Dairy Australia

Dairy Farm Monitor Project

Western Australia | Annual Report 2017–18

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We also acknowledge the work of Dairy Australia's farm analysts Sam Henty, Jake Musson and Fiona Smith, who conducted the data checking, validation and analysis.

This report was produced by Kirk Reynolds in conjunction with Dairy Australia.

The project plays a critical role in identifying areas for farm performance improvement, as well as providing vital benchmark information for Dairy Australia's DairyBase tool. It is linked to our aims of growing the agricultural sector in order to grow jobs and investment in the region.

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How to read this report

This section explains the calculations used and the data presented throughout this report. The purpose of the different sections of the report is also discussed.

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 2017–18 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 are 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 six farms located throughout the dairying areas of Western Australia.

Any reference to ‘last year’ refers to the 2016–17 Dairy Farm Monitor Project report.

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

It should be noted that not all of the participants from 2016–17 are in the 2017–18 report. This year, there are two 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.

What's new in 2017–18?

The Dairy Farm Monitor Report for 2017–18 includes a number of changes since last year's report. The most significant are:

- All Dairy Farm Monitor Project data from Victoria, South Australia, New South Wales, Western Australia and Tasmania now provide the baseline data for comparative purposes in DairyBase, Dairy Australia's national dairy industry database for farm level data.
- Within the overhead cost category, registration and insurance have now been separated into farm insurance and motor vehicle expenses. Farm insurance relates to all farm insurance that is not personal, such as death and total and permanent disability (TPD). Motor vehicle expenses include registration, insurance, fuel and repairs on vehicles.
- Return on assets is now referred to as return on total assets.
- Water use previously reported as mm/ha is now reported as total water use efficiency (t DM/100mm/ha). Total water use efficiency estimates the amount of home grown feed produced from rainfall and irrigation applied across the usable area. This calculation aligns with DairyBase and the Dairy Moving Forward Feedbase targets.
- Data in this report are produced using standard values, which have been outlined in Appendix B. The standard values for livestock and imputed labour have been revised to align with market values. These standard values may vary from other organisation's standard values. Take care when directly comparing the results of multiple benchmarking studies without due diligence investigating the assumptions made in each data set.
- Australia's dairy industry greenhouse gas emissions estimator, the national greenhouse gas inventory (NGGI), was used in conjunction with the physical and financial data provided by participant farms which remains unchanged from last year but may differ to other Greenhouse Gas Emission calculator outputs.
- This year in Western Australia only, to protect the anonymity of participants, farms have been allocated a different number. Therefore results for individual farms may not be directly compared to previous years.

Keep an eye on the project website for further reports and updates on the project at dairyaustralia.com.au/dairyfarmmonitor

Summary

Summary

In 2017–18 the data from 24 farms in WA resulted in average whole farm earnings before interest and tax (EBIT) of $511,339 a 8% decrease on the previous year's $565,416. On average, participants achieved positive return on total assets averaging 4.3%, down from last year's 6.7%. The average milk price received was $7.00 /kg MS (50.1 c/l), a 1% decrease from last year.

This is the fifth 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 to profitability and production.

Twenty four farms participated in the project in 2017–18, of which 14 have been involved since the project began. There were two new farms in this year's dataset. The WA DFMP participants generated an average earnings before interest and tax (EBIT) of $511,339 per farm or $1.54/kg MS (11 c/l), an 8% decrease from 2016–17.

Once interest and lease costs were taken into account the resulting average net farm income was $354,324, a 16% decrease. This equated to an average return on equity of 7.7%.

The average milk price of $7.00 /kg MS (50.1 c/l) was a 1% decrease from last year's price of $7.05 /kg MS (51.4 c/l). The milk price reflected the current "static nature" of Western Australia's domestic milk supply. This year saw "true" livestock trading profits collated, whereby if a business grew the male dairy offspring out, or value added with dairy x beef heifers the actual value add was collected. Previously these stock were "sold out" internally at the weaning stage. As a result livestock trading profit did lift $0.11 /kg MS (0.6 c/L) which meant that the gross farm income was in line with last year.

The milk income again varied considerably from $6.15 to $8.02 kg/MS (44.1-60.9 c/L). 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). Those suppliers with the lowest prices were all supplying the same processor with their lowest supply month being January.

Participants costs of production generally increased by 8% in both variable and overhead costs. Variable costs rose from $3.76/kg MS last year to $4.05/kg MS, with average overhead costs rising from $2.39/kg MS to $2.57/kg MS. The main drivers of higher costs were purchased feed (up 13%) and labour (up 10%). Home grown feed as a source of metabolisable energy decreased from 61% to 57%. The increase in purchased feed from 2.8t to 3.0 t DM/hd and the average concentrate price increase of $25/t to $429/t DM drove the higher purchased feed costs.

The static gross farm income, coupled with higher costs, in feed and labour, lead to return on total assets (ROTA) lowering from 6.7% to 4.3%. Two participants recorded a negative ROTA with the spread being -0.8% to 11.4%.

The 2017–18 season, although in line with a total average rainfall, proved to be a difficult autumn. The above average rains in December/January were welcomed by the small amount of irrigators, however due to WA's predominant dryland operations it provided limited assistance. The staggered and below average autumn break was the major reason that the amount and cost of purchased feed increased. The south coast of Scott River and Denmark were severely affected by the autumn. Due to the east coast experiencing a very poor start and the domestic sheep and beef markets being buoyant, fodder prices soared in late autumn/winter, again increasing the feed costs to those purchasing.

The top 25% farms achieved an average EBIT of $3.05/kg MS (22 c/L) and average return on total assets of 8.2%.This large difference between the average and top 25% is mainly due to 6% higher milk income, better labour efficiency, higher milk production per hectare, more grazed pasture in the diet along with 17% lower costs of production.

Expectations for the 2018–19 season are predominantly no change in business returns, or a deterioration, with only 17% expecting an improvement. 83% believe that milk price will remain stable with the majority seeing milk production remaining stable or decreasing.

The majority of respondents see an increase in purchased feed prices (83%) and fuel and oil (54%). Fertiliser, irrigation, repairs and maintenance and labour are considered to remain stable.

Milk price, input costs, pasture/fodder and managing seasonal conditions were the major issues facing the Western Australian participant farmers in both the short and long term. Water and succession planning by enlarge are viewed with little to no importance.

Farm monitor method

Farm monitor method

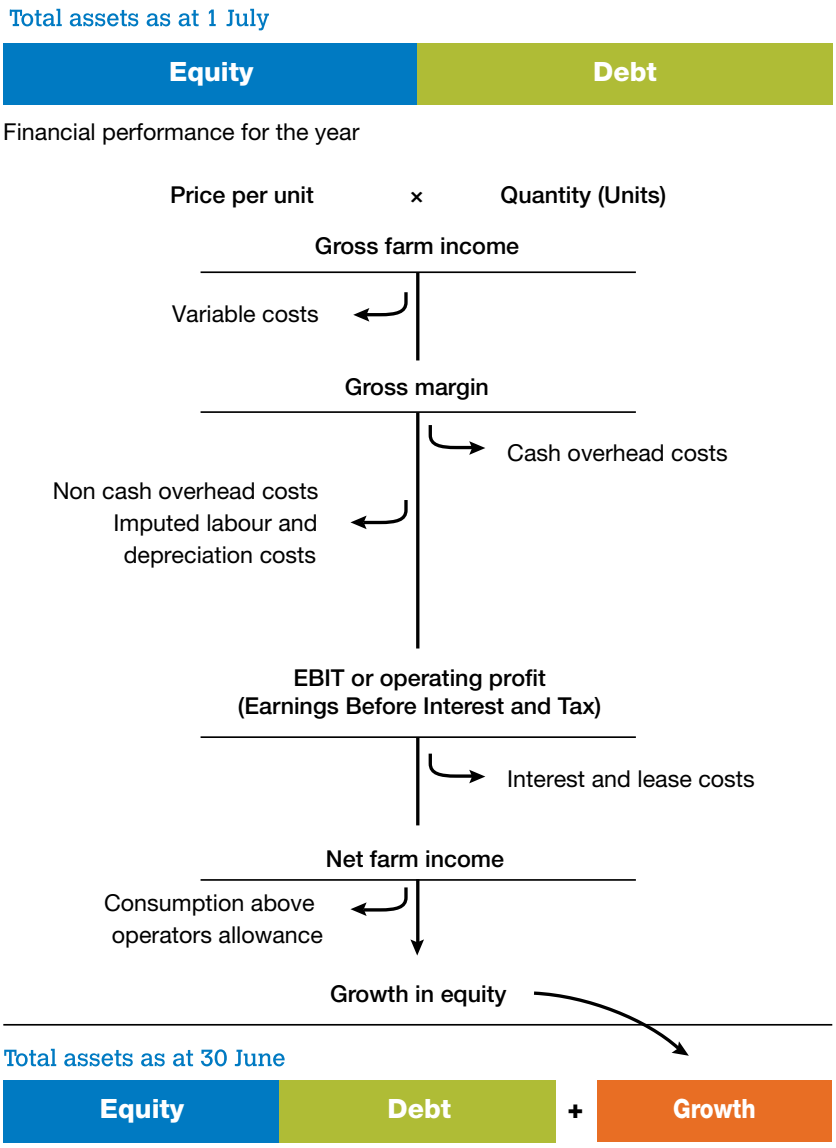
This chapter explains the method used in the Dairy Farm Monitor Project (DFMP) and defines the key terms used.

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 Dairy Farm Monitor Project (DFMP) 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.

Figure 1 Dairy farm monitor project method



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.

Variable costs

Variable costs 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

Overhead costs are costs 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

Net farm 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

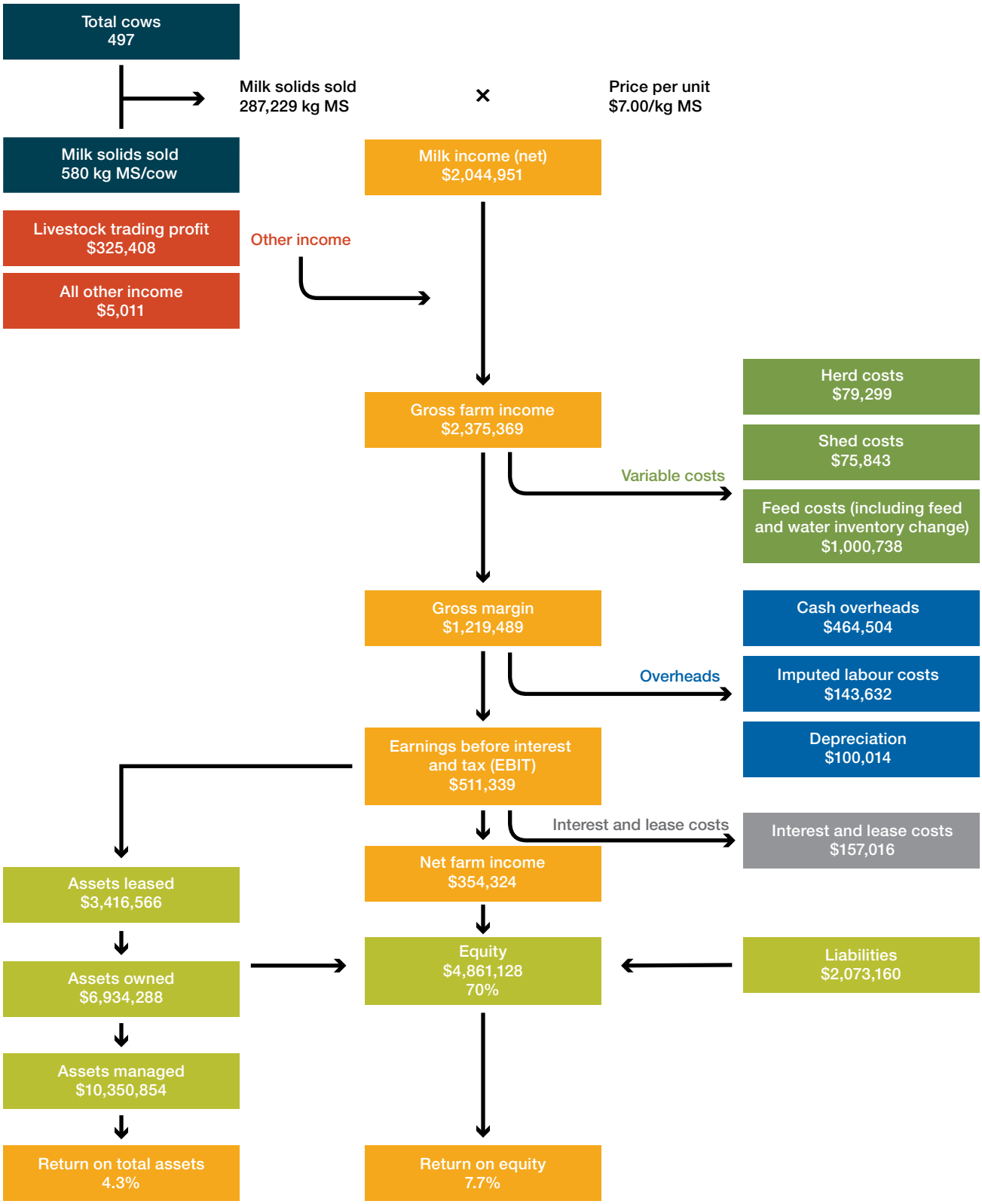
Two commonly used economic indicators of whole farm performance are return on total assets (ROTA) and return on equity (RoE). They measure the return to their respective capital base.

