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Profit from improved pasture skills

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Abstract

Benchmarking activities undertaken by the Circular Head Beef Business Group (CHBBG) revealed low levels of profitability. The low profit levels were a function of low pasture growth and utilisation, and a high proportion of feed being consumed to maintain animals rather than for liveweight gain.

The group undertook a 2 day pasture management workshop and developed the Producer Initiated Research and Development (PIRD) project to look at the issues of increasing pasture growth and utilisation and increasing the proportion of pasture energy partitioned to liveweight gain. In addition to this, the PIRD was used as a training activity where producers were coached on a monthly basis in the implementation of the principles from the pasture management workshop.

Pasture utilisation was increased by more than 40%, liveweight production per hectare by 73% and farm profit by 250%.

Executive Summary

- The PIRD was undertaken for two main reasons:
    - To address a number of issues that became evident from the groups formal benchmarking activities. The main issues were; significant limitation in skills of the producer members on how to increase the amount of pasture grown and utilised and whether or not the proportion of energy partitioned to saleable product (meat production) could be increased above the group average of 25%.
    - As a support mechanism to enable practice change for the group once they had completed a pasture management workshop. The PIRD was used to demonstrate the implementation of pasture management principles in a commercial environment, enabling farmers to discuss the strategies derived from the principles and observe the outcomes of implementing these strategies.

- The group met on a monthly to six weekly basis and went through the process of collecting and processing the data required to make the best decisions to increase pasture growth and utilisation as well as meet the nutritional requirements of the stock.

- The data collected included pasture cover in each paddock, pre and post grazing residuals and leaf emergence rate. From this raw data, pasture growth rate and rotation length were established and feed allocation and supplementary feeding decisions were made. The purpose being to maximise pasture growth by grazing at the appropriate leaf stage and eating as much of this feed grown as possible by matching animal demand to the pasture growth.

- Pasture utilisation was increased from an average of around 5,500 kg DM/ha to 7,800 kg DM/ha or close to 42% and was associated with an increase in liveweight production per hectare from 345 kg/ha to 600 kg/ha.

- A skills audit and pre and post project survey indicated that farmer skill level and their confidence about making pasture management decisions had increased significantly over the course of the PIRD project. In fact they had similar levels of skills in the area of pasture management as the most profitable producers in the state.

- By having the appropriate rotation length for the whole year the need for nitrogen fertiliser was reduced. Over 40% more feed was harvested with less nitrogen input.

- Variable costs were increased in a pro rata manner (in the model) with pasture utilisation but there was significant savings (or dilution) of overhead costs and a reduction in the cost of production per kg of beef.

- The combination of increased liveweight production and reduced costs resulted in an increase in profit of about 250% and levels of profitability (return on capital) comparable with the best managers in the industry.

Contents

1 Background

1.1 Background

The Circular Head Beef Group formed 30 years ago to provide an opportunity for beef farmers to come together to learn about technical, seasonal and other issues relating to production. More recently a sub-group called the Circular Head Beef Business Group formed to allow interested farmers to go into more depth in business analysis and management. The group commenced activities by working through the MLA cost of production (CoP) calculator to initiate benchmarking between group members. The group have since taken their CoP analysis further to assess their return on capital, as well as many of the physical aspects of the business (see Appendix 1).

The members of the group are all beef producers, but there is significant variation in their production systems. The average size of the farms is 800 hectares grazing area with a stocking rate of 19.3 DSE/ha.

1.2 Problem definition

Since the group commenced benchmarking using the MLA CoP calculator it has become evident that each of the group members has considerable scope to increase business profit (Appendix 2). The most important issues highlighted have been that the use of the pasture base is low when compared to dairy farmers in the same area and that the proportion of grazed pasture used in maintaining animals rather than as saleable product is too high at around 75% (see Appendix 2). This was the case regardless of the whether the farm trades in cattle, runs a breeding operation or has a combination of the two. It is also despite seasonality of calving.

In order to improve profit, business intensity must increase. More pasture must be consumed on a per hectare basis and the proportion of pasture (or feed energy) going to beef production must increase. This can be partly addressed by increasing stocking rate but there also needs to be an improvement in pasture and fodder planning in order to finish cattle more quickly.

In recognition of the scope to improve their business profit from the COP and benchmarking activities, the group identified that the biggest limiting factor to achieving this was their pasture management skills. While a number of the group members had completed grazing management courses such as Prograze, they sought to build these skills in a process that supported them to implement what they learn on their own farms.

Since most of the farmers in the group had attended these courses in the past, the issue of why change had not been implemented on-farm arose. There seemed to be a number of reasons but ultimately it was proof that the principles could be implemented on farm, an opportunity to interact with other farmers while this was happening and an opportunity to both practice and observe the outcomes of implementing these principles. The group arranged to participate in a two-day pasture management workshop. Aligned with this course was the PIRD project “Profit from improved pasture skills” that actively demonstrated how to put the theory of pasture and grazing management into practice.

2 Project Objectives

2.1 Project Aims

2.1.1 Observational

Provide an opportunity for farmers to observe firsthand the impact on farm productivity and business profit of improved pasture management skills and practices.

2.1.2 Practice

To practice the skills obtained in a pasture management workshop and to promote these benefits to the wider beef community.

2.2 Project objectives

2.2.1 Pasture management principles

To demonstrate that by implementing the pasture management principles learned in the pasture management workshop, and developing the necessary skills associated with pasture management, that productivity can be increased and that the risks generally associated with higher stocking rates can be offset.

2.2.2 Pasture utilisation

In the case of the host farms to lift pasture utilisation by 40% within 12 months from an average of 5 tonnes DM/ha to 7 tonnes DM/ha.

2.2.3 Pasture partitioning

To reduce the proportion of pasture utilised going to animal maintenance from 75% to 60% by increasing growth rates and the speed at which animals are turned off. Currently the average is 270 days to gain 200 kg LW and it is felt that this could be reduced to 200 days with best management practice.

2.2.4 Supported learning

To provide an opportunity for the 8 farm businesses in the CHBBG that have committed to the pasture management workshop to regularly practice the skills developed in the workshop.

2.2.5 Awareness

To expose the broader CHBG group to the value of developing skills in the area of pasture management and to demonstrate that implementing these skills is simple and rewarding.

3 Methodology

3.1 Methodology - Supported learning

One of the group members who have completed the pasture management workshop volunteered a proportion of the farm to be managed at a much more intensive level using the principles of the pasture management workshop. This option was preferred to moving round a number of farms as it limited the number of distractions associated with having more than one farm to monitor and focused attention on the issues at hand.

