Dairy Runoff Management and Profitability

Case Studies in the Canterbury region of New Zealand

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This study investigated the issues pertaining to runoff ownership in Canterbury, focusing particularly on reasons for purchase, how the runoff was used, and profitability.

Six case study farmers were selected and interviewed, following identification by industry key informants. Initial selection criteria were runoff ownership, and availability of comprehensive and reliable information. Final criteria included achieving diversity of situation in respect to land type and farming system. The runoffs were evaluated according to the net benefits they contributed to the overall dairying operation.

Achieving greater business control was the major driver for runoff purchase. A secondary driver related to increased profitability opportunities, including both operating returns and capital gains. Farmers also enjoyed the diversity of operations and decision making challenges that runoff ownership provided.

All case study farmers used their runoff for wintering purposes and supplying feed to the milking platform for lactating cows. Four farmers used the runoff for rearing their heifers, with three farmers pursuing dairy beef, carrying-over empty cows, and cash cropping activities. Three farmers also sold surplus feed on the open market.

The relative amount of runoff area to milking platform area ranged from 0.4 to 0.98ha (per 1ha of milking platform). The value of runoff capital invested ranged from $1,540 to $8,645 per lactating cow (on peak numbers). These ratios were dependent on both the management activities undertaken on the runoff and the runoff's resources.

Annual operating returns (EBIT) ranged between 3.4% and 6.0% for the 2004/05 year. These cash rates of return are comparable to returns generated through other capital appreciating assets. Capital gains ranged from 15.5% to 23.9% compounded per annum, from the year of purchase through to 2005, net of development expenditure. Currently these operating returns are less than the interest costs incurred, assuming the current market value is totally funded with debt capital. Runoff cashflow levels were found to become self-funding after a small period of time. Due to capital gains, a 4% cash return on current market values is considerably greater when expressed across the historical purchase price (debt employed). The financial success of future runoff investments will depend strongly on market price movements for runoff-grown feed and the levels of capital gains that are achieved.

Keywords: dairy runoff, milking platform, farm management, risk management, control, profitability, operating returns, capital gains, case study, qualitative research.

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Glossary

- Capital gains returns – the average annual compounding increases in the current market value of the runoff investment since the year of purchase, less development expenditure.

- Economic depreciation – the loss in 'market value' (in dollar terms) of plant and machinery for a year. It recognises the 'real market' cost of maintaining such assets.

- Economic returns – the total investment return achieved through runoff ownership; includes operating and capital gains returns.

- EBIT – 'Earnings Before Interest, Tax, but including Depreciation'. This value recognises the difference between operating revenues and costs, while also deducting economic depreciation.

- EBITD – 'Earnings Before Interest, Tax and Depreciation'. This value expresses the difference between operating revenues and costs only.

- Milking platform – a parcel of land used exclusively for feeding lactating cows.

- Operating returns – equates to EBITD divided by the current market value of the runoff investment

- Runoff – a parcel of land owned by a dairy farmer for the purposes of supplying feed to support the milking platform

CHAPTER 1

INTRODUCTION

1.1 Overview

The majority of dairy farmers in Canterbury use a "milking platform" strategy. A milking platform can be defined as a parcel of land used exclusively for feeding lactating cows. Farmers that adopt this strategy are therefore required to source feed supplies from outside the milking platform to graze their young stock and supply winter cow grazing. Purchasing a dairy runoff is one option available to farmers in providing the necessary feed supplies. Within this dissertation, a runoff has been defined as being a parcel of land owned by a dairy farmer for the purposes of supporting the milking platform and fulfilling the feed deficits that arise from the milking platform strategy outlined above. Alternatives to runoff ownership include leasing land, grazing out drystock, or purchasing feed supplies through contracts on the open market.

There has been considerable debate within the Canterbury dairying industry as to the merits of owning a runoff. There are three generally accepted benefits that stem from runoff ownership. A runoff provides a means for annual cashflow returns, capital gains opportunities, and greater risk management options through farmer control and diversified income streams. However, some industry commentators argue that in some situations the costs of runoff ownership exceed these potential benefits (Davis, 2005, ; McVerry, 2003, ; O'Connor, 2003b, ; SIDDC, 2004, ; Westbrooke, 1996). This suggests that runoff ownership may be detrimental to the financial performance levels realised on some Canterbury dairying operations.

This dissertation seeks insights and understandings into the benefits and costs that dairy farmers have achieved through runoff ownership. Research has been undertaken within the qualitative genre to capture the diversity of situation of each runoff holder.

1.2 Research problem statement and relevance of research

Limited in-depth investigations have previously been channelled into exploring the profitability of owned runoffs in the context of the whole-farm system. In the past a small focus has been placed on using hypothetical models to gain insights into runoff profitability, as was used by Davis (2005). This general analysis however, has failed to address the diverse and unique range of resources and management strategies that exist between different runoff owners. These knowledge gaps are highlighted within the brief review of literature outlined in chapter 2.

It is clear that the dairy industry requires further investigations into the profitability levels that runoff ownership offers both current and prospective owners. Preliminary discussions with a number of Canterbury dairy farmers and consultants have raised issues questioning the value that runoffs contribute to the total farming operation. These differing opinions essentially provide the source of the problem, and justify the need for further clarification into these areas. Gaining greater understandings in respect to these issues will provide a greater alignment of thought within the Canterbury dairying industry. Failing to provide this information will create an environment where dairy farmers are encouraged to purchase runoff blocks largely on intuition and not in response to the real underlying profitability associated with the purchase.

This research will investigate the management practices undertaken on runoffs in greater detail, and calculate the profitability levels inherent in runoff ownership in Canterbury. The results obtained from this study will contribute to the knowledge coupled to this topic and lead to an increased understanding within the New Zealand dairy industry. Purchasing a runoff is an option available to all dairy farmers who are motivated towards increasing the overall wealth and profitability of their dairying operation. It is hoped that results from this research will enhance a Canterbury dairy farmer's ability to consider the cost-savings of owning a runoff, and in doing so provide a decision support tool in justifying the purchase from an economic standpoint. More informed decision making will have great benefits to the industry.

1.3 Research aim

The research will explore the primary issue of:

Quantifying the economic returns being realised by Canterbury dairy farmers that own runoff blocks and identifying the management and investment strategies that are linked with the financial performance levels being achieved.

The aim of this project is therefore to identify and investigate the key issues that relate to how runoffs are used within Canterbury, and to identify common and novel management strategies that contribute to the increased overall profitability of the runoff when analysed as a 'stand-a-lone' investment.

1.4 Key questions

Preliminary questions have been derived to provide structure and a starting point for the investigation. The key questions of this research are:

- What are the reasons for farmers purchasing runoffs in Canterbury?
- What are the current management strategies used on Canterbury runoffs? How do these integrate with the milking platform and other external parties?
- What are the cost-savings generated from the purchased runoff compared to sourcing feed from alternative means?
- Do these cost-savings compare favourably with the opportunity costs of capital and labour? Was the purchase justified?
- What common runoff policies have a direct and intrinsic link to profitability?

1.5 Research approach

A qualitative, case study research approach was chosen for this particular study. Six Canterbury dairy farmers were interviewed during November and December of 2005, providing the raw data for all subsequent analysis. Data was sought on the physical and financial performance levels being achieved from the owned runoff. Information pertaining to the individual dairy farmer's personal and business objectives, including the reasoning behind the runoff's purchase, was also collected. Chapter 3 contains more detailed information regarding the methodology used.

1.6 Dissertation outline

This dissertation has been arranged into six chapters as outlined below.

Chapter 1 **Introduction**

Chapter 2 **Literature Review** – provides a brief review of literature relating to potential runoff uses and resulting profitability levels. This section situates the research study in context with all existing research and theory.

Chapter 3 **Methodology** – describes the research methods used within this study including sampling, data collection and data analysis methods. This section also justifies the reasons why this approach was adopted.

Chapter 4 **Case Study Profiles** – provides detailed information on farmer participants, including their objectives, runoff resources, management strategies implemented, and runoff profitability.

Chapter 6 **Discussion and Conclusions** – discusses the implications and relevance of the results. Briefly summarises the key findings and highlights potential areas for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will review literature addressing the reasoning behind why dairy farmers purchase runoffs, and the costs and benefits associated with runoff ownership. Within this review, a range of articles will be analysed that can be classified as 'popular' literature, such as dairy conference proceedings and other farmer-level industry publications; text which is often opinionated and subjective in nature. These references are still deemed to have merit in providing direction for this particular project. They highlight current industry views and practices, and raise the issues that are important to dairy farmers. Material covered within this review will ultimately lead to the conceptualisation and design of this research.

2.2 Reasoning driving the purchase and use of dairy runoffs

Hockings (2002, p.100) stated that increased intensification of land use on dairy milking platforms had been the biggest factor driving the need for dairy farmers to have runoffs. The aim of this strategy is to "have every kilogram of drymatter produced on the farm consumed by a milking cow", with feed supplies for heifers and wintering cows being sourced elsewhere. Feed produced from a runoff is one alternative available to dairy farmers in providing these supplies.

The feed supplies produced on a runoff can be utilised by a dairy farmer for a number of purposes. O'Connor (2003b, p.139) outlined three opportunities that a runoff offers existing or prospective purchasers. These are "support for the milking platform through strategic grazing or supplementary feed, business growth through rearing surplus

replacement stock or diversifying into drystock operations (i.e. bull beef), and increased quality control over management through growing both stock and supplements."

Davis (2005, p.220) reasoned that "runoffs are becoming more common in Canterbury as dairy farmers aim to control their winter grazing, supply of supplements and young stock grazing." In this way, the key drivers behind runoff purchases have been strongly interrelated with risk management, as dairy farmers seek to achieve total control across the overall dairying enterprise. This reasoning was further reinforced by the findings from a SIDDC survey of South Island dairy consultants (SIDDC, 2004). A significant part of this survey was directed toward gaining greater insights into this 'risk management' reason. It found that a number of dairy farmers have had previous substandard experiences with outside, independent graziers in respect to both unsatisfactory feeding levels and over-inflated costs. A runoff provided a mechanism to mitigate these production orientated risks, through offering "self containment" in feed supplies.

Additionally, capital gain possibilities may form part of the reasoning for purchase of a runoff (SIDDC, 2004). Purchasing a runoff expands the land base of the overall farming enterprise. When land prices increase, dairy farmer equity levels also increase. Over recent years these appreciations have been very substantial. Wilson (2004, p.4) believed that "purchasers with increasing equity, chasing a fixed supply of land", have led to this phenomenon, and that emphasis has shifted largely from "farming livestock to farming land."

Rationales that are not explicitly linked to financial factors may also motivate a dairy farmer to purchase a runoff. Westbrooke (1996, p.55) claimed that "runoffs are purchased for many reasons, some of which are non-financial." A runoff provides a new challenge to the ownership and management team, which may in turn present a strong driver for its purchase. O'Connor (2003a, p.2) also raised the point that many dairy farmers see a runoff as being a "hobby", and that it is acceptable if a farmer makes "an informed decision to purchase a runoff irrespective of the cost". In this way all decisions must closely correlate with the goals and objectives of the dairy farmers concerned.

2.3 Costs and benefits of runoff ownership

Feed supplies sourced on the open market provide dairy farmers with an alternative to runoff ownership. The "general expectation commonly held between farmers is that a runoff will offer cost competitive benefits which the marketplace cannot provide"(O'Connor, 2003b, p.139).

Dairy farmers may also make changes on the milking platform that result in the milking platform being self contained, totally negating any dependence on sources of feed from outside the milking platform (i.e. conservative stocking rate or shorter lactation). This however, conflicts with the trend toward 'intensification' on the milking platform in New Zealand (especially Canterbury), as outlined by Hockings (2002).

Sourcing grazing and supplemental feeds on the open market is a widely recognised alternative to runoff ownership. The benefits that accrue to dairy farmers through utilising this option are commonly used to contest runoff ownership. Westbrooke (1996, p.54) stated that the advantages from runoff ownership must be balanced against the "debt servicing and risk associated with the purchase." Exploiting the grazing services available through independent parties provides the necessary feed supplies without any requirement for investment capital. Further advantages also stem from the reduction in labour and management inputs by the dairy farmer. McVerry (2003, p.15) claimed that many dairy farmers find that the "apparent savings made in grazing [through runoff ownership] are offset by the cost of spending time away from their core business [the milking platform]." This danger was also addressed by Westbrooke (1996, p.55), who contended that the runoff "must not detract from the home farm, but should in fact complement it."

Furthermore, in an editorial, Barrow (2002, p.121) raised a viewpoint that "dairy farmers have expertise in dairying, while drystock [and cropping] farmers have greater expertise than dairy farmers in the operations from which they make a living." Adopting this argument adds another perspective to the costs associated with runoff ownership. It suggests that dairy farmers may be better off concerting their efforts entirely on

producing milk, and relying on others in satisfying their feeding demands. It must be noted however, that for some farmers, attaining control is an important motivator driving a runoff's (Davis, 2005, ; O'Connor, 2003b, ; SIDDC, 2004); and relying on 'outsiders' does not in any way fulfil these objectives.

The continuity of feed supplies available through runoff ownership is also achievable through leasehold land tenures. The primary differences are that the lessee has no stake in capital gains, has no land capital invested, and has less control over the farming operations (due to lease stipulations and length of tenure). O'Connor (2003a) is an example of a dairy farmer who chose not to purchase a runoff, deciding instead to lease. His reasoning was that the he could accrue the feed supply benefits from the market (through paying a land rental), without enduring the investment related costs associated with freehold (owned) tenure.

Westbrooke (1996, p.55) stated that "one way of looking at the cost of the runoff was to look at the cost of the feed it produces in comparison with other feed sources." This method of evaluation exposes the profits (or losses) that are generated from the management strategies adopted on the runoff, as determined by the market. The costs of runoff ownership are not greatly understood by dairy farmers. Davis (2005, p.1) stated that "there is a cost (capital) to owning runoffs that many farmers do not consider when they look at purchasing that ideal runoff." This in turn leads to the profit levels actually achieved after the purchase being considerably less than what was initially forecast. This dilemma has resulted in "many runoffs being run marginally or even at a loss...as they can't always provide the benefits that the market can provide" (O'Connor, 2003b, p.139-140).

O'Connor (2003b, p.140) stated that in order to assess the profitability of runoff ownership, the business should be 'ring fenced' and analysed as a 'stand-a-lone' venture. Failing to do this will result in the "runoff being lost in the farm accounts, and you [the dairy farmer] never knowing its true value." In computing these profitability levels, it is necessary to calculate and compare the real costs of the runoff with the benefits that accrue from its purchase. O'Connor said that these costs and benefits should be

evaluated from a commercial standpoint, suggesting that a dairy farmer consider the following:-

- "Value inputs of time, machinery and capital development on runoff
- Budget reasonable running costs, fertiliser, wages, etc.
- Include the opportunity cost of the runoff (i.e. capital and labour)
- Use realistic productivity potentials
- Understand break-even points
- Utilise the runoff to its best advantage (i.e. highest and best use)
- Analyse the risks
- Treat the runoff as a business, not as a hobby"

In a recent farmer presentation, Davis (2005, p.9) used a model farm to evaluate runoff purchases, investigating the costs associated with runoff ownership in Canterbury and the returns on capital generated through different management strategies. This brief simulation found that "the cost of runoff was dependant on the purchase price of the land and the quantity of feed grown." It was also suggested "that most runoffs will benefit from producing supplement as opposed to dairy heifer grazing, and that cropping generally doesn't increase the profitability of the runoff."