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. Return on total assets is sometimes referred to as return on capital.

Earnings before interest and tax expressed as a return on total assets 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 percent 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



Western Australian overview

Western Australian overview

Western Australia produced approximately 4.1%, or 385 million litres, of the Australian milk production in 2017–18. Milk production in Western Australia remained stable in 2017–18, reflecting constant domestic demand conditions, compared to the national increase of 3%.

During 2017–18 there remained a significant range in prices received for milk in the WA industry, however the gap reduced from the previous year. There were no summer growth incentives in place this season, however some processors adjusted their monthly pricing payments to try and encourage milk supply through the summer to try to balance local supply. In March, the Brownes processor announced a re-opening of its cheese-making facility, which may create more demand into the future when production gets underway.

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. Western Australia 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.

Western Australian 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.

Seasonal conditions

Drier seasonal conditions prevailed throughout 2017–18, with below autumn rainfall across most WA dairy regions.

The total rainfall in 2017–18 was largely in line with the long term average, however when it fell bears more importance. Participant farms received an average of 903 mm rainfall, 3% less than the long term average of 935 mm. However, some farms received 20% less than their long-term average annual rainfall.

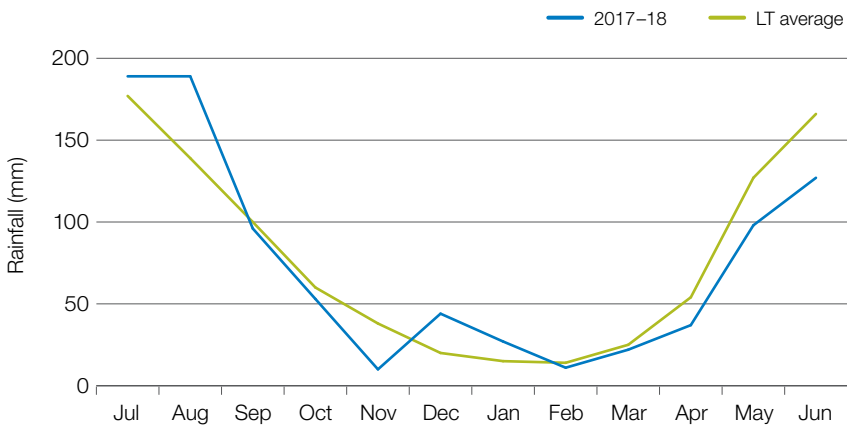
For most farms the month in which the rain fell is generally more important. Figure 4 shows the average monthly rainfall pattern compared to the long term annual average.

The spring of 2017 was comparatively average with the majority of farmers relatively happy with their fodder production. The autumn of 2018 was very difficult for most, as can be seen with the lower rainfall amounts in April, May and June (Figure 4). For farms on the west coast there was a good opening rain in mid-April but then a long 5-6 week dry spell that reduced early pasture growth. The farms on the south coast missed out on the April rain and experienced one of their most difficult starts to the season.

In general, summer conditions were mild with some the rainfall storms in December/January providing minor relief for some irrigators.

The April, May and June deficits lead to most farmers exhausting all fodder supplies and having to buy in expensive fodder in late Autumn/ Winter. The impact can also be seen with estimated grazed pasture falling from 5.0 t DM/ha to 3.8 t DM/ha.

Figure 4 Monthly average rainfall (all farms)



Whole farm analysis

The 2017–18 year has produced the poorest business performance since the inception of the project 5 years ago. With a relatively constant production profile, a small decline in milk price and an increase in the amount and price of purchased feed, margins were eroded. The majority of on-farm fodder was largely consumed with the late break in 2018.

The 24 participant farms represented 16% of the Western Australian dairy industry in terms of number of farms, however it represents 25% 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 were two new entrants into the project so conclusions cannot be drawn from changes in averages, particularly when trying to determine whole farm analysis.

A consistent feature of this year's data is the difference that has emerged between the profitability of dryland and irrigated farms over the past two years. In 2016–17 there was little difference in EBIT and ROTA between irrigated and dryland participant farms; with irrigated farms having a higher cost of production (CoP) which was offset by a higher milk price. In 2017–18, irrigated farms had ROTA of 3.4% compared with dryland systems at 4.9 %, and an EBIT of $1.26/ kg MS (9.0 c/l) vs $1.73/kg MS (12.4 c/l). Irrigated farms again had a higher cost of production (1.1 c/l) however their milk price was only 0.1 c/l higher.

A decrease in average herd size of 9% was mainly driven by the substitution of smaller businesses into the project as replacements to larger businesses from 2016–17.

The average labour efficiency kg MS/FTE increased by 6%.

Table 1 presents a summary of the average physical parameters of the 24 participant farms. Further details can be found in the Appendix Table 2 for individual farms.

While the average herd size (number of cows milked for at least three months) was 497 there was a wide range in herd size from 170 to 1,575 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 hectare and greater labour efficiency compared to the average.

Table 1 Farm physical data - state overview

Farm physical parameters	Average	Q1 to Q3 range	Top 25% average
Annual Rainfall 17–18 (mm)	903	811–952	844
Total water use efficiency (tDM/100mm/ha)	0.5	0.4–0.6	0.6
Total usable area (hectares)	586	302–719	731
Milking cows per usable hectares	0.9	0.7–1.1	1.0
Milk sold (kg MS /cow)	580	518–623	562
Milk sold (kg MS /ha)	521	379–584	546
Home grown feed as % of ME consumed	57%	50%–61%	60%
Labour efficiency (milking cows / FTE)	87	75–100	104
Labour efficiency (kg MS / FTE)	50,807	41,919–55,335	58,850

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 86% of income, with the remainder coming from livestock trading profit. It is important to note that this season the 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 14% of gross farm income, but ranged from 4% to 24%.

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 to 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 $7.00/kg MS (50.1 c/l) with a range of $6.15/kg MS and $8.02/kg MS (44.1 c/l to 60.9 c/l).

The top 25% performers received an average milk price of $7.40/kg MS (53.3 c/l) with 83% of gross income coming from milk sales.

Average gross farm income in 2017–18 was $8.16/kg MS (58.4c/L) and $8.96 (64.5c/L) for the top 25%.

The participants in 2016–17 in comparison had an average gross farm income of $8.12/kg MS (59.2 c/l) and $8.56 (63.2 c/l) for the top 25% performers.

Milk solids sold

There was a large variation in the amount of milk solids sold per usable hectare with a range of 315 kg MS/ha to 984 kg MS/ha reported (Figure 6), with the average being 521 kg MS/ha.

The top 25% of farms sold an average of 546 kg MS/ha which was only 5% more than the average of all WA participants. Last year this was 26% higher mainly driven by stocking rate (30% higher).

There are two new entrants this year who have larger livestock trading profits (24%) which would dilute the milk solids/ha as the energy would be partitioned to meet production.

The average kilograms of milk solids sold per cow remained stable at 580 kg MS/cow, and ranged between 418 kg MS/cow and 713 kg MS/cow. The top 25% had an average per cow production of 562 kg MS/cow in 2017–18.

Figure 5 Gross farm income of per kilogram of milk solids

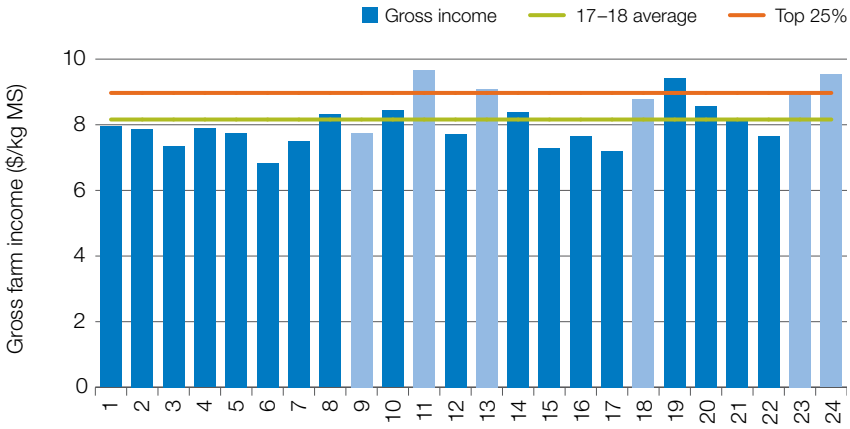
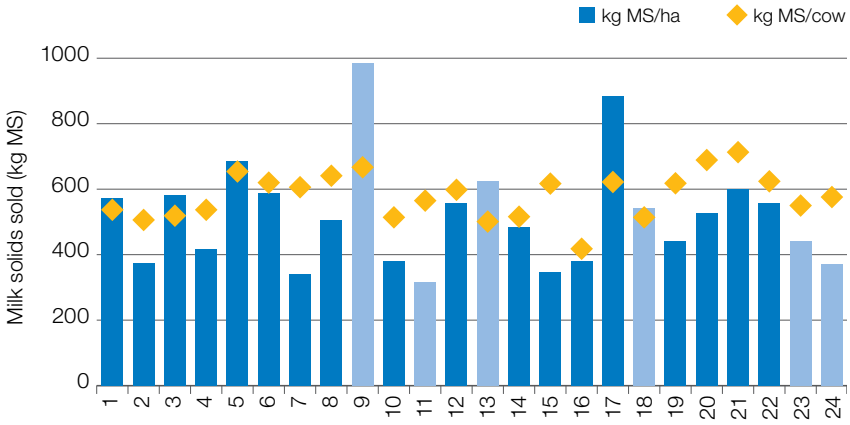


Figure 6 Milk solids sold



Milk sales versus calving pattern

Figure 7 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 1.32; with 9% of annual milk produced in October compared to 7% in February.

Most WA herds have a split calving pattern being spring and autumn. This can be seen in the shape of the curve with two distinct "bumps" in Aug/Sep and Feb/Mar. Many factors influence choice of calving pattern on individual farms including matching feed supply with animal demand, receiving seasonal milk price, rainfall and irrigation, ease of management and herd fertility management.

The 24 participant farms calved 29% of their cows in August to October and another 35% in February to April.

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 $4.05/kg MS (29.0 c/l). The range was from $3.23/kg MS to $5.09/kg MS (22.9 c/l to 35.3 c/l). The average variable cost was higher compared to last year's average of $3.77/kg MS (27.4 c/L). The top 25% had lower variable costs at $3.67/kg MS (26.4 c/l) than the average of all participant farms.