In addition to this the other members of the group collected similar data on their farms. This was on a smaller scale but provided useful information in two areas:

1. Whether or not measuring smaller areas was useful in managing the whole farm.
2. Group members practiced the skills learned in the pasture management workshop and have relevant and timely information about their own farms to use as learning and discussion material when they met on the host farm.

The information was collected on the other group member's farms using a proforma, which was developed by the consultant. This ensured consistency in the information collected between farms, was more comparable and ensured replicated data for learning beyond the immediate group.

Both the area used and the mob size was above the industry average and truly represented a viable business unit. The group was interested in a demonstration that reflected the fundamental issues facing a commercial farm.

The host farm and other group members measured the following on a monthly to six weekly with the consultant:

1. Leaf emergence rate in order to set the correct rotation length and maximise pasture growth and feed quality.
2. All paddocks on the farm to determine the amount of pasture cover and relate this to pasture cover targets set at the start of the project. Pasture growth rate was also measured and related to animal requirement.
3. Pre grazing pasture mass and post grazing residual were measured in order to determine feed on offer and feed intake.
4. Animal requirements were determined to maximise animal intake and animal performance
5. Liveweight gain was measured bi-monthly to monitor the relationship between pasture intake and expected growth rate.

The group also noted any likely issues with respect to sustainability. The project was primarily focussed on financial sustainability but undertook to make a note of any environmental and social challenges associated with managing these particular adaptations to the beef system.

The other members of the group provided a network that supported the host farmer, as well as actively involved themselves in the decision-making processes on the farm. With the support group farmers implementing similar strategies on their own farms, they faced similar issues during the project period. The regular farm walks on the host farm provided an opportunity for them to discuss these with the group and the consultant.

A consultant was used to facilitate, support and provide coaching assistance to the group, particularly the host farm. The profitability changes were measured against the current performance of the farm using a variation of the cost of production calculator which included the capital value of the farm in order to calculate return on capital.

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4 Results and Discussion

4.1 Background

4.1.1 Host farm numbers

It was decided by the group to run two host farms. These farms were quite different with one being on lower rainfall coastal country. This area typically dries off earlier in the season but recovers more quickly in the autumn and has better winter growing conditions. The second farm was situated inland with a much higher rainfall, particularly through the summer but lower winter temperatures.

The decision to have two farms was twofold; firstly so that all members of the group were able to identify with a farm that had a similar resource base and climatic conditions and secondly to look at how the implementation of the various pasture principles would result in differing operational decisions on a day-to-day basis.

4.1.2 Farm walks

The farm walks were carried out initially on a monthly basis during the most dynamic period of the season (spring and early summer) and then 6-weekly as the season slowed down. The group may have benefitted from meeting more often however the budget constraints of the project did not permit this. The host farms and other group members and interested persons stayed in touch via email and there was a significant amount of discussion about various aspects of management throughout the year.

The farm walks generally consisted of the PIRD area being walked and pasture readings taken using a rising plate meter. At most walks there were 4-6 producers using their own plate meters to take recordings. In conjunction with the farm walk leaf emergence rate was also determined, the condition of the stock inspected and an assessment of weed and pest infestations also determined.

At the completion of each farm walk the group sat down and worked through the process of determining the appropriate rotation length (and hence area allocated to the mob each day), the amount of pasture on offer to each animal and the associated animal production expected, animal requirements and supplementary feeding or fodder conservation strategies.

The other members of the group, and any other interested participants were also encouraged to bring along similar data and a general discussion about how the data varied between farms took place as did discussions about how this might impact on management decisions.

4.1.3 Extension activities

The project plan and outline was described prior to commencement at a Red Meat Targets – More Beef from Pastures field day. This attracted a significant amount of interest and resulted in a number of producers and industry service providers registering their interest. While this was not originally

part of the project the group was happy to broaden the days to include other interested parties at the farm walks. A summary of the demographics and attendance is recorded in Table 4.1 below.

Table 4.1 Demographics and attendance at the monthly farm walks

Demographic	Average number attending monthly
Producer businesses	11
Producers	16
Service providers	3
Government	1

Over time interest grew in the project with a number of local and visiting farmers coming during times of the year that suited then. There was also about half a dozen international visitors as well as employees of MLA.

Table 4.2 Activities

Activity	No of activities	Total attendance
Monthly farm walk	8	128
Meat profit days	3	153
Field days	1	35
Articles	4	-
Interviews (radio)	2	-
Group visits	4	16

4.2 Results

4.2.1 Background

The results were collected by the host farmers as part of their management of the PIRD area. All cattle were weighed on to and off the PIRD area and in addition to this were weighed monthly to determine the average liveweight of the animals for the month and the average liveweight gain. The combination of these two data sets were used to back-calculate the pasture consumed on the PIRD site for the month. It was validated with the pre and post grazing pasture residuals.

4.2.2 Pasture utilisation - back calculation method

In order to quickly and cost effectively determine the amount of pasture being harvested and then the proportion of that which was maintaining animals or contributing to liveweight gain the following process was used.

Average liveweight of the animals on the PIRD site each month was determined from the weighing records. A simple relationship was then used to determine the average amount of pasture eaten daily for maintenance; average liveweight/100 + 1 = kg DM utilised for maintenance.

Similarly it was assumed that for every kg of liveweight gain, 4 kg DM pasture was consumed. This was based on an average of megajoules (MJ) of metabolisable energy (ME) being required to produce 1 kg liveweight (Lwt) and pasture being an average of 10 MJ ME per kilogram of drymatter (DM). In both instances it was assumed that the average quality of the pasture was 10 MJ ME/kg

DM. The sum of these two then became the amount of pasture utilised. Dividing by the area resulted in a pasture utilisation per hectare and dividing each of the two categories (maintenance and liveweight gain) by the total gave the ratio of pasture partitioning between liveweight and maintenance.

4.2.3 Summary of pasture utilisation results

The results for the two farms over the 12 month period of the PIRD are summarised in Tables 4.3 and 4.4. Complete data sets are attached in Appendices 3 and 4. One of the major complications with the trial was that the PIRD site formed part of the larger farm and as a result there were whole farm considerations to be taken into account. Of particular note, on Farm 1 there was a need to cut some additional hay and silage on the PIRD site as it was part of a small area on the farm suitable for this purpose. As a result of this the stocking rate was lower than that which may have fully utilised the additional feed and this may have compromised the amount of feed consumed for liveweight gain.

