Dairy Australia

DAIRY FARM MONITOR PROJECT

WESTERN AUSTRALIA ANNUAL REPORT 2021/22

ACKNOWLEDGEMENTS

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

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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.

Further information

Jo Saunders
Western Dairy Executive Officer
PO Box 5066
Bunbury WA 6230
0437 324 242
jo.saunders@westerndairy.com.au

Helen Quinn
Program Manager – Farm Business Management
Dairy Australia
Level 3, HWT Tower
40 City Road
Southbank VIC 3006
helen.quinn@dairyaustralia.com.au

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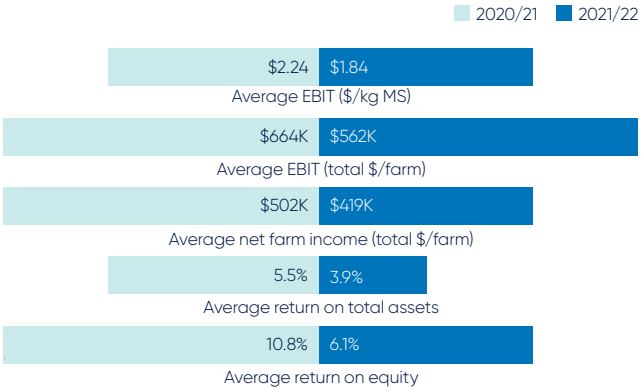
EXECUTIVE SUMMARY

In 2021-22 the average Western Australia Farm Monitor profitability declined by 21% on the previous year and was the sixth highest in the 9-years of the project (accounting for inflation).

An increased milk price of $7.72 per kilograms of milk solids ($/kg MS) or 56.0 cents per litre (c/L) and increased livestock trading profit at $2.25/kgMS (16.3c/L) was offset by higher input costs and supply constraints, including for feed and fertiliser which impacted farm business margins in 2021-22.

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

Western Australia



An increase in the milk price and higher livestock trading conditions meant gross farm income increased however this was offset by greater increases in variable and overhead costs which resulted in a lower EBIT.

There was an increase in business equity across the year through reduction in debt, investment in plant and equipment and revaluation of land holdings.

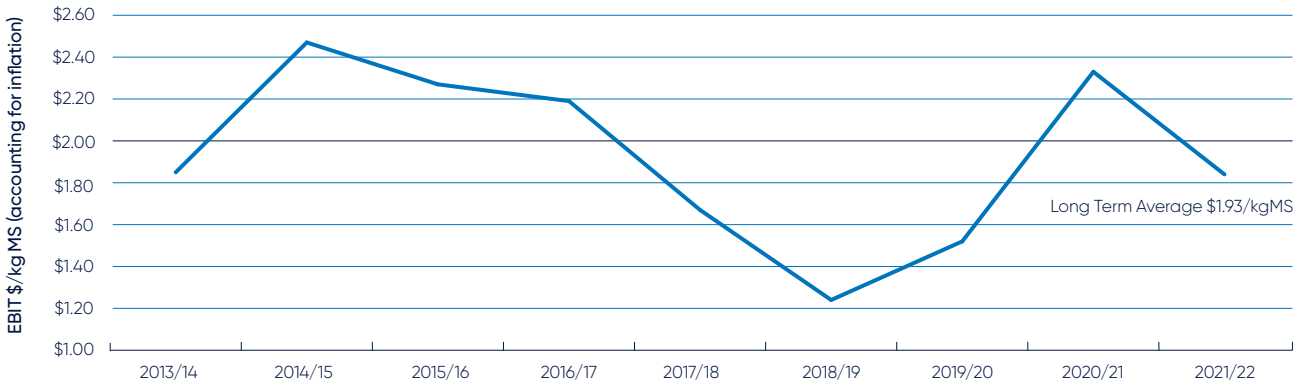
An average winter and a wet October produced better quality fodder crops despite lower yields than previous seasons. High fertiliser costs saw individuals use fodder reserves in place of some fertiliser inputs which resulted in a decline in fodder reserves on hand at year end and a drop in the average homegrown feed on milking area. Combined with higher input costs for fertiliser, chemicals and contractors the average cost of homegrown feed increased compared to last year.

Gross farm income was the highest over the 9 years and profitability (average EBIT per kilogram of milk solids) was the 6th highest (accounting for inflation).

Despite increased milk incomes and good livestock trading conditions, increases in feed and overhead costs resulted in a decrease in average profit compared to the previous year for participating farms.

How does 2021/22 compare?

Historical profitability



Average profit (per kg milk solids) in 2021-22 was $1.84/kg MS (13.4c/L) which was below the long-term average of $1.93/kgMS for Western Australia.

Strong profit results per farm (average $561,805) across the state, were below the 9-year long term average of $576,351, but down on the average of $691,573 (adjusted for inflation) in 2020-21.

Milk price

Milk price increased by 5.8% from 2020-21. Milk income contributed on average, 77 per cent of gross farm income with a 28 per cent increase in livestock trading contribution to gross farm income on the previous year.

Western Australia ↑ 5.8%
to $7.72/kg MS 0.56 c/L

Expectations for profit in 2022/23

Participant farmers were generally optimistic in their outlook for farm business returns in the coming 12 months with 69 per cent of participants expecting better returns in 2022-23, with only 4 per cent expecting returns to decline. Input costs and milk price were identified by participants as the greatest risk to their business followed by labour and their ability to maintain homegrown feed production on farm.

Greenhouse gas emissions

The average carbon footprint for Western Australian dairy farm participants was 4,570 tonnes of carbon dioxide equivalents per farm in 2021-22. Over the last five years, with the exception of 2020-21 declining herd sizes and stable milk production per farm have contributed to stable greenhouse gas emissions.

WESTERN AUSTRALIA OVERVIEW

State-wide, average profitability in Western Australia was positive but below the 9-year long term average. Strong prices received for milk and livestock was offset by the impact of higher costs.

