveries and increase wear and tear on the crushing equipment. The Miller pays a bonus to Grower's whose ash levels are below a certain threshold level. Historically the MCP operation has always benefited from this incentive and therefore is budgeted as a revenue item. BDU rebates are essentially rebates received from suppliers of stores items (for example fertilizer, crop chemicals and machinery spares) as a result of the bulk buying of these items. Large company Growers benefit from rebates where as the average Private Grower does not. The budgeted costs as shown in the operation cost line of Budget No 1 do not include these "discounts" but are taken into account as a once off

revenue item. Sundry revenue refers to the rental received from leasing out approximately 250 hectares of MCP land to Growers in other cane regions.

Payment for cane delivered to the mill is based on quantity, measured by raw tonnage over the weighbridge, and quality, which is based on a recoverable value or RV. The recoverable value takes the base sucrose (or sugar) content of the cane and deducts penalties for excess fibre and non-sucrose components. Cane sales revenue would then be determined by the tonnage delivered to the Mill multiplied by the RV percent cane and the industry price per ton of RV.

3.2.2 Miller Cum Planter Production Analysis

Heatonville MCP irrigation production records (Tongaat-Hulett Sugar Limited. Estate Document No 2) were used to establish trends in cane supply from the area and to evaluate the reliability of the supply of cane. The relationship between the production output of the MCP, in terms of tons cane per hectare harvested, and the resulting profitability were evaluated with the use of tables and graphs. This entailed searching the Heatonville record keeping system for production and performance records over the past 5 years. These results have been recorded and saved on both hard (paper) copies and in computer files at the Heatonville MCP administration office. The administration clerk was tasked with presenting the past records to the researcher. The results are tabled using a number of production determinants for example tons per hectare under cane and total tons delivered as information on Estate performance over the past 5 years. The information in these tables shows how cane production varies from year to year.

A graph showing the relationship between Estate revenue per ton of cane and cost per ton of cane was developed using the tabled information as a database. The purpose of the graph is to show where the costs of production equate to the revenue derived from cane sales. This determines the break-even point at which no profit and no loss are made to the Heatonville MCP operation.

3.2.3 Analysis of Marginal Milling Revenue

The concept of Marginal Milling Revenue was explored with specific reference to the contribution that the Heatonville MCP makes to this revenue source. This was done by evaluating past Mill crush records (Felixton Mill Group Board Document No 1) to establish the extent of the gap between the Mills designed potential and the actual total annual cane deliveries from the entire supply area. Records of past milling performance were obtained from the Felixton Mill Group Board Offices in Empangeni in consultation with the Mill Group Board Secretary and were crosschecked by means of an interview held by telephone with the Felixton Mill Cane Supply Manger.

The concept of Marginal Milling revenue and the specific relationship between the Heatonville MCP irrigation operation and the Felixton Mill was explored. This was done by means of a financial evaluation of the costs of MCP production and the contribution that the MCP makes to the total Company revenue stream. The MCP costs of production for this analysis were obtained from the Heatonville Budget model as described in section 3.2.1 of this chapter. The Administration Manager at the Felixton Mill was interviewed by telephone to obtain Mill related information pertaining to Mill financial break-even tonnages and the Rand value of Marginal Milling Revenue. The Cane Supply Manager at the Felixton Mill was interviewed by telephone in order to determine the Mills design capacity. This information was then used in conjunction with the information gained from the evaluation of the Heatonville Budget Model to tabulate and graph the financial relationships that exist between the Heatonville MCP and the Felixton Mill, a specific relationship that the mill does not enjoy with other grower groups. The relationship between MCP costs of production, Marginal Milling Revenue and the net financial impact on the parent company were explored with the aid of tables and graphs. These results are presented in chapter 4.

3.2.4 Private Commercial Farmer Evaluation

The profitability of private cane growers was evaluated with the use of a computer-generated model that was drawn up by the researcher using the MCP budget model as a base reference point. However the cost of production parameters were modified to better

suit private grower cost structures. This model is shown in Appendix 2. These growers, some of whom are members of the Heatonville Irrigation Scheme, are potential purchasers of the MCP irrigation land. Therefore in the light of potential divestiture and the outsourcing of cane production to private growers it is important to evaluate, in a broad sense, their financial strengths and weaknesses.

The researcher developed this computer model to show how the cost and revenue structure vary for an average sized private farm operating under a number of different scenarios. This model, as shown in Appendix 2, describes the revenue and cost structures of an average size farm using established cane farming practises based on industry norms for the Felixton area. For example average replant programmes are based on a 10 percent of area under cane norm with area harvested being 90 percent of the area under cane. The model is based on the Miller Cum Planter budget model as was described in section 3.2.1 of this chapter and simulates four theoretical sugar cane farms to show how the viability and profitability of Growers in the Felixton Mill Group area differ. Each of these commercial Growers operates their farm in their own specific way making use of various methods of cane haulage and cane harvesting techniques. Labour requirements and mix of labour compliments vary from farm to farm, as do the volumes and types of agricultural chemicals and fertilisers. This all leads to each farm having a different mix of resource utilisation and therefore cost of production. However over the years (as with the MCP operations) standards and norms have been established within the Industry. The South African Cane Growers Association is a body employed by the commercial growers to act on their behalf in all cane growing matters including the provision of a regional Economist to assist in financial matters. This body produces an annual guideline to cane growing costs (South African Cane Growers Association, 2003) and is obtainable from the regional economist in each Mill area. These guidelines were used in the drawing up of the model as shown in Appendix 2.

The model assumes long-term average weather conditions and subsequent yields and is not based on any particular farm in the area. However the model does give one insight

into the economies of cane growing over a range of conditions in the Felixton Mill area. The four grower groups are described as follows:

i. PG1.Dryland (non-irrigated) cane grower operating in the low production potential area.
ii. PG2. Dry land (non-irrigated) cane grower operating in the high production potential area.
iii. PG3. Irrigated cane grower operating under conditions considered to be low in production potential for irrigated cane.
iv. PG4. Irrigated cane grower operating under conditions considered to have high production potential for irrigated cane.

The model summarises the MCP Budget Model and shows this summarised version, in the same format as the Private Grower model, on the right hand side of the table for comparative purposes. The bottom line of the model as shown in Appendix 2 compares the profit before income and tax (PBIT) of each grower group. The aim of the model was to assist in the evaluation of the potential of Private Growers to effectively farm the MCP land and maintain cane supplies into the future should the decision be taken to outsource cane supplies to this group of growers.

3.2.5 Miller Cum Planter Land Categorisation

The MCP irrigated cane growing operation was evaluated in order to establish why the annual yields on the Estate are lower than those that can normally be expected under supplementary irrigation conditions. This exercise required a detailed land and production survey that was carried out by Estate Managers under the supervision and guidance of the researcher. The aim of this section was to categorise the cane farming land into four production areas based on the production potential of the sugar cane fields. The detailed analysis of these land categories is shown in Appendix 3 to Appendix 6 and is described in more detail below. The specific economics of each of these areas and their contribution to Marginal Milling Revenue was evaluated with the use of descriptive tables. This evaluation is important to the case study as it gives a clear insight into the production potential and therefore influences the management decision to divest from this

land and outsource the production of cane to Private Growers. It will show that the economics of farming land of varying production potential differs from one production category to the next. To evaluate the whole of the MCP as one contiguous unit is perhaps too broad an evaluation. This section provides a more in depth evaluation of the Heatonville MCP operation in order to aid management decision-making.

The base data collection (budget) model as described in section 3.2.1 reflects the Heatonville MCP operating budget based on a set tonnage deliverable to the Mill from a particular Estate on a holistic basis. The Heatonville budget model uses workloads and standards as described to build up the budget on an operation-by-operation basis. However at Heatonville the cane farming land is variable in terms of its soil potential. One of the specific features of the Heatonville area is that the soils, and therefore cane growing potential, is more variable than those found in other cane growing areas. Many of the soils in the flatter land are poorly drained, shallow, acidic and difficult to farm. Other soils are deep, well drained and easier to farm. This exercise focuses on the individual cane fields at the Heatonville MCP and categorises each sugar cane field, or parts of fields into 4 main categories as follows:

i. Category 1 fields: Potential cane yield greater than 80 tons per hectare.
ii. Category 2 fields: Potential cane yield between 60 and 80 tons per hectare.
iii. Category 3 fields: Potential cane yield between 45 and 60 tons per hectare.
iv. Category 4 fields: Potential cane yield less than 40 tons per hectare.

The researcher formed a team consisting of the two Estate Managers at Heatonville, the South African Sugar Experiment Station Extension Officer and the Researcher. With the aid of soil maps and soil classification data the individual sugar cane fields at Heatonville, of which there are approximately 200, were classified into the categories as described above. The Estate managers used past field records and their knowledge of the fields and growing conditions infield to categorise their farms. Once all the fields were categorised the Estate Managers were asked to map out the different categories on colour coded mapping overlays. The mapped areas were measured and the total hectares of each

category calculated. Appendix 3 through to Appendix 6 shows the detailed classification dispositions of the four sections that make up the two Heatonville Estates.

The Estate Managers then investigated their cost of operation by applying the standard budget model as described in section 3.2.1 of this chapter to each land category (i.e. four budgets were developed). The question which had to be investigated was would the Marginal Milling Revenue derived from the additional tons of cane produced by each land category more than cover the cost of farming them. The results of the budget runs for each of the 4 land categories were summarised in a model that is shown in Appendix 7. The model uses the same format as the Private Grower model in Appendix 2 to show how each of the 4 land categories differ in respect of costs of production and profitability. The Agricultural Accountant at Heatonville was asked to assist in this process. The results of the evaluation will be discussed in chapter 4 of the case study.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents the results gathered in order to deal with the issues of Estate financial viability, the financial relationship of the Heatonville Miller Cum Planter with the Felixton Mill and the financial viability of Private Growers. These results are viewed in the context of the potential for the Company to divest from cane growing operations and outsource the production of sugar cane to third parties.

A sensitivity analysis showing the effect of total cane production on Estate profitability is shown. The concept of Marginal Milling Revenue and the effect that this revenue source has on Miller Cum Planter operations is discussed in view of the fact that the Felixton Mill and the Heatonville Miller Cum Planter operation fall under the banner of the same parent Company. The financial viability of Private Growers is discussed with the aid of a model to simulate the production economics of farms in 4 generic production areas. Finally the production economics of the various land categories within the Heatonville Miller Cum Planter operation are shown in order to evaluate their specific contribution to Estate profitability.

4.2 Sensitivity Analysis

The MCP irrigation operation is a crop growing operation and therefore weather plays an important part in determining the amount of cane produced on the farm. The MCP irrigation scheme is run on a supplementary irrigation basis. This means that the irrigation water supplied through the irrigation system, supplements, or makes up the difference between the crops requirement and the natural rainfall received. However supplementary irrigation schemes of this nature are designed on long term average rainfall, therefore in dry or drought years, irrigation cannot fully make up the difference between the crop requirement and the natural rainfall and crop yield drops as a result. In

other cane growing areas (for example in the Pongola area) irrigation supplies 100 percent of the crop demand and therefore annual crop yields are more stable and reliable.

Table 4.1 below, shows how MCP cane yields have varied over the past 5 years. The reason for this variance could be multifaceted because cane yields will vary with efficiency of weed control, the application of crop fertiliser, efficiency of irrigation practises and other management related variables. However assuming that management input in relation to these carefully controlled variables has been more or less constant over the period, the most important yield determinants are the quantity and distribution of natural rainfall of 900 mm per annum is received. The last column of the table gives the "normal" or expected scenario if long-term average rainfall is received. In 2001 and 2002 the cane crop was significantly less than what is considered to be a normal crop. This was a result of the total amount and distribution of rainfall, which was received over the growth period of the crop. In 2001 the rainfall received was only 820 mm and in 2002 only 784 mm. In 2000 the total MCP yield of 157,000 tons of cane was greater than the normal or average crop as a result of above average rainfall (1346 mm) during the growth period of this cane crop. The Heatonville Budget No 1 (Appendix 1) is based on the normal or average yield of 70.4 tons per hectare harvested or 60.4 tons per hectare under cane.

Table 4.1: Miller Cum Planter Historical Cane Delivery Summary.

Year	1998	1999	2000	2001	2002	Normal
Total Tons	138,483	134,771	157,211	110,757	105,255	148789
Area U Cane (Ha)	2460	2,460	2,478	2,478	2,464	2,464
Area Harvested (Ha)	2164	2,101	2,179	2,159	2,101	2,113
T Ca/Ha U Cane	56.3	54.8	63.4	44.7	42.7	60.4
T Ca/Ha Harvested	70.0	64.1	72.1	51.3	50.1	70.4

Source: Heatonville MCP production and performance records (1998 to 2002)

The volume of cane grown on the Heatonville Estates and subsequently delivered to the Mill determines revenue (adjusted up or down by the quality incentive) and is therefore crucial to the operation. The biggest profit actuator for the MCP and all other Growers is

the volume of cane delivered to the Mill. In fact the biggest profit actuator for the Mill is the volume of cane that it receives from its growers, so a bad (dry) season means reduced growing and milling profits.

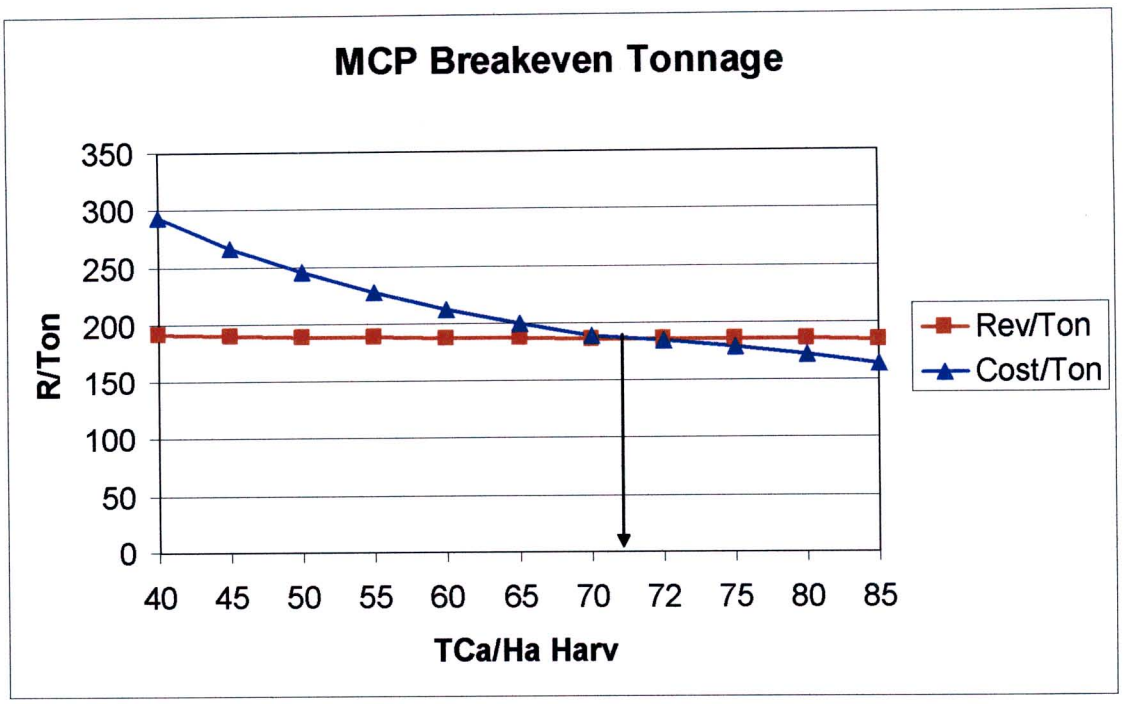
To put the effect of a reduced crop into perspective the budget model, Heatonville Budget No1 (Appendix 1), was run using a number of yield parameters to explore the sensitivity of MCP profit margin to cane yield. This relationship is shown in the following table, Table 4.2. Crop yields ranging from 40 tons per hectare harvested to 85 tons per hectare harvested were run in the budget model to show the effect on total cost, total revenue and total profit per ton from a change in yield. The 11 budget runs, based on the tonnages as shown in Table 4.2, are shown in Appendix 8 through to Appendix 18. The table shows that the MCP irrigation operation will run at a loss at any yield lower than 72 tons per hectare harvested. Adequate financial returns in terms of profit per ton of cane are only achieved at yields of 80 tons per hectare or more. It is an established Company norm, that a profit of between R20 per ton of cane and R25 per ton of cane is considered to be an adequate profit for cane growing operations. Profits in excess of R25 per ton are considered to be good. When referring back to Table 4.1, which shows historical yields, it appears as though yields of 80 tons per hectare harvested on an overall basis are not achievable for MCP irrigated cane growing operations at Heatonville.