Table 4.3: Summary of results for Farm 1 (Stanley)

Variable	Historical	PIRD Trial
Pasture harvested for maintenance (kg DM/ha)	4128	4255
Pasture harvested for Liveweight (kg DM/ha)	1563	2237
Pasture conserved (kg DM/ha)	-	763
Change in pasture cover (kg DM/ha)	-	263
Total pasture harvested (kg DM/ha)*	5691	7518
Percentage pasture to maintenance (%)	73	72
Percentage pasture to Liveweight (%)	27	28
Liveweight per ha (kg)	391	559
Rainfall	812	707

*Includes increase in average pasture cover

Table 4.4: Summary of results for farm 2 (Lileah)

Variable	Historical	PIRD Trial
Pasture harvested for maintenance (kg DM/ha)	3995	4221
Pasture harvested for Liveweight (kg DM/ha)	1197	2857
Pasture conserved (kg DM/ha)	-	865
Change in pasture cover (kg DM/ha)	-	129
Total pasture harvested (kg DM/ha)*	5192	8072
Percentage pasture to maintenance (%)	77	71
Percentage pasture to Liveweight (%)	23	29
Liveweight per ha (kg)	299	636
Rainfall	1278	1032

*Includes increase in average pasture cover

The amount of additional pasture grown, or at least utilised, increased by 30-55% and this is reflected in the beef production per hectare figure which increased 42 and 112% on the respective sites.

Table 4.5: Results for Farm 1 (Stanley) for pasture eaten

Variable	Historical	PIRD Trial
Pasture harvested for maintenance (kg DM/ha)	4128	4255
Pasture harvested for Liveweight (kg DM/ha)	1563	2237
Total pasture eaten (kg DM/ha)	5691	7518
Percentage pasture to maintenance (%)	73	57
Percentage pasture to Liveweight (%)	27	33

Table 4.6: Results for farm 2 (Lileah) for pasture eaten

Variable	Historical	PIRD Trial
Pasture harvested for maintenance (kg DM/ha)	3995	4221
Pasture harvested for Liveweight (kg DM/ha)	1197	2857
Total pasture eaten (kg DM/ha)	5192	7078
Percentage pasture to maintenance (%)	77	60
Percentage pasture to Liveweight (%)	23	40

4.3 Seasonality

Obviously the season can have a significant impact on the production and utilisation of pasture. In the year of the PIRD trial rainfall was 12-19% below average and the year was characterised by a late spring, very dry summer and an early autumn. As a result there would seem to be, on a whole, no significant positive seasonal impact biasing the results of the PIRD trial.

The increase in pasture growth and/or utilisation can be assigned primarily to an increase in pasture and animal management.

4.4 Stocking rate

The stocking rate adopted on the PIRD sites was driven out of feed budgets which were based on historical averages of growth on the farms. Since these averages are a function of historical management they are to some extent self limiting. However it was felt that significant increases in the number of animals on the PIRD site was not necessary given that one of the primary aims of the PIRD was to increase the proportion of feed to liveweight gain. The simplest way to achieve this was to increase the amount of feed to each animal, increase liveweight gain and dilute the amount of pasture consumed to maintain animals.

There were significant periods of time however when pasture growth exceeded demand and silage or hay had to be made. An increase in stocking rate through more animals may have increased the direct harvesting of pasture and business profit. In addition to this there was also limited opportunity to use nitrogen to further increase pasture production due to the conservative stocking rates.

Another reason for not increasing stocking rate through additional animals was that the confidence of the host farmers may not have been high enough after just attending the pasture management workshop. The host farmers contributed a significant part of their farm and as a result may have felt overly exposed financially if large increases in stocking rate were required. If the trial was redone or extended an increase in stocking rate would almost certainly be required. It is likely that the producers would be confident enough to do this now.

4.5 Pasture utilisation

Pasture utilisation increased dramatically (32% and 55%) and was due to a number of issues. The most important was the introduction of a system that based grazing rotation on plant morphology. This meant that at all times of the year pasture growth was being optimised by grazing at the appropriate leaf stage (2.5-3 leaves for ryegrass based pastures) and coinciding with peak dry matter accumulation.

Inappropriate grazing rotation length can easily reduce pasture growth by 50% and increase pasture costs by upwards of 60% (CoP calculation). The combination of these two factors leads to a significant impact on farm business profit.

While there was limited information available on the potential for animals to consume certain amounts of pasture, the group was able to use post grazing residual as a good guide. This meant that when pasture was in excess the animals were getting as much as they could physically eat without compromising pasture regrowth and quality.

4.6 Beef production

Beef production per hectare increased even more dramatically than pasture production. This was to be expected due to the fact that similar stocking rates existed on the PIRD as the rest of the farm (that is the historical average) but they were better fed. In effect much of the additional pasture grown and subsequently consumed ended up as animal production (the rest as conserved fodder or an increase in average pasture cover).

An increase in production per hectare of 42 and 112% respectively with little increase in the cost of production could be expected to have a significant impact on business profit.

In addition to the increase in the liveweight of the animals the rate of gain was also higher than the historical average. There was some anecdotal evidence from both farms that this resulted in an increased proportion of these animals achieving higher MSA specifications and an increased beef price. This was not included in the economic evaluation.

4.7 Energy partitioning – maintenance versus production

The aim was to try to reduce the proportion of pasture (or energy) that is consumed by the grazing animal going to maintaining that animal, or conversely increasing the proportion going to liveweight gain. When the total amount of pasture harvested is considered there was only a slight increase in this area and certainly nothing like the aim of reducing the proportion from 75% to 60%.

The reasons again are complex but could potentially be overcome. There were significant amounts of fodder conserved on both sites. A higher stocking rate would have seen more pasture grazed in-situ and provided additional “mouth power” to consume the remaining conserved fodder. If this were very high quality silage then increasing liveweight gain may have resulted. There does not appear to be any economic reason to deliberately make hay, which tends to have lower energy density and higher NDF.

Many of the animals lost weight through the autumn period despite increasing pasture availability, allocation and intake. This is an area that may warrant further investigation from an animal nutrition

point of view. From a grazing management point of view it probably would have been better to increase the amount of supplements at the autumn break and allow the sward to growth through to at least 2 leaf stage prior to grazing. This could have easily been achieved with a more aggressive supplement strategy through the autumn. It is unlikely that the total amount of supplements required would have increased since the animals had adequate pasture (albeit not of the appropriate quality). Where a farm did not have access to supplements they could have continued to maintain or increase the rate at which liveweight is being lost in the short term in order to achieve this.