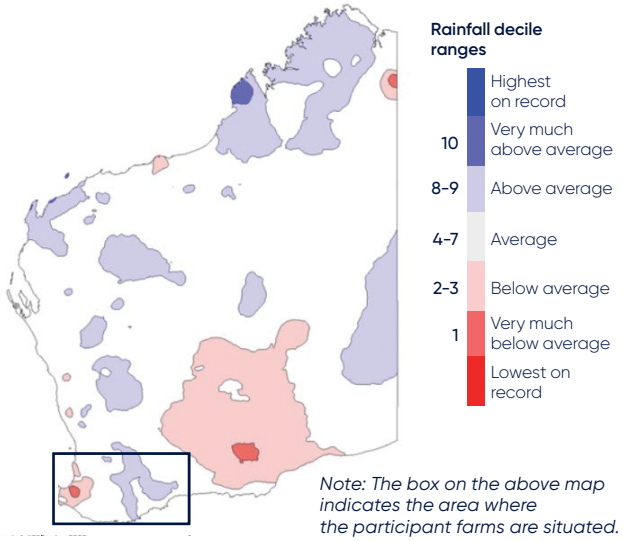
Profitability was constrained due to increases in input costs such as fertiliser and hay and silage costs. Fodder conservation was also down on last year due to an average winter and wet October producing better quality fodder crops but lower yields. This impacted the ability of farms to conserve high quantities of quality homegrown feed.

There were significant increases in costs, especially feed on the back of higher input cost for homegrown feed and higher unit prices on purchased feeds particularly grain. Increasing overhead costs, particularly for imputed labour and repairs and maintenance also contributed to lower margins compared to 2020-21.

Dairying in Western Australia

There were approximately **116 dairy farm businesses** in WA that produced **341 million litres** or **4 per cent** of Australia's national milk production in 2021/22.

Dairy Farm Monitor Project farm locations and rainfall in 2021/22



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

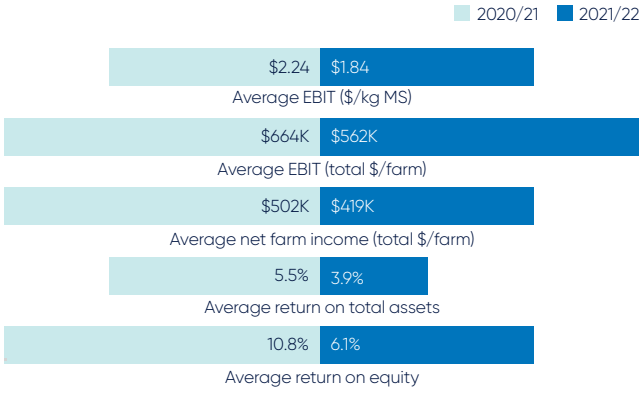
Physical farm characteristics

The average herd size of DFMP participants in Western Australia decreased to 471 cows, milk produced per cow declined from 569kgMS/cow to 557kgMS/cow. Farms grazed and conserved 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.

Average herd size	Milk solids sold	Homegrown feed
↓10%	↓2%	↓4%
471 cows	557 kg MS/cow	64% of metabolisable energy consumed

Profitability

In 2021/22, 93 per cent of all WA participants recorded a profit



2021/22 farm profitability has been influenced by:

Increased average milk price of $7.72/kg MS (56c/L)

↑14%
In herd costs to **$0.33/kg MS (2.4c/L)**

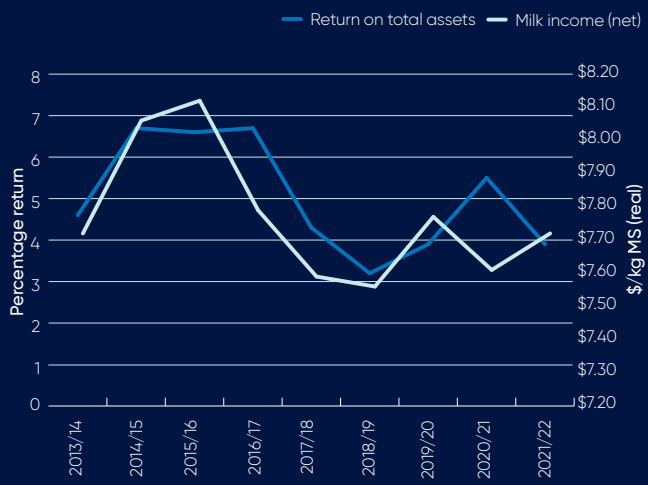
↑24%
In shed costs to **$0.31/kg MS (2.3c/L)**

↑22%
In total feed costs to **$4.14/kg MS (30.0c/L)**

↑13%
In overheaad costs to **$3.39/kg MS (24.5c/L)**

Increased costs across the state in most areas of the business reduced the benefit of positive livestock trading conditions and an increased milk price for the season. The state-wide average total EBIT per farm was the fifth highest on record, accounting for inflation.

Return on total assets and milk price



PHYSICAL MEASURES

The majority of farms received below average rainfall in 2021-22. An average winter and a wet October produced better quality fodder crops despite lower yields than previous seasons.

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 decreased to 471 in 2021-22 to the lowest in the projects nine year history.

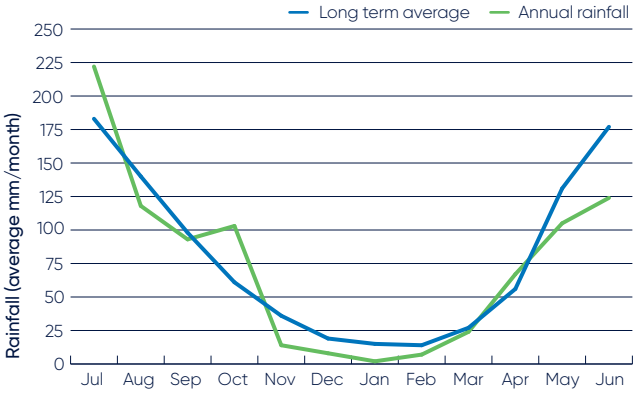
WA pasture based dairy production

Dairying in Western Australia is predominantly pasture based, with 64 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

A below average winter and slightly above average spring rainfall in 2021 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.