"Any runoff proposition needs to be carefully evaluated on a financial and physical basis" (Hockings, 2002, p.100). In order to make informed decisions, the prospective purchaser must have accurate data relating to the potential management operations and the resulting financial implications from the purchase. Only after objectively quantifying and evaluating this data will a dairy farmer be able to justify a particular decision, and have reasonable confidence that the investment will not be 'marginal', but in fact contribute favourably to overall profitability.

2.4 Areas of deficiency and debate

Very little detailed literature is available to farmers or consultants on the physical performance levels achieved through different runoff management strategies, and the financial implications that are exhibited through their application. These knowledge deficiencies have been continually highlighted throughout this literature review. As a direct consequence, runoff purchases have not been justified on the true underlying benefits that accrue from the investment; instead being based on intuition and 'gut feeling'. This has exposed dairy farmers to greatly inflated risk levels when purchasing runoffs. It is important that this information becomes available to dairy farmers, so that they are able to "make an informed choice when considering these opportunities, to enhance their overall business" (O'Connor, 2003b, p.140). Further investigations are necessary to reveal and quantify the important variables, and increase the objectivity and confidence levels behind runoff investment decisions.

A number of alternatives are available to dairy farmers in sourcing feed supplies without any reliance on runoff ownership. Currently there is insufficient data within the industry to accurately evaluate the alternatives, and choose the option that aligns with individual objectives and maximises profitability. McVerry (2003, p.15) believed that more consideration has to be given into understanding "what the real costs of grazing versus owning a run-off are." Runoffs may provide "a good reason not to take your family to the beach" (O'Connor, 2003b), but may not encourage optimum financial performances to be achieved from the overall farming enterprise.

The South Island Dairying Development Centre (SIDDC) has recognised the knowledge deficiency within the industry, and initiated preliminary investigations into runoff management and profitability through both farmer and consultant surveys (SIDDC, 2004). Further detailed information is needed to supplement the outcomes of SIDDC's research.

This research study aims to explore the management operations undertaken on Canterbury runoffs in greater detail, and quantitatively assess the financial contribution that they offer to the overall dairying operation. It is recognised that there are many

issues surrounding runoff ownership and that in no way will the results from this research provide all the answers. As was recognised by Marshall and Rossman (1999, p.36), "the development of theory takes place by incremental advances and small contributions to knowledge through well conducted and well conceptualised research." The purpose of this study is to explore and investigate the issues further, and in doing so provide results that can be adopted as both a decision tool for dairy farmers, and a framework for future related studies.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The key objectives underpinning this research relate to exploring issues relating to runoff management and profitability. Analysing this problem will provide insights that can be used by dairy farmers in the future to implement improved management strategies, and also evaluate the purchase of a runoff support block. In satisfying this, a qualitative case study approach was carried out, in which six dairy farmers were interviewed in person using an open-ended, semi-structured questionnaire. This chapter outlines the rationale behind the qualitative approach used for the purposes of this study, describes the sampling methods used for data collection, and briefly explains how this raw data was analysed in subsequent chapters.

3.2 Type of research

A qualitative approach was adopted to provide insights and understanding into issues pertaining to runoff management and profitability. Patton (1987, p.44) states that "qualitative methods are particularly oriented toward exploration, discovery and inductive logic." The decision to use a qualitative structure to support this research was logical after first identifying the overall purpose behind this study, and secondly appreciating the exploratory insights that were needed to align the outcomes of the research to these objectives. Limitations inherent with other research approaches may discourage the diversity of information that is required to fulfil the purposes of this study.

An owned runoff only forms part of a dairy farmer's total operation. It is therefore important to analyse the whole farm system, including the interactions that occur between

the runoff and external parties. A qualitative study will help discover and explain these interactions, allowing the researched problem to be evaluated in its entirety.

The number of variables yet to be identified in relation to this topic makes it very difficult to carry out a qualitative study without face-to-face, personal interaction. A case study method was therefore deemed suitable as a strategy for data collection. This approach allows the researcher to analyse the problem within its context, while also providing sufficient flexibility to channel further investigations into new and unexplored territory. A case study is defined as "an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 1994, p.13).

The research was limited to focus on six in-depth case studies. Rich and detailed information was considered to be paramount in drawing insightful and objective conclusions in subsequent analysis. Flexibility within the interviews was of utmost importance, as it allowed unanticipated issues to be investigated further.

Two broad types of information were collected within the interviews. Firstly, information was sought on the individual dairy farmer's reasoning behind the purchase of the runoff, and how the runoff was situated within the overall dairying operation. Secondly, data was collected on the physical and financial performance levels achieved through runoff ownership. This information is fundamental in determining whether or not the runoff contributes favourably to the overall farming operation. Data collection within this qualitative study revolved around seeking increased insights and understandings into the topic; rather than carrying out the statistical tests and probabilities that are employed with purely quantitative research approaches. The fresh, insightful information stemming from this research will contribute to the current gap in knowledge that exists concerning runoff management and profitability.

3.3 Selection of the sample

Case studies farmers were selected using purposive sampling. A number of Canterbury dairy consultants acted as key informants in this selection. Patton (1987, p.52) claimed that "the power of purposive sampling lies in the selection of 'information rich' cases". This was important given the small number of farmers studied. The restricted number of participants is justifiable given the exploratory nature of this research and the non-requirement for definitive answers. By no means will results obtained from this small sample achieve saturation of all the issues facing Canterbury runoff owners.

In attaining 'rich' information, a strong emphasis was placed on selecting case study dairy farmers that offered diversity of situation in terms of runoff resources and the management strategies implemented. Case study participants were selected according to three criteria. The criteria are: owning a runoff, having access to quality and reliable information, and providing diversity of situation.

3.4 Data collection

For the purposes of this study, all data was collected through the use of personal, semi-structured interviews. Marshall and Rossman (1999, p.61) noted that "a study focusing on individual lived experience typically relies on an in-depth interview strategy." Bingham and Moore (1924), (cited in (Dane, 1990, p.128)), "described an interview as a conversation with a purpose." The interview strategy used to collect data for the purposes of this research revolved around having a small number of pre-determined questions that explored the key topics relating to the participant's views and the management operations undertaken. This interview guide (Appendix 1) provided a degree of structure to the interview.

In addition, the interview had sufficient flexibility to give the interviewer powers to explore issues further, and in doing so reveal greater insights. The diversity of situation that exists between each participant, combined with the number of unknown variables

pertaining to the topic, makes it impossible to accomplish these objectives within a highly-structured framework. Secondary questions were developed during the interview. These questions searched and probed into issues that were applicable to each individual farmer, often seeking information that was not anticipated.

Care was taken to ensure that all the answers obtained were based totally on the interviewee's standpoint, and not influenced by the researcher's own perspective. The story behind each runoff owner's position is the subject of this dissertation. Bias introduced by the researcher is contradictory to this aim. Open-ended and non-direct questions were used to avoid this situation occurring. Dane (1990, p.234) described exploratory questions as tending "to be rather general, but not necessarily frivolous or uninformative"; while Marshall and Rossman (1999, p.38) believed that "questions should be general enough to permit exploration but focused enough to delimit the study." In some situations more direct questions were presented to tease out the relevant details regarding the physical activities undertaken on the runoff. This data was necessary to quantify runoff performance and profitability levels; the key driver behind this study. The interviews were very relaxed and conversational in tone. This created an environment that was conducive to a greater flow of information, while also encouraging more meaningful answers.

All interviews took place at the farmer's own property, generally lasting between one and a half and two hours. Marshall and Rossman (1999, p.159) insisted that with a case study approach, "the research must begin in natural settings and incorporate historical and organisational contexts." In all cases, a follow up interview was also conducted lasting approximately half an hour. This second interview was necessary to seek clarification and validate the initial results. As part of the data collection process, a farm walk was carried out across the runoff. This provided an important opportunity for the researcher to gain a greater understanding of the participant's position in respect to runoff and milking platform management. In all cases, this time stimulated other relevant discussion that would not have been forthcoming in the confines of the interview.

Field notes were taken during the interview to provide an aid for further questioning. The entire interview was recorded on tape, which allowed answers to be re-examined at a later date, thus enhancing the accuracy of results. These audio recordings were also beneficial for quoting exact farmer responses. All information collected from the interviews was written out in full, immediately after the interview. This information subsequently led to individual case study profiles being drafted for each farmer.

3.5 Data analysis, costing procedures, and financial appraisal

Information was collected from runoff owners for the year starting August 1st 2004 and ending July 31st 2005. It is acknowledged that these dates do not align with the financial year of most dairy farmers. The specified dates were used as they correspond to the feed supplies grown in a complete season on the runoff, while also aligning with the start of calving on the milking platform (relates to when wintering period finishes on runoff). To simplify analysis, the complete wintering for 2005 was considered, even if it extended beyond July 31st, with all wintering activities from 2004 being excluded. These adjustments were necessary as cows were staggered home from the runoff to the milking platform immediately prior to calving for all the case study farmers. The costs and revenue linked to all other physical activities on the runoff were collected and analysed for the year specified.

Only the costs and revenues accruing during the period were analysed. This was necessary to ensure that the year under consideration was not benefited or penalised by the activities undertaken in past or future years. To do this, adjustments were made to reflect the changes in supplement on hand between the two dates, as an increase in supplement corresponds to income foregone. For similar reasons, increases in stock values on the runoff were calculated over the single year with an August 1st market value being deducted from all sales. Development expenditure incurred over the year in question was also reduced to a value that was considered sustainable, i.e. maintenance.

Costs and revenues were generally calculated as per the farmer's financial accounts, as this reflected their unique position. In a small number of situations, when this data was not available, values were assessed according to the Financial Budget Manual (Burtt, 2004). As was suggested by O'Connor (2003b), the runoff was 'ring fenced' and analysed as a stand-a-lone investment. Physical transfers of feed from the runoff to outside parties (including the milking platform) were valued at market rates. In this way the true marginal value of the runoff was considered, as 'without' the runoff the dairy farmer would have paid for the feed on the open market.

Plant and machinery for the particular farmer was also considered on a 'with, without' basis (i.e. what plant and machinery would the dairy farmer not have if the runoff was not owned). Plant that was attributable to the runoff purchase was accounted for by considering both cash costs and economic depreciation, and included with value of land and buildings as total capital invested. Current market values of the land and buildings were established by considering neighbouring, comparable sales. Contract plant and machinery hire rates were used for all plant that would still have been owned by the milking platform, irrespective of the runoff ownership.

Finally, an operational surplus for each runoff was calculated for the year being analysed. This amounted to 'earnings before interest and tax, net of economic depreciation' (EBIT). An annual production return on capital was then calculated by expressing the EBIT value across the current market value of capital invested. To complete the financial appraisal, average capital gains were determined. These appreciation rates represented the annual compounding gains attributable to each farmer since the year of purchase, net of development expenditure.

3.6 Confidentiality issues

At the beginning of the interview, every farmer was assured that all information disclosed was considered confidential, and would not be identifiable back to individual farmers. Farmers were assigned a letter (e.g. Farmer A), which is used throughout the chapters covering case study profiles, discussions and conclusions. Only the people directly involved with this study had access to the full, un-edited data sets. Every effort has been made to avoid the readers of this report being able to identify respondent farmers and properties. The researcher does however acknowledge that these confidentially efforts may become void in circumstances where the reader has a close acquaintance with a particular farmer. All participants were made aware of these potential issues.

4.5 Limitations of research method

No research approach is without its limitations. Patton (1990, p.162) noted that "there are no perfect research designs, there are always tradeoffs." It is of utmost importance that a research approach is selected that gives the researcher the ability to satisfy the particular objectives behind the research, while also reducing the limitations inherent within the approach. It is believed that this qualitative case study research has satisfied these dual objectives.

The research approach adopted within this dissertation allows for in-depth analysis of the issues, despite the small number of participants. The level of validity generated through this detailed information could not be replicated using other research methods. Achieving the full understanding beneath each outcome was fundamental. Loosely structured questioning also offered many advantages, giving the interviewer powers to investigate the complete problem in its entirety. Whole farm system analysis is necessary to understand all system components, and justify whether or not the runoff adds favourably to the overall operation.

Purposive sampling is not seen as a limitation within this study. The broad aim of this research is to provide greater insights and understandings into the topic. The fact that the sample size may not represent the issues facing the total population is not contractive to this aim. In no way does this research seek definitive answers that reflect the position of all Canterbury runoff holders. Instead it is hoped that the results from this research can be at least partially utilised by farmers as a decision support tool in executing more profitable management strategies to their own unique operation.

A qualitative case study approach can, in some situations introduce bias through the selection of farmer participants, interview format and the skills of the interviewer (Yin, 1994). The use of open-ended questions in this research has considerably helped in reducing this problem. The researcher made every effort to search for the answers, as opposed to force-feeding answers to the interviewees, enhancing the objectivity and accuracy of results.

Time constraints were also significant in this research. This problem was to some extent alleviated by concentrating efforts on investigating a specific issue (i.e. profitability) as it related to a small, focused sample group. The issues surrounding runoff integration are however widespread, and will require further concentrated research efforts in the future. It is hoped that the outcomes identified from this exploratory research have highlighted further areas of interest, and provided a starting point for future analysis.

CHAPTER 4

CASE STUDY PROFILES

4.1 Introduction

This chapter gives profiles on the six farmers who participated within this research. These profiles contain only information that was collected through the interview process. Further analysis of this information can be found in Chapter 5, 'Discussion and Conclusions.' Detailed financial budgets for each farmer covering the 2004/05 year are detailed in Appendix 2. All of the farmers were located in the Mid-Canterbury district, in the South Island of New Zealand, and owned a milking platform and dairy runoff. Farmers have been assigned a letter designation to ensure confidentiality and allow for easy reference in the discussion section of this dissertation.

Each profile will firstly give an overview of the farmer's total dairying operation. Following this, the reasoning for purchasing the runoff block, runoff operations, and runoff profitability will be detailed.

4.2 Farmer A

4.2.1 Introduction

Farmer A's total dairying enterprise encompasses three dairy farms through which 2800 cows are milked, and a runoff block which adjoins two of the milking platforms. The third dairy farm is located approximately 20km from the runoff. All the land coupled to the milking platforms is irrigated, totalling 780 effective hectares. The owner has the structures in place to irrigate 110 hectares of the 320 hectare runoff block. However, in dry seasons there is insufficient water to irrigate this land as the milking platforms get preference at all times. The runoff can therefore be classified as being predominantly dryland in nature, due to its Lismore/Chertsey soils and low irrigation availability. The

dairy support block consists of two purchases of 70ha and 250ha, which were bought in 1997 and 1999 respectively.

In the 2004/05 season, the dairy farms produced a total of 1,148,000kgMS. This equated to an average of 410kgMS/cow (range between properties of 390 – 461 based on peak cows milked), and 1475kgMS/ha (1250 – 1550). The runoff is used for winter grazing (Tabu ryegrass, Kale, and Triticale silage) and supplying grass silage to the adjoining milking platforms.