However, if we consider just the proportion of the pasture consumed (tables 4.5 and 4.6) there was a significant improvement in the proportion of feed converted to liveweight gain, in fact very close to the targets set at the start of the PIRD.

4.8 Skill development

4.8.1 Background

The project, in addition to the technical objectives outlined earlier, was also very strongly focussed on providing members of the broader beef business group with an opportunity to practice and to see the results of implementing the principles in the pasture management workshop.

Each month, in addition to the calculations associated with the operational management of the PIRD sites there was a session on data collection and analysis and skill development. Some of the topics covered included:

1. Plant identification
2. Determining leaf emergence rate
3. Animal requirements
4. Pasture growth rates
5. Average pasture cover
6. Fertiliser requirements including nitrogen
7. Calculating the area for fodder conservation
8. Nitrogen use and is profitability
9. Supplementary feeding strategies
10. Optimising plant persistence

As each new skill was learned it was reinforced at subsequent farm walks while ever it was still a relevant issue. This meant that there were many opportunities to practice the skills on the PIRD farms and farmers were also encouraged to bring their own numbers along and the exercises were repeated for a number of farms each month. This not only created a repetitive learning process but kept it entertaining and relevant by using the group members own situations.

The other very important aspect of constantly applying the pasture management principles was clearly demonstrating that these principles while holding in all situations will result in very different strategies for different farms with different resources bases or facing different climatic conditions.

It was extremely encouraging that a number of younger farmers were attending the meetings with their parents and catching on to the principles very quickly and becoming extremely motivated by the potential improvements they could make with the new found skills.

4.8.2 Change in skill base

In order to determine the change in skills base a skills audit was conducted prior to and at the completion of the PIRD project. In both instances the audit was completed without any input from the project manager. The results are contained in Figure 4.1 below.

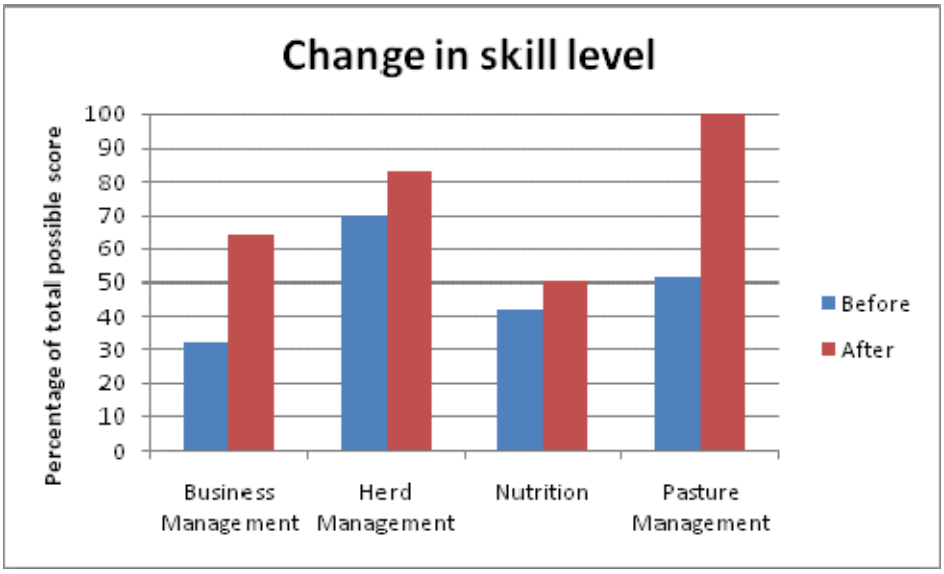

Figure 4.1: Change in skill level after the completion of the PIRD

There was a major increase in the level of skill in all areas measured by the skills audit but particularly in the area of pasture management where the participants were able to demonstrate a very high level of skill and knowledge.

Some of the improvements in the other areas could be due, or at least be partly due to the coaching process as it is very hard not to touch on other areas of the business. In particular the coaching might have been expected to improve skills in the area of nutrition and herd management because these issues clearly arise with increased intensity of management. It appeared that an improvement in management areas other than just pasture management resulted from the PIRD.

The participants lifted their skills levels significantly and in the areas of pasture management, business management and herd management compared very well with the “best” producers in the grazing industries. The comparison between the PIRD group and the “best” in the industry is contained in Figure 4.2.

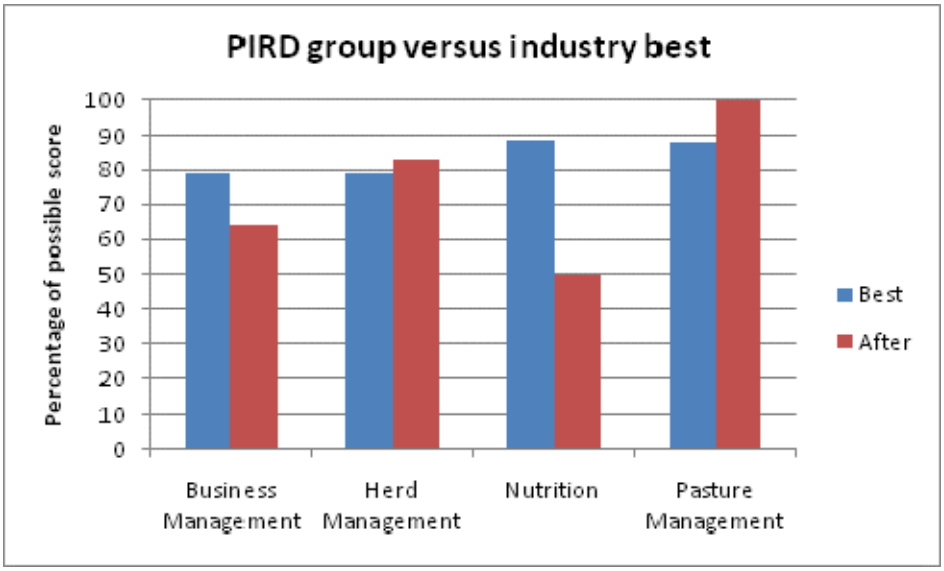

Figure 4.2 Comparison of the PIRD group and the best in the industry after the PIRD

The best producers in the grazing industries are achieving returns to capital of around 5% pa despite record high land prices and low meat prices (Davey and Maynard skills audit and CoP data 2004-2007). The level of skill that they possess and ultimately implement is what drives profit.