Figure 1 Monthly rainfall 2021/22



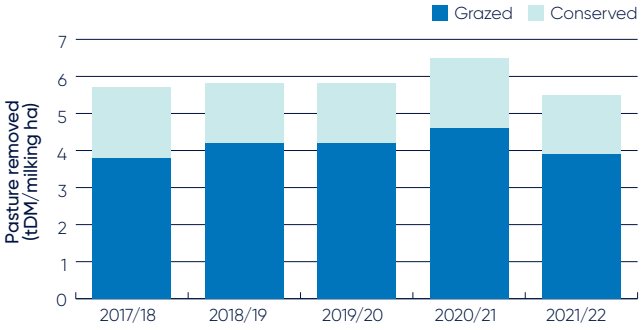
Below average winter rainfall provided issues for participants in lower than average pasture growth. Below average autumn rainfall resulted in reduced availability of homegrown feed for grazing and resulted in many farms utilising some of their fodder reserves from the previous year.

Feed consumption and harvest

With lower homegrown feed availability across the state, the average tonnes of homegrown feed reduced by 1t DM/ha (Figure 2). Whilst the proportion of fodder consumed in the diet increased there was a decline in concentrates as a proportion of the diet.

The ability to grow and harvest feed may have also been impacted by lower fertiliser applications due to high fertiliser prices.

Figure 2 Estimated tonnes of homegrown feed removed

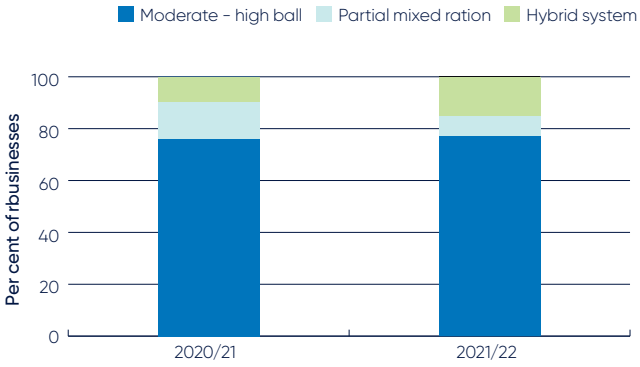


Feeding system

Moderate to high bail feeding systems were the most popular feeding system in 21-22 (Figure 3). The reduction in farms utilising a partial mixed ration system from 2020/21 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 77 per cent of farms with a Moderate-High bail system and 23 per cent utilising either a hybrid system or partial mixed ration.

Western Australia is predominantly reliant on annual pasture species, comprising approximately 93 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.

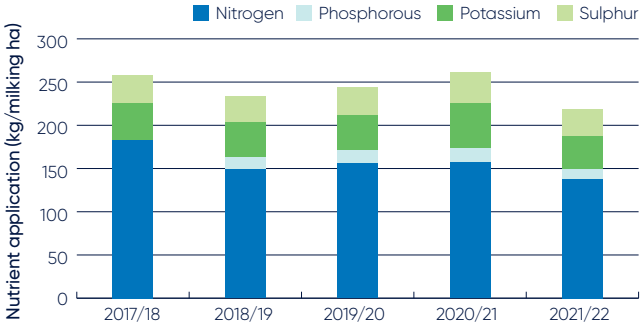
Fertiliser application

Total nutrient application on the milking area reduced by 16% in 2021/22 to the lowest in five years. The significant increase in fertiliser prices and volume of carry over feed resulted in farmers applying lower quantities of fertiliser.

In comparison to the previous year, Figure 4 shows that in 2021/22:

- Nitrogen applied was 138 kg/ha, a 12 per cent reduction
- Phosphorous applied was 11 kg/ha, a 35 per cent reduction
- Potassium applied was 39 kg/ha, a 25 per cent reduction
- Sulphur applied was 31 kg/ha, a 11 per cent reduction

Figure 4 Nutrient application

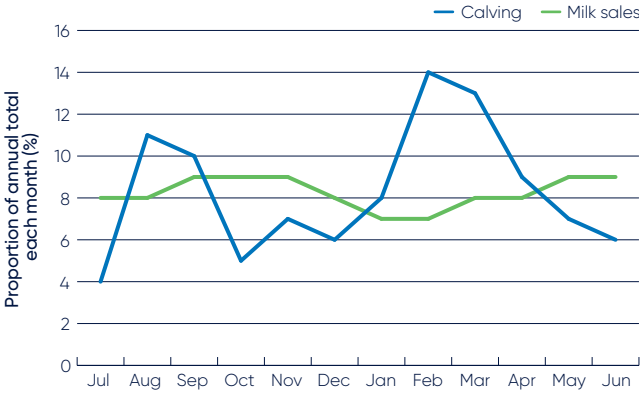


Milk solids sold

Western Australian participant farms on average decreased the level of total milk production on farm due to reduced milk production per cow and a decrease in average herd size.

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).

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 June/July and October.