This property places great emphasis on having high levels of transparency between each individual farming enterprise. To attain this, each of the four farms has been set up as a subsidiary company and treated as a 'stand-a-lone' enterprise. All movements of feed between the different farms, including labour and machinery transfers, are fully costed at market rates. Farmer A is then able to very accurately assess and evaluate the financial performance levels achieved by each company, and ascertain how each contributes to the parent company has a whole.

4.2.1 Reasoning for purchase

The primary reason behind Farmer A's decision to purchase the runoff was to gain greater control over the feed supplies necessary to support the milking platforms. Prior to the purchase, the owner had difficulty in finding grazing and supplemental feeds from external parties that were of sufficient quality for feeding the dairy cows over the winter. Farmer A stated that in the past drystock farmers' attitude to feeding stock were very different to his own, but said that this culture had changed substantially in recent years. It was therefore through frustration that the runoff was purchased, as runoff ownership provided a means of guaranteeing continuity of feed supplies.

"It all goes back to control; its not being comfortable with the quality of graziers [contract drystock farmer] and feed we require, and being happy in our own management...The whole value is control; it's next door, it's between two dairy farms so

we can milk off it, we can run stock there for the winter, we can calve cows there, we can move feed from the runoff to the milking platform without putting it on a truck."

The immediate proximity of the runoff to two of the dairy farms is a special feature of this runoff, substantially increasing its value to the overall dairying operation. Farmer A clearly stated that "if it was 3km down the road it would be a totally different scenario [as its value to the overall dairying operation would be reduced]."

Farmer A believes that the runoff is beneficial to the overall farming enterprise, not from a production return (cash flow) perspective, but from the increased control it gives. The owner stated that the runoff gave very poor financial returns, but was prepared to accept these as a trade-off for higher levels of control. Farmer A insisted that the rapid appreciation in land prices over recent years had exaggerated the poor annual cashflow returns that were currently being realised. Capital gains were seen as an added bonus to having the runoff, but definitely not as the biggest driver. "If we were after capital gains we would sell it tomorrow."

The dryland nature of the runoff has driven the decision to retain it as a runoff. The fact that "it was bought at the right money" was also a strong driver. A dairy runoff is seen as its highest and best use, as other land uses are very limited in this dryland environment. Farmer A said, however, that he would not hesitate in converting it to milking cows if water became available in the future, as this alternative offers substantially higher returns. If this conversion were ever to occur, a further support block would be purchased to provide the continuity of feed supplies and retain the same level of control that is achieved at present. It is therefore evident that the underlying reasons for keeping the runoff relate to risk management, as opposed to investing in land for increased production returns.

4.2.2 Runoff operations

The runoff is used to support the milking platform in two ways, through winter grazing the entire dairy herd (i.e. 2800 cows), and growing supplement to support the milking platform in early and late lactation (for 2100 cows). Farmer A places a strong emphasis on feeding the cows well throughout the season, while also aiming to maximise lactation length. These management strategies have contributed to the high milk production levels achieved and the need for external feed supplies.

All heifer replacements are grazed off-farm independently of the runoff from 1st December after weaning, until 1st May (17 months later), when they return as in-calf rising 2 year olds and are wintered on the runoff before calving. This grazing feed is sourced through farmers who are prepared to feed the young stock well and with whom strong relationships have been formed over past years. A flat rate per week is paid across the entire grazing period. Farmer A believes that it is not physically feasible to grow the heifers on the runoff given the current management regime undertaken.

"Without irrigation there is no point trying to farm them yourselves; they clash too much with the other farming operations. The reason why they are bought back in May is because grazing becomes too expensive, and it allows them to be conditioned before entering the dairy herds."

A simple two year cropping rotation is implemented on the runoff. This rotation has been designed to grow and utilise crops that provide high amounts of spring and autumn production. "Our cropping policy essentially allows us to put a dollar each way, investing for spring (Triticale) and autumn (Kale) growth", thus providing another risk management strategy. Specific crops are not sown for summer production because the runoff's dryland characteristics are not conducive to growth over this period.

The 2-year rotation is described below.

- mid – November; 145ha kale is sown out of Tabu ryegrass. This crop is used to winter the cows; yields average 8tDM/ha (up to 12tDM/ha)
- mid – August; 145ha triticale is sown. It is then cut between mid-December and late January as pit-silage. Yields are highly variable, depending entirely on November and December rainfall (5.9tDM/ha and 10.3tDM/ha achieved over the last 2 years).
- mid – February; 145ha annual ryegrass (Tabu) is direct drilled into triticale stubble. This receives its first grazing in early June in wintering the cows (3,000kgDM/ha utilised), and then cut for silage in late October (3,500kgDM/ha utilised).

The other half of the runoff (145ha) is cropped in exactly the same way, being one year out of synchrony with what is described above.

Due to the extended lactation on this property, the dairy cows are dried off on the 31st May, before being moved to the runoff on approximately the 5th of June. The dairy replacement heifers are also transported to the runoff at this time, after being grazed on the dairy farms from the 1st May until this date. The cows are first used to graze the Tabu ryegrass, where they are allocated 7kgDM/cow, along with 5kgDM/cow of triticale silage (all expressed as 'down the throat' values). They are fed this ration until approximately the 24th June, from when the Tabu is substituted with 7kgDM/cow of kale. All the dairy cows are fed 12kgDM/cow/day while on the runoff. The cows are split into 6 separate herds (according to the dairy farm they relate to and condition). This policy allows lighter cows to gain 45kg (1C.S.) from their feed over the wintering period (heavier cows gain approximately 30kg).

The dairy cows from the two adjacent farms remain on the runoff until they calf, extending the average winter completion date for this group of cows out until approximately the 14th September (on runoff for 70 days), and allowing all pasture on these platforms to be utilised for milk production. The dairy cows from the third dairy

farm are removed on the 1st August at the planned start of calving (on runoff for 54 days), due entirely to distance factors.

4.2.3 Runoff profitability

Table 4.2 below illustrates the importance that Farmer A places on management strategies that generate winter feed. The fact that the runoff does not own any plant or machinery (so zero depreciation) is another key feature of Farmer A's runoff; instead a total reliance is placed on contractors.

Table 4.1 Profit Summary of Runoff (Farmer A) for 2004/05

Revenue		**04/05**
Winter grazing	$356,400	
Heifer grazing	$0	
Supplement sales (to milking platform)	$86,520	
Change in feed reserves (income foregone)	$74,240	
		$517,160
Costs		
Cultivation	$78,080	
Irrigation	$19,000	
Fertiliser and Weed control	$124,285	
Supplement making costs	$48,840	
Other expenses (incl. overheads)	$37,800	
		$308,005
Operating Surplus (EBITD)		**$209,155**
Economic Depreciation on Plant and Machinery		**$0**
EBIT (incl. Economic Depreciation)		**$209,155**
Total Runoff Capital Investment		**$4,320,000**
Return on Capital (EBIT)		**4.84%**

4.3 Farmer B

4.3.1 Introduction

Farmer B owns a 170ha effective dairy farm, across which 600 cows were milked in the 2004/05 season (3.5 cows/ha). The milking platform is fully irrigated, consisting of 110ha of borderdyke and 60ha of spray irrigation. The dairying operation also includes 150 effective hectares of runoff, located a small distance from the milking platform. The runoff is irrigated with centre pivot (50ha) and borderdyke (100ha) irrigation. In the past a number of other small dairy support blocks were owned (totalling 119ha), which were sold in 2003 to fund the purchase of the current runoff.

The milking platform produced 225,000kgMS (1323kgMS/ha and 398kgMS/cow) in the 2004/05 season, excluding calf milk. The runoff is used to supply grass and lucerne silage to the milking platform to extend cow lactation length. The runoff is also used to winter all dairy cows, rear and grow heifer replacements, carry over a small number of dry cows, and rear and fatten dairy beef stock. The runoff has allowed the overall dairying operation to be totally self-sufficient with all its feed supplies (supplements and grazing). "The runoff supplies all and any of the feed needed here [milking platform]."

4.3.2 Reasoning for purchase

Attaining greater control was the main driver behind the runoff's purchase. "It's about achieving self reliance. I like buying and developing land, I like owning land and being in control. I'm not interested in getting on the phone or getting in the car and driving around to check on my stock." It was clear that Farmer B was strongly motivated towards being self reliant across his entire operation. "We pretty much do everything here, with the exception of drain digging, re-bordering and bulk silage. We do everything else ourselves; because I want to."

An improved lifestyle was also a significant driver, as the runoff is seen as a fresh challenge and a bit of a hobby. "The runoff is basically my jet boat, my holiday house or

whatever. It is my cave if I want to hide from anything, as I can go round there and usually no person can find me." Farmer B was not interested in converting the runoff to a dairy farm in the future in an attempt to increase production returns. "That has no appeal to me at all, why would you cock it up by turning it into a shitty old dairy farm. It's not where my satisfaction lies."

Seeking increased capital gains were not a strong motivator behind the purchase. Farmer B however stated that he had made strong capital profits on the three previous runoff blocks. "I'm not motivated in making capital profit by buying and selling land, we've been on this dairy farm for the last 20 years; it's the exception rather than the rule in this district."

"The major driver behind the runoff is self reliance. It's a hobby and a challenge."

4.3.3 Runoff operations

The runoff is used to winter the dairy farm's entire dairy herd from drying off at the end of May, and are staggered home just before calving being away for an average of 65 - 70 days. The last cows return on the 1st of September. The cows are wintered on a combination of grass, barley straw and grass silage, totalling 12kgDM/head/day. No crops are grown on the runoff for wintering. "I've been there and tried triticale and maize. They are good crops, but are very expensive. We also don't grow kale, as it takes a long time for the cows to get used to it, leading to utilisation rates of probably only 70%."

All calves are reared on the runoff, including 154 AI dairy heifers and 150 MA dairy beef calves. Farmer B's objective is to maximise stock sales from the runoff, "taking a $40 bobby calf and fattening it before the second winter. We can also have a dollar each way; selling them as stores when demand is high, or we can fatten them." In 2004, 50, 100kg Fresian bull calves were sold, with 100 mixed-sex dairy beef calves being retained as yearlings through the winter. All calves go directly to the runoff for rearing after birth as "dairy pastures and calves do not go together on high producing dairy farms."

All replacement heifer calves are grazed on the runoff until they return to the milking platform prior to calving. A strong emphasis is placed on growing very good young stock. Surplus AI heifer calves are reared and generally sold prior to calving. In 2005, all surplus cows were calved on the milking platform, with 40 in-milk cows instead being sold at Christmas as pasture growth slowed.

The best empty cows are kept on the runoff after drying off. In 2004, 40 cows were kept, winter mated, and sold in March as autumn calving cows. After the 2005 season, 90 cows (70% of the total dries) were carried over. This policy was seen by Farmer B as being a "tidy wee earner."

A significant amount of grass (300 bales) and lucerne (40 bales) was transferred from the runoff to the milking platform in the 2004/05 season. Farmer B said his objective was to not make any silage on the milking platform at all, with the farm's stocking rate being designed to match peak spring pasture growth. Feed supplies imported from the runoff are therefore crucial in bridging pasture deficits and extending lactation.

In 2004, 280,000kgDM of pit silage was made on the runoff, being substantially more than an average season. This was due to favourable growing conditions and improved pasture species (after a development programme). 95,000kgDM was still on hand at the end of the season, with the balance being used to winter the cows and drystock. Farmer B said that in the future he would consider selling early cuts of high quality silage on the open market when pasture surpluses occurred, although he would first attempt to use it himself. "16 – 18c/kgDM is not bad dough for standing feed."

The runoff also contains an award winning home, which contributes to the runoff manager's remuneration package (market rental at $180/week)

4.3.4 Runoff profitability

Table 4.2 below highlights the diversified income streams accruing to Farmer B through runoff ownership; especially with regard to the added value created through carry over cow and dairy beef operations. Farmer B's runoff owned a range plant and machinery (including irrigators); this was accounted for by considering the cash costs of the machinery's use and deducting economic depreciation.

Table 4.2 Profit Summary of Runoff (Farmer B) for 2004/05

Revenue		**04/05**
Winter grazing	$80,759	
Heifer grazing (R1s & R2s)	$81,015	
Carry over cow revenue (added value)	$24,000	
Supplement sales (to milking platform)	$37,374	
Other stock sales (dairy beef)	$90,465	
Other revenue (rental of dwelling)	$9,360	
		$322,972
Costs		
Cultivation	$7,925	
Irrigation	$13,700	
Fertiliser and Weed control	$40,241	
Supplement making costs	$27,660	
Animal health and feeding costs	$36,500	
Other expenses (incl. overheads)	$63,800	
		$189,826
Operating Surplus (EBITD)		**$133,147**
Economic Depreciation on Plant and Machinery		**$25,350**
EBIT (incl. Economic Depreciation)		**$107,797**
Total Runoff Capital Investment		**$3,157,000**
Return on Capital (EBIT)		**3.41%**

4.4 Farmer C

4.4.1 Introduction

Farmer C owns and manages a milking platform and dairy runoff. The milking platform consists of 140 hectares effective, 70ha of which is irrigated with borderdykes. The remaining 70ha is dryland. In the current season (05/06) a total of 400 cows are milked on the dairy farm, comprising of 200 spring and 200 autumn calving cows. The 122 ha effective dairy runoff is located approximately 10km from the platform, and is fully irrigated with both borderdyke and rotorainer systems. The runoff was purchased in 2001.

In 2004/05, the runoff was used for wintering the spring calving cows, growing all heifer replacements, carrying over dry cows, sourcing supplement for the milking platform, and growing and fattening dairy beef cattle. Between the milking platform and the runoff, the total farming operation is fully self-contained with no feed and grazing being sought on the open market. It must be noted that Farmer C is currently in a transition stage, after quitting his own sharemilking contract in 2004 to manage his own dairy farm (previously had another manager on his own farm), "so you're really getting the tail end of what we were doing and the start of what we are trying to do."

In the 2004/05 season Farmer C employed a manager, while he finished his last season of sharemilking. The milking platform produced 79,500kgMS from 263 spring calving cows across the 70ha border-dyked area, equating to 1136kgMS/ha and 300kgMS/cow. Farmer C said very poor pasture and feeding management were attributable to this poor production performance. Currently, under Farmer C's own management, the property is on track to produce 150,000kgMS (inc. winter milk but excl. calf milk) for the year ending 31st July 2006 across (includes the 70ha dryland). These production levels of 370kgMS/cow and 1070kgMS/ha are more reflective of the milking platform's potential.

4.4.2 Reasoning for purchase

The primary reason for purchasing the runoff was to gain control over the total dairying operation. After moving up through the sharemilking ranks (to their current ownership position), Farmer C said he had had enough in dealing with outside people for grazing and supplement, believing that they often got the raw end of the deal. Farmer C did however say that he has had some good experiences in the past as well..

"At the end of the day we're not really 'people' people. We like to stick to our own thing, and do our own thing. Right or wrong, that's what we do. At the same time it takes a lot of risk out of the equation."

