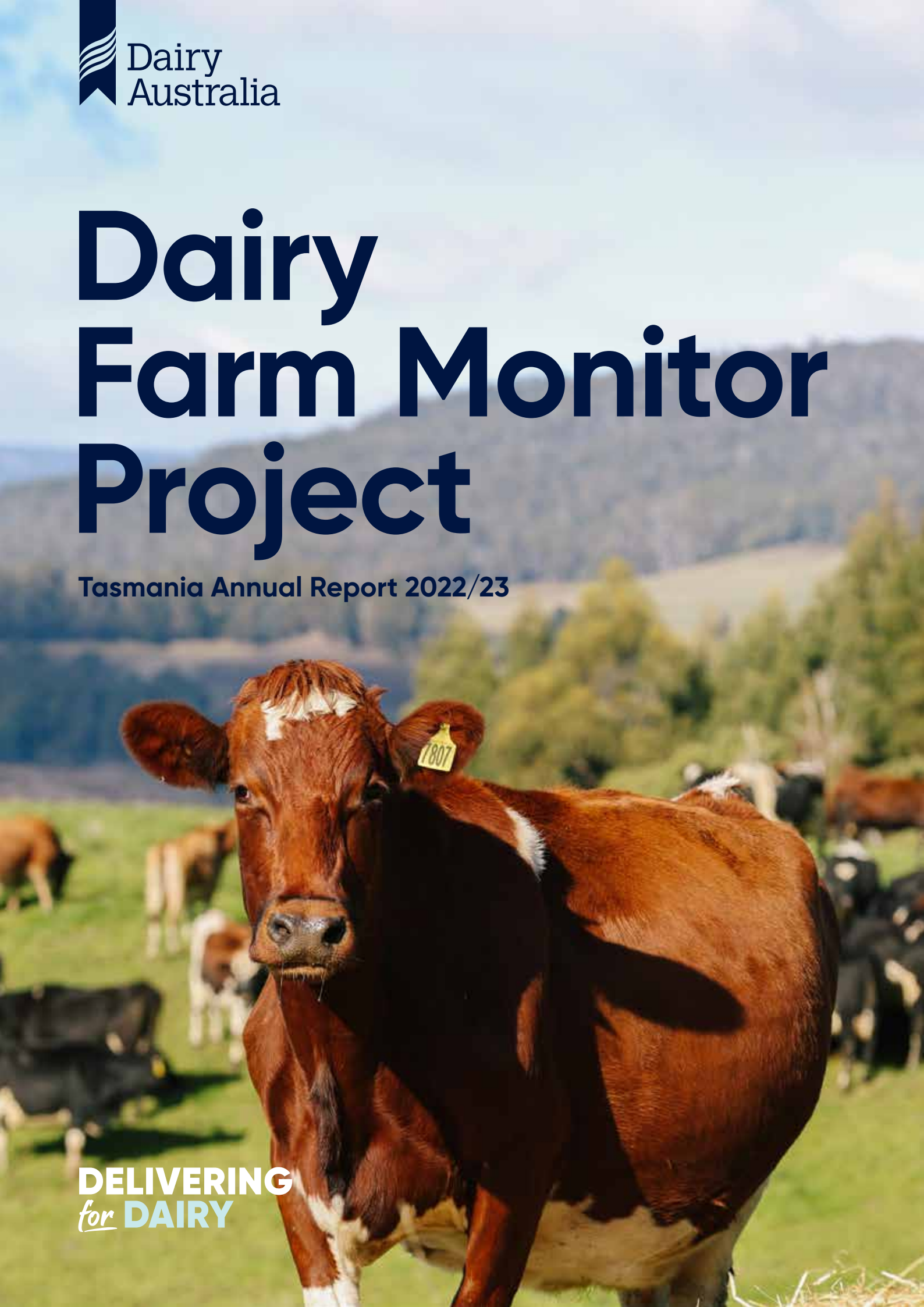
Dairy Australia

Dairy Farm Monitor Project

Tasmania Annual Report 2022/23



DELIVERING for DAIRY

Acknowledgements

Participants

The participant farmers are thanked for their efforts in supplying data for the Dairy Farm Monitor Project for the 2022-2023. For continuing participants and those new to the project, thank you for your participation.

While efforts are made to select participants from each region and a range of farm sizes, results should not be viewed as a representation of the entire Tasmanian dairy farm population.

Report

The report was prepared by Lesley Irvine in conjunction with Dairy Australia.

Contributors/data collectors

Symon Jones and Lesley Irvine from the Tasmanian Institute of Agriculture collected the data for this report.

The diligent work of Dairy Australia's consultant analysts Kerry Kempton and Fiona Smith who assisted with data collection, conducted data checking, validation and analysis is much appreciated.

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 Tasmanian project participants.

Further information

Lesley Irvine
Tasmanian Institute of Agriculture
PO Box 3523
Burnie TAS 7320
0428 880 287
lesley.irvine@utas.edu.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

DairyTas Dairy Australia TIA Tasmanian Institute of Agriculture UNIVERSITY of TASMANIA Tasmanian Government

TIA is a joint venture of the University of Tasmania and the Tasmanian Government

Contents

List of figures and tables

Figures

Tables

Executive summary

In 2022/23 the average Tasmania Dairy Farm Monitor profitability increased significantly on the previous year both in terms of EBIT and RoTA (accounting for inflation).

The increased profitability on Tasmanian dairy farms was driven by a higher milk price.

There was a minor increase in average total farm equity across the year. The most significant increase in asset value was for irrigation equipment, with total liabilities marginally higher at the end of the financial year than at the start.

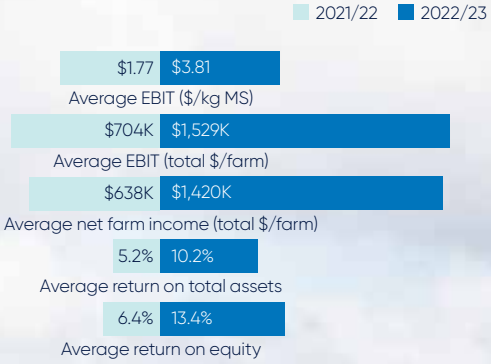
Homegrown feed production, a key profit driver in Tasmania's pasture-based industry, increased by 0.1 t DM/Mha.

A higher milk price resulted in a significant improvement in Tasmanian dairy farm profitability in the 2022/23 season. This was seen across all measures of profitability – EBIT (Earnings Before Interest and Tax), net farm income, return on total assets and return on equity.

However, despite improved profitability, there was only a minor increase in farm equity and total asset value while total liabilities were marginally higher at the end of the 2022/23 financial year than they were at the start. This indicates farm profits are being spent off-farm.

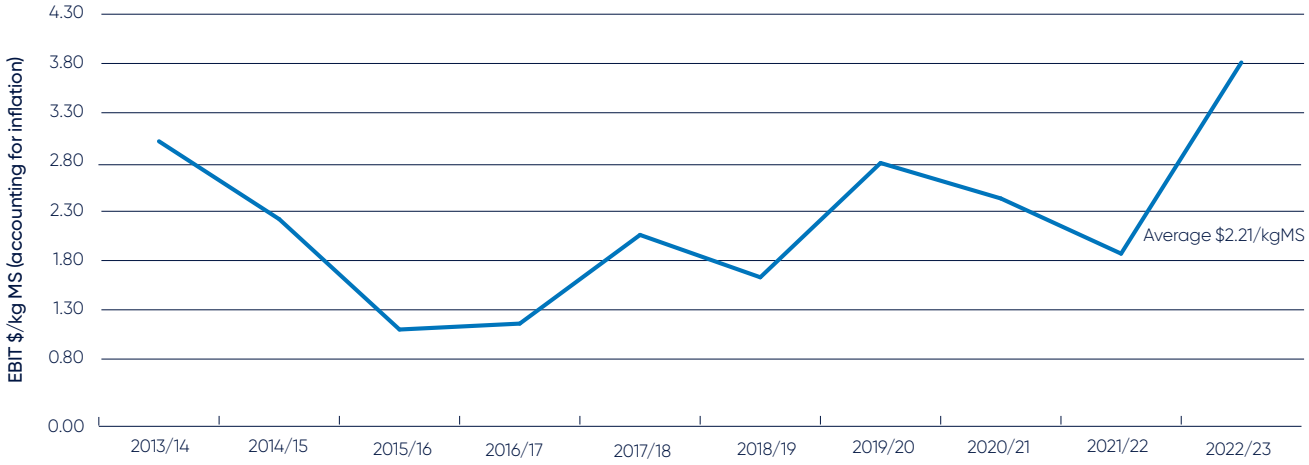
Home grown feed consumption increased slightly to 10.6 t DM/milking ha. Sixty-eight per cent of the energy consumed in the diet came from home grown feed. On average, 1.3 t DM/cow of purchased concentrates was fed.

Tasmania



How does 2022/23 compare?

Historical profitability



Average EBIT (per kg milk solids) in 2022/23 was higher than the 10-year average for the Tasmania Dairy Farm Monitor Project of $2.21/kg MS (adjusted for inflation). It is the highest in the 10 years of the project.

Milk price

Milk price increased from $7.48/kg MS in 2021/22 to $9.88/kg MS. Milk income contributed on average, 92 per cent of total farm income.

Tasmania ↑ 32%
to $9.88/kg MS

Expectations for profit in 2022/23

The majority of participant farmers expect that farm business profits will decrease in 2023/24 on the back of an expected drop in milk price and increasing or stable input prices.

Greenhouse gas emissions

The median carbon footprint for Tasmanian dairy farm participants was 4,082 tonnes of carbon dioxide equivalents per farm in 2022/23. Over the last five years, larger herd sizes and greater milk production per farm have contributed to increasing median greenhouse gas emissions. Emissions intensity (t CO_2-e/FPCM) is at the equal lowest level since the Dairy Farm Monitor Project started reporting on emissions 5 years ago.


464

State overview

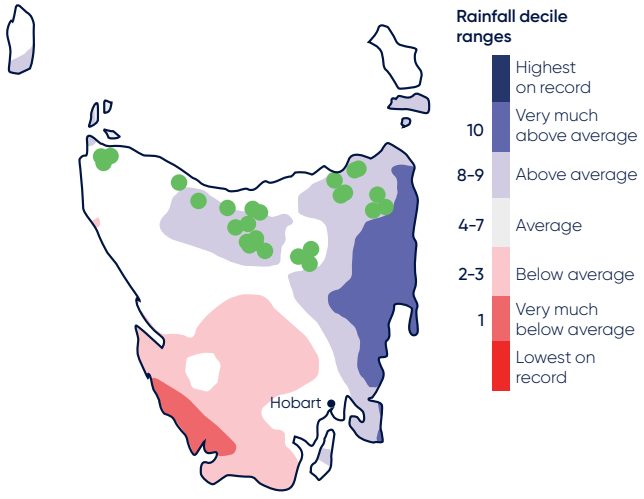
State-wide, average profitability in Tasmania was positive and well above the 10-year average of the Tasmania Dairy Farm Monitor Project. The average Earnings Before Interest and Tax was $1,528,595 compared to the average of $700,684 (adjusted for inflation). The average Net Farm Income was $1,419,820 compared to the average $571,111 (adjusted for inflation).

