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Australian dairy
Farm technology and management practices 2010–11

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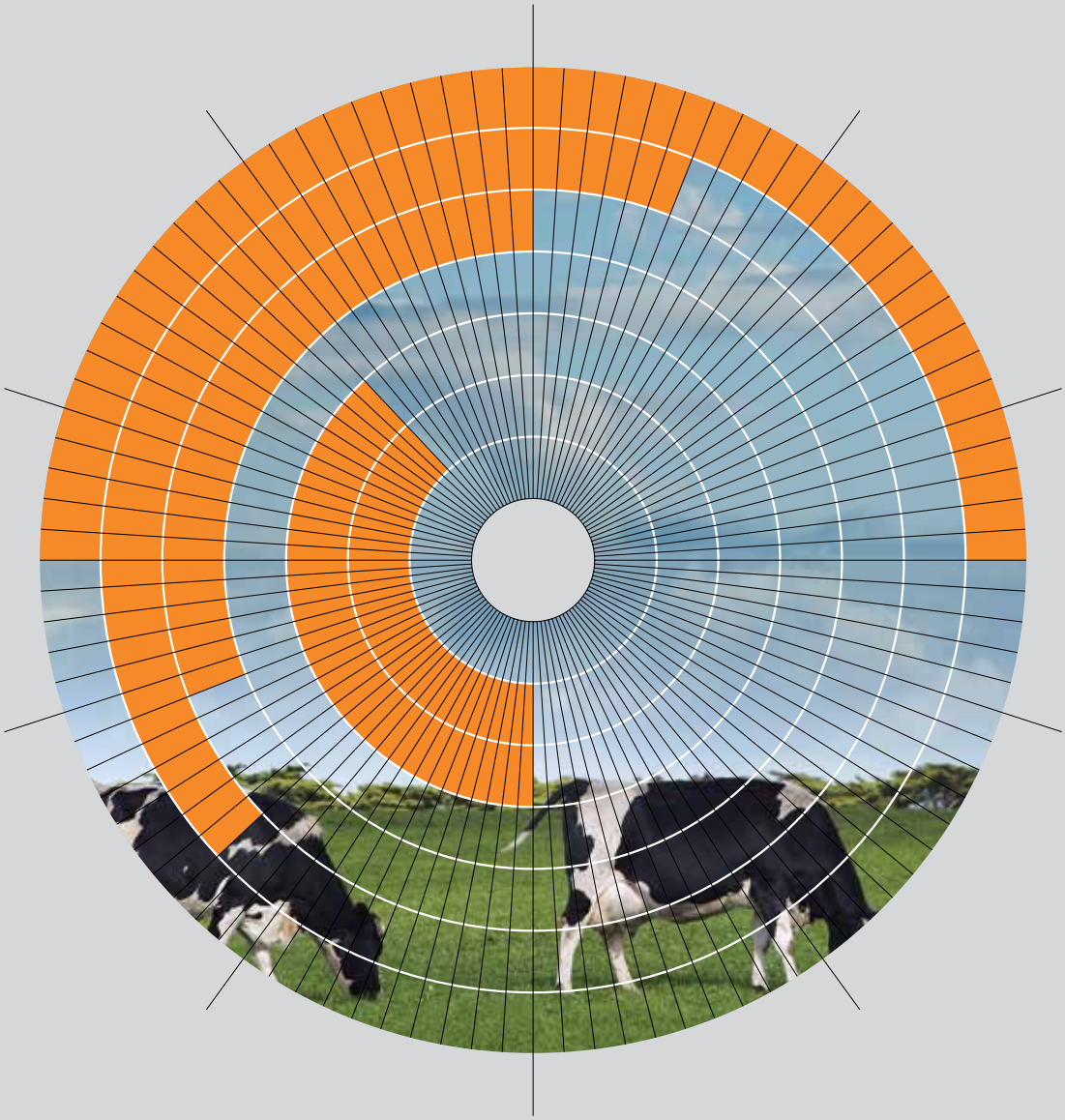

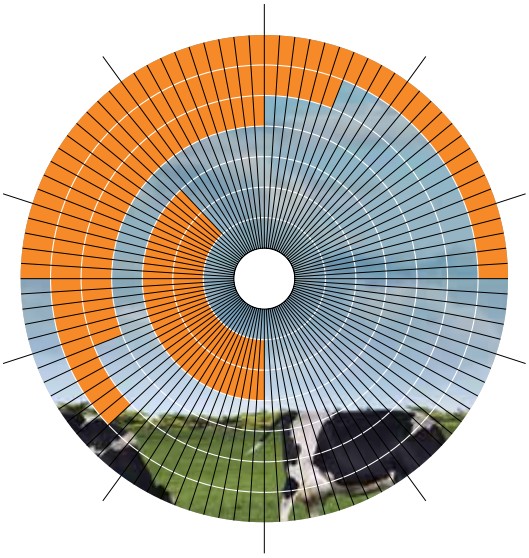

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Chapter 1
Introduction

ABARES conducts annual surveys of Australian dairy farms to collect detailed physical and financial performance data. Every second year, in conjunction with the annual dairy industry survey, ABARES also collects supplementary information on dairy farmers' use of technology and management practices.

The supplementary survey includes information on milking shed set-up and management, herd and farm management, feeding regimes, fodder conservation, soil testing, participation in training courses, workshops and extension projects, and intended changes in farm management.

The 2010–11 supplementary survey marks 20 years since the first collection of technology and management practices information in 1991–92. Over this time there have been major structural changes in Australia's dairy industry, including a fall in the number of dairy farms and increases in average farm size and the average number of cows per farm.

Along with other industries, the Australian dairy industry has faced a long-term decline in the industry's terms of trade. Declining terms of trade mean that prices paid for farm inputs are increasing faster than prices received for farm commodities sold. Improved technologies and better management practices are important investments for dairy farmers to avoid declining real farm incomes.

Dairy farmers continually adjust their farming practices in response to changes in their operating environment, including declining terms of trade. Adjustments may include improving herd nutrition through attending training courses, improving pasture productivity through optimum fertiliser applications and targeted supplementary feeding using concentrates and grain. Using superior genetic stock, as well as keeping animals healthy and well-fed, are the main factors contributing to increased milk production. Automating some operations in the milking shed makes labour savings possible.

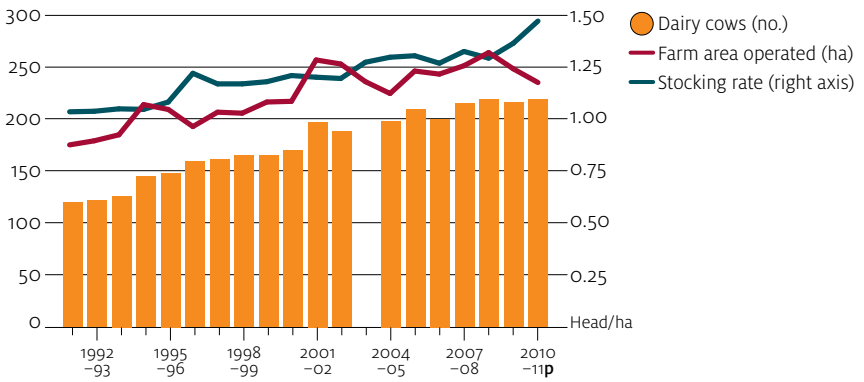
This report provides a summary of results for the 2010–11 financial year and selected results from previous years. Herd management practices are covered in Chapter 2, infrastructure and technologies in Chapter 3 and training and intended changes in Chapter 4. Additional results at national and regional levels are provided in Appendixes A and B, and survey methods and terminology are explained in Appendix C. This report is limited to reporting the major findings and trends; it does not investigate the underlying factors behind changes that are observed. ABARES may undertake such research in the future.

Chapter 2
Herd management practices

Stock carried

On average, stocking rates on Australian dairy farms have increased over the past 20 years (Figure 1). In 1991–92 the average number of cows carried per hectare was 1, and in 2010–11 was 1.5.

FIGURE 1 Farm areas, cow numbers and stocking rates average per farm



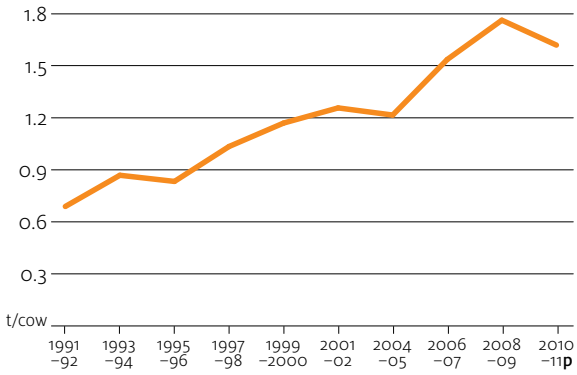
p Preliminary estimate.
Note: No data were collected for cow numbers in 2003–04.
Source: ADIS

Feed practices

One way dairy farmers have been able to increase stocking rates is through supplementing pasture production with other feeds. Since 1991–92 most Australian dairy farmers have supplemented pasture-based production with grains, concentrates and by-products. Almost 100 per cent of farms fed their herds with supplements in 2010–11.

