Dairy Australia

DAIRY FARM MONITOR PROJECT

WESTERN AUSTRALIA ANNUAL REPORT 2019/20

ACKNOWLEDGEMENTS

The Dairy Farm Monitor Project (WA) is supported by Western Dairy through funding from Dairy Australia and the South West Development Commission.

Western Dairy gratefully acknowledges the cooperation and goodwill of the farmers who supplied their business information, and the work of dairy consultants Colin Bosustow, Steve Hossen, Dan Parnell, Sarah Lang and Kirk Reynolds who collected farm data, provided feedback and data validation.

Thank you to Dairy Australia's farm analysts Jake Musson and Fiona Smith for additional support with data checking, validation and analysis.

This project plays a critical role in identifying areas for farm performance improvement, providing vital benchmarking information for Dairy Australia's DairyBase tool, and potentially growing dairy employment and investment in Western Australia.

Further information regarding the Dairy Farm Monitor Project can be obtained from:

Western Dairy
PO Box 5066
Bunbury WA 6230
08 9778 5111
admin@westerndairy.com.au

Helen Quinn
Program Manager – Farm Business Management
Dairy Australia
Level 3, HWT Tower
40 City Road
Southbank, Victoria 3006
03 9694 3777
hquinn@dairyaustralia.com.au

GOVERNMENT OF WESTERN AUSTRALIA

SOUTH WEST DEVELOPMENT COMMISSION

Western DAIRY

Dairy Australia

CONTENTS

LIST OF FIGURES AND TABLES

Figures

Tables

HOW TO READ THIS REPORT

This section explains the calculations used and the data presented throughout the report, as well as the purpose of the different sections.

This report is presented in the following sections:

- Summary
- Farm monitor method
- Western Australia overview
- Business confidence survey
- Greenhouse gas emissions report
- Historical analysis
- Appendices.

Participants were selected for the project in order to represent a distribution of farm sizes, herd sizes and geographical locations within Western Australia. The results presented in this report do not represent population averages as the participant farms were not selected using random population sampling.

The report presents visual descriptions of the data for the 2019/20 year. Data is presented for individual farms, as state averages and for the state top 25% of farms ranked by return on total assets (RoTA). The presented averages should not be considered averages for the population of farms in the state due to the small sample size and these farms not being randomly selected.

The top 25% of farms are presented as lighter coloured bars in the state overview figures. Return on total assets is the determinate used to identify the top 25% of producers as it provides an assessment of the performance of the whole farm irrespective of differences in location and production system.

The Q1–Q3 data range for key indicators is also presented to provide an indication of the variation in the data. The Q1 value is the quartile 1 value, that is, the value of which one quarter (25%) of data in that range is less than the average. The Q3 value is the quartile 3 value that is the value of which one quarter (25%) of data in that range is greater than the average. Therefore the middle 50% of data resides between the Q1–Q3 data range.

The appendices include detailed data tables, a list of abbreviations, a glossary of terms and a list of standard values used.

Milk production data is presented in kilograms of milk solids (fat + protein) reflecting payment systems and where possible production data is also presented in litres.

The report focuses on measures on a 'per kilogram of milk solids' basis, with occasional reference to measures on a 'per hectare' or 'per cow' basis. The appendix tables contain the majority of financial information on a per kilogram of milk solids basis.

Percentage differences are calculated as [(new value – original value)/original value]. For example 'costs went from $80/ha to $120/ha, a 50% increase'; [{(120-80)/80} x (100/1)] = [(40/80) x 100] = 0.5 x 100 = 50%, unless otherwise stated.

The top 25% consists of seven farms located throughout the dairying areas of Western Australia.

Any reference to 'last year' refers to the 2018/19 Dairy Farm Monitor Project report.

Price and cost comparisons between years are nominal unless otherwise stated.

Not all of the participants from 2018/19 are in the 2019/20 report. This year, there are three new participating farms. This is important to bear in mind when comparing data sets between years.

Please note that text explaining terms may be repeated within the different chapters.

PREFACE

The data collection method used during the 2019/20 period has not changed from the previous year. To protect the anonymity of participants, farms continue to be allocated a different number each year. Results for individual farms may not be directly compared to previous years, e.g. farm number 3 cannot be compared to farm number 3 between years.

For further project reports and updates, visit: **dairyaustralia.com.au/dairyfarmmonitor**.

SUMMARY

In 2019/20 the data from 25 farms in WA resulted in average whole farm earnings before interest and tax (EBIT) of $437,466 a 24% increase on the previous year's $353,193. On average, participants achieved return on total assets averaging 3.9%, up from last year's 3.2%. The average milk price received was $7.35/kg MS (52.3¢/L), a 4% increase from last year.

This is the seventh year of the Dairy Farm Monitor Project (DFMP) in Western Australia with support and funding from Dairy Australia. The project aims to provide the WA dairy industry with valuable farm level data relating physical and financial performance.

Twenty five farms participated in the project in 2019/20, of which 11 have been involved since the project began. There was one new farm and one re-entry in this year's dataset. The WA DFMP participants generated an average earnings before interest and tax (EBIT) of $437,466 per farm or $1.44/kg MS (10.3¢/L), a 24% increase from 2018/19 and the second lowest since the projects inception in 2013/14.

Once interest and lease costs were taken into account the resulting average net farm income was $286,577, a 46% increase. This equated to an average return on equity (RoE) of 8.1%, which is the median figure achieved since the DFMP began.

The average milk price of $7.35/kg MS (52.3¢/L) was a 4% increase from last year's price of $7.07/kg MS (50.8¢/L). The milk price reflected the current 'static nature' of Western Australia's domestic milk supply, with slightly higher feed costs. Livestock trading profit improved 16% to $1.34/kg MS (9.5¢/L) in light of the strong beef prices and increased heifer export values. This meant that the gross farm income increased 6% to $8.74/kg MS (62.2¢/L).

The milk income again varied considerably from $6.76 to $8.24kg/MS (47.7–57.9¢/L), however the variation was reduced from $1.79 to $1.48kg/MS. The processor that was supplied had the greatest influence on the prices received and then the seasonality of when the milk was produced (with summer premiums significantly higher than spring payments). The processing sector is giving strong indications when it wants the milk, however the large variation in pricing is causing concern for the industry confidence.

Participants costs of production (inc. inventory change) increased by 10%. Both variable and overhead costs increased, with the main change in variable costs due to the higher feed costs. Variable costs were consistent at $4.41/kg MS (31.4¢/L), with average overhead costs rising again from $2.69/kg MS to $2.89/kg MS (20.6¢/L). The main drivers of higher overhead costs were repairs and maintenance (up 16%) and imputed labour (up 15%). Home-grown feed as a source of metabolisable energy (ME) was consistent at 61%. There was a slight decrease in purchased feed, from 2.9 to 2.6 t DM/hd due to the known higher costs before summer feeding, and the earlier break to the season. The average concentrate price continued to increase $19/t DM to $507/t DM. The increase in price, offset with the lower amount fed meant feed costs remained stable.

The improved gross farm income, coupled with stable variable costs, and only slightly higher overhead costs, lead to RoTA improving from 3.2 to 3.9%. All participants recorded a positive RoTA with the spread being 0.5 to 11.4%. In contrast the number of participants with a negative RoE fell from 9 to 2 with the spread being -2.7 to 83%.

Continued on next page

The 2019/20 season was quite dry with the annual rainfall 213mm short of the average (23% short of average). The dry September of 52mm (53% of average) reduced the amount of pasture grown and fodder to be harvested. Fortunately the autumn was one of the better starts for numerous years with the rain starting in March and continuing as average for each month then on. This allowed farmers to remove some of the concentrate from the diet earlier than previous years which meant that on average 300kg/cow of concentrate was not fed.

The top 25% farms achieved an average EBIT of $2.58/kg MS (18.4¢/L) and average RoTA of 7.7%.The large difference between the average and top 25% is mainly due to 14% higher livestock trading profit, 11% lower purchased feed costs, 16% lower overhead costs (mainly labour and depreciation), better labour efficiency (16%), higher milk production per hectare (23%), along with 11% lower costs of production.

Terms of trade have improved for the past 12 months which gives some context to the results. Expectations for the coming season were more optimistic with 72% of farmers predicting an improvement in farm business returns compared to 27% last year. The expectations of production stability increased from 54% to 64% whilst 80% of businesses expecting decline in purchased feed costs.

Expectations for the 2019/20 season were optimistic with 72% expecting an improvement in business returns. 64% believe that production will remain stable and 48% feel their milk price will improve.

The majority of respondents see a decrease in purchased feed prices (80%) with fertiliser, fuel & oil, irrigation, repairs and maintenance and labour considered to largely remain stable.

Milk price was by far the major issues facing the Western Australian participant farmers in both the short and long term. The variation in seasons was seen as the next concern with less than 5% of respondents seeing succession planning as a major issue facing their business.

FARM MONITOR METHOD

This chapter explains the method used in the DFMP and defines the key terms used.

The method employed to generate the profitability and productivity data was adapted from that described in The Farming Game (Malcolm et al. 2005) and is consistent with previous reports. Readers should be aware that not all benchmarking programs use the same method or terms for farm financial reporting. The allocation of items such as lease costs, overhead costs or imputed labour costs against the farm enterprises varies between financial benchmarking programs. Standard dollar values for items such as stock and feed on hand and imputed labour rates may also vary. For this reason, the results from different benchmarking programs should be compared with caution.

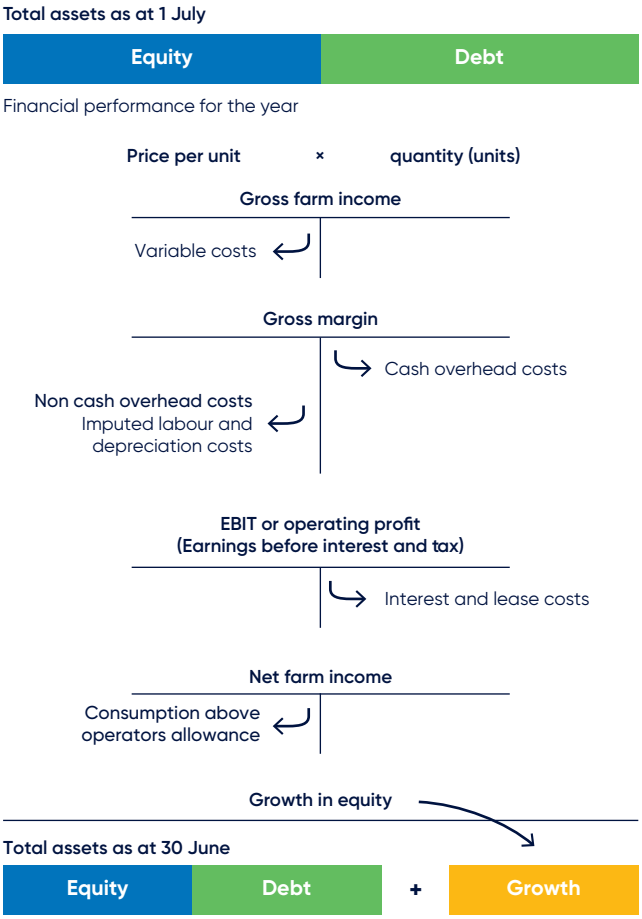
Figure 1 demonstrates how the different farm business economic terms fit together and are calculated. This has been adapted from an initial diagram developed by Bill Malcolm. The diagram shows the different profitability measures as costs are deducted from gross farm income. Growth is achieved by investing in assets which generate income. These assets can be owned with equity (one's own capital) or debt (borrowed capital). The amount of growth is dependent on the maximisation of income and minimisation of costs, or cost efficiency relative to income generation.

The performance of all participants in the project using this method is shown in Figure 2. Production and economic data are both displayed to indicate how the terms are calculated and how they in turn fit together.

Gross farm income

The farming business generates a gross farm income which is the sum of milk cash income (net), livestock trading profit or other sources such as milk share dividends. The main source of income is from milk, which is calculated by multiplying price received per unit by the number of units. For example, dollars per kilogram milk solids multiplied by kilograms of milk solids produced. Subtracting certain costs from total income gives different profitability measures.

Figure 1 Dairy Farm Monitor Project method



Variable costs

These are the costs specific to an enterprise, such as herd, shed and feed costs. These costs vary in relation to the size of the enterprise. Subtracting variable costs for the dairy enterprise only from gross farm income, gives the gross margin. Gross margins are a common method for comparing between similar enterprises and are commonly used in broad acre cropping and livestock enterprises. Gross margins are not generally referred to in economic analysis of dairy farming businesses due to the specific infrastructure investment required to operate a dairy farm making it less desirable to switch enterprise.