Feed costs, both homegrown and purchased, were higher this year than the previous year. Strong prices received for milk helped farm businesses to manage the impact of higher costs resulting in profitability for participants being higher than the previous year.

Dairying in Tasmania

There were approximately **351 dairy farm businesses** in Tasmania that produced **906 million litres** or **11 per cent** of Australia's national milk production in 2022/23.

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



Note: The points on this map show the general location of the participant farms.

Source: Rainfall map sourced from Bureau of Meteorology bom.gov.au

Physical farm characteristics

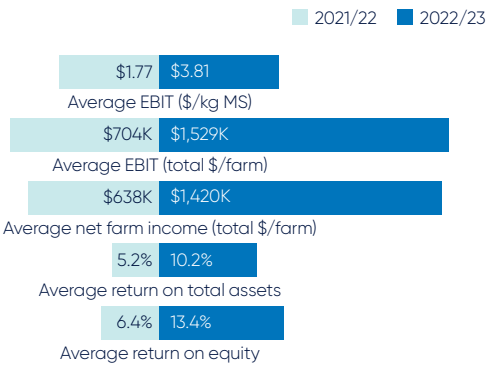
The average herd size of farms in the Tasmania Dairy Farm Monitor Project is 873 which is a decrease from 913 cows in the previous season and is higher than the actual Tasmanian average of 497 cows. Milk sold per cow increased from 403 kgMS/cow to 435 kgMS/cow.

Farms grazed more feed on their milking areas this year on the back of above average rainfall on most participant farms. Fertiliser use also increased in 2022/23 compared to the previous season.

Average herd size	Milk solids sold	Homegrown feed
↓ 4%	↑ 8%	↓ 1%
873 cows	435 kg MS/cow	68% of metabolisable energy consumed

Profitability

In 2022/23, 100 per cent of all Tasmanian participants recorded a positive profit.



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

↑32%
in average milk price to **$9.88/kg MS**

↑12%
in purchased feed and agistment costs to **$2.72/kg MS**

↑12%
in employed labour costs to **$1.24/kg MS**

↑6%
in overhead costs to **$2.50/kg MS**

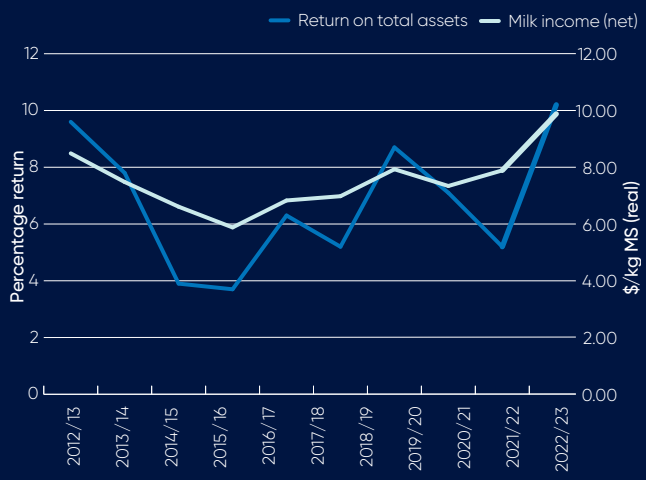
↑4%
in variable costs to **$4.46/kg MS**

↓6%
in shed costs to **$0.16/kg MS**

Despite cost of production increasing by 4 per cent to $6.94/kg MS, the higher increase in milk price still resulted in improved business profitability.

Labour use efficiency continues to be high for Tasmanian DFMP participants although per cow efficiency did decrease this season averaging 156 cows/FTE. Labour efficiency based on milk production also decreased slightly to 67,123 kg MS/FTE.

Return on total assets and milk price



Physical parameters and seasonal conditions

The majority of farms received average or above average rainfall in 2022/23, although the distribution of that rainfall was not ideal in many regions.

Seasonal conditions throughout the year resulted in a small increase in average homegrown feed.

The amount of major nutrients applied through fertiliser all increased in 2022/23.

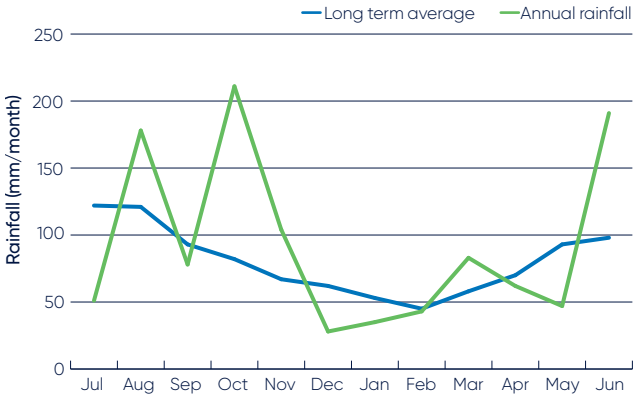
Pasture based dairy production

Dairy production in Tasmania is predominantly pasture based, with an average of 68 per cent of all consumed metabolisable energy being derived from home grown feed. Spring and autumn rainfall are important drivers of homegrown feed production as is the availability of adequate water across irrigation areas.

Rainfall

For the second year in a row, October rainfall has been well above average (Figure 1). For some regions, this resulted in major flooding, impacting on milk production, costs and fodder production. Summer was drier than average which increased the amount of irrigation water used and the cost of growing pasture.

Figure 1 Monthly rainfall 2022/23



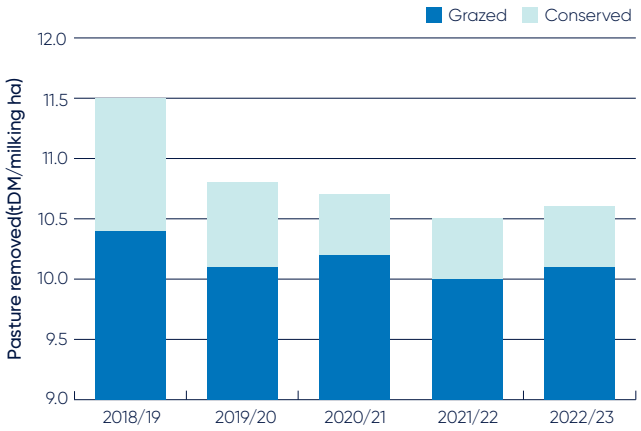
Feed consumption and harvest

Homegrown feed consumption increased from 10.5 t DM/ha to 10.6 t DM/ha. This was a result of grazed pasture increasing from 10.0 t DM/ha to 10.1 t DM/ha whilst homegrown conserved fodder remained at 0.5 t DM/ha.

The percentage of grazed pasture in the diet increased from 63 per cent in 2021/22 to 64 per cent in 2022/23. The percentage of concentrate in the diet increased from 25 per cent to 26 per cent. The average cow consumed 3.5 t DM of homegrown feed which consisted of 3.3 t DM/cow of grazed pasture and 0.2 t DM/cow of conserved pasture (silage or hay). The average cost of homegrown feed was $142/t DM.

In addition to the homegrown feed, there was 1.3 t DM/cow of concentrate fed and 0.4 tDM/cow of purchased fodder fed. This is a total per cow consumption of 5.2 t DM. The average cost of purchased feed was $488/t DM.

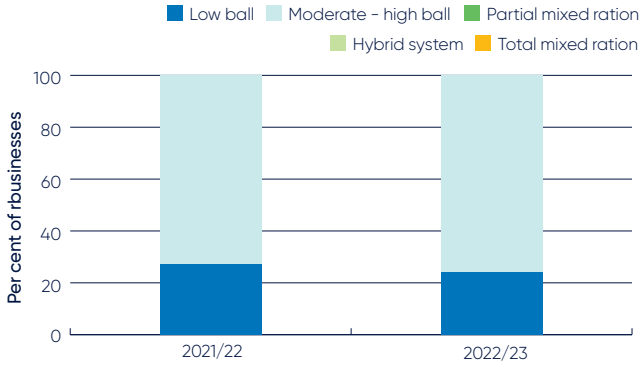
Figure 2 Estimated tonnes of homegrown feed removed



Feeding system

Tasmania is predominantly a perennial, pasture-based system. All participant farms had perennial pasture and were either in the low bail feeding system (up to 1 tonne concentrate fed in bail) or moderate-high bail feeding system (more than 1 tonne concentrate fed in the bail) (Figure 3).

Figure 3 Type of feeding systems



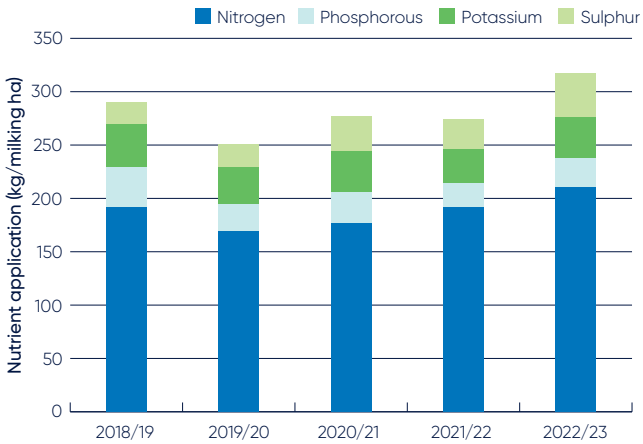
Fertiliser application

The amount of nitrogen applied increased for the third year in a row. The amount of phosphorus, potassium and sulphur applied this season was higher than last season. The amount of sulphur applied is the highest it has been in the 10 years of the Tasmanian Dairy Farm Monitor Project.

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

- Nitrogen applied was 210 kg/ha, a 9 per cent increase
- Phosphorous applied was 28 kg/ha, a 27 per cent increase
- Potassium applied was 38 kg/ha, a 19 per cent increase
- Sulphur applied was 41 kg/ha, a 46 per cent increase

Figure 4 Nutrient application

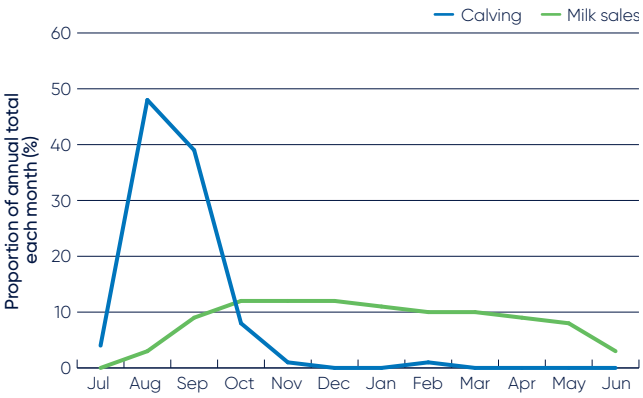


Milk solids sold

Despite the average herd size of participating farms being lower in 2022/23, total milksolids sold (387,551 kg) was 4 per cent higher than the previous year. The milk sold per cow increased from 403 kg MS/cow to 435 kg MS/cow. Milk production per hectare increased from 1,041 kg MS/ha to 1,123 kg MS/ha.