Table 4.2: Miller Cum Planter Yield Sensitivity Analysis.

TCa/ Ha Harv	Revenue/Ton	Cost/Ton	Profit/Ton
40	191	293	-101.87
45	190	266	-76.16
50	189	245	-55.58
55	188	227	-38.75
60	188	212	-24.73
65	187	200	-12.86
70	186	189	-2.69
72	186	185	1.00
75	186	180	6.13
80	186	172	13.85
85	185	165	20.65

The relationship can also be expressed graphically as shown in Figure 4.1 overleaf. The interception of the revenue per ton (Rev/Ton) line and the cost per ton (Cost/Ton) line indicates the point at which Total Cost = Total Revenue. This is the point of zero profit or the breakeven point. This point occurs when yield, as shown on the X-axis, equates to 71.3 tons per hectare. Any yield to the right (greater) than this point reflects a positive profit margin.

Figure 4.1: Graph Showing MCP Breakeven Tonnage.



4.3 Marginal Milling Revenue

4.3.1 Background

The New Felixton Mill was built in 1981 and was a result of the merging together of two older mills to produce one large mill capable of crushing 600 tons of cane per hour (Sugar Journal, April 2001: 71). In an interview with the Cane Supply Manager of the Felixton Mill it was determined that the Mill was originally designed to crush 3.1 Million tons of cane per annum. The Mill has the potential to crush for 38 weeks operating for 6 days a week (one day for planned maintenance) and crushing for 24 hours a day at 600 tons per hour. A factor for Mill Mechanical efficiency of 94 percent is then applied to cater for unplanned stops due to Mill breakdown or non-ratable cane supplies. The Cane Supply Manger explained that there is currently a Local Area Agreement in place between the Miller and the Growers, which restricts the Mill to a maximum crush period of 36 weeks. This period enables the cane to be harvested at the maximum sucrose (sugar content) whilst also allowing the Mill sufficient time to crush all potentially available

cane. The 36-week period means that under the current agreement the Mill's maximum crush potential is 2.88 million tons per annum within the 36-week period from April to December of any year. The building of the Mill coincided with the development of the timber industry around Richards Bay and Empangeni during the same period. The result of the expansion of the timber industry and the good world pulp prices (Tongaat-Hulett Sugar Limited. Heatonville Irrigation Project Proposal, 1992) was that farmers who originally would have developed cane chose instead to sell of land to the timber companies who were offering good prices for agricultural land. The effect of this was to reduce the cane supply to the Felixton mill from 3 million tons per annum to a maximum of 2.66 million tons. The cane supply to the Mill over the past 5 years is summarised in Table 4.3, shown below. Milling records were obtained from the Mill Group Board Offices (Felixton Mill Group Board Document No 1)

Table 4.3 Felixton Mill Annual Tons Cane Crushed.

Year	1995	1996	1997	1998	1999	2000	2001	2002
Tons Cane (X 1000)	1,945	2,658	2,638	2,175	2,265	2,573	2,018	2,175

Source: Felixton Mill Group Board (2003)

The Felixton Sugar Mill, like the MCP cane growing operation, has a breakeven point. That point where total cost of operations (cane milling) exactly equals the revenue derived from the sale of raw sugar. On interviewing the Administration Manager at Felixton Mill the breakeven point of the Felixton Mill was determined to be 1.2 million tons of cane per annum. At this point all the fixed costs of production are covered by revenue. Any ton of cane crushed after the 1.2 million mark is reached earns what is termed Marginal Milling Revenue (MMR). In other words additional revenue (marginal revenue) is earned as only variable costs, the costs of production, are incurred after this point. No additional fixed costs or capital costs are required in order to crush the additional (marginal) tons of cane.

During the interview session with the Administration Manager at the Felixton Mill it was determined that a gap exits between the full milling potential of the Felixton Mill, i.e. 2.88 million tons under the current agreement and the amount of cane that is supplied by growers, that is a maximum of 2.66 million tons in 1999. Taking the 2002 total crush as an example, the shortfall equates to 700,000 tons of cane. It is thus imperative that the Mill secures any actual or potential cane supply that it can. In the past, before the land disposal program was initiated, backward vertical integration was seen as a strategy to secure cane supplies and thereby secure marginal milling profits. It was for this reason that the Heatonville MCP irrigation operation and the Heatonville Irrigation Scheme were developed (Tongaat-Hulett Sugar Limited. Heatonville Irrigation Project Proposal, 1992). Other methods of securing cane supply have been to tie up Growers with Cane Supply Agreements whereby Growers promise cane supply to the Mill for a defined period (normally 20 years) in return for an agreed financial compensation. In fact most cane land disposals (for the purpose of cane growing) include a cane supply agreement included in the sale conditions. However this does not necessarily mean that the cane supply will be maintained. Should farms go out of business (bankrupt) cane supplies are lost and cane supply agreements alone cannot secure the lost cane.

There are severe financial implications in not being able to crush to the full extent of the Mills capability. The interview with the Felixton Mill Administration Manager revealed that the Marginal Milling Revenue is approximately R80.00 for every ton of cane crushed after 1.2 million tons. In the 2002 season 700,000 tons of cane were not crushed that the Mill has the potential to crush. A calculation based on 700,000 tons at R80 per ton of Marginal Milling Revenue shows that this equates to R56 Million potential loss in revenue. Failure to at least maintain existing supplies of cane would result in further losses of Marginal Milling Revenue.

Discussions in earlier sections of Chapter 4 revealed that profit margins in the MCP irrigation operation are thin and that in any year where the gross production of cane is less than 149,000 tons, or 71 tons per hectare harvested, a MCP financial loss situation exists. This relationship was shown in table 4.2. When reviewing the data shown in Table

4.2 and the graph depicted in Figure 4.1 in isolation, it can be shown that the MCP operation makes a loss at any production level of less than 71 tons per hectare. If the Heatonville MCP operation was a stand-alone operation, run by a private company there would have to be a careful evaluation of the business. Parts of the business would probably have to be closed down. However when evaluating the whole cane value chain, from cane growing to milling and in the context of the Heatonville MCP being part of the same Company as the Mill, a different picture emerges. This value chain is described in the following section.

4.3.2 The Effect of Marginal Milling Revenue

The Felixton Mill requires as much additional (marginal) cane as possible in order for it to take advantage of Marginal Milling Revenue. Private Growers do not benefit from milling revenue and therefore the revenue that they get from cane sales to the Mill has to at least cover their expenses and provide a reasonable profit marginal to enable capital reinvestment and growth. With the MCP however the situation is quite different. As has been discussed before, the Felixton Mill and the Heatonville MCP irrigation operation are both owned by one company.

The total cost of cane growing and the Marginal Milling Revenue resulting from the supply of additional (marginal) cane by the MCP to the Mill needs to be examined jointly and not in isolation. As long as the additional revenue derived from the Marginal Milling Revenue is greater than any loss suffered from the MCP cane growing operations there will be a net benefit to the company as a whole. This relationship is explored using the information from the previous Table 4.2 and introducing the new information that Marginal Milling Revenue adds to the evaluation. The following table, Table 4.4, shows how the breakeven point of 71 tons per hectare can change when marginal milling revenue is added to the equation.

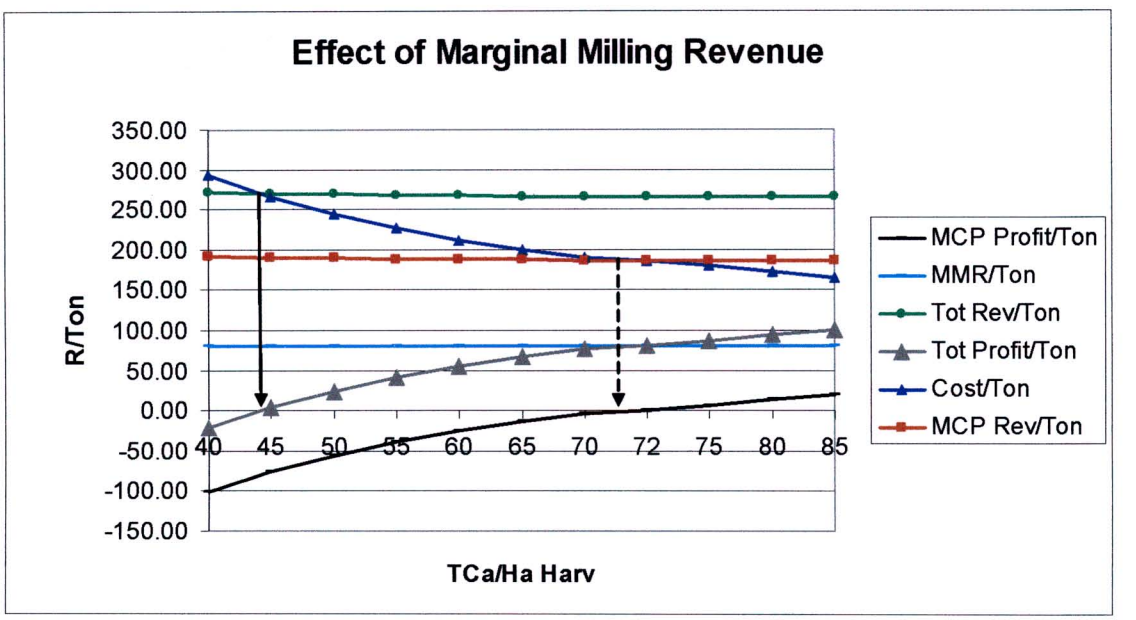
Table 4.4: The Effect of Marginal Milling Revenue on MCP Profitability.

TCa/ Ha Harv	Revenue/Ton	Cost/Ton	Profit/Ton	MMR/Ton	Tot Rev Per Ton	Tot Profit Per Ton
	(R)	(R)	(R)	(R)	(R)	(R)
40	191	293	-101.87	80.00	271.46	-21.87
45	190	266	-76.16	80.00	270.15	3.84
50	189	245	-55.58	80.00	269.10	24.42
55	188	227	-38.75	80.00	268.24	41.25
60	188	212	-24.73	80.00	267.52	55.27
65	187	200	-12.86	80.00	266.92	67.14
70	186	189	-2.69	80.00	266.40	77.31
72	186	185	1.00	80.00	266.22	81.00
75	186	180	6.13	80.00	265.95	86.13
80	186	172	13.85	80.00	265.56	93.85
85	185	165	20.65	80.00	265.21	100.65

From Table 4.4 it can now be seen that if Marginal Milling revenue is taken into account and added to MCP revenue the MCP, on behalf of the Company (Milling and Growing) can produce cane at 45 tons per hectare and still make a profit of R3.80 per ton. In terms of the Companies definition of adequate returns of R20 per ton as discussed in section 4.1 this would be achieved at a production level of approximately 50 tons per hectare harvested. A private grower farming these same irrigated farms would not be able to produce cane at these low tonnages and remain in business. Using Table 4.2 as a reference point (although Private Grower economics will be evaluated in the next section) a grower producing at the 50 ton per hectare harvested level will incur losses of R55.58 per ton. It should be noted that in Table 4.2 and Table 4.4 revenue increases as tonnage decreases on a per ton cane basis. This is due to the fact that other revenue (for example rentals) is fixed and therefore makes up a larger proportion of total revenue.

Figure 4.2 below shows the effect of marginal milling revenue on the viability of the Heatonville MCP irrigation operation. The MCP cost and revenue lines are shown as they were in the previous graph (Figure 4.1) and show the breakeven point as highlighted by the dashed vertical arrow. This arrow also passes through the MCP profit line at the point of breakeven tonnage per hectare (i.e. 71 tons per hectare). When Marginal Milling Revenue is added to MCP revenue (see the MMR line and the MCP Rev line) a new revenue line is generated namely the Total Revenue (Tot Rev/Ton) line, which is the sum of MCP revenue and Marginal Milling Revenue.

Figure 4.2: Graph Showing the Effect of Marginal Milling Revenue.



At the point where the cost per ton (Cost/Ton) equals the total revenue per ton (tot Rev/Ton) the new breakeven point is generated. This is demarcated by the solid vertical arrow and shows that this point is reached at 44 tons per hectare cane production. MCP profit (MCP Profit/Ton) without Marginal Milling Revenue at this point, shown by the solid black line is negative, but total MCP profit shown by the Tot Profit/Ton line is zero that is the breakeven position. This graph is shown as a full-page figure in Appendix 19.