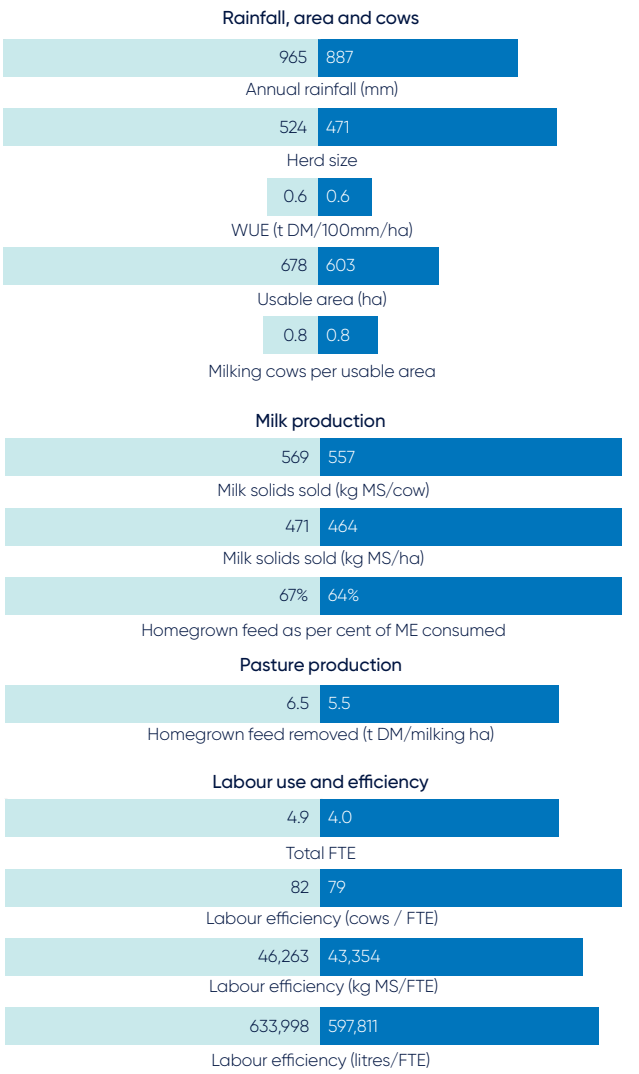
WHOLE FARM ANALYSIS

On average, farm profitability decreased by 21% in 2021-22 from the previous year. Earnings before Interest and Tax (EBIT) was positive for 92 per cent of participating farms.

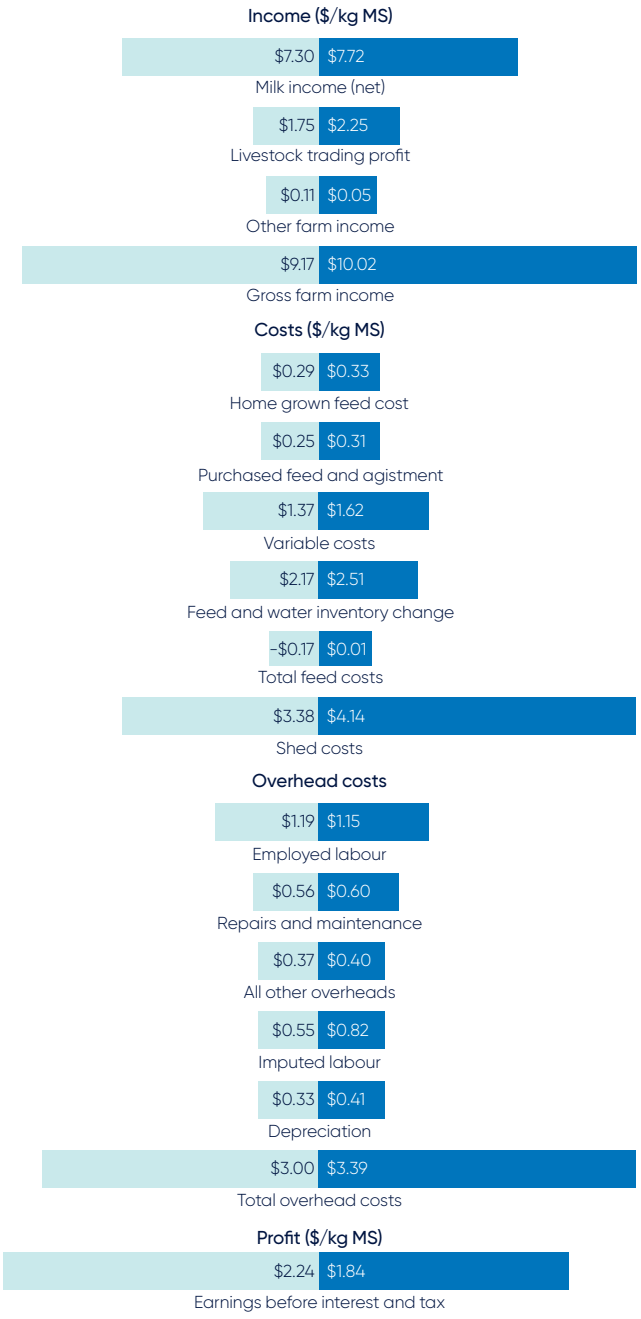
The increased milk price and improved livestock trading conditions did not lead to increased profitability across the state due to increase in total expenses.

Variable costs increased by 22 per cent, primarily due to feed costs, with overhead costs higher by 13 per cent.

Physical parameters



Financial parameters



Gross farm income

Higher gross farm income was recorded in 2021/22 than the previous year. When accounting for inflation, it is the highest over the 9 years of the DFMP. The key drivers were an increased milk price and increased livestock trading profit.

Variable costs

Variable costs increased by $0.86/kg MS (6.2c/L) with higher purchased feed costs being the largest component followed by homegrown feed costs.

Homegrown feed costs increased by $0.25/kg MS (1.8c/L) with fertiliser contributing $0.12/kg MS (0.9c/L), and fuel and oil costs contributing a further $0.06/kgMS (0.5c/L).

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

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

Whilst shed and herd costs increased from last year the biggest increase was in dairy supplies which increased $0.05/kgMS (0.3c/L).

Overhead costs

Total overhead costs increased on average by 13 per cent in 2021/22.

Decreased spending on employed labour by $0.04c/kg MS (0.2c/L), due to supply, was more than offset by the increase in imputed labour by $0.27/kg MS (1.9c/L) and increased depreciation costs accounted for $0.07/kg MS (0.5c/L).