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

Tasmania is characterised as spring calving (Figure 5) with the majority of cows from participant farms calving between July and November. In 2022/23 peak milk production occurred in November and December – each of these months has 13 per cent of the annual milk production. Only forty-four percent of milk was produced from July to December in 2022 compared to 51 per cent in the same period in 2021.

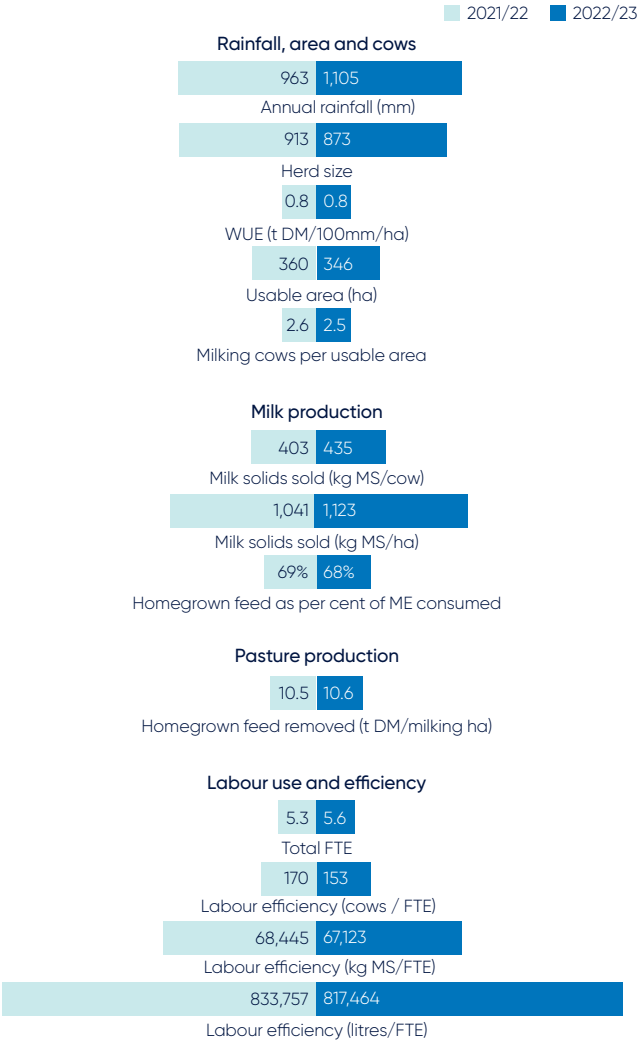
Whole farm analysis

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

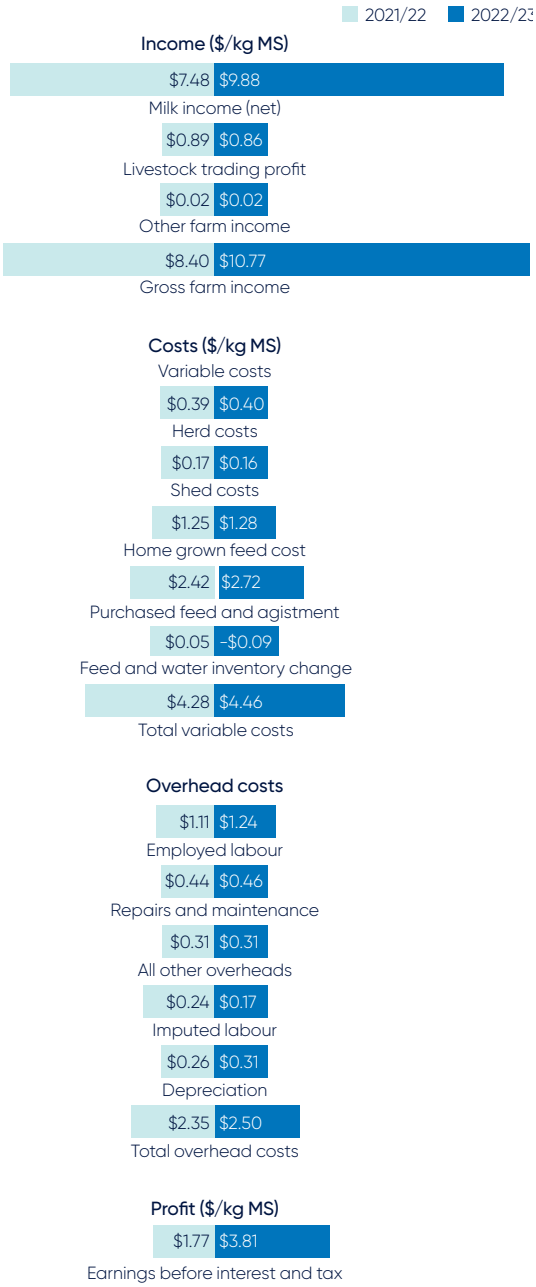
Both variable and overhead costs increased in 2022/23. Variable costs increased by 7 per cent (primarily due to feed costs and inventory change), with overhead costs also higher by 7 per cent.

Return on Total Assets and Return on Equity increased in 2022/23.

Physical parameters



Financial parameters



Gross farm income

There was a large increase in EBIT and Gross Farm Income in the 2022/23 season. When accounting for inflation, it is the highest it has been in the 10 years of the Tas Dairy Farm Monitor Project, driven largely by higher milk prices.

Variable costs

Variable costs increased from $4.28/kg MS in 2021/22 to $4.46/kg MS in 2022/23. This was an increase of $0.16/kg MS, or 4 per cent. While this not a major increase, it should be noted that variable costs were $3.26/kg MS in 2020/21. This is an increase of 36 per cent in two years.

Purchased feed and agistment costs make-up the largest component of variable costs. In 2022/23 they increased by $0.30/kg MS to $2.72/kg MS, a 12 per cent increase. Concentrates were the largest contributor to this increase with an extra $0.22/kg MS being spent this season, taking the cost of concentrates to $1.69/kg MS. In 2022/23 the amount of concentrate being fed was 1.3 t DM/cow, 0.1t DM/cow higher than the previous year. While feeding more concentrate will increase the total feed cost, the main cause of the increased amount spent on concentrates was the unit cost. In 2021/22, the average cost of concentrate was $487/t DM while in 2022/23 the average cost was $582/t DM.

In comparison, homegrown feed costs only increased by $0.03/kg MS representing a 2 per cent increase from the previous year. After a $0.28/kg MS increase in fertiliser costs last year, they increased a further $0.05/kg MS this year to $0.81/kg MS. This increase was offset by lower irrigation costs (despite low summer rainfall) and lower pasture improvement/cropping costs.

Shed costs decreased slightly in 2022/23. Herd costs increased by $0.01/kg MS. Within herd costs, there was more spent on animal health which increased from $0.18/kg MS to $0.22/kg MS but the amount spent on AI and herd test, and calf rearing both slightly decreased.

Overhead costs

Total overhead costs increased from $2.16/kg MS in 2020/21 to $2.35/kg MS in 2021/22 and there was a further increase in 2022/23 to $2.50/kg MS. This is a 6 per cent increase in the past 12 months and a 16 per cent increase over the 2 years.

Again, the largest contributor to this increase was employed labour costs which increased by $0.13/kg MS.

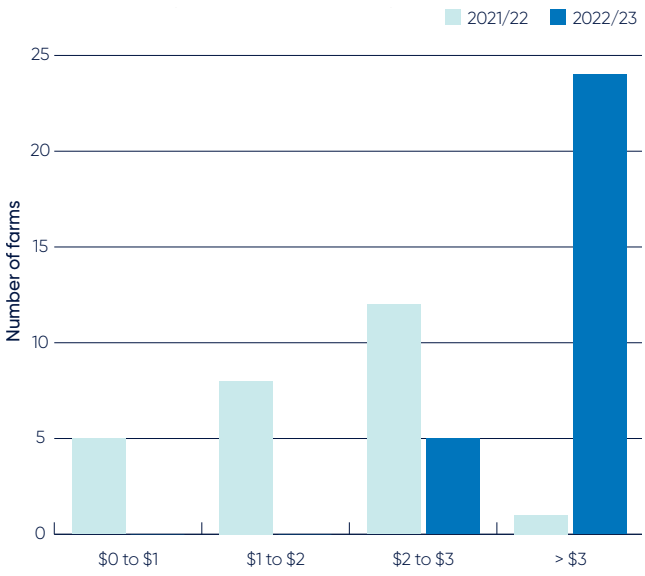
Other increased overhead costs were:

- Depreciation ($0.05/kg MS)
- Repairs and maintenance ($0.02/kgMS)
- Other overheads ($0.02/kg MS)

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 Tasmanian DFMP, accounting for inflation. Average EBIT ($/kg MS) also increased and was the highest in the 10 years of the project, accounting for inflation.

Figure 6 Average EBIT per kg MS



Return on total assets and equity

A positive return on total assets (ROTA) was recorded for 100 per cent of participants (Figure 7). In 2022/23 average ROTA increased to 10.2 per cent compared to 5.2 per cent the previous year. This higher return is a result of a higher EBIT driven largely by a higher milk price.

Average return on equity (ROE) in 2022/23 increased to 13.4 per cent relative to the previous year at 6.4 per cent. Equity levels remained stable 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), 55 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

** One participating business had a RoE of 60.3 per cent. This was not included on the graph so the other points could be seen more clearly.*

Business confidence survey

Almost 50 per cent of participants expect their farm business returns to decrease in the next 12 months (2023/24).

Over 70 per cent of participant farms expect milk price to decrease in 2023/24.

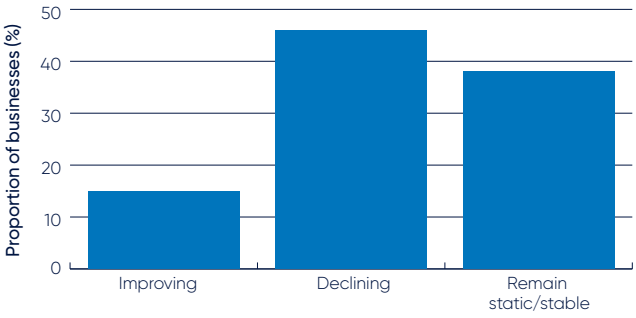
Climate and seasonal conditions was the major issue listed for the coming 12 months, with input costs being the most significant issue for the coming 5 years, followed by milk price.

Fifty percent or more of participants expect the cost of purchased feed, fuel and oil, and labour to increase in the 2023/24 season.

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. Forty-six percent of participants expect business profit to decrease, thirty-eight expect it to remain stable and only 15 per cent expect profit to improve (Figure 8). This is quite different to expectations for the 2022/23 season where the majority of participants expected business profits to increase (which they did).

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

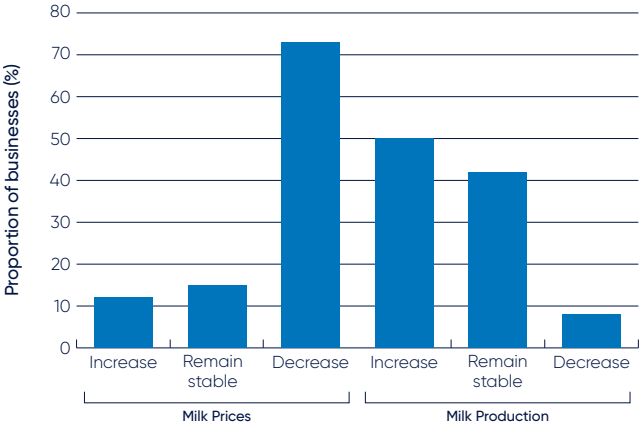


Price and production expectations – milk

The majority of respondents (73 per cent) were expecting milk price to decrease for 2023/24 with 15 per cent expecting it to remain stable and 12 per cent expecting it to increase (Figure 9).

