

Dairy Farm Monitor Project

Western Australia Annual Report 2022/23



DELIVERING
for DAIRY

Acknowledgements

Participants

Western Dairy would like to gratefully acknowledge the cooperation, patience and goodwill of the farmers who willingly supplied their farm information.

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Report

The report was prepared by Sarah Lang (Regional Finance Hub) in conjunction with Dairy Australia.

Contributors/data collectors

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We also acknowledge the work of Dairy Australia's farm analysts Fiona Smith and Kerry Kempton, who conducted the data checking, validation and analysis.

Appendix Tables

The appendices at the end of this report provide detailed metrics on the historical physical and financial performance and efficiency for the average of the Western Australian project participants.

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Disclaimer

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Executive summary

In 2022-23 the average Western Australia Dairy Farm Monitor profitability was the highest in the 10-years of the project (accounting for inflation).

Average milk price increased to \$9.30 per kilograms of milk solids (\$/kg MS) or 67.5 cents per litre (c/L).

Total Gross Farm income increased to \$11.37/kg MS or 82.6c/L in 2022/23 from \$10.02 (\$/kg MS) or 72.6c/L in 2021/22.

The increase in milk price was partially offset by higher input costs, including for feed and fertiliser. Lower beef prices reduced livestock trading profit to \$2.03/kg MS (14.7c/L).

70 per cent of the participants recorded higher ROE than ROTA meaning they have been able to grow their business.

A 20 per cent increase in the milk price meant gross farm income increased despite a lower livestock trading profit. Average EBIT increased 44 per cent from last year despite an increase in both variable and overhead costs.

There was an increase in total business equity across the year through increased profits and investment in assets. 100 per cent of participants recorded a profit.

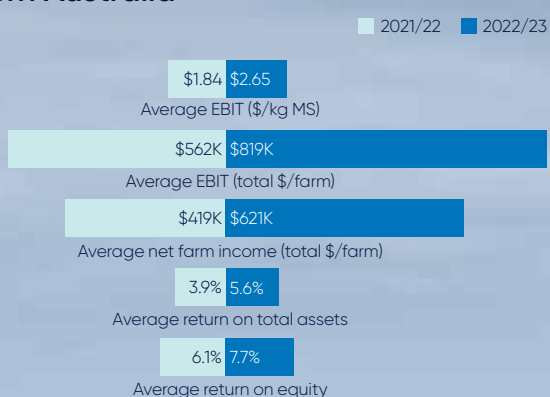
A below average winter and spring rainfall in 2022 was followed by below average rainfall across autumn and summer, that combined with high fertiliser costs lead to lower fodder production in comparison to previous years.

Combined with higher input costs for fertiliser, chemicals and contractors, the average cost of homegrown feed increased to \$166/t DM compared to \$141/t DM last year.

Gross farm income and profitability (average EBIT per kilogram of milk solids) was the highest (accounting for inflation) in the history of the 10-year project.

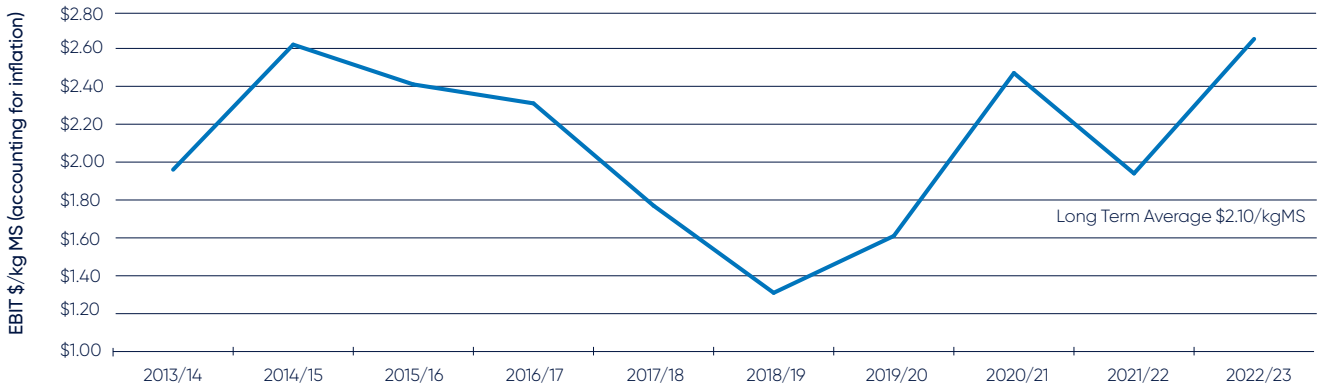
Despite a decrease in livestock trading profit and increased variable and overhead costs, the increased milk income resulted in an increase in average profit compared to the previous year for participating farms.

Western Australia



How does 2022/23 compare?

Historical profitability



Average profit (per kg milk solids) in 2022/23 was \$2.65/kg MS (19.3c/L) which was above the long-term average of \$2.10/kg MS for Western Australia.

Strong profit results per farm (average \$818,520) across the state, was higher than the 10-year long term average of \$630,606, and the highest in the 10 years of the project.

Milk price

Milk price increased by 20 per cent from 2021-22. Milk income contributed on average, 82 per cent of gross farm income due to the strong influence of increased milk prices across WA and lower livestock profit.



Western Australia ↑ 20%
to \$9.30/kg MS 67.5 c/L

Expectations for profit in 2022/23

Participant farmers were less optimistic in their outlook for farm business returns in the coming 12 months than last year with 48 per cent of participants expecting better returns in 2023/24, down from 69 per cent in 2021/22 and 30 per cent expecting returns to decline, up from 4 per cent in 2021/22. Milk price (30%) followed by input costs (22%) were identified by participants as the greatest risk to their business followed by labour (13%) and climate/seasonal conditions (13%).

Greenhouse gas emissions

The median carbon footprint for Western Australian dairy farm participants was 3,346 tonnes of carbon dioxide equivalents per farm in 2022/23. This year more specific questions were asked about the participating farm systems, and the results more accurately reflect the on-farm emissions. Prior to 2020/21 average farm GHG emissions had been trending upwards, mostly due to larger herd sizes and greater milk production per farm.



Western Australia overview

State-wide, average profitability in Western Australia was the highest in the 10-years of the project. Average profits rose by 44 per cent to \$2.65/kg MS or 19.3c/L. Strong prices received for milk was partially offset by the impact of higher costs and lower livestock profitability.

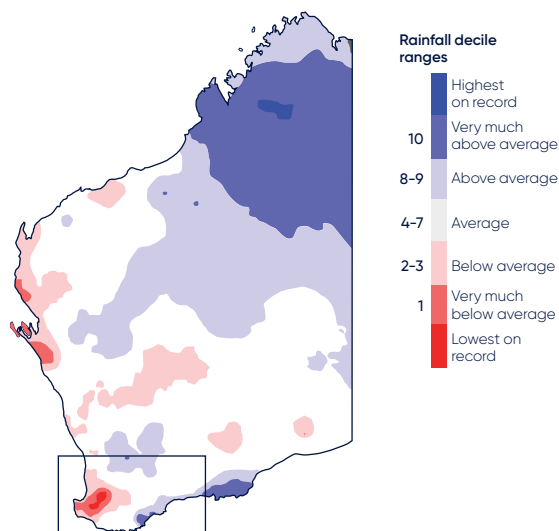
Profitability was constrained due to increases in input costs such as fertiliser and fodder purchases. Fodder conservation was also down in comparison to last year due to inconsistent 24-hour rainfall events in April and a dry May resulting in inconsistent rain impacting fodder production. This impacted the ability of farms to grow high quantities of quality homegrown feed.

Dairying in Western Australia



There were approximately **112 dairy farm businesses** in WA that produced **338 million litres** or **4 per cent** of Australia's national milk production in 2022/23.

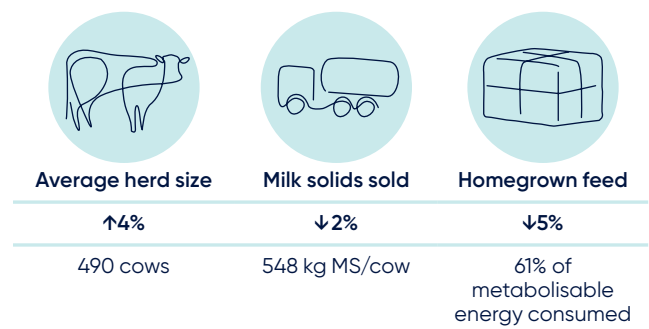
Dairy Farm Monitor Project farm locations and rainfall in 2022/23



The box on the above map indicates the area where participant farms are situated.