Feed costs were the major variable cost accounting for 87% of total variable costs and 53% of total costs. The top 25% of farms' feed costs were $3.20/kg MS (23.0 c/l), 10% less than the average of $3.52/kg MS (25.2 c/l).

Imported feed increased to 43% of whole farm metabolisable energy (ME) fed, compared to 38% last year. At the same time, concentrate costs increased by 6% to an average of $429/t. The price of purchased concentrate ranged from $327/t DM to $556/t DM.

The average home grown feed was $132/t DM with the range being $63/t DM to $264/t DM.

The top 25% purchased concentrates on average for $394/t DM and it cost them $127/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 8 further highlights the variation in overhead costs between participant farms with values ranging from $1.91/kg MS to $3.63/kg MS (11.6 c/l to 26.1 c/l). The top 25% recorded lower overhead costs at $2.24/kg MS (16.1 c/l) compared to the average of $2.57/kg MS (18.4 c/l).

Labour costs, including employed and imputed labour, were the major overhead cost, accounting for 58% of total overhead costs and 22% of total costs.

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. Repairs and maintenance and depreciation decreased 10% from the previous year.

Figure 7 Milk sales vs calving pattern

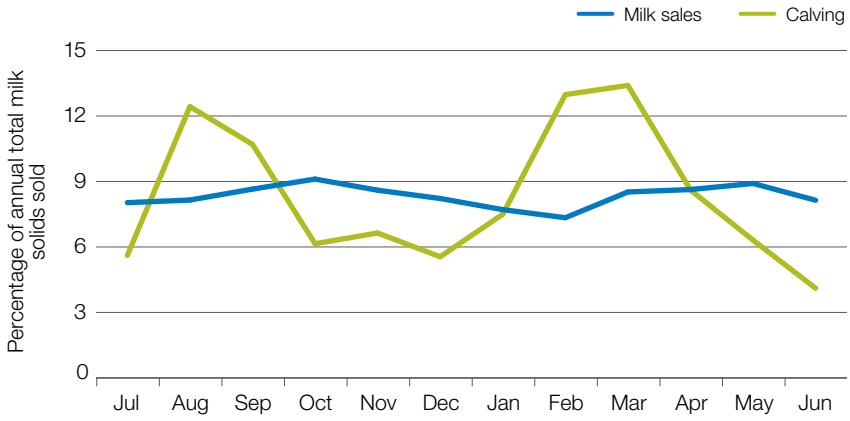
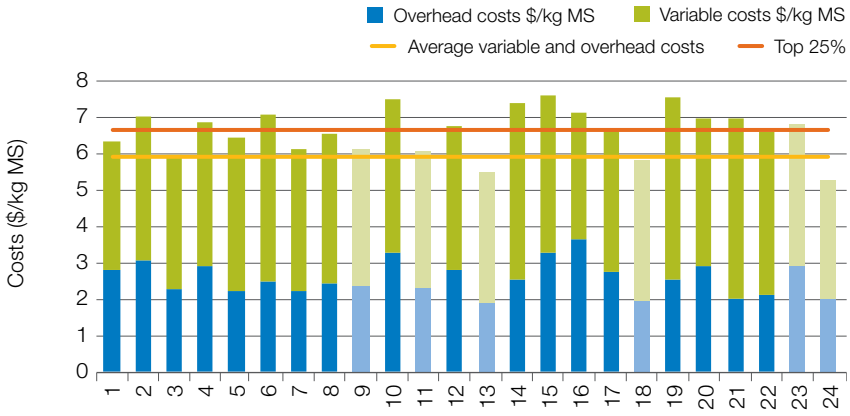


Figure 8 Whole farm variable and overhead costs per kilogram of milk solids



Cost of production

Cost of production 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 loss or increase is also considered in the cost of production where there is a decrease in the value of livestock due to reduced stock numbers, or an increase due to natural increase rather than through purchases.

Table 2 shows that the average cost of production (with inventory changes accounted for) was $6.54/kg MS (46.9 c/l) and the top 25% was $5.42/kg MS (39.0 c/l).

The average cost of production of the top 25% was 17% lower than the average for participant farms with all costs (except home grown feed costs and feed inventory changes) being equal to or lower than the average. The top 25% allocated more dollars to fertiliser than the average (0.7 c/L). The majority of costs were in line with last year, except for purchased feed and agistments (1.4 c/L) due to the increase in concentrate price and the amount used. Depreciation also increased from last year (0.8 c/L) but this is likely due to a change in procedure whereby the milk plant and irrigation equipment are removed from land and buildings and depreciated accordingly. Having a low cost of production is one key determinant of being a top 25% producer in 2017–18 .

Table 2 Cost of production

	Average		Q1 to Q3 range	State top 25% average	
Farm costs	**$/kg MS**	**c/l**	**$/kg MS**	**$/kg MS**	**c/l**
Cash cost of production	$5.51	39.5	$5.08–$5.83	$5.04	36.2
Cost of production without inventory change	$6.56	47.0	$6.08–$6.96	$5.82	41.9
+/- feed inventory changes	$0.06	0.4	$0–$0.11	$0.09	0.7
+/- livestock inventory changes - purchases	-$0.08	-0.6	$-0.37–$0.2	-$0.50	-3.5
Cost of production with inventory change	$6.54	46.9	$6.16–$7.04	$5.42	39.0

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 9 shows the EBIT per kg MS.

The average EBIT for 2017–18 was $511,339 per farm, down from $565,416 per farm in 2016–17, noting some participant changeover this year.

On average, EBIT per kg MS decreased more than 20% to $1.54/kg MS (11.0 c/l) in 2017–18 from $1.98/kg MS (14.5 c/l). The decrease in EBIT is a reflection of the higher concentrate price and the higher amounts used. This explains 59% of the drop.

The strength of the top 25% performers was highlighted with an average EBIT only decreasing 2% to $3.05/kg MS (22.0 c/l), and the amount almost double the average. This meant they were able to retain 34% of their gross farm income compared to 18% for the average.

Return on total assets and equity

Return on total assets (ROTA) 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. Figure 10 to Figure 13 were calculated excluding capital appreciation.

The average ROTA for participants was 4.3%, down from last year's 6.7% ranging from negative 0.8% to 11.4% (Figure 11). Only 25% of participants recorded a ROTA higher than 5%, as opposed to 62% last year. Only one farm achieved a ROTA greater than 10%, compared to 6 in the previous season.

The market value of land varied widely across the 24 farms, depending on location and land capability. While the average land value was $14,681/ha across all farms (range $10,271/ha to $21,875/ha) there were three farms with land values greater than $20,000/ha. As a result, this wide variation of land asset value has a significant impact on return on total assets.

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 (RoE) for the 24 farms was 7.7% in contrast to 11.2% last year. Return on equity ranged from negative 6.5% to 36.9%, with the top 25% recording an RoE of 12.5%. The majority (33%) of farms recorded a RoE of 0-5%. There were 3 farms this year that recorded a negative RoE as opposed to 1 last year. (Figure 12 and Figure 13).

It is of interest to note that the two farms with largest RoE do not sit in the top 25% of ROTA. These two businesses lease a large majority of the land which provides an interesting insight into how future business structures could be implemented. Further discussion of return on total assets and return on equity occur in the risk section below. Appendix Table A1 presents all the return on total assets and return on equity for the participant farms.

Figure 9 Whole farm earnings before interest and tax per kilogram of milk solids

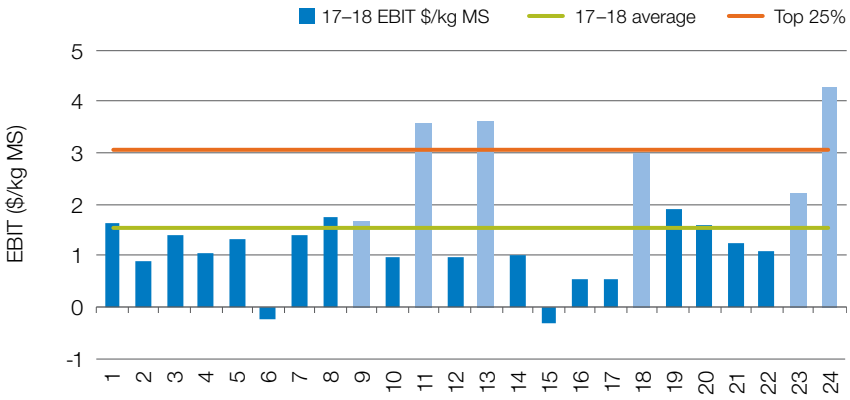


Figure 10 Distribution of farms by return on total assets

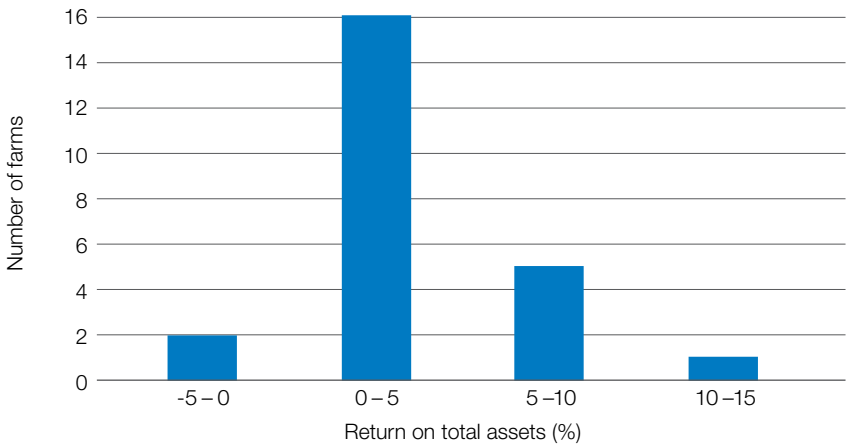


Figure 11 Return on total assets

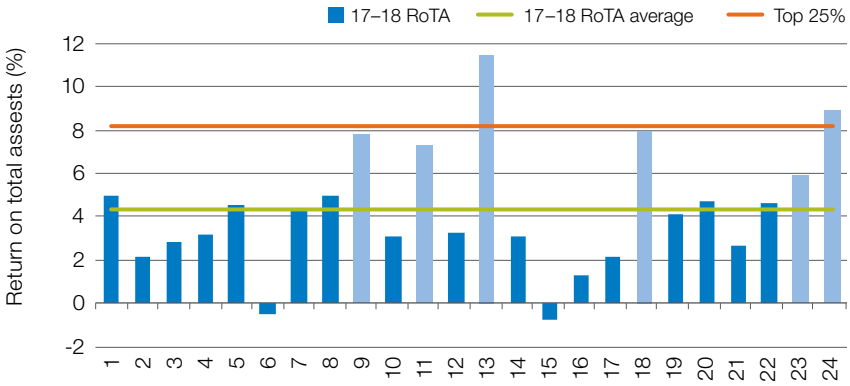


Figure 12 Distribution of farms by return on equity

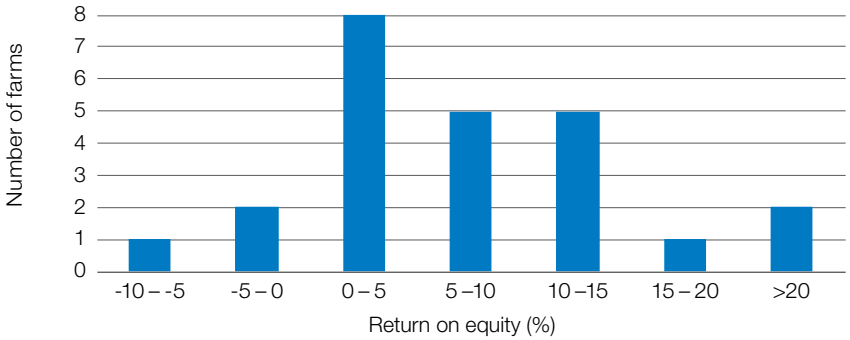
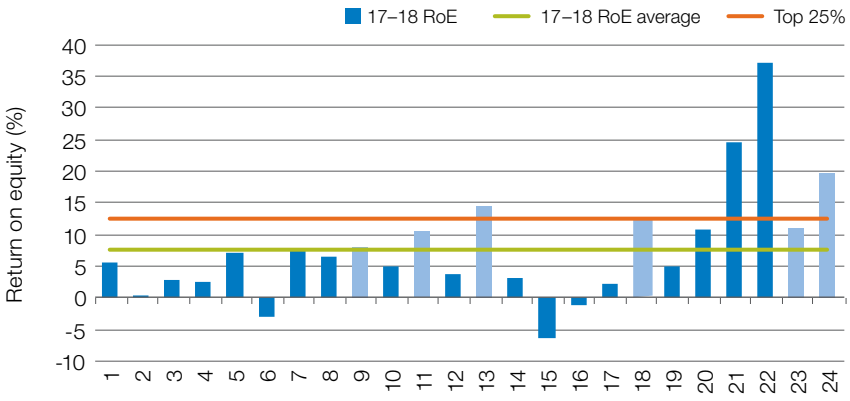


Figure 13 Return on equity



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…"[2]

Table 3 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.