Over the same period there has been a sharp increase in the quantity of supplementary feeds used. Since 1991–92, the quantity of concentrates, grain and by-products fed has increased from around 0.7 tonnes per cow to about 1.7 tonnes per cow (Figure 2). Part of the increase in 2006–07 and 2008–09 can be attributed to the widespread drought prevailing at that time and a resulting fall in pasture production. Very wet conditions during 2010–11 meant much greater pasture production and a fall in the quantity of supplementary feed used.

FIGURE 2 Concentrates, grain and by-products fed per cow average per farm



p Preliminary estimate.
Source: ADIS

Feeding intensity

Supplementary feeding allows more stock to be carried and also allows farms to increase their milk production per cow. Average milk production increased from an average of around 3811 litres per cow in the early 1990s to about 5630 litres per cow in 2010–11.

Some financial implications of supplementary feeding were explored by comparing farms using high intensity feeding with farms using low intensity feeding. High intensity farms were defined as those feeding more than 1.5 tonnes of grain and concentrates per cow in 2010–11, and low intensity farms fed less than 1.5 tonnes per cow (1.5 tonnes was around the average amount of grain/concentrates fed per cow in 2010–11). These two groups were further divided according to milk production pattern—either seasonal milk producers or year-round milk producers (Table 1).

In 2010–11 both groups of high intensity farms recorded higher performance in almost all measures than farms in the low intensity groups. On average, high intensity farms milked more cows, produced more milk per hectare and attained higher milk yields per cow than farms in the other group. However, farms in the low intensity group reported higher average stocking rates. Nevertheless, despite reporting lower average farm cash incomes and farm business profits, low intensity farms achieved similar rates of return to the high intensity farms.

TABLE 1 Feeding intensity, by calving system, 2010–11 average per farm

		Seasonal and split calvers				Year-round calvers			
		Low feeding intensity a		High feeding intensity b		Low feeding intensity a		High feeding intensity b	
Estimated proportion of population	%	24	(20)	22	(19)	32	(18)	23	(11)
Dairy cows milked for more than 3 months	no.	182	(9)	242	(6)	174	(6)	264	(8)
Milk yield per cow	L	4 934	(7)	6 355	(5)	5 199	(4)	6 022	(4)
Stocking rate	no./ha	1.6	(6)	1.5	(7)	1.5	(7)	1.3	(8)
Grain, concentrates and by-products per cow c	t	0.9	(13)	2.2	(4)	1.1	(5)	2.4	(4)
Milk production per effective hectare	L	8 014	(7)	11 458	(6)	8 941	(8)	11 908	(5)
Purchased feed	$	66 031	(13)	161 580	(8)	81 801	(12)	209 208	(9)
– grain, concentrates and by-products	$	57 341	(15)	145 821	(8)	67 621	(14)	177 361	(10)
– hay and silage	$	8 690	(39)	13 633	(25)	10 539	(35)	20 836	(15)
Feed costs per cow	$	349	(9)	671	(6)	442	(9)	738	(4)
Farm cash income	$	105 178	(16)	158 824	(14)	124 451	(18)	204 616	(11)
Farm business profit	$	57 576	(42)	82 548	(29)	53 318	(34)	105 907	(18)
Rate of return – excl. capital appreciation	%	4.1	(17)	4.1	(15)	3.7	(16)	3.8	(9)

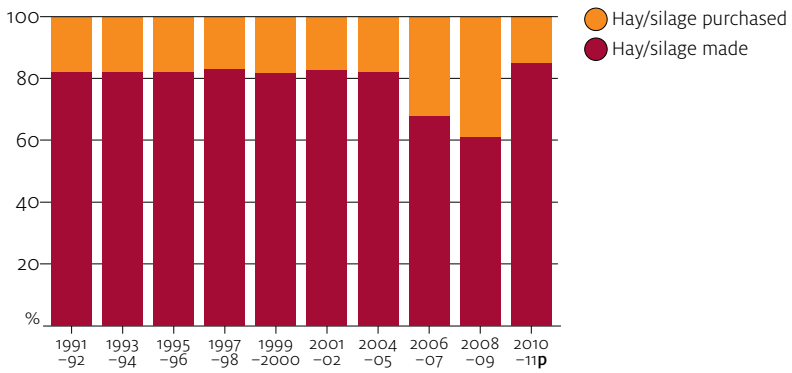
a Low feeding intensity is less than 1.5 tonnes of grain and concentrate fed per cow. **b** High feeding intensity is more than 1.5 tonnes of grains and concentrate fed per cow. **c** Farms feeding concentrates or grain.
Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided.
Source: ADIS

Fodder conservation

Over the past 20 years dairy farms have made around 80 per cent of their hay and silage requirements on farm. A much higher proportion, up to almost 40 per cent, was purchased during 2006–07 and 2008–09 because of drought in many dairying regions of Australia (Figure 3).

Of the total volume of hay and silage purchased by dairy farms in 2010–11, hay accounted for around 68 per cent of total purchases (average of 118 tonnes per farm) and silage accounted for 32 per cent (average of 55 tonnes per farm). Of the total hay/silage produced on farm, silage accounted for the greater proportion (71 per cent of the total), and hay made up the remaining 29 per cent.

FIGURE 3 Hay and silage production and purchases average per farm

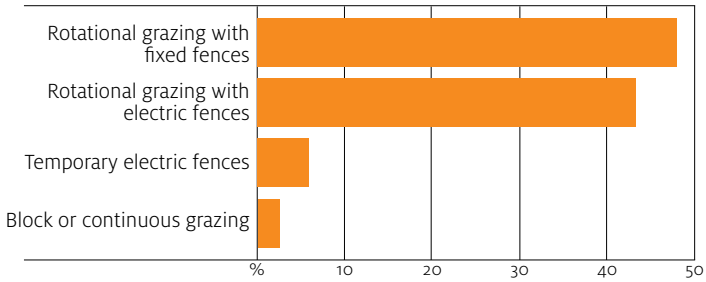


p Preliminary estimate.
Source: ADIS

Grazing systems

The most common grazing systems used in 2010–11 were rotational grazing using fixed fences (around 48 per cent of farms) and rotational grazing using electric fences (43 per cent of farms) (Figure 4).

FIGURE 4 Grazing systems used, 2010–11 proportion of farms

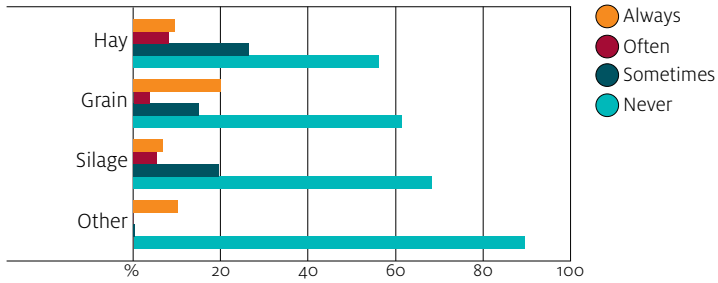


Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

Analysis of feedstuffs

Feedstuffs can be analysed by laboratories for a range of nutritional parameters, including dry matter, protein, energy and digestibility. In 2010–11, 20 per cent of farms reported that they always used analysis reports before purchasing grain and a further 15 per cent sometimes wanted an analysis done (Figure 5). Around 25 per cent of farms sometimes had hay analysed before purchase and 20 per cent of farms sometimes tested silage before purchase.

FIGURE 5 Farms analysing feedstuffs, 2010–11 average per farm

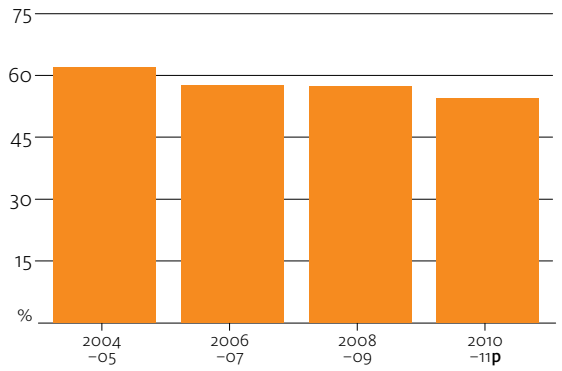


Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

Soil testing and fertiliser management

Soil testing enables farmers to determine the nutrient status of soils and formulate an appropriate fertiliser program. Matching fertiliser applications with plant needs also helps to address run-off of excess nutrients. In 2010–11 an estimated 55 per cent of dairy farmers conducted soil tests (Figure 6). This was a little lower than in previous surveys. Most farms conducting soil tests in 2010–11 used the results to make adjustments to their fertiliser management regime.