Seeking increased capital gains was also an important reason behind their decision to purchase, as it was seen as a positive step in growing their equity. "There's always capital gain in land, which has always been at the back of our minds; we made good gains from a past sale. Also with sharemilking, all the equity is tied up in cows, so runoff ownership helped diversify our investments."

Realising increased enjoyment from the farming operation was another strong motivator behind the purchase. Farmer C was "sick to death of doing nothing but milking cows and shifting irrigators all day. The runoff gives a chance to do something else. I enjoy it."

"We will always have a runoff type situation. I'm not interested in being stuck in the shed, so a lot of it is lifestyle. However these lifestyle reasons were probably not as strong when we first bought it. We could see the capital gains, could break even, and could keep control of the enterprise. Now it is more like, we like doing it, so that's why we are doing it, it's a fresh challenge."

However, achieving a self contained unit was the primary driver behind the purchase. "Self containment and capital gains are the main drivers; it's an asset at the end of the day. We're also getting to the stage where control overrides profit to a certain extent. A few years ago we couldn't afford to."

4.4.3 Runoff operations

Two hundred spring calving cows were wintered on the dairy runoff in 2005 from 1st June until the 1st of August. These cows were wintered on 11.6ha of kale and barley/grass seed straw, before being put onto grass for the last 2 weeks of July before calving. Barley straw is bought in from nearby cropping farmers. No autumn calving cows were grazed over the summer (dry period) on the runoff in 2005, however 200 will be grazed in future years.

Farmer C purchased 80 empty dairy cows in May 2004 from other dairy farmers. These were then winter mated for April 1st calving and grazed on the dairy runoff until they calved and entered the farmer's own autumn calving herd. Carrying these cows over essentially increased the cow's value from a $350 cull to a $1100 lactating cow in only 10 months.

In the 2004/05 season, 5ha of Tabu grass seed was grown for Farmer C's own use. This seed is used extensively on the milking platform's dryland pastures through direct drilling, while also being used on the runoff for permanent pastures. The paddock yielded 5.5t of dressed seed. The runoff was also used to grow 180tDM of pit silage for the milking platform. 300 bales of grass and 400 bales of Lucerne baleage were also sold to an outside party.

All suitable dairy beef animals are reared on the milking platform, before being fattened on the runoff as from December 1st. These are sold prime between 20 and 24 months of age. 80 calves were reared in the autumn of 2004, with 100 in the autumn of 2005. 140 calves were reared in the spring 2004.

A homestead is also located on the runoff, which is used as accommodation for a member of the milking platform staff. This is tied into the employee's employment package. The homestead therefore accrues $150 per week to the overall farming operation.

In the spring of 2004, the runoff was under stocked resulting in large surpluses of feed. Instead of planting the usual triticale (which was planted in again 2005), 9.6ha was planted in specialist small seeds (Chinese Cabbage and Radish). Farmer C had major difficulty harvesting the crops due to above average autumn rains. This resulted in a break even situation from a financial perspective. Greenfeed oats were then sown into the cabbage paddock for winter feed, with triticale being direct drilled into the radish. This can be considered to be an abnormality. Farmer C said he would never plant these crops again.

4.4.4 Runoff profitability

The financial performance levels achieved by Farmer C are outlined in table 4. Wintering cows provided a relatively small revenue stream compared to other management activities, especially supplement and dairy beef sales. Value created through carrying over cows was also significant. Economic depreciation was charged on one roto-rainer irrigator and a small range of plant and machinery.

Table 4.3 Profit Summary of Runoff (Farmer C)

Revenue		**04/05**
Winter grazing	$24,300	
Heifer grazing (R1s and R2s)	$64,820	
Carry over cow revenue (added value)	$46,000	
Supplement sales (to milking platform)	$106,940	
Other stock sales (dairy beef)	$91,000	
Other revenue	$7,800	
		$340,860
Costs		
Cultivation	$14,260	
Irrigation	$15,000	
Fertiliser and weed control	$38,342	
Supplement making costs	$12,675	
Animal health and feeding costs	$43,500	
Other expenses (incl. overheads)	$56,200	
		$179,976
Operating Surplus (EBITD)		**$160,884**
Economic Depreciation on Plant and Machinery		**$20,000**
EBIT (incl. Economic Depreciation)		**$140,884**
Total Runoff Capital Investment		**$2,346,000**
Return on Capital (EBIT)		**6.01%**

4.5 Farmer D

4.5.1 Introduction

Farmer D owns and manages a large scale dairying operation. The overall farming enterprise includes two dairy farms milking a total of 1250 cows (363ha), and a 320ha runoff block located a short distance from the two dairy units. The two dairy farms and runoff block are fully irrigated. All but 60 ha of the runoff block are irrigated by two towable centre pivots, with the balance being irrigated by a variety of small travelling

irrigators. The runoff was bought in 2001 after a previous support block was converted to a milking platform.

In the 2004/05 season, the two dairy farms produced 534,000kgMS, equating to 1463kgMS/ha and 425kgMS/cow. The property runs a stocking rate of 3.45 cows/ha which is lower than most neighbouring farms. This feature allows feed supplies to be driven predominantly by pasture throughout lactation, with "feed utilisation and pasture quality being the main drivers [on the milking platform]." Farmer D also produces milk according to a winter milk contract, which utilises a small number of autumn calving and carry over cows. "It's done to cut cow wastage rates; it cuts the empty rate in half, with no inductions or CIDRS."

The runoff is used for winter cow grazing, growing all heifer replacements, and supplying maize and grass supplements to the milking platforms. Historically it was used solely for dairy support operations, but "became 1/3 too big after we sold one of our milking platforms [used to milk 2000 cows on three farms]." The runoff is now also used for cash cropping, and supplies a small amount of winter feed to outside dairy farmers. "The overall operation has absolutely no reliance on external parties for feed supplies.

Farmer D places a strong emphasis on separating individual cost and revenue streams between the runoff and milking platforms, believing that if "you don't measure it, then you can't control it." Very accurate and informed decisions can be made as a result of these high transparency levels.

4.5.2 Reasoning for purchase

Achieving control over all feed supplies was the central reason behind the purchase of the runoff. Farmer D said that he himself had not had bad experiences in obtaining feed supplies from 'off-farm' sources in the past, although he was aware of the problems that a number of other dairy farmers had in doing so. The purchase therefore had a very strong risk management focus.

"I guess, well it may not seem much of a reason, but it's having total control. Irrespective of the economics of it, we just didn't want to be on the market having to look for grazing for 2000 cows and all replacements. The logistics of having that number of cows and heifers out around the county, and having a quality job done, is just not feasible. Our philosophy, and it always has been, is to have control of the replacements, control of the winter grazing, and that is why we have always gone down the path of having control over our entire operations. It sounds like we are control freaks, but that's the way we like to do it."

Farmer D said that he had closely scrutinised the numbers, and found that justifying the capital tied up in the runoff block was very difficult in terms of annual cashflow returns. "It's not even close to the milking platforms in terms of the economics." Capital gains were not seen as being a strong driver behind the purchase, but were seen as a bonus on top of the increased control that was attained through runoff ownership. "In terms of the capital gains it was an excellent option, we have made more money on that than we ever would with any other investment."

Farmer D is driven by "running sound economic dairy units, that's where we get our satisfaction." The guaranteed feed that the runoff contributes plays a key part in this equation. "I enjoy the whole lot [runoff and milking platforms], the runoff gives us greater variety, it's a bit of a hobby."

4.5.3 Runoff operations

The runoff was used to winter 1225 in-calf cows (incl. R2s) in 2005, along with 110 empty cows from the end of May. Cows are transferred back to the milking platform in groups immediately prior to calving. On average they are on the runoff for 64 days. The 110 empty cows (that weren't carried over for winter milk purposes) were wintered on the runoff and then sent to the works for foetal blood.

Kale and grass silage forms the basis of the wintering system, with a small amount of standing pasture being fed across transition periods. Farmer D places a strong emphasis on feeding the cows well over this time to set them up for the oncoming season. The dairy cows are fed ad-lib, consuming 12 – 13kgDM/cow/day. This comprises of 8kgDM/cow/day of kale (utilised) with the balance being grass silage. 80ha of kale is sown in late November, yielding a total of 15tDM/ha before accounting for utilisation rates. The cows are expected to gain 0.5 - 0.75 of a CS over the winter period, ideally calving at 5.3 – 5.5 CS. The autumn calving cows in 2004/05 were dried off for 3 – 4 weeks, but were used to clean up paddocks on the milking platform. 150 cows from an outside dairy farm were also wintered in 2005 at $15/week in order to utilise surplus feed supplies.

In the 2004/05 season, 334 dairy heifer calves were grazed on the runoff from December 1st. All heifers are reared in sheds on the milking platform, therefore not consuming any of the milking platform's pasture supplies. 330 R2 dairy heifers were also grazed on the runoff up until May 1st, when 106 surplus IC heifers were sold off-farm, leaving 225 heifers to be wintered and calved for replacements.

Farmer D said that he operated a conservative cropping rotation, which had resulted in a large improvement in soil quality since it was purchased in 2001. Previously, the runoff had been 100% cropped. Because the runoff is used to grow dairy heifers the cropping rotation has a strong reliance on pasture. Generally paddocks are cropped for 3 years, before being planted in pasture for another 3 years before further cropping is undertaken.

34ha of maize was grown on the runoff in 2004, with 8ha (150tDM) being sold standing to a neighbour for $0.175/kgDM. The 26ha (430tDM) balance was transferred to the milking platform and used to extend lactation to the end of May. The maize crop is planted in October after kale. The runoff was used to supply 150tDM of pit silage to the milking platform. In addition, 270 bales of grass silage and 75 bales of meadow hay were also transferred to the milking platform.

The runoff is also used to grow contract crops, with wheat, peas and potatoes being planted in the 2004/05 season. 34 hectares of feed wheat and 15 hectares of peas (for seed) were grown, contributing $70,000 (GM $1400/ha) and $18,000 (30t @ $600/t) respectively. Farmer D was not satisfied with the economics in growing the peas (and the delay in payment), and will replace these with oats in future rotations. In 2004, 30ha of land for grazing potatoes was also leased out at $1700/ha, plus $680/ha for irrigation costs.

A very modern homestead is also situated on the runoff block, which is used for the owner's residence. The runoff purchase (land + buildings) therefore contributes a further $180/week in accommodation benefits, in addition to income derived from the 'land'.

4.5.4 Runoff profitability

Table 4.4 below emphasises the diversity of management strategies adopted by Farmer D. It highlights the strong emphasis that is placed on wintering cows, heifer grazing, supplement sales and cash cropping activities. Farmer D has a significant amount of plant and machinery engaged with the runoff. All costs are expressed according to the cash costs associated with the activities (except where contractors are used); economic depreciation has also been deducted.

Table 4.4 Profit Summary of Runoff (Farmer D)

Revenue		**04/05**
Winter grazing	$212,886	
Heifer grazing (R1s and R2s)	$165,136	
Supplement sales (to M.P. and externally)	$167,100	
Cropping	$156,230	
Other revenue (rental of homestead)	$9,360	
		$710,711
Costs		
Cropping	$143,690	
Maize	$45,100	
Irrigation	$40,720	
Fertiliser and Weed Control	$3,040	
Other farm working expenses	$10,490	
Overheads	$133,880	
		$376,920
Operating Surplus (EBITD)		**$333,791**
Economic Depreciation on Plant and Machinery		**$85,150**
EBIT (incl. Economic Depreciation)		**$248,641**
Total Runoff Capital Investment		**$6,411,000**
Return on Capital (EBIT)		**3.88%**

4.6 Farmer E

4.6.1 Introduction

Farmer E's dairy enterprise includes a milking platform and dairy runoff. These parcels of land are located in very close proximity to each other. The milking platform consists of 178 effective hectares, from which 700 cows were milked through the 2004/05 season (3.9 cows/ha). The runoff comprises of 100 hectares effective. Both properties are 100% spray irrigated with roto-rainer systems. The milking platform was bought in 2001, with the runoff being purchased a year later in 2002.

In the 2004/05 season, the milking platform produced 301,000kgMS, amounting to 430kgMS/cow and 1690kgMS/cow. Farmer E aims to be in the top 5% of dairy farmers in New Zealand, believing that they are doing this at present from a production standpoint, but not currently on a profit basis. Producing 2000kgMS/ha with less than $2.50kgMS FWE is the biggest intermediate driver within the overall dairying enterprise. The runoff plays a key part in this philosophy. It is used for wintering the entire dairy herd (plus an outside farmer's cows), while also being used to supply grass and triticale silage to the milking platform and the open market.

4.6.2 Reasoning for purchase

Attaining greater control over the dairying operations was the key driver behind the purchase of the runoff. Prior to the milking platform purchase in 2001, Farmer E had owned and managed a split calving dairy farm, and was unfamiliar with the concept of sending dairy cows elsewhere to graze. The wintering costs after the first season ($130,000 for 8 weeks) were also perceived to be unjustifiably high. "I said stuff that, I'm not doing that again. I hated it, I was definitely not happy with the job they did; it was as simple as that. If we want 1700 – 1800kgMS/ha, which is what we are doing, we can't feed them the way some other people feed them." Farmer E stated that it was essential to feed cows well over the winter if high and increased milk production levels were to be achieved in future years. It was then decided to purchase a runoff, to provide greater control over feed supplies and internalise all wintering costs.

"I had always been used to controlling my own destiny. I didn't like it [not having control], so I went to the neighbours and said that I wanted to buy his farm. I wanted to be self-sufficient and be able to control my own destiny. That way you don't get screwed."

Achieving a high annual cashflow return on capital invested was also big driver. Farmer E acknowledged that he was only achieving a return between 3 – 6%. "Capital gains have however been growing at a 23% return compounding in recent years, suppressing

cashflow returns as the milk prices haven't appreciated accordingly [with the land value increases]. You are therefore talking with different figures." These asset appreciations were not a strong motivator, "as they are only valuable if you sell up or die, while also making it difficult for family succession."

Achieving total control over the milking platform's feed supplies was therefore the main driver behind the runoff's purchase. The increased milk production levels (and returns) obtained through this controlled interaction was also a strong motivator.

4.6.3 Runoff operations

The runoff is used to support the milking platform by providing winter grazing for Farmer E's entire herd (i.e. 760 cows in 2004/05). Farmer E places a strong emphasis on feeding the cow's well through the winter period, feeding 13.5kgDM down the throat consisting of a mixture of barley straw, grass silage and pasture (June, 3kgDM b. straw, 5.5 g. silage, 5 grass; July, 4kgDM b. straw, 4.5 g. silage, 5 grass). During this period they are expected to put on 0.8 CS, returning at an average of 5.5. Dairy cows are walked to the runoff following drying off at the end of May. They are brought back in mobs twice a week, immediately prior to calving. This practice allows all pasture grown on the milking platform to be utilised for milk production, which is necessary in achieving the farm's high production targets. In 2005, 500 outside cows were also wintered on 17ha of kale and 10ha of grass. This will not be repeated in the following year, with surplus standing pasture instead being sold on the open market.

The runoff was also used to grow grass and triticale silage for the milking platform. 17ha of triticale was sown in August out of poor performing grass, and was harvested in mid-January as silage. The total yield of 194,000kgDM (11.4tDM/ha) was imported to the milking platform, and used for bridging pasture deficits and extending lactation. A kale crop was then direct drilled into the triticale stubble immediately following its harvest, which was then resown into permanent pasture after the winter.