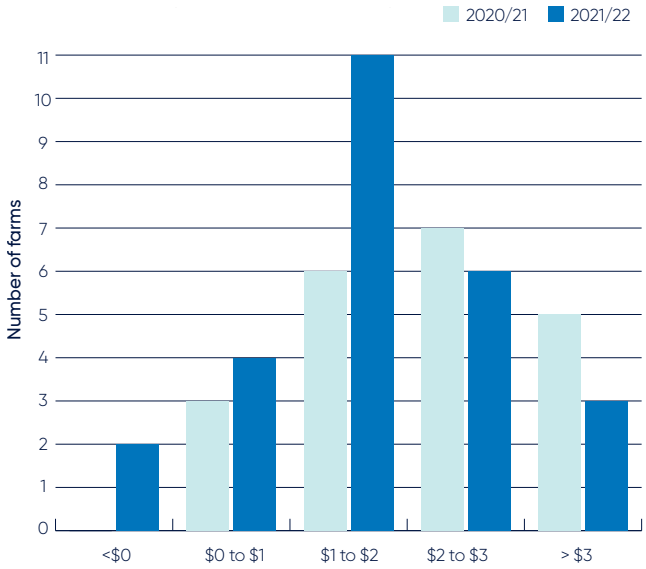
The majority of farms increased the hourly rate for employed labour with wage rates and availability of labour and accommodation frequently raised by farmers as a prominent issue.

The high value of assets on some farms, including considerable infrastructure investment in 2021/22 has seen an increase in the non-cash cost of depreciation. Some of this increase is due to the separation of significant buildings on farms in 2021/22 to ensure depreciation is being captured accurately and allowing sufficient allocation to asset replacement in the future.

Earnings before interest and tax

In 2021/22, 92 per cent of participants had a positive EBIT (Figure 6). Average EBIT per farm (total dollars) was the fifth highest in the nine years of the DFMP, accounting for inflation. Average EBIT ($/kg MS) was lower in comparison to 2020/21.

Figure 6 Average EBIT per kg MS



Return on total assets and equity

A positive return on total assets (ROTA) was recorded for all but two participants (Figure 7). In 2021/22 average ROTA reduced to 3.9 per cent compared to 5.5 per cent the previous year. The lower returns were a result of lower total EBIT combined with increasing values on total assets managed across participant farms.

Average return on equity (ROE) in 2021/22 decreased to 6.1 per cent relative to the previous year at 10.8 per cent. Equity levels increased on the majority of farms during the last 12 months.

With the cost of financing lower than the returns from accessing additional assets (e.g. land and infrastructure upgrades), 62 per cent of the participants recorded higher ROE than ROTA meaning they have been able to grow their business.

Figure 7 Average returns ROTA and ROE

** Two farms that have average ROEs of 17.1 percent and 22.5 per cent are not represented on the graph due to scaling*

BUSINESS CONFIDENCE SURVEY

Participant farmers were confident in their outlook for farm business returns in the coming 12 months (2022-23).

All participant farms expected milk price to increase or remain stable with 42% of farms expecting milk production to increase.

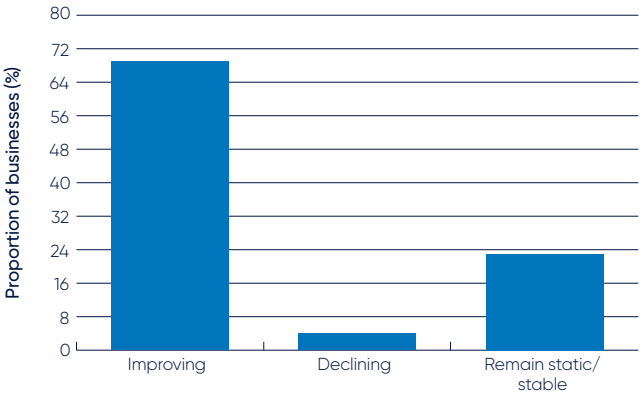
Input costs was the major issue listed for the coming 12 months with milk price being the most significant issue for the coming 5 years.

In 2022-23 the majority of participants were expecting costs to increase across most categories.

Expectations for business profit 2022/23

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 69 per cent of farms expecting an increase in returns and 23 per cent expecting returns to remain stable. Only one farm is expecting returns to decrease (Figure 8).

Figure 8 Expected change to farm business profit in 2022/23

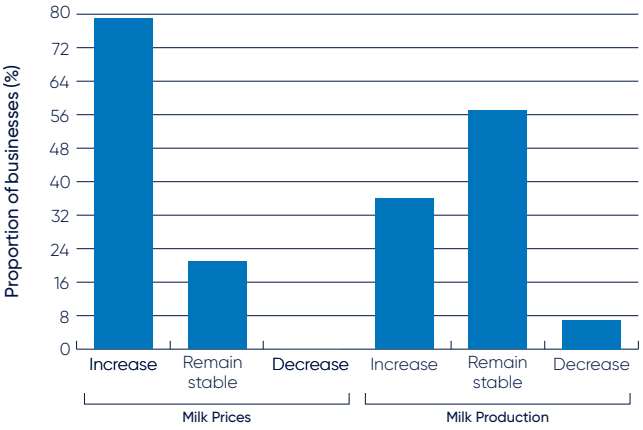


Price and production expectations – milk

Participants were confident in their outlook for milk price, and milk production for 2022-23. This is mainly due to the timing of milk price announcements (1 June), with farmers having more informed choices on their milk factory at the time of the DFMP survey (August-October 2022).

77 per cent of respondents were expecting milk price to increase with the remaining 23 per cent expecting it to remain stable. Around 46 per cent were expecting milk production to remain stable while 42 per cent expected it to increase in the coming year. Only 12 per cent predicted milk production would decrease in 2022-23 (Figure 9).

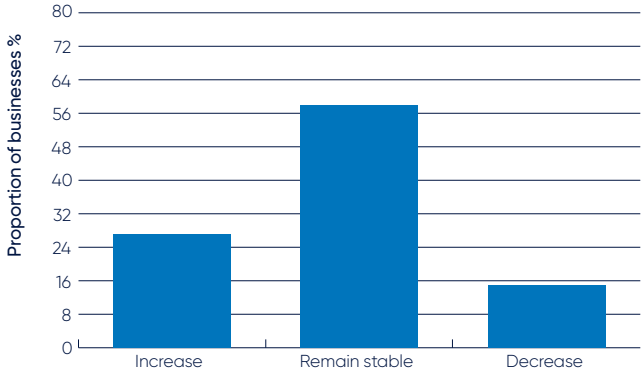
Figure 9 Producer expectations of milk prices and production in 2022/23



Production expectations – fodder

Fodder production in 2022-23 was expected to remain stable for 58 per cent of participant farms with a further 27 per cent expecting an increase in fodder after the impacts of frequent rainfall events in spring of 2021-22 caused a drop in fodder production on a number of farms (Figure 10).