Exposure to risk in business is entirely rational if not unavoidable. It is through managing risk that greater profits can be made. It is also the case that by accepting a level of risk in one area of business, a greater risk in another area can be avoided. Using the example of feed sources, dairy farmers are generally better at dairy farming than they are at grain production. Thus by allowing someone who is experienced in producing grain to supply them, they lessen the production and other business risks as well as the financial risks dairy farmers would have exposed themselves to by including extensive cropping in their own business. The trade-off is that they are then exposed to price and supply risks.

The trade-off between perceived risk and expected profitability will dictate the level of risk a given individual is willing to take. It then holds that in regions where risk is higher, less risk is taken. While in good times this will result in lower returns, in more challenging times it will lessen the losses.

The higher the risk indicator (or lower equity %) in Table 3, the greater the exposure to the risk of a shock in those areas of the business. Further, the data in Appendix Tables A4 and A5 are in cost per kilogram of milk solids sold. This data set is best used as risk indicators, given it is measured against the product produced and sold currently and not the capital invested.

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.

Only one farm in the project relied on <25% of imported feed for the herd's feed requirement. With an average of 43% 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 25% to 63%.

Equity levels averaged a very healthy 70%, although debt per cow rose by almost $700/cow.

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 3 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.

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 2017–18, 17 of the 24 of participant farms (71%) received a return on equity greater than their return on assets. This was down from 85% of businesses last year. 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 3 Risk indicators - statewide

	2017–18
Cost structure (percentage of total costs that are variable costs)	6
Debt servicing ratio (percentage of income as finance costs)	6
Debt per cow	$3,905
Equity percentage (percentage ownership of total assets managed)	70
Percentage of feed imported (as a % of total ME)	43

Physical measures

Participant farms sourced 36% of their metabolisable energy (ME) from directly grazed pasture and concentrates provided 37% of ME. The other main supply of energy was from silage (16%) and hay (10%).

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 2017–18, 63% of the diet ME is forage based; with grazed pasture the major component of the cows' diet at 36% (Figure 14).

Concentrates supply the greatest proportion of ME of all the supplements fed, accounting for 37% of the diet, a similar figure to last year.

These ratios altered from last year where the diet consisted of 44% grazed pasture, 37% concentrate, 12% 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 as dark blue bars in Figure 15) and conserved pasture (shown as light blue bars).

The average total pasture harvested (grazed and conserved) from the milking area was 5.6 t DM/ha., decreasing from last year's 6.3 t DM/ha.

The amount of pasture consumed as directly grazed feed on the milking area this year averaged 3.8 t DM/ha, ranging from 0.5 t DM/ha to 6.9 t DM/ha. This average was down considerably from last year by 1.3t DM/ha which was driving more fodder and grain to be used and driving up the cost of production.

Pasture harvested on the usable area decreased to 4.7 t DM/ha in 2017–18, from 5.1 t DM/ha last year and ranged from 3.1 t DM/ha to 7.7 t DM/ha.

There is a strong indication that the top 25% manage the pasture base with high consumption across all the usable area, rather than just the milking platform. Top businesses understand that the land is a resource, and managing all the pasture well, is essential to lower the cost of production.

It should be noted that 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 and 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 metabolisable energy

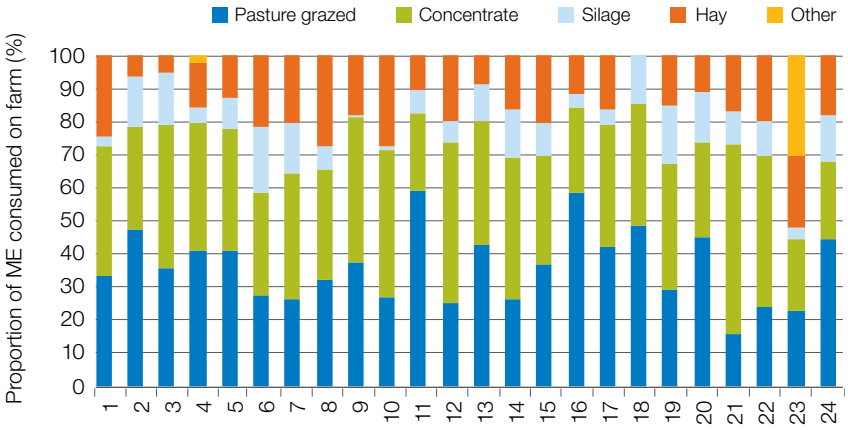
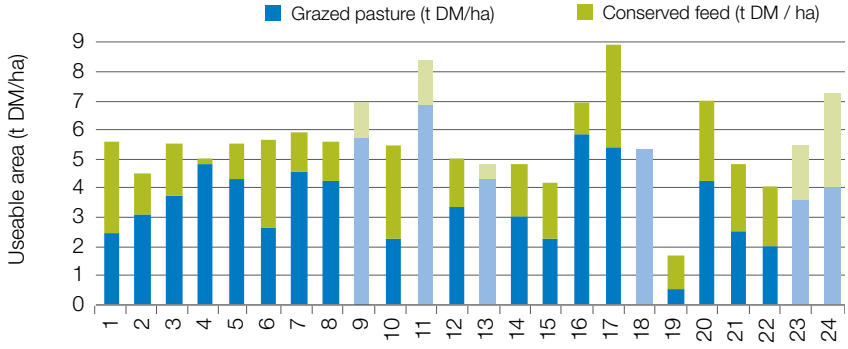


Figure 15 Estimated tonnes of home grown feed removed per milking hectare



Fertiliser application

Application of total nutrients between participant farms have steadily increased since the start of the project in 2013-14, but driven mainly by increases in nitrogen application.
The total nutrient use was 201 kg/ha comprising of 111 kg/ha nitrogen, 19 kg/ha phosphorus, 41 kg/ha potassium and 29 kg/ha sulphur (Table 4).

It should be noted that 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.

Western Australian 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 37 kg N/ha up to 240 kg N/ha, with the group average at 111 kg N/ha (Figure 17). Farms in the top 25% applied slightly more fertiliser than the average but the variation was a lot smaller than in previous years. The only nutrient of significant variation was 11% more nitrogen applied than the average usage.

It should also be recognised that grazing strategies and timing of rainfall and irrigation scheduling would also impact upon pasture growth and consumption. The values for Figure 17 can be found in Appendix Table A2.

Figure 16 Estimated tonnes of home grown feed removed per usable hectare

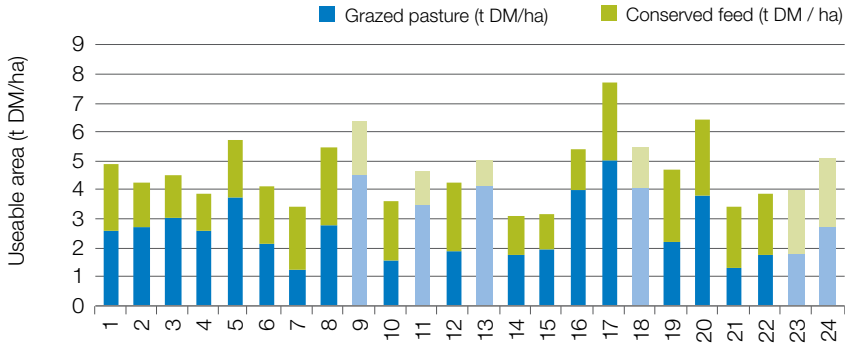


Figure 17 Fertiliser application per usable area (kg/ha)

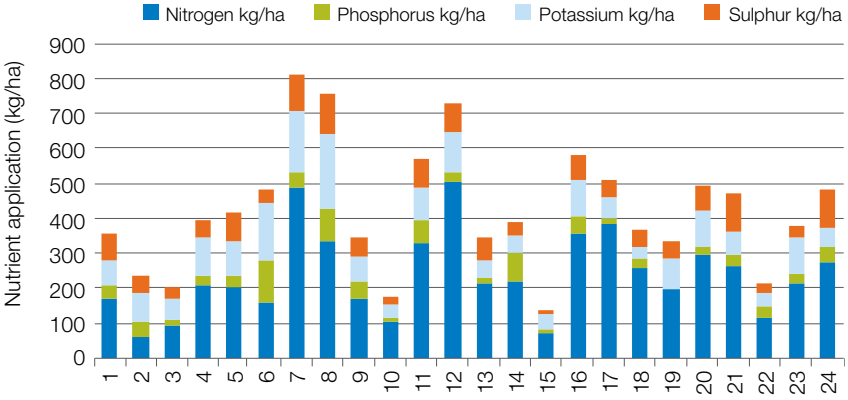


Table 4 Fertiliser use on usable area

Applied fertiliser	2013–14	2014–15	2015–16	2016–17	2017–18
Nitrogen	86	89	97	109	111
Phosphorus	12	14	16	14	19
Potassium	34	38	41	38	41
Sulphur	25	29	28	28	29

Business confidence survey

Expectations and issues

Responses to this business confidence survey were made from July to September 2018 with regard to the 2018–19 financial year and the next five years to 2022–23.

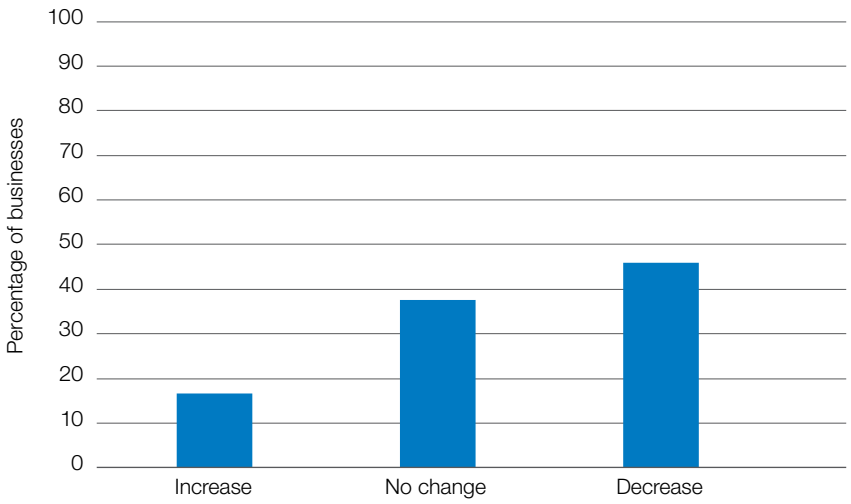
Expectation for business returns

Following a difficult autumn for pasture growth, and with rising grain and fodder prices, the business confidence was seriously impacted during the completion of the survey. Expectations for the coming season remained more cautious with only 17% of farmers predicting an improvement in farm business returns compared to 35% last year. The expectations of stability or deterioration certainly increased with 46% and 37% expecting no change or a decrease in farm business returns.