200,000kgDM of standing grass was transferred to the milking platform as silage. All other surplus grass was sold on the open market. The majority of this was sold standing for $0.15c/kgDM (450,000kgDM) with some also being delivered to a nearby dairy farm for $0.19c/kgDM (240,000kgDM). A strong emphasis is placed on growing high quality pastures for silage (11.4MJME/kgDM).

"If I specialised in anything, I specialise in grass. Whatever we put in is analysed and tested. There is absolutely no guess work. We do soil nutrient budgeting, herbage tests, we do everything. We have to because we're running everything to the maximum. It's the way I want to do it, if we do it, we do it right."

In 2004, 42ha of permanent pasture was sown (24ha from Feast II & 18ha from Kale). This is considerably more than an average year, but was necessary to get everything into high-performing permanent pastures. Next year, no further grass paddocks will be renewed; instead 18ha will be continuously rotated for three years between triticale and kale. Farmer E said that this practice would be achievable due to the runoff's Lismore soils, and their low potential for pugging and soil damage.

Farmer E stated that the permanent pastures produce 21,000kgDM per year, consisting of five cuts of supplement and one grazing in the winter. The five cuts of silage were taken between the 15th of October and the 4th of April being approximately 40 days apart, and yielding about 4300, 3400, 3000, 3000 and 2800kgDM respectively with each cut. Only four cuts of silage are taken off the renewed pastures due to a cut being missed with establishment (cut 90 days from planting). Permanent pastures are sown with 20kg of Bronsyn, and 3kg of a mixture of Sustain and Aran white clover.

All heifer replacements are grown by outside dairy graziers from the 1st December through to the 20th May (18 months later), when they return to the runoff as in-calf Rising 2 year olds. "We don't grow heifers here; we can't afford to tie up another labour unit. We are very fussy about growing our heifers and we believe that we should let them be grown by an expert, as that is what he specialises in. We would only be pissing around with them. We expect great things from our heifers. We want a 480kg heifer when we

get it back. We have tried grazing our own, but it's tough on labour and on the milking platform."

An interesting feature about the runoff, relates to the fact that no animals are grazed on the runoff outside the wintering period. Instead all surplus pastures are removed mechanically through 'cutting'. Farmer E has realised the impact that removing large amounts of herbage 'off-farm' has on soil fertility. The high levels of soil and herbage monitoring allows fertiliser inputs to match all grass outputs, with specialist fertiliser applications being designed during the season.

4.6.4 Runoff profitability

Table 4.5 below illustrates the operating returns and profitability levels achieved by Farmer E in 2004/05 through runoff ownership. It shows the strong reliance placed on activities concerning the wintering of cows and selling of supplement (both to the milking platform and outside parties). Economic depreciation was charged on the irrigation equipment; contract rates were used for other plant and machinery requirements.

Table 4.5 Profit Summary of Runoff (Farmer E)

Revenue		**04/05**
Winter grazing	$117,800	
Heifer grazing (R2's)	$1,620	
Supplement sales (to M.P. and externally)	$201,041	
		$320,461
Costs		
Cultivation	$7,106	
Irrigation	$36,200	
Fertiliser and Weed control	$73,793	
Supplement making costs + feed purchases	$51,828	
Other expenses (incl. overheads)	$41,100	
		$210,027
Operating Surplus (EBITD)		**$110,434**
Economic Depreciation on Plant and Machinery		**$17,400**
EBIT (incl. Economic Depreciation)		**$93,034**
Total Runoff Capital Investment		**$2,439,000**
Return on Capital (EBIT)		**3.81%**

4.7 Farmer F

4.7.1 Introduction

Farmer F owns and manages a milking platform comprising of 171 ha effective, milking 515 cows. The total dairying enterprise also includes two dairy runoffs which are used to support the milking platform, totalling 174ha. In 2004/05 the milking platform was irrigated with borderdykes. The majority of these borderdykes have recently been replaced with a centre pivot and pond system, in an attempt to utilise available water supplies more efficiently. The first dairy runoff (82ha) was purchased in 1999, and is fully irrigated with turbo-rain sprayer. The second runoff (92ha) was purchased in 2002 and is 100% irrigated with borderdykes.

In 2004/05 the milking platform produced a total of 243,600kgMS, equating to 1425kgMS/ha and 470kgMS/cow; excluding calf milk. The two runoffs are used to supply the entire milking platform's feed requirements, including winter cow grazing, heifer rearing and grazing, and the growing of barley grain and grass silage. Dairy beef calves are also reared and fattened on the runoffs.

4.7.2 Reasoning for Purchase

Achieving total self control was the number one reason behind the purchase of the two runoffs. Before purchasing the first runoff, Farmer F had developed a very strong and trusting relationship with a drystock farmer, who had grown their heifers for 10 years. This relationship terminated when the drystock farmer sold his farm. Farmer F purchased the runoff to replace this grazing arrangement and provide high quality feed for the milking platform's heifers. The first runoff had a very desirable location with subdivision potential, having a strong 'investment emphasis.'

The second runoff was purchased to provide quality winter grazing for the dairy herd. Prior to the purchase, Farmer F had sourced winter grazing from nearby cropping farmers, being predominantly greenfeed oats. Farmer F believed that he was losing weight and milksolids potential over this wintering period, due to the time it took the cows to change their diet. "The runoff was bought to have self control over what we fed the cows, and keep their diet more consistent compared to what it had been [move toward grass wintering]. It would be very hard to find grazing during the winter on grass, nice and handy to the milking platform, that we know is going to be available year after year."

Farmer F said that if he was looking to maximise annual cash returns, then he would have been better off in selling the runoffs and buying another dairy farm. "But if I had another dairy farm, I would have had twice as many wintering problems." This highlights the importance that Farmer F places on having total control over feeding, and the extent that it overrides cash returns. Capital gains were also a strong driver behind the two purchases, particularly the first runoff which was viewed simultaneously as being a dairy

support block and a commercial investment. "These capital gains have been very substantial, and most probably won't continue in the future. I guess you could turn around and ask the question, why don't you sell them? But I guess now that you've got them, and you've got the self control, you're a bit reluctant to let it go. Self control is definitely the number one reason to having the runoff blocks."

"The interesting thing has been, that in the 4 to 5 years that we have owned these runoff, land prices have doubled to trebled, and grazing prices have stayed the same. It would more than likely have paid interest a few years a go [based on 100% being borrowed]. With today's prices [for land] you wouldn't have a hope."

Farmer F was also adamant that the two runoffs contributed "at least 20,000kgMS per year to the milking platform through synergies, which when multiplied by $4, made the runoffs start to look pretty good. For the last 4 years we've continually increased production on the milking platform by 10,000kgMS per year without significant changes to farm management. I believe it comes down to keeping the cow's diet more consistent and extending lactation."

4.7.3 Runoff operations

In 2004/05 the runoff was used to winter 430 MA cows and 120 R2 heifers. The cows are dried off on the 2nd of June, and walked to the runoff immediately after their last milking. The cows remain on the runoff until calving, averaging 75 days, with the late calvers staying there until the end of September. During this time they are wintered on a combination of grass, grass silage and some barley straw. All the R2 heifers are moved to the milking platform at the end of July (60 days wintering) irrespective of their calving date.

Twenty of the herd's best empty cows were also carried over on the runoff after the winter of 2004, where they are spring-mated and calved the following August. This class of stock are used to maintain feed quality on the runoff, cleaning up head races and

poorly grazed paddocks. Retaining these cows has contributed $650/head to the total dairying operation, converting a $350 cull into a $1,000 in-calf cow.

The runoff is used to rear all calves, as it has a very good set up with small paddocks and lots of shelter. In 2004, 240 calves were reared including 148 AI heifer calves and 92 mixed-sex dairy-beef calves. No beef calves were reared in 2005. Farmer F is currently looking to contract graze outside dairy heifers to utilise surplus pastures that had previously been used to grow rising-1 year beef calves.

The runoff also fattened 96 R2 dairy beef steers and heifers (03 born), that were killed at 20 months of age (i.e. before their second winter). Half of these animals were reared from their own cows, with the other half being brought in. These sales averaged $800 per head across the complete line. 120 of Farmer F's own R2 replacement heifers were grown on the runoff in 2004/05, with a further 56 R2 heifers from an outside farmer contracted for 36 weeks @ $6/week.

In 2004, a total of 50ha of barley was grown, yielding 6.5t/ha on the Lismore soils (18ha), and 9t/ha on the Templeton soils (32ha). The 18ha crop of barley formed part of a re-bordering programme. A total of 405t of grain was grown, and transferred to the milking platform for feeding in the dairy shed, of which 110t was still on hand at the end of the season. 180 bales of barley straw was baled after heading and used to winter the cows; 90 bales of this straw was still on hand at the end of the winter. In 2005, the barley cropping area was reduced to 21ha, with 18ha being leased out for potatoes at $1750/ha, plus watering costs ($2/mmha).

In 2005, 20ha was direct drilled into Tabu (own previously grown seed), and 27ha was drilled with a cross-slot drill into permanent pastures being Impact AR1 and Aran white clover, following the harvesting of the barley. A small 3ha paddock of kale was also planted after the barley was harvested as part of the rebordering development.

Between the two runoffs, 110,000kgDM of silage was transferred to the milking platform. In addition to this, 150,000kgDM of pit silage was made and used on the runoffs for

Table 4.6 Profit Summary of Runoff (Farmer F)

Revenue		**04/05**
Winter grazing	$76,082	
Heifer grazing (R1s and R2s)	$79,322	
Carry over cow revenue (added value)	$11,900	
Supplement sales (to milking platform)	$125,650	
Other stock sales (dairy beef)	$64,008	
Other revenue (rental of dwelling/farm buildings)	$13,010	
		$369,972
Costs		
Cultivation	$25,180	
Irrigation	$12,932	
Fertiliser and weed control	$53,295	
Supplement making costs	$29,450	
Animal health and feeding costs	$16,143	
Other expenses (incl. overheads)	$58,800	
		$195,801
Operating Surplus (EBITD)		**$174,172**
Economic Depreciation on Plant and Machinery		**$15,500**
EBIT (incl. Economic Depreciation)		**$158,672**
Total Runoff Capital Investment		**$4,451,500**
Return on Capital (EBIT)		**3.56%**

CHAPTER 5

DISCUSSION and CONCLUSIONS

5.1 Introduction

This chapter will discuss the implications of the results obtained within this dissertation. It will highlight relevant insights into issues pertaining to runoff ownership and draw appropriate conclusions. The data summarised in tables 5.1 and 5.2 supports all reasoning within this chapter. More detailed information on individual case study farmers can be found in Chapter 4, 'Case Study Profiles.'

5.2 Why do dairy farmers purchase runoffs?

This research found that there were three key drivers for purchasing a runoff. Runoff ownership provided farmers with a means of achieving greater control. It also offered the potential for increased profits. Thirdly, farmers enjoyed the contribution that the runoff made to the overall farming operation, thus presenting a 'non-economic' driver.

All study participants emphasised that achieving greater control over their dairying operations was the strongest motivator behind their runoff purchase. 'Self containment', 'self reliance' and 'controlling my own destiny' were quoted for justification. Throughout the interviews it became evident that farmers were prepared to sacrifice profitability in order to attain this control. This emphasises how important the risk management benefits realised through runoff ownership were to the six case study farmers. Control was king, cash flow certainly wasn't. All other factors stemming from the purchase were viewed as being secondary in importance.

Table 5.1 Summary of information obtained from study participants

Category	FARMER					
	A	B	C	D	E	F
Milking platform (M.P.)						
- area (effective ha)	780	170	140	363	178	171
- irrigation	spray	spray & B/D	70 B/D, 70 dryland	spray	spray	spray & B/D
- cows (peak)	2800	600	400 (incl. 200 aut.)	1250	700	515
- stocking rate (cows/ha)	3.59	3.53	2.86	3.44	3.93	3.01
- production (kgMS/cow)	410	400	370	425	430	470
- production (kgMS/ha)	1475	1325 (excl. clf milk)	1070 (excl. clf milk)	1665	1690	1425 (excl. clf milk)
Runoff (R.O.)						
- area (effective ha)	310	150	122	312	100	168
- irrigation	110ha irrigatable?	B/D & spray	B/D & spray	spray	spray	B/D & spray
- year of purchase	#1 1997(70ha) #2 1999 (250ha)	2003	2001	2001	2002	#1 1999(80ha) #2 2001(90ha)
Runoff uses	winter grazing silage for M.P.	winter grazing heifer grazing feed for M.P. carry over MT cows dairy beef	winter grazing heifer grazing feed for M.P. feed for open mkt carry over MT cows dairy beef	winter grazing heifer grazing feed for M.P. feed for open mkt cash cropping	winter grazing silage for M.P. silage for open mkt	winter grazing heifer grazing carry over MT cows feed for M.P. dairy beef
Feeds grown	tabu r.g. (+ silage) kale triticale	pasture (+ silage) lucerne	pasture (+ silage) lucerne kale greenfeed oats triticale radish (small seeds)	pasture (+ silage) kale maize wheat peas potatoes	pasture (+ silage) kale triticale	pasture (+ silage) barley kale
Reasons for purchase	achieve control close proximity	self reliance hobby + challenge	self contained capital gains enjoyment	increased control variety + enjoyment	increased control quality w. grazing	control investment decision offer grass wintering
Current market value						
- land and buildings	$4,320,000	$2,988,000	$2,246,000	$5,900,000	$2,323,000	$4,374,000
- plant (incl. irrigators)	$0	$169,000	$100,000	$511,000	$116,000	$77,500
Purchase price	#1 @ $175,000 #2 @ $1,000,000	$2,085,000	$775,000	$3,200,000	$1,000,000	#1 @ $700,000 #2 @ $830,000
Net development expenditure	$90,000	$230,000	$270,000	$310,000	$400,000	$230,000

Table 5.2 Summary of information derived for each participant

Category	FARMER					
	A	B	C	D	E	F
Total revenue generated ($/ha)	$1,668	$2,153	$2,794	$2,278	$3,205	$2,202
Total costs incurred excluding development ($/ha)	$994	$1,266	$1,475	$1,208	$2,100	$1,165
EBITD (b4 economic depreciation)	$209,155	$133,147	$160,884	$333,791	$110,434	$174,172
Economic depreciation	$0	$25,350	$20,000	$85,150	$17,400	$15,500
EBIT (after economic depreciation)	$209,155	$107,797	$140,884	$248,641	$93,034	$158,672
EBIT return on capital	4.84%	3.41%	6.01%	3.88%	3.81%	3.56%
EBIT return per hectare	$675	$719	$1,155	$797	$930	$944
Avg. net annual capital gains (on purch price + devpmnt)	21.88%	17.33%	23.90%	15.50%	23.24%	20.64%
Value of runoff investment	$4,320,000	$3,157,000	$2,346,000	$6,411,000	$2,439,000	$4,451,500
- per cow (peak milking numbers)	$1,543	$5,262	$5,865	$5,129	$3,484	$8,644
- per hectare (effective)	$13,935	$21,047	$19,230	$20,548	$24,390	$26,497
Ratio of runoff area to milking platform area	0.40	0.88	0.87	0.86	0.56	0.98
kgDM used for wintering cows (per cow)	792	838	378	768	1050	918
kgDM of runoff grown feed used for 'milking' (per cow)	185	142	450	545	563	701
total kgDM used for 'milking and wintering' per cow	977	979	828	1,313	1,613	1,619
total kgDM used for 'milking and wintering' per M.P. ha	3,508	3,453	2,364	4,468	6,343	4,877
total kgDM used for 'milking and wintering' per R.O. ha	8,826	3,913	2,713	5,199	11,290	4,964
Total revenue breakdown						
% wintering cows	68.9%	25.0%	7.1%	25.3%	36.8%	20.6%
% heifer grazing		25.1%	19.0%	23.2%	0.5%	21.4%
% supplement transfers to M.P.	16.7%	5.4%	7.9%	19.8%	17.8%	22.5%
% external supplement sales (incl. winter feed sales)			8.3%	8.4%	44.9%	
% feed supplies on hand	14.4%	6.2%	8.7%			11.5%
% dairy beef		28.0%	26.7%			17.3%
% carry over cows		7.4%	13.5%			3.2%
% cash cropping (incl. r.g. seed)			6.5%	22.0%		
% other sources		2.9%	2.3%	1.3%		3.5%

Results from this dissertation provide some insight into why control is such a strong driver influencing runoff ownership. All of the farmers were focused on achieving high performance levels from their milking platforms, believing that there was too much at stake to rely on external parties for their feed requirements. Runoff ownership was deemed necessary to reduce these risks. Previous substandard experiences with 'outside' parties triggered the purchase for three of the farmers. This view however, was by no means universal across the group of farmers. Farmer F was explicit in stating that past experiences did not influence his purchasing decision, as he had formed very valuable and trusting relationships in the past.