Overhead costs

These costs are not directly related to an enterprise as they are expenses incurred through the general operating of the business. The DFMP separates overheads into cash and non-cash overheads, to distinguish between different cash flows within the business. Cash overheads include rates, insurance, and repairs and maintenance. Non-cash overheads include costs that are not actual cash receipts or expenditure; for example the amount of depreciation on a piece of equipment.

Imputed operators' allowance for labour and management is also a non-cash overhead that must be costed and deducted from income if a realistic estimate of costs, profit and the return on the capital of the business is to be obtained.

Earnings before interest and tax

Earnings before interest and tax (EBIT) are calculated by subtracting variable and overhead costs from gross farm income. Earnings before interest and tax is sometimes referred to as operating profit and is the return from all the capital used in the business.

Net farm income

This income is EBIT minus interest and lease costs and is the reward to the farmer's own capital. Interest and lease costs are viewed as financing expenses, either for borrowed money or leased land that is being utilised.

Net farm income is then used to pay tax and what is remaining is net profit or surplus and therefore growth, which can be invested into the business to expand the equity base, either by direct reinvestment or the payment of debt.

Return on total assets and return on equity

Two commonly used economic indicators of whole farm performance are RoTA and RoE. They measure the return to their respective capital base.

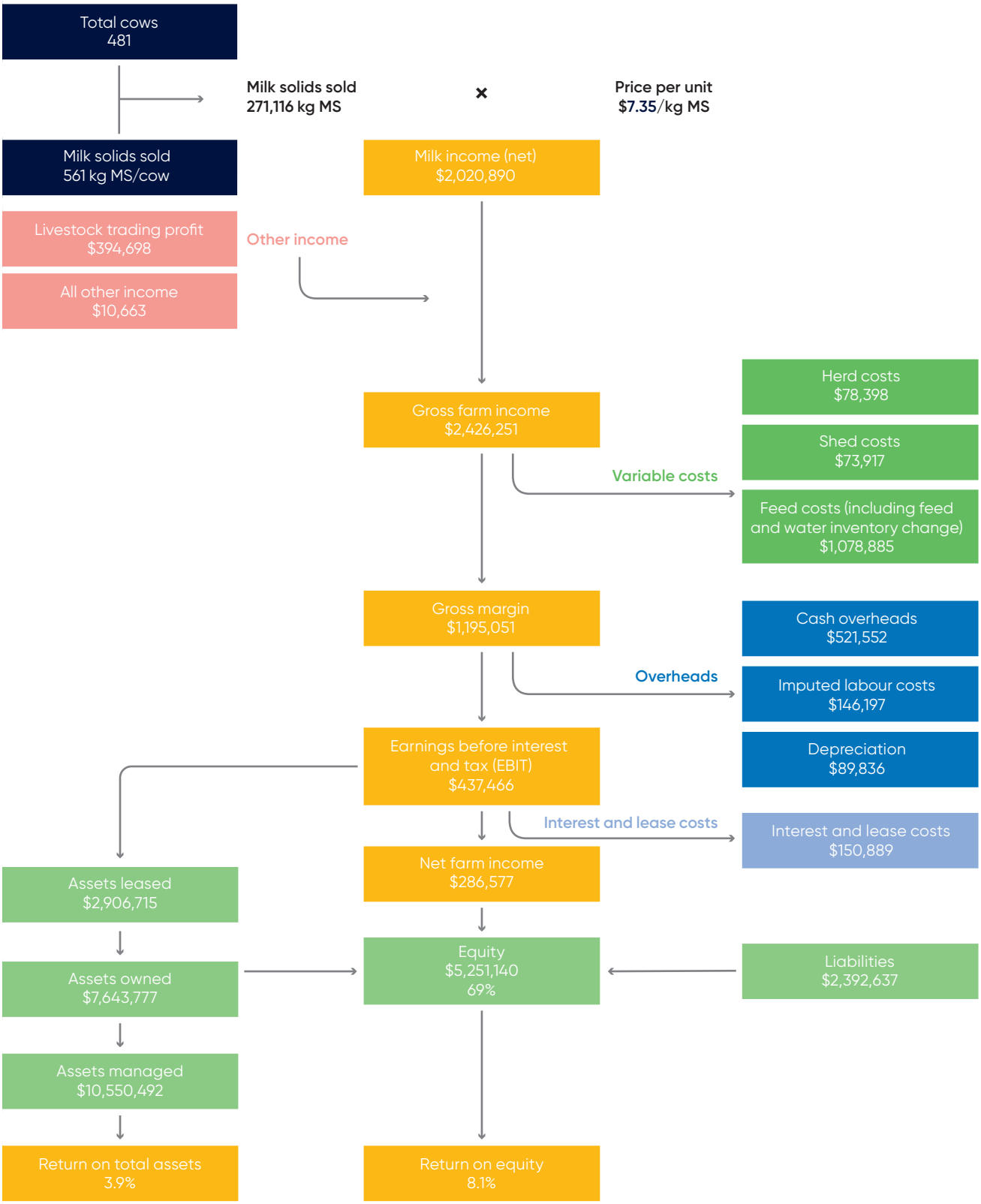
Return on total assets indicates the overall earning of the total farm assets, irrespective of capital structure of the business. It is EBIT expressed as a percentage of the total assets under management in the farm business, including the value of leased assets. RoTA is sometimes referred to as return on capital.

Earnings before interest and tax expressed as a RoTA is the return from farming. There is also a further return to the asset from any increase in the value of the assets over the year, such as land value. If land value goes up 5% over the year, this is added to the return from farming to give total return to the investment. This return to total assets can be compared with the performance of alternative investments with similar risk in the economy. In Figure 1, total assets are visually represented by debt and equity. The debt: equity ratio or equity per cent of total capital varies depending on the detail of individual farm business and the situation of the owners, including their attitude towards risk.

Return on equity measures the owner's rate of return on their own capital investment in the business. It is net farm income expressed as a percentage of total equity (one's own capital). The DFMP reports RoE without capital appreciation. The RoE is reported in Appendix Table A1.

Figure 2 Dairy Farm Monitor Project method profit map – state average 2019/20 data*

All 25 farms



*Profit map adapted from Queensland Dairy Accounting Scheme – 2010 with permission from Ray Murphy, Department of Agriculture, Fisheries and Forestry, Queensland

Western Australia overview

WA produced approximately 4.3%, or 364 million litres, of the Australian milk production in 2019/20. Milk production in Western Australia remained stable in 2019/20, reflecting constant domestic demand conditions. The national milk production remained stable at 8.8 billion litres.

During 2019/20 there remained a significant range in prices received for milk in the WA industry. Processor payments are now targeting summer milk with pricing incentives as well as some premium and penalties for components. As a result, the level of production across the season is very consistent with a peak:trough ratio of 1.7.

The WA dairy industry is located in the higher rainfall (>750 mm) coastal region of the south west and south coast of the state. Land values in the south west are generally higher than the south coast reflecting greater land use competition from industries such as viticulture and lifestyle pursuits.

The WA dairy region has a Mediterranean climate with consistent winter rainfall and hot dry summers. WA has a ryegrass pasture-based production system based on rain-fed annuals on dryland farms and irrigated perennial pastures or summer crops on farms with irrigation. These pasture-based systems are supplemented with a range of feeds including concentrates, silage and hay at levels ranging from low input to high input farms.

The farms participating in this project were located from Waroona in the north through to Denmark/Albany in the south with a good distribution of dryland and irrigation systems and varying herd size.

WA milk continues to be recognised for its high quality, with five WA farms being in the top 100 nationally, based on bulk milk cell count, also consistent with the level of national milk supply produced by this state.

2019/20 seasonal conditions

Drier winter, spring conditions prevailed throughout 2019, with average 2020 autumn rainfall across all WA dairy regions. The critical month of September recorded only 53% of average rainfall.

The total rainfall in 2019/20 was drier than the long term average for the majority of participants, with only three respondents receiving close to their average.

Participant farms received an average of 727 mm rainfall, 23% less than the long term average of 940 mm. However, one farm received only two-thirds of their long-term average annual rainfall.

For most farms the month in which the rain falls is generally more important. Figure 4 shows the average monthly rainfall pattern compared to the long term annual average.

The September of 2019 was again very dry with the majority of farmers very anxious. Good October rains meant they were relatively happy with fodder production. The autumn of 2020 was in contrast with recent years, as can be seen with the average rainfall amounts in April, May and June (Figure 4). For farms on the west coast there was a good opening rain in late March with average follow up rains enabling good early pasture growth.

In general, summer conditions were mild with little rainfall activity in providing little relief for irrigators. The early autumn break meant pastures established well and grazing was able to take place earlier than in past years. This reduced the amount of concentrate fed to cows by 300kg/cow.

Figure 3 2019/20 annual rainfall

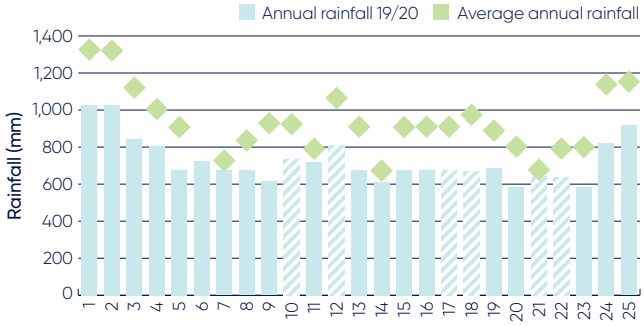
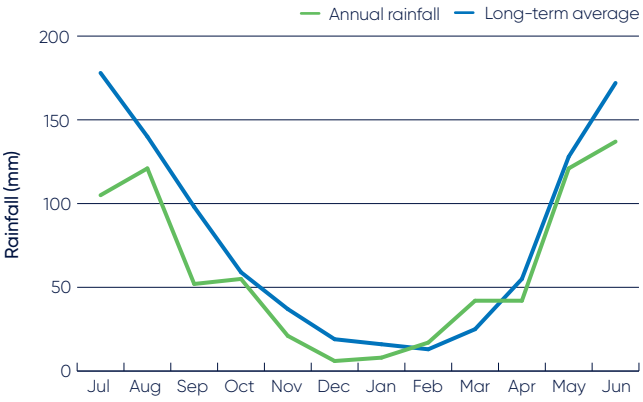


Figure 4 Monthly average rainfall (all farms)



WHOLE FARM ANALYSIS

The 2019/20 year has produced the second poorest business performance since the inception of the project seven years ago, but an improvement on last year. With only a small decrease in production (3%), an improved milk price (4%) and a reduction in the amount of concentrate fed (10%), margins were improved. All farming businesses returned a positive EBIT and consequent positive RoA.

The 25 participant farms represented 17% of the Western Australian dairy industry in terms of number of farms, however it represents 26% of milk volume. However, there is a large range of farming systems, calving patterns and herd size across the participant farmers, so care is required when interpreting averages.

There was one new entrant, and two re-entries into the project so conclusions cannot be drawn from changes in averages, particularly when trying to determine whole farm analysis.

An interesting feature of this year's data is the difference that has emerged between the profitability of dryland and irrigated farms. This year the dryland farms had a very similar cost of production and EBIT with a lower milk price (24¢/kg MS), but a higher livestock trading profit (34¢/kg MS).

The average herd size of 481 cows was very close to previous years supporting the consistent participation of the similar size businesses as well as most businesses in a static production profile.

The average labour efficiency continued to be around 46,000kg MS/FTE. This figure is generally less than most other dairy regions, particularly the exporting ones. This is a function of a greater proportion of livestock trading in the WA dairy businesses and less access to contractors so each business does a lot more operational tasks 'in house' (e.g. seeding, spraying, fodder making etc).

Table 1 presents a summary of the average physical parameters of the 25 participant farms. Further details can be found in Appendix Table 2 for individual farms.

While the average herd size (number of cows milked for at least three months) was 481 there was a wide range in herd size from 190 to 1,440 cows with two farms milking more than 1,000 cows.

The top 25% participants were, in general, characterised by a larger herd size, larger farm size, lower cost of production, higher milk solids per cow and per hectare and greater labour efficiency compared to the average. They also had a higher milk price and livestock trading profit which gave them a much greater net farm income (more than 400%).

Table 1 Farm physical data

Farm physical parameters	State average	Q1 to Q3 range	Top 25% average
Annual rainfall 2019/20 (mm)	727	666–806	693
Herd size	481	290–570	627
Total water use efficiency (t DM/100mm/ha)	0.7	0.5–0.8	0.7
Total usable area (ha)	582	287–640	647
Milking cows per usable hectares	0.9	0.7–1.0	1.1
Milk sold (kg MS/cow)	561	517–596	578
Milk sold (kg MS/ha)	507	371–574	626
Home-grown feed as a per cent of ME consumed	61	58–66	57
Labour efficiency (cow/FTE)	82	71–90	97
Labour efficiency (kg MS/FTE)	45,809	36,491–53,709	54,688

Financial measures

Gross farm income

Gross farm income includes all farm income from milk sales, livestock trading profit and other farm income.