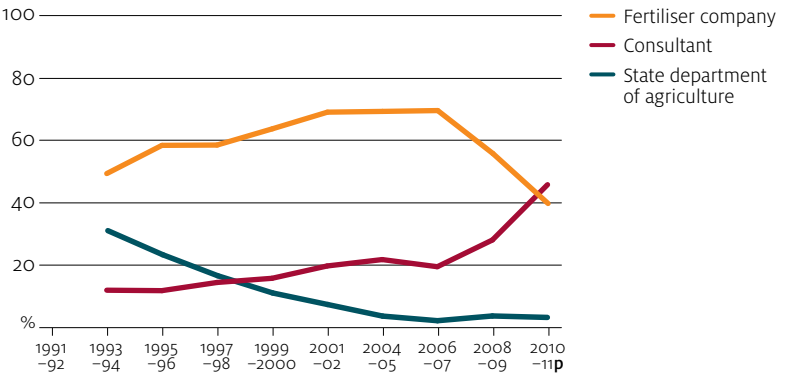
FIGURE 6 Farms conducting soil testing proportion of farms



p Preliminary estimate.
Source: ADIS

The main sources of fertiliser advice were representatives from fertiliser companies and consultants (Figure 7). As availability of advice from state departments of agriculture decreased, there has been an increase in the use of fertiliser companies and consultants. However, in recent years advice from fertiliser companies has declined.

FIGURE 7 Sources of fertiliser advice proportion of farms



p Preliminary estimate.
Note: Data are based on two-year moving average.
Source: ADIS

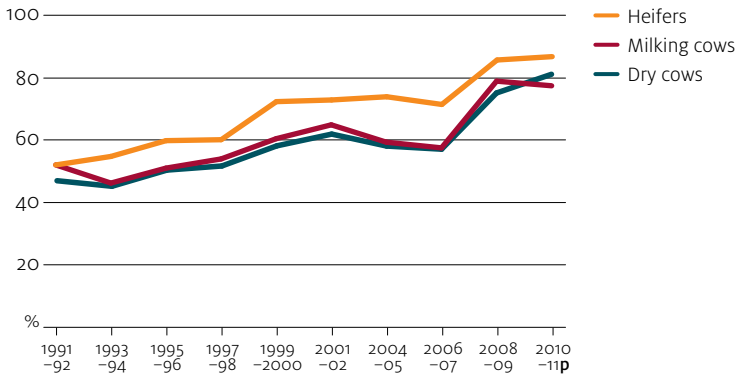
Herd health

Leptospirosis is the most common bacterial zoonosis (disease transmitted from animals to humans) worldwide (Lau et al. 2010). In humans, leptospirosis is usually contracted by exposure to water contaminated with the urine of infected animals (Burns undated). It is a particular occupational hazard for dairy farmers who are often in close contact with cows and their effluent in areas such as milking sheds and wash-down pads. If not treated, leptospirosis can result in kidney damage, meningitis, liver failure, respiratory distress and, in rare cases, death (Burns undated).

Cattle herds can be severely affected by leptospirosis if not protected by an effective vaccination program. Depending on the bacterial strain, leptospirosis can cause abortion in cows, sharp falls in milk production and ill health and death in calves (Zelski 2007). While it is generally recommended that cattle herds be vaccinated every 12 months, herds at high risk of the disease should be vaccinated more frequently (Zelski 2007).

Since 1995–96, there has been a general upward trend in the proportion of farms vaccinating dairy stock types against this disease (Figure 8). In 2010–11 at least three-quarters of dairy farms vaccinated their cows and heifers, compared with around 50 per cent in 1991–92.

FIGURE 8 Farms vaccinating for leptospirosis, by stock type proportion of farms



p Preliminary estimate.
Source: ADIS

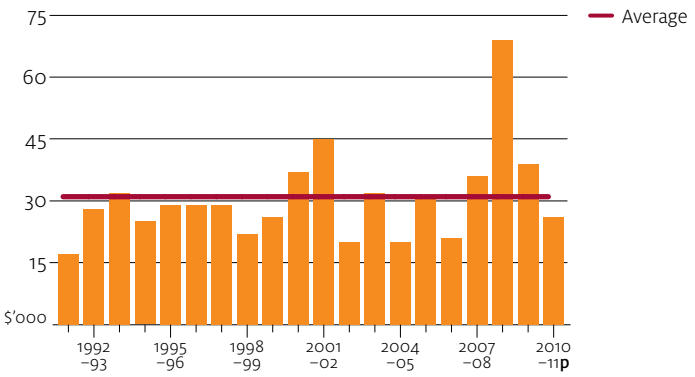
Chapter 3
Infrastructure and technologies

New on-farm investment

In 2010–11 dairy farms reported an average net investment in non-land capital (for example, vehicles, plant, machinery and farm improvements) of around $25 000 (Figure 9). This was less than in the previous three years and less than the long-term average. The largest category of capital expenditure on dairy farms in 2010–11 was tractors, followed by vehicles and crop harvesting and handling machinery (Figure 10).

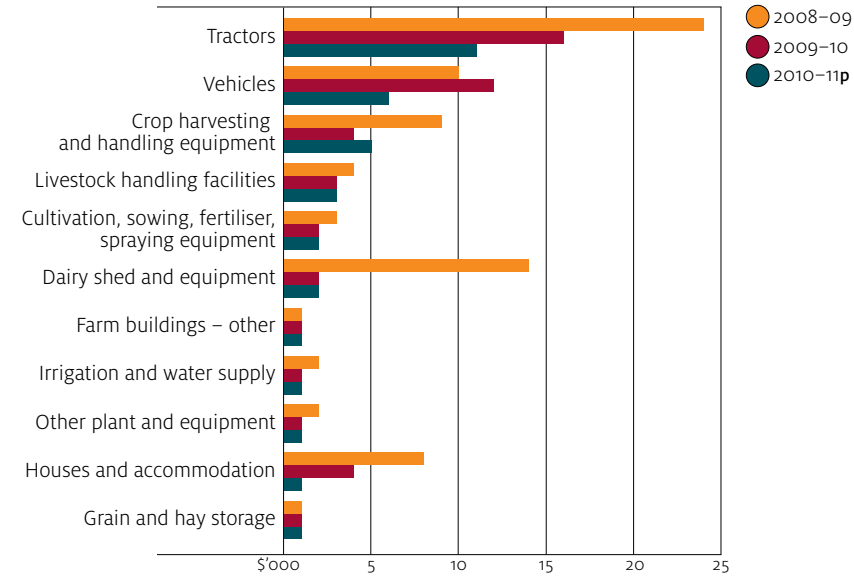
Capital investment decisions are normally based on a range of factors such as existing capital items, financial situations, expected investment benefits and risks and tax considerations. There is typically a close relationship between dairy farm cash income and non-land capital investment (Figure 11).

FIGURE 9 Net non-land capital investment average per farm



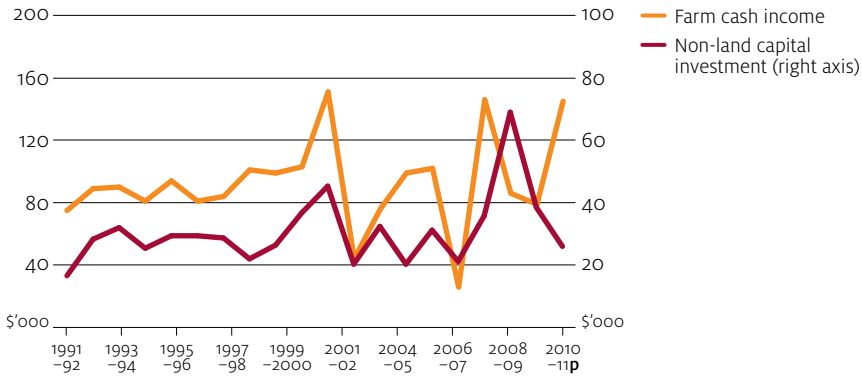
p Preliminary estimate.
Note: Capital investment estimates are in 2010–11 dollar terms.
Source: ADIS