Fifty per cent of respondents expect milk production to increase in 2023/24. This is a higher percentage than expected to increase in the previous year despite concerns about seasonal conditions and the expectation of a lower milk price. Only 8 per cent of respondents expected their milk production to decrease.

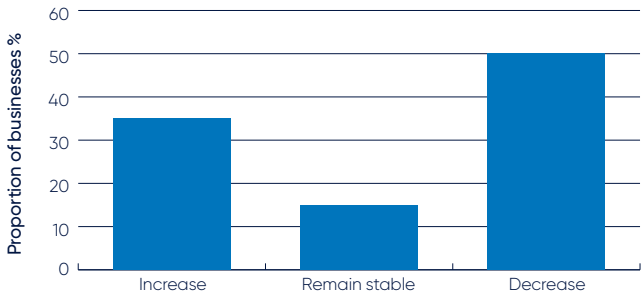
Figure 9 Producer expectations of milk prices and production in 2023/24



Production expectations – fodder

While the percentage of respondents expecting fodder production to increase for 2023/24 (35 per cent) was similar to the previous year, 2022/23 (38 per cent), there was a much larger percentage expecting fodder production to decrease, 50 per cent in 2023/24 vs 4 per cent in 2022/23. This likely reflects concerns about the forecast El Niño weather pattern.

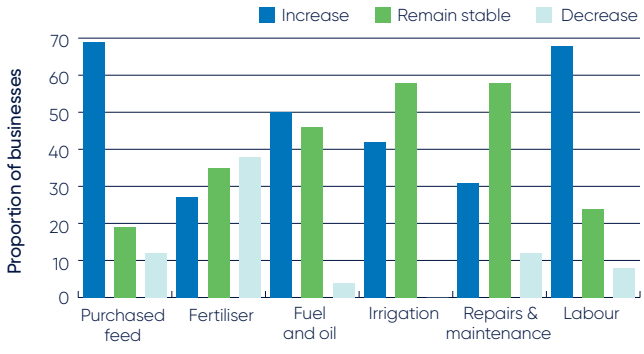
Figure 10 Producer expectations of fodder production in 2023/24



Cost expectations

Similar to last year, the cost increases expected by the greatest proportion of businesses was purchased feed and labour (this proved to be accurate last year). Expectations regarding other costs are fairly mixed although very few participants expect decreases in the cost of fuel and oil, repairs and maintenance or labour and no-one expects a decrease in the cost of irrigation. Almost 38 per cent of participants expect the cost of fertiliser to decrease.

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



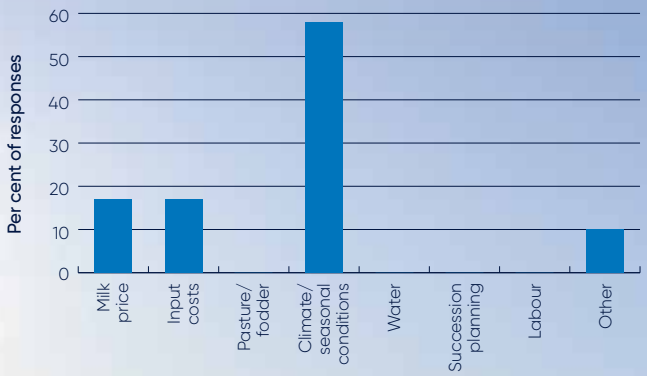
Issues of importance to dairy businesses

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 climate and seasonal conditions with 58 per cent of respondents ranking it their number one issue. Milk price and input costs were also listed by some participants as a major issue for the next 12 months.

Figure 12 Major issues for individual businesses – 12 month outlook



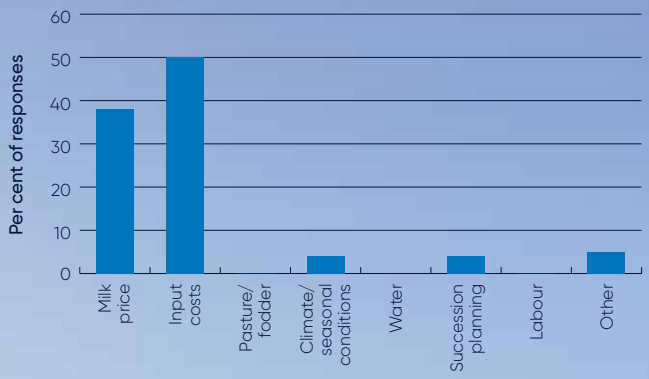
Medium to long term issues – Next five years

Unlike last year when labour was ranked the issue of most concern of the next 5 years, this year the main concern for the next 5 years is input costs followed by milk price. All respondents ranked input costs in their top four concerns.

However, labour was ranked the second most important issue by 46 per cent of respondents and 71 per cent ranked it in the top three major concerns.

Again, water was not considered a major issue by the respondents with no-one ranking it in their top three issues.

Figure 13 Major issues for individual businesses – 5 year outlook



2022/23 Greenhouse gas emissions

The median carbon footprint for Tasmanian dairy farm monitor farms was 5,516 tonnes of carbon dioxide equivalents (t CO_2-e) per farm in 2022/23.

Methane from cow rumination (enteric) accounted for an average of 67 per cent of on-farm emissions.

Larger herd sizes and greater total farm milk production have contributed to the trend of increased greenhouse gas (GHG) emitted per farm over the last 5 years.

Total emissions

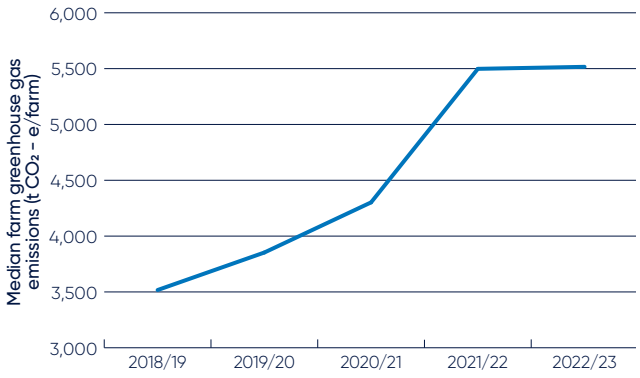
Net greenhouse gas (GHG) emissions (median) in 2022/23 were the highest in 5 years at 5,516 tonnes of carbon dioxide equivalent (Table 1 and Figure 14). Median milk production increased in 2022/23 and there was also a change in the way the data inputs were captured. User defined inputs for manure management were captured instead of the state defaults. Over the last 5 years, higher median GHG emissions were also associated with greater herd size and milk production per farm.

Methane from manure management contributed the largest increase to higher emissions in 2022/23 indicating that the previous reliance on state defined factors did not accurately reflect the emissions across all farms. Greater fuel use also increased carbon dioxide emissions as did the pre-farm emission from fertiliser manufacture with extra fertiliser applied on participant farms this year compared to last year.

The softening of fertiliser prices and positive seasonal conditions resulted in an increase in fertiliser use compared to 2021/22. Increased fertiliser use results in greater greenhouse gas emissions.

Enteric methane remained the same as the past two years accounting for 67 per cent of emissions and is sensitive to changes in livestock weights and numbers on individual farms.

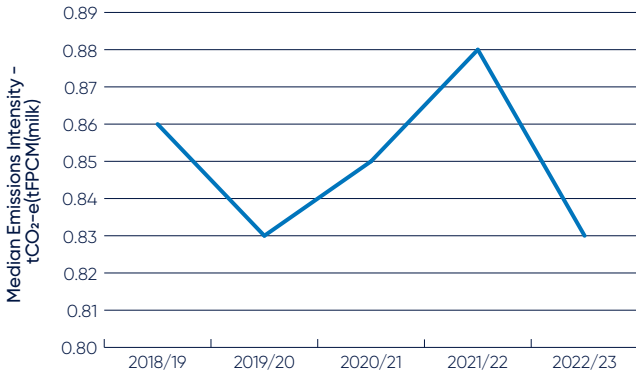
Figure 14 Estimated median GHG emissions between 2018/19 and 2022/23 (CO_2 equivalent)



Emissions intensity

The emissions intensity allocated to milk production (once meat production is considered), has fluctuated over the years between 0.83 to 0.88 t CO_2-e/t FPCM (Figure 15 and Table 1). Emissions intensity in 2022-23 was the lowest (along with 2019-20) at 0.83 t CO_2-e/t FPCM. Emissions intensity is calculated by dividing total emissions by the amount of fat and protein corrected milk (FPCM); standard of 4.0 per cent fat and 3.3 per cent protein. Regional and farm variation was also observed over this period.

Figure 15 Estimated median emissions intensity between 2018/19 and 2022/23 (CO_2 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 and had to separate out the urea portion of any fertiliser blends.

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

Table 1 Estimated average GHG emissions and intensity between 2018/19 and 2022/23 (CO_2 equivalent)

Emission source	Units	2018/19	2019/20	2020/21	2021/22	2022/23
Sample size		32	27	31	26	29
Methane	t CO_2-e/farm	2,615	2,866	2,957	3,998	4,082
Pre-farm	t CO_2-e/farm	339	435	445	597	642
Nitrous oxide	t CO_2-e/farm	460	467	538	636	676
Carbon dioxide	t CO_2-e/farm	54	51	127	180	107
Tree carbon	t CO_2-e/farm	N/A	N/A	N/A	0	0
Net GHG emissions	t CO_2-e/farm	3,517	3,853	4,302	5,498	5,516
Emissions intensity	t CO_2-e/FPCM (milk)	0.86	0.83	0.85	0.88	0.83
Emissions intensity	t CO_2-e/t MS (milk)	12.0	11.5	11.7	12.1	11.4
Emissions intensity	t CO_2-e/kg lwt (meat)	4.4	4.2	4.3	4.5	4.5

How does 2022/23 compare?

Gross farm income increased by 28 per cent to $10.77/kg MS, the highest in the 10-year history of DFMP (accounting for inflation), driven by the record high milk price in 2022/23.

Strong profit results per farm (average $1,528,595) across the state, were well above the 10-year long term average of $700,684 (accounting for inflation).

The increase in EBIT resulted in an increase in return on total assets to 10.2 per cent.

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 $1,528,595 in 2022/23, compared to the long-term average of $700,684. Net farm income was $1,419,820 in 2022/23, compared to the long-term average of $571,111.

Average ROTA was 10.2 per cent in 2022/23, increasing from 5.2 per cent the previous year (Figure 17), which is the highest in the last 10 years. The average ROE increased to 13.4 per cent in 2022/23 from 6.4 per cent in 2021/22. This is compared to the long-term average of 8.3 per cent.

