Dairy Australia

Farm efficiencies lead to reduced emissions

Case Study – Birregurra, Victoria

Farm Background

The Rowan farm is a family business located in a lower rainfall area of south-west Victoria. Over the past decade Bruce and Judy Rowan have focused on growing the business to enable the inclusion of the next generation into the business, but making sure there was a reward for everyone. "We had to grow to get the next generation into the business, but we needed to do that efficiently". Their son James is now share-farming for them and their son Lachlan has joined as an employee in recent years. Between 2010 and 2023 the herd size has doubled from 180 cows to 360 cows, with a strong focus on improving efficiency and actively seeking opportunities to improve their farm management skills. The farm is a modern ryegrass-based pasture system. Calving now starts in early April but previously started in late May.

The Rowans have been focused on increasing production and efficiency, with the primary goal of being more profitable. The improvements in efficiency have also meant that the emissions intensity per kilogram of milk has reduced. Their main strategy was to regularly assess the performance of the business to ensure they were heading in the right direction, improving the milk production per cow and per hectare, optimising the efficiency of fertiliser and irrigation and utilisation of pasture. The main changes have been using the 20ha pivot irrigator to create the autumn break, getting pasture growing and making the most of irrigation water available at that time. With the extra pasture available they have shifted calving from winter to autumn to maximise use of the additional pasture. Recently they have added more land to enable further growth.

Physical description of the farm and summary of farm performance

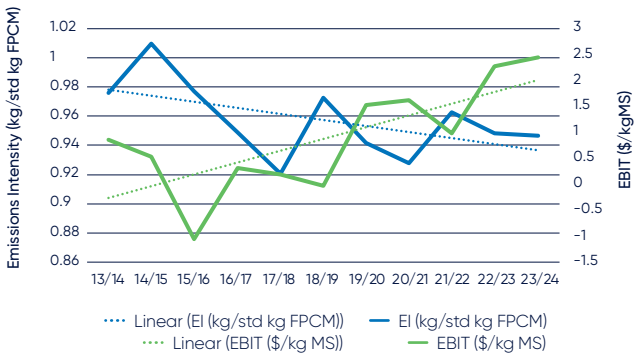
Farm details	Farm system	Farm performance ($)	Emissions intensity
Land area 220 ha milking area and 333 total useable ha. **Average rainfall** 750mm over the past six years **Irrigation** Typically 30 ha is irrigated	**Grazing system** **Herd type** Predominantly Holstein-Friesian **Herd size** 335 cows **Autumn calving pattern** Medium-High Concentrate Feeding (2 t DM/cow) **Stocking rate** 1 cow/hectare	**Earnings Before Interest and Tax (EBIT) per kg milk solids (MS)** $1.77 ($0.98 - $2.44) **Return on Total Assets (ROTA)** 3.9% (1.7% - 5.2%) (average and range over the past 5 years)	Reduced from about 0.98 in 2015/16 to about 0.94 kg/standard kg Fat and Protein Corrected Milk (FPCM)

Delivering for Dairy

Key messages

Focusing on efficiency and profitability has resulted in a slight decrease in emissions intensity from about 0.98 in 2015/16 to about 0.94 kg/standard kg Fat and Protein Corrected Milk (FPCM) in recent years. This has coincided with a substantial increase in Earnings Before Interest and Tax (EBIT) from a low of about negative $1/kg MS in 2015/16 to $2.44/kg of milk solids in 2023/24. This has occurred mostly through a focus on optimising efficiency from inputs to improve profit. It is also worth noting that this has occurred alongside an increase in herd size of about 45% and an increase in milk production of about 60% over the last 9 years.

Figure 1 Changes in farm emissions intensity and profit over time



Farm system

The Rowan family maintain a relatively simple farming system that is primarily home-grown pasture based with some supplementary dairy pellets, almond hulls and barley. Their farm receives an average of 750mm/year over the past six years. There is a 20 ha centre pivot that can be moved to three sites and some other areas can be irrigated with a hard hose irrigator. The area irrigated has varied between years. They irrigated a larger area in autumn 2024 to get the pasture started. Typically, about 30 ha is irrigated. Stocking rate is currently at 1 cow/hectare, which is still a bit lower than others in the district but, their rainfall is also a bit lower. In 2025 they will milk 360 predominantly Holstein-Friesian cows that calve from March onwards for 12 weeks.