FIGURE 10 Capital expenditure by item, 2010–11 average per farm



Note: Capital expenditure estimates are in 2010–11 dollar terms. Figures for 2010–11 are preliminary estimates.
Source: ADIS

FIGURE 11 Farm cash income and non-land capital investment average per farm



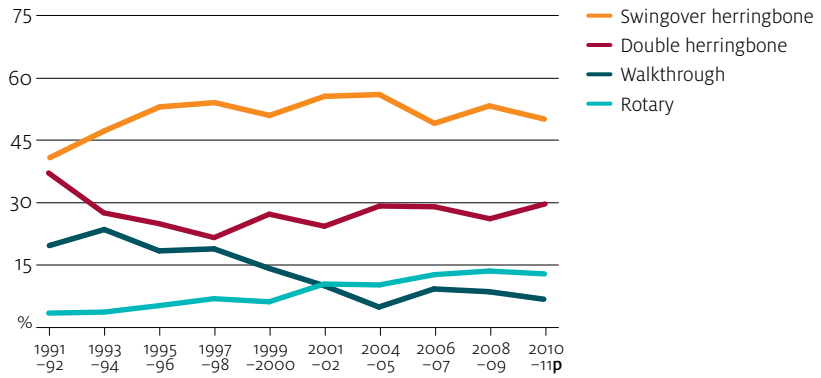
p Preliminary estimate.
Note: Capital investment and farm cash income estimates are in 2010–11 dollar terms.
Source: ADIS

Dairy sheds

The most common type of milking shed used on Australian dairy farms is a herringbone shed. In 2010–11, swingover type herringbone sheds accounted for about half of all sheds used and double herringbone units comprised a further 27 per cent (Figure 12, Table 2). Since 1991–92 there have been modest trends toward swingover units and away from double units. Rotary sheds were favoured by farmers with large dairy herds. While around 15 per cent of farms had rotary dairies in 2010–11, these farms milked an average of 389 cows at peak milking time. This was almost double the average for farms with a swingover herringbone shed and over two and a half times more than for farms with a walkthrough shed.

The long-term decline in the use of walkthrough sheds continued in 2010–11 with less than 10 per cent of Australian dairy farms now using this type of shed.

FIGURE 12 Dairy shed types proportion of farms



p Preliminary estimate.
Source: ADIS

TABLE 2 Selected characteristics, by shed type, 2010–11 average per farm

		Double herringbone		Swingover herringbone		Rotary		Walkthrough	
Proportion of farms	%	27		53		14		7	
Shed characteristics									
Milking shed bails	no.	21	(6)	20	(5)	46	(3)	8	(7)
Milking time at peak season	min.	146	(6)	129	(5)	143	(8)	153	(19)
Number of operators at peak season	no.	1.5	(5)	1.7	(4)	1.8	(5)	1.7	(19)
Cows milked at peak season	no.	175	(9)	190	(5)	389	(7)	108	(22)
– per hour	no./hr	72	(10)	89	(7)	163	(5)	43	(8)
– per operator	no./op	120	(9)	109	(5)	212	(8)	62	(11)

p Preliminary estimate.
Notes: Figures in parentheses are standard errors, expressed as a percentage of the estimates provided. Figures for 2010–11 are preliminary estimates.
Source: ADIS

Selected physical and financial indicators by shed type

Selected physical and financial performance outcomes for dairy farms are compared according to shed type in Table 3.

On average, farms using rotary sheds in 2010–11 were much larger production units than farms using other shed types—they operated the largest areas (421 hectares) and had the largest herds (614 head of cattle). Financially these farms reported, on average, significantly higher farm cash incomes, farm business profits and rates of return than the other groups.

Farms using the two types of herringbone sheds tended to have similar farm performance. For example, farm area, herd size and milk production per cow for farms with double herringbone units were only marginally higher on average than those with swingover systems. Farms using swingover units reported slightly higher stocking rates and total milk production. On average, farm cash incomes, business profits and rates of return on capital were similar regardless of shed type.

Farms using walkthrough sheds tended to have smaller herd sizes and lower milk production per cow, on average, than farms in the other three groups. Farm cash income, farm business profit and rate of return were also much lower, on average, for farms with walkthrough sheds than for herringbone and rotary shed farms.

TABLE 3 Physical and financial performance, by shed type, 2010–11 average per farm

		Double herringbone		Swingover herringbone		Rotary		Walkthrough	
Area operated	ha	229	(10)	203	(7)	421	(6)	149	(14)
Dairy herd at 30 June	no.	323	(14)	304	(4)	614	(6)	200	(15)
Stocking rate	no./ha	1.4	(9)	1.5	(7)	1.5	(6)	1.3	(26)
Milk production	'000L	1 036	(7)	1 080	(4)	2 281	(7)	487	(4)
Milk yield per cow	L/cow	5 784	(5)	5 654	(3)	5 748	(3)	3 907	(23)
Milk production per labour weeks worked	L/wks	8 079	(6)	8 263	(4)	12 563	(5)	4 314	(13)
Grain inputs per cow	t/hd	1.7	(7)	1.7	(6)	1.9	(6)	0.7	(63)
– concentrates	t/hd	0.9	(14)	1	(13)	1	(18)	0.6	(59)
– grain	t/hd	0.7	(17)	0.5	(17)	0.9	(16)	0.1	(244)
– by-products	t/hd	0.1	(40)	0.1	(40)	0	(69)	0	–(99)
Feed costs per cow	$/hd	651	(8)	556	(6)	567	(7)	215	(52)
Farm cash income	$	119 487	(13)	141 803	(13)	215 407	(17)	61 457	(74)
Farm business profit	$	60 705	(26)	62 802	(27)	140 483	(23)	–11 557	(310)
Rate of return excl. capital appreciation	%	3.7	(16)	3.7	(13)	4.9	(9)	0.4	(274)

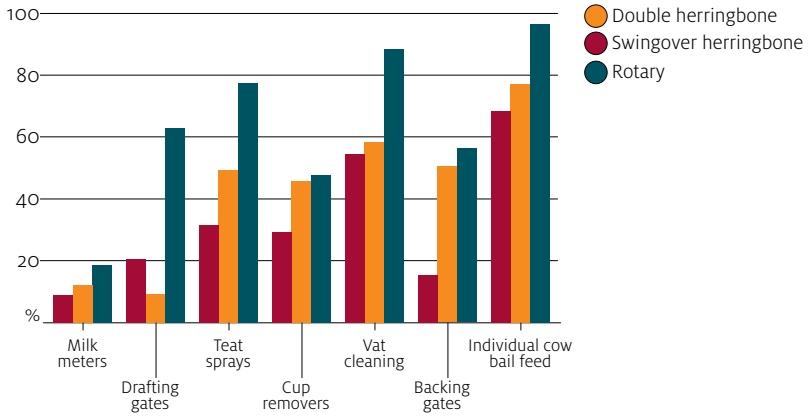
Notes: Figures in parentheses are standard errors, expressed as a percentage of the estimates provided. Figures for 2010–11 are preliminary estimates.
Source: ADIS

Shed automation

A variety of operations can be automated in dairy sheds to reduce reliance on labour. In 2010–11, automation was highest in farms with rotary sheds. Farms with this shed type had the highest proportion of automated vat cleaning systems, automatic backing gates, cup removers, teat spraying, drafting gates, milk flow meters and individual cow bail feed (Figure 13).

Of the farms with herringbone sheds, double units had a higher proportion of automatic backing gates, automatic vat cleaning systems, automatic cup removers, automatic teat sprays, individual cow bail feed and milk flow meters. Swingover units had a higher proportion of automatic drafting gates.

FIGURE 13 Automation by shed type, 2010–11 proportion of farms



Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

Effluent disposal

Effluent disposal methods have changed over time as the dairy industry has tried to minimise the effect of effluent on the environment. Apart from the small proportion of farms with older technology walkthrough sheds, most farms in 2010–11 did not allow effluent to run off directly into paddocks (Table 4). Two pond systems were favoured by farmers with swingover herringbone and rotary dairies, while one pond systems were most common on farms with double herringbone units.

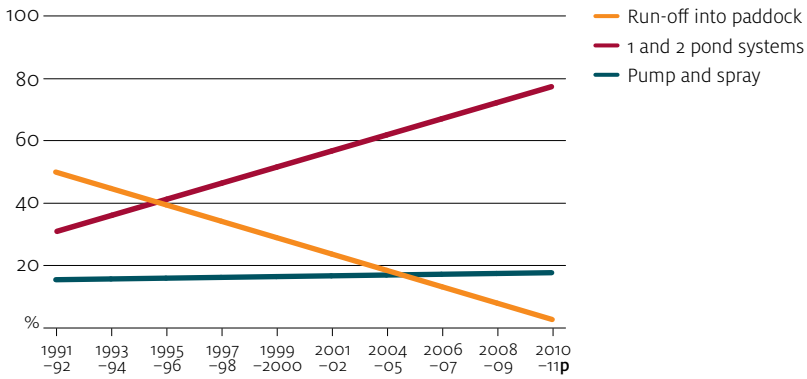
Over the past 20 years the main changes have been a steep decline in the use of run-off into paddock systems and an offsetting increase in the use of one pond and two pond systems (Figure 14).