4.4 Private Cane Growers Analysis

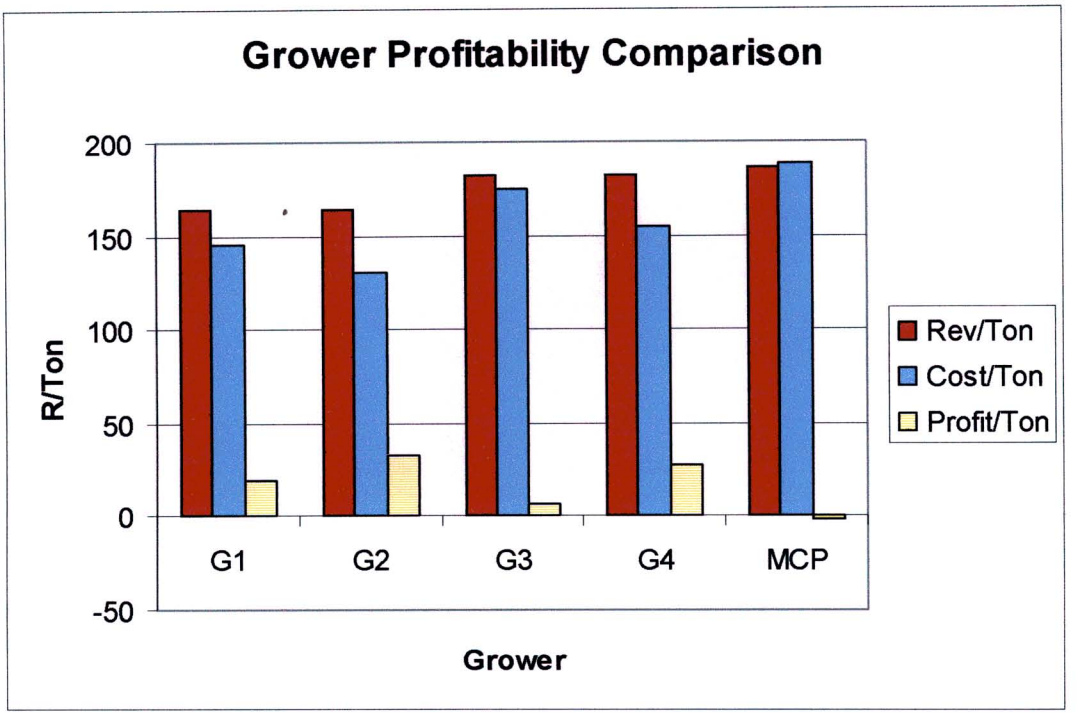
There are approximately 145 private growers (excluding Small Growers) delivering cane to the Felixton Mill, whose cane growing operations range in farm size from approximately 50 hectares under cane to 350 hectares under cane (Felixton Mill Group Board Document No 1). The average farm size is approximately 150 hectares in extent. There are a wide range of growing conditions in the Felixton Mill area ranging from the week coastal sands which have a low production potential to the deep red Hutton soil types with high production potential. There are 34 privately owned commercial growers who irrigate their crops due to the fact that these farms are situated in areas that receive less rainfall on an annual basis than is required to sustain cane growth. These irrigated growers are situated in the Heatonville and Inkwaleni areas North West of Empangeni. There is also a small group of irrigated commercial growers who are deemed to be Felixton Growers in the Pongola area. These farms are situated approximately 250 km from the Felixton Mill but form part of the annual supply of cane to the Felixton Mill. The Mill subsidises these growers cane haulage costs, as it needs the cane for its Mill. This bears testament to the fact that the Felixton Mill needs every additional ton of cane that it can source for as long as the immediate cane supply area cannot supply the required 2.88 million tons on a sustainable basis. However this area only makes up about 400 hectares out of the total cane supply area and delivers approximately 40,000 tons of cane to the Felixton Mill per annum.

The model as shown in Appendix 2 clearly shows, that on a generic basis, farm profits of R33 per ton can be achieved at significantly lower yields under dry land conditions than under irrigated conditions. The reason for this is that irrigation is expensive at R2900 per hectare and so higher yields have to be attained in order to cover these costs. Other costs for example replanting costs are higher under irrigated conditions as more conventional ploughing, drainage and field layout operations are required when re-establishing irrigated cane land as opposed to dry land cane. This relationship becomes even more apparent when viewing the following bar graph as shown in Figure 4.3. What the graph

also shows is that cane growing profit margins even in the better cane growing areas are low and the level of operating costs are high in relation to cane growing revenue.

By referring to the Private Grower Model in Appendix 2 it can be shown that in the irrigated areas cane yields of 70 tons per hectare per annum are not sufficient to generate reasonable profits (PBIT) of R20 per ton or more. This is consistent with the findings in the MCP operations where 71 tons per hectare harvested was shown to be a break-even situation. Farmers in these areas need to be able to produce between 80 and 90 tons per hectare harvested in a normal year to attain R20 per ton profit before income and Tax.

Figure 4.3: Graph Showing a Comparison of Grower Profitability.



G1	Dryland (non-irrigated) cane grower operating in the low production potential area.
G2	Dryland (non-irrigated) cane grower operating in the low production potential area.
G3	Irrigated cane grower operating in the low production potential area.
G4	Irrigated cane grower operating in the high production potential area.

However the question must be asked as to whether private commercial growers would be able to maintain cane supplies in these low production potential areas under irrigated conditions? The model as described would suggest that this would not be possible on any irrigated land that has a production potential of less than 70 tons per hectare. Although average tonnages are approximately 70 tons per hectare harvested, wide seasonal (annual) variations are common and this also needs to be taken into account as it affects long-term cash flows of the farming businesses.

4.5 Evaluation of Land Categorisation

Table 4.5 overleaf summarises the results of the exercise conducted in order to categorise the Heatonville MCP land into production potential categories. The table shows that there is a significant amount of land at Heatonville that is farmed at a production potential of less than 71 tons per hectare. This is significant because the 71 tons per hectare is the breakeven production point at which MCP cost of production equals the MCP revenue derived from cane sales to the Mill. The discussions in sections 4.2, sensitivity analysis, and in section 4.4 the Private Grower economics showed that farming irrigated sugar cane is not profitable below 71 tons per hectare harvested. Table 4.5 shows that all of the Category 3 and Category 4 land would produce less than 71 tons per hectare in a normal year. The sum of these two categories alone is 714.5 hectares out of the total MCP area of 2500 hectares. There are also approximately 500 hectares in category 2 which, by definition would also have a production potential of around 71 tons per hectare harvested as the average production potential of this whole category is 75 tons cane per hectare harvested. There is approximately 1,200 hectares of cane land at the Heatonville MCP that has a production potential of less than 71 tons per hectare harvested.

Table 4.5: Heatonville Miller Cum Planter Irrigation Land Category Summary

Land Category	Category Description	Total Ha Under Cane	Ha Harvested (normal year)	% Area
Category 1	Potential > 80 T/Ha	665.3	575.0	27
Category 2	Potential 60 T/ha – 80 T/Ha	1084.2	931.4	44
Category 3	Potential 45 T/ha – 59 T/Ha	542.1	459.6	22
Category 4	Potential < 45 T/Ha	172.4	147.0	7
TOTAL		**2464.0**	**2113.0**	**100**

The area harvested (Ha Harvested), which is shown in column 4 of table 4.5, is based on a more or less fixed percentage of the area under cane per Land Category. It is standard practice to harvest approximately 86 percent of the total area under cane per land Category per annum. Therefore the 665.3 hectares of Category 1 land represents 27 percent of the total area under cane and the 575.0 hectares of Category 1 land that is harvested on an annual basis represents 27 percent of the total area to harvest as well. The same applies for all the land categories.

The results of the land categorisation exercise can also be expressed in the format as described in Table 4.6 overleaf, which shows the average yield and total tons of cane produced per land category.

Table 4.6: Production Indicators of Land Categories

Land Category	Ha Harvested Per Annum	Tons Cane Per Ha Harvested	Tons cane Per Annum
1	575.0	86	49450
2	931.4	75	69855
Sub Total	**1506.4**	**79.2**	**119305**
3	459.6	51	23604
4	147.0	40	5880
Sub Total	**606.6**	**48.6**	**29484**
TOTAL	**2113.0**	**70.4**	**148789**

Once the budgets were run separately for each of the land categories the contribution of each land category to MCP profits was calculated. The results obtained from the budget re-runs using the Heatonville Budget No 1 as a base model, are shown in Appendix 7. For ease of reference and to aid the discussion the results from Appendix 7 are summarised in the following table, Table 4.7. It is worth noting that the total revenue per ton of cane is fixed at R186.32, as this is the current per ton value of the payment received from the Mill based on a constant quality of cane. It is possible that the cane quality varies from category to category and therefore the revenue per ton would also vary. However research has not yet been undertaken that determines whether this is the case. Further fieldwork is required on a field-by-field basis during 2003, once cane quality results are released from the Mill after crushing of the sugar cane.

Table 4.7: Profitability of Miller Cum Planter Land Categories

	MCP Total	Cat 1	Cat 2	Cat 3	Cat 4
	71 T/Ha	> 80T/Ha	60 -80T/Ha	45 -59T/Ha	< 45 T/Ha
Tot Cost Per Ton	**188.10**	165.15	179.51	237.63	284.97
Total Rev Per Ton	**186.32**	186.32	186.32	186.32	186.32
Profit Per Ton before MMR	**-1.78**	21.17	6.81	**-51.31**	**-98.65**
Marginal Mill Revenue	**80.00**	80.00	80.00	80.00	80.00
Profit after MMR	**78.22**	101.17	86.81	28.69	**-18.65**

The table shown in Appendix 7 details all costs on an operation-by-operation basis. Examination of this table in Appendix 7 shows that in some operations, for example the drainage, field layout, planting and cultivation operations the cost per hectare to perform the operation in low potential areas are much greater than in the higher production potential categories. This is due to the fact that the fields in this category are poorly drained and require extensive drainage and field layout work to remove excess water. Cane growth is also slower and therefore the competition from weeds greater. This results in more costly weed control and fertilisation operations. The fields in categories 1 and 2 also contribute less to Estate revenue, as the yields from these areas are significantly lower than in the categories with the higher potential. As was explained earlier on in this chapter it may well be possible that the cane quality from the poorer categories is of a lower quality and would therefore contribute less to revenue on a per ton basis.

Table 4.7 shows that the profit per ton of cane, before Marginal Milling Revenue is taken into account, is positive in categories 1 and 2, but negative in categories 3 and 4, as well as being negative for the MCP as a whole. However if categories 3 and 4 were not farmed the MCP would make a net profit of approximately R13 per ton (weighted average between categories 1 and 2) before taking into account the contribution that Marginal Milling Revenue makes. Table 4.7 shows that when Marginal Milling Revenue (R80 per

ton) is added to the equation the category 3 areas go from a loss situation into a R28.69 per ton profit situation. However category 4, even with the addition of Marginal Milling Revenue, still makes a loss of R18.65 per ton

4.6 Conclusion

Table 4.7 shown in section 4.5 of this chapter highlights the main concepts of the results of the research in general and not only the specific results of the land categorisation evaluation. It shows how sensitive cane growing profits are to the tons of cane produced and harvested per hectare of cane, and how an irrigated cane farm needs to produce a minimum of 71 tons cane per hectare harvested to break even. The effects of Marginal Milling revenues are clearly shown, and how the inclusion of Marginal Milling Revenue into the Heatonville MCP irrigation operation revenue stream allows the MCP to farm land and contribute to cane supply where a Private Grower cannot. The table also shows how different land categories with varying production potential contribute to the profitability of the Heatonville MCP irrigation operation. Further, it is shown that there is potential for some land to be outsourced with little risk, whilst other land with lower potential would, if outsourced, face the risk of going out of sugar cane production. This would impact on the Mill and the Company as a whole as Marginal Milling Revenue would be lost.

CHAPTER FIVE: SUMMARY OF RESULTS

5.1 Introduction

This chapter summarises the results from the previous chapter in terms of the research questions that were presented in chapter 1 and restated in the research design. Each research question will be dealt with sequentially so that the results can be summarised in a logical fashion. The research questions are linked and do not necessarily cover specific sections of the case study; therefore the answering of one research questions may give the reader insight into the next. The analysis serves to highlight the key concepts of Vertical Integration, Divestiture and Outsourcing as they effect the Heatonville Miller Cum Planter operation.

In the next chapter conclusions are drawn relating to the overall research problem, which is the pressure that the sugar company is under to divest and outsource in a move away from vertical integration.

5.2 Answers to Research Questions

***Research question No 1**: Is outsourcing of core components of the cane supply chain justifiable given the specific situation of the Heatonville Miller Cum Planter irrigation operation?*

The sensitivity analysis conducted in section 4.1 showed that cane production in the Heatonville area is variable and that there has only been one year in the past 5 years where cane production has been greater than the long-term production potential. Table 4.1 shows that the long term average production potential of the Heatonville MCP irrigation operation is 70.4 tons per hectare harvested. Table 4.2 shows that the breakeven level of cane production is between 70 and 72 tons per hectare harvested. This is confirmed by examining the graph in Figure 4.1 which shows that the actual breakeven

production level occurs at 71.3 tons per hectare harvested for irrigated sugar cane. This indicates that in at least 50 percent of all situations the Heatonville MCP irrigation operation will make a financial loss. Similarly the evaluation of Private Grower Economics in section 4.3 revealed that Private Growers, even though their cost structures are different to the Miller Cum Planters', can only make what is regarded to be sufficient returns (R20 pet ton profit or more) with production yields of between 80 and 90 tons per hectare harvested in irrigated sugar cane. These results would suggest that outsourcing the whole of the Miller Cum Planter irrigation operation at Heatonville to Private Growers is not justifiable. The existing Private irrigated Growers farm land that has higher production potential than the average MCP irrigated land and they do not farm on Category 3 or 4 land as identified in the land category evaluation exercise. This means that many of their farms are yielding above 80 tons per hectare harvested in a normal year.

Research Question No 2: *Will the Felixton Mill continue to benefit from these cane supplies should the Company divest its land holdings at Heatonville?*

The discussion in the answer to Research Question No 1 applies to this question as well and therefore on a broad basis the answer to the question is that the Felixton Mill would not continue to benefit from the cane supplies in the case of outsourcing. However when the question is considered in greater depth the answer becomes less direct. Section 4.4, the Evaluation of Land Categorisation, showed very clearly that the Miller Cum Planter operations consist of land that has variable production potential. Table 4.5 shows that 665 hectares of category 1 land has a production potential greater than 80 tons per hectare harvested. The table also shows that there are 1084 hectares of category 2 land which have a potential to yield between 60 and 80 tons per hectare harvested. Referring back to section 4.3 on Private Grower Economics it was determined that 80 tons per hectare or more, in irrigated situations, would yield positive returns to the grower. Therefore it is feasible that at least 665 hectares could be outsourced to Private Growers with little risk of loosing these cane supplies. There would possibly be other areas in land category 2 that could be outsourced, but there would always be the risk that cane supplies from these

areas would be lost in the event of a change in the cost-revenue balance. For example a small decrease in the price of sugar could have a marked effect on profitability of cane growing in this category.

Research Question No 3: *Are continued cane supplies from the Heatonville Miller Cum Planter irrigation operation strategic in the sense that they add value to the sugar company?*

The data analysis in section 4.2 showed that the Felixton Mill has a full potential to crush 3 million tons of cane per annum and a potential of 2.88 million tons under the existing Local Area Agreement. The average total cane supply to the Mill over the past 8 years has only been 2.31 million tons indicating that there is a potential gap in the supply of sugar cane in the vicinity of 600,000 tons per annum. Further it was shown that every additional ton of cane crushed by the Mill over the break-even tonnage of 1.2 million tons earns Marginal Milling Revenue of R 80 per ton. Until the Felixton Mill can be supplied (and crush) at its full potential of 3 million tons of cane per annum the cane supply from the Heatonville Miller Cum Planter can be viewed as strategic and adding value to the company. However If the Mill were running at full capacity this would not be the case, as the cane supplies would not be viewed as strategic.