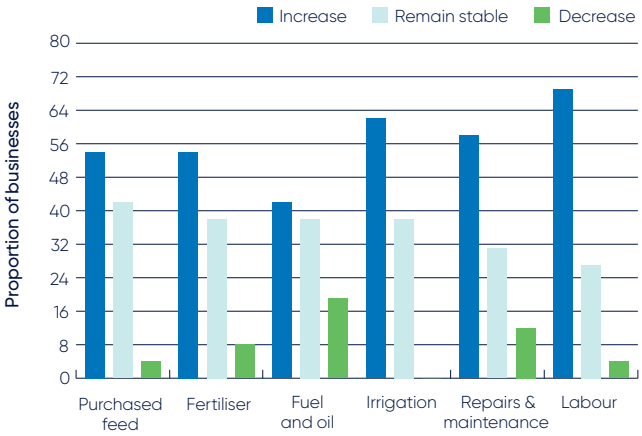
Figure 10 Producer expectations of fodder production in 2022/23



Cost expectations

In 2022-23, the majority of participants are expecting increases in purchased feed, fertiliser, fuel and oil, irrigation, repairs and maintenance and labour (Figure 11). 69 per cent of participants expect labour costs to increase. No participants are expecting a decrease in irrigation costs.

Figure 11 Producer expectations of costs for the dairy industry in 2022/23



Comments from participants

Respondents indicated concern for interest rates rises and focusing on debt repayment. Others noted that lack of available land for both purchase and lease is restricting growth and reducing production.

Another key concern was around rising wages and overall labour expenses including lack of available accommodation for employees. Others are looking to increase automation to address the labour shortage.

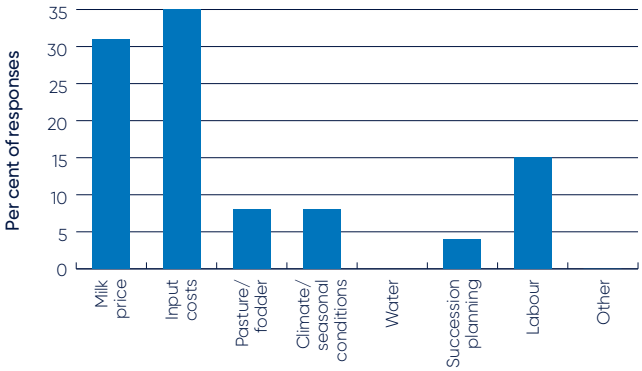
ISSUES OF IMPORTANCE TO DAIRY BUSINESSES

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 input costs with 35 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. Milk price (ranked number 2 by 31 per cent of respondents) was then ahead of labour (at 15 per cent) as being a major issue.

Figure 12 Major issues for individual businesses – 12 month outlook

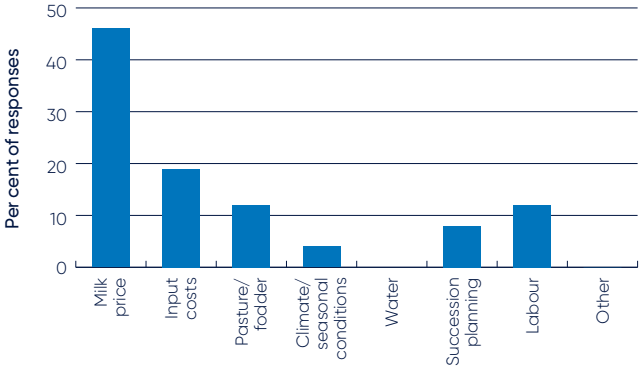


Medium to long term issues – Next five years

Milk price remains the major consideration for 46% of participants farms which is higher than the 30% in 2020/21 although pasture/fodder costs were noted as an increased consideration over the coming five years.

Input costs remain the next highest consideration at 19 per cent followed by pasture/fodder and labour (12 per cent respectively).

Figure 13 Major issues for individual businesses – 5 year outlook



2021/22 GREENHOUSE GAS EMISSIONS

The average carbon footprint for Western Australian dairy farm monitor farms was 4,570 tonnes of carbon dioxide equivalents (t CO2-e) per farm in 2021/22.

Methane from cow rumination (enteric) accounted for an average of 69 per cent of on-farm emissions.

Reducing herd sizes and total farm milk production have contributed to the trend of decreased greenhouse gas (GHG) emitted per farm over the last 5-years, with the exception of 2020/21.

Total emissions

Over the last five years, average GHG emissions have been relatively stable with the exception of last year. In 2021-22, the average carbon footprint (net GHG emissions) for WA participants was estimated to be 4,570 t CO2-e/farm (FIGURE 14) which is the lowest emissions in the 5 year history.

In 2021/22 there was a decrease in methane emissions per farm, combined with decreases 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), resulting in a decrease in average net emissions since last year. There was also a decrease in carbon dioxide emissions from fossil fuel consumption (electricity or petrochemicals) whilst carbon capture from trees was noted as an offset on any of the participating farms.

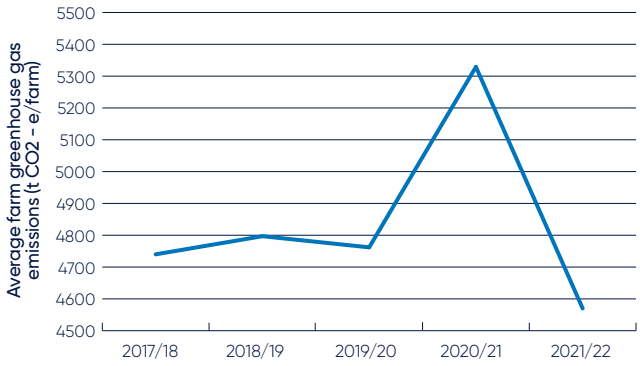
Enteric methane accounted for approximately 69 per cent of emissions and is sensitive to changes in livestock weights and numbers on individual farms.