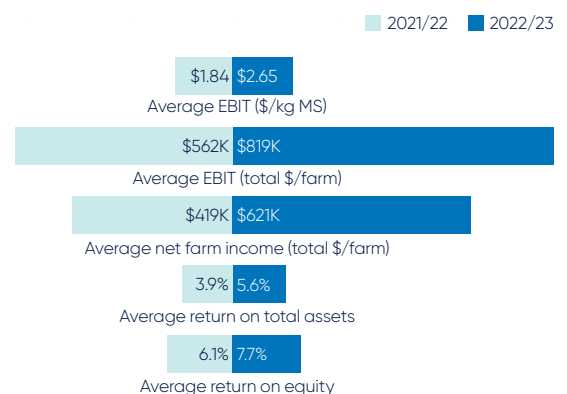
Physical farm characteristics

The average herd size of DFMP participants in Western Australia increased to 490 cows, however milk produced per cow declined from 557kg MS/cow to 548kg MS/cow. Farms grazed less feed on their milking areas this year on the back of below average rainfall on most participant farms combined with lower levels of fertiliser applied on average to result in a drop in overall homegrown feed.



Profitability

In 2022/23, 100 per cent of all WA participants recorded a profit



2022/23 farm profitability for the state has been influenced by:



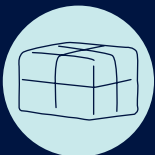
↑ 20%
in average milk price to **\$9.30/kg MS**
(67.5c/L)



↑ 20%
in herd costs to **\$0.97/kg MS** (7.1c/L)



↑ 13%
in shed costs to **\$0.35/kg MS** (2.5c/L)



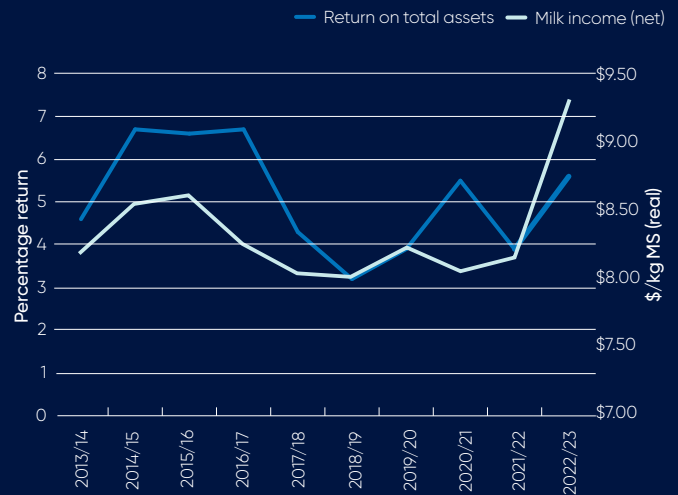
↑ 7%
in total feed costs to **\$4.41/kg MS**
(32.1c/L)



↑ 7%
in overhead costs to **\$3.62/kg MS**
(26.2c/L)

A lower livestock profit and increased costs across the state in most areas of the business reduced the benefit of an increased milk price for the season. The state-wide average EBIT per farm was the highest on record, accounting for inflation..

Return on total assets and milk price



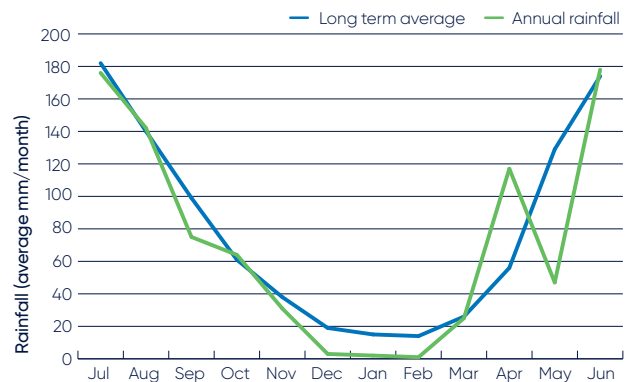
Physical parameters and seasonal conditions

The majority of farms received below average rainfall in 2022/23. Inconsistent 24-hour rainfall events in April resulted in inconsistent rain and a dry May impacting fodder production.

Seasonal conditions throughout the year resulted in a drop in homegrown feed on milking platforms, with a drop in fertiliser application rates likely to have impacted this as well.

Farm systems have remained similar although the average herd size increased to 490 in 2022/23 from 471 in 2021/22.

Figure 1 Monthly rainfall 2022/23



WA pasture based dairy production

Dairying in Western Australia is predominantly pasture based, with 61 per cent of all consumed metabolisable energy home grown across participant farms. Spring and Autumn rainfall are important as is the availability of adequate water across irrigation areas.

Rainfall

Rainfall in 2022/23 was 10 per cent below the long-term average. A below average winter and spring rainfall in 2022 was followed by below average rainfall across autumn and summer which impacted the physical and financial performance across Western Australia. The preceding conditions as well as the conditions prevalent in a particular month influence feed availability and conditions to harvest pastures and crops as well as their timely renovation or sowing. Below average autumn rainfall resulted in reduced availability of homegrown feed for grazing.

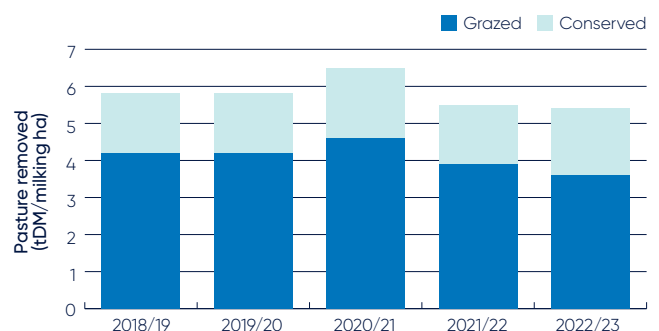
Feed consumption and harvest

Seasonal conditions impacted the ability to grow, graze and harvest feed with slightly less homegrown feed availability across the state in comparison to last year. The amount of grazed pasture decreased by 0.3 t DM/milking ha to 3.6 t DM/milking ha and conserved feed increased by 0.2 t DM/milking ha (Figure 2). Whilst the proportion of grazed feed consumed in the diet decreased by 2 per cent it was replaced by an increase in hay as a proportion of the diet.

The ability to grow and harvest feed was impacted by a lower than average annual rainfall and lower fertiliser applications due to high fertiliser prices.

As a proportion of the diet, homegrown feed (grazed and conserved pasture) accounted for 61 per cent of the metabolisable energy consumed, compared to 64 per cent in the previous year.

Figure 2 Estimated tonnes of homegrown feed removed

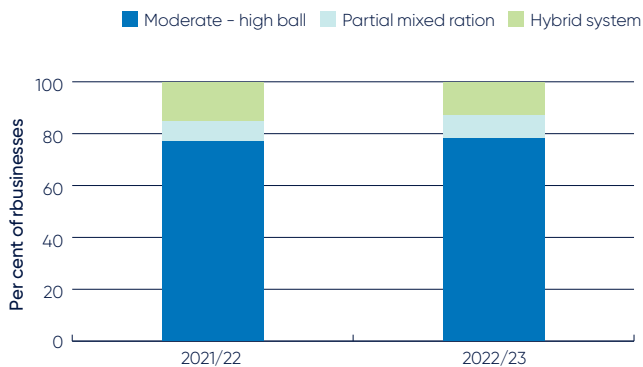


Feeding system

Moderate to high bail feeding systems were the most popular feeding system in 2022/23 (Figure 3). The marginal reduction in farms utilising a hybrid ration system from 2021/22 is largely due to a change in participant farms rather than showing a particular trend in the West Australian farming systems. This year there were 78 per cent of farms with a moderate-high bail system and 22 per cent utilising either a hybrid system or partial mixed ration.

Western Australia is predominantly reliant on annual pasture species, comprising approximately 92 per cent of pastures on average, with the remaining portion made up of perennials.