Research Question No 4: *It is likely that other grower bodies in this situation will be able to maintain these cane supplies after company divestiture?*

This question has been answered in the discussions around Research Questions No 1 and 2. Those land categories that produce at least more than 71 tons per hectare, but preferably more than 80 tons per hectare harvested can be financially viable in the hands of Private Growers yielding farm profits of R20 per ton or more. However any irrigated land producing less than 71 tons per hectare will not be sustainable. Table 4.7 shows that when Marginal Milling Revenue is added to cane farming revenue all land categories except for category 4 (which is only 172.4 hectares) can be farmed and still make a positive contribution to overall Company profits. In other words all Heatonville Miller

Cum Planter irrigated land, apart from category 4 land, could be profitably farmed by third parties but only if their operating losses were subsidised from Marginal Milling Revenues. Using category 3 land as an example, these subsidies would have to be in the vicinity of between R40 and R50 per hectare to ensure farm profits of R20 per ton.

Research Question No 5: *Was the original practice adopted, that of Vertical Integration into cane supplies at the Heatonville Miller Cum Planter irrigation operation, justified in light of the research evidence.*

The answer to Research Questions No 2 and 3 are relevant to the answering of this research question. As was shown in section 4.2.1 the Mill is under supplied with cane to the extent of approximately 600,000 tons per annum. The Miller Cum Planter delivers approximately 150,000 tons to the Felixton Mill on an annual basis and as is explained in section 4.2.2 the value of this cane supply to the combined Mill and Miller Cum Planter operation at R80 per ton Marginal Milling Revenue is R12 million per annum. Even though the farming operation is very much a breakeven one in terms of agricultural profits the net benefit to the Company is positive. Had the Company not "vertically integrated backwards" into the purchasing of the Heatonville MCP this additional revenue would be lost to the Company. It was clearly shown in the analysis of the data on Private Grower Economics in section 4.3 that on a broad level Private Farmers of irrigated land would not have been able to maintain all the cane supplies from the land that the Heatonville Miller Cum Planter farms and therefore these cane supplies could have been lost if the Mill had not vertically integrated backwards into cane supply. However the analysis in section 4.5 showed that those land categories yielding less than 45 tons cane per hectare harvested should not have been planted to sugar cane as the additional value of the Marginal Milling revenue does not offset the Miller Cum Planter cane growing loss. The results of the case study show that investment in these areas (only 172 hectares) by the Company should not have taken place.

CHAPTER SIX: CONCLUSION

6.1 Conclusion

The summary of results presented in chapter 5 indicates clearly that the Felixton Mill needs to at least maintain all its existing cane supplies and where possible extend the supply of cane to meet its maximum design potential of 3 million tons of cane per annum. Under current conditions this means that the Mill would have to extend its cane supply by 300,000 tons per annum or, expressed in area terms, an additional 5000 hectares under cane. Backward vertical integration would be one way in which to do this and the Company could invest in cane growing Miller Cum Planter Operations. However taking Private Grower economics into account and the real need to redistribute Company land holdings, it is realised that as long as cane growing yields in future cane supply areas are greater than the threshold levels described for Private Growers, outsourcing of the cane growing operation is probably the best option. However, the literature reviewed did not necessarily support this argument. Vertical Integration is often seen as being a strategy to improve product quality, control and synchronisation of the throughput of raw materials. Vertical integration can also increase flexibility and reduce costs, especially transaction costs.

When taking the specific case of the Heatonville Miller Cum Planter into account it has been shown that the original strategy of Vertically Integrating backwards into the production of core cane supplies was the correct strategy. However the question of whether these core cane supplies should be outsourced is one that needs to be dealt with in the future. The results of this case study as presented in chapter 4 and summarised in chapter 5 show that outsourcing only selected areas of high irrigation potential land would be recommended. However the practical management aspects of this strategy have to be taken into account. One cannot select out the high production potential parts of farms that are situated alongside or near to areas of low production. Farms are sold as continuous economic units and not fragmented sections. In the Heatonville Miller Cum Planter situation there are also irrigation management factors to consider. Irrigation

systems transect land in more than one production category but have to be managed as a single farming unit.

The authors referred to in the literature review are divided on the topic of outsourcing. Many analysts view Vertical Integration as being cumbersome and not focused on the core function of the business. In this case study the core business would be the Milling operation, but the Heatonville Miller Cum Planter irrigated cane is certainly viewed as being both strategic and core to the business of generating Marginal Milling Revenue. Other analysts believe that in taking the decision to outsource (or divest with cane supply agreements), companies do not properly evaluate the costs of outsourcing and run the risk of suppliers, who do not have the benefit of economies of scale, having by necessity to increase the cost of inputs.

The research problem, which has guided this case study, is the pressure that the sugar Company is under to divest and outsource in a move away from Vertical Integration. These pressures have led to the divestiture of Miller Cum Planter operations in many cane growing areas whether irrigated or not. However in answering the research questions related to the research problem, the general finding in the case of the Heatonville Miller Cum Planter irrigation operation and its relationship to the Felixton Mill, is that that the immediate management focus should be on securing cane supplies for the Felixton Mill from is current 80 percent of full capacity and consider divestiture and resultant outsourcing of these strategic cane supply only when the Felixton Mill is at full capacity.

This case study of vertical integration in the South African sugar cane industry makes no attempt to generalise findings to other cane growing irrigation schemes that are owned by the company that owns the sugar producing mills, whether they are owned by Tongaat-Hulett Sugar Limited, or other similar sugar milling companies. Vertically integrated irrigation schemes supplying their own mills are not uncommon in Southern Africa and elsewhere. Many of these are likely to have to confront the same issues of outsourcing

and divestiture being addressed by the management of Tongaat-Hulett Sugar Limited in both the South African context and in other African countries.

Given this scenario, which may well pertain to other vertically integrated company operations, generalisations should be avoided. All that can be said with some confidence in relation to this case study of a company's own irrigated Miller Cum Planter land supplying its own mill, is that wherever similar situations prevail management decisions could well be guided by the findings of this study, given the systematic application of the study's budget model in each situation.

Overall this case study makes a specific contribution to the management of vertical integration, divestiture and outsourcing in the sugar cane industry based on a production and output analysis of real farm returns. It does not attempt to isolate labour relations and the host of other human issues that impinge on the attainment of farming returns. However the effect of these and other legislative requirements are built into the cost of operations by incorporating them into the budget model and therefore these issues are indirectly dealt with in the case study. The study clearly shows that decision making in relation to vertical integration and the related concepts is complex and highly situation specific, even within a largely homogeneous agricultural business organisation.

6.2 Areas for Future Research

The case study of the Heatonville Miller Cum Planter irrigation operation assumes that divestiture will take place and cane supplies outsourced to the Private Commercial Growers who currently operate self-sufficient business operations. The study has not taken into account the large body of Small Growers who could potentially purchase the Heatonville Miller Cum Planter farms on a project basis. The Government makes LRAD (Land Reform and Distribution) grants of up to R100,000 available to emerging Black Growers. This together with interest subsidies that the Company may offer (as it does in Medium Scale Farmer projects) might create a vehicle through which Small Scale Growers could purchase Miller Cum Planter land on a communal basis. There would

have to be many issues thought through, and in particular the fact that the irrigation scheme is designed across farm boundaries would create a need for integrated irrigation management by people with those particular skills.

The economics of small-scale growers are very different to Commercial growers as often farming is only a secondary form of income and not the primary source as it is with Commercial Growers. Joint ventures could be considered where the Company manages the distribution of water through the high-tech irrigation works and the small-scale growers perform the balance of the farming operations. This proposed future study could use the models and recommendations of the Heatonville Miller Cum Planter case study to investigate the feasibility of outsourcing of cane supplies to small Black Growers.

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Appendix 1

Heatonville Budget No 1 — **72 Tons per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	F/LAYOUT	CON.PREP	CHEM.PREP	H.PLANT	PL.CULT	RAT.CULT	CONTR. CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV.	ENVIROMENT	IRRIGATION	EST.ADMIN.	MACH.MNT	BREAK MNT	BUILD.MNT	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27282	5073988	197608		5271596
O/TIME											60938	58757				210802				330497	60152		390649
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				298396	292416		119590	1688386	2545032	150020	181983	27282	6828656	257760		7086416
																				0			0
GENERAL	26515				4418										5258786	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8668	20027																28695			28695
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					1992739										33961		2067778			2067778
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	1992739						25602	5258786	296819	191950	115646	126431	12344820			12344820
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				570650	801264			107615	23435		216984	3444	2386402	454579		2840982
TRAILERS												113132								113132			113132
M.VEHS.																636174	56006			692181			692181
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				570650	914397			107615	659610	56006	216984	3444	3287089	454579		3741668
CANE HAUL (RAIL)																						1819209	1819209
CANE HAUL (ROAD)																						1521436	1521436
CRANE LOAD																							
TOT.TPT.																						3340645	3340645
RENTALS																64679				64679			64679
ELSWATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4769911	1992739	0	0	869046	1206813	0	145193	7054787	4977843	397976	514614	157137	23934946	712340	3340645	27987931	27987931
Tot Cost Per Ton	0.28	1.56	2.66	0.17	2.86	4.90	32.05	13.39	0.00	0.00	5.84	8.11	0.00	0.98	47.41	33.46	2.67	3.46	1.06	160.86	4.79	22.45	188.10	27723041

REVENUE :	0
CANE SALES	26620395
OTHER	1102646
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	211943
-BDU REBATES	477500
-SUNDRY	377497
TOTAL	27723041

TOTAL REVENUE :	27723041	OK	27723041
ESTATE PROFIT :	3788094		-264890
PROFIT PER TON:	25.46		-1.78
TOTAL TONS	148789.2		

Appendix 2

Simulated Budgets and Income Statements for Private Growers

WORKLOADS	PG1	PG2	PG3	PG4	MCP
Area Under Cane	150	150	150	150	2464
Area To Plant (Conv)	7	7	15	15	317
Area To Plant (Chem)	8	8			76.8
Area To Fallow	2	2	2	2	65
AreaTo Ratoon	118	118	118	118	1654.2
Area To Irrigate	0	0	150	150	2399
Area To Harvest	135	135	135	135	2113
Tons/Ha Harv	50	65	70	90	71
Tons To Mill	6750	8775	9450	12150	148789
RV % Cane	11.0%	11.0%	12.2%	12.2%	12.2%
Tons Rv	742.5	965.25	1152.9	1482.3	18182
RV Price	1466.08	1466.08	1466.08	1466.08	1466.08

COST OF OPERATIONS	Cost per Unit (R)							Cost per Unit (R)	
DRAINAGE	131.27	/ha plant	919	919	1969	1969	41614	131.27	/ha plant
FIELD LAYOUT	733.69	/ha plant	5136	5136	11005	11005	232579	733.69	/ha plant
CONV PREPARATION	1249.21	/ha plant	8744	8744	18738	18738	396000	1249.21	/ha plant
CHEM PREPARATION	320.57	/ha plant	2565	2565	0	0	24620	320.57	/ha plant
HAND PLANT	1060.36	/ha plant	15905	15905	15905	15905	426129	1082.09	/ha plant
PLANT CULTIVATION	2230.03	/ha plant	33450	33450	33450	33450	728966	2299.58	/ha plant
CROP CULTIVATION	2455.00	/ha ratoon	289690	289690	289690	289690	4768911	2882.91	/ha ratoon
CANE CUTTING	12.00	/ton cane	81000	105300	113400	145800	1992739	13.39	/ton cane
CONTRACTOR LOAD	0.00	/ton cane	0	0	0	0	0	0.00	/ton cane
DIRECT DELIVERY	0.00	/ton cane	0	0	0	0	0	0.00	/ton cane
GRABLOAD	5.78	/ton cane	39015	50720	54621	70227	869046	5.84	/ton cane
INFIELD HAULAGE	8.00	/ton cane	54000	70200	75600	97200	1206813	8.11	/ton cane
MECH HARVESTING	0.00	/ton cane	0	0	0	0	0	0.00	/ton cane
ENVIROMENT	47.56	/ha u cane	7134	7134	7134	7134	145193	58.93	/ha u cane
IRRIGATION	2876.00	/ha irrig	0	0	431400	431400	7054767	2940.71	/ha irrig
ESTATE ADMINISTRATION.	29.00	/ton cane	195750	254475	274050	352350	4977843	33.46	/ton cane
MACHINE MAINTENANCE	2.67	/ton cane	18023	23429	25232	32441	397976	2.67	/ton cane
ROADS AND BREAKS	208.85	/ha u cane	31328	31328	31328	31328	514614	208.85	/ha u cane
BUILDING MAINTENANCE	76.68	/ha u cane	11502	11502	11502	11502	157137	63.77	/ha u cane
SUB-TOTAL			**794161**	**910497**	**1395024**	**1550139**	**23934947**		
CRANE LOADING	4.79	/ton cane	32333	42032	45266	58199	712340	4.79	/ton cane
CANE HAULAGE	22.45	/ton cane	151538	196999	212153	272768	3340645	22.45	/ton cane

SUB-TOTAL		**183870**	**239031**	**257418**	**330966**	**4052985**
TOTAL COST		**978031**	**1149528**	**1652442**	**1881105**	**27987932**
COST/TON		**145**	**131**	**175**	**155**	**188**

CANE SALES REVENUE		**1088564**	**1415134**	**1690244**	**2173170**	**26620395**
OTHER REVENUE		19376	25189	30086	38682	1102646
TOTAL REVENUE		**1107941**	**1440323**	**1720330**	**2211853**	**27723041**
TOT REV/TON		**164**	**164**	**182**	**182**	**186**

