Farm efficiencies lead to reduced emissions

Case Study – Jindivick, Victoria

Farm Background

Steve and Bec Ronalds are fourth generation farmers on their farm in Jindivick, in the high rainfall area of West Gippsland. This case study, focusses on the period from 2014/15 to 2019/20, during which time the farm was managed by a sharefarmer. During the period analysed, they were milking an average of 415 Jersey cows. Since then, the sharefarmer has moved to another farm, and the herd size has been reduced but will gradually increase again over time.

During the analysed years, the total usable area varied between 267 and 371 hectares, depending on the combination of lease blocks available at the time. The farm is predominantly a ryegrass-based pasture system.

Steve has always had a holistic approach to farm management, with a strong focus on profitability, soil health, emissions reduction, and long-term sustainability. Efficiency improvements during the analysed period led to increased profitability while also reducing emissions intensity per kilogram of milk produced.

Although the Ronalds have not participated in the Dairy Farm Monitor Project in recent years, the data from this earlier period provides valuable insights. It captures a time of detailed record-keeping and highlights key changes and progress in farm management and performance.

Physical description of the farm and summary of farm performance

Farm details	Farm system	Farm performance ($)	Emissions intensity
Land area 371 to 267 ha total usable area with 165 ha milking area. **Average rainfall** 1,015 mm/year **Irrigation** None	**Grazing system** **Herd type** Jersey **Herd size** 415 cows **Multiple calving pattern (3 batches)** **Medium-high grain feeding (1.7 t DM/cow)**	**Earnings Before Interest and Tax (EBIT) per kg milk solids (MS)** $1.41 ($0.88 - $2.42) **Return on Total Assets (ROTA)** 3.3% (2 - 6%) (average and range over the 5 years 2015-2020)	Reduced from 1.01 to 0.82 kg CO_2e/ kg Fat and Protein Corrected Milk in FPCM) over the period 2014/15 to 2019/20

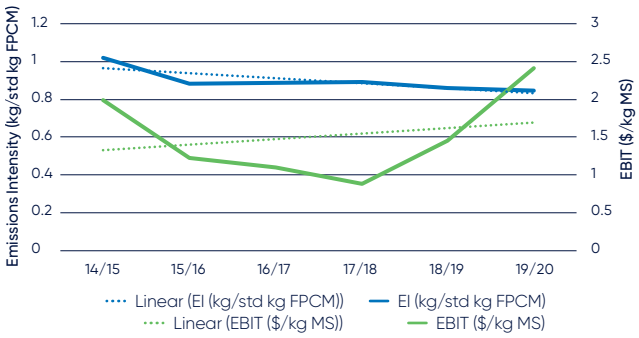
Delivering for Dairy

Key messages

The Ronalds family have reduced the emissions intensity of their milk while also making the farm more profitable. Focusing on efficiency and profitability resulted in a decrease in emissions intensity from 1.01 in 2014/15 to 0.87 in 2015/16 and to 0.82 kg CO2e / kg FPCM in 2019/20. This has coincided with a substantial increase in EBIT from a low of $0.88/kg MS in 2017/18 to $2.42/kg of milk solids in 2019/20. The emissions intensity of 0.82 kg CO2e/kg FPCM in 2019/20 is lower than the industry average. This has occurred mostly through a focus on optimising efficiency from inputs to improve profit.

Carbon emissions were estimated using the Australian Dairy Carbon Calculator within DairyBase, using data collected through the Dairy Farm Monitor Project. Emissions intensity is the estimated amount of carbon dioxide emissions produced per standard kilogram of fat and protein corrected milk.

Figure 1 Changes in farm emissions intensity and profit



Farm system

During the 2014/15 – 2019/20 period, the Ronalds family maintained a rain-fed pasture-based system with about 75% of the feed being home-grown. Grain feeding in the dairy averaged about 1.7 t DM/cow per year and very little hay or silage was purchased. Their farm is located in a high-rainfall area of Gippsland, Victoria with a long-term average annual rainfall of 1,015 mm/year. In the period analysed, they milked an average of about 415 Jersey cows in a batch calving system. They have a spring calving period in August – September and an early autumn/late summer calving period in February – March, and in later years a batch in June, to further flatten their supply pattern. Stocking rate was about 2.5 cows/hectare which is about average for their district. Farm total milk production was reasonably stable throughout the period analysed.