Figure 5 shows the income generated this season. Milk is the dominant income stream providing 84% of income, with the remainder coming from livestock trading profit. It is important to remember that this is the third season that livestock trading profit provides a 'truer' picture than previously, whereby dairy steers that remained on property were sold out internally. Across the participating farms, income from sources other than milk accounted for 15% of gross farm income, but ranged from 8% to 27%.

The majority of the income from other sources is derived from higher livestock trading profit on many WA dairy farms compared to other dairy states. This is a combination of many farms choosing to rear extra heifers for export or replace an aging herd structure plus rearing steer calves to sell as part of their value-add enterprise.

The average milk income received this season was $7.35/kg MS (52.3¢/L) with a range from $6.76 to $8.24kg/MS (47.7–57.9¢/L) This variation, whilst still large, was reduced from $1.79 to $1.48kg/MS compared to the previous year.

The top 25% performers received an average milk price of $7.51/kg MS (53.3¢/L) with 83% of gross income coming from milk sales.

Average gross farm income in 2019/20 was $8.74/kg MS (52.2¢/L) and $9.08/kg MS (64.9¢/L) for the top 25%.

By comparison, the participants in 2018/19 had an average gross farm income of $8.25/kg MS (59.3¢/L) and $8.96 (64.5 ¢/L) for the top 25% performers.

Due to confidentiality reasons the individual milk price is not presented in the appendix tables. However the average and top 25% income metrics can be seen in greater detail in Table 2 and Appendix A1.

Variable costs

Variable costs (Figure 8) are those that change directly according to the amount of output and are measured in cost per kilogram of milk solids. Variable costs include herd, shed and feed costs.

The average variable cost of all participant farms was $4.41/kg MS (31.4¢/L). The range was from $3.29/kg MS to $6.52/kg MS (25.3¢/L to 42.1¢/L). The average variable cost was very similar to last year's average of $4.40/kg MS (31.6¢/L). The top 25% had lower variable costs than the average of all participant farms at $4.08/kg MS (29.2¢/L).

Feed costs were the major variable cost accounting for 88% of total variable costs and 53% of total costs. The top 25% of farms' feed costs were $3.58/kg MS (25.6¢/L), 7% less than the average of $3.86/kg MS (27.5¢/L).

Imported feed decreased slightly to 39% of whole farm metabolisable energy fed, compared to 40% last year. At the same time, concentrate costs increased by 4% to an average of $507/t. The price of purchased concentrate ranged from $359/t DM to $641/t DM. The average home-grown feed was $139/t DM with the range being $69/t DM to $259/t DM.

The top 25% purchased concentrates on average for $485/t DM and it cost them $158/t DM for home-grown feed.

The percentage breakdown of the variable costs can be found in Appendix Table A6.

Overhead costs

The calculation of overhead costs in the Dairy Farm Monitor project consists of cash and non-cash costs to the dairy business. Examples of cash overheads include rates, insurance and employed labour, and non-cash overheads include depreciation of plant and machinery and imputed owner/operator and family labour.

Figure 6 further highlights the variation in overhead costs between participant farms with values ranging from $1.95/kg MS to $4.14/kg MS (14.9¢/L to 28.9¢/L). The top 25% recorded lower overhead costs at $2.42/kg MS (17.3¢/L) compared to the average of $2.89/kg MS (20.6¢/L).

Labour costs, including employed and imputed labour, were the major overhead cost, accounting for 59% of total overhead costs and 23% of total costs. Repairs and maintenance and depreciation increased another 12% from the previous year.

The breakdown of overheads cost as expressed in $/kg MS and as a percentage of total costs for individual farms can be found in Appendix Tables A5 and A7, respectively.

Cost of production

This gives an indication of the average cost of producing a kilogram of milk solids. It is calculated as variable plus overhead costs and accounts for changes in fodder and livestock inventory. Including changes in fodder inventory is important to establish the true costs to the business. The changes in fodder inventory count for the net cost of feed from what was fed out, conserved, purchased and stored over the year. Livestock trading is also considered in the cost of production. Where there is a decrease in the value of livestock due to reduced stock numbers, or value, then this represents a cost to the business. An increase in value or retention of more young stock due to natural increase, rather than through purchases, will lead to a negative cost as there has been a growth in the assets and this change is captured as a negative cost.

Table 3 shows that the average cost of production (with inventory changes accounted for) was $7.31/kg MS (52.0¢/L)and the top 25% was $6.48/kg MS (46.4¢/L).

The average cost of production of the top 25% was 11% lower than the average for participant farms with all costs (except home-grown feed cost) being equal to or lower than the average. The top 25% allocated less dollars to hay and silage making, concentrate, other overheads and depreciation costs than the average (combined 3.6¢/L). The majority of costs were in line with last year, except for purchased feed and agistments (down 1.5¢/L) due to the improved seasonal conditions. Having a low cost of production is one key determinant of being a top 25% producer in most cases.

Earnings before interest and tax

Earnings before interest and tax (EBIT) is the gross farm income less variable and overhead costs. As EBIT excludes interest and lease costs, it is a valuable measure of operating profit. Figure 7 shows the EBIT per kg MS.

The average EBIT for 2019/20 was $437,466 per farm, up from $353,193 per farm in 2018/19, noting some participant changeover this year.

On average, EBIT per kg MS increased more than 24% to $1.44/kg MS (10.3¢/L) in 2019/20 from $1.16/kg MS (8.4¢/L). The increase in EBIT is a reflection of the better autumn break and the reduced amount of concentrate used. The lower EBIT recorded during the project is 31% down compared to the highest level recorded in 2015/16 (Figure 25).

The top 25% performers also improved profitability with EBIT increasing 10% to $2.58/kg MS (18.4¢/L), although the margin is more than double that of the average. This meant they were able to retain 28% of their gross farm income compared to only 16% for the average.

Figure 5 Gross farm income ($/kg MS)

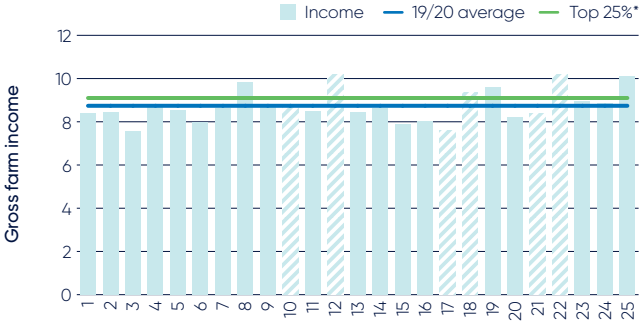


Figure 6 Whole farm variable and overhead costs

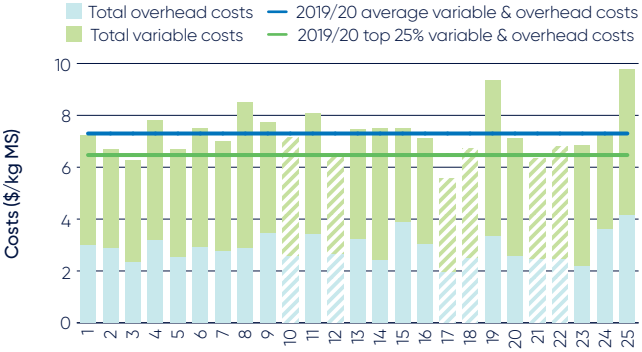
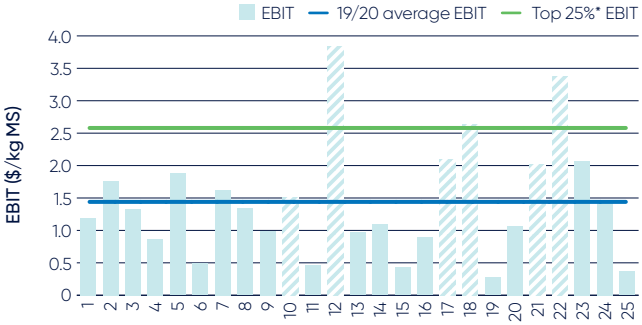


Figure 7 Whole farm EBIT ($/kg MS)



Having a low cost of production is one key determinant of being a top 25% producer in most cases

Table 2 Average farm financial performance

Farm costs	Average	Q1 to Q3 range	Top 25% average
Income	**$ kg/MS**	**$ kg/MS**	**$ kg/MS**
Milk income (net)	7.35	7.07–7.61	7.51
Livestock trading profit	1.34	0.9–1.83	1.53
Other farm income	0.00	0.01–0.08	0.00
Total income	8.74	8.35–8.89	9.08
Variable costs			
Herd cost	0.27	0.2–0.33	0.27
Shed cost	0.28	0.2–0.33	0.24
Home-grown feed cost	1.41	1.16–1.63	1.42
Purchased feed and agistment	2.56	2.12–2.82	2.28
Feed inventory change	-0.10	-0.21–0	-0.11
Water inventory change	0.00	0–0	0.00
Total feed costs	3.86	3.45–4.09	3.58
Total variable costs	4.41	3.91–4.63	4.08
Gross margin			
Per kilogram of milk solids	4.33	3.91–4.47	5.00
Overhead costs			
Employed labour	0.99	0.69–1.23	1.04
Repairs and maintenance	0.51	0.31–0.66	0.50
All other overheads	0.33	0.25–0.4	0.28
Imputed labour	0.71	0.36–1.01	0.33
Depreciation	0.35	0.25–0.43	0.27
Total overhead costs	2.89	2.49–3.21	2.42
Variable and overhead costs	7.30	6.73–7.51	6.50
Earnings before interest and tax			
Per kilogram of milk solids	**1.44**	**0.89–1.88**	**2.58**

Table 3 Cost of production

Farm costs ($/kg MS)	Average	Q1 to Q3 range	Top 25% average
Cash cost of production	6.35	5.82–6.66	6.02
Cost of production (excl. inventory changes)	7.40	6.82–7.69	6.62
Inventory change			
+/- feed and water inventory changes	-0.10	-0.21–0	-0.11
+/- livestock inventory changes minus purchases	0.01	-0.16–0.18	-0.02
Cost of production (incl. inventory changes)	7.31	6.56–7.85	6.48

Figure 8 Distribution of farms by return on total assets (%)

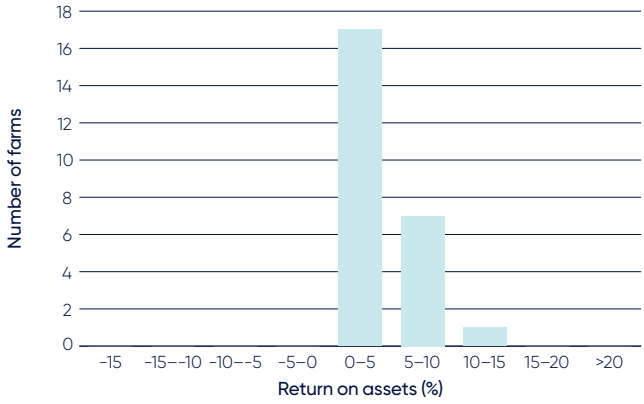


Figure 9 Return on total assets (excl. capital appreciation)

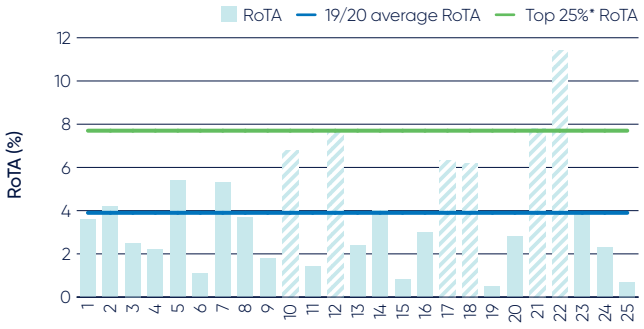


Figure 10 Distribution of farms by return on equity

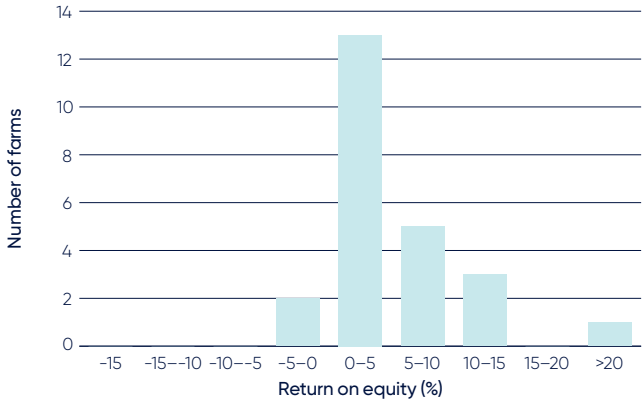
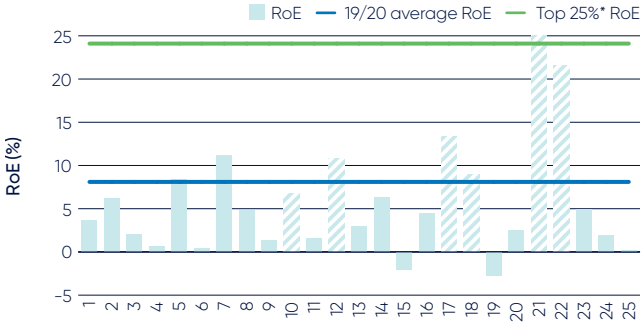


Figure 11 Return on equity



Return on total assets and equity

Return on total assets is EBIT expressed as a percentage of total assets under management. It is an indicator of the overall earning power of total assets, irrespective of capital structure.