PBIT		**129910**	**290795**	**67888**	**330747**	**-264891**
PBIT/TON		**19.25**	**33.14**	**7.18**	**27.22**	**-1.78**

Appendix 3

Land Categorisation Estate 1 Section 1

Field No	Area Ha	Ratoon	Variety	Aspt	Slope	Tam mm	Depth mm	S/F	Par Mat	Overhead Drip Dry	T C H 1999	T C H 2000	T C H 2001	T C H 2002	Category	Problems	Solution	Cat 1	Cat 2	Cat 3	Cat 4
101	20.2	6	376	NW	10	70	750	BO	D/B	Overhead	52	85	57	35	2	Row/Width	R/ w1.22 N29		20.2		
102	5.1	6	376	NE	15	70	750	BO	D/B	Overhead	80	97	55	47	1	Row/Width	R/ w1.22 N29	5.1			
103	16.8	P	N27	NW	15	70	750	OA	D/B	Overhead	49	86	46	F	2	Row/Width	R/ w1.22 N27		16.8		
104	14.0	P	N27	N	15	70	750	GS	D/B	Overhead	37	88	49	F	2 , 3	Row/Width	R/ w1.22 N27		7.4	6.6	
105	12.6	6	N29	SW	15	70	750	MY	D/B	Overhead	76	85	51	27	2	Row/Width	R/ w1.22 N27 Gypson		12.6		
106	5.6	P	N27	NW	15	70	750	AR	D/B	Overhead	66	77	41	F	2 , 3	Soil Row/W	R/ w1.22 N27 Gypson Drain		2.5	3.1	
107	10.3	P	N29	NW	15	70	750	CA	B/SH	Overhead	66	79	28	F	2 , 3	Row/Width	R/ w1.22 N27 Gypson Drains		7.0	3.3	
108	18.3	6	376	NE	10	70	750	OA	B/SH	Overhead	75	82	70	49	1	Row/Width	R/ w1.22 N27 Gypson Drains	18.3			
109	7.0	6	376	S	10	70	750	OA	B/SH	Overhead	68	98	55	40	2	Row/Width	R/ w1.22 N27 or N29	7.0			
110	18.7	6	N19	NE	10	70	750	OA	B/SH	Overhead	70	83	54	47	1	Row/Width	R/ w1.22 N27 or N29	18.7			
111	4.3	6	N19	N	10	70	750	SW	D/B	Overhead	77	112	58	55	1	Row/Width	R/ w1.22 N27 or N29	4.3			
112	19.3	6	N19	NE	15	70	750	VA	D/B	Overhead	48	80	52	31	2	Row/Width	R/ w1.22 N27 or N29		19.3		
113	23.0	6	N19	NW	15	70	750	VA	D/B	Overhead	64	87	49	44	2 , 4	Row/Width	R/ w1.22 N27 or N29		21.7		1.3
114	8.4	6	N19	NW	15	70	750	VA	D/B	Overhead	40	82	42	20	2	Row/Width	R/ w1.22 N27 Gypson Drai		8.4		
115	11.6	P	N27	SE	11	70	750	OA	B/SH	Overhead	41	54	32	60	2 , 3	Soil Row/W	R/ w1.22 N27 Gypson Drains		3.8	7.8	
116	21.9	6	N19	E	11	70	750	OA	B/SH	Overhead	69	81	54	34	2 , 3	Soil Row/W	R/ w1.22 N27 Gypson Drains		5.0	16.9	
117	8.1	6	N19	S	8	70	750	VA	B/SH	Overhead	81	75	61	43	2	Row/Width	R/ w1.22 N27 Gypson Drains		8.1		
118	16.0	6	N19	NE	10	70	750	AR	B/SH	Overhead	62	74	53	53	2	Row/Width	R/ w1.22 N27 Gypson Drains		16.0		
119	17.3	6	N19	SW	10	70	750	OA	B/SH	Overhead	63	75	59	44	2	Row/Width	R/ w1.22 N27 Gypson Drains		17.3		
120	18.3	6	N19	SW	12	70	750	OA	B/SH	Overhead	50	80	49	46	2	Row/Width	R/ w1.22 N27 Gypson Drains		18.3		
121	19.4	6	N19	NE	10	70	750	OA	B/SH	Overhead	64	88	68	52	1	Row/Width	R/ w1.22 N27 Gypson Drains	19.4			
122	8.1	3	N12	E	10	70	750	OA	B/SH	Dry	28	103	19	27	1	No Irrigatio	Irrigation	8.1			
123	7.8	3	N12	NE	10	70	750	OA	B/SH	Dry	35	114	31	28	1	No Irrigatio	Irrigation	7.8			
124	9.8	3	N12	E	12	70	750	OA	B/SH	Dry	31	91	32	26	1	No Irrigatio	Irrigation ***	9.8			
125	3.9	3	N12	E	12	70	750	OA	B/SH	Dry	34	78	16	43	1	No Irrigatio	Irrigation	3.9			
207	24.9	6	N19	SE	3	70	750	OA	B/SH	Overhead	49	60	43	37	1	Row/Width	R/ w1.22 N29	24.9			
208	11.3	6	376	NE	11	70	750	OA	B/SH	Overhead	78	91	54	55	2	Row/Width	R/ w1.22 N29		11.3		
209	12.9	1	376	SE	6	70	750	RE	B/SH	Overhead	53	64	63	54	2	*	R/ w1.22	12.9			
210	8.1	7	376	SW	8	70	750	RE	B/SH	Overhead	68	66	49	57	2	Row/Width	R/ w1.22 N27 Gypson Drains			8.1	
211	14.4	7	376	SW	4	70	750	RE	B/SH	Overhead	74	69	51	45	3 , 4	Row/Width	R/ w1.22 N27 Gypson Drains		9.7		4.7
212	22.3	P	N27	NE	6	45	400	OA	B/SH	Overhead	39	45	F	76	3 , 4	Soil Salinit	R/ w1.22 N27 Gypson Drains		5.0	5.5	11.8
213	7.7	P	N29	NE	3	50	450	OA	B/SH	Overhead	48	48	F	80	3 , 4	Soil Salinit	R/ w1.22 N29 Gypson Drains			3.2	4.5
214	21.9	7	N19	E	8	50	450	OA	B/SH	Overhead	47	35	23	28	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			21.9	
215	16.8	P	N29	S	8	50	450	OA	B/SH	Overhead	49	42	37	F	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			16.8	
216	14.0	7	376	NW	5	50	450	OA	B/SH	Overhead	41	69	35	22	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			14.0	
217	12.2	7	N19	NW	9	50	450	OA	B/SH	Overhead	68	62	45	35	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			12.2	
218	15.6	7	376	SW	7	50	450	OA	D/B	Overhead	58	62	47	37	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			15.6	
219	14.7	7	Mixed	SE	12	60	600	BO	D/B	Overhead	63	65	43	31	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			14.7	
220	19.3	P	N19	SE	6	40	400	BO	D/B	Overhead	55	48	34	F	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			19.3	
221	13.1	7	N19	E	8	45	450	GS	D/B	Overhead	58	47	34	35	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			13.1	
222	8.1	7	N19	E	9	45	450	BO	D/B	Overhead	58	53	21	37	3	Soil Salinit	R/ w1.22 N27 Gypson Drip			8.1	
223	7.8	P	N12	NE	7	40	400	SW	D/B	Overhead	35	47	61	37	4	Soil Salinit	R/ w1.22 N27 Gypson Drip				7.8
232	11.0	4	376	W	4	45	450	SW	D/B	Overhead	41	50	42	35	4	Soil Salinit	R/ w1.22 N27 Gypson Drip				11.0
240	19.4	P	376	SE	8	50	500	SW	T/S	Overhead	47	80	56	F	2	Soil Salinit	R/ w1.22 N27 Gypson Drains		19.4		
241	25.3	6	N19	SE	5	45	450	WE	T/S	Overhead	60	77	50	41	2 , 3	Soil Salinit	R/ w1.22 N27 Gypson		7.6	17.7	
242	8.6	P	N12	SE	5	40	450	WE	T/S	Overhead	57	68	44	50	3 , 4	Soil Salinit	R/ w1.22 N27 Gypson			4.7	3.9
	635.2																	140.2	237.4	212.6	45.0

Appendix 4

Land Categorisation Estate 1 Section 2

Field No	Area Ha	Ratoon	Variety	Aspt	Slope	Tam mm	Depth mm	S/F	Par Mat	Overhead Drip Dry	T.C.Ha 1999	T.C.Ha 2000	T C Ha 2001	T C Ha 2002	Categ ory	Problems	Solution	Cat 1	Cat 2	Cat 3	Cat 4
201	16.5	7	N19	S	3	65	520	BO	D/B	Overhead	38	48	18	37	2 , 4	Soil Row width Varity Drains Rn/Grass *	R/ w1.22Spray Gypson Replant		14.2		2.3
202	16.4	7	N19	SW	3	78	650	BO	D/B	Overhead	50	70	37	57	2 , 3 ,4	Row width Varity Irr leaks Drains Rn/Grass*	R/ w1.22Spray Gypson Replant		8.0	8.4	
203	23.5	7	N19	SW	5	63	550	OA	D/B	Overhead	48	68	46	46	2 , 3 ,4	Row width Varity Irr leaks Drains Rn/Grass	R/ w1.22Spray Gypson Replant		6.3	14.8	2.4
204	8.8	P	N19	N	5	44	500	GS	D/B	Overhead	35	55	35	F	4	Soil Row width Varity *	R/ w1.22 N27 Replant				8.8
205	5.5	P	N19	N	5	60	470	MY	D/B	Overhead	34	31	F	60	3	Soil Row width Varity *	R/ w1.22 N27 Replant			5.5	
205A	3.3	7	N19	N	1	78	650	My	D/B	Overhead	50	61	40	40	3	Row Width Varity Irr Leaks*	R/ w1.22 N27 Replant			3.3	
206	8.8	P	N19	S	0	78	650	AR	D/B	Overhead	41	40	F	75	2	Row width Varity Irr leaks Rn/Grass *	R/ w1.22 Spray Drains		8.8		
224	12.8	7	N19	NW	3	65	600	CA	B/SH	Overhead	41	50	45	63	2 , 3 , 4	Soil Row Width Varity Irr Leaks Rn/Grass**	R/ w1.22 Security Com		7.3	4.0	1.5
225	10.9	1	N19	SE	3	65	600	OA	B/SH	Overhead	40	34	45	60	3	Soil Row Width Varity Irr Leaks Rn/Grass**	R/ w1.22 Security Com			10.9	
226	11.6	1	N19	SE	4	50	600	OA	B/SH	Overhead	35	30	45	49	3 , 4	Soil Row Width Varity Irr Leaks Rn/Grass**	Abandon 50%Sec/Com			11.6	
227	17.0	1	N19	E	1	65	600	OA	B/SH	Overhead	25	24	45	36	3 , 4	Soil Row Width Varity Irr Leaks Rn/Grass**	Abandon 50%Sec/Com			14.7	2.3
228	8.2	P	N19	NE	5	63	600	SW	D/B	Overhead	53	59	51	50	2	Soil Row Width Varity Irr Leaks Rn/Grass**	R/ w1.22 Security Com		8.2		
229	20.3	7	N19	SE	5	55	600	VA	D/B	Overhead	52	51	41	33	2 , 3	Row width Varity Irr leaks R/Grass	R/ w1.22 Security Com		10.6	9.7	
230	16.1	7	N19	S	6	57	600	VA	D/B	Overhead	56	61	45	33	2 , 3	Row width Varity	N29 R/ w1.22		13.0		3.1
231	12.0	F	376	SW	7	50	600	OA	B/SH	Overhead	51	63	28	Seed	3 , 4	Soil Row Width Varity Irr Leaks Rn/Grass	Abandon 50%			12.0	
300	12.6	P	Mixed	SW	2	80	650	OA	B/SH	Drip	15	60	F	88	2	Rn/Grass *	Sray		12.6		
301	18.2	3	N19 376	NE	2	41	450	VA	B/SH	Drip	70	84	50	43	2 , 3	Rn/Grass *	Sray		15.1	3.1	
302	19.9	3	N19 376	E	3	72	600	AR	B/SH	Drip	73	83	55	45	2 , 3	Rn/Grass *	Sray		18.2	1.7	
303	14.1	1	376	E	1	50	450	OA	B/SH	Overhead	20	49	45	39	2 , 3	SoilDrainage Salinity Rn/Grass Compaction	Drains Spray Gypson Replant			14.1	
304	18.6	3	376	SE	5	60	600	OA	B/SH	Drip	78	89	61	41	2 , 4	Soil Drainage Rn/grass Compaction *	Drains Spray		16.5	2.1	
305	17.8	3	376	NE	6	60	600	OA	B/SH	Drip	93	75	56	38	2 , 4	Soil Drainage Rn/grass Compaction *	Drains Spray		12.5	5.3	
306	20.6	3	376	SE	4	45	400	OA	B/SH	Drip	74	75	57	40	2 , 4	Soil Drainage Rn/grass Compaction *	Drains Spray		15.7	4.9	
307	13.7	3	376	E	4	45	400	OA	B/SH	Drip	75	82	51	53	2 , 4	Soil Drainage Rn/grass Compaction *	Drains Spray		6.6	7.1	
308	10.3	P	376	E	2	60	600	OA	B/SH	Overhead	63	68	38	62	2	Soil Row width *	N27 1.22 R/ W		10.3		
309	16.8	3	376	NE	2	45	600	OA	B/SH	Drip	61	60	56	41	3 , 4	Soil Drainage Rn/grass Compaction *	Drains Spray Gypson		7.2	9.6	
310	21.5	3	376	NE	2	45	500	OA	B/SH	Drip	71	80	63	53	2 , 3	Soil Drainage Rn/grass Compaction *	Drains Spray Gypson Replant		17.7	3.8	
311A	4.4	3	376	E	0	60	600	RE	B/SH	Drip	80	90	Seed	60	1	*		4.4			
311B	9.3	5	376	E	0	60	600	RE	B/SH	Overhead	70	81	57	56	1	Row width Varity *	N29 1.22 R/ W	9.3			
311C	9.9	5	376	W	2	50	450	RE	B/SH	Overhead	65	51	40	12	3 , 4	Soil Row Width Rn/Grass Salinity *	Drains Spray Gypson Replant			3.8	6.1
312	16.8	1	376	W	1	45	400	OA	B/SH	Overhead	26	53	35	10	4	Soil Row Width Run/grass ***	Abandon				16.8
313	23.7	3	376	NW	2	60	600	OA	B/SH	Drip	80	99	59	64	1 , 3	Compaction *	Drains	20.5		3.2	
314A	10.7	1	376	NW	2	50	450	OA	B/SH	Drip	35	75	Seed	55	2 , 3	Soil *	Drains		7.4	3.3	
314B	5.1	3	376	NW	2	50	450	OA	B/SH	Drip	72	84	45	46	3	Soil *	Drains			5.1	
315A	11.4	1	376	NW	2	50	450	OA	B/SH	Drip	20	80	55	50	2 , 3	Soil *	Drains		8.5	2.9	
315B	5.0	3	376	NW	2	50	450	OA	B/SH	Drip	75	94	50	56	1	Soil *	Drains	5.0			
501	11.3	8	376	NE	10	70	600	OA	D/B	Overhead	40	71	50	46	2 , 3	Row width	R/ w 1.22		9.7	1.6	
502	7.9	P	376	E	10	60	600	BO	D/B	Overhead	36	56	45	F	2 , 3	Soil Row width Irr leaks Salinity *	N27 R/ w1.22 Drains			7.9	
503	9.3	8	376	E	20	40	500	BO	D/B	Overhead	38	75	46	53	2 , 3	Row width Irr leaks *	R/ w 1.22		3.9	5.4	
504	12.1	8	376	NW	10	60	600	GS	D/B	Overhead	58	79	51	47	2 , 3 ,4	Soil Row width Irr leaks Drainage *	R/ w1.22 Drains		6.9	1.0	4.2
505	14.9	8	376	N	12	60	600	BO	D/B	Overhead	50	77	48	44	2 , 3 , 4	Row width Irr leaks Drainage	R/ w1.22 Drains		4.5	7.2	3.2
506	10.6	8	376	NW	15	60	600	SW	D/B	Overhead	59	78	42	48	2 , 3	Row width Varity Drainage	N27 R/ w1.22		9.1	1.5	
507	5.9	8	376	NW	12	60	600	SW	D/B	Overhead	64	82	53	53	1 , 3	Row width Irr leaks	R/ w1.22	4.5		1.4	
508	15.0	8	376	SE	12	40	450	SW	T/S	Overhead	58	80	55	51	1 , 2 , 3	Row width Irr leaks	R/ w 1.22	4.7	4.0	6.3	
509	12.1	8	376	NE	12	40	450	WE	T/S	Overhead	30	53	45	49	2 , 3 ,4	Soil Highly Erodible	Abandon			12.1	
510	11.8	4	376	NE	5	40	450	WE	T/S	Overhead	33	59	30	35	2 , 4	Soil Highly Erodible	Abandon		2.4		9.4
511	3.4	7	376	E	7	50	450	BO	D/B	Overhead	30	28	20	15	2	Soil Row width Irr leaks Varity *	N27 R/ w 1.22		3.4		