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

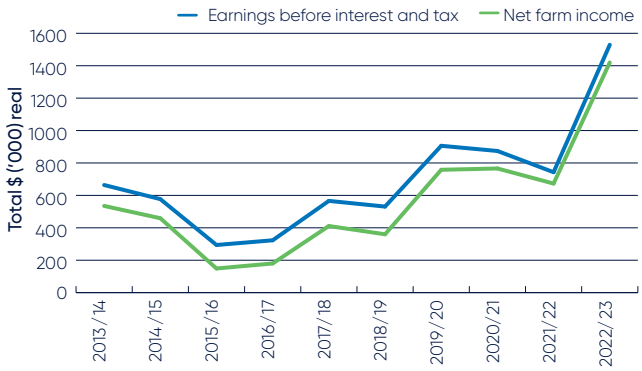
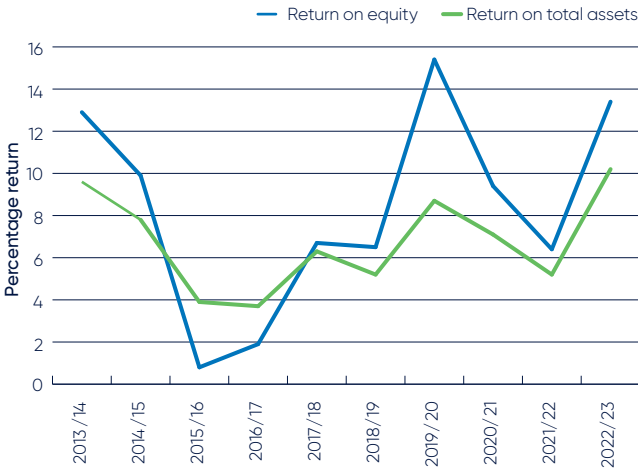
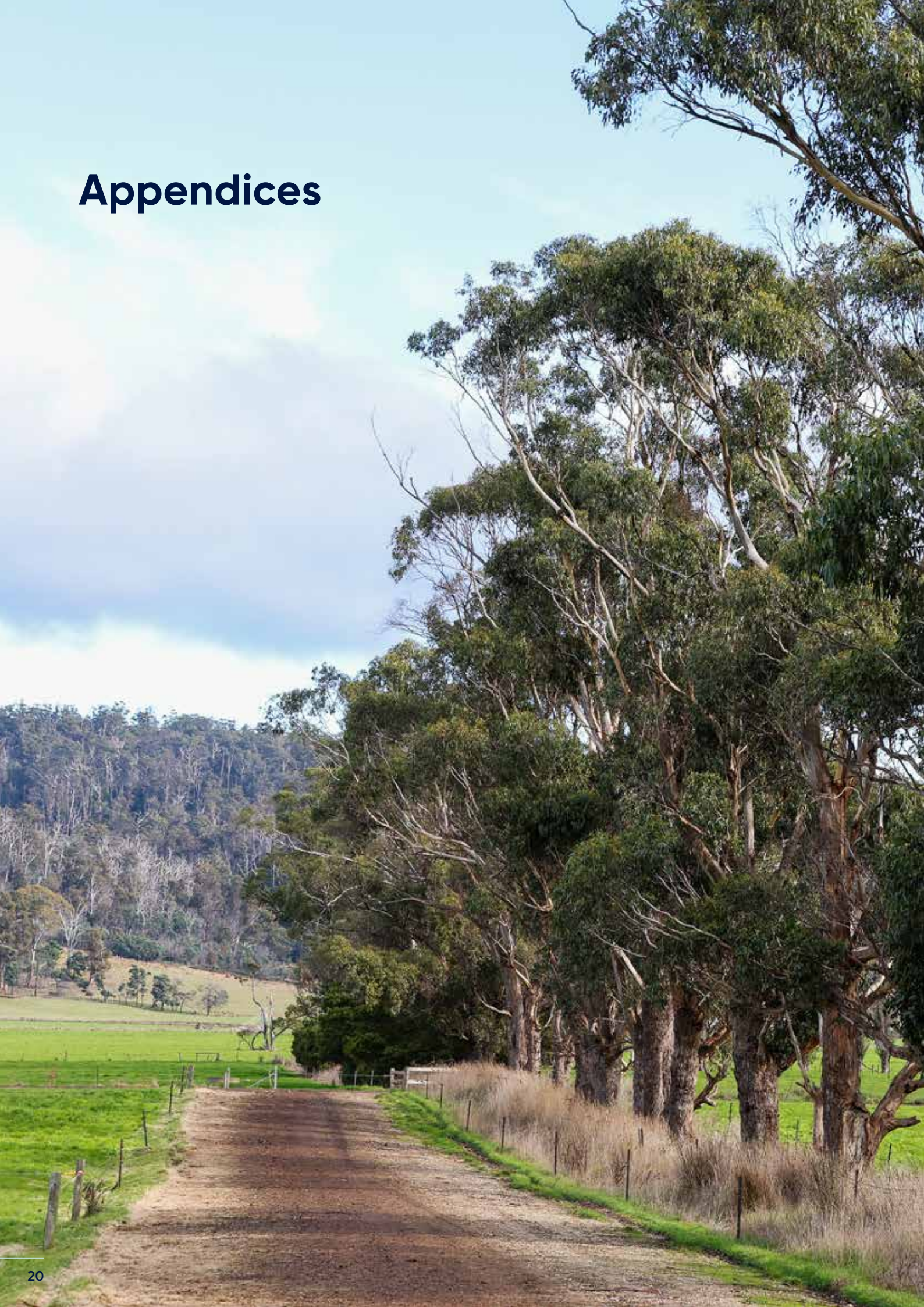


Figure 17 Whole farm performance between 2013/14 and 2022/23



Appendices



Appendix A – Summary tables

Table A1 Main financial indicators

Farm number	Milk income (net)	All other income	Gross farm income	Total variable costs	Total overhead costs	Cost structure (variable costs/total costs)	Earnings before interest and tax	Return on total assets (exc. capital apprec.)	Interest and lease charges	Debt servicing ratio	Net farm income	Return on equity
	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	%	$/kg MS	%	$/kg MS	% of income	$/kg MS	%
TA0001	9.54	1.50	11.04	3.49	5.50	39	2.05	2.1	1.45	13.1	0.61	0.9
TA0008	9.31	0.93	10.25	4.30	1.74	71	4.20	13.8	0.28	2.7	3.92	16.8
TA0011	9.82	0.79	10.60	4.08	2.95	58	3.57	7.5	0.83	7.8	2.75	11.7
TA0038	9.41	2.37	11.78	4.90	4.03	55	2.84	3.5	0.13	1.1	2.71	3.5
TA0048	9.40	2.44	11.85	5.04	3.72	58	3.08	7.3	0.95	8.0	2.13	9.2
TA0050	9.85	1.11	10.96	4.11	2.34	64	4.51	15.4	0.78	7.1	3.73	60.3
TA0053	9.85	0.59	10.44	4.25	1.85	70	4.34	13.0	0.19	1.8	4.15	14.8
TA0067	10.14	0.97	11.11	4.04	2.29	64	4.79	11.2	0.36	3.2	4.43	14.1
TA0068	9.46	1.11	10.57	3.28	3.50	48	3.79	4.9	1.21	11.4	2.59	4.5
TA0069	9.85	0.91	10.77	4.67	1.88	71	4.22	12.5	0.27	2.5	3.95	14.7
TA0074	10.39	0.37	10.76	4.72	1.94	71	4.09	14.8	0.14	1.3	3.95	16.6
TA0075	10.47	0.46	10.93	3.98	2.08	66	4.88	11.1	0.04	0.4	4.84	11.0
TA0076	9.70	0.61	10.31	4.18	2.88	59	3.25	9.2	0.06	0.6	3.19	9.0
TA0077	10.12	0.60	10.73	5.22	1.91	73	3.60	11.6	0.03	0.3	3.57	11.5
TA0078	10.86	0.51	11.36	4.39	1.54	74	5.43	14.5	0.04	0.3	5.39	14.4
TA0079	9.23	3.08	12.31	4.55	2.55	64	5.22	6.4	2.08	16.9	3.13	20.4
TA0081	9.59	0.84	10.42	4.10	1.99	67	4.34	9.8	0.74	7.1	3.59	12.2
TA0082	9.74	0.58	10.32	4.42	2.86	61	3.04	7.3	0.30	3.0	2.73	8.8
TA0085	9.97	0.97	10.94	3.99	2.48	62	4.47	11.3	0.51	4.7	3.96	20.0
TA0086	10.11	0.46	10.57	4.79	1.96	71	3.82	12.9	0.03	0.3	3.79	12.8
TA0087	10.13	0.59	10.72	5.05	1.71	75	3.97	12.9	0.03	0.3	3.94	12.9
TA0088	9.97	0.45	10.43	4.68	2.79	63	2.95	9.8	0.00	0.0	2.95	9.9
TA0089	10.14	0.34	10.48	4.36	1.96	69	4.16	16.0	0.03	0.3	4.13	15.9
TA0090	9.87	0.63	10.50	4.79	1.81	73	3.90	15.4	0.03	0.3	3.86	15.2
TA0091	9.99	0.03	10.02	4.88	2.07	70	3.07	9.5	0.03	0.3	3.04	9.4
TA0092	10.08	0.36	10.44	5.17	1.98	72	3.28	12.8	0.03	0.3	3.25	12.7
TA0093	9.96	0.60	10.56	5.36	2.35	70	2.86	6.8	0.35	3.3	2.51	9.6
TA0094	9.79	1.22	11.02	3.83	2.83	57	4.35	7.1	0.63	5.8	3.72	7.9
TA0095	10.05	0.09	10.14	4.71	2.88	62	2.55	5.7	0.45	4.5	2.09	8.9
Average	**9.88**	**0.89**	**10.77**	**4.46**	**2.50**	**65**	**3.81**	**10.2**	**0.41**	**3.7**	**3.40**	**13.4**
Top 25%*	**10.04**	**0.63**	**10.68**	**4.42**	**1.88**	**70**	**4.38**	**14.7**	**0.21**	**2.0**	**4.16**	**22.0**