Figure 3 Type of feeding systems



Information on feeding systems was first collected in 2020/21 and the purpose is to capture the intensification of dairy feeding systems in Western Australia over time. The type of feeding system employed reflects a longer-term decision made by the business operator to manage a certain type of feeding system, rather than a short term one to manage adverse seasonal conditions in a given year, i.e., wet soils management or drought.

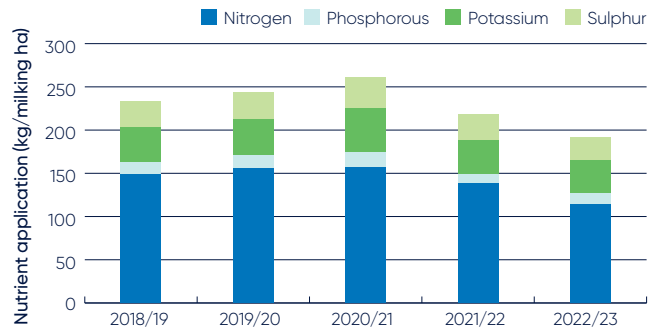
Fertiliser application

Total nutrient application on the milking area reduced by 12 per cent to 192 kg / milking ha. The significant increase in fertiliser prices and lower than average rainfall resulted in farmers applying lower quantities of fertiliser.

In comparison to the previous year, Figure 4 shows that in 2022/23:

- Nitrogen applied was 114 kg/ha, a 17 per cent reduction
- Phosphorous applied was 13 kg/ha, an 18 per cent increase
- Potassium applied was 38 kg/ha, a 3 per cent reduction
- Sulphur applied was 27 kg/ha, a 13 per cent reduction

Figure 4 Nutrient application

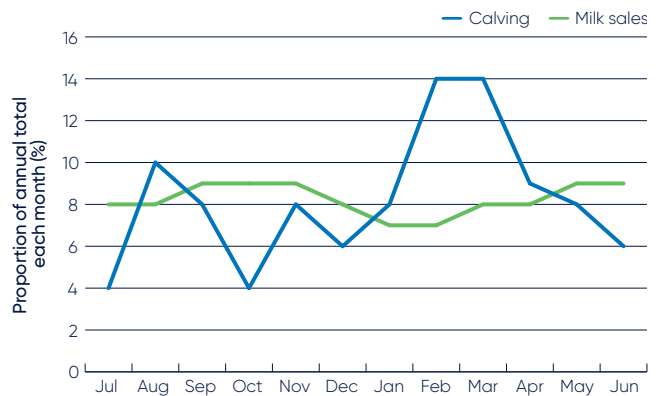


Milk solids sold

Milk production reflects the seasonal nature of calving. Calving pattern determines milk production and subsequently the milk payment system available to participant farms (Figure 5).

Western Australian participant farms on average increased the level of total milk production on farm due to an increase in average herd size, despite a drop in per cow production.

Figure 5 Monthly distribution of milk sales and calving



Calving pattern

Western Australia is characterised by split calving (spring and autumn) as shown in Figure 5. Many factors influence choice of calving pattern on individual farms, including matching feed supply with animal demand, receiving seasonal milk price, rainfall and irrigation, ease of management and herd fertility management.

The lowest proportion of cows calving occurs across July and October.

Whole farm analysis

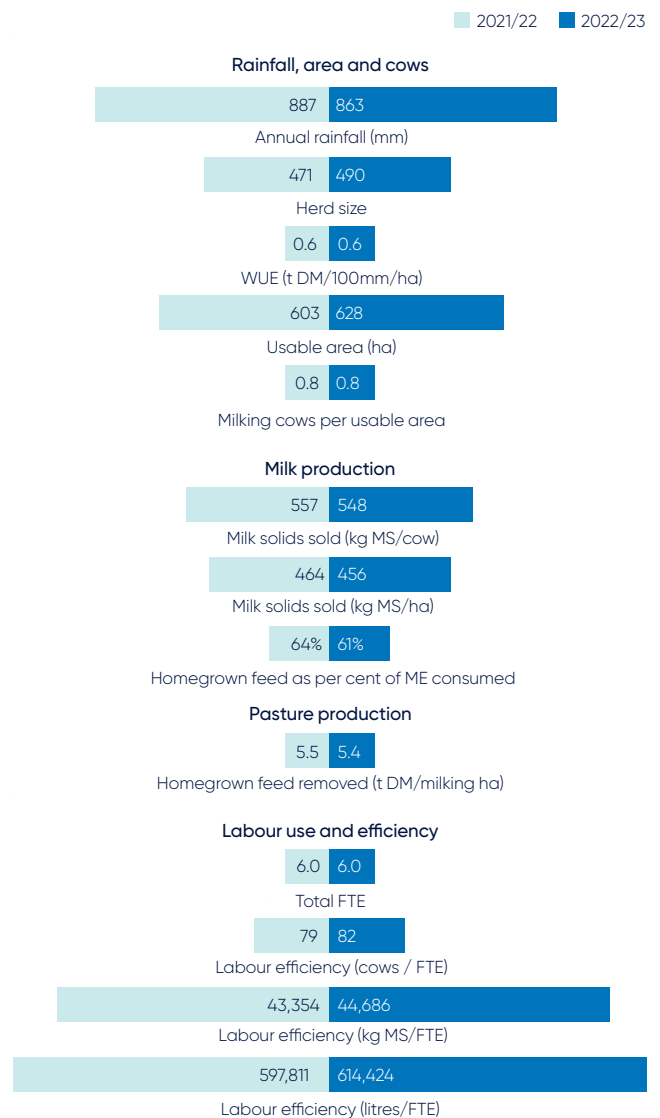
In 2022/23 the highest milk price was recorded in the 10 years of DFMP at \$9.30 kg/MS or 67.5 c/L.

On average, farm profitability increased by 44 per cent in 2022/23 from the previous year. Earnings before Interest and Tax (EBIT) was positive for 100 per cent of participating farms.

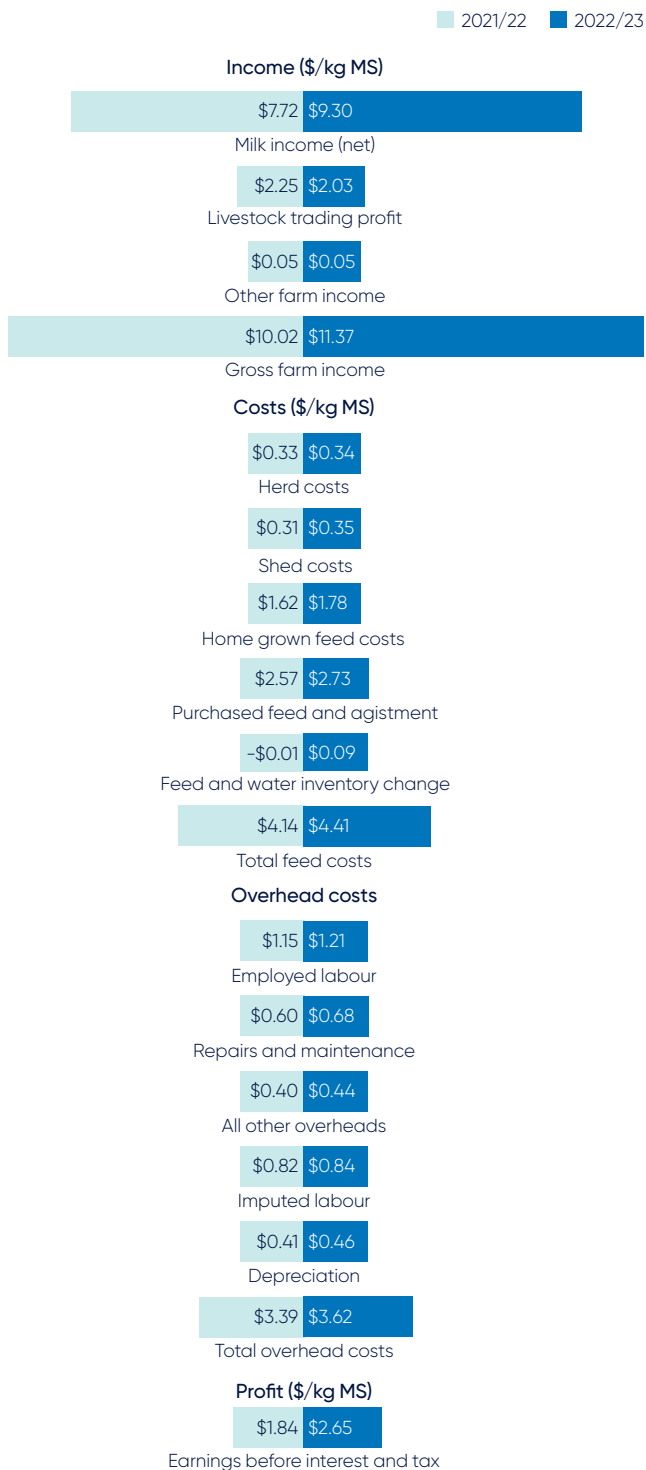
Livestock trading profit declined 10 per cent due to reduced prices, especially in the second half of the year.