Appendix 5

Land Categorisation Estate 2 Section 3

Feb-02

Block	Area	tons cane per ha. 1996	1998	1999	2000	2001	Rtn	tc/ha aver.	Var	poten-tial	Problem & proposal	TC/HA/ 100MM	Aspt	TAM mm	Depth MM	Soil Form	Par Matl	Type of irrig.	Category 1	2	3	4
501	16.7	83.7		48.6	53.62		7	62	n19	80	Drainage-subsurface & row-width	4.19	NW	68				OH		16.7		
502	15.3	76			86.19	78.8	6	81.1	n19	85	ok	6.26	NW	68				OH	15.3			
503	7.9	54.8		79.2	70.22		7	68.1	n19	75	ok	5.49	F	68				OH	7.9			
504	16	47.4		54.9	60.82		7	54.4	n19	75	Crop husbandry	4.97	NW	68				OH		16		
505	8.6	66.3		89.3	65.21		7	73.6	n19	80	Crop husbandry	5.09	NW	68				OH		8.6		
506	8.1	58.5		77.7	85.64		7	74	376	85	ok	6.69	SE	68				OH	8.1			
507	20.2	78.5		58.9	81.97		7	73.1	376	80	ok	6.4	NW	68				OH	20.2			
508	22.8	52		59.8	56.46		7	56.1	376	65	Surface water mgt.	4.41	SE	68				OH		22.8		
509	19.4	67.8		65.2	70.01		7	67.7	n19	75	Salinity-compaction & surface water mgt	5.47	SE	68				OH		19.4		
510	8	79.5		54.3	72.46		P	68.7	n19	85	ok	5.27	NW	68				OH	8			
511	7.6	55.4		59.6	57.83	60.8	6	57.6	n19	80	Ratoon-age(variety) & drainage	4.2	NW	68				OH	7			0.6
601	13.8	74.6				109.6	P	74.6	Mix	85	ok	P	SE	62				OH	13.8			
602	10.8	56.5		120.7	58.59		P	78.6	376	85	New replant March 2001	4.11	SE	62				OH	10.8			
603	9.3	77.2		53.4	81.43	69.2	7	70.7	n19	75	Mild cynodian infestation-variety mixture	5.71	SW	62				OH		9.3		
604	6.9	59.2		71.4	62.92	47.6	5	64.5	376	70	Severe cynodian infestation-control plan reqd.	4.41	SW	62				OH		6.9		
605	10.8	113.3		73.2	67.41	78.1	P/5	84.6	Mix	80	+-80%Replanted march 2001	4.73	SE	62				OH	10.8			
606	4.6	113.3		85.4	91.16	56.6	P/5	96.6	376	90	ok	6.39	SE	62				OH	4.6			
607	9.4	85.1		72.9	69.52	55	5	75.8	376	80	Shallow soil depth in places	4.88	N	62				OH		9.4		
608	6.9	76.3		66.9	45.25	35.7	5	62.8	376	75	Shallow soils-cynodian & cattle damage	3.17	N	62				OH			6.9	
609	9.8	48.9		72.1	66.18	59.4	5	62.4	376	70	Surface water drainage & cattle damage	4.53	NW	62				OH	9.8			
610	9.7	51		72.9	76.21	43.1	5	66.7	376	75	Stalk population reduction with age-otherwise okay	5.22	N	62				OH	9.7			
611	10.1	91.7		86.9	80.92	69	5	86.5	376	85	Stalk population reduction with age-otherwise okay	5.54	NE	62				OH		10.1		
612	16.3	29.5		70.9	71.33	73.4	5	57.2	376	80	Stalk population reduction with age-otherwise okay	4.89	N	62				OH		16.3		
701	11.2	39.3		64.4	61.99	49.7	P/6	55.2	n19	75	70% replanted march 2001-cynodian on bal.	4.25	SW	58		SW		OH	7.2	4		
702	15.8	69.4		41.3	54.69	35	6	55.1	n19	80	N19 response to age(ratoon)+ cynodian pockets	3.81	NE	51		SW		OH		13	2.8	
703	16.2	62.7		69.6	75.09	48.52	6	69.1	n19	80	N19 response to age(ratoon)+ cynodian pockets	5.31	NE	51		SW		OH		16.2		
704	14.2	67.8		58	67.95	58.8	6	64.6	n19	80	N19 response to age(ratoon)+ cynodian pockets	4.8	E	64		SW		OH		14.2		
705	10.4			68.1	67.59	48.6	6	67.8	n19	80	N19 response to age(ratoon)+ cynodian pockets	4.78	SE	53		BO		OH		10.4		
706	14.8	42.2		52.3	69.94	61.6	6	54.8	n19	80	N19 response to age(ratoon)+ cynodian pockets	4.95	SE	72		BO		OH		14.8		
801	12.1	66.3	49.34	60.4	59.7	32.3	6	58.9	376	75	Replant 01/02-surface water mgt & min. UGD required	4.14	S	75	>400	Umz-CL	KO	OH		12.1		
802	7	54.9	69.26	73.4	61.27		6	64.7	376	75	Replant 01/02-surface water mgt & min. UGD required	4.24	S	75	>400	Umz-CL	KO	OH		7		
803	8	64.4	83.97	83.2	94.96	67.5	6	81.6	376	85	ok	6.58	N	75	>400	Umz-CL	KO	OH	8			
804	4.4	57.2	77.08	50.5	81.73	70.5	6	66.6	376	85	ok	5.66	W	75	>400	Umz-CL	KO	OH	4.4			
805	2.1	63.1	70.12	seed	58.95	50.6	6	48	376	65	Shallow soils & ununiform stand (seedcane)	4.12	F	75	>400	Umz-CL	KO	OH			2.1	
806	19.3	77.8	56.45	57.7	77.02	69.3	6	67.2	376	80	Surface & sub-surface drainage & stargrass envelopes	5.38	S	75	>400	VAL	KO	OH		16.7	2.6	
807	12.9	74.2	58.4	58.3	90.99		6	70.5	376	80	Part dryland	6.36	S	75	>400	GL	KO	OH	11.3		1.6	
808	7.1	106.5	70.26	62.5	63.67		6	75.7	376	75	Part dryland +-3.0ha	4.45	SW	75	>400	VAL	KP	OH		5.3	1.8	
809	16.7	67.2	80.23	88.1	79.06	42.7	6	78.6	376	80	ok +-2.0ha of dryland	5.52	SE	75	>400	GL	KO	OH	14.6		2.1	
810	8.4	65.1	44.07	79	68.72	58.8	6	64.2	376	75	Surface & sub-surface drainage & stargrass envelopes	4.8	S	75	>400	GL	KO	OH		8.4		
901	12.7	108.3		58.7	65.37	54.6	6	77.5	376	80	Cynodian areas-drainage & compaction-T/O-2002	4.86	NE	60		SW		OH		12.7		
902	9.6	70.2		59.4	68.62	66.2	6	66.1	376	75	Cynodian areas-drainage & compaction-T/O-2002	5.1	F	55		SW-MY		OH		9.6		
903	19.9	54.9		57.7	61.18	49.7	6	57.9	376	75	Severe cynodian infestation-50% replant 2001	4.23	NE	26		MY		OH	10	9.9		
904	17.6	68.1		51.6	57.12	46.7	6	58.9	n19	75	Shallow soils-ratoon age-variety	3.95	SW	37		GS-MY		OH		17.6		
905	11.7	93.7		73.9	85.04	67.8	6	84.2	Mix	85	Severe cynodian infestation- replant 2001	5.88	NE	55		GS-MY		OH	11.7			
906	21.1	58		63.3	48.3	59.8	P/6	56.5	n19	75	+-80%-Replanted '2001' - improvement expected	3.34	SE	44		MY		OH	18	3.1		
907	18.8	78.1		51.3	76.3	43.8	P/6	68.6	n19	75	+-70%-Replanted '2001' - improvement expected	5.28	NE	34		GS		OH	15.4	3.4		
512	8.6			50.2	96.7	82	3	73.5	n19	100	ok		SE	68				Drip	8.6			

Appendix 6

Land Categorisation Estate 2 Section 4

Feb-02

ECTION 4	tons cane per ha.						Rtn	tc/ha		poten-	Problem & proposal	TC/HA/		TAM	Depth	Soil	Par	Type of	Category			
Block	Area	1997	1998	1999	2000	2001		aver.	Var	tial		100MM	Aspt	mm	MM	Form	Mat	irrig.	1	2	3	4
101	14.6	69.9	48.8	52.1	71	53.2	6	60.4	n19	70	Revet to wetlands	5.24	Flat	58	650	GS		OH	10		2	2.6
102	9.9	103.3	64.5	76.4	71.6		7	79	376	80	Crop husbandry	5.35	E	58	650	BO		OH		9.9		
103	7.9	72	60.8	82.5	71.8		7	71.8	376	80	Crop husbandry	5.35	W	58	650	MS		OH		7.9		
104	10	77.3	64.4	76.6	75.8		7	73.5	376	77	Salinity suspect	5.66	W	58	600	BO		OH		10		
105	12.2	49.1	52.2	46.8	58.2		7	51.6	376	60	Drainage problems	4.35	E	58	650	BO		OH	12.2			
106	8.2	102.7	69.2	61.2	59.3		7	73.1	376	80	Crop husbandry	4.43	SW	58	700	BO		OH		8.2		
107	17.2	53.2	49.5	54.5	75		7	58	376	60	Crop husbandry	5.6	SW	58	600	BO		OH		17.2		
108	18.3	95.8	55.8	73.5	73.5	94.8	6	74.7	mix	90	ok	5.43	Flat	58	650	AR		OH	18.3			
109	6.8	96.8	62.1	57.8	70	96.3	6	71.7	n19	95	ok	5.52	Flat	58	650	AR		OH	6.8			
110	8.6	91.4	63.4	49.2	55.6		P	64.9	mix	75	Replanted 2001 march-improvement expected-Beaufords	4.15	SW	58	550	SW		OH	5		2	1.6
111	14.8	61.3	45.3	46.9	58.5	30.5	7	53	376	55	Shallow soils Rocks&drg. Soil-pits - establish TAM--T/out	3.71	E	56	600	BO		OH			10	4.8
112	13.5	72.5	61.5	72.6	59.6	35	7	66.5	376	75	Includes part dryland	4.24	NE	56	660	SW		OH		8.5	5	
113	18.5	56.8	42.4	41.4	30.3		P	42.7	mix	70	IdentifyWetland.Salinity test.Soil type&H2O mgnt	2.14	E	56	650	GS		OH	17			1.5
114	23.7	88.2	64.1	60.6	59.9	55.4	6	68.2	376	85	Surface water mgt.	4.26	NE	56	600	GS		OH		20		3.7
115	18.7	64.6	55.7	47.2	49.5		7	54.2	376	55	Cynodian;drainage;shallow soils	3.53	SW	56	550	SW		OH			15	3.7
116	5.6	34.4	32.2	56.5	62.1		5	46.3	n19	65	Crop husbandry	4.64	W	58	500	BO		OH			5.6	
117	7.3	82.9	74.6	62.1	64.6		4	71	n19	85	Crop husbandry	4.82	W	58	500	BO		OH		7.3		
201	14.9			45.6	50.5	30.7	6	48.1	376	75	Surface water mgt & drainage&cynodian.Replant 2001	3.46	W	54				OH	14.9			
202	17.1			30.7	78.8	48.9	7	54.7	n19	80	Part area Same asabove.Replant 2001	5.39	FLAT	54				OH		11	6.1	
203	10.7		69.7	56	83.7	39.1	3	69.8	n19	80	Cynodian control prog.&Irrig mgt.&surface water mgt.	5.73	FLAT	54				OH	10.7			
204	4		97.2	66.2	69.2	34	3	77.5	n19	90	Cynodian control prog.&Irrig mgt.&surface water mgt.	4.74	FLAT	54				OH		4		
205	8.6	75.9	93.7	48.7	96.8	55.9	6	78.8	376	95	ok	5.91	E	54				OH	8.6			
206	9.5	76.9	79.9	51.9	78.1	80.9	6	71.7	376	80	ok	4.76	W	54				OH	9.5			
207	8.1	72.5	58.7	40.3	95.3	93.6	6	66.7	376	90	ok	5.82	NE	54				OH	8.1			
208	11.6	62.4	71.3	77.4	72.2	56.4	6	70.8	376	75	ok	4.4	TOP	54				OH	11.6			
209	13.7	68.2	45.4	49.7	45.9		P	52.3	mix	70	Installed structures & w/ways. Replanted 2000.	3.14	NE	54				OH	6		4	3.7
210	6.1		25.5	32.2	68.9		3	42.2	376	65	Dryland	5.14		54				Dry				6.1
301	9.4				99.3	75.3	1	99.3	376	100	ok	7.1	Flat	56	650	SW		Drip	9.4			
302	11.9				101.9	55.1	1	101.9	n19	100	Stargrass & poor quality drip installation	5.51	Flat	56	680	VA		Drip			11.9	
303	11				109.7	52.1	1	109.7	n19	100	Stargrass & poor quality drip installation	5.94	Flat	56	650	OA		Drip			11	
304A	5.5				81.9	93.5	1	81.9	n19	100	Stargrass & poor quality drip installation	4.43	Flat	56	600	VA		Drip			5.5	
305	9.6				100	73	P	100	n19	100	Seedcane	5.5	Flat	56	650	VA		Drip		9.6		
306	11.4				104.7	51.9	1	104.7	376	100	Stargrass & salinity&improve managment	5.67	Flat	56	750	VA		Drip			8	3.4
307	11.7				76.9	49.7	1	76.9	376	100	Stargrass & salinity suspect	5.5	Flat	56	650	VA		Drip	10			1.7
308	12.5				60.9	51.4	1	60.9	376	100	Stargrass & salinity suspect	4.36	Flat	56	750	VA		Drip	10.5			2
401	10.7	89.4	92.1	59.8	60.4	68.3	7	75.4	n19	80	Rtn age & variety detoriation.To replant soon	3.95	W	68	>400	KO	DO/BA	OH		10.7		
402	10.8	106.5	97.3	86.7	77.1	71.1	7	91.9	n19	90	Stalk population-varietal change response Rtn age	5.12	W	68	>400	KO	DO/BA	OH		10.8		
403	15.3	99.7	83.3	75.8	70.6	63.5	7	82.3	n19	85	Stalk population-varietal change response Rtn age	4.66	S	68	>400	KO	DO/BA	OH		15.3		
404	24.8	65.6	56.4	53.4	64	67.7	7	59.9	376	80	Poor performing drylandsShallow soilsSoil pits & inspect	4.25	SW	68	<400	KO		OH		21.3		3.5
405	7.7	74.3	69.6	73.6	67.8	54.7	7	71.3	n19	75	Stalk population-varietal change response Rtn age	4.44	W	68	>400	KO		OH		7.7		
406	7.1	80.9	74.8	70.1	57.4		P	70.8	mix	80	Replanted march 2001	3.75	Flat	68	>400	KO		OH	7.1			
601	7.6			58.7	58.9	53	7	58.8	376	75	Drainage&surface water mgt.Replant 2001	5.8		52				OH	6			1.6
602	4.8			79.1	59	65.5	7	69	376	75	Drainage&surface water mgt.Replant 2001	5.81		52				OH	4.8			
603	9.1			50.4	88.4	57.4	7	69.4	376	85	Improve mgt.	6.61		52				OH		9.1		
604	7.2			56.8	103.9	67.3	7	80.4	376	100	ok	6.6		52				OH	7.2			
605	8.4			71.7	102.4	54.4	7	87	376	100	ok	6.5		52				OH	8.4			
606	13.6			41.8	82.1	64.8	7	62	376	80	Crop husbandry	5.21		52				OH		13.6		
607	6.8			53.9	88.7	65.2	7	71.3	376	80	ok	5.85		52				OH	6.8			
608	10.2			43.2	75.5	46.3	P/7	59.4	376	80	Rocky knoll-shallow soils&stargrass	4.98		52				OH	5.5	4.7		
609	8.9			37.6	53.2	96	P/7	45.4	376	75	+-90%replanted-improvment expected	3.51		52				OH	6.9	2		
610	9			62.3	93.5	56.6	7	77.9	376	85	Crop husbandry - control watergrass	6.17		52				OH		9		
611	5			32.8	60	22.7	7	46.4	376	55	Very low TAM-shallow soils cynodian&star grass	3.89		52				OH				5
612	13.3			35.7	65	46.1	7	50.3	376	70	Proximity to dams-waterlogged areas-redefine & drain			52				OH		11		2.3
613	13.1			45.9	65	36.1	7	55.5	376	70	Proximity to dams-waterlogged areas-redefine & drain			52				OH		10		3.1
304	5.6				100		P	100	mix	100	Seedcane		Flat	56	600	VA		Drip	5.6			