It is often suggested that the drought conditions and inflated feed prices experienced in Canterbury during the 2001/02 season contributed to farmers purchasing runoffs (SIDDC, 2004). This viewpoint held true for Farmer E who sought runoff ownership in 2002 to control winter feed availability and it's pricing. In contrast to this, four out of the six farmers purchased runoffs in the three years prior to this devastating season, in years when feed supplies were readily available on the open market. This may imply that seeking control is strategic rather than reactive, and not necessarily influenced by 'outside' experiences. If this is true, then runoff ownership may almost be seen as a natural progression for dairy farmers once sufficient financial support is available. The alignment between the year of runoff purchase for these farmers, and the so called 'high-income years' goes some way in supporting this proposition.

Runoff ownership was also seen by the six farmers as a way for increasing the overall profitability of the dairying enterprise, thus presenting another driver for its purchase. Profitability opportunities could be captured through annual production returns and capital gains. Annual production returns were deemed to be important to all the farmers. It was evident that capturing the profit synergies offered through the controlled interaction between the runoff and milking platform was also a driver of the purchase. In general, seeking increased capital gains was not a strong driver, especially for Farmers A, E and D. In respect to these farmers, capital gains were viewed more as being a bonus on top of the control that was achieved. Capital appreciation opportunities were regarded as being slightly more important for Farmers B and F, who acknowledged that these

partially influenced their purchasing decision. None of the farmers were planning on selling the runoff in an attempt to 'cash in' on these capital gains. Selling would relinquish their current levels of control; control that currently underpins the entire dairying operation.

The third reason behind runoff ownership related to 'non-economic' factors. All farmers said that they enjoyed the contribution that the runoff made to their overall dairying operation. This was due to the increased variety it offered away from 'milking platform' activities. Farmer B called the runoff his 'jet boat and holiday house' emphasising that it was viewed as a hobby farm. Farmer C said that it gave him a new challenge, as he was 'sick of milking cows and shifting irrigators all day.' It is difficult to quantify the extent to which these psychological issues influence runoff ownership. These benefits must however be considered to ensure that the outcomes from runoff ownership align with farmer goals and objectives.

5.3 How are dairy farmers using their runoff?

The results obtained within this study confirm the diversity that exists with regard to runoff uses and management strategies in Canterbury. Across the six farmers, runoffs were found to have eight main physical functions. These included wintering cows, grazing heifers, exporting supplement to the milking platform, selling supplement to external parties, carrying over empty cows, rearing and fattening dairy beef, cash cropping, and providing accommodation facilities. The different management strategies and feed contributions made by the runoff will now be explored.

With all case study participants, the need for a runoff resulted from a highly stocked milking platform; stocking rates that have been designed for annual demand to exceed feed supplies. Runoff ownership provides a feed source to bridge these deficits. These rates ranged from 3.01 to 3.93 cows/ha on the irrigated milking platforms. A lower stocking rate of 2.86 was used by Farmer C reflecting the dryland nature of half the milking area.

All of the six case study farmers utilised their runoff for wintering purposes. During the interviews it appeared that providing winter feed supplies was the most important management strategy undertaken on the runoff. This was especially true for Farmers A, E and F who emphasised that controlled feeding over the winter period was integral to the success of their dairying operation. Each of the farmers staggered their cows from the runoff to the milking platform (except 700 of Farmer A's herd due to distance factors) immediately prior to calving. This was done to avoid dry cows consuming 'milking platform' pasture, leading to increased milksolids production levels. Runoff ownership therefore offers a dairy farmer flexibility with their wintering needs; flexibility that would not necessarily be achieved with contract grazing.

Examining the wintering strategies in greater detail is necessary to understand the benefits that stem from the controlled feeding provided by runoff ownership. All of the farmers fed their cows well over this dry period, citing the improved milksolids production that resulted the following season for doing so. Farmers B and F said that the runoff gave them the opportunity to winter on an 'all-grass' diet, allowing them to keep the cows diet consistent during the year. Farmer E placed strong emphasis on feeding the cows to their full potential during the winter, at 13.5kgDM/head day (down the throat) and 1050kgDM/cow across the total winter (70 days). The other farmers fed their cows 12kgDM/cow/day, equating to between 770 and 920kgDM/cow/winter depending on calving spread. Typically between 0.5 and 1.0 C.S/cow were gained over the winter period, with all farmers aiming for 5.5 C.S at calving. Having control over the quantity and quality of winter grazing was seen as an important driver for profitability. For example, Farmer F was adamant that his all-grass wintering contributed an additional 20,000kgMS/year.

Unlike the wintering of dairy cows, strategies pertaining to the grazing of heifers were not so universal. Four of the farmers grazed their Rising 1 and Rising 2 year heifers on the runoff, with the other two (A and E) choosing to rely on outside contract grazing. Maintaining control over how their young stock was grown was central behind Farmer B, C, D and F's decision to graze heifers on the runoff. In addition to this, Farmer B and D

reared and raised a number of surplus heifer calves that were sold in-calf, thus presenting another diversified revenue stream. Farmer F also grazed some 'outside' dairy heifers on contract, generating an additional income flow without any capital investment. In contrast to this, Farmer A and E were prepared to relinquish the control over heifer grazing obtained by the above farmers. Farmer A believed that they clashed too much with other runoff operations, especially given their dryland environment. Farmer E's decision was based on the belief that outside graziers had greater expertise in the field of growing stock, believing that channelling his own time into this activity would be detrimental to the milking platform's performance.

All study participants used the runoff to export feed supplies for use on the milking platform. This 'milking feed' was primarily used to bridge feed deficits in the autumn, enabling lactation to be extended. Controlling the availability of this feed, its quality, and its pricing, was cited by all farmers as the reason for this runoff and milking platform interaction. A large range in the amount of 'milking feed' transferred to the milking platform existed between the six farmers, varying from 142 and 701kgDM/cow. Stocking rate factors and milk production levels per cow influenced these transfer levels, as these dictated the actual need for additional feed supplies, over and above milking platform grown pasture. Differences in the types of feed transferred were also found. Pasture silage was used by all the farmers. However in addition, Farmer D, E and F grew maize silage, triticale silage and barley grain respectively, all being used for 'milking feed.'

In addition to feed grown for the milking platform, Farmers C, D and E sold surplus feed on the open market. This strategy was particularly important to Farmer E, generating 45% of the runoff's total revenue. Farmers A, B, C and F also chose to carry a quantity of 2004/05 grown feed through to the next season instead of selling it on the market. These increases in feed inventory amount to income foregone.

Farmers B, C and F used the runoff for carrying-over empty spring calving cows. Farmers B and F used this policy to add value to their own herd. Farmer C bought in a substantial number of empty cows from outside farmers. Farmers B and C winter mated

the cows for autumn calving, adding approximately $650 per head ($350 cull to $1100 IC cow) in a ten month period after accounting for empties and deaths. In contrast, Farmer F spring mated his best empty cows. In all three situations, the cows were used to clean up paddocks, allowing other classes of stock to benefit from increased pasture quality. Although it was a relatively small earner in terms of gross revenues, carrying over empty cows proved to be very valuable. This strategy incurred very low costs and contributed significantly to the 'bottom line'.

The rearing and fattening of dairy beef calves was found to be another 'value adding' runoff use, exploited by three of the farmers (B, C and F). All revenue realised through these beef sales, over and above the bobby calf price, can be attributed to the runoff. These three farmers also commented on the flexibility that it offered within their runoff operations. Dairy beef cattle could be traded as stores or fattened before the second winter. Dairy beef fattening gave farmers the opportunity to diversify their product sales portfolio, thus presenting another risk management strategy.

Cash cropping activities were undertaken by three runoff owners. Farmer G used his runoff for growing wheat, peas and potatoes, providing a diversified income stream away from the dairying operation. Farmer F grew barley grain for use on the milking platform. In the 2004/05 season, Farmer C grew Tabu seed for his runoff's and milking platform's own re-grassing purposes. This seed was valued at the amount the seed would have cost if purchased on the market. This strategy has therefore allowed the 'middle man' margins to be captured as increased profit. Farmers B and F said that they had grown their own ryegrass seed in the past with a lot of success; Farmer A was growing it for the first time in 2005/06 season.

A homestead was located on four of the farmer's runoffs, thus providing another use for the runoff. In all cases, these accommodation benefits were captured within the overall dairying operation, being tied into the employment packages of staff. This activity therefore accrued approximately $8,000 a year ($150 - $180/week) to the runoff.

5.4 Factors influencing runoff management; how large a runoff is necessary?

The range of management strategies identified in the above section raises some interesting issues, such as: what role does the runoff play within the overall dairying operation, and what were the management intentions behind purchasing the purchase? In answering these questions it becomes obvious that each dairy farmer purchases a runoff to satisfy different needs. Prospective purchasers must understand how large a runoff is necessary to perform the required functions. Some farmers (B, C, D and F) want total containment over all feed supplies, while also having opportunities to realise diversified income streams away from milksolids revenue. Conversely, Farmer A was motivated toward controlling winter feeding and extending lactation length.

It was found that runoff management was strongly influenced by the feed deficit experienced on the milking platform relative to the amount of feed grown on the runoff. The relationship between runoff area and milking platform area is an important indicator of this. Farmer A had the lowest ratio of runoff area to milking platform area (0.4 : 1), leading to all the feed grown on the runoff being channelled toward 'wintering feed' and 'milking feed'. At the other end of the continuum, Farmer F had 0.98ha of runoff to every 1ha of milking platform area. This higher ratio creates a feed surplus over and above the milking platform's needs. This in turn allowed Farmer F to pursue other activities, including heifer grazing and dairy beef fattening.

Further insight into the interaction between the runoff and milking platform can be achieved by calculating the amount of runoff feed used for 'wintering' and 'milking'. Expressing the sum of these two feed transfers on a per cow, milking platform area, and runoff area basis reveals some key relationships. Farmer E imported the greatest amount of 'runoff grown' feed for 'wintering' and 'milking' purposes. This higher feed input flowed through to higher milksolids production. A greater understanding into runoff management can also be attained in expressing this 'wintering' and 'milking' feed relative to the runoff area. This ratio varied by a factor of four across the participants. Feed grown on the runoff over and above this value can be channelled into other

management activities. Farmer C had the biggest surplus of feed, explaining why activities such as dairy beef, heifer grazing and cash cropping could be undertaken. In contrast, Farmer A's dryland runoff produced a very small feed surplus; because of this the runoff can essentially be viewed as an adjunct to the milking platform

Lastly, some interesting correlations can be drawn comparing the management strategies undertaken on the runoff and the amount of area and capital invested.

- Farmer A was able to winter all his cows and produce some 'milking feed' with 0.4ha of dryland runoff (to every 1ha of milking platform), and an investment of $1540/cow and $14,000/runoff hectare.
- Farmer E produced all the necessary 'wintering and milking feeds' with surplus pasture being sold on the open market (note that heifers aren't grazed), with 0.56ha of irrigated runoff, and an investment of $3,480 per cow, and $24,390 per runoff hectare.
- Farmers B, C and D were able to achieve total containment over all their feed supplies and pursue other diversified activities. This required between 0.86 and 0.88ha of irrigated runoff, and capital ranging between $5,130 - $5,870 per cow, and $19,230 and $21,050 per runoff hectare.
- Farmer F achieved total containment over feed supplies with 0.98ha of irrigated runoff and a capital investment of $8,645 per cow and $26,497 per runoff hectare. These high capital values are explained by the subdivision potential of one of Farmer F's runoff blocks.

5.5 What levels of financial performance are runoff owners achieving?

There are two components to the economic returns that are captured through runoff ownership. These include annual operating returns (expressed as EBIT) and capital gains.

When analysed as a 'stand-a-lone' investment, annual operating returns for the six farmers were found to range between 3.4 and 6.0% for the 2004/05 year. These are

consistent with the average returns of 3.5% to 4% that Davis (2005) said were being made on Canterbury runoffs. All the farmers interviewed considered the milking platform as being the 'cash cow' within the overall dairying operation, implying that the returns generated from 'milking' activities were superior. These cash rates of return are very comparable to the returns that are generated through other capital appreciating assets. It must also be noted that runoff ownership also provides greater security to the operating returns achieved on the milking platform through the risk management benefits that are captured.

Additionally, capital gains have been very substantial for these runoff owners, ranging from 15.5% to 23.9% across the study participants. These rates represent the annual compounding gains attributable to each farmer since the year of purchase, net of development expenditure. For most of the farmers they exceeded operating returns by a factor of five to six. The enormity of these capital gains has led to substantial increases in farmer equity levels; justifying the purchasing decision from an economic standpoint. The magnitude of these capital returns were quoted by farmers as being the reason for the poor operating returns currently being generated. This is because net annual income streams have not appreciated to the same extent as runoff investment capital.

It is clear though, that if farmers are to finance the purchase of a runoff with 100% debt capital, then an overall cash deficit after interest will occur. This is because the 'earnings before interest and tax and including depreciation' (EBIT) are insufficient to cover current interest costs. This introduces potential liquidity problems. In order for the purchase to be sustainable, the runoff must receive a cash subsidy or be financed partly with equity capital. The six farmers interviewed were prepared to subsidise the runoff investment's cashflow in the initial years, until it could stand on its own feet. It is important to note that the levels of debt employed with a runoff purchase are relative to the historical cost of the asset. In an appreciating property market these debt levels rapidly diminish relative to the current market values of the asset. Likewise, net revenues have also increased relative to the interest costs corresponding to this debt across the time (although not to the same extent). As a result, the runoff investment becomes self-funding in terms of cashflow after a small period of time, as a 4% return on current

market values is substantially higher when expressed on the historical purchase price. Runoff ownership therefore has the potential to increase future cashflow levels.