The average RoTA for participants was 3.9%, up from last year's 3.2% ranging from 0.5 to 11.4% (Figure 8). 36% of participants recorded a RoTA higher than 5%, compared to 22% last year and 62% two years ago. Four farms achieved a RoTA greater than 10%, compared to one in 2018/19.

Figure 8 to Figure 11 were calculated excluding capital appreciation.

It is of interest to note that the two farms with largest RoE are heavily skewing the average. If these two were removed from the data set then the average would be almost halved to 4.3%

Return on equity is the net farm income expressed as a percentage of owners equity. It is a measure of the owner's rate of return on their investment. The average return on equity for the 25 farms was 8.1% in contrast to 4.4% last year. RoE ranged from -2.7% to 83%, with the top 25% recording an RoE of 24.1%. There were two participants (8%) that recorded a negative RoE down from nine last year.

It is of interest to note that the two farms with largest RoE are heavily skewing the average. If these two were removed from the data set then the average would be almost halved to 4.3%. This figure, whilst improved, is indicative of the current mood in the industry and the lack of willingness to invest. Appendix Table A1 presents all the return on total assets and return on equity for the participant farms.

Risk

"Risk is conventionally classified into two types: business risk and financial risk. Business risk is the risk any business faces regardless of how it is financed. It comes from production and price risk, uncertainty and variability. 'Business risk' refers to variable yields of crops, reproduction rates, disease outbreaks, climatic variability, unexpected changes in markets and prices, fluctuations in inflation and interest rates, and personal mishap. 'Financial risk' derives from the proportion of other people's money that is used in the business relative to the proportion of owner-operator's capital..."[1]

As most farms use a mix of borrowed and owned capital, they are generally exposed to both business and financial risk. It is important to understand that risk drives return, and achieving the right rate balance between risk and return can drive success.

Table 4 presents some key risk indicators. Refer to Appendix E for the definition of terms used in Table 3. These indicators can also be found in Appendix Tables A1, A3 and A8.

Six farms (24%) in the project relied on <30% of imported feed for the herd's feed requirement. With an average of 39% of feed imported, WA dairy farms are exposed to fluctuations in prices and supply in the feed market. The percentage of imported feed ranged from 19% to 77%.

The cost structure ratio provides variable costs as a proportion of total costs. A lower ratio implies that overhead costs comprised a greater proportion of total costs which in turn indicates less flexibility in the business. Table 4 shows that across the state for every $1.00 spent, 61 cents was used to cover variable costs. This figure is very consistent across years.

The debt services ratio shows interest and lease costs, as a proportion of gross farm income. This year's ratio of 6% indicates that on average farms repaid 6 cents of every dollar of gross farm income to their creditors, again a very consistent figure.

Equity levels averaged 69% up from 68% last year. Debt per cow rose by $56/cow which means it has risen $1294/cow or 39% in the last three seasons.

The benefit of taking risks and borrowing money can be seen when farm incomes yield a higher return on equity than on their return on assets. In 2019/20, 16 of the 25 participant farms (64%) received a return on equity greater than their return on assets, up from 56% last season. When the percentage of RoE increases compared to RoTA, it is the result of a higher return from the additional assets than the interest or lease rate.

Table 4 Risk indicators – state-wide

Cost structure	61%
Debt service ratio (% of income as finance costs)	6%
Debt per cow	$4,525
Equity percentage (ownership of total assets managed)	69%
Percentage of feed imported (as % of total ME)	39%

1 Malcolm, L.R., Makeham, J.P. and Wright, V. (2005), *The Farming Game:, Agricultural Management and Marketing*, Cambridge University Press, New York. p180

PHYSICAL MEASURES

There are a wide range of farming systems that exist in the WA dairy industry. The average WA dairy produces milk from roughly equal portions of grass, fodder and grain with 61% of the diet coming from home-grown feed.

However the systems vary in terms of cow type, feedbase, stocking rate and production levels and are underpinned by quite varying feed inputs. Participant farms sourced 40% of their metabolisable energy from directly grazed pasture (range 18–62%) and concentrates provided 35% of ME (range 16–52%). The other main supply of energy was from silage (16%) and hay (8%).

Milk solids sold

There was a large variation in the amount of milk solids sold per usable hectare with a range of 306kg MS/ha to 991kg MS/ha reported, with the average being 507kg MS/ha (Figure 12).

The top 25% of farms sold an average of 626kg MS/ha 23% more than the average of all WA participants. This is a consistent trend mainly driven by stocking rate (30% higher) rather than production per cow (578kg MS vs. 561kg MS). The top 25% typically portion a higher amount of land to milking area. Couple this with better grazing management and this highlights the better management of resources that the top operators achieve.

The average kilograms of milk solids sold per cow remained stable at 561kg MS/cow (7,884 L/cow), and ranged between 408kg MS/cow and 704kg MS/cow (5,859–10,253L/cow). The top 25% had an average per cow production of 578kg MS/cow in 2019/20.

Milk sales versus calving pattern

Figure 13 shows the average milk sales for all participant farms against the monthly distribution of calves born.

Average monthly distribution of milk production in WA reflects the cost of producing milk in a Mediterranean climate (hot dry summers and mild wet winters) together with processors' requirement for a flatter milk supply for the liquid milk market.

Peak milk production is in spring when pasture growth is greatest and conversely milk production is lowest in summer when reliance on supplements and irrigation is greatest. This is reflected in a peak to trough ratio of 1.7; with 9.2% of annual milk produced in October compared to 7.0% in February.

Most participants in the DFMP have a split calving pattern being spring and autumn. This can be seen in the shape of the curve with two distinct 'bumps' in August/September and February/March. Another small increase of calving can be seen in November where some attempt to capture the summer premiums. 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.

Interestingly the irrigation farms produce 23% of their milk in summer with dryland farms similar at 21%.

The 25 participant farms calved 26% of their cows in August to October and another 37% in February to April. There is a slight shift to more autumn calving which could be a result of the milk price signals for summer milk.

Figure 12 Variable and overhead costs per kg of milk solids

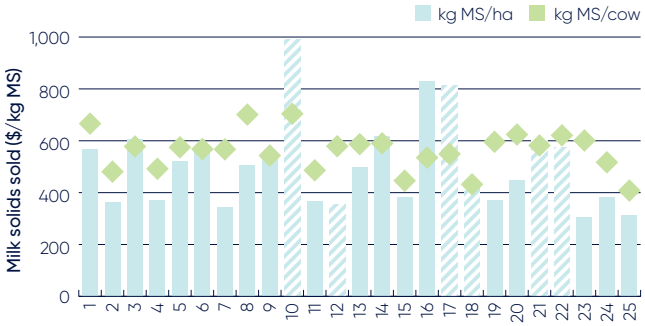
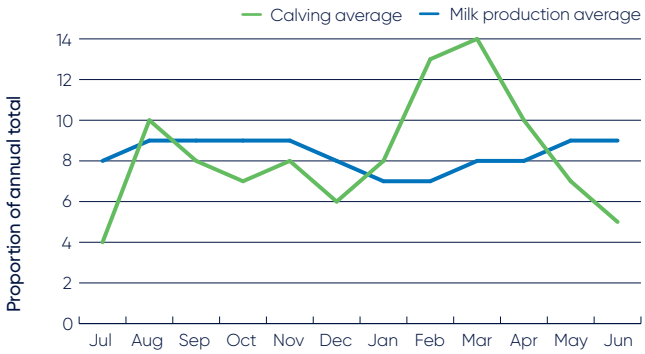


Figure 13 Monthly milk production and calving



Feed consumption

Pasture consumption is calculated as the gap between the total energy required on farm for all livestock classes and the energy provided from concentrates, silage, hay and other sources. A further description of the energetics method used to calculate energy sources and feed consumption can be found in the Appendix B.

A cow's diet can consist of grazed pasture, harvested forage, crops, concentrates and other imported feeds.

In 2019/20, 60% of the diet metabolisable energy is supplement based; with grazed pasture the major component of the cows' diet at 40% (Figure 14).

Concentrates supply the greatest proportion of ME of all the supplements fed, accounting for 35% of the diet, a similar figure to last year. These ratios were very consistent with last year where the diet consisted of 41% grazed pasture, 35% concentrate, 16% silage and 8% hay providing the energy. Appendix Table A3 provides further information on purchased feed.

Grazed pasture consumption was estimated by using a back calculation method embedded in DairyBase.

Home-grown feed can be grazed pasture (shown in blue in Figure 15) and conserved pasture (shown in green).

The average total pasture harvested (grazed and conserved) from the milking area was 5.6t DM/ha, similar to last year's 5.8 t DM/ha. The amount of pasture consumed as directly grazed feed on the milking area this year averaged 4.2 t DM/ha, ranging from 1.2 t DM/ha to 7.0 t DM/ha. This average was consistent with last year with the same amount of pasture in the diet.

Pasture harvested on the usable area was again 5.1 t DM/ha in 2019/20, and ranged from 3.2 t DM/ha to 8.3 t DM/ha.

The usual gap that exists with the top 25% with higher grass consumption across all the usable area (0.5t DM/ha), as well as the milking platform (1t DM/ha). Top businesses understand that the land is a resource, and managing all the pasture well is essential to lower the cost of production. The short growing season makes it difficult for all operators to actively manage resources.

There can be a number of sources of error in this method including incorrect estimation of liveweight, amounts of fodder and concentrates fed, ME concentration of fodder and concentrate, ME concentration of pasture, wastage of feed and associative effects between feeds when they are digested by the animal. Comparing pasture consumption estimated using the back calculation method between farms can lead to incorrect conclusions due to errors in each farm's estimate. It is best to compare pasture consumption on the same farm over time using the same method of estimation.

More details on how pasture consumption was calculated can be found in Appendix B.

Figure 14 Sources of whole farm ME

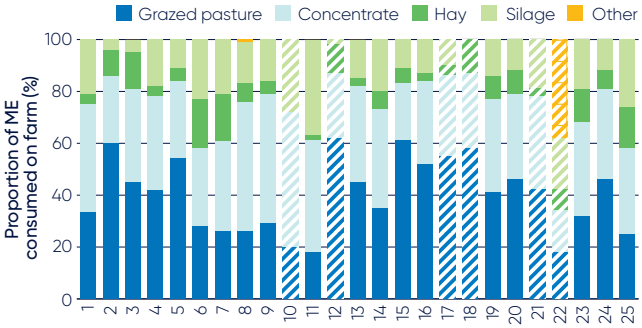


Figure 15 Estimated tonnes of home-grown feed per milking ha (t DM/ha)

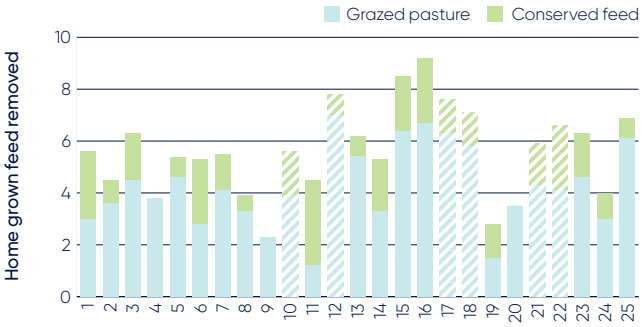


Table 5 Fertiliser application per hectare (kg/ha)

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Nitrogen	89	97	109	111	115	124
Phosphorus	14	16	14	19	15	17
Potassium	38	41	38	41	40	44
Sulphur	29	28	28	29	29	28

Fertiliser application

Application of total nutrients between participant farms has steadily increased since the start of the project in 2013/14, but driven mainly by increases in nitrogen application.

The total nutrient use this year was 199kg/ha comprising of 115kg/ha nitrogen, 15kg/ha phosphorus, 40kg/ha potassium and 29kg/ha sulphur (Table 5).

Water availability, pasture species, soil type, pasture management, seasonal variation in response rates to fertilisers, variations in long-term fertiliser strategies plus other factors will all influence pasture growth and fertiliser application strategies. These particular strategies are not captured as part of this project.