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 business return in 2018–19 were a lot lower than last year (Figure 18). This is primarily driven by the high grain and fodder prices and peoples expectations that they will remain high.

Figure 18 Expectation of business returns



Price and production expectations – Milk

The majority of respondents expected their price and production to remain stable. Overwhelmingly, 83% of farmers expected their price to remain the same, a reflection of the higher grain markets and also the balanced position of the domestic market at present.

Whilst the expectations on production were more balanced only 21% were expecting to increase their production.

46% of respondents would maintain their production level with 33% expecting a decrease.

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.

Fifty per cent of participating farmers expected no change in fodder production in 2018–19 (Figure 20).

Only 17% 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.

Cost expectations

In relation to costs there is little expectation of costs to decrease across the major cost categories. A great majority (83%) expect an increase in purchased feed costs due to the record high grain prices. (Figure 21).

Fifty four percent thought that the fuel and oil prices would increase and 38% thought fertiliser would increase. This is not surprising as these commodities increase in price when the grain market is at record levels.

Among the irrigators, the majority of users (78%) expected costs to remain similar to last year. Due to the high cost of grain there will be a greater focus on utilising the higher allocation of water this season.

** Dataset includes 10 farms with irrigation*

Figure 19 Price and production expectations - milk

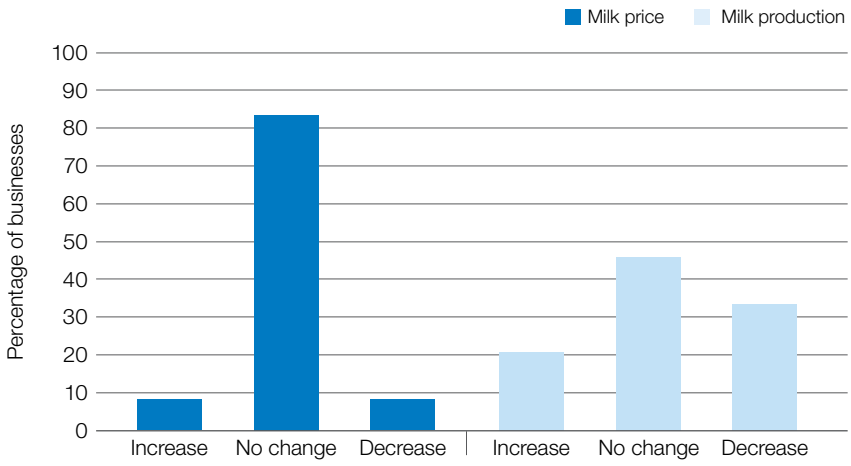


Figure 20 Production expectations - Fodder

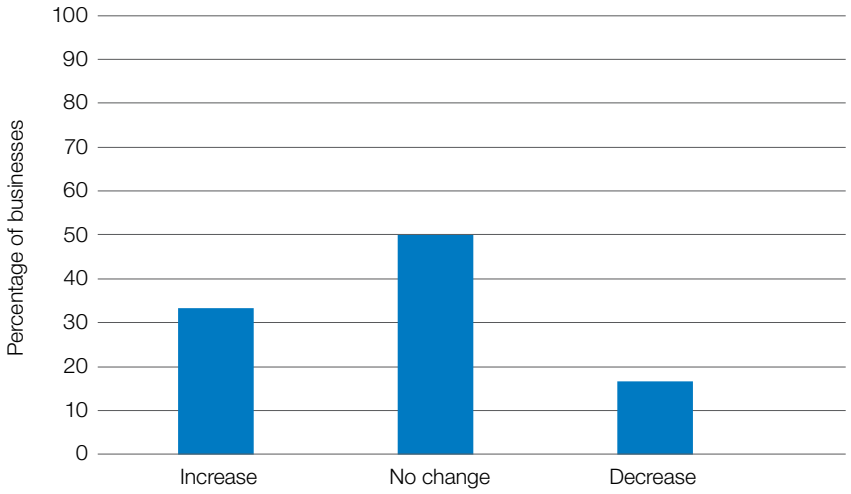
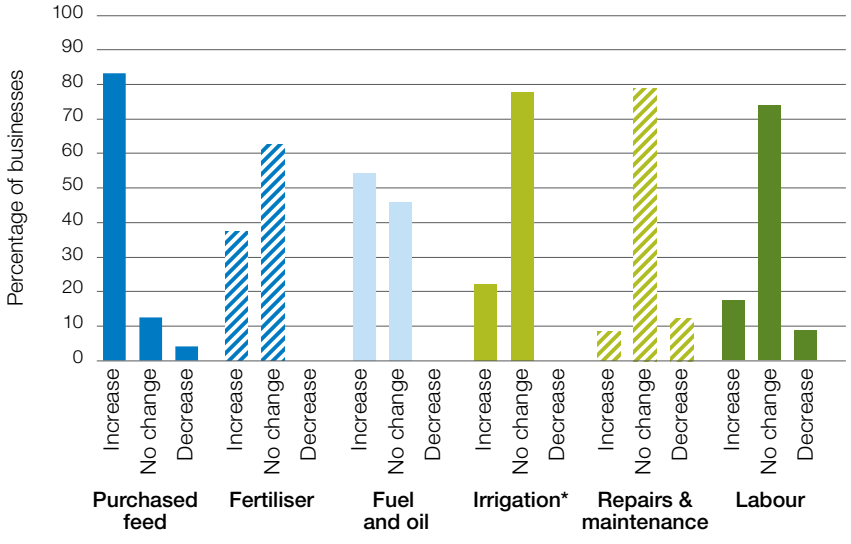


Figure 21 Cost expectations



Major issues facing the dairy industry – the next 12 months

Figure 22 provides a summary of the key issues identified by participants for the coming 12 months.

Of the issues considered a major concern pasture/fodder followed by milk price and input costs were of most importance importance facing participants. This is not surprising after a late autumn break and a reduction in farm margins.

Climate/seasonal conditions was the next major issue.

Succession planning, labour and water remained less important concerns for 2018–19, which was a similar trend to last years survey.

Major issues facing the dairy industry – the next five years

Participants were asked to respond to seven key issues for their business over the next five years to 2022–23 (Figure 23).

Milk price, input costs and pasture/fodder were again ranked highly important across participants. Succession planning gained a little more importance for the long term future then in the immediate year ahead. Water was only 36% highly important or important which is a reflection of the large amount of dryland farms in WA..

Figure 22 Major issues facing the dairy industry - 12 month issues

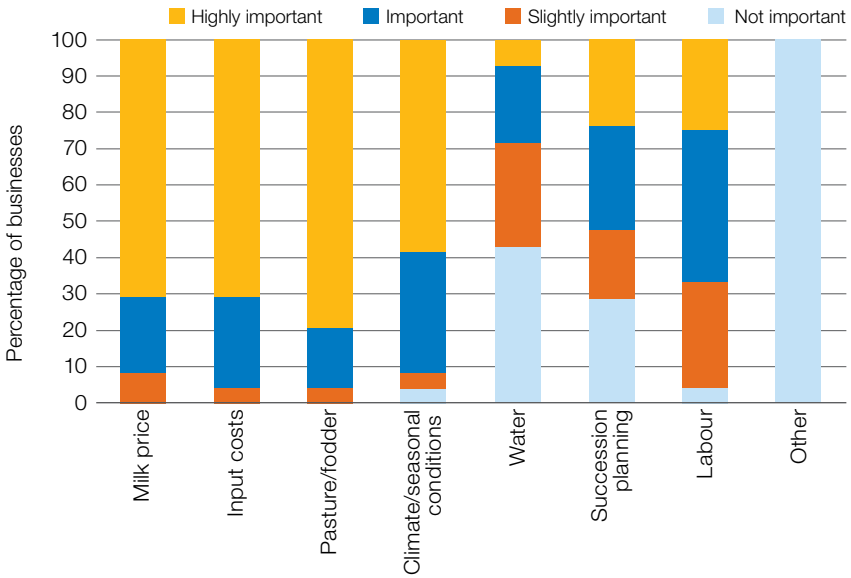
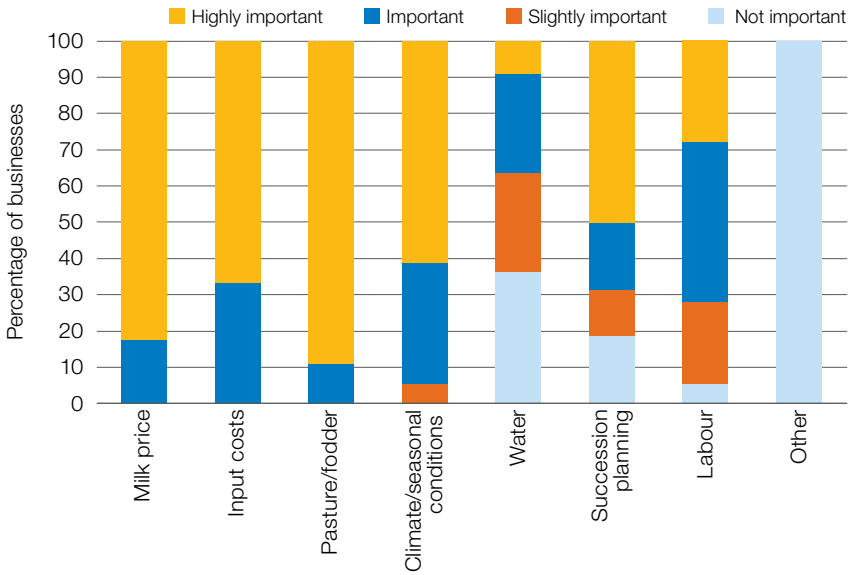


Figure 23 Major issues facing the dairy industry - 5 year issues



Greenhouse gas emissions

2017–18 Greenhouse gas emissions

The average level of emission from participating farms was 14.6 t CO_2-e/t MS in 2017–18, 19% lower than last year's 18.1 t CO_2-e/t MS. While the changes for most were minimal, the CH_4 decreased (26%) and prefarm gate increased (30%) significantly.

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 40 kg of methane (CH_4) and 3.4 kg 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 2017–18 is shown in Figure 24. Greenhouse gas emissions per tonne of milk solids produced ranged from 3.4 CO_2-e/t MS to 37.1 t CO_2-e/t MS with an average emission level of 14.6 t CO_2-e/t MS. The percentage breakdown for emissions in 2017–18 was 75% for CH_4, 9% for CO_2, and 15% for N_2O emissions.

Methane was identified as the main greenhouse gas emitted from dairy farms, accounting for 75%, or 9.3 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 55% of total emissions. Methane from effluent ponds accounted for 8% of total emissions on average across the state in 2017–18.

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.