Looking forward, it is very difficult to predict whether the financial benefits accrued through runoff ownership in the past will continue. It is highly dependent on capital gains and the cash operating returns that can be generated. Due to interest rates currently being higher than operating returns, prospective purchasers will incur a cash cost in the early years. This initial cash cost is necessary to achieve control over feed supplies, and create the potential for capital gains and improved cash-flow in the future. The success of purchasing a runoff today will depend entirely on two factors; firstly, the market price movements for runoff grown feeds, and secondly the extent to which land appreciates in the future.

5.6 Success measures; what has been learned?

Achieving control is the number one reason driving runoff ownership. Creating an opportunity for additional profits was also a strong driver. The success of the runoff investment will depend on whether the performance levels achieved through the purchase correlate with farmer objectives. Runoff ownership gives farmers ultimate control over feed supplies, thus satisfying the number one objective underpinning runoff ownership. In this way questions regarding whether or not a farmer should own a runoff based on profitability levels are to some extent very naïve. A more appropriate question relates to improving profitability of the runoff, given that the runoff has already been purchased and desired levels of control obtained. In this way, the runoff purchase may be considered a 'sunk cost', with all emphasis being channelled towards minimising the costs of this ownership through achieving higher financial returns.

Runoff ownership has proved to be very profitable over recent years, contributing significant wealth to the overall dairying operation. Annual operating cash returns (EBIT) were found to range between 3.4% and 6.0%, with annual capital gains varying between 15.5% and 23.9%.

A range of management strategies are being adopted by Canterbury runoff owners. Wintering of dairy cows and supplying supplement to the milking platform were found to be among the most important uses. Surplus runoff-grown feed over and above the farmer's 'wintering and milking' are channelled toward other more diversified runoff uses; including heifer grazing, dairy beef and cash cropping.

Large differences exist between the runoff area and the amount of capital invested in the runoff between Canterbury dairy farmers. These ratios are strongly dependant on both the range of management activities employed, and the resources associated with each runoff (i.e. dryland or irrigated).

5.7 What further questions does this research raise?

The main purpose of this study has been to explore the issues of runoff management and profitability in Canterbury in greater detail. Because of this, the outcomes of this research have raised a number of questions. Further work is warranted in gaining greater insight and understandings into the following areas:

- Investigating the management strategies and profitability levels on runoff in other geographical areas.
- Investigating further key performance indicators (KPIs) into the physical and financial levels being achieved through runoff ownership.
- Developing models that optimise management strategies for runoffs
- Investigating the merits of converting irrigated runoffs to milking platforms; are dryland runoffs more feasible?

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APPENDIX 1

INTERVIEW GUIDE

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1) Introductory questions relating to the runoff and milking platform; gaining basic information about the farmer's overall dairying operation.

2) What was the thinking behind buying the runoff?
What other options did you look at? Was it an obvious way to go?
If you hadn't bought the runoff, what do you think you would have done?

3) Do you think that you could make more money out of this runoff?
What constraints do the runoff put on your overall farming enterprise; i.e. diverting time away from milking platform?

4) What environmental issues to you believe are relevant to this runoff?
What measures have been (and are proposed) to mitigate these concerns?

5) Runoffs essentially provide a solution to managing the feed management problem.
Consider the sources of feed demand and feed supplies on the runoff.
What changes have occurred as a result of having a runoff? (overall perspective)
What are your views on self-containment versus sourcing off-farm feed supplies?
Have you considered buying in additional feed as an alternative?

6) Management strategies undertaken on the runoff:
Runoff operations; calendar of events for the past year?
Stock numbers and LWG data, conserved feed?
Does this reflect a normal year?

7) What changes will you make in the future with the runoff?
What will be the key drivers behind these changes?

Note: These above questions were used only as an interview guide. More detailed, secondary questions were developed during the interview to search and probe further into the relevant issues pertaining to each case study farmer.

APPENDIX 2

DETAILED CASE STUDY BUDGETS

FARMER A

Revenue Data

Winter Grazing

2100 cows	70 days	147000	
700 cows	54 days	37800	
		184800	cow wintering days
		26400	cow wintering weeks
Assuming $13.50/head/week (net)		**$356,400**	

Tabu Supplement

148 ha	3500 kgDM	518000	kgDM total
Assuming $0.14c/kgDM (net)		**$72,520**	

Surplus kale (sold to neighbour - i.e. feed adjustments)

100000 kgDM	Kale	$0.14	**$14,000**

Surplus Triticale (kept on hand - i.e. feed adjustments)

Triticale grown (148ha @ 10tDM/ha)		1,480,000	kgDM
Triticale utilised			
2100 cows	70 days	147000	
700 cows	54 days	37800	
		184800	cow wintering days
Triticale consumed (5kgDM/cow/day utilised) (assuming 6kg fed gross)		1108800	kgDM
Surplus		371,200	kgDM
Inventory on hand valued @ 20c/kgDM (net)		**$74,240**	

Total Revenue generated for 2004/05 year **$517,160**

Cost Data

Cultivation expenses						
Kale						
Plough	140	@	$80	ha	$11,200	
Rolled/leveller	140	@	$35	ha	$4,900	
Grub & rolled	140	@	$55	ha	$7,700	
Drilled	140	@	$60	ha	$8,400	
					$32,200	
Triticale						
Plough	148	@	$80	ha	$11,840	
Rolled/leveller	148	@	$35	ha	$5,180	
Grub & rolled	148	@	$55	ha	$8,140	
Drilled	148	@	$60	ha	$8,880	
					$34,040	
Tabu						
Direct-drilled	148	@	$80	ha	$11,840	
Total cultivation expenditure						$78,080

Irrigation	
Weighted average cost of power + lease of well	$19,000

Fertiliser, Seed and Weed control costs						
Kale ha 140						
Seed	3	@	$22	kg	$9,240	
Cropmaster 13	300	@	$430	t	$18,060	
Borate 46	12	@	$1,230	t	$2,066	
Urea	100	@	$400	t	$5,600	
Urea	100	@	$400	t	$5,600	
Freight	71.68	@	$15	t	$151	
Application costs	71.68	@	$4.5	t	$45	
					$40,762	
Triticale ha 148						
Seed	100	@	$110	t	$1,628	
Cropmaster 13	300	@	$430	t	$19,092	
Urea	100	@	$400	t	$5,920	
Freight	59.2	@	$15	t	$131	
Application costs	59.2	@	$4.5	t	$39	
Trimec + Karate + Application (@ $50/ha)					$7,400	
					$34,211	
Tabu ha 148						
Seed	18	@	$4.20	kg	$11,189	
Super-phosphate	500	@	$160	t	$11,840	
Urea	100	@	$400	t	$5,920	
Urea	100	@	$400	t	$5,920	
Urea	150	@	$400	t	$8,880	
Freight	125.8	@	$15	t	$279	
Application costs	125.8	@	$4.5	t	$84	
					$44,112	
Lime (spread)	162.5	@	$32	t	$5,200	
Total fertiliser, seed and weed expenses						$124,285

Harvesting costs				
Triticale silage	1480000 kgDM	@	$0.033	$48,840

Overheads		
Operational manager's wage	$20,000	
Operational manager's vehicle expenses (incl. fuel)	$8,000	
Office allowance (admin)	$1,400	
Repairs and maintenance	$4,000	
Telephone expenditure	$400	
Professional services	$1,500	
Rates	$2,500	
		$37,800

Total Expenses incurred for 2004/05 year **$259,165**

Value of Runoff Capital Investment

Land				
	320 ha	@	$13,500 ha	$4,320,000
Buildings				$0
Total capital invested in runoff				**$4,320,000**

FARMER B

Revenue Data

Winter Grazing					
625	cows	67	days	41875	cow wintering days
				5982	cow wintering weeks
	Assuming $13.50/head/week (net)				**$80,759**

Carry over cows (winter mated)					
40	cows	@	$1,050	$42,000	
	less value of cull ($450 @ Aug 1st)			$18,000	
					$24,000

Dairy heifer grazing					
154	yearlings	8	weeks	$2	$2,464
		22	weeks	$4.50	$15,246
		17	weeks	$6.50	$17,017
161		39	weeks	$6.50	$40,814
		4	weeks	$8.50	$5,474
					$81,015

Dairy beef (sales and income foregone)				
2004 born				
50	Fresian bulls (100kg)	@	$325	$16,250
	less their value as 4-day old calves	@	$80	$4,000
				$12,250
100	MS Hereford x MS 04 calves (Aug 1st value)	@	$450	$45,000
	less their value as 4-day old calves	@	$80	$8,000
				$37,000
2003 born				
10	Jersey yearling bulls	(9 weeks @ $6.50/wk)		$585
70	Hereford x steers (14 mths)	@	$680	$47,600
	less value at 1st August	@	$530	$37,100
				$10,500
85	MS Hereford x 03 calves (Aug 1st value)	@	$760	$64,600
	less their value as yearlings	@	$450	$38,250
				$26,350
2002 born				
20	Hereford x bulls (2.5 yrs)	@	$1,089	$21,780
	less value at 1st August	@	$900	$18,000
				$3,780
				$90,465

Grass and Lucerne Baleage Sales (to the milking platform or on hand)					
300	bales	@	$0.14	$15,120	
40	bales	@	$0.16	$2,304	
95000	kgDM	@	$0.21	$19,950	
					$37,374

Other revenue				
Rental of homestead	@	$180	week	**$9,360**

Total Revenue generated for 2004/05 year **$322,972**

Cost Data

Cultivation expenses						
Lucerne and Pasture	25 ha					
Glyphosate spray (6L/ha)		@	$50	ha	$1,250	
Chisel plough		@	$25	ha	$625	
Plough		@	$60	ha	$1,500	
310 Maxi (or grubber) - 4 passes		@	$80	ha	$2,000	
Graded		@			$1,300	
Roller drill		@	$50	ha	$1,250	
						$7,925

Irrigation					
Border dyke (full 175ha contracted)	$20			$3,500	
Centre pivot costs (diesel for generator)	60 days	@	$170	$10,200	
					$13,700

Fertiliser, Seed and Weed control costs			150 ha			
Cropmaster 15 (146ha)	300	@	$395	t	$17,301	
Lucerne fertiliser mix (4ha)	600		$250	t	$600	
Urea (100kgN/ha)	217	@	$400	t	$13,043	
Lucerne seed (4ha)	60	@	$15	kg	$900	
Crusader r.g. seed (21ha)	378	@	$6	kg	$2,268	
Pasture spray (MCPA) - 21ha		@	$40	ha	$840	
Lucerne aphid/weed spray - 4ha		@	$75	ha	$300	
Other sprays					$300	
Fertiliser freight	78.81	@	$10	t	$788	
Fertiliser application	600	@	$6.50	ha	$3,900	
Total fertiliser, seed and weed expenses						**$40,241**

Supplement making costs						
Pit silage	283500	kgDM			$26,700	
Meadow hay (round bales)	40	@	$24	bale	$960	
						$27,660

Animal Health and Feeding costs						
Animal health (04 born)	150		@	$15	calf	$2,250	
Animal health (03 born)	85		@	$8	calf	$680	
Milk (from vat) ($4.60/kgMS)	150		@	28	kgMS/calf	$19,320	
Pellets	3.5	t	@	$780	t	$2,730	
Barley straw purchases	60		@	$36	bale	$2,160	
Ryegrass straw purchases	260		@	$36	bale	$9,360	
							$36,500

Overheads		
Manager's wage	$27,000	
Owner's wage (runoff portion)	$20,000	
Vehicle expenses	$6,000	
Office allowance (includes admin)	$1,600	
Repairs and maintenance	$4,000	
Professional services	$1,200	
Rates and Insurance	$4,000	
		$63,800

Total Expenses incurred for 2004/05 year	**$162,166**

Economic depreciation on plant and machinery	
Market value of plant	$169,000
Economic depreciation (15% DV)	**$25,350**

Value of Runoff Capital Investment

Land					
160	ha	@	$16,800	ha	$2,688,000
Buildings					$300,000
Plant and machinery					$39,000
Irrigators					$130,000
Total capital invested in runoff					**$3,157,000**

FARMER C

Revenue Data

Winter Grazing					
200	cows	63	days	12600	cow wintering days
				1800	cow wintering weeks
	Assuming $13.50/head/week (net)				**$24,300**

Carry over cows (winter mated)					
75	cows	@	$1,100	$82,500	
5	dry cows	@	$450	$2,250	
	less value of cull ($350)			$26,250	
	less grazing (15th May - 31 July)			$8,000	
					$46,000

Dairy heifer grazing					
140	yearlings	22	weeks	$4.50	$13,860
		17	weeks	$6.50	$15,470
140	R2's	39	weeks	$6.50	$35,490
					$64,820

Dairy beef (sales and income foregone)				
2005 born				
100	Autumn born MS beef calves (Aug 1st value)	@	$300	$30,000
	less their value as 4-day old bobby calves	@	$80	$8,000
				$22,000
2004 born				
140	Spring born MS beef calves (Aug 1st value))	@	$420	$58,800
	less their value as 4-day old bobby calves	@	$80	$11,200
				$47,600
40	Autumn born beef heifer calves	@	$600	$24,000
	less their value at 1st August	@	$250	$10,000
	less grazing for 12 weeks	@	$80	$3,200
				$10,800
20	Autumn born beef bull calves	@	$650	$13,000
	less value at 1st August	@	$280	$5,600
	less grazing for 14 weeks	@	$100	$2,000
				$5,400
20	Autumn born beef calves (haven't been sold)	$5 per wk	$260	$5,200
				$91,000

Grass and Lucerne Baleage Sales					
180	tDM pit silage	@	$0.15	$27,000	
400	bales Lucerne	@	$0.16	$16,640	
300	bales g silage	@	$0.15	$11,700	
300	grass baleage (still on hand)	@	$50	$15,000	
50	grass hay (on hand)	@	$42	$2,100	
50	g. seed straw (on hand)	@	$40	$2,000	
300	barley straw (on hand)	@	$35	$10,500	
5500	kg of Tabu grass seed	@	$4	$22,000	
					$106,940

Other Revenue				
Rental	@	$150	week	**$7,800**

Total Revenue generated for 2004/05 year **$340,860**

Cost Data

Cultivation expenses							
Kale (full cultivation)	5.5	ha					
Glyphosate spray	@	$40	ha		$220		
Chisel plough	@	$45	ha		$248		
Grubber	@	$40	ha		$220		
Maxi-till/harrow/roller	@	$55	ha		$303		
Drilling	@	$45	ha		$248	$1,238	
Kale (direct-drilled)	6	ha					
Glyphosate spray	@	$40	ha		$240		
Direct-drilling	@	$80	ha		$480	$720	
Tabu	15	ha					
Glyphosate spray	@	$40	ha		$600		
Chisel plough	@	$45	ha		$675		
Maxi-till/harrow/roller	@	$60	ha		$900		
Drilling	@	$45	ha		$675	$2,850	
Greenfeed oats	4	ha					
Maxi-till and roll	@	$55	ha		$220		
Drilling	@	$45	ha		$180	$400	
Double-take Triticale	4.6	ha					
Glyphosate spray	@	$40	ha		$184		
Direct-drilling	@	$80	ha		$368	$552	
Re-bordering	10	ha		@	$850	$8,500	
							$14,260