Table A2 Physical information

Farm number	Total usable area	Milking area	Total water use efficiency	Number of milking cows	Milking cows per usable area	Milk sold	Milk sold	Fat	Protein
	ha	ha	t DM/100mm/ha	hd	hd/ha	kg MS/cow	kg MS/ha	%	%
TA0001	255	144	0.5	380	1.5	307	457	5.2	4.1
TA0008	502	355	0.7	1,250	2.5	515	1283	4.1	3.4
TA0011	343	207	0.4	485	1.4	464	656	4.5	3.5
TA0038	331	211	0.4	535	1.6	342	553	4.4	3.5
TA0048	107	85	0.6	205	1.9	427	817	4.4	3.4
TA0050	585	355	1.0	1,280	2.2	494	1081	4.6	3.8
TA0053	370	360	0.9	1,220	3.3	511	1685	4.6	3.7
TA0067	553	402	0.8	1,340	2.4	418	1013	4.8	3.8
TA0068	392	240	0.5	665	1.7	336	570	4.7	3.6
TA0069	278	269	0.7	865	3.1	474	1475	4.6	3.7
TA0074	336	300	0.7	1,153	3.4	470	1613	4.4	3.7
TA0075	538	523	0.6	1,240	2.3	392	904	4.6	3.6
TA0076	187	187	0.9	524	2.8	409	1146	5.5	4.1
TA0077	284	235	0.7	725	2.6	431	1101	4.5	3.7
TA0078	389	372	0.8	1,245	3.2	417	1336	4.6	3.7
TA0079	265	111	0.4	179	0.7	378	255	4.5	3.4
TA0081	151	151	1.1	511	3.4	479	1620	4.4	3.7
TA0082	407	304	1.0	950	2.3	487	1136	4.7	3.7
TA0085	400	305	0.8	933	2.3	490	1143	4.6	3.6
TA0086	320	320	0.9	975	3.0	424	1292	4.7	3.7
TA0087	346	346	0.8	1,045	3.0	442	1335	4.6	3.6
TA0088	240	236	0.8	835	3.5	467	1623	4.7	3.7
TA0089	351	351	0.9	1,169	3.3	441	1468	4.6	3.7
TA0090	336	315	1.2	1,212	3.6	455	1642	4.6	3.8
TA0091	341	341	1.0	1,107	3.2	396	1284	4.5	3.5
TA0092	410	336	1.1	1,235	3.0	469	1414	4.4	3.7
TA0093	455	400	0.6	950	2.1	429	896	4.5	3.5
TA0094	362	274	0.6	540	1.5	422	630	4.5	3.4
TA0095	212	201	0.9	560	2.6	433	1144	4.1	3.3
Average	**346**	**284**	**0.8**	**873**	**2.5**	**435**	**1,123**	**4.6**	**3.6**
Top 25%	**410**	**344**	**0.9**	**1,218**	**3.1**	**472**	**1,444**	**4.5**	**3.7**

Farm number	Estimated grazed pasture*	Estimated conserved feed*	Home grown feed % as of ME consumed	Nitrogen application*	Phosphorous application*	Potassium application*	Sulphur application*	Labour efficiency	Labour efficiency
	t DM/ha	t DM/ha	% of ME	kg/ha	kg/ha	kg/ha	kg/ha	hd/FTE	kg MS/FTE
TA0001	7.8	0.3	83	111	14	20	10	131	40,028
TA0008	12.8	0.0	68	101	43	-	53	149	76,918
TA0011	8.2	0.0	71	122	-	9	15	133	61,741
TA0038	8.1	0.3	69	276	24	34	65	106	36,154
TA0048	8.2	0.1	67	104	38	49	89	119	50,688
TA0050	14.8	0.3	74	235	56	12	46	154	76,178
TA0053	12.8	0.0	66	252	23	72	33	203	103,922
TA0067	10.3	0.3	68	180	26	40	17	239	100,005
TA0068	6.1	2.5	70	19	12	5	2	144	48,503
TA0069	9.2	0.3	55	219	19	21	20	151	71,413
TA0074	12.3	0.3	63	261	25	30	79	138	64,881
TA0075	8.1	0.4	72	172	21	20	48	166	65,165
TA0076	8.2	2.0	70	29	30	58	45	114	46,773
TA0077	9.1	1.0	62	344	30	28	90	151	65,131
TA0078	11.0	0.4	70	205	26	53	30	249	103,942
TA0079	5.4	1.2	76	25	28	49	42	113	42,683
TA0081	12.9	0.5	73	363	40	86	64	153	73,005
TA0082	11.7	0.8	73	358	64	86	86	136	66,176
TA0085	11.1	0.3	75	197	25	75	25	173	84,723
TA0086	10.2	0.3	65	232	6	5	13	147	62,474
TA0087	9.7	0.5	62	281	10	13	18	158	70,058
TA0088	14.2	0.5	69	363	37	29	68	158	73,844
TA0089	11.5	0.0	65	203	7	8	7	163	71,918
TA0090	12.9	0.1	65	442	51	103	54	183	83,527
TA0091	10.4	0.1	63	182	4	5	1	156	61,814
TA0092	12.8	0.1	61	335	46	96	48	167	78,510
TA0093	6.1	0.7	54	172	31	51	47	169	72,648
TA0094	8.3	0.4	80	137	35	2	5	101	42,463
TA0095	8.2	0.1	57	163	34	37	66	118	51,269
Average	**10.1**	**0.5**	**68**	**210**	**28**	**38**	**41**	**153**	**67,123**
Top 25%*	**12.6**	**0.3**	**67**	**243**	**33**	**40**	**43**	**177**	**83,041**

*on milking area
Note: Calculation of the average for conserved feed excludes zero values

Table A3 Purchased feed

Farm number	Purchased feed per milker	Concentrate price	Silage price	Hay price	Other feed price	Average purchased feed price	of total energy imported
	t DM/hd	$/t DM	$/t DM	$/t DM	$/t DM	$/t DM	% of ME
TA0001	0.9	436	-	225	-	302	17
TA0008	2.4	762	-	328	499	548	32
TA0011	1.8	725	241	200	-	466	29
TA0038	2.1	607	420	201	276	363	31
TA0048	2.1	548	400	184	-	398	33
TA0050	1.5	621	667	667	-	636	26
TA0053	1.9	575	584	428	393	555	34
TA0067	1.6	559	414	269	-	516	32
TA0068	1.5	516	221	155	-	451	30
TA0069	2.5	533	286	393	-	447	45
TA0074	1.8	579	-	260	-	553	37
TA0075	1.3	550	-	263	-	513	28
TA0076	1.4	552	-	263	-	506	30
TA0077	1.8	553	360	263	-	527	38
TA0078	1.3	552	360	263	-	517	30
TA0079	1.9	602	337	199	-	415	24
TA0081	1.5	566	385	120	-	438	27
TA0082	1.5	662	300	250	-	554	27
TA0085	1.5	651	300	253	-	483	25
TA0086	1.8	568	-	228	-	488	35
TA0087	1.9	575	-	282	-	537	38
TA0088	1.8	543	301	312	-	487	31
TA0089	1.7	571	-	232	-	535	35
TA0090	1.7	570	-	286	-	532	35
TA0091	1.8	579	-	160	-	479	37
TA0092	2.1	582	-	273	-	556	39
TA0093	2.6	608	277	200	-	450	46
TA0094	1.3	567	347	235	-	448	20
TA0095	2.3	557	300	235	-	449	43
Average	**1.8**	**582**	**361**	**263**	**389**	**488**	**32**
Top 25%	**1.8**	**604**	**537**	**352**	**-**	**554**	**33**

Note: Calculation of average price of silage, hay and other feed excludes zero values

Table A4 Variable costs

Farm number	AI and herd test	Animal health	Calf rearing	Shed power	Dairy supplies	Total herd and shed costs	Fertiliser	Irrigation	Hay and silage making
	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS
TA0001	0.16	0.22	0.14	0.13	0.13	0.78	0.71	0.17	0.20
TA0008	0.14	0.20	0.12	0.05	0.10	0.62	0.36	0.15	0.08
TA0011	0.17	0.24	0.08	0.09	0.08	0.65	0.45	0.15	0.28
TA0038	0.00	0.20	0.03	0.06	0.12	0.41	1.52	0.06	0.09
TA0048	0.18	0.20	0.03	0.16	0.16	0.72	0.94	0.26	0.16
TA0050	0.17	0.27	0.17	0.06	0.10	0.77	0.85	0.26	0.06
TA0053	0.22	0.26	0.06	0.03	0.04	0.61	0.76	0.08	0.00
TA0067	0.10	0.18	0.02	0.04	0.09	0.43	0.82	0.04	0.19
TA0068	0.07	0.10	0.04	0.11	0.11	0.43	0.20	0.20	0.01
TA0069	0.14	0.30	0.01	0.07	0.11	0.63	0.72	0.11	0.06
TA0074	0.17	0.22	0.00	0.08	0.06	0.52	0.78	0.10	0.05
TA0075	0.12	0.09	0.00	0.06	0.07	0.34	0.72	0.06	0.10
TA0076	0.04	0.15	0.00	0.09	0.07	0.36	0.50	0.13	0.27
TA0077	0.13	0.23	0.00	0.09	0.05	0.50	0.94	0.05	0.09
TA0078	0.09	0.14	0.00	0.05	0.04	0.32	0.66	0.08	0.11
TA0079	0.10	0.21	0.03	0.18	0.20	0.72	1.14	0.00	0.46
TA0081	0.17	0.17	0.04	0.11	0.08	0.57	0.87	0.30	0.03
TA0082	0.19	0.39	0.06	0.05	0.07	0.75	1.26	0.14	0.03
TA0085	0.14	0.30	0.01	0.06	0.05	0.55	0.94	0.12	0.12
TA0086	0.19	0.22	0.04	0.08	0.07	0.61	0.76	0.06	0.14
TA0087	0.18	0.21	0.05	0.07	0.12	0.63	0.80	0.05	0.06
TA0088	0.09	0.17	0.03	0.07	0.05	0.40	0.84	0.15	0.29
TA0089	0.17	0.19	0.02	0.04	0.06	0.49	0.62	0.09	0.00
TA0090	0.12	0.14	0.00	0.02	0.06	0.34	1.00	0.11	0.01
TA0091	0.21	0.28	0.05	0.06	0.11	0.71	0.56	0.01	0.01
TA0092	0.14	0.26	0.02	0.05	0.05	0.52	1.02	0.11	0.01
TA0093	0.17	0.26	0.01	0.06	0.08	0.58	0.93	0.18	0.08
TA0094	0.19	0.23	0.04	0.05	0.06	0.57	0.99	0.09	0.16
TA0095	0.15	0.26	0.04	0.08	0.08	0.61	0.88	0.09	0.05
Average	**0.14**	**0.22**	**0.04**	**0.07**	**0.08**	**0.56**	**0.81**	**0.12**	**0.11**
Top 25%	**0.15**	**0.20**	**0.05**	**0.05**	**0.07**	**0.52**	**0.72**	**0.13**	**0.05**