TABLE 4 Effluent disposal systems, by shed type, 2010–11 proportion of farms

		Double herringbone		Swingover herringbone		Rotary		Walkthrough	
Proportion of farms	%	27		53		14		7	
Shed effluent disposal system									
Run-off into paddock	%	5	(63)	3	(55)	7	(54)	58	(82)
Pump and spray	%	25	(22)	22	(30)	9	(30)	2	(212)
1 pond	%	43	(11)	29	(20)	16	(49)	30	(133)
2 ponds	%	24	(22)	45	(19)	65	(13)	6	(230)

Notes: Figures in parentheses are standard errors, expressed as a percentage of the estimates provided. Figures for 2010–11 are preliminary estimates.
Source: ADIS

FIGURE 14 Effluent disposal proportion of farms (trend line)



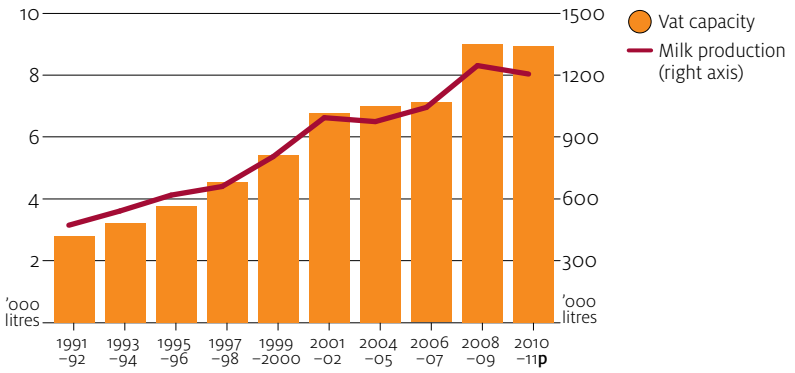
p Preliminary estimate.
Note: Trend line is a linear line.
Source: ADIS

Milk vats

As average total milk production per farm has increased, so too has the capacity of milk vats (Figure 15). Average vat capacity has increased from around 3800 litres in 1995–96 to over 8900 litres in 2010–11.

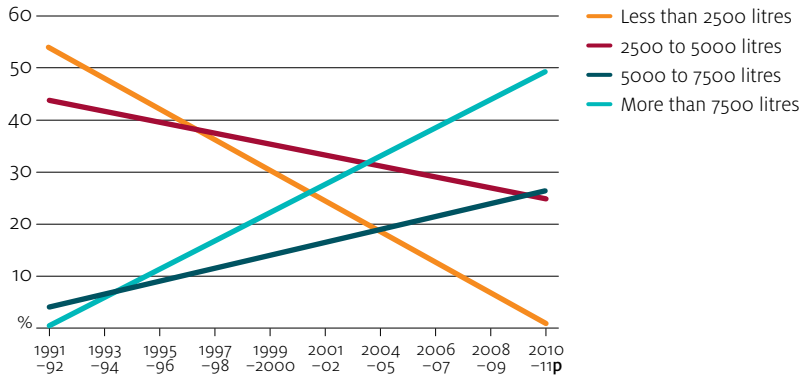
The proportion of farms with high capacity milk vats—a capacity over 7500 litres—has also been increasing. Since 1991–92, the proportion of farms with high capacity vats has risen from around 2 per cent to more than 40 per cent in 2010–11 (Figure 16). Over the same period, the proportion of farms with bulk vats with a capacity of less than 2500 litres has declined from around 50 per cent to around 3 per cent.

FIGURE 15 Vat capacity and milk production — average per farm



p Preliminary estimate.
Source: ADIS

FIGURE 16 Milk vat capacities — proportion of farms (trend line)



p Preliminary estimate.
Note: Trend line is a linear line.
Source: ADIS

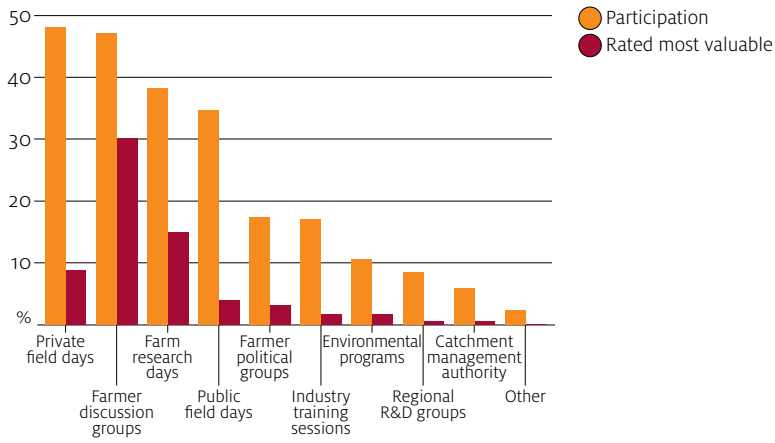
Chapter 4
Training and changes to management practices

Dairy farmers use a range of information sources to assist with their business decision-making. The source used most in 2010–11 was other farmers and family. On average, farm business advice was obtained from other farmers and family members on around seven occasions in 2010–11.

Australian dairy farmers also attended a range of discussion groups, workshops and programs in 2010–11 (Figure 17). Events attracting the highest participation rates were field days run by the private sector (48 per cent of farms) and farmer discussion groups (47 per cent of farms). Over 30 per cent of farmers participated in research days and public field days. Of the various activities attended by dairy farmers in 2010–11, farmer discussion groups and farm research days were rated the most valuable in aiding farm management decisions.

In 2010–11, almost 40 per cent of dairy farmers reported that advice about supplementary feeding and herd nutrition helped improve farm profitability. A further 35 per cent of farms reported that advice about improved pasture management helped improved farm profitability.

FIGURE 17 Participation and rating of activities, 2010–11 proportion of farms



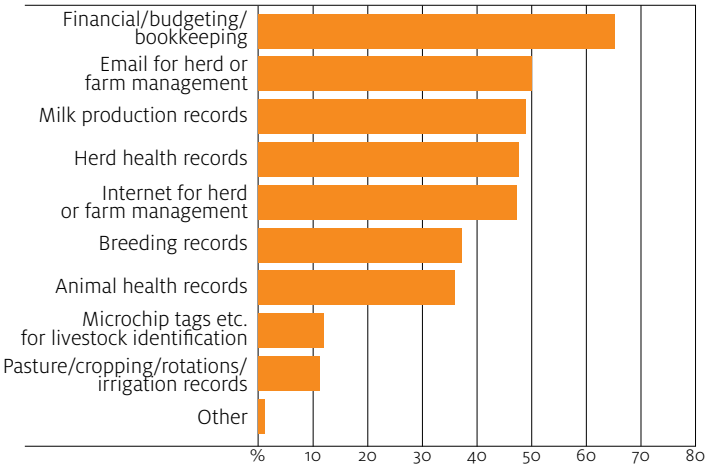
Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

Computer use

The proportion of dairy farms using a computer program for herd and financial management was around 61 per cent in 2010–11. The most common type of internet connection in 2010–11 was wireless (43 per cent of farms), followed by ADSL (39 per cent), satellite (16 per cent) and dial-up and other types of connections (2 per cent).

The most common computer application used was for financial, budgeting and bookkeeping purposes (Figure 18)—around 65 per cent of farms used computer programs for this purpose in 2010–11. The next most common use of computers was to send or receive information on herd or farm management via email (50 per cent of farms).

FIGURE 18 Purposes for computer use, 2010–11 proportion of farms



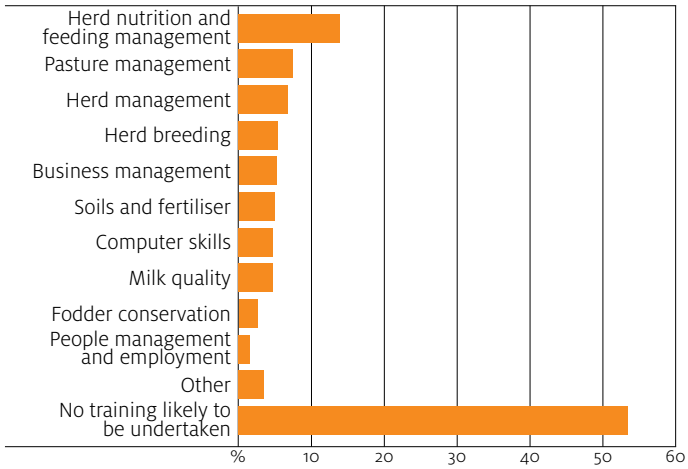
Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

Future intentions

Around 45 per cent of farmers intended to participate in training and skills activities and were most attracted to topics such as herd nutrition, pasture management and herd management. Over 50 per cent of dairy farmers in 2010–11 indicated that they were unlikely to undertake any training courses or skills development in the next 12 months (Figure 19). This was a similar result to that recorded in the previous survey.