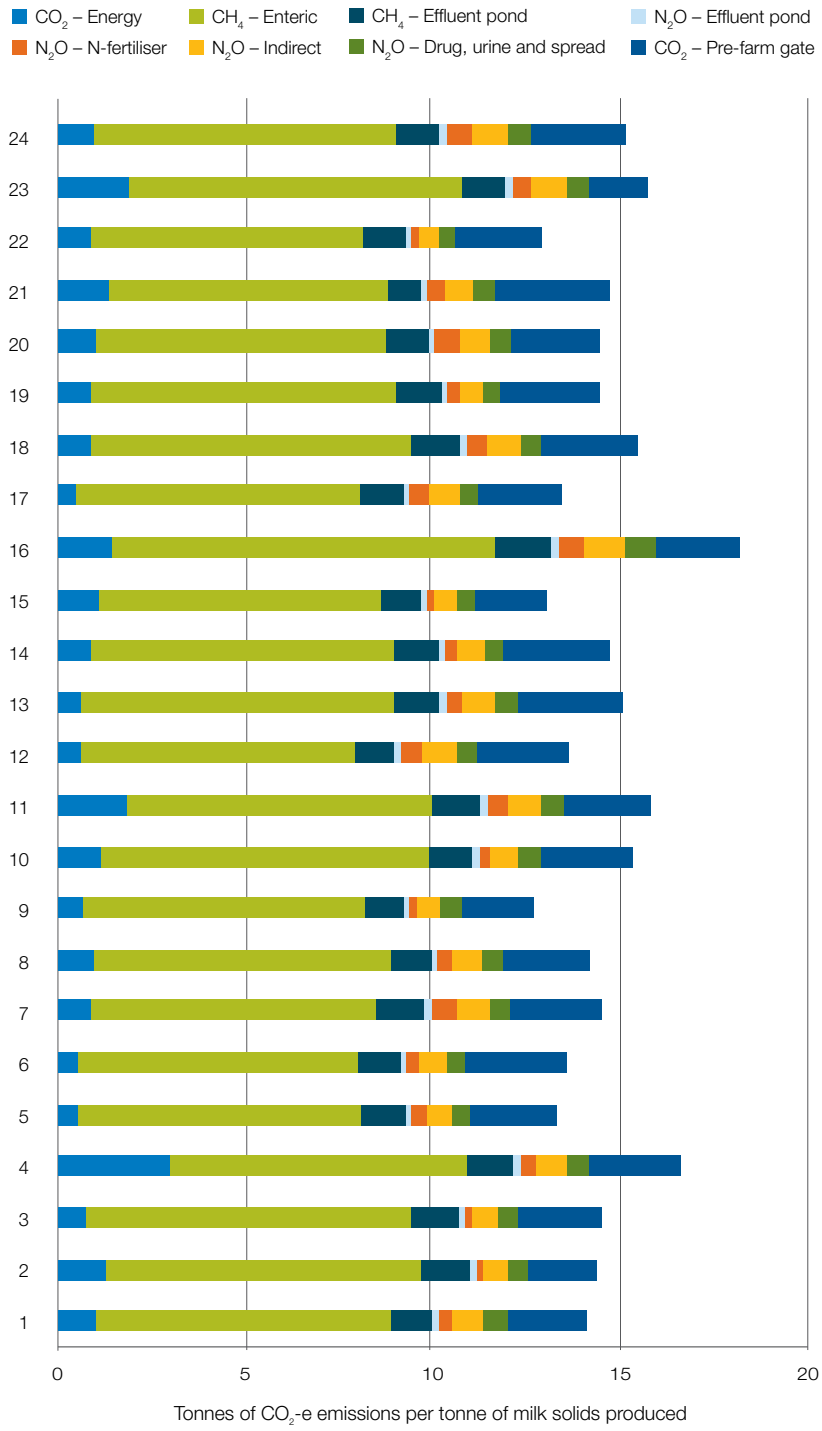
The second main greenhouse gas emission was pre-farm gate being produced primarily from fossil fuel consumption as either electricity or petrochemicals. The NGGI calculates carbon emissions from both pre-farm gates and on-farm sources. Carbon dioxide accounted for 18% of total emissions (3.3 t CO_2-e/t MS); 12% from pre-farm gates sources and 6% 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 (eg 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 15% of total emissions or 2.1 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 2% of total emissions and excreta accounted for 5%. 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 24 Greenhouse gas emissions per tonne of milk solids produced



Historical analysis

Historical analysis

In real terms, the EBIT for 2017–18 is lower than the previous three years, however it remains higher than first year of the project. Return on Total Assets was also down to 4.3% which is the lowest business performance recorded during the five years the project has been running. Real farm incomes continued a downward trend over the past three years.

This section compares the performance of participant farms in the Dairy Farm Monitor Project over the past five years. While figures are adjusted for inflation to allow comparison between years it should be noted that only 13 farms from the initial farms in 2013–14 have participated over all five seasons with two new farms participating in 2017–18.

The average EBIT and net farm income decreased for the third year in a row, however they were higher than at the start of the project in 2013–14 (Figure 25).

Earnings before interest and tax as well as net farm income declined slightly in 2017–18 due to the increase in purchased feed costs (adjusted for inflation). The current business performance is the worst in terms of ROTA, although it is the second worse season in terms of EBIT and RoE.

Return on total assets (ROTA) at 4.3% in 2017–18 has dropped significantly in the past twelve months and have trended down for the past three years (Figure 26).

In all of the previous three years, all participating farms, except one last year, achieved a positive ROTA. This year two had a negative return. In the last three years more than 60% of farms achieved a ROTA greater than 5% compared to only 25% of farms in 2017–18. This smaller proportion of farms' positive performance in 2017–18 was primarily due to the higher costs in purchased feeds.

The average return on equity (RoE) decreased significantly from a very healthy 11.2% in 2016–17 to 7.7%, whilst the top 25% still remained at 12.5%.

Figure 25 Historical EBIT and net farm income

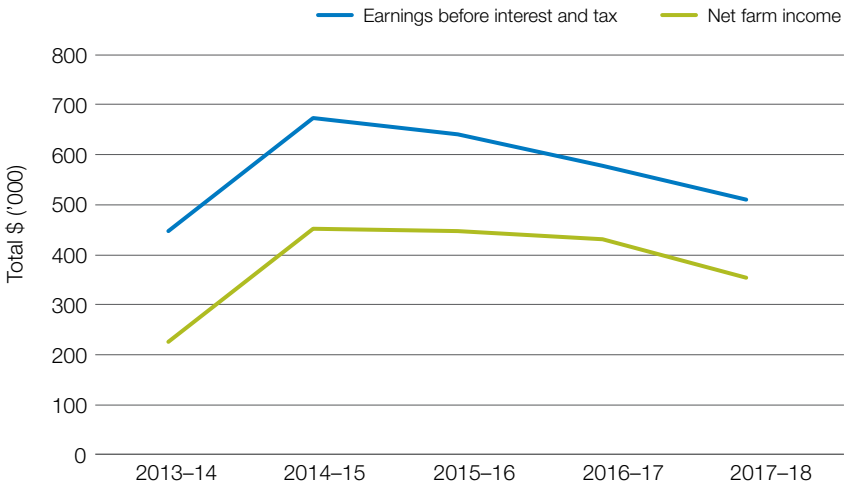
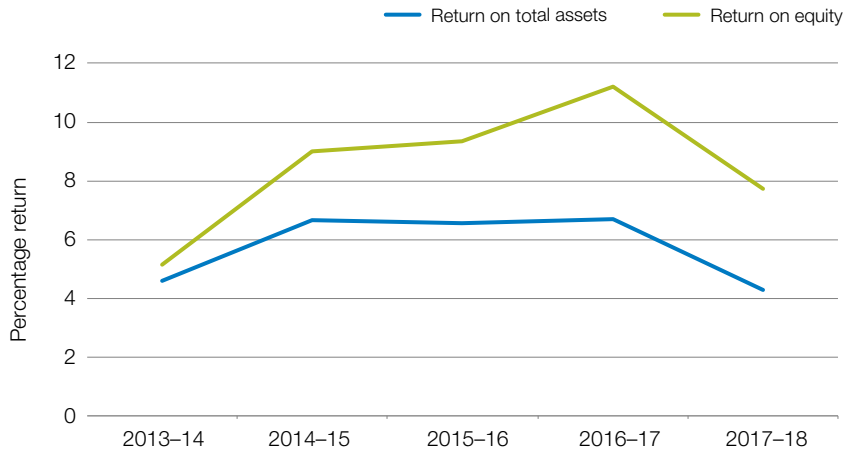


Figure 26 Historical return on assets and return on equity



Appendices

Appendix A **Statewide 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	%
1			7.95	3.55	2.79	56	1.61	5.0	0.54	6.8	1.07	5.4
2			7.88	3.93	3.06	56	0.89	2.1	0.85	10.8	0.04	0.2
3			7.35	3.68	2.27	62	1.40	2.8	0.47	6.3	0.94	2.6
4			7.89	3.93	2.90	58	1.06	3.1	0.73	9.3	0.33	2.5
5			7.75	4.20	2.23	65	1.31	4.5	0.11	1.5	1.20	7.0
6			6.84	4.59	2.49	65	-0.25	-0.6	0.24	3.6	-0.49	-3.0
7			7.51	3.89	2.25	63	1.37	4.3	0.58	7.7	0.80	7.7
8			8.31	4.09	2.46	62	1.75	5.0	0.58	7.0	1.17	6.2
9			7.75	3.74	2.36	61	1.65	7.8	0.00	0.0	1.65	7.8
10			8.43	4.18	3.30	56	0.95	3.0	0.14	1.6	0.81	5.0
11			9.66	3.77	2.31	62	3.58	7.3	0.61	6.3	2.97	10.3
12			7.71	3.94	2.80	58	0.97	3.3	0.20	2.6	0.77	3.6
13			9.08	3.56	1.91	65	3.61	11.4	0.36	4.0	3.25	14.2
14			8.38	4.86	2.53	66	0.99	3.1	0.44	5.3	0.55	2.9
15			7.29	4.36	3.25	57	-0.32	-0.8	0.81	11.2	-1.14	-6.5
16			7.66	3.49	3.63	49	0.55	1.2	0.79	10.3	-0.24	-1.4
17			7.20	3.92	2.74	59	0.54	2.1	0.36	5.0	0.18	2.2
18			8.78	3.85	1.95	66	2.98	7.9	0.63	7.2	2.35	11.9
19			9.42	4.98	2.55	66	1.89	4.0	0.64	6.8	1.25	4.7
20			8.58	4.05	2.93	58	1.60	4.7	0.90	10.5	0.70	10.8
21			8.20	4.96	2.00	71	1.24	2.6	0.34	4.1	0.90	24.4
22			7.65	4.47	2.12	68	1.07	4.5	0.82	10.7	0.25	36.9
23			9.00	3.87	2.91	57	2.21	5.9	0.71	7.9	1.50	11.0
24			9.53	3.23	2.03	61	4.27	8.8	0.85	9.0	3.41	19.6
Average	**7.00**	**1.16**	**8.16**	**4.05**	**2.57**	**61**	**1.54**	**4.3**	**0.53**	**6.5**	**1.01**	**7.7**
Top 25%	**7.40**	**1.57**	**8.97**	**3.67**	**2.24**	**62**	**3.05**	**8.2**	**0.53**	**5.7**	**2.52**	**12.5**

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	%	%
1					1.1	537	573	4.0	3.1
2					0.7	506	373	4.1	3.3
3					1.1	519	583	3.7	3.2
4					0.8	537	417	3.7	3.2
5					1.0	654	686	3.8	3.4
6					0.9	620	588	4.2	3.5
7					0.6	606	340	4.2	3.2
8					0.8	641	506	3.8	3.2
9					1.5	667	984	3.9	3.3
10					0.7	514	379	3.9	3.2
11					0.6	565	315	4.0	3.3
12					0.9	598	558	4.2	3.3
13					1.3	501	626	4.3	3.4
14					0.9	516	483	3.6	3.2
15					0.6	617	346	4.3	3.4
16					0.9	418	379	3.8	3.2
17					1.4	622	885	3.9	3.3
18					1.1	514	542	3.7	3.3
19					0.7	618	442	3.7	3.2
20					0.8	689	527	3.9	3.2
21					0.8	713	601	3.7	3.1
22					0.9	624	556	4.0	3.4
23					0.8	550	441	3.9	3.2
24					0.6	576	370	3.7	3.3
Average	**586**	**277**	**0.5**	**497**	**497**	**580**	**521**	**3.9**	**3.2**
Top 25%*	**731**	**367**	**0.6**	**653**	**653**	**562**	**546**	**3.9**	**3.3**

*on milking area

Appendix A **Statewide summary tables** (continued)

Table A2 Physical information (continued)