Appendix 7

Budgets Expressed on a Land Category Basis

WORKLOADS	CAT 1	CAT 2	CAT 3	CAT 4	MCP
Area Under Cane	665.3	1084.2	542.1	172.4	2464
Area To Plant (Conv)	45.8	82.1	138.5	50.6	317
Area To Plant (Chem)	29.4	47.4			76.8
Total Area to Plant	75.2	129.5	138.5	50.6	393.8
Area To Fallow	14.8	25.6	16.6	8.0	65
AreaTo Ratoon	485	776.3	304.5	88.4	1654.2
Area To Irrigate	626.1	1058.4	542.1	172.4	2399
Area To Harvest	575	931.4	459.6	147	2113
Tons/Ha Harv	84.9	74.5	50.7	40	71
Tons To Mill	49450	69855	23604	5880	148789
RV % Cane	12.2%	12.2%	12.2%	12.2%	12.2%
Tons Rv	6043	8536	2884	719	18182
RV Price	1466.08	1466.08	1466.08	1466.08	1466.08

COST OF OPERATIONS

		COST OF OPERATIONS PER UNIT FOR EACH CATEGORY				
DRAINAGE	/ha plant	56.98	98.00	128.56	135.00	131.27
FIELD LAYOUT	/ha plant	500.67	524.12	640.88	750.89	733.69
CONV PREPARATION	/ha plant	1105.45	1105.45	1345.99	1350.78	1249.21
CHEM PREPARATION	/ha plant	320.57	320.57	320.57	320.57	320.57
HAND PLANT	/ha plant	1082.90	1082.90	1082.90	1082.90	1082.90
PLANT CULTIVATION	/ha plant	2080.00	2167.90	2400.62	2434.00	2230.03
CROP CULTIVATION	/ha ratoon	2765.00	2862.95	3018.77	3237.11	2882.91
CANE CUTTING	/ton cane	13.39	13.39	13.39	13.39	13.39
CONTRACTOR LOAD	/ton cane	0.00	0.00	0.00	0.00	0.00
DIRECT DELIVERY	/ton cane	0.00	0.00	0.00	0.00	0.00
GRABLOAD	/ton cane	5.84	5.84	5.84	5.84	5.84
INFIELD HAULAGE	/ton cane	8.11	8.11	8.11	8.11	8.11
MECH HARVESTING	/ton cane	0.00	0.00	0.00	0.00	0.00
ENVIROMENT	/ha u cane	58.93	58.93	58.93	58.93	58.93
IRRIGATION	/ha irrig	2940.71	2940.71	2940.71	2940.71	2940.71
ESTATE ADMINISTRATION.	/ton cane	33.46	33.46	33.46	33.46	33.46
MACHINE MAINTENANCE	/ton cane	2.67	2.67	2.67	2.67	2.67
ROADS AND BREAKS	/ha u cane	208.85	208.05	208.05	208.05	208.85
BUILDING MAINTENANCE	/ha u cane	63.77	63.77	63.77	63.77	63.77
CRANE LOADING	/ton cane	4.79	4.79	4.79	4.79	4.79
CANE HAULAGE	/ton cane	22.45	22.45	22.45	22.45	22.45

DRAINAGE		4285	12691	17806	6831		41614
FIELD LAYOUT		37650	67874	88762	37995		232579
CONV PREPARATION		50630	90757	186420	68349		396000
CHEM PREPARATION		9425	15195	0	0		24620
HAND PLANT		81434	140236	149982	54795		426129
PLANT CULTIVATION		95264	177985	332486	123160		728966
CROP CULTIVATION		1341025	2222508	919215	286161		4768911
CANE CUTTING		661477	940225	315738	79674		1992739
GRABLOAD		288788	407953	137847	34339		869046
INFIELD HAULAGE		401040	566524	191428	47687		1206813
ENVIROMENT		39206	63892	31946	10160		145193
IRRIGATION		1841179	3112447	1594159	506978		7054767
ESTATE ADMINISTRATION.		1654597	2337348	789790	196745		4977843
MACHINE MAINTENANCE		132032	186513	63023	15700		397976
ROADS AND BREAKS		138948	225568	112784	35868		514614
BUILDING MAINTENANCE		42426	69139	34570	10994		157137
SUB-TOTAL		6819404	10636855	4965955	1515435		23934947
CRANE LOADING		236866	334605	113063	28165		712340
CANE HAULAGE		1110153	1568245	529910	132006		3340645
SUB-TOTAL		1347018	1902850	642973	160171		4052985
TOTAL COST		**8166422**	**12539705**	**5608928**	**1675606**		**27987932**
Cost/Ton		165	180	238	285		188
TOTAL REVENUE		**9213524**	**13015384**	**4397897**	**1095562**	**0**	**27722366**
Tot Rev/Ton		186	186	186	186		186

PBIT		**1047102**	**475678**	**-1211031**	**-580045**	**0**	**-265566**
PBIT/TON		**21.17**	**6.81**	**-51.31**	**-98.65**	**#**	**-1.78**

Appendix 8

Heatonville Budget No 2 **40 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	FA.LAYOUT	CON PREP	CHEM PREP	H.PLANT	PL. CULT.	RAT.CULT.	CONTR. CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV	ENVIROMENT	IRRIGATION	EST ADMIN.	MACH MNT	BREAK MNT	BUILD MNT	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											32982	32071				210802				275855	30587		306442
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				270440	265730		119590	1688386	2545032	150020	181983	27262	6772014	228195		7000209
																							0
GENERAL	28515				4418										5258766	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8868	20027																28895			28895
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					1132707										33961		1207746			1207746
																							0
TOT.STORES	28515	2723	76989	20027	4418	547082	3659113	1132707						25602	5258766	296819	191950	115646	126431	11484788			11484788
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				324265	455500			107615	23435		216984	3444	1794254	258128		2052381
TRAILERS												64253								64253			64253
M.VEHS.																660157	56006			716163			716163
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				324265	519753			107615	683593	56006	216984	3444	2670044	258128		2928172
CANE HAUL (RAIL)																						1016190	1016190
CANE HAUL (ROAD)																						881992	881992
CRANE LOAD																							
TOT.TPT.																						1898181	1898181
RENTALS																64679				64679			64679
EL&WATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	1132707	0	0	594706	785484	0	145193	7054767	5001826	397976	514614	157137	22403228	486323	1898181	24787732	24787732
Tot Cost Per Ton	0.49	2.75	4.69	0.29	5.04	8.63	56.43	13.40	0.00	0.00	7.04	9.30	0.00	1.72	83.48	59.19	4.71	6.09	1.86	265.11	5.76	22.46	293.33
																							16180338

REVENUE :	0
CANE SALES	15122231
OTHER	1058107
-RENTALS	29040
-SEED CANE SALE	6685
-RV INCENTIVE	122866
-BDU REBATES	477500
-SUNDRY	422036
TOTAL	16180338

TOTAL REVENUE :	16180338	OK		16180338
ESTATE PROFIT :	-6222890			-8607394
PROFIT PER TON:	-73.64			-101.86
TOTAL TONS	84504			

Appendix 9

Hostenville Budget No 3 **45 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	F.LAYOUT	CON.PREP	CHEM.PREP	H.PLANT	PL.CULT.	RAT.CULT.	CONTR. CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV	ENVIROMENT	IRRIGATION	EST.ADMIN.	MACH.MNT.	BREAK.MNT.	BUILD.MNT.	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											37610	36479				210802				284891	35539		320430
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				275068	270139		119590	1688386	2545032	150020	181983	27262	6781050	233147		7014197
																							0
GENERAL	26515				4418										5258766	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8666	20027																28695			28695
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					1274295										33961		1349334			1349334
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	1274295						25602	5258766	296819	191950	115646	126431	11626376			11626376
																							0
TRACTORS	8365	107474	259367	1436	177643	23365	85369				364798	512438			107615	23435		216984	3444	1891724	290394		2182118
TRAILERS												72285								72285			72285
M.VEHS.																656210	56006			712216			712216
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8365	202847	259367	1436	177643	23365	85369				364798	584723			107615	679646	56006	216984	3444	2771599	290394		3061993
CANE HAUL (RAIL)																						1145633	1145633
CANE HAUL.(ROAD)																						992241	992241
CRANE LOAD																							
TOT.TPT.																						2137874	2137874
RENTALS																64679				64679			64679
EL&WATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	1274295	0	0	639866	854861	0	145193	7054767	4997879	397976	514614	157137	22655407	523541	2137874	25316822	25316822
Tot Cost Per Ton	0.44	2.45	4.17	0.26	4.48	7.67	50.16	13.40	0.00	0.00	6.73	8.99	0.00	1.53	74.21	52.57	4.19	5.41	1.65	238.31	5.51	22.49	266.31	18077334

REVENUE :	0
CANE SALES	17011548
OTHER	1065786
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	138224
-BDU REBATES	477500
-SUNDRY	414357
TOTAL	18077334

TOTAL REVENUE :	18077334	OK	18077334
ESTATE PROFIT :	-4578074		-7239488
PROFIT PER TON:	-48.16		-76.15
TOTAL TONS	95067		

Appendix 10

Heatonville Budget No 4 **50 Tons Per Hectare Harvested**

ACTIVITY CODE (XX	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP	U/DRAIN	F/LAYOUT	CON PREP	CHEM PREP	H PLANT	PL CULT	RAT CULT	CONTR CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV	ENVIROMENT	IRRIGATION	EST ADMIN	MACH MNT	BREAK MNT	BUILD MNT	SUB-TOTAL	CRANE LD	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											42237	40888				210802				293927	40490		334417
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				279695	274547		119590	1688386	2545032	150020	181983	27262	6790086	238098		7028184
																							0
GENERAL	26515				4418										5258766	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8668	20027																28695			28695
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					1415883										33961		1490923			1490923
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	1415883						25602	5258766	296819	191950	115646	126431	11767964			11767964
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				405331	569375			107615	23435		216984	3444	1989195	322660		2311855
TRAILERS												80317								80317			80317
M.VEHS.																652263	56006			708269			708269
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				405331	649692			107615	675699	56006	216984	3444	2873155	322660		3195814
CANE HAUL (RAIL)																						1275077	1275077
CANE HAUL (ROAD)																						1102490	1102490
CRANE LOAD																							
TOT.TPT.																						2377567	2377567
RENTALS																64679				64679			64679
ELEWATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	1415883	0	0	685026	924239	0	145193	7054767	4993932	397976	514614	157137	22907587	560758	2377567	25845911
Tot Cost Per Ton	0.39	2.20	3.75	0.23	4.03	6.90	45.15	13.40	0.00	0.00	6.49	8.75	0.00	1.37	66.79	47.28	3.77	4.87	1.49	216.87	5.31	22.51	244.68

CONTROL
25845911
19974330

REVENUE :	0
CANE SALES	18900865
OTHER	1073465
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	153582
-BDU REBATES	477500
-SUNDRY	406678
TOTAL	19974330

TOTAL REVENUE :	19974330	OK	19974330
ESTATE PROFIT :	-2933257		-5871582
PROFIT PER TON	-27.77		-55.59
TOTAL TONS	105630		

Appendix 11

Heatonville Budget No 5 **55 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	F/LAYOUT	CON PREP	CHEM PREP	H.PLANT	PL CULT.	RAT.CULT.	CONTR. CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	VT SELF	M/HARV.	ENVIROMENT	IRRIGATION	EST.ADMIN.	MACH MNT	BREAK MNT	BUILD MNT	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											46684	45296				210802				302982	45442		348404
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				284322	278955		119590	1688386	2545032	150020	181983	27262	6799121	243050		7042171
																							0
GENERAL	26515				4418										5258766	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8666	20027																28695			28695
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					1557472										33961		1632511			1632511
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3859113	1557472						25602	5258766	296819	191950	115646	126431	11909553			11909553
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				445865	626313			107615	23435		216984	3444	2086665	354926		2441591
TRAILERS												88348								88348			88348
M.VEHS.																648316	56006			704322			704322
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				445865	714661			107615	671752	56006	216984	3444	2974710	354926		3329636
CANE HAUL (RAIL)																						1404521	1404521
CANE HAUL (ROAD)																						1212739	1212739
CRANE LOAD																							
TOT.TPT.																						2617259	2617259
RENTALS																64679				64679			64679
ELEWATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND.M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	1557472	0	0	730187	993616	0	145193	7054767	4989985	397976	514614	157137	23159766	597976	2617259	26375001
Tot Cost Per Ton	0.36	2.00	3.41	0.21	3.67	6.27	41.04	13.40	0.00	0.00	6.28	8.55	0.00	1.25	60.72	42.95	3.43	4.43	1.35	199.32	5.15	22.53	226.99

REVENUE :	0
CANE SALES	20790181
OTHER	1081144
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	168940
-BDU REBATES	477500
-SUNDRY	398999
TOTAL	21871325