Dairy farmers were asked if they were likely to change their current technology use or management practices in the next 12 months. About 37 per cent of farmers reported that they were unlikely to make any significant changes within this time frame (Figure 20). For farmers intending to make changes, it was most likely to entail new plant and equipment and dairy improvements (both nominated by 13 per cent of farms), improving grazing and pasture management (12 per cent) and irrigation plant or layout (10 per cent).

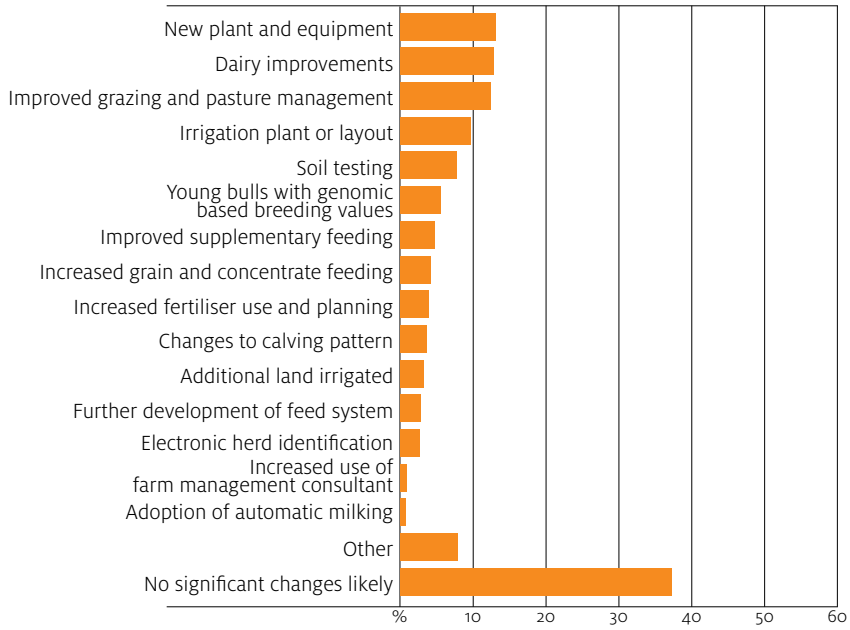
FIGURE 19 Training course intentions, 2010–11 proportion of farms



Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

FIGURE 20 Intended farm management/technology changes, 2010–11

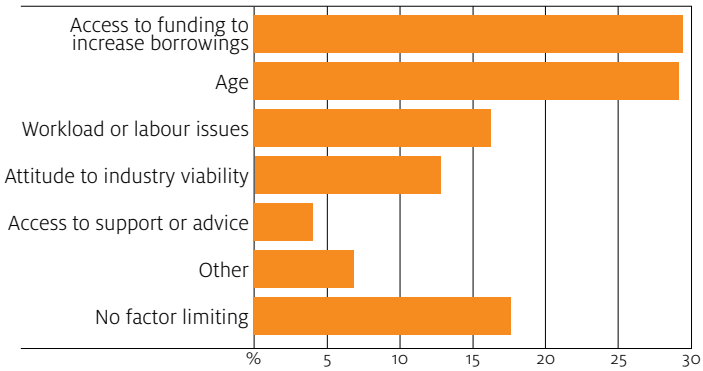
proportion of farms



Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

However, not all dairy farmers believed they would be able to implement changes over the coming year. The two major factors limiting change were access to funding and farmers' ages (both 29 per cent of farms). Eighteen per cent of farmers reported no factor would hinder their ability to make changes (Figure 21).

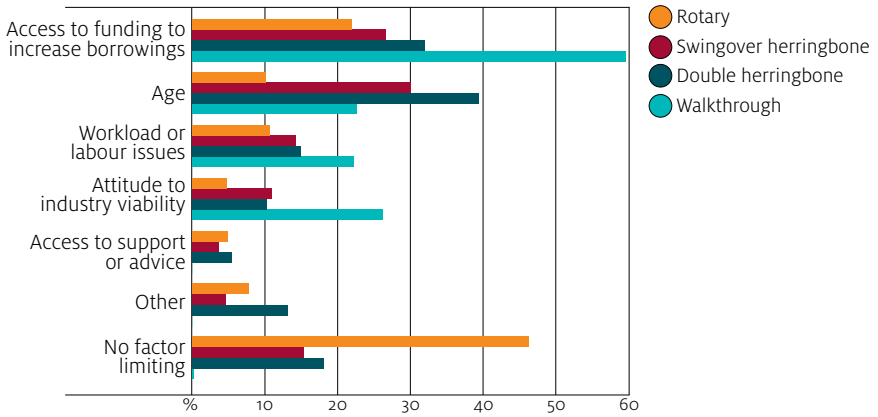
FIGURE 21 Factors limiting management/technology changes, 2010–11
proportion of farms



Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

The factors limiting dairy farmers' abilities to change technology and farm management techniques were examined further by categorising farms according to shed type (Figure 22). The most important limiting factor for farms with walkthrough sheds was access to funding to increase borrowings (nominated by 59 per cent of farms), while for farmers with double herringbone and swingover herringbone units it was age (39 per cent and 30 per cent). The most common response from farmers with rotary units was that there was no limiting factor (46 per cent).

FIGURE 22 Factors limiting management/technology changes, by shed type, 2010–11
proportion of farms

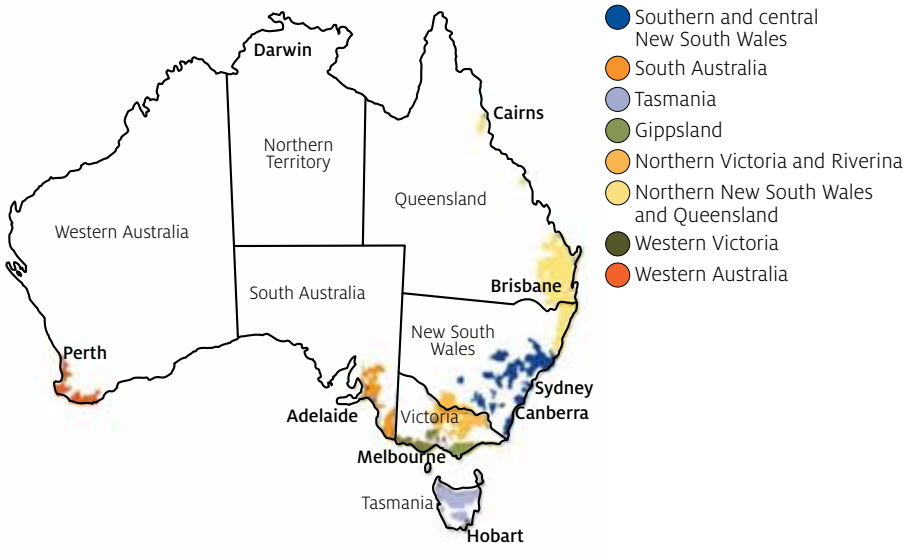


Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

Appendix A
Regional estimates 2010–11

This appendix provides survey results for the dairy industry regions used by Dairy Australia, namely: northern New South Wales and Queensland, northern Victoria and Riverina (NSW), Tasmania, Western Australia, South Australia, the Gippsland region (Victoria), western Victoria, and southern and central New South Wales (Map 1).