4.8.3 Change in confidence

Often when dealing with dynamic and leaky systems such as those associated with primary production, it is not always possible to measure improvement by either physical or economic parameters between seasons. Even a change in skill base may not always result in significant improvement in the physical and economic aspects of the business within the timeframe of the project. As a result a pre and post project survey was conducted to look at how confident and to what extent producers were implementing the skills learned in the pasture workshop and PIRD.

The change in confidence and level of practice of the skills is outlined in Table 4.5 below.

Table 4.5 Change in confidence and attitude of participants in the PIRD

	Before	After
Plans for the next 3-5 years		
- reduce activity	12.5%	0
- maintain activity	12.5%	12.5%
- grow gradually	62.5%	62.5%
- grow rapidly	12.5%	25%
Target pasture utilisation (T DM/ha)	5	7
Confident in		
- increasing stocking rate	na	100%
- increasing production from pasture	na	100%
- increasing profit	na	100%
Skill awareness*	85%	100%
Skill confidence*	36%	60%
Skill value*	100%	100%
Skill practice*	19%	55%
Coaching process rating (1-5 scale)	na	5
Project rating (1-5 scale)	na	5

* Set of 14 pasture management skills

The participants appear to be much more confident in the use of the various skills associated with pasture management, and as a result of this were practicing these skills well. In actual fact a significant number of the group were using plate meters in preference to “eyeballing” pastures and were calculating animal feed requirements on paper but not in their heads. Both these methods are preferential and should result in the other, less accurate option being ticked as “practised”. This would have lifted the “Skills practice” section to about 65%.

4.9 Economic performance

4.9.1 The model

A simple economic model was developed from the Cost of Production calculator which took the economic evaluation to the level of return on capital. This information was gathered for the two years prior to the PIRD being started and was used as the basis for analysing the change in farm profit associated with a change in pasture skills.

In addition to the information gathered by the CoP information determining pasture utilisation and partitioning is also included as is information about the farms capital value. An example of the Model is contained in appendix 1.

4.9.2 Assumptions

In order to look at the change in economic performance it is necessary to make a number of assumptions. The first and most important is that the performance on the PIRD area can be replicated over the entire grazing area of the farm. It was deemed that this was a reasonable assumption because there were no perceived logistical restrictions to this and the PIRD was selected as being a representative area of the whole farm.

There are a number of issues that might come to mind as limiting the ability of the PIRD results to be replicated over the whole farm. These are dealt with in section 4.9.4, because ultimately they could be overcome by allocating money to them.

A summary of the change in economic performance (modelled) is illustrated in Table 4.6.

Table 4.6: Change in a number of key economic parameters

	Farm1 before	Farm 1 after	Farm 2 before	Farm 2 after
Income	$307,700	$424,000	$329,740	$639,580
Variable costs	$88,900	$117,430	$167,640	$217,470
Gross margin	$218,780	$306,570	$162,100	$422,110
Overhead costs	$90,200	$96,980	$147,240	$158,590
EBIT	$128,580	$209,590	$14,860	$263,520
ROC	3.2%	5.2%	0.3%	5.6%

4.9.3 Impact on income

Income increased dramatically despite not including the sales of conserved fodder or valuing the increase in average pasture cover over the 12 month period. Income increased on average by 67% and was the single biggest driver of the increase in total farm profit. The increase in income with a constant price is directly related to the additional pasture utilisation and beef production per hectare.

4.9.4 Impact on costs

On both farms the variable costs were increased in line with the additional pasture utilisation. This is despite, in reality less total inputs being used in the area of nitrogen. It is possible that there would be only small increases in the fertiliser needs since the improved position of the business is due to managerial influence rather than being driven directly by inputs. It was felt however that on an ongoing basis additional inputs would be needed to sustain the higher level of production. While they may not be on a pro rata basis in this case they were increased in this fashion.

Overhead costs were increased where it was deemed appropriate. Obviously costs such as rates and insurance would not increase, however labour and repairs and maintenance were increased to reflect the anticipated increase in livestock numbers and in the case of repairs and maintenance the associated wear and tear on infrastructure such as yards and laneways.

4.9.5 Impact on profit

Profit increased from and average of $140/ha prior to the PIRD to $490/ha after. This is an increase of 250% and the culmination of increased pasture utilisation, increased income and cost control. This is a spectacular increase in profit and is believed to be a conservative figure based on pro rata increases in variable costs and the decision not to include potential income from fodder produced over and above that required by the animals in the trial and the potential profit from the increase in average pasture cover during the trial period.

5 Success in Achieving Objectives

5.1 Pasture utilisation

The project clearly achieved the objective of increasing pasture utilisation. On average pasture utilisation was increased by around 43% in a lower than average rainfall season and with less nitrogen. The target was to increase pasture utilisation on both of the PIRD farms by 2000 kg DM/ha or by 37%.

As a result the pasture utilisation objective was clearly met.

5.2 Pasture partitioning

The PIRD trial had an objective of decreasing the amount of pasture (energy) going to maintenance from 75% to 60%. Whether or not this objective was met is debateable. If we consider the proportion of pasture that ended up as liveweight as a percentage of the total pasture harvested the goal was not achieved. However if it is considered as a percentage of the pasture consumed by cattle, and not including that conserved or increasing average pasture cover then the objective was achieved.

5.3 Beef production

Based on the increase in pasture utilisation a target of 473 kg beef produced per hectare was set. The PIRD trial averaged 598 kg liveweight per hectare, this is 26% above the target set and as a result the beef production target was clearly met.

5.4 Skill development

The project was particularly successful in this area. At the end of the project the farmers involve in the group clearly demonstrated a higher level of skill and as a result of this increased confidence in managing the pasture base.

The method adopted (supported learning by coaching) was very successful in helping farmers to ground truth the principles from the pasture management workshop and to see the results of this in a complex and dynamic environment. The objective of increasing farmer skills and confidence was clearly met.

5.5 Farm profitability

The combined influence of the parameters described in sections 5.1-5.4 had a dramatic influence on farm profit. It was expected that profit would increase significantly but the increase realised was very impressive with profit more than doubling.

The profit objective was clearly met.

6 Impact on Industry – now & in five years time

6.1 Impact on Meat and Livestock Industry

6.1.1 Now

As is the case with much of the information about the Southern beef industry there appears to be huge scope to increase farm productivity and profit. This was confirmed by the CHBBG's own benchmarking and to their credit they committed to doing something about it.