Farm number	Fuel and oil	Pasture improvement/ cropping	Other feed costs	Fodder purchases	Grain/ concentrates/ other	Agistment costs	Feed and water inventory change	Total feed costs	Total variable costs
	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS
TA0001	0.11	0.34	0.00	0.64	0.70	0.00	-0.16	2.71	3.49
TA0008	0.10	0.37	0.00	0.66	1.90	0.08	0.00	3.69	4.30
TA0011	0.14	0.08	0.00	0.46	1.47	0.38	0.00	3.43	4.08
TA0038	0.38	0.09	0.00	0.95	1.52	0.00	-0.12	4.49	4.90
TA0048	0.19	0.16	0.00	0.86	1.47	0.70	-0.41	4.32	5.04
TA0050	0.08	0.18	0.00	0.62	1.22	0.53	-0.46	3.35	4.11
TA0053	0.03	0.03	0.00	0.53	1.49	0.82	-0.10	3.64	4.25
TA0067	0.04	0.16	0.00	0.33	1.50	0.61	-0.06	3.61	4.04
TA0068	0.23	0.03	0.00	0.17	2.11	0.08	-0.18	2.85	3.28
TA0069	0.06	0.04	0.00	0.62	1.55	0.84	0.04	4.04	4.67
TA0074	0.07	0.15	0.00	0.08	1.97	0.98	0.02	4.20	4.72
TA0075	0.06	0.16	0.00	0.11	1.56	1.00	-0.13	3.64	3.98
TA0076	0.09	0.06	0.00	0.16	1.76	0.98	-0.12	3.82	4.18
TA0077	0.05	0.24	0.00	0.11	2.20	1.11	-0.06	4.72	5.22
TA0078	0.04	0.22	0.00	0.12	1.66	1.27	-0.10	4.07	4.39
TA0079	0.13	0.15	0.00	0.59	1.52	0.00	-0.17	3.82	4.55
TA0081	0.14	0.10	0.00	0.16	1.22	0.80	-0.08	3.52	4.10
TA0082	0.12	0.22	0.00	0.23	1.57	0.26	-0.16	3.67	4.42
TA0085	0.06	0.19	0.00	0.39	1.33	0.40	-0.11	3.44	3.99
TA0086	0.05	0.16	0.00	0.24	1.96	0.83	-0.02	4.19	4.79
TA0087	0.05	0.17	0.00	0.16	2.10	0.92	0.10	4.41	5.05
TA0088	0.07	0.06	0.00	0.30	1.71	0.96	-0.08	4.29	4.68
TA0089	0.04	0.17	0.00	0.09	1.91	0.84	0.11	3.87	4.36
TA0090	0.04	0.03	0.02	0.15	1.96	1.16	-0.06	4.45	4.79
TA0091	0.04	0.14	0.00	0.19	2.19	1.03	0.01	4.17	4.88
TA0092	0.05	0.07	0.00	0.10	2.26	1.01	0.03	4.65	5.17
TA0093	0.07	0.05	0.00	0.77	1.90	0.72	0.08	4.78	5.36
TA0094	0.10	0.28	0.00	0.38	1.35	0.19	-0.28	3.26	3.83
TA0095	0.10	0.05	0.00	0.62	1.96	0.45	-0.11	4.09	4.71
Average	**0.09**	**0.14**	**0.00**	**0.37**	**1.69**	**0.65**	**-0.09**	**3.90**	**4.46**
Top 25%	**0.06**	**0.16**	**0.00**	**0.32**	**1.73**	**0.81**	**-0.08**	**3.90**	**4.42**

Table A5 Overhead costs

Farm number	Rates	Farm insurance	Motor vehicle expenses	Repairs and maintenance	Other overheads	Employed labour	Total cash overheads	Depreciation	Imputed owner/ operator and family labour	Total overheads
	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS	$/kgMS
TA0001	0.11	0.11	0.23	0.86	0.96	1.22	3.51	1.03	0.96	5.50
TA0008	0.04	0.12	0.01	0.29	0.13	0.69	1.28	0.20	0.27	1.74
TA0011	0.04	0.17	0.02	0.78	0.16	0.80	1.97	0.38	0.60	2.95
TA0038	0.07	0.11	0.03	0.60	0.06	1.52	2.38	0.99	0.66	4.03
TA0048	0.06	0.20	0.05	0.82	0.37	0.55	2.04	0.62	1.07	3.72
TA0050	0.03	0.03	0.00	0.43	0.12	1.41	2.02	0.33	0.00	2.34
TA0053	0.02	0.05	0.00	0.49	0.05	0.95	1.57	0.25	0.03	1.85
TA0067	0.03	0.04	0.05	0.77	0.25	0.94	2.08	0.16	0.04	2.29
TA0068	0.13	0.14	0.14	0.56	0.04	2.02	3.03	0.47	0.00	3.50
TA0069	0.03	0.06	0.02	0.35	0.11	1.03	1.60	0.28	0.00	1.88
TA0074	0.05	0.04	0.07	0.22	0.05	1.40	1.84	0.10	0.00	1.94
TA0075	0.04	0.04	0.04	0.39	0.06	1.37	1.94	0.14	0.00	2.08
TA0076	0.04	0.10	0.14	0.51	0.12	1.82	2.74	0.14	0.00	2.88
TA0077	0.04	0.07	0.05	0.34	0.06	1.23	1.79	0.12	0.00	1.91
TA0078	0.03	0.04	0.05	0.19	0.07	1.05	1.44	0.11	0.00	1.54
TA0079	0.00	0.03	0.13	0.18	0.14	0.59	1.08	0.08	1.39	2.55
TA0081	0.01	0.26	0.06	0.24	0.09	1.10	1.75	0.23	0.00	1.99
TA0082	0.02	0.08	0.06	0.88	0.12	1.29	2.44	0.42	0.00	2.86
TA0085	0.03	0.07	0.01	0.53	0.10	1.13	1.86	0.62	0.00	2.48
TA0086	0.08	0.05	0.00	0.35	0.06	1.27	1.81	0.14	0.00	1.96
TA0087	0.08	0.05	0.00	0.13	0.06	1.16	1.48	0.23	0.00	1.71
TA0088	0.04	0.06	0.04	0.53	0.11	1.78	2.55	0.24	0.00	2.79
TA0089	0.07	0.04	0.00	0.38	0.06	1.27	1.81	0.15	0.00	1.96
TA0090	0.02	0.04	0.00	0.43	0.07	1.08	1.65	0.16	0.00	1.81
TA0091	0.06	0.05	0.00	0.45	0.05	1.33	1.94	0.13	0.00	2.07
TA0092	0.01	0.04	0.00	0.45	0.10	1.25	1.85	0.13	0.00	1.98
TA0093	0.04	0.07	0.00	0.44	0.12	1.20	1.87	0.48	0.00	2.35
TA0094	0.06	0.06	0.10	0.41	0.20	1.83	2.66	0.17	0.00	2.83
TA0095	0.04	0.09	0.00	0.41	0.17	1.80	2.51	0.37	0.00	2.88
Average	**0.04**	**0.08**	**0.05**	**0.46**	**0.14**	**1.24**	**2.02**	**0.31**	**0.17**	**2.50**
Top 25%	**0.04**	**0.05**	**0.02**	**0.35**	**0.08**	**1.12**	**1.66**	**0.18**	**0.04**	**1.88**

Table A6 Variable costs – percentage

Farm number	AI and herd test	Animal health	Calf rearing	Shed power	Dairy supplies	Total herd & shed costs	Fertiliser	Irrigation	Hay and silage making
	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs
TA0001	1.8	2.4	1.5	1.4	1.5	8.7	7.9	1.9	2.2
TA0008	2.3	3.4	2.0	0.9	1.6	10.2	5.9	2.5	1.3
TA0011	2.4	3.4	1.2	1.3	1.1	9.3	6.5	2.2	3.9
TA0038	0.0	2.2	0.3	0.7	1.4	4.6	17.0	0.6	1.0
TA0048	2.0	2.3	0.3	1.8	1.8	8.2	10.7	3.0	1.8
TA0050	2.6	4.1	2.7	0.9	1.6	11.9	13.2	4.1	1.0
TA0053	3.6	4.3	0.9	0.5	0.6	9.9	12.5	1.3	0.0
TA0067	1.6	2.9	0.3	0.6	1.4	6.7	12.9	0.6	3.0
TA0068	1.1	1.5	0.6	1.6	1.6	6.4	2.9	3.0	0.2
TA0069	2.2	4.5	0.2	1.1	1.6	9.6	10.9	1.7	0.9
TA0074	2.5	3.3	0.0	1.1	0.8	7.8	11.7	1.5	0.7
TA0075	2.0	1.5	0.0	1.0	1.1	5.6	11.9	1.0	1.7
TA0076	0.6	2.2	0.0	1.3	1.0	5.1	7.1	1.8	3.8
TA0077	1.8	3.2	0.0	1.2	0.7	6.9	13.1	0.7	1.3
TA0078	1.6	2.4	0.0	0.8	0.7	5.4	11.1	1.4	1.9
TA0079	1.5	2.9	0.5	2.5	2.8	10.2	16.1	0.0	6.5
TA0081	2.7	2.8	0.7	1.9	1.3	9.4	14.2	5.0	0.5
TA0082	2.6	5.4	0.8	0.6	0.9	10.3	17.3	1.9	0.4
TA0085	2.1	4.6	0.1	0.9	0.8	8.5	14.5	1.8	1.9
TA0086	2.9	3.2	0.6	1.2	1.1	9.0	11.3	0.9	2.1
TA0087	2.7	3.1	0.8	1.0	1.8	9.4	11.8	0.8	0.9
TA0088	1.2	2.2	0.4	0.9	0.6	5.3	11.2	2.0	3.9
TA0089	2.7	3.0	0.4	0.6	1.0	7.7	9.8	1.5	0.0
TA0090	1.8	2.1	0.0	0.3	1.0	5.2	15.2	1.7	0.2
TA0091	3.0	4.1	0.7	0.8	1.6	10.2	8.0	0.1	0.2
TA0092	2.0	3.6	0.3	0.7	0.7	7.3	14.2	1.5	0.2
TA0093	2.2	3.3	0.1	0.8	1.1	7.5	12.1	2.3	1.1
TA0094	2.9	3.4	0.6	0.8	0.9	8.5	14.9	1.3	2.4
TA0095	2.0	3.4	0.5	1.0	1.1	8.1	11.5	1.2	0.7
Average	**2.1**	**3.1**	**0.6**	**1.0**	**1.2**	**8.0**	**11.6**	**1.7**	**1.6**
Top 25%	**2.4**	**3.2**	**0.9**	**0.7**	**1.0**	**8.3**	**11.3**	**2.0**	**0.7**