Farm production has increased by 30 per cent over the last five years due to:

- Increase of 10 per cent in milking cow numbers (285 to 330)
- Improved pasture composition and management, particularly trying to graze at the three-leaf stage to improve yields
- Soil tests to make sure the appropriate fertiliser is being applied
- Strategic fertiliser management including not using urea when it is excessively wet or dry
- Herd testing to identify lower producing cows and removing them from the herd
- Calving earlier using the pivot irrigator to create an 'autumn break' and promote pasture growth
- A centre pivot was installed to improve irrigation efficiency, produce more feed in autumn and replace a labour-intensive irrigation system.

Further increases in efficiency have been created by

- The dairy was upgraded from a 15-unit swing over to a 22-unit double up with stall gates, and can now milk 360 cows with one person.
- Upskilling in financial and pasture management, by attending courses such as Pasture for Profit and Farm Business Fundamentals
- Reviews of the business with a farm consultant has grown the management skills of the family, allowing them to focus on the areas of the business that are important to growing the business while remaining efficient.

Emissions intensity and farm planning

The Rowans have not focused on the emissions intensity of their farm business, rather reductions in emissions intensity have come about through improved efficiency in use of fertiliser, more efficient irrigation with the new pivot irrigator, more efficient feeding of cows and better pasture utilisation. They found the reductions surprising given over the past five years they have built the herd quickly, with some years running 30 per cent replacements requiring a lot of feed. Over the next couple of years, as the herd numbers stabilise, they expect to see further improvements.

The key to decreasing emissions intensity seems to be in their increased cow efficiency leading to less methane emitted per kg of MS produced. The Rowans have gone from producing about 425 kg MS/cow in 2015/16 to an average in the last five years of about to 500 kg MS/cow from 500 kg cows. The quantity of grain fed per cow did not increase dramatically until the last two years when the higher milk price provided the opportunity to profitably feed higher levels of grain. The improved cow efficiency may have come about through genetic gain as well as improved nutrition. The Rowans work with a breeding advisor to select cows on stature, fertility and production. They have been using predominantly sexed semen to help grow the herd. They have not yet considered greenhouse gas emissions when selecting bulls for artificial insemination.

The overall profitability of the business is strong with a Return on Total Assets managed (ROTA) of over 5 per cent in the last year.

ROTA is heading in the right direction and with the herd now around 360 cows the business is on track to continue to improve efficiency and achieve their goal of growing the business for the next generation.

Farm details

	2019/20	2020/21	2021/22	2022/2023	2023/2024
Milking cow numbers	296	320	324	285	335
Milking area (ha)	220	220	220	220	220
Rainfall (mm)	660	833	908	881	504
Irrigation (ML)	60	100	75	90	131
Milk solids (kg MS)	164,759	160,041	148,082	156,808	182,659

Primary indicators

	2019/20	2020/21	2021/22	2022/2023	2023/2024
Business efficiency					
EBIT per kg Milk Solids	1.53	1.62	0.98	2.27	2.44
Return on Total Assets managed %	4.4%	4.0%	1.7%	4.2%	5.2%

Cost and price indicators

	2019/20	2020/21	2021/22	2022/2023	2023/2024
Milk price ($/kg MS)	6.87	6.68	7.30	9.44	9.09
Total Variable Costs ($/kg MS)	3.57	3.20	4.31	4.79	4.51
Homegrown feed costs ($/t DM)	146	112	159	215	207
Cost of Production (including inventory changes) ($/kg MS)	5.98	5.52	7.58	7.75	7.09

Efficiency indicators

	2019/20	2020/21	2021/22	2022/2023	2023/2024
Tonnes of grain per cow	1.7	1.6	1.3	2.2	2.4
Milk solids as a % of cow liveweight	111%	100%	91%	110%	109%
Proportion of homegrown feed in the diet	77%	77%	80%	63%	59%
Homegrown feed consumed (t DM) per 100mm rainfall and irrigation	0.9	0.7	0.5	0.5	0.8
Homegrown feed consumed (t DM/ha)	5.8	5.6	4.8	4.1	4.5
Milk solids per Labour Unit (kg/FTE)	49,133	49,262	43,714	51,342	61,355
Nitrogen fertiliser kg/usable hectare	165	132	124	111	189

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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