Each member of the group invested their own money in attending a pasture management workshop and was fortunate enough to obtain MLA funding for the PIRD. The PIRD provided the opportunity to discuss, practice and see the results of implementing the principles from the workshop at the commercial scale. By the end of the 12 month period producers were very familiar with the principles used to determine pasture grazing strategies and clearly very confident and skilful in implementing these strategies.

The project clearly demonstrates that if adequate resources are deployed to train and support producers through the learning process then significant increases in skill and farm performance can result. It is important that the areas where training occurs are areas that have a large impact on farm profit in order to justify the expenditure.

The impact that the project has on industry, in reality is likely to be very small due to the fact that despite the project demonstrating that very large increases in profit are possible, it does not provide ongoing opportunities for other producers to do the same. It is debateable whether farmers would pay the full commercial rate in order to achieve these results, without a significant awareness and marketing campaign.

6.1.2 In five years time

If a coordinated approach was adopted by industry, particularly in the higher rainfall and irrigated areas of Australia then enormous benefit could be derived from a similar, larger scale project. It is likely that there would be significant economies of scale that could be captured if a whole of industry approach was adopted.

There is an enormous amount of data suggesting that the best producers are a long way in front of the average and that in the majority of cases this is due to the management of the feedbase. The results obtained in this project could quite easily be replicated on an industry wide basis with a centralised and coordinated approach.

In five years up to 50% of Southern beef producers could be put through this process and profitability could be dramatically increased.

7 Conclusions and Recommendations

7.1 Conclusions and Recommendations

It is clear that there still remains a huge potential to increase farm profit on beef farms in Southern Australia. There is a large body of work that clearly suggests that this is the case; however when it

comes to helping farmers to achieve this it has proven very difficult with only modest improvements in profit over the last 20 years.

Clearly it is not impossible, and with the right support, quite easy. However this is where the dilemma exists. In order to get a large number of principles (many of which are often counterintuitive) implemented by farmers in complex systems there is the need for significant support. In addition to this there is a very high level of awareness of the importance of pasture management and utilisation of the fodder base but also confusion amongst producers between the skills required and the technologies at their disposal.

What this means is that many producers are prepared to use the latest and greatest technologies in the hope that they alone will increase profit. This is not the case and in fact where skills are limiting the opposite can occur, that is profit will decline.

Just like any training activity, dogs and children included there is the need for support as part of the process. Support is a significant upfront cost that must be borne by someone and often a producer with a poorly performing business cannot afford this and so the cycle is self perpetuating.

One idea could be to use seed capital to get some groups implementing and then for them to go forward as advocates to encourage others to spend the money required to gain the skills. A second option might be for MLA or a sponsor to provide a loan or a money back guarantee to participants.

There certainly needs to be leadership and innovation in breaking this most fundamental of problems in the area that continues to limit farm profit and the viability of the Southern beef industry.

8 Appendices

8.1 Appendix 1

		Total	Per Effective Hectare	Per kg beef
Beef sales				
Total beef produced				
191,106 kg @ 1.61		$307,681	$629.20	$1.61
Total Income		**$307,681**	**$629**	**$1.61**
Cow Costs				
An. Health	7290			
Electricity	2560			
Transport and Cartage	2807			
Selling costs	2151			
		$14,900	$30.47	$0.08
Feed Costs				
Pasture costs	$45,371			
Contract costs	$14,791			
Purchased feed	$0			
		$60,200	$123.11	$0.32
Tractor,Plant & Vehicle Operating Costs				
Repairs	$7,003			
Fuel and oil	$6,798			
		$13,801	$28.22	$0.07
Total Variable Costs		**$88,901**	**$182**	**$0.47**
Gross Margin		**$218,780**	**$447**	**$1.14**
Wages/Drawings Including Superannuation & Workers Comp				
Permanent	$50,160			
Casual	$0			
		$50,160	$102.58	$0.26
Structures & Improvements R&M		$10,701	$21.88	$0.06
Insurance		$4,047	$8.28	$0.02
Administration		$8,323	$17.02	$0.04
Rates		$7,205	$14.73	$0.04
Capital Replacement/Depreciation		$9,780	$20.00	$0.05
Total Overheads		**$90,216**	**$184**	**$0.47**
EBIT**		**$128,564**	**$263**	**$0.67**
ROC		**3.3%**		

	Opening No.	Closing No.	Average	Difference	Average Lwt	Total Energy
Cows	235	244	239.5	9	550	6180769
Calves	0	0	0	0	0	0
Weaners	325	285	305	-40	305	4235599
Heifers	82	62	72	-20	500	1204134
Steers 1yr	150	167	158.5	17	350	3110085
Steers 2yr	102	145	123.5	43	500	3855546
Bulls	21	14	17.5	-7	800	345900

	MJ	Pasture
Maintenance	18932034	1893203
Production	7644240	764424
Purchased feed	0	0
Total		2657627

Total pasture utilisation /ha

5435 kgDM/ha

Pasture/ha for maintenance	71%	3872	kgDM/ha
Pasture/ha for beef production	29%	1563	kgDM/ha