Farm number	Fuel and oil	Pasture improvement/ cropping	Other feed costs	Fodder purchases	Grain/ concentrates/ other	Agistment costs	Feed and water inventory change	Total feed costs	Total variable costs
	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs
TA0001	1.3	3.8	0.0	7.1	7.8	0.0	-1.8	30.2	38.8
TA0008	1.6	6.1	0.0	10.9	31.4	1.3	0.0	61.0	71.2
TA0011	2.1	1.2	0.0	6.5	20.9	5.5	0.1	48.7	58.0
TA0038	4.3	1.0	0.0	10.6	17.1	0.0	-1.4	50.3	54.9
TA0048	2.1	1.9	0.0	9.8	16.7	8.0	-4.6	49.3	57.5
TA0050	1.2	2.7	0.0	9.7	18.9	8.2	-7.1	51.9	63.7
TA0053	0.4	0.5	0.0	8.6	24.5	13.5	-1.6	59.8	69.7
TA0067	0.6	2.5	0.0	5.2	23.7	9.6	-1.0	57.1	63.9
TA0068	3.4	0.5	0.0	2.5	31.1	1.2	-2.7	42.0	48.4
TA0069	0.8	0.6	0.0	9.5	23.7	12.8	0.6	61.7	71.3
TA0074	1.0	2.3	0.0	1.2	29.6	14.8	0.3	63.0	70.9
TA0075	0.9	2.6	0.0	1.8	25.7	16.5	-2.2	60.1	65.7
TA0076	1.3	0.8	0.0	2.3	25.0	13.9	-1.7	54.1	59.2
TA0077	0.7	3.4	0.0	1.5	30.8	15.6	-0.9	66.3	73.2
TA0078	0.6	3.8	0.0	2.1	28.0	21.4	-1.6	68.6	74.0
TA0079	1.8	2.1	0.0	8.3	21.5	0.0	-2.3	53.9	64.1
TA0081	2.2	1.6	0.0	2.7	20.0	13.1	-1.4	57.9	67.4
TA0082	1.7	3.0	0.0	3.2	21.5	3.6	-2.2	50.4	60.7
TA0085	1.0	2.9	0.0	6.0	20.6	6.2	-1.7	53.2	61.7
TA0086	0.7	2.3	0.0	3.6	29.0	12.3	-0.2	62.0	71.0
TA0087	0.8	2.5	0.0	2.3	31.2	13.7	1.4	65.4	74.7
TA0088	0.9	0.7	0.0	4.0	22.9	12.9	-1.1	57.3	62.6
TA0089	0.6	2.7	0.0	1.4	30.2	13.2	1.8	61.3	69.0
TA0090	0.6	0.5	0.4	2.3	29.8	17.6	-0.9	67.4	72.6
TA0091	0.6	2.0	0.0	2.7	31.5	14.8	0.1	60.1	70.3
TA0092	0.7	1.0	0.0	1.4	31.6	14.1	0.4	65.0	72.3
TA0093	1.0	0.6	0.0	9.9	24.6	9.4	1.0	62.0	69.5
TA0094	1.5	4.2	0.0	5.7	20.3	2.8	-4.2	49.0	57.5
TA0095	1.3	0.6	0.0	8.1	25.8	5.9	-1.4	53.9	62.0
Average	**1.3**	**2.1**	**0.0**	**5.2**	**24.7**	**9.7**	**-1.3**	**56.7**	**64.7**
Top 25%	**0.9**	**2.6**	**0.1**	**5.2**	**27.5**	**12.9**	**-1.3**	**61.8**	**70.2**

Table A7 Overhead costs – percentage

Farm number	Rates	Farm insurance	Motor vehicle expenses	Repairs and maintenance	Other	Employed labour	Total cash	Depreciation	Imputed owner/ operator and family labour	Total
	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs
TA0001	1.2	1.3	2.6	9.6	10.7	13.6	39.0	11.4	10.7	61.2
TA0008	0.7	1.9	0.2	4.8	2.2	11.3	21.1	3.2	4.4	28.8
TA0011	0.6	2.4	0.2	11.1	2.3	11.4	28.0	5.4	8.5	42.0
TA0038	0.8	1.2	0.4	6.8	0.6	17.0	26.7	11.0	7.4	45.1
TA0048	0.6	2.3	0.5	9.3	4.3	6.2	23.2	7.0	12.2	42.5
TA0050	0.4	0.5	0.0	6.7	1.8	21.9	31.2	5.1	0.0	36.3
TA0053	0.4	0.9	0.0	8.0	0.9	15.6	25.7	4.1	0.5	30.3
TA0067	0.5	0.7	0.7	12.2	4.0	14.9	33.0	2.6	0.6	36.1
TA0068	1.9	2.1	2.0	8.3	0.6	29.8	44.6	6.9	0.0	51.6
TA0069	0.4	0.9	0.3	5.4	1.7	15.7	24.5	4.2	0.0	28.7
TA0074	0.7	0.6	1.1	3.3	0.8	21.1	27.6	1.6	0.0	29.1
TA0075	0.6	0.7	0.7	6.5	0.9	22.6	32.1	2.2	0.0	34.3
TA0076	0.5	1.4	2.1	7.2	1.7	25.8	38.7	2.1	0.0	40.8
TA0077	0.5	1.0	0.8	4.8	0.9	17.3	25.2	1.6	0.0	26.8
TA0078	0.5	0.7	0.9	3.3	1.1	17.7	24.2	1.8	0.0	26.0
TA0079	0.0	0.5	1.8	2.6	2.0	8.3	15.2	1.1	19.5	35.9
TA0081	0.2	4.2	1.0	4.0	1.4	18.1	28.8	3.8	0.0	32.6
TA0082	0.3	1.0	0.8	12.0	1.6	17.8	33.6	5.7	0.0	39.3
TA0085	0.5	1.0	0.1	8.1	1.6	17.4	28.8	9.5	0.0	38.3
TA0086	1.1	0.8	0.0	5.2	0.9	18.8	26.8	2.1	0.0	29.0
TA0087	1.1	0.7	0.0	2.0	0.9	17.2	21.9	3.4	0.0	25.3
TA0088	0.5	0.7	0.5	7.2	1.5	23.8	34.2	3.2	0.0	37.4
TA0089	1.1	0.7	0.0	6.0	0.9	20.1	28.7	2.3	0.0	31.0
TA0090	0.4	0.6	0.0	6.6	1.1	16.4	25.0	2.4	0.0	27.4
TA0091	0.9	0.7	0.0	6.4	0.7	19.2	27.9	1.8	0.0	29.7
TA0092	0.1	0.5	0.0	6.3	1.4	17.5	25.9	1.8	0.0	27.7
TA0093	0.5	0.9	0.0	5.7	1.5	15.6	24.2	6.3	0.0	30.5
TA0094	0.9	0.9	1.5	6.2	3.0	27.5	39.9	2.6	0.0	42.5
TA0095	0.6	1.2	0.0	5.5	2.2	23.7	33.1	4.9	0.0	38.0
Average	**0.6**	**1.1**	**0.6**	**6.6**	**1.9**	**18.0**	**28.9**	**4.2**	**2.2**	**35.3**
Top 25%	**0.6**	**0.8**	**0.3**	**5.5**	**1.3**	**17.7**	**26.2**	**2.9**	**0.7**	**29.8**

Table A8 Capital structure

Farm assets				
	Land value	Land value	Permanent water value	Permanent water value
	$/ha	$/cow	$/ha	$/cow
Average	31,721	12,801	760	375
Top 25%	29,436	9,152	236	80

Other farm assets (per usable hectare)				
Plant and equipment	Livestock	Hay and grain	Other assets	Total assets
$/ha	$/ha	$/ha	$/ha	$/ha
854	6,122	177	283	39,926
740	7,281	215	491	38,398

Liabilities	
Liabilities per usable hectare	Liabilities per milking cow
$/ha	$/cow
6,270	2,845
2,332	812

Equity	
Equity per usable hectare	Average equity
$/ha	%
33,656	86
36,066	95

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	$6.87	8.48	$7.59	9.37	0.28	0.35	0.23	0.28	2.51	3.10	3.02	3.73
2014/15	$6.19	7.47	$6.90	8.33	0.29	0.35	0.20	0.24	2.65	3.20	3.13	3.78
2015/16	$5.55	6.61	$6.10	7.27	0.29	0.35	0.17	0.20	2.81	3.35	3.27	3.90
2016/17	$5.03	5.88	$5.84	6.83	0.28	0.33	0.20	0.23	2.38	2.78	2.87	3.36
2017/18	5.95	6.83	$6.70	7.69	0.30	0.34	0.18	0.21	2.47	2.83	2.95	3.38
2018/19	6.16	6.98	$6.90	7.81	0.30	0.35	0.18	0.21	2.78	3.15	3.27	3.70
2019/20	7.09	7.93	7.94	8.88	0.28	0.31	0.18	0.20	2.68	2.99	3.13	3.50
2020/21	6.66	7.34	7.62	8.39	0.34	0.37	0.15	0.17	2.76	3.04	3.26	3.59
2021/22	7.48	7.89	8.40	8.86	0.39	0.41	0.17	0.18	3.72	3.92	4.28	4.52
2022/23	9.88	9.88	10.77	10.77	0.40	0.40	0.16	0.16	3.90	3.90	4.46	4.46
Average		**7.53**		**8.42**		**0.36**		**0.21**		**3.23**		**3.79**

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 ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Nominal ($/kgMS)	Real ($/kgMS)	Return on total assets %	Return on equity %
2013/14	1.41	1.74	$0.73	0.90	2.14	2.64	2.44	3.01	0.47	0.58	1.97	2.43	9.6	12.9
2014/15	1.34	1.62	$0.60	0.72	1.94	2.34	1.84	2.22	0.42	0.51	1.42	1.71	7.8	9.9
2015/16	1.43	1.71	$0.48	0.57	1.91	2.28	0.92	1.10	0.56	0.67	0.36	0.43	3.9	0.8
2016/17	1.30	1.52	$0.68	0.79	1.98	2.31	0.99	1.16	0.63	0.74	0.36	0.42	3.7	1.9
2017/18	1.36	1.56	$0.73	0.84	2.09	2.40	1.80	2.06	0.66	0.76	1.14	1.31	6.3	6.7
2018/19	1.35	1.53	$0.84	0.95	2.19	2.48	1.44	1.63	0.66	0.75	0.78	0.88	5.2	6.5
2019/20	1.57	1.75	0.74	0.83	2.31	2.58	2.50	2.80	0.58	0.65	1.92	2.15	8.7	15.4
2020/21	1.61	1.77	0.54	0.59	2.16	2.38	2.21	2.43	0.37	0.41	1.84	2.03	7.1	9.4
2021/22	1.85	1.95	0.50	0.53	2.35	2.48	1.77	1.87	0.27	0.28	1.50	1.58	5.2	6.4
2022/23	2.02	2.02	0.48	0.48	2.50	2.50	3.81	3.81	0.41	0.41	3.40	3.40	10.2	13.4
Average		**1.72**		**0.72**		**2.44**		**2.21**		**0.58**		**1.63**	**6.8**	**8.3**

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 2017/18 gross farm income did not include feed inventory changes and changes to the value of carry-over water. These are now 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 per usable area	Milk sold	Milk sold	Estimated grazed pasture*	Estimated conserved feed*	Home grown feed as % of ME consumed	Concentrate price	
	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	260	178	0.6	502	2.1	425	894	9.0	0.6	72	437	539
2014/15	280	191	0.8	545	2.1	447	924	9.3	0.7	69	429	518
2015/16	302	198	0.7	580	2.1	444	936	10.2	0.5	69	440	524
2016/17	268	190	0.6	542	2.2	433	976	9.7	0.7	74	390	456
2017/18	289	208	0.9	607	2.3	445	1,031	10.1	0.6	71	426	489
2018/19	305	210	0.8	639	2.2	418	947	10.4	1.1	76	550	622
2019/20	326	236	0.8	707	2.2	423	948	10.1	0.7	74	519	580
2020/21	357	249	0.9	769	2.2	431	955	10.2	0.5	71	462	509
2021/22	360	285	0.8	913	2.6	403	1,041	10.0	0.5	69	487	514
2022/23	346	284	0.8	873	2.5	435	1,123	10.1	0.5	68	582	582
Average	**309**	**223**	**0.8**	**668**	**2.3**	**430**	**977**	**9.9**	**0.7**	**71**		**533**

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 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.

Acknowledgement
Dairy Australia acknowledges the funding from levy payers and contribution by Commonwealth Government.

ISSN 2651-9216 (Print) ISSN 2652-6778 (online)

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 3701
E enquiries@dairyaustralia.com.au
dairyaustralia.com.au

5543 | Dec 2023