Variable costs increased by 7 per cent (primarily due to feed costs and inventory change), with overhead costs also higher by 7 per cent.

Physical parameters



Financial parameters



Gross farm income

Higher gross farm income at \$11.37/kg MS or \$0.83c/L was recorded in 2022/23 than the previous year. When accounting for inflation, it is the highest over the 10 years of the DFMP. The key driver was an increased milk price.

Variable costs

Variable costs increased by \$0.31/kg MS (2.4c/L) with higher homegrown feed costs and purchased feed costs being the largest components.

Homegrown feed costs increased by \$0.16/kg MS (1.6c/L) with fertiliser contributing \$0.97/kg MS (7.1c/L), and fuel & oil costs contributing a further \$0.26/kg MS (1.9c/L).

Purchased feed costs also increased, largely on the back of higher grain prices.

The lower than average rainfall and high feed reserves from last year resulted in a reduction in feed on hand by year end.

Whilst shed and herd costs increased from last year the biggest increase was in shed power which increased \$0.02/kg MS (0.2c/L).

Overhead costs

Total overhead costs increased on average by 7 per cent in 2022/23.

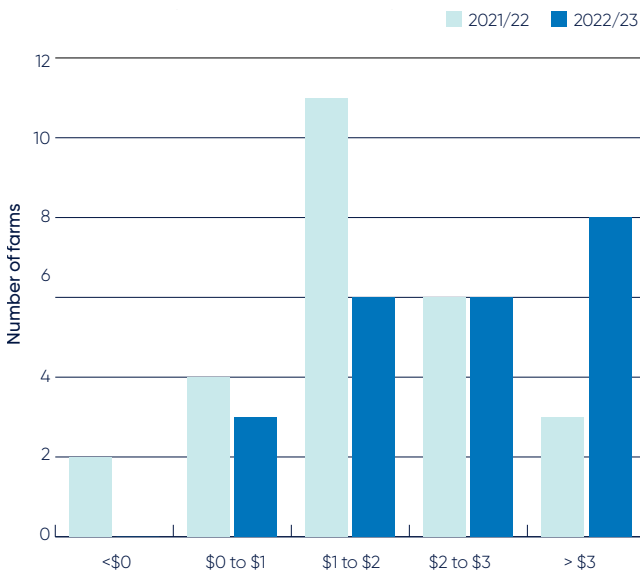
Repairs and maintenance increased by 13 per cent to 0.68/kg MS (4.9 c/L) and increased depreciation costs accounted for \$0.46/kg MS (3.3 c/L).

Spending on employed labour increased 5 per cent or \$0.06/kg MS (0.2c/L). The majority of farms increased the average hourly rate for employed labour with wage rates and availability of labour and accommodation frequently raised by farmers as a prominent issue.

Earnings before interest and tax

In 2022/23, 100 per cent of participants had a positive EBIT (Figure 6). Average EBIT per farm (total dollars) was the highest in the 10 years of the DFMP, accounting for inflation. The average EBIT of \$2.65/kg MS (19.3c/L) was 44 per cent higher in comparison to 2021/22, predominantly influenced by high milk price.

Figure 6 Average EBIT per kg MS



Return on total assets and equity

Returns were strong in 2022/23. A positive return on total assets (ROTA) was recorded for all participants (Figure 7). In 2022/23 average ROTA increased to 5.6 per cent compared to 3.9 per cent the previous year. The higher returns were a result of higher total EBIT across participant farms.

Average return on equity (ROE) in 2022/23 increased to 7.7 per cent relative to the previous year at 6.1 per cent. Equity levels increased on the majority of farms during the last 12 months due to strong profit performances.

The cost of financing was lower than the returns from accessing the additional assets and 43 per cent of the participants recorded higher ROE than ROTA. These farmers have been able to grow their business.

Figure 7 Average returns ROTA and ROE





Business confidence survey

Participant farmers were less confident in their outlook for farm business returns in the coming 12 months (2023/24) than they were last year.

All participants expected milk price to either increase (13 per cent) or remain stable (87 per cent), and 48 per cent of farms are expecting milk production to increase.

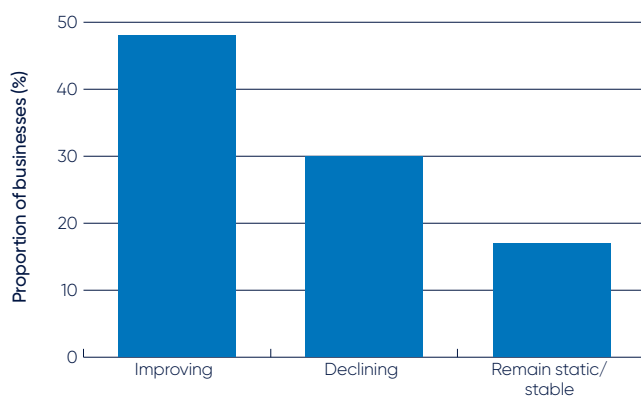
Milk price was the major issue listed for the coming 12 months and 5 years, followed by input costs.

In 2023/24 the majority of farms were expecting costs to remain stable across all categories except labour which is expected to increase.

Expectations for business profit 2023/24

The participant survey considers different aspects of farming, from climate outlook to expectations about market conditions for dairy products. Expectations for business profit in the coming year were generally positive with 48 per cent of farms expecting an increase in returns and 17 per cent expecting returns to remain stable. 7 farms are expecting returns to decrease (Figure 8) and 1 farm expecting to exit the industry.

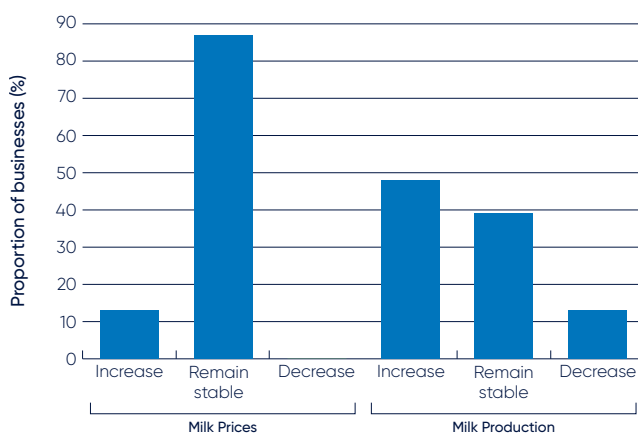
Figure 8 Expected change to farm business profit in 2023/24



Price and production expectations – milk

Participants were neutral in their outlook for milk price, but positive in their milk production outlook for 2023/24. This is mainly due to the timing of milk price announcements (1 June 2023), prior to the start of the last financial year. Only 13 per cent of respondents were expecting milk price to increase with the remaining 87 per cent expecting it to remain stable. Around 48 per cent were expecting milk production to increase while 39 per cent expected it to remain stable in the coming year. Only 13 per cent predicted milk production would decrease in 2023/24 which is similar to last year (Figure 9).