High fertiliser prices and seasonal conditions saw the reduced use of fertiliser on farm. Farms are also increasing their adoption of alternative energy sources such as solar power. All these factors have played a role in the relatively stable trend for farm emissions since 2017-18 with the exception of 2020-21.

Emissions intensity

The emissions intensity allocated to milk production (once meat production is considered), has remained stable over the five years (Table 1). Emissions intensity has remained stable as average milk production has decreased. Regional and farm variation was also observed over this period. These averages reflect the profiles of the participating farms and should not be taken as representative of the dairy industry.

Figure 14 Estimated average GHG emissions between 2017/18 and 2021/22 (CO^2 equivalent)



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

Changes to the emission accounting framework in 2021-22 include 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 more accurately in 2021-22. Data from all five years was analysed using the 2021-22 accounting framework.

Table 1 Estimated average GHG emissions and intensity between 2017/18 and 2021/22 (CO^2 equivalent)

Emission source	Units	17/18	18/19	19/20	20/21	21/22
Sample size		25	27	25	21	26
Methane	t CO^2-e/farm	3,224	3,317	3,230	3,688	3,167
Pre-farm	t CO^2-e/farm	594	606	604	641	548
Nitrous oxide	t CO^2-e/farm	557	575	574	678	562
Carbon dioxide	t CO^2-e/farm	365	300	354	322	294
Tree carbon	t CO^2-e/farm	0	0	0	0	-1
Net GHG emissions	t CO^2-e/farm	4,740	4,797	4,762	5,329	4,570
Emissions intensity	t CO^2-e/FPCM (milk)	0.92	0.92	0.94	0.91	0.93
Emissions intensity	t CO^2-e/t MS (milk)	13.1	13.0	13.3	12.9	13.2
Emissions intensity	t CO^2-e/kg lwt (meat)	4.2	4.1	4.2	4.1	4.9

HOW DOES 2021/22 COMPARE

An increase in milk prices in 2021-22 and favourable livestock trading conditions helped buffer the impact of higher costs.

Strong profit results per farm (average $561,805) across the state, was below the 9-year long term average of $576,351.

The comparatively lower EBIT (compared to 2020-21) over a larger asset base decreased the resulting return on total assets.

Farm profit (EBIT) in 2021-22 was the fifth highest (accounting for inflation) since the start of the DFMP in 2013-14 (Figure 15). Average EBIT was $561,805 in 2021/22, compared to the long-term average of $576,351. Net farm income was $419,051 in 2021-22, compared to the long-term average of $390,010.

Average ROTA was 3.9 per cent in 2021-22, decreasing from 5.5 per cent the previous year (Figure 16), which is the second lowest in the last 9 years. The average ROE decreased to 6.1 per cent in 2021-22 from 10.8 per cent in 2020-21. This is compared to the long term average of 8.6 per cent.

Figure 15 Farm profitability between 2013/14 and 2021/22

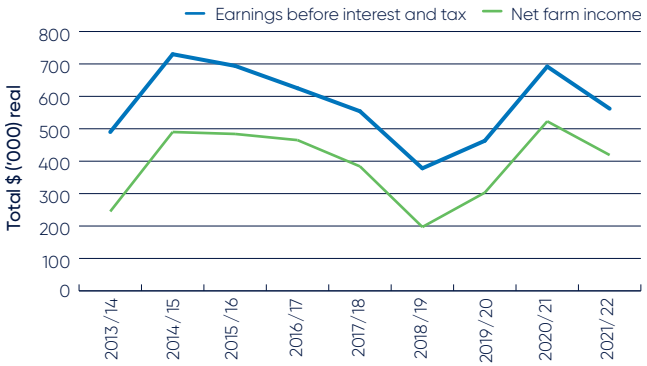
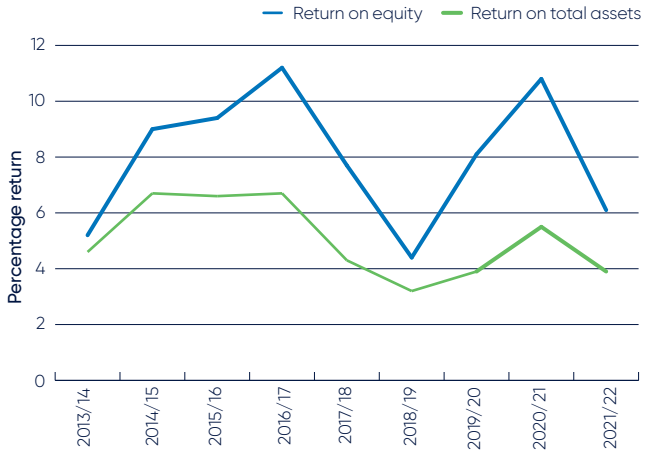


Figure 16 Whole farm performacne between 2013/14 and 2021/22



Appendices

Table A8 Capital structure

Farm assets				
	Land value	Land value	Permanent water value	Permanent water value
	$/ha	$/cow	$/ha	$/cow
Average	11,015	13,943	263	316
Top 25%	11,137	12,958	82	118

Other farm assets (per usable hectare)				
Plant and equipment	Livestock	Hay and grain	Other assets	Total assets
$/ha	$/ha	$/ha	$/ha	$/ha
1,324	3,124	137	209	16,073
1,139	3,414	170	365	16,307

Liabilities	
Liabilities per usable hectare	Liabilities per milking cow
$/ha	$/cow
4,051	5,227
4,233	4,629