Cents per kilogram of Drymatter $0.03

DSE/ha 20.1

8.2 Appendix 2

Key Performance Indicators

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Average
Business								
ROC	3.3%	0.3%	2.5%	4.7%	2.0%	4.0%	3.3%	2.9%
Increase Land 10%	3.0%	0.3%	2.3%	4.3%	1.8%	3.8%	3.1%	2.7%
Reduce Land 10%	3.6%	0.4%	2.8%	5.1%	2.1%	4.4%	3.6%	3.1%
ROE								
EBIT ($'000)	$128,564	$14,868	$48,622	$180,593	$221,635	$104,795	$136,662	$119,391
Disp.Inc ($'000)	$188,504	$129,975	$108,025	$255,191	$428,223	$195,608	$212,160	$216,812
NW Incr. ($'000)								
People								
DSE/FTE	7,166	3,710	3,778	9,660	9,040	3,659	7,752	6395
Inc./FTE ($'000)	$214,689	$96,175	$117,612	$260,234	$215,550	$134,314	256662.7	$185,034
Op.Hrs/Week								
Holidays								
Training								
Injury								
Environmental								
Irrigation ML								
Nitrogen								
Pasture Fertility								
	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
Soil type								
Olsen P								
K								
Farm								
Kg liveweight	191106	198640	125039	236450	594770	172864	213175	247435
DSEs	10,270	12,721	5,583	14,132	37,416	7,430	11,074	14089
Grazing Area	489	664	234	1050	2300	357	546	806
Labour FTE	1.43	3.4	1.5	1.5	4.1	2.0	1.4	2.2
Irrigation ML								
Price kg beef	$1.61	$1.66	$1.39	$1.61	$1.50	$1.58	$1.72	$1.58
Productivity Ratios								
Kg beef/Ha	391	299	534	225	259	484	390	369
Kg beef/DSE	19	16	22	17	16	23	19	19
Heifer %								
DSE/Ha	21.0	19.2	23.9	13.5	16.3	20.8	20.3	19.3
Comparative SR	21.0	19.2	23.9	13.5	16.3	20.8	20.3	19.1
Pasture								
Home T DM/Ha	5691	5192	6466	3647	4409	5640	5497	5220
Pasture maintenance	3935	3995	4400	2724	3318	3703	3935	3716
Pasture beef	1562	1197	2065	879	978	1936	1562	1454
Irrigation %	0%	0%	0%	0%	0%	0%	0%	0.0%
c/kgDM	$0.03	$0.04	$0.03	$0.02	$0.03	$0.02	$0.04	$0.03
Purchased %	0%	0%	2%	0%	0%	0%		0.4%
Financial								
Total Assets ($m)	$3,928,325	$4,574,320	$1,920,170	$3,868,630	$11,261,290	$2,592,450	$4,137,880	$4,611,866
Total Liabilities($m)								
Net Worth ($m)								
Equity %								
Assets/Ha	$8,033	$6,889	$8,206	$3,684	$4,896	$7,262	$7,579	$6,650
Assets/DSE	$383	$360	$344	$274	$301	$349	$374	$340
Assets/kg beef	$21	$23	$15	$16	$19	$15	$19	$18

Totals ($'000)

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Average
Beef	$307,681	$329,742	$173,804	$380,685	$892,155	$272,745	$366,661	$389,068
L/S Trading & Other	$0	$0	$0	$0	$0	$0	$0	$0
Total Income	$307,681	$329,742	$173,804	$380,685	$892,155	$272,745	$366,661	$389,068
Animal Husbandry	$14,900	$21,500	$5,800	$28,900	$101,600	$16,700	$15,700	$29,300
Feed	$74,001	$146,139	$46,729	$67,047	$319,655	$44,531	$105,725	$114,832
Total Variable Costs	$88,901	$167,639	$52,529	$95,947	$421,255	$61,231	$121,425	$144,132
Gross Margin	$218,780	$162,103	$121,275	$284,738	$470,900	$211,514	$245,236	$244,935
Overheads(Excl.Labour)	$40,056	$57,235	$20,931	$52,945	$107,271	$35,706	$58,574	$53,245
Labour	$50,160	$90,000	$51,722	$51,200	$141,994	$71,013	$50,000	$72,298
Total Overheads	$90,216	$147,235	$72,653	$104,145	$249,265	$106,719	$108,574	$125,544
EBIT	$128,564	$14,868	$48,622	$180,593	$221,635	$104,795	$136,662	$119,391
Total Dairy Assets	$3.9 m	$4.6 m	$1.9 m	$3.9 m	$11.3 m	$2.6 m	$4.1 m	$4.6 m
ROC	3.3%	0.3%	2.5%	4.7%	2.0%	4.0%	3.3%	2.9%

Per Hectare

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Average
Beef	$629	$497	$743	$363	$388	$764	$671.54	$579
L/S Trading & Other	$0	$0	$0	$0	$0	$0	$0	$0
Total Income	$629	$497	$742.75	$362.56	$387.89	$763.99	$671.54	$579
Animal Husbandry	$30	$32	$24.79	$27.52	$44.17	$46.78	$28.75	$34
Feed	$151	$220	$199.70	$63.85	$138.98	$124.74	$193.64	$156
Total Variable Costs	$182	$252	$224.48	$91.38	$183.15	$171.52	$222.39	$190
Gross Margin	$447	$244	$518	$271	$205	$592	$449.15	$390
Overheads(Excl.Labour)	$82	$86	$89.45	$50.42	$46.64	$100.02	$107.28	$80
Labour	$103	$136	$221.03	$48.76	$61.74	$198.92	$91.58	$123
Total Overheads	$184	$222	$310	$99	$108	$299	$198.85	$203
EBIT	$263	$22.39	$207.79	$171.99	$96.36	$293.54	$250.30	$176

Per DSE

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Average
Beef	$30	$26	$31	$27	$24	$37	$33	$30
L/S Trading & Other	$0	$0	$0	$0	$0	$0	$0	$0
Total Income	$30	$26	$31	$27	$24	$37	$33	$30
Animal Husbandry	$1	$2	$1	$2	$3	$2	$1	$2
Feed	$7	$11	$8	$5	$9	$6	$10	$8
Total Variable Costs	$9	$13	$9	$7	$11	$8	$11	$10
Gross Margin	$21	$13	$22	$20	$13	$28	$22	$20
Overheads(Excl.Labour)	$4	$4	$4	$4	$3	$5	$5	$4
Labour	$5	$7	$9	$4	$4	$10	$5	$6
Total Overheads	$9	$12	$13	$7	$7	$14	$10	$10
EBIT	$13	$1	$9	$13	$6	$14	$12	$10

Per kg beef

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Average
Beef	$1.61	$1.66	$1.39	$1.61	$1.50	$1.58	$2.12	$1.64
L/S Trading & Other	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Income	$1.61	$1.66	$1.39	$1.61	$1.50	$1.58	$2.12	$1.64
Animal Husbandry	$0.08	$0.11	$0.05	$0.12	$0.17	$0.10	$0.09	$0.10
Feed	$0.39	$0.74	$0.37	$0.28	$0.54	$0.26	$0.61	$0.46
Total Variable Costs	$0.47	$0.84	$0.42	$0.41	$0.71	$0.35	$0.70	$0.56
Gross Margin	$1.14	$0.82	$0.97	$1.20	$0.79	$1.22	$1.42	$1.08
Overheads(Excl.Labour)	$0.21	$0.29	$0.17	$0.22	$0.18	$0.21	$0.34	$0.23
Labour	$0.26	$0.45	$0.41	$0.22	$0.24	$0.41	$0.29	$0.33
Total Overheads	$0.47	$0.74	$0.58	$0.44	$0.42	$0.62	$0.63	$0.56
EBIT	$0.67	$0.07	$0.39	$0.76	$0.37	$0.61	$0.79	$0.52

Cost of Production ?