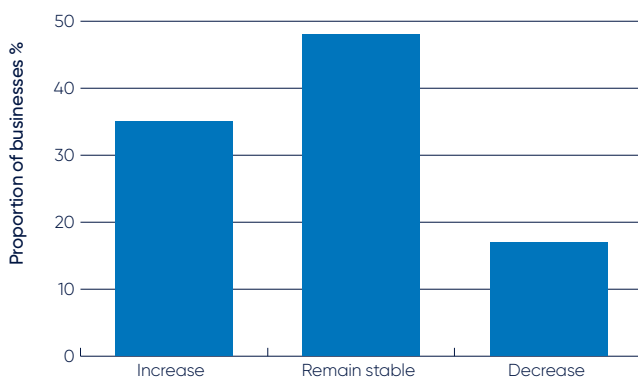
Figure 9 Producer expectations of milk prices and production in 2023/24



Production expectations – fodder

Fodder production in 2023–24 was expected to remain stable for 48 per cent of participant farms with a further 35 per cent expecting an increase in fodder. 17 per cent of farms are expecting a decrease in fodder production due to consecutive years of below average rainfall (Figure 10).

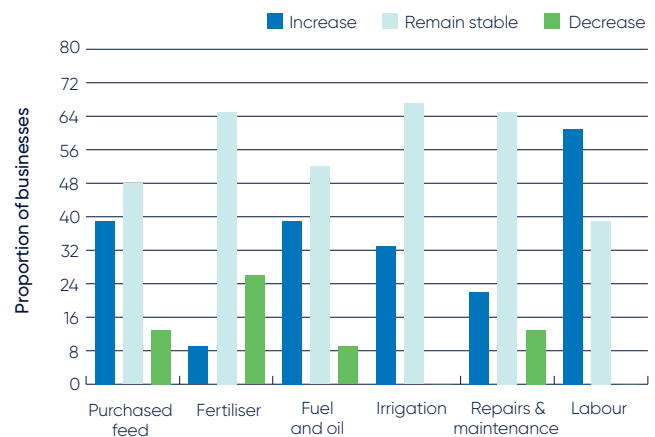
Figure 10 Producer expectations of fodder production in 2023/24



Cost expectations

In 2023/24, the majority of participants are expecting purchased feed, fertiliser, fuel and oil, irrigation and repairs and maintenance to remain stable (Figure 11). All participants expect labour costs to increase or remain stable. No participants are expecting a decrease in irrigation costs. 26 per cent of participants are expecting fertiliser costs to decrease.

Figure 11 Producer expectations of costs for the dairy industry in 2023/24



Comments from participants

Respondents indicated they are feeling the effects of multiple interest rates rises and are looking to hold machinery longer rather than replace with new due to the cost of finance. As a result, repairs and maintenance are expected to continue to increase.

Others noted that lack of available land for both purchase and lease and the cost per hectare is restricting growth and reducing production. This is also impacting succession.

Another key concern was around continued lack of available employees. A shortage of available accommodation was again noted as being a barrier for attracting full time staff.

Some farmers are looking to grow their beef enterprise to minimise reliance on milk price.

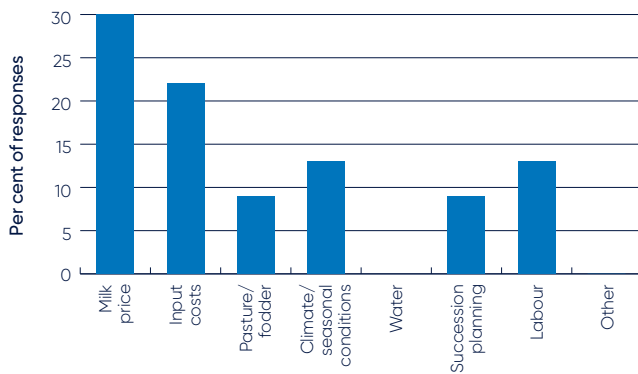
ISSUES OF IMPORTANCE TO DAIRY BUSINESSES

Participants were asked to rank issues based on the level of importance to their business – with a ranking of (1) being most important and (8) being least important. The results are shown in Figure 12 for the short-term issues and Figure 13 for medium term issues.

Short term issues – Next 12 months

The most important issue in the coming 12 months was milk price with 30 per cent of respondents ranking this as number 1 which was not surprising given the increase in variable and overhead costs in the past year. Input costs (ranked number 2 by 22 per cent of respondents) was then ahead of labour and climate/seasonal conditions (at 13 per cent respectively) as being a major issue.

Figure 12 Major issues for individual businesses – 12 month outlook

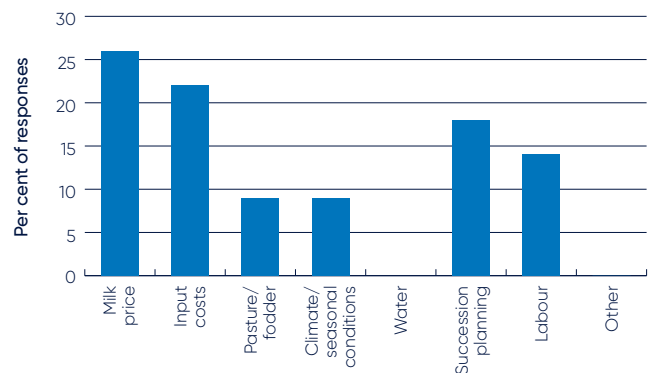


Medium to long term issues – Next five years

Milk price remains the major consideration for 26 per cent of participants farms which is lower than the 46 per cent in 2021/22 followed by input costs at 22 per cent as an increased consideration over the coming five years.

Succession planning remains the next highest consideration at 18 per cent followed by labour (14 per cent).

Figure 13 Major issues for individual businesses – 5 year outlook



2022/23 Greenhouse gas emissions

The median carbon footprint for Western Australian dairy farm monitor farms was 3,346 tonnes of carbon dioxide equivalents (t CO₂-e) per farm in 2022/23.

Changes in net farm emission for WA dairy farms in 2022/23 can be attributed to changes in data capture process and increases across most emissions sources on farm.

Methane from cow rumination (enteric) accounted for 63 per cent of on-farm emissions (median).

Emissions intensity was 0.94 t CO₂-e/FPCM (Milk) which was similar to the previous year.

Total emissions

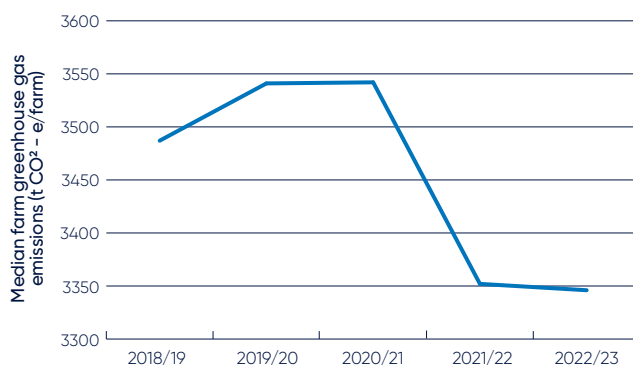
In 2022/23, the median carbon footprint (net GHG emissions) for WA participants was estimated to be 3,346 t CO₂-e/farm (FIGURE 14). Prior to 2020/21 average farm GHG emissions had been trending upwards, mostly due to larger herd sizes and greater milk production per farm. Since 2020/21 there was a change in data capture including carbon sequestration in trees and in 2022/23 user defined inputs for manure management were captured rather than utilising state defaults, accounting for some of the variation in total farm emissions.

In 2022/23, there was a slight decrease in farm emissions largely due to tree carbon offset. There was an increase in pre-farm emissions (fertiliser manufacture, production of purchased fodder, grain and concentrates), nitrous oxide emissions (gas produced from wastes - dung/urine, applied fertiliser and effluent ponds), carbon dioxide emissions from fossil fuel consumption (electricity, petrochemicals and/or fuel from contractors).

The increased use of purchased fodder, grain and concentrates and the separation of the Urea component of fertiliser blends combined with increased electricity use across farms contributed to an increase in farm emissions. The change in data capture in 2022/23 to include an estimate for the fuel used by contractors on farm for activities such as fodder conservation and sowing has also contributed to the increase.

Enteric methane slightly decreased on the previous year accounting for approximately 63 per cent of emissions and is sensitive to changes in livestock weights and numbers on individual farms.