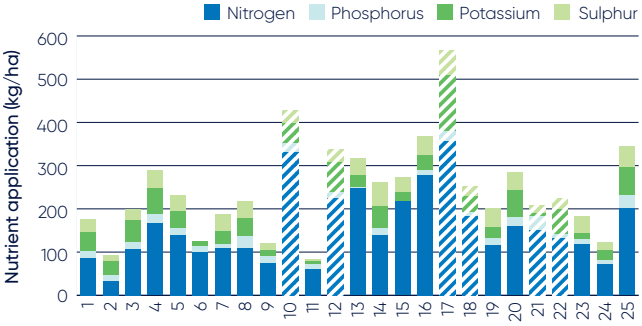
WA participant farms used a wide range of fertilisers and fertiliser application rates, both between farms and with the mix of key macronutrients on individual farms.

Nitrogen applied varied from 23kg N/ha up to 305kg N/ha, with the group average at 124kg N/ha (Figure 16). Farms in the top 25% applied slightly more (15%) fertiliser than the average but the variation was a lot smaller than in previous years. The main nutrients of significant variation was 31% more nitrogen applied than the average user.

Grazing strategies and timing of rainfall and irrigation scheduling will also impact upon pasture growth and consumption. The values for Figure 16 can be found in Appendix Table A2.

The main nutrients of significant variation was 31% more nitrogen applied than the average user

Figure 16 Fertiliser application per milking ha



Business confidence survey

Expectations and issues

Responses to this business confidence survey were made from July to September 2020 with regard to the 2019/20 financial year and the next five years.

Expectations for business returns

Following improved milk and livestock prices and a normal autumn break, the business confidence was seriously improved during the survey period. Terms of trade have improved for the past 12 months which gives some context to the results. Expectations for the coming season remained more optimistic with 72% of farmers predicting an improvement in farm business returns compared to 27% last year. The expectations of production stability increased from 54% to 64% whilst 80% of businesses expecting decline in purchased feed costs.

Responses to the survey took into consideration all aspects of farming including climate and market conditions for all products bought and sold.

The respondents expectations for a similar or improved business return in 2019/20 were a lot higher than last year (Figure 17). This is primarily driven by the reduction in feed prices, very good winter production and improved income levels. Cautious optimism, with a desire to remain stable rather than progress, was a common theme.

Price and production expectations – milk

The majority of respondents expected their price to increase and production to remain stable. The continued higher cost of production, and the expectations that current supply and demand will remain stable is the reasoning.

Whilst the expectations on production were more balanced only 12% were expecting to decrease their production. 64% of respondents would maintain their production level with 24% expecting a increase (Figure 18).

Production expectations – fodder

The question on farmers' expectations of fodder price was not asked in this year's survey, however expectations for fodder production were captured.

60% of participating farmers expected an increase in their level of fodder production in 2019/20 (Figure 19).

Only 4% indicated that they expected a decrease in their fodder production for the coming year, not surprising given the current high cost market conditions for fodder, and the favourable winter conditions.

Figure 17 Expectation of business returns

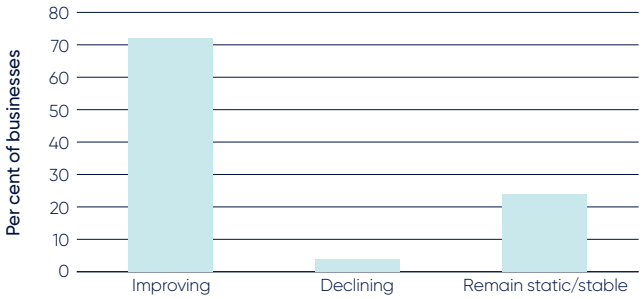
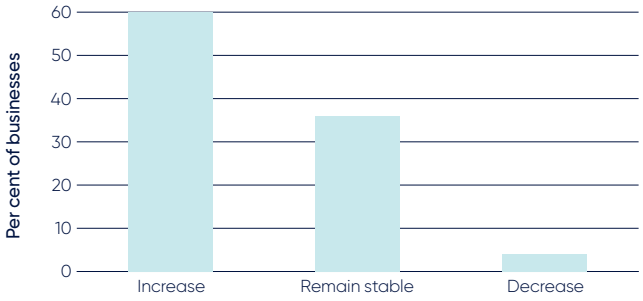


Figure 18 Price and production expectations – milk

Figure 19 Producer expectations – fodder



Major issues in the dairy industry – the next 12 months

The participants were asked to consider seven issues as identified in Figure 21, and to rank them based on the level of importance to their business for the upcoming year. They were asked to rank the issues from 1 to 7, with 1 being the most important, and 7 being the least important. They were also given the opportunity to identify other issues of importance to their business.

Figure 21 and 22 highlight that the trends for the next 12 months are perceived to be similar for the next 5 years. The great majority (63%) of the respondents identified milk price as the most important issue they are facing in the short term (next 12 months) and long term (53%). This is not surprising given the increase in cost of production and lower profit seen across the state in recent years. With low rainfall in the previous two autumns, and the 'shaky' springs, farmers commented that the impact of seasonality and growth of pasture and fodder, as the next issues that are all interlinked with input costs. Water, labour and succession planning were less important issues in the short term in this survey as seen in previous years.

There were numerous comments from farmers about the impact of an autumn break on confidence. Some farmers commented that the high cost of production and seasonal volatility felt tiring and relentless and was affecting their morale and that of their families. Others said that after a reliable autumn break they were looking forward to a good spring to replenish fodder supplies.

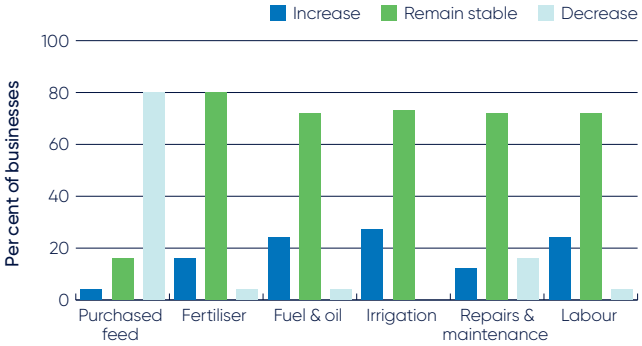
Cost expectations

There was little expectation of costs to decrease across the major cost categories, except purchased feed. The majority (80%) expect a decrease in purchased feed costs due to the high grain prices and the improved seasonal conditions, (Figure 20).

Eighty per cent thought that the fertiliser would remain stable and 72% thought the rest of costs would remain unchanged. This is not surprising as these commodities move in price when the grain market is moving. The expectation that grain price will retreat gives logic to the fertiliser and fuel remaining constant.

Due to the continued high cost of grain, and predicted water restrictions, there will be a greater focus on cost effectively utilising water this season. There has been a shift in the expectations around labour with most businesses expecting cost to remain stable rather than increase.

Figure 20 Cost expectations



*Dataset includes 12 farms with irrigation

Figure 21 Major issues facing the dairy industry – 12-month outlook

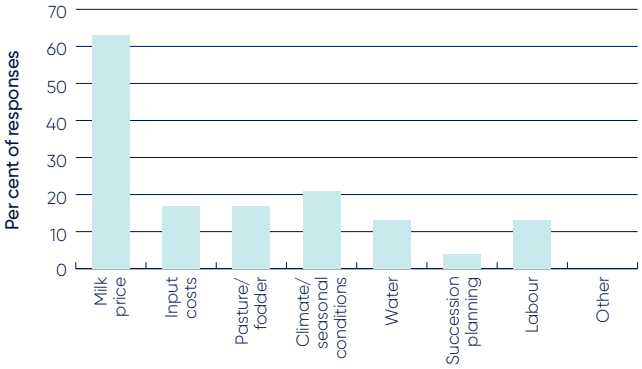
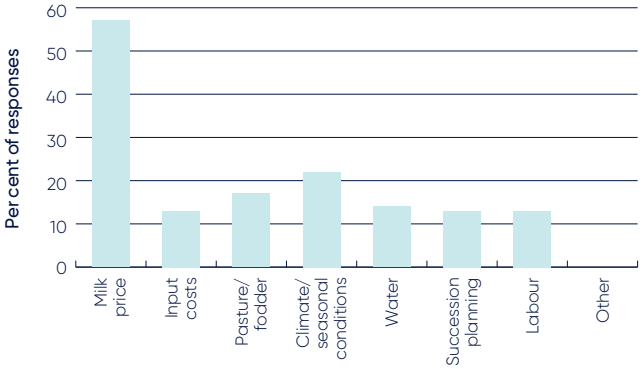


Figure 22 Major issues facing the dairy industry – 5-year outlook



Greenhouse gas emissions

The average level of emission from participating farms was 15.0 t CO_2-e/t MS in 2019/20, very similar to last year's 14.8 t CO_2-e/t MS. Each of the three main gases responsible for emissions, methane, carbon dioxide and nitrous oxide were calculated for each farming participant.

Carbon dioxide equivalents (CO_2-e) are used to standardise the greenhouse potentials from different gases. The Global Warming Potential (GWP) is the index used to convert relevant non-carbon dioxide gases to a carbon dioxide equivalent. This is calculated by multiplying the quantity of each gas by its GWP. All of the data in this section is in CO_2-e tonnes and expressed per tonne of milk solids produced (CO_2-e/t MS).

In 2016 the method of estimating Australia's dairy industry greenhouse gas emissions (NGGI) altered to reflect new research outcomes and align with international guidelines. The GWP for the three gases that are discussed in this report have altered to 1: 25: 298 (CO_2: CH_4: N_2O). This means that one CO_2-e tonne equates to 40kg of methane (CH_4) and 3.4kg of nitrous oxide (N_2O). Other changes have included a decrease in the proportion of waste (dung and urine) deposited onto pastures while the milking herd graze, resulting in an increase in waste CH_4 and N_2O emissions along with some changes to the emission factors for N_2O emissions from nitrogen fertiliser and animal waste.

In addition, the estimation of greenhouse gas emissions now include a pre-farm gate emission source. This is the greenhouse gases emitted with the manufacturing of fertilisers and the production of purchased fodder, grain and concentrates. The result of these changes with the NGGI method and inclusion of pre-farm gate emissions will be an increase in emissions intensity of around 30%. This percentage increase will vary between farms in the state.

The distribution of different emissions for 2019/20 is shown in Figure 23. Greenhouse gas emissions per tonne of milk solids produced ranged from 12.6 CO_2-e/t MS to 19.3 t CO_2-e/t MS with an average emission level of 15.0 t CO_2-e/t MS. The percentage breakdown for emissions in 2019/20 was 62% for CH_4, 23% for CO_2, and 13% for N_2O emissions.

Methane was identified as the main greenhouse gas emitted from dairy farms, accounting for 63%, or 9.4 t CO_2-e/t MS, of all greenhouse emissions. There are two main sources of CH_4 emissions on farm: ruminant digestion and anaerobic digestion in effluent management systems. Methane produced from ruminant digestion is known as enteric CH_4 and was the major source of emissions from all farms in this report, with an average of 54% of total emissions. Methane from effluent ponds accounted for 8% of total emissions on average across the state in 2019/20.

The most efficient strategy to reduce enteric CH_4 production is manipulating the diet by increasing the feed quality through improved pastures or supplementation with particular concentrates. Adding fat supplements such as whole cotton seed, canola meal or linseed oil into the diet can also reduce CH_4 emissions. This is a simple and effective method however it is recommended that fats should not constitute more than 6–7% of the dietary dry matter intake.

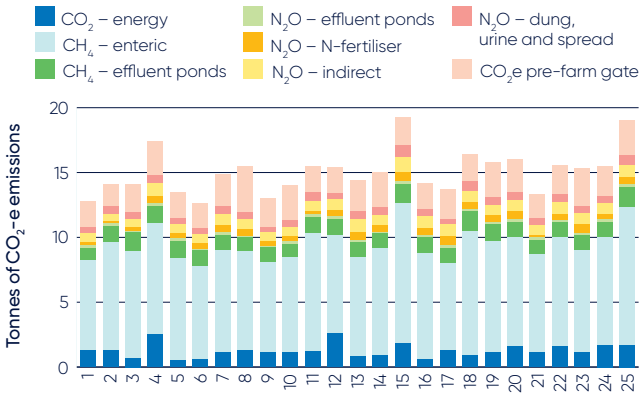
The second main greenhouse gas emission was pre-farm gate being produced primarily from fossil fuel consumption as either electricity or petrochemicals. The NGGI calculates carbon emissions from both pre-farm gates and on-farm sources. Carbon dioxide accounted for 24% of total emissions (3.5 t CO_2-e/t MS); 15% from pre-farm gates sources and 8% from on-farm energy sources. Output levels were highly dependent on the source of electricity used with farms using brown coal generated electricity and electricity sourced from renewable sources (e.g. solar). There are a number of technologies available to improve energy efficiency in the dairy while reducing electricity costs.