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
1	2.5	3.2	60%	100.9	24.3	41.0	46.7	94	50,315
2	3.1	1.4	69%	37.9	27.5	48.5	29.7	63	31,805
3	3.7	1.8	50%	57.2	10.0	34.5	20.0	96	49,988
4	4.8	0.2	56%	95.8	14.4	48.5	22.6	70	37,448
5	4.3	1.2	58%	134.8	21.4	64.8	53.2	100	65,430
6	2.7	3.0	49%	105.9	81.9	111.2	24.0	80	49,355
7	4.6	1.3	62%	118.2	10.2	43.1	24.6	69	41,959
8	4.3	1.4	60%	109.6	29.0	70.3	37.5	83	52,918
9	5.7	1.2	51%	95.1	27.4	39.7	28.2	116	77,183
10	2.3	3.2	55%	56.0	5.5	19.1	12.3	63	32,221
11	6.9	1.5	74%	94.5	17.1	27.3	22.8	94	53,011
12	3.4	1.7	49%	172.7	9.2	40.0	27.6	83	49,844
13	4.3	0.5	52%	138.7	11.1	31.8	40.3	116	58,026
14	3.0	1.8	44%	86.0	31.2	18.9	16.0	101	52,152
15	2.3	1.9	58%	36.9	6.3	20.3	7.3	90	55,266
16	5.8	1.1	74%	131.2	17.7	36.9	26.1	72	30,235
17	5.4	3.5	62%	240.2	9.8	35.2	32.2	61	37,724
18	5.4	0.0	61%	164.0	16.4	23.6	30.4	108	55,540
19	0.5	1.1	55%	68.9	0.0	32.5	16.5	75	46,560
20	4.2	2.8	69%	176.4	13.1	62.3	43.1	79	54,735
21	2.5	2.3	37%	132.3	15.7	32.9	56.8	108	76,989
22	2.0	2.0	47%	68.2	17.2	22.4	17.9	82	51,321
23	3.6	1.9	48%	118.0	13.9	55.9	18.4	76	41,798
24	4.1	3.2	75%	133.5	19.8	26.0	53.1	117	67,542
Average	**3.8**	**1.9**	**57%**	**111.4**	**18.8**	**41.1**	**29.5**	**87**	**50,807**
Top 25%*	**5.0**	**1.6**	**60%**	**124.0**	**17.6**	**34.1**	**32.2**	**104**	**58,850**

*on milking area

Table A3 Purchased feed

Farm number	Purchased feed per milker	Concentrate price	Silage price	Hay price	Other feed price	Average purchased feed price	Percent of total energy imported
	t DM/hd	$/t DM	$/t DM	$/t DM	$/t DM	$/t DM	% of ME
1	2.3	367		294		363	40
2	1.9	529				529	31
3	3.2	461		253		425	50
4	2.8	371		242	1,427	379	45
5	3.0	487		268		450	42
6	4.4	517	619	353		454	51
7	2.5	327			1,189	363	39
8	3.1	384		494		394	40
9	3.2	342	222	188		322	49
10	3.0	448		313		447	45
11	2.3	453		311		435	26
12	3.4	365		301	654	367	52
13	3.2	376		278		345	49
14	3.1	364	252	202	2,292	346	57
15	3.6	556		206		470	42
16	1.6	354				354	26
17	2.8	480		240	82	430	38
18	2.6	426		262		412	39
19	4.3	522		294		476	45
20	2.8	501		294		487	31
21	4.3	419		274		401	65
22	3.6	485	577	300		450	53
23	3.9	436			42	170	53
24	1.6	331		347		332	25
Average	**3.0**	**429**	**418**	**286**	**948**	**400**	**43**
Top 25*	**2.8**	**394**	**222**	**277**	**42**	**336**	**40**

Appendix A **Statewide summary tables** (continued)

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
	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS
1	0.20	0.13	0.01	0.20	0.14	0.67	0.49	0.00	0.17
2	0.13	0.10	0.01	0.16	0.09	0.48	0.59	0.23	0.14
3	0.10	0.06	0.01	0.12	0.05	0.35	0.29	0.00	0.03
4	0.17	0.12	0.01	0.28	0.10	0.69	0.58	0.17	0.07
5	0.11	0.07	0.02	0.09	0.05	0.32	0.43	0.12	0.32
6	0.11	0.07	0.00	0.08	0.11	0.38	0.27	0.27	0.46
7	0.09	0.13	0.00	0.11	0.09	0.41	0.79	0.00	0.31
8	0.10	0.25	0.02	0.12	0.15	0.64	0.58	0.00	0.07
9	0.03	0.10	0.00	0.14	0.12	0.38	0.73	0.00	0.20
10	0.13	0.07	0.01	0.12	0.12	0.45	0.40	0.00	0.14
11	0.12	0.10	0.00	0.10	0.10	0.42	0.80	0.19	0.21
12	0.12	0.14	0.07	0.13	0.09	0.53	0.55	0.20	0.29
13	0.14	0.14	0.00	0.11	0.09	0.48	0.40	0.00	0.04
14	0.09	0.28	0.12	0.12	0.09	0.70	0.47	0.14	0.33
15	0.06	0.08	0.00	0.24	0.45	0.82	0.21	0.00	0.10
16	0.05	0.04	0.00	0.23	0.08	0.39	0.72	0.45	0.05
17	0.12	0.08	0.00	0.12	0.16	0.48	0.37	0.24	0.30
18	0.06	0.06	0.01	0.15	0.10	0.38	0.47	0.45	0.09
19	0.08	0.22	0.01	0.15	0.23	0.69	0.28	0.00	0.00
20	0.17	0.11	0.00	0.13	0.13	0.55	0.60	0.00	0.09
21	0.14	0.22	0.02	0.14	0.16	0.69	0.59	0.00	0.11
22	0.13	0.16	0.01	0.09	0.14	0.53	0.30	0.00	0.16
23	0.12	0.23	0.00	0.15	0.04	0.54	0.63	0.00	0.23
24	0.04	0.18	0.09	0.14	0.20	0.65	0.58	0.00	0.09
Average	**0.11**	**0.13**	**0.02**	**0.14**	**0.13**	**0.53**	**0.51**	**0.10**	**0.17**
Top 25%*	**0.09**	**0.13**	**0.02**	**0.13**	**0.11**	**0.48**	**0.60**	**0.11**	**0.14**

Table A4 Variable costs (continued)

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
	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS
1	0.16	0.29	0.06	0.06	1.64	0.00	0.01	2.88	3.55
2	0.17	0.10	0.01	0.00	2.18	0.00	0.04	3.45	3.93
3	0.08	0.09	0.00	0.28	2.40	0.05	0.12	3.33	3.68
4	0.11	0.09	0.00	0.17	2.04	0.00	0.00	3.24	3.93
5	0.05	0.47	0.00	0.25	2.20	0.04	0.00	3.88	4.20
6	0.07	0.14	0.00	0.94	1.83	0.00	0.23	4.21	4.59
7	0.14	0.35	0.02	0.00	1.67	0.00	0.19	3.48	3.89
8	0.17	0.05	0.29	0.22	1.77	0.00	0.31	3.46	4.09
9	0.22	0.22	0.10	0.17	1.49	0.15	0.06	3.36	3.74
10	0.30	0.17	0.00	0.02	2.69	0.04	-0.04	3.73	4.18
11	0.09	0.14	0.00	0.18	1.75	0.00	-0.01	3.36	3.77
12	0.08	0.20	0.02	0.13	1.84	0.00	0.11	3.40	3.94
13	0.09	0.10	0.00	0.63	1.85	0.01	-0.04	3.08	3.56
14	0.12	0.61	0.00	0.55	2.13	0.01	-0.20	4.16	4.86
15	0.23	0.11	0.08	0.28	2.36	0.00	0.16	3.53	4.36
16	0.18	0.28	0.00	0.00	1.31	0.00	0.11	3.10	3.49
17	0.06	0.32	0.00	0.23	2.11	0.00	-0.18	3.44	3.92
18	0.09	0.12	0.00	0.12	2.12	0.00	0.00	3.46	3.85
19	0.10	0.37	0.00	0.46	3.19	0.00	-0.12	4.29	4.98
20	0.25	0.22	0.17	0.09	2.09	0.00	0.00	3.51	4.05
21	0.23	0.26	0.00	0.26	2.74	0.00	0.09	4.28	4.96
22	0.21	0.38	0.00	0.40	2.48	0.00	0.01	3.94	4.47
23	0.42	0.25	0.00	0.00	1.24	0.00	0.55	3.33	3.87
24	0.20	0.20	0.13	0.08	1.06	0.25	0.00	2.58	3.23
Average	**0.16**	**0.23**	**0.04**	**0.23**	**2.01**	**0.02**	**0.06**	**3.52**	**4.05**
Top 25%*	**0.18**	**0.17**	**0.04**	**0.20**	**1.58**	**0.07**	**0.09**	**3.20**	**3.67**

Appendix A **Statewide summary tables** (continued)

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
	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS	$/kg MS
1	0.02	0.11	0.04	0.59	0.09	0.52	1.38	0.55	0.86	2.79
2	0.06	0.01	0.02	0.48	0.09	1.09	1.75	0.56	0.75	3.06
3	0.08	0.05	0.03	0.32	0.09	0.87	1.44	0.30	0.52	2.27
4	0.03	0.06	0.07	0.38	0.12	1.52	2.17	0.39	0.34	2.90
5	0.04	0.08	0.01	0.56	0.11	0.25	1.06	0.38	0.80	2.23
6	0.10	0.06	0.17	0.31	0.05	0.57	1.26	0.24	0.99	2.49
7	0.01	0.05	0.02	0.45	0.08	0.97	1.57	0.16	0.52	2.25
8	0.03	0.05	0.01	0.56	0.08	1.21	1.94	0.31	0.21	2.46
9	0.02	0.09	0.06	0.41	0.05	0.57	1.21	0.85	0.29	2.36
10	0.04	0.16	0.08	0.38	0.18	0.75	1.58	0.43	1.29	3.30
11	0.07	0.06	0.00	0.39	0.17	0.71	1.40	0.28	0.63	2.31
12	0.07	0.07	0.01	0.55	0.18	1.18	2.06	0.38	0.36	2.80
13	0.05	0.01	0.01	0.27	0.05	0.91	1.29	0.26	0.35	1.91
14	0.03	0.09	0.01	0.65	0.18	0.69	1.65	0.31	0.56	2.53
15	0.03	0.08	0.06	0.44	0.20	0.37	1.19	1.07	0.99	3.25
16	0.17	0.07	0.04	0.21	0.09	0.98	1.57	0.53	1.53	3.63
17	0.10	0.08	0.05	0.35	0.11	0.37	1.06	0.18	1.50	2.74
18	0.08	0.04	0.04	0.32	0.13	1.05	1.67	0.08	0.20	1.95
19	0.08	0.10	0.05	0.34	0.12	0.41	1.10	0.52	0.93	2.55
20	0.04	0.06	0.10	0.62	0.16	1.25	2.23	0.23	0.46	2.93
21	0.00	0.06	0.03	0.40	0.20	0.84	1.53	0.18	0.28	2.00
22	0.01	0.11	0.03	0.32	0.09	0.76	1.32	0.26	0.53	2.12
23	0.08	0.08	0.06	0.58	0.04	0.94	1.78	0.40	0.73	2.91
24	0.05	0.11	0.10	0.35	0.10	0.69	1.40	0.24	0.38	2.03
Average	**0.05**	**0.07**	**0.05**	**0.43**	**0.11**	**0.81**	**1.53**	**0.38**	**0.67**	**2.57**
Top 25%*	**0.06**	**0.07**	**0.04**	**0.39**	**0.09**	**0.81**	**1.46**	**0.35**	**0.43**	**2.24**