Figure 14 Estimated median GHG emissions between 2018/19 and 2022/23 (CO₂ equivalent)

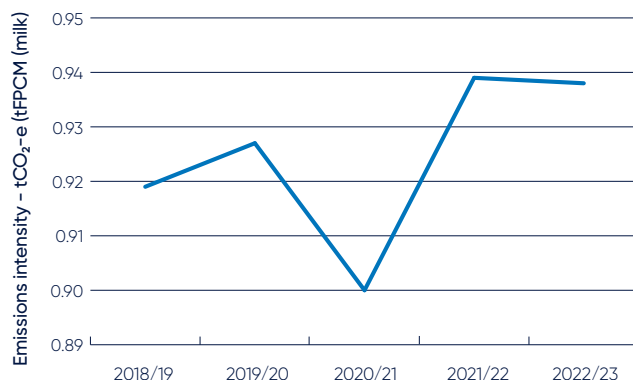


NOTE: Greenhouse gas emission estimates are calculated using the Australian Dairy Carbon Calculator embedded within DairyBase.

Emissions intensity

The emissions intensity allocated to milk production (once meat production is considered), remained similar to the previous year at 0.94 t CO₂-e/t FPCM and has increased over the years with the exception of 2020/21 (Figure 15 and Table 1). Emissions intensity is calculated by dividing total emissions by the amount of fat and protein corrected milk (FPCM); standard of 4.0% fat and 3.3% protein. Regional and farm variation was also observed over this period.

Figure 15 Estimated median emissions intensity between 2018/19 and 2022/23 (CO₂ equivalent)



The data

The median GHG emissions have been provided as the data is not symmetrically distributed. When the data are skewed, the median is more useful because the average will be distorted by outliers. These median values reflect the profiles of the participating farms in the project.

Changes to the emission accounting framework in 2021/22 included new factors for methane, nitrous oxide, fertiliser, purchased feeds, electricity and fuel. The scope considered other livestock on dairy farms (dairy beef) and the allocated proportion of GHG to meat production. Carbon capture and storage from trees was recorded. Data from all five years was analysed using the 2021/22 accounting framework. In 2022/23 additional information was captured for manure management on all farms where previously state based defaults had been allocated to this area. Participant farms also needed to estimate the fuel usage by contractors on farm.

Table 1 Estimated average GHG emissions and intensity between 2018/19 and 2022/23 (CO₂ equivalent)

| Emission source | Units | 18/19 | 19/20 | 20/21 | 21/22 | 22/23 |
|---------------------|------------------------------------|-------|-------|-------|-------|-------|
| Sample size | | 27 | 25 | 21 | 26 | 23 |
| Methane | t CO ₂ -e/farm | 2,418 | 2,471 | 2,520 | 2,377 | 2,375 |
| Pre-farm | t CO ₂ -e/farm | 431 | 423 | 469 | 391 | 410 |
| Nitrous oxide | t CO ₂ -e/farm | 433 | 402 | 451 | 391 | 406 |
| Carbon dioxide | t CO ₂ -e/farm | 204 | 240 | 193 | 155 | 213 |
| Tree carbon | t CO ₂ -e/farm | 0 | 0 | 0 | 0 | -15 |
| Net GHG emissions | t CO ₂ -e/farm | 3,487 | 3,541 | 3,542 | 3,352 | 3,346 |
| Emissions intensity | t CO ₂ -e/FPCM (milk) | 0.92 | 0.93 | 0.90 | 0.94 | 0.94 |
| Emissions intensity | t CO ₂ -e/t MS (milk) | 13.1 | 13.1 | 12.8 | 13.3 | 13.3 |
| Emissions intensity | t CO ₂ -e/kg lwt (meat) | 4.1 | 4.2 | 4.1 | 4.4 | 5.7 |

How does 2022/23 compare?

An increase in milk prices in 2022/23 helped buffer the impact of higher costs and a lower livestock profit.

In 2022/23 the average Western Australian Dairy Farm Monitor profitability was the highest in the 10-years of the project (accounting for inflation).

Strong profit results per farm (average \$818,520) across the state, was above the 10-year long term average of \$630,606 (accounting for inflation).

Farm profit (EBIT) in 2022/23 was the highest (accounting for inflation) since the start of the DFMP in 2013-14 (Figure 16). Average EBIT was \$818,520 in 2022/23, compared to the long-term average of \$630,606. Net farm income was \$621,251 in 2022/23, compared to the long-term average of \$433,435.

Average ROTA was 5.6 per cent in 2022/23, increasing from 3.9 per cent the previous year (Figure 17), which is the fourth highest in the last 10 years. The average ROE increased to 7.7 per cent in 2022/23 up from 6.1 per cent in 2021/22. This is compared to the long-term average of 8.0 per cent.

Figure 16 Farm profitability between 2013/14 and 2022/23

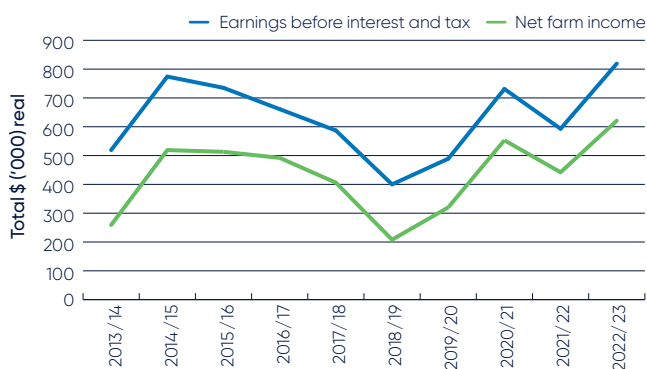
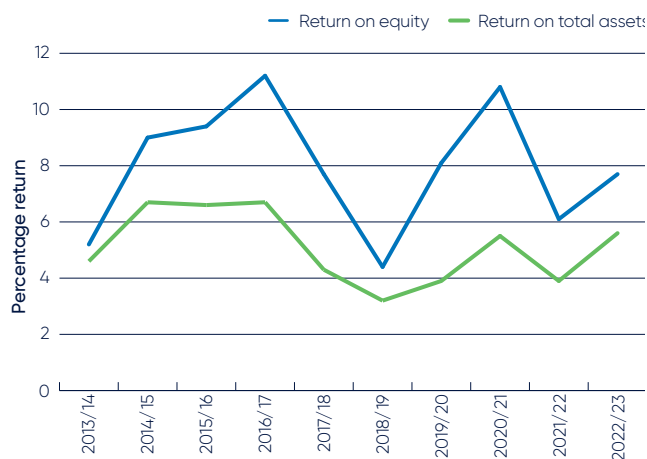


Figure 17 Whole farm performance between 2013/14 and 2022/23



Appendices



Table A8 Capital structure

| Farm assets | | | | | Other farm assets (per usable hectare) | | | | |
|----------------|------------|------------|-----------------------|-----------------------|--|-----------|---------------|--------------|--------------|
| | Land value | Land value | Permanent water value | Permanent water value | Plant and equipment | Livestock | Hay and grain | Other assets | Total assets |
| | \$/ha | \$/cow | \$/ha | \$/cow | \$/ha | \$/ha | \$/ha | \$/ha | \$/ha |
| Average | 11,689 | 14,899 | 372 | 397 | 1,379 | 3,083 | 134 | 208 | 16,864 |
| Top 25% | 9,254 | 11,183 | 342 | 316 | 1,220 | 3,415 | 253 | 228 | 14,711 |

| Liabilities | | | Equity | |
|----------------|--------------------------------|-----------------------------|---------------------------|----------------|
| | Liabilities per usable hectare | Liabilities per milking cow | Equity per usable hectare | Average equity |
| | \$/ha | \$/cow | \$/ha | % |
| Average | 4,107 | 5,471 | 12,758 | 72 |
| Top 25% | 3,861 | 4,251 | 10,850 | 76 |