The third main greenhouse gas emission was nitrous oxide, accounting for 13% of total emissions or 2.0 t CO_2-e/t MS. Nitrous oxide emissions on dairy farms are primarily derived from direct emissions, including nitrogen fertiliser application, effluent management systems and animal excreta (dung and urine), as well as indirect emissions such as from ammonia and nitrate loss in soils.

Nitrous oxide emissions from fertiliser accounted for 3% of total emissions and excreta accounted for 4%. Nitrous oxide from indirect emissions was 5%. Nitrous oxide emissions are highest in warm, waterlogged soils with readily available nitrogen. Over application of nitrogen, high stocking intensity and flood irrigation are all potential causes of increased nitrogen loss as N_2O. Strategic fertiliser management practices can reduce N_2O emissions and improve nitrogen efficiency.

There is a growing importance to understand and monitor greenhouse gas emissions, and these are likely to become more important into the future. To find detailed information on the Australian National Greenhouse Gas Inventory, strategies for reducing greenhouse gasses and more details on sources of greenhouse gases on dairy farms visit the Australian Department of the Environment's website at **environment.gov.au/climate-change**.

Figure 23 Greenhouse gas emissions per tonne of milk solids produced



Historical analysis

The 2019/20 was an improved year for the WA dairy industry as well as nationally. Continued high feed costs did not help, however an improved autumn break and improved prices has led to improved business performance. In real terms, the EBIT and RoTA for 2019/20 is the second lowest in the projects seven year history. Net farm income and return of equity were also below average figures for the past seven years.

This section compares the performance of participant farms in the Dairy Farm Monitor Project over the past seven years. While figures are adjusted for inflation to allow comparison between years it should be noted that only 12 farms from the initial farms in 2013/14 have participated over all seven seasons with one new farm participating in 2019/20.

The average EBIT and net farm income (NFI) improved on last year but still considerably lower than the period 2014–2018 (Figure 25).

Earnings before interest and tax as well as net farm income improved significantly, 22 and 54% respectively in 2019/20 due to an improved autumn break, leading to a reduction in the amount of concentrate purchased (adjusted for inflation). The current business performance is still below average in terms of RoTA, EBIT, NFI and RoE.

RoTA at 3.9% in 2019/20 has improved in the past 12 months but is still below the remaining five years of results (Figure 26). The farms' positive performance in 2019/20 was primarily due to the reduction in purchased feeds and improved milk and livestock income.

The average RoE improved from 4.4 to 8.1% in 2019/20, whilst the top 25% was a very healthy 24.1%. The top 25% of figures as well as the average was distorted by two participants who had an RoE in excess of 20%.

Figure 24 Historical EBIT and net farm income

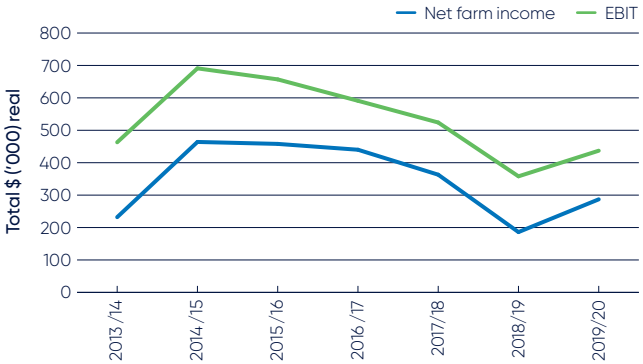
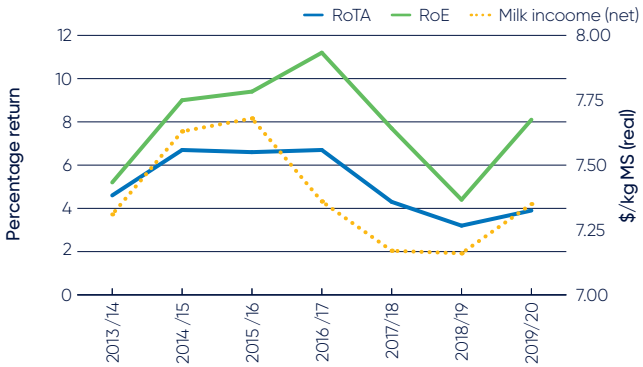


Figure 25 Historical return on assets, return on equity and real milk income



APPENDICES

Appendix A Western Australia 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 & 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	%
1			8.42	4.23	3.00	59	1.19	3.6	0.44	5.2	0.75	3.7
2			8.43	3.78	2.89	57	1.76	4.2	0.96	11.4	0.80	6.2
3			7.58	3.91	2.34	63	1.33	2.5	0.36	4.7	0.97	2.0
4			8.70	4.65	3.18	59	0.87	2.2	0.79	9.1	0.08	0.6
5			8.55	4.17	2.51	62	1.88	5.4	0.23	2.6	1.66	8.4
6			8.01	4.60	2.91	61	0.49	1.1	0.40	5.0	0.10	0.4
7			8.63	4.24	2.77	60	1.62	5.3	0.59	6.8	1.03	11.2
8			9.85	5.64	2.87	66	1.34	3.7	0.40	4.1	0.93	4.8
9			8.70	4.25	3.46	55	0.99	1.8	0.28	3.3	0.70	1.3
10			8.67	4.60	2.56	64	1.51	6.8	0.03	0.3	1.48	6.8
11			8.52	4.64	3.43	58	0.46	1.4	0.15	1.7	0.31	1.6
12			10.25	3.80	2.63	59	3.83	7.6	0.46	4.5	3.37	10.8
13			8.46	4.28	3.21	57	0.97	2.4	0.22	2.6	0.76	2.9
14			8.58	5.09	2.40	68	1.09	4.0	0.44	5.1	0.65	6.3
15			7.91	3.59	3.89	48	0.43	0.8	0.88	11.2	-0.45	-2.0
16			8.02	4.11	3.02	58	0.89	3.0	0.45	5.6	0.44	4.4
17			7.65	3.61	1.95	65	2.09	6.3	0.71	9.3	1.38	13.4
18			9.37	4.25	2.49	63	2.64	6.2	0.51	5.4	2.13	9.0
19			9.61	6.00	3.34	64	0.27	0.5	0.96	10.0	-0.69	-2.7
20			8.19	4.57	2.55	64	1.07	2.8	0.88	10.7	0.20	2.5
21			8.35	3.89	2.45	61	2.01	7.8	0.76	9.1	1.25	83.1
22			10.18	4.36	2.44	64	3.37	11.4	0.40	3.9	2.98	21.6
23			8.89	4.63	2.19	68	2.07	3.9	1.19	13.4	0.88	4.9
24			8.80	3.77	3.59	51	1.44	2.3	1.20	13.7	0.24	1.9
25			10.17	5.66	4.14	58	0.37	0.7	0.27	2.7	0.10	0.2
Average	7.35	1.34	8.74	4.41	2.89	61	1.44	3.9	0.56	6.5	0.88	8.1
Top 25%*	**7.51**	**1.53**	**9.08**	**4.08**	**2.42**	**63**	**2.58**	**7.7**	**0.48**	**5.4**	**2.10**	**24.1**

Table A2 Physical information

Farm number	Milking cows per usable area	Milk sold	Milk sold	Fat	Protein	Est. grazed pasture	Est. conserved feed	Home grown feed	Application				Labour efficiency	
									nitrogen	phosphorous	potassium	sulphur		
	hd/ha	kg MS/ cow	kg MS/ ha	%	%	t DM/ha	t DM/ha	% of ME	kg/ha	kg/ha	kg/ha	kg/ha	hd/ FTE	kg MS/ FTE
1	0.9	666	567	4.0	3.3	3.0	2.6	57	71	22	49	38	72	47,642
2	0.8	481	365	4.0	3.3	3.6	0.9	69	23	15	35	17	64	30,815
3	1.1	578	608	3.7	3.3	4.5	1.8	58	84	14	43	23	93	53,868
4	0.8	492	371	3.7	3.2	3.8	0.0	63	118	18	49	28	70	34,570
5	0.9	575	523	3.9	3.3	4.6	0.8	67	107	14	36	31	90	51,743
6	1.0	568	556	4.3	3.5	2.8	2.5	65	116	27	29	3	76	43,017
7	0.6	567	344	4.2	3.3	4.1	1.4	65	96	12	50	39	64	36,491
8	0.7	701	506	3.8	3.2	3.3	0.6	46	139	43	90	53	71	49,629
9	1.0	543	555	3.7	3.1	2.3	0.0	56	116	15	43	20	101	54,770
10	1.4	704	991	3.7	3.1	3.9	1.7	30	197	25	43	29	85	59,575
11	0.8	486	366	4.0	3.1	1.2	3.3	54	46	10	9	6	84	40,675
12	0.6	579	356	3.9	3.3	7.0	0.8	75	91	16	35	21	93	53,769
13	0.8	587	498	4.2	3.2	5.4	0.8	63	170	16	43	28	80	46,835
14	1.0	590	617	3.8	3.0	3.3	2.0	60	161	16	96	58	82	48,524
15	0.9	446	381	3.8	3.2	6.4	2.1	78	139	14	36	32	64	28,463
16	1.5	535	829	3.7	3.2	6.7	2.5	66	243	8	31	38	59	31,790
17	1.5	549	815	4.1	3.5	6.3	1.3	64	305	14	77	33	121	66,317
18	1.0	432	420	3.8	3.2	5.8	1.3	70	108	13	28	18	124	53,709
19	0.6	596	372	3.8	3.2	1.5	1.3	64	89	12	44	29	55	32,519
20	0.7	624	450	3.9	3.2	3.5	0.0	67	141	20	63	36	79	49,619
21	1.0	582	601	3.9	3.3	4.3	1.6	63	112	27	8	12	84	49,146
22	0.9	621	574	3.8	3.2	4.1	2.5	40	167	6	49	22	73	45,611
23	0.5	601	306	3.7	3.3	4.6	1.7	64	115	11	16	45	104	62,499
24	0.7	517	382	3.8	3.2	3.0	1.0	63	76	8	28	20	78	40,141
25	0.8	408	313	3.8	3.2	6.1	0.8	66	82	17	65	33	82	33,475
Average	0.9	561	507	3.9	3.2	4.2	1.6	61	124	16	44	28	82	45,809
Top 25*	**1.1**	**578**	**626**	**3.9**	**3.3**	**5.2**	**1.5**	**57**	**163**	**17**	**40**	**22**	**97**	**54,688**

*on milking area

Table A3 Purchased feed

Farm number	Purchased feed per milker	Price					% of total energy imported
		Concentrate	Silage	Hay	Other feed	Average purchased feed	
	t DM/hd	$/t DM	$/t DM	$/t DM	$/t DM	$/t DM	% of ME
1	3.1	474	–	462	–	473	43
2	2.2	625	200	227	–	518	31
3	3.3	507	911	379	–	488	42
4	2.6	503	–	412	–	499	37
5	2.4	572	–	316	–	528	33
6	2.4	575	426	236	–	539	35
7	2.6	424	–	–	–	424	35
8	5.9	476	–	231	–	427	54
9	2.7	561	–	–	–	561	44
10	5.7	420	267	235	–	367	70
11	2.7	565	–	275	–	522	46
12	2.2	505	–	–	–	505	25
13	2.6	470	–	–	–	470	37
14	3.3	641	–	302	–	614	40
15	1.6	359	–	–	–	359	22
16	2.4	568	280	–	–	555	34
17	2.5	495	368	220	–	464	36
18	2.0	467	–	310	–	465	30
19	3.7	602	–	–	–	602	36
20	3.1	560	–	–	–	560	33
21	2.5	467	–	274	–	458	37
22	7.0	426	285	125	139	219	60
23	2.9	435	–	–	–	494	36
24	2.7	405	–	240	–	388	37
25	2.2	565	–	412	–	557	34
Average	3.1	507	391	291	139	482	39
Top 25*	**3.6**	**463**	**307**	**233**	**139**	**413**	**43**