TOTAL REVENUE :	21871325	OK	21871325
ESTATE PROFIT :	-1288441		-4503676
PROFIT PER TON	-11.09		-38.76
TOTAL TONS	116193		

21871325

Appendix 12

Hostonville Budget No 6 **60 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	FA.LAYOUT	CON.PREP	CHEM.PREP	H.PLANT	PL.CULT.	RAT.CULT.	CONTR. CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF.	M/HARV.	ENVIROMENT	IRRIGATION	EST.ADMIN.	MACH.MNT.	BREAK MNT.	BUILD MNT.	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244066	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											51491	49704				210802				311998	50394		362392
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244066	158519	1024429				288950	283364		119590	1688386	2545032	150020	181983	27262	6808157	248002		7056159
																							0
GENERAL	26515				4418										5258786	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8668	20027																28695			28695
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					1699060										33981		1774099			1774099
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	1699060						25602	5258786	296819	191950	115646	126431	12051141			12051141
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				486398	683250			107615	23435		216984	3444	2184136	387192		2571328
TRAILERS												96380								96380			96380
M.VEHS.																644369	56006			700375			700375
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				486398	779630			107615	667805	56006	216984	3444	3076265	387192		3463457
CANE HAUL (RAIL)																						1533964	1533964
CANE HAUL.(ROAD)																						1322988	1322988
CRANE LOAD																							
TOT.TPT.																						2856952	2856952
RENTALS																64679				64679			64679
ELSWATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	1699060	0	0	775347	1062994	0	145193	7054787	4986038	397976	514614	157137	23411945	635193	2856952	26904091	26904091
Tot Cost Per Ton	0.33	1.83	3.12	0.19	3.36	5.75	37.62	13.40	0.00	0.00	6.12	8.39	0.00	1.15	55.66	39.34	3.14	4.06	1.24	184.70	5.01	22.54	212.25	23768321

REVENUE :	0
CANE SALES	22679498
OTHER	1088823
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	184298
-BDU REBATES	477500
-SUNDRY	391319
TOTAL	23768321

TOTAL REVENUE :	23768321	OK	23768321
ESTATE PROFIT :	356376		-3135769
PROFIT PER TON	2.81		-24.74
TOTAL TONS	126756		

Appendix 13

Hostenville Budget No 7 **65 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	F/LAYOUT	CON PREP	CHEM PREP	H PLANT	PL CULT.	RAT CULT.	CONTR. CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV	ENVIROMENT	IRRIGATION	EST ADMIN.	MACH MNT	BREAK MNT	BUILD MNT	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											56119	54113				210802				321034	55345		376379
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				293577	287772		119590	1688386	2545032	150020	181983	27262	6817192	252953		7070146
																							0
GENERAL	26515				4418										5258766	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8666	20027																28695			28695
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					1840648										33961		1915688			1915688
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	1840648						25602	5258766	296819	191950	115646	126431	12192729			12192729
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				526931	740188			107615	23435		216984	3444	2281607	419458		2701064
TRAILERS												104412								104412			104412
M.VEHS.																640422	56006			696428			696428
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				526931	844599			107615	663858	56006	216984	3444	3177821	419458		3597278
CANE HAUL (RAIL)																						1663408	1663408
CANE HAUL.(ROAD)																						1433237	1433237
CRANE LOAD																							
TOT.TPT.																						3096645	3096645
RENTALS																64679				64679			64679
EL&WATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	1840648	0	0	820508	1132371	0	145193	7054767	4982091	397976	514614	157137	23664125	672411	3096645	27433180	27433180
Tot Cost Per Ton	0.30	1.69	2.88	0.18	3.10	5.31	34.73	13.40	0.00	0.00	5.98	8.25	0.00	1.06	51.38	36.28	2.90	3.75	1.14	172.33	4.90	22.55	199.78
																							25665317

REVENUE :	0
CANE SALES	24568815
OTHER	1096502
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	199657
-BDU REBATES	477500
-SUNDRY	383640
TOTAL	25665317

TOTAL REVENUE :	25665317	OK	25665317
ESTATE PROFIT :	2001193		-1767863
PROFIT PER TON:	14.57		-12.87
TOTAL TONS	137319		

Appendix 14

Hostenville Budget No 8 **78 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	F/LAYOUT	CON PREP	CHEM PREP	H.PLANT	PL. CULT.	RAT CULT.	CONTR. CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV.	ENVIROMENT	IRRIGATION	EST ADMIN	MACH MNT.	BREAK MNT.	BUILD M'NT.	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688388	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											60746	58521				210802				330069	60297		390366
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				298204	292180		119590	1688388	2545032	150020	181983	27262	6826228	257905		7084133
																							0
GENERAL	26515				4418										5256786	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8868	20027																28895			28895
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					1982237										33961		2057276			2057276
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	1982237						25602	5256786	296819	191950	115646	126431	12334318			12334318
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				567464	797125			107615	23435		216984	3444	2379077	451724		2830801
TRAILERS												112443								112443			112443
M.VEHS.																636475	56006			692481			692481
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				567464	909568			107615	659911	56006	216984	3444	3279378	451724		3731100
CANE HAUL (RAIL)																						1792852	1792852
CANE HAUL (ROAD)																						1543486	1543486
CRANE LOAD																							
TOT.TPT.																						3336337	3336337
RENTALS																64679				64679			64679
EL&WATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	1982237	0	0	865668	1201749	0	145193	7054787	4978144	397976	514614	157137	23916304	709629	3336337	27962270	27962270
Tot Cost Per Ton	0.28	1.57	2.68	0.17	2.88	4.93	32.25	13.40	0.00	0.00	5.85	8.13	0.00	0.98	47.71	33.66	2.69	3.48	1.06	161.73	4.80	22.56	189.09	27562313

REVENUE :	0
CANE SALES	26458132
OTHER	1104181
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	215015
-BDU REBATES	477500
-SUNDRY	375961
TOTAL	27562313

TOTAL REVENUE :	27562313	OK	27562313
ESTATE PROFIT :	3646009		-399957
PROFIT PER TON:	24.65		-2.70
TOTAL TONS	147882		

Appendix 15

Hestonville Budget No 9 **72 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	FA.LAYOUT	CON PREP	CHEM PREP	H.PLANT	PL CULT	RAT CULT	CONTR CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV	ENVIROMENT	IRRIGATION	EST.ADMIN	MACH MNT	BREAK MNT	BUILD MNT	SUB-TOTAL	CRANE LD	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											62597	60285				210802				333683	62278		395961
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				300055	293944		119590	1688386	2545032	150020	181983	27262	6829842	259886		7089728
																							0
GENERAL	26515				4418										5258786	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8868	20027																28895			28895
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					2038872										33961		2113911			2113911
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	2038872						25602	5258786	296819	191950	115646	126431	12390953			12390953
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				583677	819900			107615	23435		216984	3444	2418066	464630		2882696
TRAILERS												115656								115656			115656
M.VEHS.																634896	56006			690902			690902
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				583677	935556			107615	658332	56006	216984	3444	3319998	464630		3784628
CANE HAUL (RAIL)																						1844629	1844629
CANE HAUL.(ROAD)																						1587585	1587585
CRANE LOAD																							
TOT.TPT.																						3432214	3432214
RENTALS																64679				64679			64679
ELB/WATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND.M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4769911	2038872	0	0	883732	1229500	0	145193	7054767	4976565	397976	514614	157137	24017176	724516	3432214	28173906	28173906
Tot Cost Per Ton	0.27	1.53	2.60	0.16	2.80	4.79	31.35	13.40	0.00	0.00	5.81	8.08	0.00	0.95	46.38	32.72	2.62	3.38	1.03	157.90	4.76	22.56	185.22	28321111

REVENUE :	0
CANE SALES	27213858
OTHER	1107253
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	221158
-BDU REBATES	477500
-SUNDRY	372890
TOTAL	28321111

TOTAL REVENUE :	28321111	OK	28321111
ESTATE PROFIT :	4303936		147206
PROFIT PER TON:	28.30		0.97
TOTAL TONS	152107.2		

Appendix 16

Heatonville Budget No 10 **75 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	F/LAYOUT	CON.PREP	CHEM PREP	H.PLANT	PL. CULT.	RAT.CULT.	CONTR. CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV.	ENVIROMENT	IRRIGATION	EST.ADMIN.	MACH.MNT.	BREAK MNT.	BUILD MNT.	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073986	197608		5271596
O/TIME											65373	62930				210802				339105	65249		404353
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				302831	296589		119590	1688386	2545032	150020	181983	27262	6835264	262857		7098120
																							0
GENERAL	26515				4418										5258786	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8668	20027																28695			28695
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					2123825										33961		2198864			2198864
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	2123825						25602	5258786	296819	191950	115646	126431	12475906			12475906
																							0
TRACTORS	6355	107474	259367	1436	177643	23365	85369				607997	854063			107615	23435		216984	3444	2476548	483990		2960538
TRAILERS												120475								120475			120475
M.VEHS.																632528	56006			688534			688534
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	6355	202847	259367	1436	177643	23365	85369				607997	974538			107615	655964	56006	216984	3444	3380931	483990		3864921
CANE HAUL (RAIL)																						1922295	1922295
CANE HAUL (ROAD)																						1653734	1653734
CRANE LOAD																							
TOT.TPT.																						3576030	3576030
RENTALS																64679				64679			64679
ELSWATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	2123825	0	0	910829	1271127	0	145193	7054787	4974197	397976	514614	157137	24166483	746848	3576030	28491359

CONTROL
28491359
29459309

Tot Cost Per Ton	0.26	1.47	2.50	0.16	2.69	4.60	30.10	13.40	0.00	0.00	5.75	8.02	0.00	0.92	44.53	31.39	2.51	3.25	0.99	152.54	4.71	22.57	179.82

REVENUE :	0
CANE SALES	28347448
OTHER	1111860
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	230373
-BDU REBATES	477500
-SUNDRY	368282
TOTAL	29459309

TOTAL REVENUE :	29459309	OK	29459309
ESTATE PROFIT :	5290826		967949
PROFIT PER TON:	33.39		6.11
TOTAL TONS	158445		

Appendix 17

Hostenville Budget No 11 **80 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	F/LAYOUT	CON PREP	CHEM PREP	H.PLANT	PL. CULT	RAT CULT	CONTR CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV	ENVIROMENT	IRRIGATION	EST ADMIN	MACH MNT	BREAK MNT	BUILD MNT	SUB-TOTAL	CRANE LD	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											70001	67338				210802				348140	70200		418341
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				307459	300997		119590	1688386	2545032	150020	181983	27262	6844299	267808		7112108
																				0			0
GENERAL	26515				4418										5258766	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			8666	20027																28695			28695
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					2265413										33961		2340453			2340453
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	2265413						25602	5258766	296819	191950	115646	126431	12617494			12617494
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				648530	911000			107615	23435		216984	3444	2574019	516256		3090274
TRAILERS												128507								128507			128507
M.VEHS.																628581	56006			684587			684587
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				648530	1039507			107615	652017	56006	216984	3444	3482487	516256		3998742
CANE HAUL (RAIL)																						2051739	2051739
CANE HAUL.(ROAD)																						1763983	1763983
CRANE LOAD																							
TOT.TPT.																						3815722	3815722
RENTALS																64679				64679			64679
ELEWATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND.M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
																							CONTROL
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	2265413	0	0	955989	1340504	0	145193	7054767	4970250	397976	514614	157137	24420663	784084	3815722	29020449	29020449
Tot Cost Per Ton	0.25	1.38	2.34	0.15	2.52	4.31	28.22	13.40	0.00	0.00	5.66	7.93	0.00	0.86	41.74	29.41	2.35	3.04	0.93	144.49	4.64	22.58	171.71	31356305

REVENUE :	0
CANE SALES	30236765
OTHER	1119540
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	245731
-BDU REBATES	477500
-SUNDRY	360603
TOTAL	31356305

TOTAL REVENUE :	31356305	OK	31356305
ESTATE PROFIT :	6935842		2335856
PROFIT PER TON:	41.04		13.82
TOTAL TONS	169008		

Appendix 18

Hestonville Budget No 12 **85 Tons Per Hectare Harvested**

ACTIVITY CODE (XX)	04	01	02	03	05	10	20	33	33	34	33	45	36	65	99	50	60	61	62		91	93	
ACTIVITY DESCRIP.	U/DRAIN	F/LAYOUT	CON PREP	CHEM PREP	H PLANT	PL CULT.	RAT CULT	CONTR CUT	CNTR CT & LD	DIRECT DEL	GRABLOAD	I/T SELF	M/HARV.	ENVIROMENT	IRRIGATION	EST ADMIN.	MACH MNT	BREAK MNT.	BUILD MNT.	SUB-TOTAL	CRANE LD.	CANE HAUL	TOTAL
SALARIES																739765				739765			739765
WAGES	6744	27009	59644	3157	244068	158519	1024429				237458	233659		119590	1688386	912059	150020	181983	27262	5073988	197608		5271596
O/TIME											74628	71746				210802				357176	75152		432328
BONUS 10%																211090				211090			211090
-HARV																							
-INCENT																							
N/S ALLOW																							
PENSION																193793				193793			193793
LEVIES																							
RATIONS																							
OTHER																233042				233042			233042
HOU.COMP																44481				44481			44481
TOT.PERS.	6744	27009	59644	3157	244068	158519	1024429				312086	305406		119590	1688386	2545032	150020	181983	27262	6853335	272760		7126095
																							0
GENERAL	26515				4418										5258766	296819	191950		126431	5904899			5904899
HERBICIDES						201871	1311784							25602				81685		1620942			1620942
NEMATICIDE																				0			0
ROUNDUP			6966	20027																28895			28895
FERTILIZER			29766			345211	2070122													2445099			2445099
RIPENERS							277207													277207			277207
CONTRACTING		2723	38355					2407002										33981		2482041			2482041
																							0
TOT.STORES	26515	2723	76989	20027	4418	547082	3659113	2407002						25602	5258766	296819	191950	115648	126431	12759083			12759083
																							0
TRACTORS	8355	107474	259367	1436	177643	23365	85369				689063	967938			107615	23435		216984	3444	2871489	548522		3220011
TRAILERS												136539								136539			136539
M.VEHS.																624634	56006			680640			680640
HIRE-IN CHARGES		95374																		95374			95374
																							0
TOT.VEHS	8355	202847	259367	1436	177643	23365	85369				689063	1104476			107615	648070	56006	216984	3444	3584042	548522		4132563
CANE HAUL (RAIL)																						2181183	2181183
CANE HAUL (ROAD)																						1874232	1874232
CRANE LOAD																							
TOT.TPT.																						4055415	4055415
RENTALS																64679				64679			64679
EL&WATER																116738				116738			116738
GENERAL																1294965				1294965			1294965
IND M.G.B.																							
TOT.OTHER																1476382				1476382			1476382
TOT.COST	41614	232579	396000	24620	426129	728966	4768911	2407002	0	0	1001149	1409882	0	145193	7054767	4966303	397976	514614	157137	24672842	821282	4055415	29549539
Tot Cost Per Ton	0.23	1.30	2.21	0.14	2.37	4.06	26.56	13.40	0.00	0.00	5.58	7.85	0.00	0.81	39.29	27.66	2.22	2.87	0.88	137.40	4.57	22.58	164.56

CONTROL
29549539
33253301

REVENUE :	0
CANE SALES	32126082
OTHER	1127219
-RENTALS	29040
-SEED CANE SALE	6665
-RV INCENTIVE	261089
-BDU REBATES	477500
-SUNDRY	352924
TOTAL	33253301

TOTAL REVENUE :	33253301	OK	33253301
ESTATE PROFIT :	8580459		3703762
PROFIT PER TON:	47.78		20.63
TOTAL TONS	179571		

Appendix 19
Effect of Marginal Milling Revenue