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Average
At 0% ROC*	$0.99	$1.58	$1.03	$0.86	$1.13	$0.98	$1.08	$1.11

* "Cost of Production" here is Beef Price at which ROC =0% (Variable Costs + Overheads - L/S Trading & Other Income)

Percentage of Income

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Average
Beef	100%	100%	100%	100%	100%	100%	100%	100%
L/S Trading & Other	0%	0%	0%	0%	0%	0%	0%	0%
Total Income	100%	100%	100%	100%	100%	100%	100%	100%
Animal Husbandry	5%	7%	3%	8%	11%	6%	4%	6%
Feed	24%	44%	27%	18%	36%	16%	29%	28%
Total Variable Costs	29%	51%	30%	25%	47%	22%	33%	34%
Gross Margin	71%	49%	70%	75%	53%	78%	67%	66%
Overheads(Excl.Labour)	13%	17%	12%	14%	12%	13%	16%	14%
Labour	16%	27%	30%	13%	16%	26%	14%	20%
Total Overheads	29%	45%	42%	27%	28%	39%	30%	34%
EBIT	42%	5%	28%	47%	25%	38%	37%	32%
Finance								
Net Profit								

Assets

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	Average
Land & Improvements	$3,101,250	$3,420,000	$1,562,250	$3,070,000	$7,992,500	$1,909,250	$3,129,000	$3,454,893
Plant & Machinery	$97,800	$251,070	$78,620	$233,980	$645,940	$198,000	$254,980	$251,484
Livestock	$729,275	$903,250	$279,300	$564,650	$2,622,850	$485,200	$753,900	$905,489
Fodder								
Shares								
Total Assets	$3,928,325	$4,574,320	$1,920,170	$3,868,630	$11,261,290	$2,592,450	$4,137,880	$4,611,866
Increase Land 10%	$4,238,450	$4,916,320	$2,076,395	$4,175,630	$12,060,540	$2,783,375	$4,450,780	$4,957,356
Reduce Land 10%	$3,618,200	$4,232,320	$1,763,945	$3,561,630	$10,462,040	$2,401,525	$3,824,980	$4,266,377
Effect of Land Value on ROC								
Base	3.3%	0.3%	2.5%	4.7%	2.0%	4.0%	3.3%	2.9%
Increase Land 10%	3.0%	0.3%	2.3%	4.3%	1.8%	3.8%	3.1%	2.7%
Reduce Land 10%	3.6%	0.4%	2.8%	5.1%	2.1%	4.4%	3.6%	3.1%
Plant & Machiney % of Total Assets	2.5%	5.5%	4.1%	6.0%	5.7%	7.6%	6.2%	5.4%

8.3 Appendix 3

Bruces PIRD site (Stanley)

APC opening	1243	kg DM/ha
APC closing	1506	kg DM/ha
Difference	263	kg DM/ha

Month	August	September	October	November	December	January	February	March	April	May	June	July	
Area (ha)	60	60	60	60	60	60	60	60	60	60	60	60	
Cattle Nos	170	170	172	172	158	108	108	108	150	152	170	170	
Days in month	31	30	31	30	31	31	29	31	30	31	30	31	
Liveweight start	228	247	331	372	424	441	452	463	475	373	253	270	
Liveweight end	247	331	372	424	441	452	463	475	460	399	270	287	
Pasture harvested (maintenance)	296	331	401	428	435	305	291	318	426	382	307	332	
Liveweight gain/day (kg/hd/day)	0.61	0.61	1.35	1.32	0.556	0.37	0.37	0.37	-0.5	0.57	0.62	0.62	
Pasture harvested (liveweight)	214	207	480	454	182	83	77	83	-150	179	211	218	
Silage/hay cut			22500	23250									
Pasture harvested/ha (actual)	502	502	1238	1248	609	384	365	397	281	551	511	543	**7131**
Pasture harvested/ha (target)	600	600	1000	1000	600	400	300	400	500	600	500	500	**7000**
% Pasture to Maint (actual)	58%	61%	46%	49%	71%	79%	79%	79%	154%	68%	59%	60%	**72%**
% Pasture to Maint (target)	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**
Liveweight/ha	**54**	**52**	**214**	**210**	**45**	**21**	**19**	**21**	**-38**	**45**	**53**	**54**	**750**
Rainfall													
Monthly average	95	85	70	57	51	40	32	45	67	83	85	102	**812**
Monthly actual	95	93	65	12	98.5	6	12.5	42	62.5	57.5	63	99.9	**707**

8.4 Appendix 4

Lester PIRD site (Lileah)

APC opening	1379	kg DM/ha
APC closing	1508	kg DM/ha
Difference	129	kg DM/ha

Month	August	September	October	November	December	January	February	March	April	May	June	July	
Area (ha)	60	60	60	60	60	60	60	60	60	60	60	60	
Cattle Nos	133	133	208	237	237	205	85	85	64	64	110	110	
Days in month	31	30	31	30	31	31	29	31	30	31	30	31	
Liveweight start	300	336	340	333	378	381	450	475	468	458	481	492	
Liveweight end	336	340	333	378	381	424	475	468	458	481	492	509	
Pasture harvested (maintenance)	287	291	469	540	587	532	231	251	180	188	323	341	
Liveweight gain (kg/hd/day)	0.93	1.14	1.33	1.55	0.01	1.38	0.85	-0.285	-0.17	1.1	0.3	0.54	
Pasture harvested (liveweight)	256	303	572	735	5	585	140	-50	-22	145	66	123	
Silage/hay cut			29750	16125	24750	0	-4000	-10500	-2750			-1500	
Pasture harvested/ha (actual)	530	593	1540	1517	1003	1094	299	27	114	330	386	434	**7868**
Pasture harvested/ha (target)	600	600	1000	1000	600	400	300	400	500	600	500	500	**7000**
% Pasture to Maint (actual)	53%	49%	45%	42%	99%	48%	62%	125%	114%	56%	83%	74%	**71%**
% Pasture to Maint (target)	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**	**<60%**
Liveweight/ha	**64**	**76**	**267**	**251**	**104**	**146**	**18**	**-56**	**-17**	**36**	**17**	**24**	**930**
Rainfall													
Monthly average	154	130	112	90	76	59	56	66	104	128	138	165	**1278**
Monthly actual	141	118	91	8	117.5	0	27	68.5	79	82	148.5	151	**1032**