Table A4 Variable costs

Farm number	AI & herd test	Animal health	Calf rearing	Shed power	Dairy supplies	Total herd & shed costs	Fertiliser	Irrigation	Hay & silage making
	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS
1	0.18	0.12	0.01	0.26	0.07	0.65	0.69	0.00	0.15
2	0.05	0.07	0.01	0.17	0.14	0.44	0.41	0.18	0.18
3	0.11	0.12	0.05	0.11	0.08	0.46	0.39	0.03	0.03
4	0.15	0.16	0.03	0.27	0.12	0.74	0.82	0.11	0.11
5	0.15	0.11	0.07	0.09	0.11	0.54	0.51	0.34	0.34
6	0.15	0.09	0.02	0.11	0.12	0.50	0.91	0.29	0.29
7	0.08	0.21	0.04	0.10	0.10	0.53	0.74	0.32	0.32
8	0.12	0.19	0.02	0.09	0.07	0.50	0.93	0.19	0.19
9	0.06	0.07	0.04	0.16	0.07	0.40	0.54	0.10	0.10
10	0.13	0.09	0.00	0.14	0.16	0.51	0.51	0.22	0.22
11	0.15	0.16	0.01	0.13	0.03	0.48	0.31	0.23	0.23
12	0.09	0.09	0.00	0.09	0.12	0.39	0.85	0.27	0.27
13	0.11	0.18	0.00	0.10	0.14	0.53	0.64	0.35	0.35
14	0.12	0.20	0.03	0.11	0.16	0.61	0.80	0.01	0.01
15	0.06	0.07	0.00	0.26	0.12	0.51	0.94	0.12	0.12
16	0.12	0.10	0.00	0.08	0.11	0.40	0.51	0.30	0.30
17	0.04	0.14	0.00	0.14	0.10	0.42	0.71	0.05	0.05
18	0.12	0.18	0.02	0.15	0.09	0.56	0.55	0.09	0.09
19	0.11	0.22	0.16	0.20	0.24	0.93	0.45	0.40	0.40
20	0.13	0.07	0.00	0.12	0.12	0.45	0.76	0.07	0.07
21	0.18	0.11	0.05	0.06	0.19	0.60	0.71	0.17	0.17
22	0.11	0.22	0.00	0.11	0.10	0.54	0.76	0.05	0.05
23	0.04	0.17	0.08	0.18	0.26	0.74	0.86	0.10	0.10
24	0.06	0.09	0.02	0.21	0.24	0.62	0.52	0.08	0.08
25	0.06	0.18	0.00	0.18	0.24	0.66	0.56	0.48	0.48
Average	0.11	0.14	0.03	0.14	0.13	0.55	0.66	0.18	0.19
Top 25*	**0.11**	**0.14**	**0.01**	**0.11**	**0.13**	**0.50**	**0.68**	**0.14**	**0.14**

Table A4 Variable costs (continued)

Farm number	Fuel & oil	Pasture improvement/ cropping	Other feed costs	Fodder purchases	Grain/ concentrates/ other	Agistment costs	Feed & water inventory change	Total feed costs	Total variable costs
	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS
1	0.21	0.34	0.00	0.19	2.20	0.00	-0.20	3.59	4.23
2	0.18	0.14	0.00	0.12	2.24	0.00	-0.09	3.34	3.78
3	0.09	0.14	0.05	0.45	2.31	0.00	-0.01	3.45	3.91
4	0.19	0.16	0.00	0.09	2.52	0.00	-0.21	3.91	4.65
5	0.07	0.42	0.00	0.24	2.05	0.03	-0.18	3.63	4.17
6	0.06	0.34	0.00	0.16	1.95	0.00	0.05	4.09	4.60
7	0.21	0.36	0.01	0.00	2.08	0.00	-0.01	3.71	4.24
8	0.27	0.29	0.00	0.40	3.28	0.00	-0.21	5.15	5.64
9	0.13	0.07	0.00	0.00	2.81	0.01	0.00	3.85	4.25
10	0.29	0.18	0.00	0.74	2.28	0.13	-0.27	4.08	4.60
11	0.32	0.26	0.06	0.24	2.86	0.22	-0.34	4.16	4.64
12	0.11	0.24	0.00	0.00	2.00	0.00	-0.35	3.40	3.80
13	0.08	0.47	0.00	0.00	2.26	0.00	-0.24	3.75	4.28
14	0.12	0.23	0.02	0.14	3.34	0.00	-0.17	4.48	5.09
15	0.22	0.14	0.00	0.00	1.36	0.00	-0.16	3.08	3.59
16	0.07	0.27	0.00	0.06	2.29	0.00	-0.04	3.71	4.11
17	0.09	0.19	0.00	0.16	1.79	0.00	0.08	3.19	3.61
18	0.11	0.30	0.00	0.02	2.11	0.00	0.00	3.68	4.25
19	0.15	0.29	0.00	0.00	3.74	0.00	0.05	5.07	6.00
20	0.21	0.28	0.03	0.00	2.77	0.00	0.00	4.12	4.57
21	0.18	0.26	0.01	0.05	1.82	0.02	0.06	3.28	3.89
22	0.49	0.22	0.00	0.33	2.20	0.00	-0.21	3.82	4.36
23	0.19	0.19	0.13	0.00	2.41	0.00	0.00	3.89	4.63
24	0.41	0.12	0.00	0.14	1.94	0.00	-0.06	3.14	3.77
25	0.20	0.41	0.00	0.13	2.94	0.00	0.00	4.99	5.66
Average	0.19	0.25	0.01	0.15	2.38	0.02	-0.10	3.86	4.41
Top 25*	**0.21**	**0.23**	**0.00**	**0.22**	**2.03**	**0.03**	**-0.11**	**3.58**	**4.08**

Table A5 Overhead costs

Farm number	Rates	Farm insurance	Motor vehicle expenses	Repairs & maintenance	Other overheads	Employed labour	Total cash overheads	Depreciation	Imputed owner/ operator & family labour	Total overheads
	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS
1	0.02	0.15	0.04	0.58	0.09	0.61	1.49	0.57	0.94	3.00
2	0.06	0.02	0.01	0.34	0.08	1.24	1.75	0.39	0.75	2.89
3	0.10	0.08	0.05	0.31	0.07	0.86	1.46	0.37	0.51	2.34
4	0.03	0.07	0.05	0.51	0.10	1.42	2.19	0.46	0.53	3.18
5	0.05	0.07	0.02	0.30	0.17	0.57	1.18	0.32	1.01	2.51
6	0.10	0.03	0.06	0.47	0.27	0.52	1.45	0.28	1.18	2.91
7	0.01	0.06	0.02	0.57	0.11	1.23	2.00	0.21	0.56	2.77
8	0.04	0.05	0.02	0.75	0.12	1.30	2.29	0.37	0.22	2.87
9	0.12	0.01	0.05	1.36	0.27	0.52	2.33	0.40	0.74	3.46
10	0.03	0.13	0.06	0.30	0.08	0.82	1.41	0.82	0.33	2.56
11	0.06	0.08	0.08	0.81	0.16	0.66	1.85	0.45	1.13	3.43
12	0.09	0.07	0.12	0.66	0.12	0.64	1.70	0.25	0.68	2.63
13	0.09	0.11	0.03	0.69	0.11	1.06	2.09	0.52	0.60	3.21
14	0.03	0.04	0.07	0.30	0.11	1.30	1.86	0.11	0.44	2.40
15	0.15	0.11	0.06	0.36	0.09	1.01	1.77	0.43	1.68	3.89
16	0.12	0.07	0.03	0.21	0.08	0.69	1.20	0.16	1.66	3.02
17	0.04	0.05	0.01	0.23	0.12	1.15	1.60	0.35	0.00	1.95
18	0.11	0.07	0.09	0.58	0.10	1.22	2.16	0.12	0.21	2.49
19	0.09	0.14	0.06	0.33	0.12	0.77	1.51	0.39	1.44	3.34
20	0.05	0.07	0.10	0.32	0.13	1.16	1.83	0.25	0.48	2.55
21	0.01	0.04	0.01	0.43	0.09	1.41	1.99	0.28	0.18	2.45
22	0.07	0.09	0.06	0.80	0.02	1.03	2.07	-0.20	0.58	2.44
23	0.05	0.11	0.07	0.31	0.16	1.04	1.73	0.24	0.22	2.19
24	0.10	0.20	0.11	0.67	0.23	1.51	2.83	0.41	0.36	3.59
25	0.07	0.19	0.04	0.54	0.17	1.13	2.14	0.76	1.24	4.14
Average	0.07	0.08	0.05	0.51	0.13	0.99	1.84	0.35	0.71	2.89
Top 25*	**0.06**	**0.07**	**0.06**	**0.50**	**0.09**	**1.04**	**1.82**	**0.27**	**0.33**	**2.42**

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 & silage making
	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS
1	2.5	1.7	0.1	3.6	1.0	8.9	9.5	0.0	2.1
2	0.7	1.1	0.2	2.5	2.1	6.6	6.1	2.7	2.7
3	1.8	1.9	0.8	1.7	1.3	7.4	6.2	0.5	0.5
4	1.9	2.1	0.4	3.4	1.6	9.4	10.5	1.3	1.3
5	2.3	1.6	1.1	1.4	1.7	8.1	7.7	5.0	5.0
6	2.0	1.2	0.3	1.5	1.6	6.7	12.1	3.8	3.8
7	1.1	3.0	0.6	1.4	1.4	7.6	10.5	4.6	4.6
8	1.4	2.2	0.3	1.1	0.8	5.8	11.0	2.3	2.3
9	0.8	0.9	0.6	2.1	0.9	5.1	7.0	1.3	1.3
10	1.8	1.2	0.0	1.9	2.2	7.2	7.1	3.1	3.1
11	1.9	2.0	0.1	1.6	0.4	6.0	3.8	2.9	2.9
12	1.5	1.4	0.1	1.3	1.8	6.1	13.3	4.2	4.2
13	1.4	2.5	0.0	1.3	1.9	7.1	8.5	4.7	4.7
14	1.5	2.6	0.4	1.4	2.2	8.1	10.6	0.1	0.1
15	0.8	1.0	0.0	3.5	1.6	6.9	12.6	1.7	1.7
16	1.7	1.4	0.0	1.1	1.5	5.7	7.1	4.1	4.1
17	0.7	2.6	0.0	2.5	1.7	7.5	12.8	0.9	0.9
18	1.8	2.7	0.3	2.2	1.4	8.4	8.1	1.4	1.4
19	1.2	2.3	1.7	2.1	2.6	10.0	4.8	4.2	4.2
20	1.8	1.0	0.0	1.7	1.7	6.3	10.7	0.9	0.9
21	2.9	1.8	0.9	1.0	3.0	9.5	11.2	2.7	2.7
22	1.6	3.2	0.0	1.6	1.5	7.9	11.2	0.7	0.7
23	0.6	2.5	1.2	2.7	3.9	10.9	12.6	1.5	1.5
24	0.8	1.2	0.3	2.9	3.2	8.5	7.0	1.1	1.1
25	0.6	1.9	0.0	1.8	2.4	6.8	5.7	4.9	4.9
Average	1.5	1.9	0.4	2.0	1.8	7.5	9.1	2.4	2.5
Top 25*	**1.7**	**2.1**	**0.2**	**1.8**	**1.9**	**7.8**	**10.6**	**2.2**	**2.2**

Table A6 Variable costs – percentage (continued)

Farm number	Fuel & oil	Pasture improvement/ cropping	Other feed costs	Fodder purchases	Grain/ concentrates/ other	Agistment costs	Feed & water inventory change	Total feed costs	Total variable costs
	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS	$ kg/MS
1	3.0	4.7	0.0	2.7	30.4	0.0	-2.7	49.6	58.5
2	2.7	2.1	0.1	1.8	33.6	0.0	-1.4	50.0	56.6
3	1.4	2.2	0.8	7.2	37.0	0.0	-0.1	55.2	62.6
4	2.4	2.0	0.0	1.1	32.0	0.0	-2.7	49.9	59.3
5	1.0	6.2	0.0	3.5	30.8	0.4	-2.7	54.4	62.5
6	0.8	4.6	0.0	2.2	26.0	0.0	0.7	54.5	61.2
7	3.0	5.2	0.2	0.0	29.6	0.0	-0.1	52.9	60.5
8	3.1	3.4	0.0	4.6	38.5	0.0	-2.4	60.4	66.3
9	1.7	0.9	0.0	0.0	36.4	0.1	0.0	49.9	55.1
10	4.1	2.6	0.0	10.4	31.8	1.8	-3.8	57.0	64.2
11	4.0	3.2	0.8	3.0	35.5	2.7	-4.2	51.5	57.5
12	1.7	3.8	0.0	0.0	31.1	0.0	-5.4	53.0	59.1
13	1.0	6.3	0.0	0.0	30.2	0.0	-3.3	50.0	57.1
14	1.6	3.0	0.2	1.8	44.5	0.0	-2.2	59.8	67.9
15	3.0	1.9	0.0	0.0	18.3	0.0	-2.2	41.2	48.0
16	1.0	3.8	0.0	0.8	32.1	0.0	-0.6	52.0	57.7
17	1.6	3.4	0.0	3.0	32.2	0.0	1.5	57.4	64.9
18	1.6	4.5	0.0	0.2	31.3	0.0	0.0	54.7	63.1
19	1.6	3.1	0.0	0.0	40.0	0.0	0.5	54.3	64.2
20	2.9	4.0	0.4	0.0	39.0	0.0	0.0	57.9	64.2
21	2.8	4.1	0.2	0.8	28.7	0.4	1.0	51.8	61.3
22	7.1	3.2	0.0	4.8	32.4	0.0	-3.1	56.2	64.1
23	2.8	2.8	1.9	0.0	35.4	0.0	0.0	57.0	67.9
24	5.5	1.7	0.0	1.8	26.4	0.0	-0.8	42.7	51.2
25	2.1	4.2	0.0	1.3	30.0	0.0	0.0	51.0	57.7
Average	2.5	3.5	0.2	2.0	32.5	0.2	-1.4	53.0	60.5
Top 25*	**3.2**	**3.6**	**0.0**	**3.2**	**31.2**	**0.4**	**-1.6**	**55.0**	**62.8**