MAP 1 Dairy farming regions



Source: Dairy Australia

TABLE 5 Selected estimates for dairy farms, by region, 2010–11 average per farm

		northern NSW and Qld	southern and central NSW	northern Vic. and Riverina	Gippsland	western Vic.	SA	WA	Tas.
Area operated	ha	222	283	212	169	236	542	482	233
Dairy cattle	no.	252	399	289	334	389	438	505	458
Beef cattle	no.	27	36	13	12	1	21	65	9
Sheep	no.	0	2	9	3	2	110	9	3
Crop area	ha	55	86	94	84	111	211	157	93
Cows milked for > 3 months	no.	131	189	173	208	244	245	246	291
Total milk production	'000L	745	1 334	986	1 202	1 363	1 767	1 811	1 560
Litres per cow	L/cow	4 926	5 987	5 573	5 813	5 272	7 167	6 856	5 330

Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

TABLE 6 Calving and grazing systems, by region, 2010–11 average per farm or proportion of farm

		northern NSW and Qld	southern and central NSW	northern Vic. and Riverina	Gippsland	western Vic.	SA	WA	Tas.
Calving system									
Seasonal	%	0	0	18	38	45	18	12	53
Split	%	2	1	45	12	8	35	0	40
Year-round	%	97	99	36	50	47	48	88	7
Other	%	0	0	0	0	0	0	0	0
Grazing system									
Rotational grazing	%	15	11	61	52	45	78	54	85
Temporary electric fence	%	16	29	0	0	9	0	0	0
Rotational and electric fence	%	67	58	37	47	40	18	42	15
Block or continuous grazing	%	1	2	2	2	6	3	4	0
Concentrates, grains or by-products fed	t	389	410	358	307	352	679	552	342
Primary reasons for feeding concentrates, grains or by-products									
Lift milk production	%	94	69	64	74	54	81	35	88
Performance feeding	%	1	0	4	0	0	0	3	0
Seasonal, for winter or incentive payments	%	0	0	0	0	0	0	0	0
Fill gaps in pasture supply	%	1	10	18	19	4	10	22	11
Zero grazing	%	0	0	0	0	0	0	0	0
Other	%	1	2	3	7	39	3	2	1
Enable increased stocking rate	%	1	19	3	0	0	3	0	0
Assist pasture management	%	2	0	9	0	3	4	39	0

Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

TABLE 7 Sharefarming, by region, 2010–11 proportion of farms

		northern NSW and Qld	southern and central NSW	northern Vic. and Riverina	Gippsland	western Vic.	SA	WA	Tas.
Farms with									
On-farm sharefarming **a**	%	1	2	5	8	10	10	1	9
Off-farm sharefarming **b**	%	0	0	0	0	0	0	0	0

a Based on farms with payments to sharefarmers. **b** Based on farms receiving off-farm sharefarming receipts.
Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

TABLE 8 Herd health, by region, 2010–11 proportion of farms

		northern NSW and Qld	southern and central NSW	northern Vic. and Riverina	Gippsland	western Vic.	SA	WA	Tas.
Sources of mastitis information									
Direct contact with professional	%	39	61	69	39	38	53	84	67
National mastitis program	%	26	13	25	21	0	15	15	6
Newsletters	%	44	46	29	18	7	56	1	1
Other web-based resources	%	5	1	0	12	0	9	3	1
Other	%	9	19	4	2	0	1	5	0
None	%	20	15	0	16	55	6	2	1
Vaccinate against leptospirosis									
Heifers	%	73	96	96	98	78	53	38	99
Milking cows	%	63	62	96	100	50	48	38	94
Dry stock	%	63	60	95	100	71	41	41	94

Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

TABLE 9 Dairy sheds and equipment, by region, 2010–11 proportion of farms

		northern NSW and Qld	southern and central NSW	northern Vic. and Riverina	Gippsland	western Vic.	SA	WA	Tas.
Farms with									
Walkthrough	%	6	26	0	0	20	0	14	0
Double herringbone	%	34	29	31	26	7	56	40	31
Swingover herringbone	%	59	42	58	71	34	19	35	52
Rotary	%	0	7	12	6	29	26	13	25
Farms with automated									
Backing gates	%	15	35	44	8	40	47	74	59
Vat or milk plant cleaning systems	%	67	62	64	44	82	69	89	57
Cup removers	%	41	61	43	22	39	63	42	26
Teat disinfectant spray system	%	27	45	65	31	43	50	49	42
Drafting gates	%	7	14	46	10	39	35	10	39
Milk meters	%	20	19	7	14	23	13	23	7
Individual cow bail feed	%	72	99	96	57	85	86	69	69

Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

TABLE 10 Sources of farm management advice, by region, 2010–11 proportion of farms

		northern NSW and Qld	southern and central NSW	northern Vic. and Riverina	Gippsland	western Vic.	SA	WA	Tas.
Milk company or factory staff	%	76	38	85	50	75	52	68	79
Private consultant	%	27	34	24	31	44	37	23	59
State agricultural department	%	20	54	11	25	23	9	15	8
Suppliers of inputs	%	53	47	24	20	81	56	78	56
Media sources	%	38	50	12	18	2	18	23	23
Others farmers or families	%	67	63	46	22	84	54	30	66
Other	%	7	2	4	0	3	0	4	0

Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

TABLE 11 Participation and involvement in activities, by region, 2010–11 proportion of farms

		northern NSW and Qld	southern and central NSW	northern Vic. and Riverina	Gippsland	western Vic.	SA	WA	Tas.
Farmer discussion groups	%	74	69	45	38	31	53	51	61
Industry training sessions	%	21	6	8	6	38	16	16	32
Farm research days or workshops	%	72	30	33	38	21	19	67	58
Public sector field days	%	31	59	38	28	26	29	24	63
Private sector field days	%	48	39	41	48	59	52	27	54
Farm political/representative groups	%	50	22	10	22	7	5	18	1
Regional R&D groups	%	9	10	12	9	3	17	15	4
Catchment management authority	%	15	15	4	3	3	8	2	10
Environmental programs	%	16	25	1	8	18	10	9	4
Other	%	0	18	4	0	0	0	2	2

Note: Figures for 2010–11 are preliminary estimates.
Source: ADIS

Appendix B
Times series tables

TABLE 12 Key physical indicators, Australian dairy industry average per farm

		1993–94	1995–96	1997–98	1999–2000	2001–02
Area operated	ha	185 (5)	210 (6)	207 (4)	217 (4)	257 (5)
Area used by milking cows	ha	na –	na –	na –	na –	112 (4)
Area used by other livestock	ha	na –	na –	na –	na –	127 (10)
Dairy herd at 30 June	no.	195 (2)	227 (3)	243 (2)	256 (3)	310 (2)
Milking cows	no.	127 (2)	143 (3)	160 (2)	168 (3)	204 (3)
Stocking rate	no./ha	1.1 (5)	1.1 (6)	1.2 (5)	1.2 (5)	1.2 (5)
Milk production	L	541 258 (2)	617 813 (4)	659 792 (3)	805 177 (4)	994 404 (4)
Milk yield per cow	L/cow	4 254 (2)	4 309 (2)	4 115 (2)	4 805 (2)	4 881 (3)
Milk production per labour unit	L/unit	na –	170 860 (4)	188 091 (3)	221 250 (4)	277 637 (4)
Milking cows per labour unit	no./unit	na –	40 (3)	46 (3)	46 (3)	57 (3)
Milk production per effective hectare	L/ha	na –	na –	na –	na –	8 863 (5)

		2004–05	2006–07	2008–09	2010–11
Area operated	ha	225 (5)	244 (6)	264 (5)	236 (5)
Area used by milking cows	ha	112 (3)	122 (5)	125 (5)	121 (4)
Area used by other livestock	ha	98 (9)	106 (10)	123 (7)	100 (7)
Dairy herd at 30 June	no.	293 (3)	310 (3)	342 (3)	347 (4)
Milking cows	no.	196 (3)	211 (3)	220 (3)	214 (4)
Stocking rate	no./ha	1.3 (5)	1.3 (5)	1.3 (4)	1.5 (4)
Milk production	L	974 895 (4)	1 044 473 (3)	1 247 345 (4)	1 205 639 (4)
Milk yield per cow	L/cow	4 985 (2)	4 949 (2)	5 674 (2)	5 635 (2)
Milk production per labour unit	L/unit	307 590 (4)	320 509 (4)	367 107 (3)	369 795 (4)
Milking cows per labour unit	no./unit	62 (4)	65 (3)	65 (3)	66 (4)
Milk production per effective hectare	L/ha	8 706 (4)	8 560 (5)	9 999 (4)	9 991 (4)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided. **na** Not applicable.
Source: ADIS

TABLE 13 Dairy characteristics, Australian dairy industry average per farm or proportion of farms