Table A9 Historical data – average farm income, costs and profit per kg of milk solids

| Year | Income | | | | Variable costs | | | | | | | |
|----------------|-----------------|--------------|-------------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|----------------------|--------------|
| | Milk income net | | Gross farm income | | Herd costs | | Shed costs | | Feed costs | | Total variable costs | |
| | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS |
| 2013/14 | 6.62 | 8.17 | 7.75 | 9.57 | 0.24 | 0.30 | 0.26 | 0.32 | 3.29 | 4.07 | 3.79 | 4.68 |
| 2014/15 | 7.07 | 8.53 | 8.26 | 9.97 | 0.25 | 0.30 | 0.26 | 0.32 | 3.31 | 3.99 | 3.82 | 4.61 |
| 2015/16 | 7.22 | 8.60 | 8.29 | 9.88 | 0.26 | 0.31 | 0.24 | 0.29 | 3.45 | 4.11 | 3.95 | 4.70 |
| 2016/17 | 7.05 | 8.24 | 8.12 | 9.49 | 0.26 | 0.30 | 0.26 | 0.30 | 3.24 | 3.79 | 3.76 | 4.40 |
| 2017/18 | 7.00 | 8.03 | 8.16 | 9.36 | 0.26 | 0.29 | 0.27 | 0.31 | 3.52 | 4.04 | 4.05 | 4.65 |
| 2018/19 | 7.07 | 8.00 | 8.25 | 9.34 | 0.28 | 0.32 | 0.27 | 0.31 | 3.85 | 4.36 | 4.40 | 4.99 |
| 2019/20 | 7.35 | 8.21 | 8.74 | 9.77 | 0.27 | 0.30 | 0.28 | 0.31 | 3.86 | 4.32 | 4.41 | 4.93 |
| 2020/21 | 7.30 | 8.04 | 9.17 | 10.10 | 0.29 | 0.32 | 0.25 | 0.28 | 3.38 | 3.72 | 3.93 | 4.33 |
| 2021/22 | 7.72 | 8.14 | 10.02 | 10.57 | 0.33 | 0.35 | 0.31 | 0.33 | 4.14 | 4.37 | 4.79 | 5.05 |
| 2022/23 | 9.30 | 9.30 | 11.37 | 11.37 | 0.34 | 0.34 | 0.35 | 0.35 | 4.41 | 4.41 | 5.10 | 5.10 |
| Average | | 8.33 | | 9.94 | | 0.31 | | 0.31 | | 4.12 | | 4.74 |

Table A9 Historical data – average farm income, costs and profit per kilogram of milk solids (continued)

| Year | Overhead costs | | | | | | Profit | | | | | | | |
|----------------|---------------------|--------------|-------------------------|--------------|----------------------|--------------|--------------------------------|--------------|--------------------------|--------------|-----------------|--------------|------------|------------|
| | Cash overhead costs | | Non-cash overhead costs | | Total overhead costs | | Earnings before interest & tax | | Interest & lease charges | | Net farm income | | RoTA % | RoE % |
| | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | Nominal \$/kgMS | Real \$/kgMS | | |
| 2013/14 | 1.50 | 1.85 | 0.86 | 1.06 | 2.36 | 2.91 | 1.59 | 1.96 | 0.65 | 0.80 | 1.01 | 1.25 | 4.2 | 4.2 |
| 2014/15 | 1.47 | 1.77 | 0.8 | 0.97 | 2.26 | 2.73 | 2.17 | 2.62 | 0.59 | 0.71 | 1.66 | 2.00 | 6.3 | 8.2 |
| 2015/16 | 1.51 | 1.80 | 0.82 | 0.98 | 2.33 | 2.78 | 2.02 | 2.41 | 0.53 | 0.63 | 1.54 | 1.83 | 6.4 | 9.1 |
| 2016/17 | 1.56 | 1.83 | 0.83 | 0.97 | 2.39 | 2.79 | 1.98 | 2.31 | 0.53 | 0.61 | 1.48 | 1.73 | 6.5 | 18.3 |
| 2017/18 | 1.53 | 1.75 | 0.52 | 0.60 | 2.57 | 2.95 | 1.54 | 1.77 | 0.53 | 0.61 | 1.01 | 1.16 | 4.3 | 7.7 |
| 2018/19 | 1.71 | 1.93 | 0.98 | 1.11 | 2.69 | 3.04 | 1.16 | 1.31 | 0.60 | 0.68 | 0.56 | 0.63 | 3.2 | 4.4 |
| 2019/20 | 1.84 | 2.05 | 1.05 | 1.18 | 2.89 | 3.23 | 1.44 | 1.61 | 0.56 | 0.62 | 0.88 | 0.99 | 3.9 | 8.1 |
| 2020/21 | 2.12 | 2.33 | 0.88 | 0.97 | 3.00 | 3.30 | 2.24 | 2.47 | 0.52 | 0.57 | 1.72 | 1.89 | 5.5 | 10.8 |
| 2021/22 | 2.16 | 2.28 | 1.23 | 1.30 | 3.39 | 3.58 | 1.84 | 1.94 | 0.54 | 0.57 | 1.30 | 1.37 | 3.9 | 6.1 |
| 2022/23 | 2.32 | 2.32 | 1.30 | 1.30 | 3.62 | 3.62 | 2.65 | 2.65 | 0.81 | 0.81 | 1.84 | 1.84 | 5.6 | 7.7 |
| Average | | 1.99 | | 1.04 | | 3.09 | | 2.10 | | 0.66 | | 1.47 | 5.0 | 8.5 |

Note: 'Real' dollar values are the nominal values converted to 2022/23 dollar equivalents by the consumer price index (CPI) to allow for inflation. From 2016/17 Gross farm income does not include feed inventory changes and changes to the value of carry-over water. These are included in feed costs.

Table A10 Historical data – average farm physical information

| Year | Total usable area | Milking area | Total water use efficiency | Number of milking cows | Milking cows | Milk sold | Milk sold | Estimated grazed pasture* | Estimated conserved feed* | Home-grown feed | Concentrate price | |
|----------------|-------------------|--------------|----------------------------|------------------------|--------------|------------|------------|---------------------------|---------------------------|-----------------|-------------------|--------------|
| | ha | ha | t DM/100mm/ha | hd | hd/ha | kg MS/cow | kg MS/ha | t DM/ha | t DM/ha | % of ME | Nominal \$/t DM | Real \$/t DM |
| 2013/14 | 606 | 280 | 0.4 | 522 | 0.9 | 505 | 453 | 3.3 | 1.5 | 62 | 418 | 516 |
| 2014/15 | 625 | 296 | 0.6 | 543 | 0.9 | 535 | 486 | 3.6 | 1.7 | 63 | 421 | 508 |
| 2015/16 | 575 | 283 | 0.5 | 545 | 1.0 | 557 | 541 | 4.1 | 1.7 | 57 | 445 | 530 |
| 2016/17 | 499 | 268 | 0.6 | 498 | 1.0 | 558 | 570 | 5.1 | 1.3 | 61 | 404 | 472 |
| 2017/18 | 586 | 277 | 0.5 | 497 | 0.9 | 580 | 521 | 4.0 | 1.9 | 57 | 429 | 492 |
| 2018/19 | 579 | 286 | 0.6 | 497 | 0.9 | 566 | 515 | 4.2 | 1.6 | 60 | 488 | 553 |
| 2019/20 | 582 | 273 | 0.7 | 481 | 0.9 | 561 | 507 | 4.2 | 1.6 | 61 | 507 | 566 |
| 2020/21 | 678 | 312 | 0.6 | 524 | 0.8 | 569 | 471 | 4.6 | 1.9 | 67 | 494 | 544 |
| 2021/22 | 603 | 284 | 0.6 | 471 | 0.8 | 557 | 464 | 3.9 | 1.6 | 64% | 513 | 541 |
| 2022/23 | 628 | 296 | 0.6 | 490 | 0.8 | 548 | 456 | 3.6 | 1.8 | 61% | 532 | 532 |
| Average | 596 | 286 | 0.6 | 507 | 0.9 | 554 | 498 | 4.1 | 1.7 | 49 | | 526 |