Equity	
Equity per usable hectare	Average equity
$/ha	%
12,022	72
12,074	75

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

	Income				Variable costs							
	Milk income (net)		Gross farm income		Herd costs		Shed costs		Feed costs		Total variable costs	
Year	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	7.72	7.75	9.03	0.24	0.28	0.26	0.30	3.29	3.84	3.79	4.42
2014/15	7.07	8.05	8.26	9.41	0.25	0.28	0.26	0.30	3.31	3.77	3.82	4.35
2015/16	7.22	8.12	8.29	9.32	0.26	0.29	0.24	0.27	3.45	3.88	3.95	4.44
2016/17	7.05	7.79	8.12	8.97	0.26	0.28	0.26	0.29	3.24	3.58	3.76	4.15
2017/18	7.00	7.59	8.16	8.85	0.26	0.28	0.27	0.29	3.52	3.82	4.05	4.39
2018/19	7.07	7.56	8.25	8.83	0.28	0.30	0.27	0.29	3.85	4.12	4.40	4.71
2019/20	7.35	7.77	8.74	9.24	0.27	0.29	0.28	0.29	3.86	4.08	4.41	4.67
2020/21	7.30	7.61	9.17	9.56	0.29	0.30	0.25	0.26	3.38	3.52	3.93	4.10
2021/22	7.72	7.72	10.02	10.02	0.33	0.33	0.31	0.31	4.14	4.14	4.79	4.40
Average		**7.77**		**9.25**		**0.29**		**0.29**		**3.86**		**4.40**

Note: 'Real' dollar values are the nominal values converted to 2021/22 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 A9 Historical data – average farm income, costs and profit per kilogram of milk solids (continued)

	Overhead costs						Profit							
	Cash overhead costs		Non-cash overhead costs		Total overhead costs		Earnings before interest and tax		Interest and lease charges		Net farm income			
Year	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Nominal ($/kgMS)	Real ($/kg MS)	Return on total assets %	Return on equity %
2013/14	1.50	1.75	0.86	1.00	2.36	2.75	1.59	1.85	0.65	0.75	1.01	1.18	4.2	4.2
2014/15	1.47	1.67	0.8	0.91	2.26	2.57	2.17	2.47	0.59	0.67	1.66	1.89	6.3	8.2
2015/16	1.51	1.70	0.82	0.92	2.33	2.62	2.02	2.27	0.53	0.60	1.54	1.73	6.4	9.1
2016/17	1.56	1.73	0.83	0.92	2.39	2.64	1.98	2.19	0.53	0.58	1.48	1.64	6.5	18.3
2017/18	1.53	1.65	0.52	0.56	2.57	2.79	1.54	1.67	0.53	0.57	1.01	1.10	4.3	7.7
2018/19	1.71	1.83	0.98	1.05	2.69	2.88	1.16	1.24	0.60	0.64	0.56	0.60	3.2	4.4
2019/20	1.84	1.94	1.05	1.11	2.89	3.06	1.44	1.52	0.56	0.59	0.88	0.93	3.9	8.1
2020/21	2.12	2.21	0.88	0.92	3.00	3.13	2.24	2.33	0.52	0.54	1.72	1.79	5.5	10.8
2021/22	2.16	2.16	1.22	1.22	3.39	3.39	1.84	1.84	0.54	0.54	1.30	1.30	3.9	6.1
Average		**1.85**		**0.96**		**2.87**		**1.93**		**0.61**		**1.35**	**4.9**	**8.6**

Note: 'Real' dollar values are the nominal values converted to 2021/2 2dollar equivalents by the consumer price index (CPI) to allow for inflation.

Table A10 Historical data – average farm physical information

	Total usable area	Milking area	Total water use efficiency	Number of milking cows	Milking cows per useable area	Milk sold	Milk sold	Estimated grazed pasture*	Estimated conserved feed*	Home grown feed as % of ME consumed	Concentrate price	
Year	ha	ha	tDM/ 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	487
2014/15	625	296	0.6	543	0.9	535	486	3.6	1.7	63	421	480
2015/16	575	283	0.5	545	1.0	557	541	4.1	1.7	57	445	500
2016/17	499	268	0.6	498	1.0	558	570	5.1	1.3	61	404	446
2017/18	586	277	0.5	497	0.9	580	521	4.0	1.9	57	429	465
2018/19	579	286	0.6	497	0.9	566	515	4.2	1.6	60	488	523
2019/20	582	273	0.7	481	0.9	561	507	4.2	1.6	61	507	536
2020/21	678	312	0.6	524	0.8	569	471	4.6	1.9	67	494	515
2021/22	603	284	0.6	471	0.8	557	464	3.9	1.6	64	513	513
Average	**593**	**284**	**0.6**	**509**	**0.9**	**554**	**503**	**4.1**	**1.6**	**54**		**496**

*From 2006/07 to 2010/11 estimated grazed pasture and conserved feed was calculated per usable hectare.
From 2011/12 estimated grazed pasture and conserved feed was calculated per hectare of 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.
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.
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.
Appreciation	An increase in the value of an asset in the market, often only applicable to land value.
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.
Cash overheads	All fixed costs that have a cash cost to the business. Includes all overhead costs except imputed labour costs and depreciation.
Cost structure	Variable costs as a percentage of total costs, where total costs equal variable costs plus overhead costs.
Concentrates	Refers to feeds with a concentrated source of energy such as grains, pellets and other grain mixes.
Debt servicing ratio	interest and lease costs as a percentage of gross farm income.
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.
Feeding Systems	**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. **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. **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. **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. **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.
Finance costs	See interest and lease costs.
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.
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)).
Gross farm income	Farm income including milk sales, livestock trading and other income such as income from grants and rebates.
Gross margin	Gross farm income minus total variable costs.
Herd costs	Cost of artificial insemination (AI) and herd tests, animal health and calf rearing.
Imputed	An estimated amount introduced into economic management analysis to allow reasonable comparisons between years and between other businesses.
Imputed labour cost	An allocated allowance for the cost of owner/ operator, family, and sharefarmer time in the business.

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
CH4	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_2O	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 vales 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 2021/22, the imputed owner/operator and family labour rate was $34/hr based on a full time equivalent (FTE) working 48 hours/week for 50 weeks of the year.

Dairy Australia Limited ABN 60 105 227 987
Level 3, HWT Tower
40 City Road, Southbank Vic 3006 Australia
T +61 3 9694 3777 F +61 3 9694 3733
E enquiries@dairyaustralia.com.au
dairyaustralia.com.au

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