

## Dairy Directions — Analysing Farm Systems for the Future

*Providing robust analysis of the impact of on-farm changes and innovation on the profitability of dairy farm systems*

### Making the ‘right’ change to your dairy farm system: A case study from south-west Victoria

Do you know where you want your dairy farm business to be in 10 years time? What are the best options to get there? More cows or fewer cows? Increasing or decreasing stocking rate? More inputs or fewer inputs?

These types of questions can be difficult to answer and require careful consideration. The Dairy Directions project examined a farm in south-west Victoria, and some possible options it could pursue to remain viable into the future. If you are thinking about change on your farm you can use this as an example of how to assess options to assist in making the right decisions for your farm business.

The approach examined how the farm was currently performing, where the owners/operators wanted to be in 10 years time and undertook robust analysis of the possible options they have to take the business forward.

#### Key Messages

- ◆ Cash, profit and wealth are the keys to assessing the economic performance of your dairy farm business.
- ◆ Always consider the impact of change on the whole farm system.
- ◆ Many different types of dairy farm are successful.
- ◆ There is no single ‘best’ stocking rate, herd size or milk production per cow that you should aim for.
- ◆ Risk needs to be considered when planning changes.
- ◆ Both financial and non-financial goals need to be explored.
- ◆ Work through a range of possible scenarios with your advisor/s, staff, colleagues and families when making decisions about change.

#### Key details of the case study farm used as the basis for the analysis:

- ◆ 750 mm average rainfall.
- ◆ 570 milking cows.
- ◆ Concentrated single calving from early July.
- ◆ Average annual milk production of 6630 L/cow (530 kg protein + fat).
- ◆ 233 ha of milking area owned by the farmer plus 338 ha of non-milking leased land.
- ◆ Family-owned and operated plus 2 full time employees and some casual labour.
- ◆ 55 unit rotary dairy.
- ◆ Stocking rate ~2.4 cows/ha.
- ◆ Estimated pasture consumption of 2.4 t DM/cow/year from the milking area plus 1.1 t DM hay/silage/cow/year from the non-milking leased land.
- ◆ Estimated pasture consumption of 5.8 t DM/ha/year from the milking area and 3.9 t DM/ha/year from the non-milking leased land.
- ◆ Around 34% of total feed (on a DM basis) required is purchased.



Data on the case study farm was collected for the 2007/08 financial year, and in this particular year, the farm was profitable. However, this was under the safeguard of historically high milk prices and concessionary lease rates. It is important to look at the performance of the system over a number of years under situations with variable costs and prices and with lease rates closer to commercial reality.

The approach used in this analysis compared the potential performance of this farm over a 10-year period if management did not change (the base farm system) to some plausible alternative options where changes to the system were made.

The performance of 4 alternative options were compared to the performance of the base farm system. The options investigated were:

1. Increasing pasture consumption per hectare above the level of the current system.
2. Increasing the land area that milking cows graze.

3. Converting more non-milking leased land to milking area, and increasing herd size to 800 cows.
4. Having no leased area and reducing herd size to 370 cows.

There were a number of things that had to change on-farm to implement these options. Annual pasture consumption on the milking area and non-milking leased area was increased in all options to 7.5 and 5 t DM/ha, respectively. This was achieved by increasing nitrogen fertiliser application from 83 to 180 kg N/ha, oversowing one third of the pasture area each year and improved monitoring and management. Increased pasture consumption allowed the farmer to reduce total farm area by 100 ha in options 1 and 2. In options 2 and 3, additional investment in new tracks, infrastructure for stock water and capital fertiliser was also required. Key changes to the base farm system for each of these alternative options are presented in Table 1.

The different options were evaluated using discounted net cash flow budgets over a 10-year period.

**Table 1: Key changes to the base farm system**

	<b>Base farm</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Milking area (ha)</b>	233	233	293	420	233
<b>Non-milking area (ha)</b>	338	238	178	151	0
<b>Total farm area (ha)</b>	571	471	471	571	233
<b>Stocking rate (cows/ha)</b>	2.4	2.4	1.9	1.9	1.9
<b>Purchased feed (% of total feed required)</b>	34	28	23	29	31
<b>Feed production cost on milking area (\$/ha)</b>	357	460	640	640	680
<b>Feed production cost on non-milking area (\$/ha)</b>	809	782	647	492	0
<b>Total lease cost (\$,000)</b>	125	88	88	125	0
<b>Cows (\$,000)</b>				299	-255
<b>Additional track cost (\$,000)</b>			40	120	
<b>Additional infrastructure for stock water cost (\$,000)</b>			10	30	
<b>Capital fertiliser cost (\$,000)</b>			20	60	

**How did each option perform?**

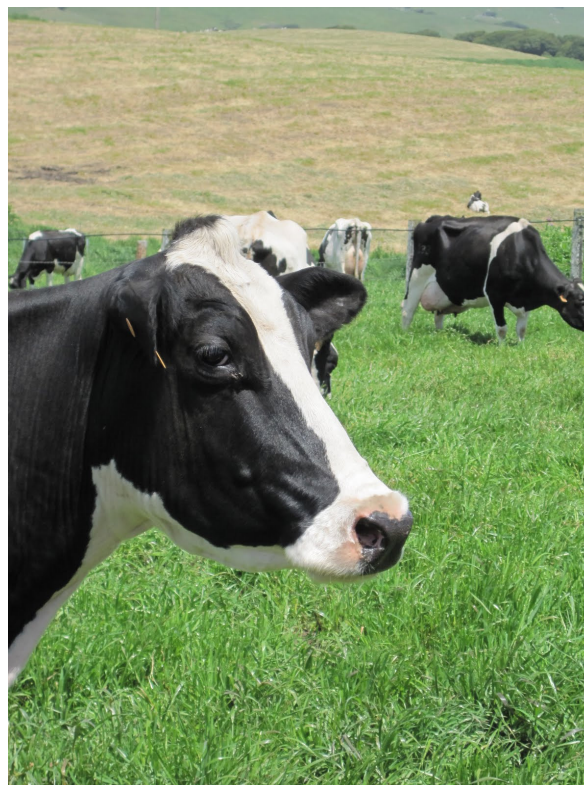
To assess the performance of the business, the three key measures used were:

1. **Cash:** Annual net cash flow in steady state.
2. **Profit:** Nominal internal rate of return – a test of the efficiency of the investment that is comparable to market interest rates.
3. **Wealth:** Nominal owner’s equity in year 10.

These measures allowed us to determine if:

- ◆ Cash flow was sufficient to meet the business owner’s needs.
- ◆ Resources were being used profitably and efficiently.
- ◆ The business increased in net worth over time.

When analysing the performance of the base farm and alternative options, each year of the 10 year budget was run with different prices, costs and yields to reflect the variability farmers experience. This was done 10,000 times to generate 10,000, ten year runs. Table 2 presents the average results for each option.



**Table 2: Average financial and economic performance over 10 years of the base farm system compared to each of the alternative options**

	<b>Base farm system</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Average annual net cash flow (steady state; \$'000)</b>	-58	180	219	399	195
<b>Average nominal internal rate of return (%)</b>	4.2	6.5	6.8	7.9	7.9
<b>Average nominal owner’s equity in year 10* (\$'000,000)</b>	1.4	4.4	4.8	6.3	5.1

\* Starting owner’s equity was \$3.1 million

Results show that if this farm doesn’t change, it will not be a viable business. Within 10 years, the owner’s equity in the business is predicted to be less than half the starting equity of \$3.1 million. All of the alternative options analysed improved this outlook. For the alternative options analysed, average annual net cash flow (after interest, lease and tax were paid) increased by at least \$238,000, and the average nominal internal rate of return by more than 50% compared to the base farm system. Unlike the base farm system, in each of the 4 options there would also be growth in wealth from the starting equity of \$3.1 million.

It is important to also examine the range in possible cash flow, internal rate of return and equity position at the end of year 10 for each of these options. The option which presents the greatest economic and financial risk can then be determined.

As an example, the variability in net cash flow is illustrated in Figure 1. The boxes incorporate the middle 50% of economic outcomes. The lines extending outside the box indicate the next 40% of observations. The size of the box and length of the lines indicate the range, variability or 'riskiness' of each option.

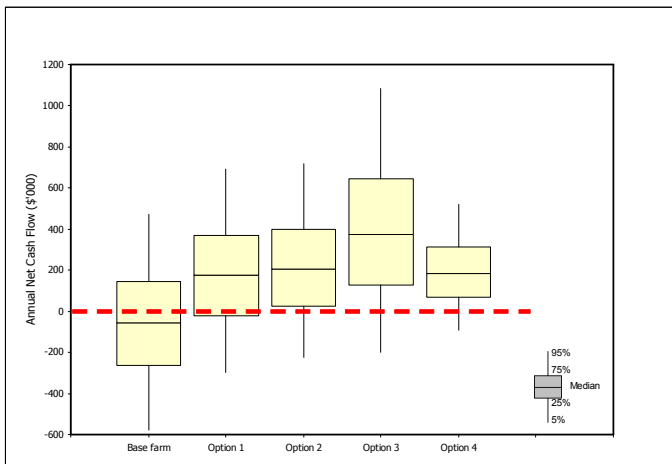


Figure 1. Box plots of annual net cash flow (after interest, lease and tax were paid) for the base farm system and the 4 scenarios analysed. The red dashed line indicates an annual net cash flow of \$0.

From the graph, it can be seen that most of the box that represents the base farm system falls below the dashed line, indicating a negative cash flow more than half of the time – not a profitable position to be in. This indicates that continuing to run the base farm system under commercial lease rates and average costs and prices is not a good choice.

Option 3 had the potential for the greatest cash flow as the box extended higher than the others. However, the box is also larger, indicating it is the most risky of all the options, and therefore the farmer could expect greater variability in returns between years. Option 4 is represented by the smallest box indicating a system with lower risk.

Similar trends were also found with nominal owner's equity in year 10, with option 3 having the greatest potential for wealth creation, but also higher risk. Interestingly options 3 and 4 had a similar internal rate of return indicating both were using allocated resources at around the same efficiency.

### Conclusions

- ◆ This farm business has strong potential to implement changes that improve productivity and profitability.
- ◆ All options presented offered a more promising future than the current system. The path the farmer actually takes going forward will depend on a range of personal preferences, and which of these options aligns best with the goals of the business.
- ◆ The 'whole of system' approach to investigating changes on farm provides an important platform on which to base decisions.

### Acknowledgments

The project team would like to acknowledge the input from the project steering committee, and the farm in south west Victoria that formed the basis of this analysis. Their assistance is much appreciated.

### Further Information

Contact : Clare Leddin 03 5561 9946 or Janna Heard 03 5573 0900  
Future Farming Systems Research Division  
Department of Primary Industries  
E-mail: [clare.leddin@dpi.vic.gov.au](mailto:clare.leddin@dpi.vic.gov.au) , [Janna.heard@dpi.vic.gov.au](mailto:Janna.heard@dpi.vic.gov.au)



Published by the Department of Primary Industries, June 2011  
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