* Milking area

Appendix A Glossary of terms, abbreviations and standard values

| | | | |
|---|--|----------------------------|---|
| All other farm income | Income to the farm from all sources except milk. Includes livestock trading profit, dividends, interest payments received, and rent from farm houses. | Feeding Systems | <p>Low bail Low bail is defined by the one-tonne annual cap of grain or concentrates fed in the dairy bail – i.e. cows are fed up to one tonne of grain and concentrate in the dairy at milking time throughout lactation and livestock graze pasture all year round.</p> <p>Moderate – High bail The level of grain or concentrate fed in the bail is more significant than one tonne per annum, and livestock graze pasture all year round.</p> <p>Partial mixed ration In the partial mixed ration (PMR) system, livestock animals graze on pasture for most of the year, if not all of the year, while being fed a PMR on a feed pad.</p> <p>Hybrid system Hybrid systems are classified as grazing pasture for fewer than nine months of the year while feeding a partial mixed ration on a feed pad with grain or concentrates.</p> <p>Total mixed ration A total mixed ration or TMR is classified by zero-grazing, where cows are contained and fed a TMR throughout the year.</p> |
| Allocation | Water that is actually available to use or trade in any given year, including new allocations and carryover. Previously known as temporary water. Full allocation means irrigators receive 100 per cent of their HRWS. | Finance costs | See interest and lease costs. |
| Allocation trade | The transfer of a volume of allocation water between a seller and buyer. Water is traded within a current irrigation season. Previously this was known as trading of temporary water entitlement and some irrigators still use this term. | Full time equivalent (FTE) | Standardised labour unit. Equal to 2,400 hours a year. Calculated as 48 hours a week for 50 weeks a year. |
| Appreciation | An increase in the value of an asset in the market, often only applicable to land value. | Grazed pasture | Calculated using the back-calculation approach. Grazed pasture is calculated as the difference between total metabolisable energy required by livestock over the year and amount of metabolisable energy available from other sources (hay, silage, grain, and concentrates). Total metabolisable energy required by livestock is a factor of age, weight, growth rate, pregnancy, and lactation requirements, walking distance to shed, terrain and number of animals. Total metabolisable energy available is the sum of metabolisable energy from all feed sources except pasture, calculated as (weight (kg) x dry matter content (DM per cent) x metabolisable energy (MJ/ kg DM)). |
| Asset | Anything managed by the farm, whether it is owned or not. Assets include owned land and buildings, leased land, plant and machinery, fixtures and fittings, trading stock, farm investments (i.e., Farm Management Deposits), debtors, and cash. | Gross farm income | Farm income including milk sales, livestock trading and other income such as income from grants and rebates. |
| Cash overheads | All fixed costs that have a cash cost to the business. Includes all overhead costs except imputed labour costs and depreciation. | Gross margin | Gross farm income minus total variable costs. |
| Cost structure | Variable costs as a percentage of total costs, where total costs equal variable costs plus overhead costs. | Herd costs | Cost of artificial insemination (AI) and herd tests, animal health and calf rearing. |
| Concentrates | Refers to feeds with a concentrated source of energy such as grains, pellets and other grain mixes. | Imputed | An estimated amount introduced into economic management analysis to allow reasonable comparisons between years and between other businesses. |
| Debt servicing ratio | interest and lease costs as a percentage of gross farm income. | Imputed labour cost | An allocated allowance for the cost of owner/operator, family, and sharefarmer time in the business. |
| Depreciation | Decrease in value over time of capital asset, usually as a result of using the asset. Depreciation is a non-cash cost of the business but reduces the book value of the asset and is therefore a cost. | | |
| Earnings before interest and tax (EBIT) | Gross income minus total variable and total overhead costs. | | |
| Employed labour cost | Cash cost of any paid employee, including on-costs such as superannuation and Workcover. | | |
| Equity | Total assets minus total liabilities. Equal to the total value of capital invested in the farm business by the owner/ operator(s). | | |
| Equity per cent | Total equity as a percentage of the total assets owned. The proportion of the total assets owned by the business. | | |
| Feed costs | Cost of fertiliser, irrigation (including effluent), hay and silage making, fuel and oil, pasture improvement, fodder purchases, grain/ concentrates, agistment and lease costs associated with any of the above costs, and feed inventory change. | | |
| Feed inventory change | An estimate of the feed on hand at the start and end of the financial year to capture feed used in the production of milk and livestock. | | |

| | |
|-------------------------------|---|
| Interest and lease costs | Total interest plus total lease costs paid. |
| Labour cost | Cost of the labour resource on farm. Includes both imputed and employed labour costs. |
| Labour efficiency | FTEs per cow and per kg MS. Measures productivity of the total labour resources in the business. |
| Liability | Money owed to someone else, e.g., family or a financial institute such as a bank. |
| Livestock trading profit | An estimate of the annual contribution to gross farm income by accounting for the changes in the number and value of livestock during the year. It is calculated as the trading income from sales minus purchases, plus changes in the value and number of livestock on hand at the start and end of the year, and accounting for births and deaths. |
| Milk income | Income from the sale of milk. This is net of compulsory levies and charges. |
| Milking area | The area of land grazed by milking cows to produce milk. |
| Net farm income | Earnings before interest and tax (EBIT) minus interest and lease costs. The amount of profit available for capital investment, loan principal repayments and tax. |
| Nominal terms | Dollar values or interest rates that include an inflation component. |
| Number of milkers | Total number of cows milked for at least three months. |
| Other income | Income to the farm from other farm owned assets and farm business related external sources. Includes milk factory dividends, interest payments received, and rent from farm cottages. |
| Overhead costs | All fixed costs incurred by the farm business that do not vary with the level of production. These include cash overhead costs such as employed labour and noncash costs such as imputed owner-operator labour, family labour and depreciation of plant and equipment. It excludes interest, lease costs, capital expenditure, principal repayments, drawings, and tax. |
| Real terms | Dollar values or interest rates that have no inflation component. |
| Return on equity (ROE) | Net farm income divided by the value of total equity. |
| Return on total assets (ROTA) | Earnings before interest and tax divided by the value of total assets under management, including owned and leased land. |
| Shed costs | Cost of shed power and dairy supplies such as filter socks, rubberware, vacuum pump oil etc. |
| Top 25% | Regional or State average for the Top 25% of participant farms ranked by return on total assets; can also be referred to as the top group, top performers within a region or the state. |
| Total income | See gross farm income. |

| | |
|----------------------------|---|
| Total usable area | Total hectares managed minus the area of land which is of little or no value for livestock production e.g., house and shed area. |
| Total water use efficiency | Homegrown feed consumed or harvested per 100 mm water 'applied' (rainfall and irrigation) to the usable hectares on the farm. |
| Variable costs | All costs that vary with the size of production in the enterprise e.g., herd, shed and feed costs (including feed and water inventory change). |
| Water inventory change | An estimate of the values irrigation water on hand at the start and end of the financial year to capture water used in the production of pasture and crops. |

List of abbreviations

| | |
|--------------------|---|
| AI | Artificial insemination |
| CH ₄ | Methane |
| CO ₂ | Carbon dioxide |
| CO ₂ -e | Carbon dioxide equivalent |
| CoP | Cost of production |
| DFMP | Dairy Farm Monitor Project |
| DM | Dry matter of feed stuffs |
| DJPR | Department of Jobs, Precincts and Resources, Victoria |
| EBIT | Earnings before interest and tax |
| FPCM | Fat and protein corrected milk |
| FTE | Full time equivalent |
| ha | Hectare(s) |
| hd | Head |
| HRWS | High Reliability Water Shares |
| kg | Kilograms |
| LRWS | Low Reliability Water Shares. |
| ME | Metabolisable energy (MJ/kg DM) |
| MJ | Megajoules of energy |
| ML | Megalitres |
| mm | Millimetres. 1 mm is equivalent to 4 points or 1/25th of an inch of rainfall |
| MS | Milk solids (protein and fat) |
| N ₂ O | Nitrous oxide |
| Q1 | First quartile, i.e., the value of which one quarter, or 25 per cent, of data in that range is less than the average |
| Q3 | Third quartile, i.e., the value of which one quarter, or 25 per cent, of data in that range is greater than the average |
| ROTA | Return on total assets |
| ROE | Return on equity |
| t | Tonne = 1,000 kg |

Standard values

Pasture consumption

The pasture consumption calculation assumes 11 ME for homegrown feed.

Livestock values

The standard values used to estimate the inventory values of livestock were determined by breed and liveweight.

Example values for Friesians were:

| Category | Opening value (\$/hd) | Closing value (\$/hd) |
|------------------------|--------------------------|--------------------------|
| Mature cows (550kg) | \$2,200 | \$2,200 |
| 2-year-old heifers | \$1,650 | \$2,200 |
| 1-year old heifers | \$825 | \$1,650 |
| 21/22 calves | | \$825 |
| Mature bulls | \$3,300 | \$3,300 |

Imputed owner/operator and family labour

In 2022/23, the imputed owner/operator and family labour rate was \$36/hr based on a full time equivalent (FTE) working 48 hours/week for 50 weeks of the year.



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