Table A7 Overhead costs – percentage

Farm number	Rates	Farm insurance	Motor vehicle expenses	Repairs & maintenance	Other overheads	Employed labour	Total cash overheads	Depreciation	Imputed owner/ operator & family labour	Total overheads
	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs
1	0.3	2.1	0.5	8.0	1.2	8.5	20.6	7.9	13.0	41.5
2	0.9	0.3	0.2	5.1	1.2	18.6	26.3	5.8	11.3	43.4
3	1.5	1.2	0.8	5.0	1.1	13.7	23.4	5.9	8.1	37.4
4	0.4	0.9	0.6	6.5	1.3	18.1	27.8	5.8	6.8	40.4
5	0.8	1.0	0.4	4.4	2.6	8.5	17.7	4.7	15.1	37.5
6	1.3	0.4	0.8	6.3	3.6	6.9	19.3	3.7	15.7	38.8
7	0.2	0.9	0.3	8.1	1.5	17.6	28.6	3.0	8.0	39.5
8	0.5	0.6	0.2	8.8	1.4	15.2	26.8	4.3	2.6	33.7
9	1.5	0.1	0.7	17.7	3.4	6.7	30.2	5.2	9.5	44.9
10	0.4	1.8	0.8	4.1	1.2	11.5	19.8	11.4	4.6	35.8
11	0.7	1.0	1.0	10.0	2.0	8.1	22.9	5.6	14.0	42.5
12	1.4	1.1	1.8	10.3	1.9	10.0	26.5	3.8	10.6	40.9
13	1.2	1.5	0.4	9.2	1.5	14.1	28.0	7.0	8.0	42.9
14	0.4	0.6	0.9	4.0	1.5	17.4	24.8	1.5	5.8	32.1
15	2.0	1.5	0.7	4.8	1.2	13.6	23.7	5.8	22.5	52.0
16	1.7	1.0	0.4	2.9	1.2	9.7	16.8	2.2	23.3	42.3
17	0.8	0.9	0.2	4.1	2.2	20.7	28.8	6.3	0.0	35.1
18	1.7	1.0	1.3	8.5	1.5	18.0	32.1	1.8	3.1	36.9
19	1.0	1.5	0.6	3.5	1.3	8.2	16.2	4.2	15.4	35.8
20	0.7	1.0	1.4	4.5	1.8	16.4	25.7	3.4	6.7	35.8
21	0.2	0.7	0.1	6.8	1.3	22.3	31.4	4.4	2.9	38.7
22	1.1	1.3	0.8	11.8	0.3	15.1	30.4	-3.0	8.5	35.9
23	0.7	1.6	1.0	4.5	2.4	15.2	25.4	3.5	3.3	32.1
24	1.4	2.8	1.5	9.1	3.2	20.5	38.4	5.5	4.9	48.8
25	0.7	1.9	0.4	5.5	1.8	11.5	21.8	7.8	12.7	42.3
Average	0.9	1.1	0.7	6.9	1.7	13.8	25.3	4.7	9.4	39.5
Top 25*	**0.9**	**1.1**	**0.8**	**7.6**	**1.4**	**16.3**	**28.2**	**4.1**	**4.9**	**37.2**

Table A8 Capital structure

Farm assets				
	Land value	Land value	Permanent water value	Permanent water value
	$/ha	$/cow	$/ha	$/cow
Average	9,859	11,304	306	292

Other farm assets (per usable hectare)				
Plant and equipment	Livestock	Hay and grain	Other assets	Total assets
$/ha	$/ha	$/ha	$/ha	$/ha
1,368	2,332	86	157	14,108

Liabilities	
Liabilities per usable hectare	Liabilities per milking cow
$/ha	$/cow
3,757	4,525

Equity	
Equity per usable hectare	Average equity
$/ha	%
10,350	68.7

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

	Income				Variable costs							
	Milk income net		Gross farm income		Herd costs		Shed costs		Feed costs		Total variable costs	
Year	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS
2013/14	6.62	7.30	7.75	8.55	0.24	0.27	0.26	0.28	3.29	3.63	3.79	4.19
2014/15	7.07	7.62	8.26	8.91	0.25	0.27	0.26	0.28	3.31	3.57	3.82	4.12
2015/16	7.22	7.69	8.29	8.82	0.26	0.27	0.24	0.26	3.45	3.67	3.95	4.20
2016/17	7.05	7.36	8.12	8.48	0.26	0.27	0.26	0.27	3.24	3.38	3.76	3.93
2017/18	7.00	7.18	8.16	8.37	0.26	0.26	0.27	0.28	3.52	3.61	4.05	4.15
2018/19	7.07	7.16	8.25	8.35	0.28	0.28	0.27	0.28	3.85	3.90	4.40	4.46
2019/20	7.35	7.35	8.74	8.74	0.27	0.27	0.28	0.28	3.86	3.86	4.41	4.41
Average		**7.38**		**8.60**		**0.27**		**0.27**		**3.66**		**4.21**

	Overhead costs						Profit							
	Cash overhead costs		Non-cash overhead costs		Total overhead costs		Earnings before interest & tax		Interest & lease charges		Net farm income			
Year	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	Nominal $ kg/MS	Real $ kg/MS	RoTA %	RoE %
2013/14	1.50	1.65	0.86	0.95	2.36	2.60	1.59	1.75	0.65	0.71	1.01	1.11	4.2	4.2
2014/15	1.47	1.58	0.8	0.86	2.26	2.44	2.17	2.34	0.59	0.64	1.66	1.79	6.3	8.2
2015/16	1.51	1.61	0.82	0.87	2.33	2.48	2.02	2.15	0.53	0.57	1.54	1.64	6.4	9.1
2016/17	1.56	1.63	0.83	0.87	2.39	2.50	1.98	2.07	0.53	0.55	1.48	1.55	6.5	18.3
2017/18	1.53	1.56	0.52	0.53	2.57	2.63	1.54	1.58	0.53	0.54	1.01	1.04	4.3	7.7
2018/19	1.71	1.73	0.98	0.99	2.69	2.72	1.16	1.17	0.60	0.60	0.56	0.57	3.2	4.4
2019/20	1.84	1.84	1.05	1.05	2.89	2.89	1.44	1.44	0.56	0.56	0.88	0.88	3.9	8.1
Average		**1.66**		**0.88**		**2.61**		**1.79**		**0.60**		**1.22**	**5.0**	**8.6**

Note: 'Real' dollar values are the nominal values converted to 2019/20 dollar equivalents by the consumer price index (CPI) to allow for inflation.
The gross income in 2017/18 did not include feed inventory changes and changes to the value of carry-over water. These were included in feed costs.

Table A10 Historical data – average farm physical information

	Total usable area	Milking area	Total water use efficiency	Number of milking cows	Milking cows	Milk sold	Milk sold	Estimated grazed pasture*	Estimated conserved feed*	Home-grown feed	Concentrate price	
Year	ha	ha	t DM/ 100mm/ha	hd	hd/ha	kg MS/ cow	kg MS/ ha	t DM/ ha	t DM/ ha	% of ME	Nominal $/t DM	Real $/t DM
2013/14	606	280	0.4	522	0.9	505	453	3.3	1.5	62	418	461
2014/15	625	296	0.6	543	0.9	535	486	3.6	1.7	63	421	454
2015/16	575	283	0.5	545	1.0	557	541	4.1	1.7	57	445	474
2016/17	499	268	0.6	498	1.0	558	570	5.1	1.3	61	404	422
2017/18	586	277	0.5	497	0.9	580	521	4.0	1.9	57	429	440
2018/19	579	286	0.6	497	0.9	566	515	4.2	1.6	60	488	495
2019/20	582	273	0.7	481	0.9	561	507	4.2	1.6	61	507	507
Average	**579**	**281**	**0.5**	**512**	**0.9**	**552**	**513**	**4.1**	**1.6**	**60**		**465**

*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 B Glossary of terms, abbreviations and standard values

All other income	Income to the farm from all sources except milk. Includes livestock trading profit, dividends, interest payments received, and rent from farm cottages.
Annual hours	Total hours worked by a person during the given twelve month period.
Appreciation	An increase in the value of an asset in the market place. 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 of production	The cost of producing the main product of the business; milk. Usually expressed in terms of the main enterprise output i.e. dollars per kilogram of milk solids. It is reported at the following levels; • cash cost of production; variable costs plus cash overhead costs • cost of production excluding inventory changes; variable costs plus cash and non-cash overhead costs • cost of production including inventory changes; variable costs plus cash and non-cash overhead costs, accounting for feed inventory change and livestock inventory change minus livestock purchases.
Cost structure	Variable costs as a percentage of total costs, where total costs equals variable costs plus overhead costs.
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 %	Total equity as a percentage of the total assets owned. The proportion of the total assets owned by the business.
Farm income	See gross farm income.
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.
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 area	Total usable area minus any area used only for fodder production during the year.
Grazed pasture	Calculated using the energetics method. Grazed pasture is calculated as the gap between total energy required by livestock over the year and amount of energy available from other sources (hay, silage, grain and concentrates). Total energy required by livestock is a factor of age, weight, growth rate, pregnancy and lactation requirements, distance to shed, terrain and number of animals. Total energy available is the sum of energy available from all feed sources except pasture, calculated as (weight [kg] x dry matter content (DM %) 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, valued at $30 per hour.
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 kilogram of milk solid. Measures of productivity of the total labour resources in the business.
Labour resource	Any person who works in the business, be they the owner, family, sharefarmer or employed on a permanent, part time or contract basis.
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. An increase in livestock trading indicates there was an appreciation of livestock or an increase in livestock numbers over the year.
Metabolisable energy	Energy available to livestock in feed, expressed in megajoules per kilogram of dry matter (MJ/kg DM).

Milk income	Income through the sales of milk. This is net of compulsory levies and charges.
Milking area	Total usable area minus out-blocks or run-off areas.
Net farm income	*Previously reported as business profit.* 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 external sources. Includes dividends, interest payments received, and rents from farm cottages.
Overhead costs	All fixed costs incurred by the farm business e.g. rates, administration, depreciation, insurance and imputed labour. Interest, leases, capital expenditure, principal repayments and tax are not included.
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.
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 used	Total rainfall plus average irrigation water used expressed as millimetres per hectare, where irrigation water is calculated as; (total megalitres of water used/total usable area) x 100.
Variable costs	All costs that vary with the size of production in the enterprise e.g. herd, shed and feed costs (including feed inventory change).

List of abbreviations

AI	artificial insemination
CH_4	methane gas
CO_2	carbon dioxide gas
CO_2-e	carbon dioxide equivalent
CoP	cost of production
DFMP	Dairy Farm Monitor Project
DM	dry matter of feed stuffs
EBIT	earnings before interest and tax
FTE	full time equivalent.
GWP	global warming potential
ha	hectare(s)
hd	head of cattle
HRWS	high reliability water shares
kg	kilograms
LRWS	low reliability water shares
ME	metabolisable energy (MJ/kg)
MJ	megajoules of energy
mm	millimetres: 1mm is equivalent to 4 points or $^1/_{25}$ of an inch of rainfall
MS	milk solids (proteins and fats)
N_2O	nitrous oxide gas
Q1	first quartile, i.e. the value of which one quarter, or 25, of data in that range is less than
Q3	third quartile, i.e. the value of which one quarter, or 25, of data in that range is greater than
RoTA	return on total assets
RoE	return on equity
t	tonne = 1,000kg

Standard values

Livestock values

The standard vales used to estimate the inventory values of livestock were as below.

Category	Opening value ($/hd)	Closing value ($/hd)
Mature cows	1,600	1,600
Rising 2 year heifers	1,200	1,600
Rising 1 year heifers	600	1,200
Calves	600	600
Bulls	2,400	2,400

Imputed owner/operator and family labour

In 2019/20 the imputed owner/operator and family labour rate was $30/hr based on a full time equivalent (FTE) working 48 hours/week for 50 weeks of the year.

Dairy Australia acknowledges the contribution made to the Dairy Farm Monitor Project by the Commonwealth Government through its provision of Matching Payments under Dairy Australia's Statutory Funding Agreement.

ISSN 2652-547X (print); 2651-866X (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 3733
E enquiries@dairyaustralia.com.au
dairyaustralia.com.au

2492 | Dec 2020