Irrigation		
Border dyke irrigation expenses	$3,000	
Rotorainer (includes power expenses and r&m)	$12,000	
		$15,000

Fertiliser, Seed and Weed control costs					
Sulfur super (115ha)	350	@	$170	t	$6,843
DAP and 10kg Boron (20.1ha)	300	@	$470	t	$2,834
30% Potash super (15ha)	800	@	$220	t	$2,640
Nitrogen (20.1ha) - as urea	869.6	@	$400	t	$6,991
Nitrogen (110ha) - as urea	217.4	@	$400	t	$9,565
Kale seed (11.5ha)	2.5	@	$14	kg	$403
Tabu seed (15ha)	20	@	$4	kg	$1,200
White clover (15ha)	3	@	$12	kg	$540
Green-feed oats seed (4ha)	120	@	$600	t	$288
Triticale seed (4.6ha)	120	@	$900	t	$497

Lime	50	@	$30	t	$1,500	
Fertiliser cartage	99.7	@	$11	t	$1,096	
Fertiliser application	280	@	$7	ha	$1,960	
Lucerne aphid/weed spray	15	@	$55	ha	$825	
Grass seed MCPA	4	@	$40	ha	$160	
Other sprays					$1,000	
Total fertiliser, seed and weed expenses						$38,342

Supplement making costs

Supplement - on hand	300	@	$0.08	kgDM	$6,240	
Hay (mowing & baling)	150	@	$20	bale	$3,000	
Grass seed straw (rake & bale)	100	@	$15	bale	$1,500	
Grass seed heading costs	4	ha			$1,000	
Dressing/bagging of seed	5500	@	$0.17	kg	$935	
						$12,675

Animal Health and Feeding costs

140	drench, tag and dhorn		@	$15	$2,100	
100	drench, tag and dhorn		@	$15	$1,500	
Vat milk for rearing beef spring calves						
140	250	L	@	$0.30	$10,500	
Milkpowder for rearing beef autumn calves						
100	40	bags	@	$60	$2,400	
Labour for rearing calves					$2,500	
Barley straw purchases	700	bales	@	$35	$24,500	
						$43,500

Overheads

Labour	$20,000	
Management wage	$15,000	
Vehicle expenses	$8,000	
Office allowance (includes admin)	$1,500	
Repairs and maintenance	$7,000	
Telephone expenditure	$300	
Professional services	$1,000	
Rates and insurance	$3,400	
		$56,200

Abnormality

Chinese cabbage and radisch - 9.6ha		
Revenue	$8,000	
Costs	$8,000	
		$0

Total Expenses incurred for 2004/05 year	**$179,976**

Economic depreciation on plant and machinery	
Market value of plant	$100,000
Economic depreciation (20% DV)	**$20,000**

Value of Runoff Capital Investment

Land				
	131 ha	@	$16,000 ha	$2,096,000
Buildings				$150,000
Plant and machinery				$40,000
Irrigators				$60,000
Total capital invested in runoff				**$2,346,000**

FARMER D

Revenue Data

Winter Grazing (own cows)

1225	IC cows	64	days	78400	cow wintering days
110	MT cows	50	days	5500	
				11986	cow wintering weeks
	Assuming $15/head/week				**$179,786**

Wintering of outside cows

150 cows	**$33,100**

Dairy heifer grazing

334	yearlings	22	weeks	$4.50	$33,066
		17	weeks	$6.50	$36,907
331	R2	39	weeks	$6.50	$83,909
225	R2	4	weeks	$8.50	$11,254
					$165,136

Supplement Sales (to the milking platform and outside parties)

150	t DM grass pit silage	@	0.14	$/kgDM	$21,000
270	bales of grass baleage	@	$50	bale	$13,500
75	bales of hay	@	$42	bale	$3,150
430	t DM maize	@	0.24	$/kgDM	$103,200
150	t DM maize	@	0.175	$/kgDM	$26,250
					$167,100

Cropping Revenue

Wheat				$66,680	
Potatoes (as per lease agreement)				$71,550	
Peas	30	t	@	$600	$18,000
					$156,230

Other Revenue

Rental of homestead	@	$180	week	**$9,360**

Total Revenue generated for 2004/05 year **$710,711**

Cost Data

Cropping Expenses					
Spraying				$25,630	
Seed				$19,550	
Harvesting				$9,450	
Fertiliser				$73,900	
Freight				$4,690	
Fertiliser spreading				$7,980	
Silo				$210	
Seed Testing				$270	
Storage				$420	
Seed Drying				$1,590	
					$143,690

Maize Expenses					
Spraying				$1,790	
Seed				$15,150	
Drilling				$3,150	
Harvesting				$13,670	
Fertiliser				$10,300	
Fertiliser spreading				$1,040	
					$45,100

Irrigation					
Electricity				$36,410	
Irrigators				$2,510	
Systems				$1,800	
					$40,720

Fertiliser and Weed control costs					
Nitrogen				$1,960	
Spreading				$390	
Storage				$90	
Weed and Pest				$600	
					$3,040

Other Farm Working Expenses					
Hay baling	150	bales	$13	$1,950	
Baleage - bale & wrap	270	bales	$20	$5,400	
Re-grassing expenses				$690	
Freight				$280	
Clothing				$530	
Shelter				$180	
Electricity				$1,460	
					$10,490

Overheads		
Labour	$66,090	
Owner's wage (runoff portion)	$20,000	
Vehicle expenses	$19,440	
Repairs and maintenance	$14,830	
Office allowance (includes admin, phone)	$1,200	
Professional services	$1,200	
Rates and insurance	$11,120	
		$133,880

Total Expenses incurred for 2004/05 year	**$376,920**

Economic depreciation on plant and machinery		
Market value of plant	$170,000	
Economic depreciation (20%)		$34,000
Market value of irrigators	$341,000	
Economic depreciation (15%)		$51,150
Total Economic Depreciation		**$85,150**

Value of Runoff Capital Investment

Land	320 ha	@	$17,500 ha	$5,600,000
Buildings				$300,000
Plant and machinery				$170,000
Irrigators				$341,000
Total capital invested in runoff				**$6,411,000**

FARMER E

Revenue Data

Winter Grazing					
Own stock					
760	cows	70	days	53200	cow wintering days
				7600	cow wintering weeks
	Assuming $15.50/head/week (net)				**$117,800**

Heifer Grazing (winter)					
180	R2's	1	week	$9	**$1,620**

Grass, Triticale and Kale Sales (to the milking platform and external parties)						
200000	kgDM	grass	@	$0.15	kgDM	**$30,000**
201575	kgDM	grass	@	$0.15	kgDM	**$30,236**
141245	kgDM	grass	@	$0.15	kgDM	**$21,187**
23774	kgDM	grass	@	$0.15	kgDM	**$3,566**
236643	kgDM	grass	@	$0.19	kgDM	**$44,962**
87666	kgDM	grass	@	$0.15	kgDM	**$13,150**
194,000	kgDM	triticale	@	$0.14	kgDM	**$27,160**
17	ha kale		8,000kgDM/ha	$0.18	kgDM	**$24,480**
10	ha grass		3,500kgDM/ha	$0.18	kgDM	**$6,300**
						$201,041

Total Revenue generated for 2004/05 year **$320,461**

Cost Data

Cultivation expenses						
Into Pasture	17 ha					
Heavy grubbers (x2)		@	$35	ha	$1,190	
Roto-crumblers (x2)		@	$35	ha	$1,190	
Drill		@	$50	ha	$850	
Into Triticale	17 ha					
Plough hire		@	$8	ha	$136	
Own tractor to plough		@	$40	ha	$680	
Contractor - v-ring press, power harrow, drill		@	$110	ha	$1,870	
Into Kale	17 ha					
Contractor - direct/drill		@	$70	ha	$1,190	
						$7,106

Irrigation		
Electricity	$29,700	
Repairs and maintenance	$6,500	
		$36,200

Fertiliser, Seed and Weed control costs							
10% Potash Super	10.2	t	@	$178	t	$1,816	
Urea bulk	12.54	t	@	$394	t	$4,941	
Sulfur Super 30	27.00	t	@	$169	t	$4,563	
KML - Urea + KCL	10.50	t	@	$362	t	$3,801	
Urea bulk	12.54	t	@	$394	t	$4,941	
Urea Potash - KCL + Urea	12.00	t	@	$450	t	$5,400	
Cropmaster DAP	4.50	t	@	$531	t	$2,390	
Borate 46 Granular	0.18	t	@	$1,055	t	$185	
Cropmaster 16 - high K	27.04	t	@	$468	t	$12,655	
Urea bulk	12.00	t	@	$394	t	$4,728	
Transport and application (base fertilisers)						$6,315	
Bulk urea spreading	37.08	t				$900	
Chicken manure (spread)	105	t	@	$52	t	$5,460	
Seeds						$15,000	
Weed sprays						$700	
Total fertiliser, seed and weed expenses							**$73,793**

Supplement making costs and feed purchases						
Supplement making costs	280,000 kgDM		@	$0.05	$14,000	
Contractor charges (chop, cart, mow and stack external silage sale)					$19,155	
Weighing costs					$1,073	
Straw purchases	180,000kgDM	440 bales	@	$40	$17,600	
						$51,828

Overheads		
Labour (1/2 a unit)	$15,000	
Owner's wage (runoff portion)	$15,000	
Vehicle expenses	$2,000	
Office allowance (includes admin)	$1,800	
Repairs and maintenance (where not otherwise included)	$1,000	
Telephone expenditure	$1,000	
Professional services	$1,600	
Rates and insurance	$3,700	
		$41,100

Total Expenses incurred for 2004/05 year	**$210,027**

Economic depreciation on plant and machinery	
Market value of plant	$116,000
Economic depreciation (15% DV)	**$17,400**

Value of Runoff Capital Investment

Land	101 ha	@	$23,000 ha	$2,323,000
Plant and machinery				$8,000
Irrigators				$108,000
Total capital invested in runoff				**$2,439,000**

FARMER F

Revenue Data

Winter Grazing

430	MA cows	75	days	32250	cow wintering days
120	IC R2	60	days	7200	
				5636	cow wintering weeks
	Assuming $13.50/head/week (net)				**$76,082**

Carry over cows

18	cows (IC)	@	$1,000	$18,000	
2	cows (MT)	@	$450	$900	
20	less value of cull ($350)			$7,000	
					$11,900

Dairy heifer grazing

148	yearlings	5	weeks	$2	$1,480
		22	weeks	$4.50	$14,652
		17	weeks	$6.50	$16,354
120	R2's	39	weeks	$6.50	$30,420
		4	weeks	$9.00	$4,320
56	Outside R2's	36	weeks	$6.00	$12,096
					$79,322

Dairy beef (sales and income foregone)

2004 born

84	MS Fresian-beef 04 calves (Aug 1st value)	@	$450	$37,800
8	MS Fresian-beef 04 calves (sold @ weaning)	@	$320	$2,560
	less their value as 4-day old calves	@	$80	$7,392
				$30,408

2003 born

96	MS Freisian-beef 03 calves	@	$800	$76,800
	less their value as yearlings	@	$450	$43,200
				$33,600
				$64,008

Grass and barley sales (to the milking platform)

295	t barley (to M.P.)	@	$230	t	$67,850
110	t barley (surplus)	@	$230	t	$25,300
110,000	kgDM standing silage	@	$0.14	kgDM	$15,400
270	bales of silage (surplus)	@	$50	bale	$13,500
90	bales of straw (surplus)	@	$40	bale	$3,600
					$125,650

Other revenue				
Rental of homestead	@	$180	week	$9,360
Rental from grain silos (350t)	@	$9	tonne	$3,150
Rental from woolshed	@			$500
				$13,010

Total Revenue generated for 2004/05 year **$369,972**

Cost Data

Cultivation expenses						
Barley	50 ha					
Plough		@	$90	ha	$4,500	
Grubber / power harrow / drill / roller		@	$120	ha	$6,000	
Re-bordering costs (9ha)					$9,000	
Direct drill Tabu (20ha)		@	$110	ha	$2,200	
Cross-slot drill permanent pasture (27ha)		@	$120	ha	$3,240	
Roller drill Kale (3ha)		@	$80	ha	$240	
						$25,180

Irrigation						
Border dyke (full 92ha contracted)		$21			$1,932	
Irrigation clocks/gates (r+m)					$400	
Stock water costs (from well)					$600	
Spray irrigation electricity costs					$10,000	
						$12,932

Fertiliser, Seed and Weed control costs			170 ha			
DAP 15 S (25 kg K)	275	@	$320	t	$14,960	
Urea (90kgN/ha)	200	@	$400	t	$13,600	
C20 (27ha of p. pasture)	200	@	$390	t	$2,106	
C20 (3ha kale)	350	@	$390	t	$410	
Lime (30ha) - spread	3	@	$29	t	$2,610	
Tabu seed (20ha)	20	@	$4.20	kg	$1,680	
Permanent pasture (27 ha)						
Impact AR1	18	@	$6.50	kg	$3,159	
Aran WC	3	@	$11	kg	$891	
Kale seed (3ha)					$90	
Barley seed (DASH)	110	@	$230	t	$1,265	
Barley seedy dressing	110	@	$80	t	$440	
Barley weed spray	50	@	$60	ha	$3,000	
Barley fungal spray	50	@	$75	ha	$3,750	
Other sprays					$1,000	
Fertiliser cartage	87.2	@	$9	t	$785	
Fertiliser application	710	@	$5	ha	$3,550	
Total fertiliser, seed and weed expenses						**$53,295**

Supplement making costs					
Barley heading costs (incl	50	@	$160	ha	$8,000
Barley straw baling	180	@	$15	bale	$2,700
Pit silage (tDM)	110	@	$0.060	kgDM	$6,600
Baleage (250kgDM/bale)	390	@	$0.10	kgDM	$9,750

Pit silage (tDM)	40	@	$0.060	kgDM	$2,400	
						$29,450

Animal Health and Feeding costs						
Drenching and de-horn	92	@	$15	head	$1,380	
Milk (vat)	92	@	26	kgMS	$11,003	
Labour					$1,000	
Muesli	92	@	$15	calf	$1,380	
Rolled barley	92	@	$15	calf	$1,380	
						$16,143

Overheads		
Labour	$24,500	
Owner's wage (runoff portion)	$15,000	
Vehicle expenses	$5,000	
Office allowance (includes admin, accountancy)	$1,600	
Repairs and maintenance (where not otherwise included)	$3,500	
Professional services	$1,200	
Rates and insurance	$8,000	
		$58,800

Total Expenses incurred for 2004/05 year	**$195,801**

Economic depreciation on plant and machinery	
Market value of plant	$77,500
Economic depreciation (20% DV)	**$15,500**

Value of Runoff Capital Investment

Land					
92	ha	@	$17,000 ha		$1,564,000
82	ha	@	$30,000 ha		$2,460,000
Buildings					$350,000
Plant and machinery (includes irrigator)					$77,500
Total capital invested in runoff					**$4,451,500**