Table A6 Variable costs – percentage

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
	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs
1	3.1	2.0	0.1	3.1	2.3	10.6	7.7	0.0	2.7
2	1.9	1.4	0.1	2.3	1.2	6.8	8.4	3.3	1.9
3	1.7	1.0	0.2	2.0	0.9	5.8	4.9	0.0	0.5
4	2.5	1.8	0.2	4.1	1.4	10.1	8.5	2.5	1.1
5	1.6	1.0	0.3	1.3	0.8	5.0	6.7	1.9	4.9
6	1.6	1.0	0.0	1.2	1.5	5.3	3.8	3.8	6.6
7	1.4	2.1	0.0	1.7	1.4	6.7	12.9	0.0	5.0
8	1.5	3.8	0.3	1.8	2.3	9.7	8.8	0.0	1.1
9	0.5	1.6	0.0	2.3	2.0	6.3	12.0	0.0	3.3
10	1.8	0.9	0.1	1.6	1.7	6.0	5.4	0.0	1.9
11	2.0	1.6	0.0	1.7	1.7	6.9	13.1	3.2	3.5
12	1.8	2.0	1.0	1.9	1.3	7.9	8.2	2.9	4.3
13	2.7	2.6	0.0	2.0	1.6	8.8	7.4	0.0	0.6
14	1.3	3.8	1.6	1.6	1.2	9.5	6.3	1.9	4.4
15	0.7	1.1	0.0	3.1	5.9	10.8	2.8	0.0	1.3
16	0.7	0.5	0.0	3.2	1.1	5.5	10.1	6.3	0.7
17	1.8	1.1	0.0	1.8	2.4	7.2	5.6	3.5	4.6
18	1.1	1.1	0.1	2.6	1.7	6.6	8.1	7.8	1.5
19	1.1	2.9	0.1	2.0	3.0	9.1	3.7	0.0	0.0
20	2.5	1.6	0.0	1.9	1.9	7.8	8.6	0.0	1.3
21	2.0	3.2	0.3	2.0	2.3	9.9	8.5	0.0	1.6
22	2.0	2.4	0.2	1.3	2.1	8.0	4.5	0.0	2.5
23	1.7	3.4	0.0	2.3	0.5	7.9	9.3	0.0	3.4
24	0.8	3.4	1.7	2.6	3.8	12.4	11.0	0.0	1.8
Average	**1.7**	**2.0**	**0.3**	**2.1**	**1.9**	**7.9**	**7.8**	**1.5**	**2.5**
Top 25%*	**1.5**	**2.3**	**0.3**	**2.2**	**1.9**	**8.2**	**10.1**	**1.8**	**2.3**

Table A6 Variable costs – percentage (continued)

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
1	2.5	4.5	0.9	1.0	25.8	0.0	0.2	45.4	56.1
2	2.4	1.4	0.1	0.0	31.3	0.0	0.5	49.4	56.3
3	1.4	1.4	0.0	4.7	40.3	0.8	2.0	56.0	61.9
4	1.6	1.3	0.0	2.5	29.9	0.0	0.0	47.5	57.5
5	0.8	7.3	0.0	3.8	34.2	0.6	0.1	60.3	65.3
6	0.9	2.0	0.0	13.3	25.8	0.0	3.3	59.5	64.8
7	2.3	5.7	0.3	0.0	27.3	0.0	3.1	56.6	63.3
8	2.5	0.7	4.4	3.3	27.1	0.0	4.8	52.7	62.4
9	3.6	3.7	1.7	2.9	24.5	2.5	1.0	55.0	61.3
10	4.1	2.3	0.0	0.3	36.0	0.5	-0.6	49.9	55.9
11	1.4	2.3	0.0	3.0	28.8	0.1	-0.1	55.2	62.0
12	1.2	2.9	0.3	1.9	27.3	0.0	1.6	50.5	58.5
13	1.6	1.8	0.0	11.6	33.7	0.3	-0.8	56.3	65.1
14	1.7	8.3	0.0	7.4	28.9	0.2	-2.8	56.3	65.7
15	3.0	1.5	1.1	3.7	31.0	0.0	2.1	46.4	57.2
16	2.6	4.0	0.0	0.0	18.3	0.0	1.6	43.5	49.0
17	0.8	4.8	0.0	3.4	31.7	0.0	-2.7	51.7	58.9
18	1.5	2.1	0.0	2.1	36.5	0.0	0.0	59.7	66.3
19	1.4	5.0	0.0	6.1	42.4	0.0	-1.5	57.0	66.1
20	3.6	3.2	2.4	1.2	29.9	0.0	0.0	50.2	58.1
21	3.2	3.7	0.0	3.8	39.4	0.0	1.2	61.5	71.3
22	3.2	5.8	0.0	6.1	37.6	0.0	0.1	59.9	67.9
23	6.2	3.7	0.0	0.0	18.3	0.0	8.2	49.1	57.1
24	3.8	3.7	2.5	1.5	20.1	4.7	0.0	49.1	61.5
Average	**2.4**	**3.5**	**0.6**	**3.5**	**30.3**	**0.4**	**0.9**	**53.3**	**61.2**
Top 25%	**3.0**	**2.9**	**0.7**	**2.5**	**27**	**1.3**	**1.4**	**54.1**	**62.2**

Table A7 Overhead costs – percentage

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
	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs	% of costs
1	0.4	1.7	0.6	9.4	1.5	8.2	21.7	8.6	13.6	43.9
2	0.9	0.1	0.3	6.9	1.3	15.6	25.0	8.0	10.7	43.7
3	1.3	0.9	0.5	5.4	1.5	14.6	24.2	5.1	8.8	38.1
4	0.4	0.9	1.0	5.5	1.7	22.3	31.8	5.7	5.0	42.5
5	0.6	1.3	0.2	8.8	1.7	3.8	16.4	5.9	12.4	34.7
6	1.4	0.8	2.4	4.4	0.7	8.1	17.8	3.4	14.0	35.2
7	0.2	0.8	0.4	7.3	1.2	15.8	25.7	2.6	8.4	36.7
8	0.5	0.7	0.1	8.5	1.2	18.5	29.6	4.8	3.2	37.6
9	0.4	1.6	1.0	6.7	0.9	9.4	19.9	14.0	4.8	38.7
10	0.6	2.1	1.0	5.1	2.4	10.0	21.2	5.7	17.3	44.1
11	1.1	1.0	0.0	6.4	2.8	11.7	23.1	4.6	10.3	38.0
12	1.0	1.1	0.2	8.1	2.6	17.5	30.5	5.6	5.4	41.5
13	0.9	0.1	0.2	4.9	0.9	16.7	23.7	4.8	6.5	34.9
14	0.4	1.3	0.2	8.8	2.4	9.3	22.4	4.3	7.6	34.3
15	0.5	1.0	0.8	5.8	2.7	4.9	15.6	14.1	13.0	42.8
16	2.4	1.1	0.6	2.9	1.3	13.8	22.0	7.5	21.5	51.0
17	1.5	1.2	0.8	5.2	1.7	5.5	15.9	2.7	22.5	41.1
18	1.5	0.7	0.7	5.5	2.2	18.2	28.7	1.4	3.5	33.7
19	1.0	1.4	0.7	4.5	1.6	5.4	14.6	6.9	12.4	33.9
20	0.6	0.9	1.5	8.8	2.3	17.9	32.0	3.4	6.6	41.9
21	0.0	0.9	0.4	5.8	2.9	12.1	22.0	2.6	4.1	28.7
22	0.2	1.7	0.4	4.9	1.3	11.6	20.1	3.9	8.1	32.1
23	1.2	1.2	0.9	8.5	0.6	13.9	26.3	5.9	10.8	42.9
24	1.0	2.2	1.8	6.6	1.9	13.1	26.6	4.6	7.3	38.5
Average	**0.8**	**1.1**	**0.7**	**6.5**	**1.7**	**12.4**	**23.2**	**5.7**	**9.9**	**38.8**
Top 25%*	**1.0**	**1.1**	**0.8**	**6.4**	**1.6**	**13.8**	**24.7**	**5.9**	**7.2**	**37.8**

Table A8 Capital structure

Farm assets				
	Land value		Permanent water value	
	$/ha	$/cow	$/ha	$/cow
Average	14,681	9,963	950	684
Top 25%*	13,008	11,464	508	620

Other farm assets (per usable hectare)				
Plant and equipment	Livestock	Hay and grain	Other assets	Total assets
$/ha	$/ha	$/ha	$/ha	$/ha
1,417	2,239	112	504	11,930
1,558	2,515	103	281	15,082

Liabilities		
	Liabilities per usable hectare	Liabilities per milking cow
	$/ha	$/cow
Average	3,261	4,075
Top 25%*	3,843	4,718

Equity	
Equity per usable hectare	Average equity
$/ha	%
8,804	70
11,239	72

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 ($/kg MS)	Real ($/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	7.07	7.75	8.26	0.24	0.26	0.26	0.27	3.29	3.51	3.79	4.05
2014–15	7.07	7.43	8.26	8.68	0.25	0.26	0.26	0.28	3.31	3.48	3.82	4.01
2015–16	7.22	7.51	8.29	8.63	0.26	0.27	0.24	0.25	3.45	3.59	3.95	4.11
2016–17	7.05	7.20	8.12	8.29	0.26	0.27	0.26	0.27	3.24	3.31	3.76	3.84
2017–18	7.00	7.00	8.16	8.16	0.26	0.26	0.27	0.27	3.52	3.52	4.05	4.05
Average		**7.24**		**8.40**		**0.26**		**0.27**		**3.48**		**4.01**

Note: 'Real' dollar values are the nominal values converted to 2017–18 dollar equivalents by the consumer price index (CPI) to allow for inflation.

	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 ($/kg MS)	Real ($/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)	Return on total assets	Return on equity
2013–14	1.50	1.60	0.86	0.92	2.36	2.52	1.59	1.70	0.65	0.69	0.95	1.01	4.6	5.2
2014–15	1.47	1.54	0.80	0.84	2.26	2.38	2.17	2.28	0.59	0.62	1.58	1.66	6.7	9.0
2015–16	1.51	1.57	0.82	0.85	2.33	2.42	2.02	2.10	0.53	0.55	1.48	1.54	6.6	9.4
2016–17	1.56	1.59	0.83	0.85	2.39	2.44	1.98	2.02	0.53	0.54	1.45	1.48	6.7	11.2
2017–18	1.53	1.53	0.52	0.52	2.57	2.57	1.54	1.54	0.53	0.53	1.01	1.01	4.3	7.7
Average		**1.57**		**0.79**		**2.47**		**1.93**		**0.59**		**1.34**	**5.8**	**8.5**

Table A10 Historical data – average farm physical information

	Total usable area	Milking area	Water used	Number of milking cows	Milking cows per useable area	Milk sold	Milk sold	Estimated grazed pasture*	Estimated conserved feed*	Home grown feed as % of ME consumed	Concentrate price	
Year	ha	ha	mm/ 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	446
2014–15	625	296	0.6	543	0.9	535	486	3.6	1.7	63	421	442
2015–16	575	283	0.5	545	1.0	557	541	4.1	1.7	57	445	463
2016–17	499	268	0.6	498	1.0	558	570	5.1	1.3	61	404	412
2017–18	586	277	0.5	497	0.9	580	521	4.0	1.9	57	429	429
Average	**578**	**281**	**0.5**	**521**	**0.9**	**547**	**514**	**4.0**	**1.6**	**60**	**439**	**432**

*From 2006–07 to 2010–11 estimated grazed pasture and conserved feed was calculated per usable hectare

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.
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 equal 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 farm 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.
Feed costs	Cost of fertiliser, irrigation (including effluent), hay and silage making, fuel and oil, pasture improvement, fodder purchases, grain/ concentrates, agistment, 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 pasture	Calculated using the energetics method. Grazed pasture is calculated as the gap 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, distance to shed, terrain and number of animals. Total metabolisable 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 net of levies and charges, livestock trading profit and other farm income, exclusive of GST.
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 $30.33 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 solids sold. 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	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 rents 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 non-cash 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.
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	Home grown 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 changes).
Water inventory change	An estimate of the irrigation water on hand at the start and end of the financial year to capture water used in the production of pasture and crops.

List of abbreviations

AI	Artificial insemination
CH_4	Methane 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. 1 mm 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 = 1,000 kg
Top 25%	The state average for the top 25% of farms ranked by return on total assets.

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
R2 Yr heifers	$1,200	$1,200
R1 Yr heifers	$600	$600
Bulls	$2,400	$2,400

Imputed owner/operator and family labour

In 2017–18 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.





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