Emissions intensity and farm planning

The Ronalds family have been conscious of managing their land sustainably since they first settled in Jindivick in 1895. Steve grew up on the farm his brother Peter was previously involved with the farm and maintains an interest, particularly in the areas of sustainability, biodiversity and soil nutrient management.
They completed an energy audit before the study period to identify energy savings in the dairy. Water is pumped with solar pumps. Peter benchmarked soil carbon levels in 2023 to monitor over time.

The reduction in emissions intensity alongside increased profitability appears to have been achieved through more targeted input use—specifically, by reducing the amount of nitrogen fertiliser applied per hectare—while simultaneously increasing pasture consumption from approximately 6 to nearly 8 tonnes of dry matter (DM) per hectare. Since the end of the study period, the Ronalds have also begun trialling foliar fertiliser applications, with the aim of further improving nutrient use efficiency.

In 2019/20, the Ronalds achieved an emissions intensity of 0.82 kg CO_2e per standard kilogram of fat- and protein-corrected milk (FPCM), which is lower than the Victorian industry average of 0.89 kg CO_2e/kg FPCM. One key contributor to the low emissions intensity seems to be in the Ronalds high cow efficiency leading to less methane emitted per kg of milk solids produced. Milk production averaged 465 kg milk solids/cow from a herd with an estimated average liveweight of 450 kg. The quantity of grain fed per cow remained relatively unchanged through the period analysed.

The Ronalds have a focus on breeding for cow longevity. This means that the lifetime methane emissions of each cow in the herd are diluted by the high proportion of productive years. While not currently considering greenhouse gas emissions when selecting bulls for artificial insemination will consider in the future.

The overall profitability of the business became stronger in the last year analysed with an average Return on Assets Managed (ROTA) of about 6% in 2019/20, which was around the average for their region in that year (Gippsland DFMP average 6.6%).

Farm details

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Milking cow numbers	470	420	385	380	380	440
Milking area (ha)	140	177	165	165	165	165
Rainfall (mm)	927	869	906	925	842	1,197
Milk solids (kg MS)	183,100	200,554	171,818	183,214	176,767	200,275

Primary indicators

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Business efficiency						
EBIT per kg Milk Solids	1.99	1.23	1.10	0.88	1.45	2.42
Return on Total Assets managed %	4.1%	2.9%	2.4%	2.0%	3.1%	6.0%

Cost and price indicators

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Milk price ($/kg MS)	6.64	5.55	4.94	5.91	6.16	6.36
Total Variable Costs ($/kg MS)	2.96	2.91	2.79	3.71	3.39	3.18
Homegrown Feed Costs ($/t DM)	81	85	87	118	67	69
Cost of Production (including inventory changes) ($/kg MS)	4.97	4.52	4.24	5.32	4.88	4.14

**Note these numbers have not been adjusted for inflation.*

Efficiency indicators

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Tonnes of grain per cow (t DM/cow)	1.6	1.7	1.6	1.8	1.6	1.6
Milk solids as a % of cow liveweight	84%	103%	99%	107%	103%	101%
Proportion of homegrown feed in the diet	68%	72%	74%	69%	79%	74%
Homegrown feed consumed per useable hectare (t DM/ha)	6.6	5.7	6.2	6.8	7.8	7.9
Milk solids per labour unit (kg/FTE)	57,481	64,435	54,545	57,106	60,867	76,636
Nitrogen fertiliser kg/usable hectare	131	93	113	83	48	79
Emissions Intensity (kg CO_2e /standard kg Fat and Protein Corrected Milk)	1.01	0.87	0.84	0.86	0.82	0.82

For further information

For more information about managing climate and environment, including initiatives for efficiency of dairy farm inputs and supporting actions to reduce greenhouse gas emissions, visit the Dairy Australia website or speak to your local team.

https://www.dairyaustralia.com.au/climate-and-environment

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