		1993–94		1995–96		1997–98		1999–2000		2001–02		2004–05		2006–07		2008–09		2010–11	
Shed type																			
Walkthrough	%	24	(13)	19	(17)	19	(17)	15	(20)	10	(19)	5	(27)	9	(38)	9	(33)	7	(51)
Double herringbone	%	28	(12)	25	(17)	22	(16)	28	(13)	24	(14)	29	(13)	29	(17)	26	(16)	30	(19)
Swingover herringbone	%	47	(7)	53	(8)	54	(8)	52	(8)	56	(7)	56	(7)	49	(12)	53	(10)	51	(13)
Rotary	%	4	(26)	5	(23)	7	(23)	6	(27)	11	(17)	10	(21)	13	(14)	14	(13)	13	(20)
Shed characteristics																			
Milking shed bails	no.	17	(3)	20	(4)	21	(4)	22	(3)	24	(3)	24	(4)	26	(4)	25	(4)	23	(5)
Milking time at peak season	mins	137	(2)	141	(2)	144	(3)	142	(3)	142	(2)	138	(3)	131	(2)	148	(4)	133	(7)
Numbers of operators at peak season	no.	1.7	(2)	1.7	(3)	1.7	(3)	1.7	(2)	1.7	(2)	1.6	(3)	1.7	(3)	1.8	(3)	1.6	(5)
Cows milked at peak season	hd	122	(2)	136	(3)	148	(3)	161	(3)	193	(3)	188	(3)	211	(9)	213	(4)	202	(5)
– per hour	hd/hr	53	(2)	58	(3)	62	(3)	68	(3)	82	(3)	81	(4)	97	(9)	86	(5)	91	(6)
– per operator	hd/op	73	(3)	81	(4)	86	(3)	96	(3)	117	(3)	115	(4)	128	(10)	121	(4)	124	(5)
Properties with automatic cup removers	%	13	(14)	12	(25)	12	(15)	14	(18)	16	(15)	26	(15)	23	(16)	37	(10)	35	(11)
Shed effluent disposal system																			
Run-off into paddock	%	44	(8)	40	(10)	38	(10)	24	(14)	21	(15)	10	(27)	20	(24)	6	(47)	8	(47)
Pump and spray	%	15	(15)	12	(20)	17	(17)	18	(18)	18	(15)	22	(15)	11	(15)	17	(15)	19	(19)
1 pond	%	25	(14)	30	(13)	26	(13)	33	(11)	33	(11)	39	(11)	36	(15)	37	(15)	30	(16)
2 ponds	%	12	(17)	14	(16)	17	(19)	23	(13)	26	(12)	26	(14)	26	(14)	40	(14)	43	(14)
Other systems	%	5	(30)	5	(37)	4	(40)	3	(41)	3	(48)	4	(33)	7	(27)	2	(42)	2	(44)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided.
Source: ADIS

TABLE 14 Walkthrough dairy characteristics, Australian dairy industry

average per farm or proportion of farms

		1993–94		1995–96		1997–98		1999–2000		2001–02		2004–05		2006–07		2008–09		2010–11	
Shed characteristics																			
Milking shed bails	no.	7	(7)	7	(10)	8	(5)	7	(11)	9	(44)	7	(4)	8	(8)	8	(3)	8	(7)
Milking time at peak season	mins	134	(5)	133	(6)	132	(4)	131	(5)	129	(9)	157	(14)	136	(3)	164	(32)	153	(19)
Numbers of operators at peak season	no.	1.6	(6)	1.7	(4)	1.7	(5)	1.8	(3)	1.5	(8)	1.9	(4)	1.9	(0)	1.8	(4)	1.7	(19)
Cows milked at peak season	hd	70	(7)	77	(12)	77	(9)	88	(10)	82	(23)	76	(13)	85	(49)	86	(5)	108	(22)
– per hour	hd/hr	32	(8)	35	(9)	35	(9)	40	(10)	38	(25)	29	(10)	38	(49)	31	(33)	43	(8)
– per operator	hd/op	45	(6)	45	(12)	44	(10)	50	(11)	54	(23)	40	(12)	44	(49)	47	(3)	62	(11)
Properties with automatic cup removers	%	7	(45)	7	(44)	13	(44)	10	(57)	8	(72)	15	(71)	15	(133)	5	(127)	31	(132)
Shed effluent disposal system																			
Run-off into paddock	%	54	(19)	69	(13)	75	(9)	56	(20)	54	(19)	20	(78)	59	(36)	47	(65)	58	(82)
Pump and spray	%	11	(33)	13	(37)	7	(52)	20	(47)	6	(62)	11	(50)	7	(73)	9	(39)	2	(212)
1 pond	%	26	(33)	9	(71)	12	(48)	16	(50)	30	(25)	38	(22)	17	(114)	35	(85)	30	(133)
2 ponds	%	3	(91)	7	(71)	4	(62)	8	(52)	6	(172)	0	na	7	(147)	9	(81)	6	(230)
Other systems	%	6	(92)	2	(101)	2	(101)	1	(183)	6	(88)	32	(57)	10	(22)	0	na	5	(97)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided.
Source: ADIS

TABLE 15 Double herringbone dairy characteristics, Australian dairy industry

average per farm or proportion of farms

		1993–94		1995–96		1997–98		1999–2000		2001–02		2004–05		2006–07		2008–09		2010–11	
Shed characteristics																			
Milking shed bails	no.	15	(6)	18	(10)	18	(10)	18	(6)	22	(9)	19	(7)	21	(6)	21	(5)	20	(7)
Milking time at peak season	mins	139	(3)	144	(5)	151	(5)	143	(7)	142	(5)	154	(6)	132	(5)	136	(8)	125	(26)
Numbers of operators at peak season	no.	1.5	(5)	1.6	(8)	1.8	(7)	1.6	(4)	1.5	(5)	1.7	(7)	1.7	(7)	1.5	(6)	1.2	(12)
Cows milked at peak season	hd	121	(5)	132	(7)	152	(8)	147	(5)	168	(6)	154	(7)	151	(6)	174	(9)	151	(14)
– per hour	hd/hr	52	(5)	55	(7)	60	(8)	62	(7)	71	(4)	60	(7)	69	(8)	77	(5)	72	(18)
– per operator	hd/op	82	(5)	83	(5)	85	(9)	92	(6)	109	(7)	92	(11)	89	(11)	119	(7)	121	(9)
Properties with automatic cup removers	%	21	(20)	26	(38)	14	(22)	22	(23)	34	(20)	31	(23)	31	(31)	46	(14)	39	(27)
Shed effluent disposal system																			
Run-off into paddock	%	45	(11)	31	(35)	18	(20)	26	(20)	33	(28)	8	(45)	27	(31)	4	(39)	4	(63)
Pump and spray	%	13	(38)	11	(32)	22	(35)	18	(30)	15	(35)	25	(20)	12	(26)	25	(20)	22	(22)
1 pond	%	27	(24)	38	(29)	34	(18)	28	(26)	40	(23)	45	(19)	40	(25)	30	(48)	36	(39)
2 ponds	%	10	(40)	8	(40)	12	(50)	20	(30)	11	(41)	20	(37)	16	(35)	41	(36)	37	(37)
Other systems	%	7	(38)	13	(48)	14	(44)	8	(57)	1	(62)	2	(53)	5	(54)	1	(64)	2	(88)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided.
Source: ADIS

TABLE 16 Swingover dairy characteristics, Australian dairy industry

average per farm or proportion of farms

		1993–94		1995–96		1997–98		1999–2000		2001–02		2004–05		2006–07		2008–09		2010–11	
Shed characteristics																			
Milking shed bails	no.	20	(4)	22	(4)	23	(5)	25	(4)	24	(5)	23	(5)	28	(6)	23	(4)	20	(6)
Milking time at peak season	mins	132	(2)	139	(3)	143	(4)	143	(3)	145	(2)	132	(4)	127	(4)	145	(6)	129	(6)
Numbers of operators at peak season	no.	1.7	(3)	1.6	(5)	1.6	(4)	1.7	(4)	1.6	(4)	1.5	(4)	1.5	(5)	1.8	(2)	1.7	(5)
Cows milked at peak season	hd	130	(3)	137	(3)	145	(4)	161	(3)	179	(3)	179	(4)	217	(17)	199	(4)	190	(6)
– per hour	hd/hr	59	(3)	59	(3)	61	(4)	67	(4)	74	(3)	81	(5)	103	(18)	82	(7)	89	(7)
– per operator	hd/op	76	(4)	85	(6)	89	(4)	97	(4)	109	(4)	119	(4)	149	(17)	109	(4)	109	(6)
Properties with automatic cup removers	%	11	(23)	6	(29)	10	(25)	10	(29)	10	(30)	23	(25)	20	(29)	33	(16)	30	(16)
Shed effluent disposal system																			
Run-off into paddock	%	42	(13)	40	(15)	36	(14)	16	(22)	14	(24)	11	(37)	13	(45)	1	(77)	3	(58)
Pump and spray	%	18	(19)	12	(39)	17	(21)	16	(21)	23	(18)	22	(24)	11	(21)	15	(25)	22	(29)
1 pond	%	23	(20)	32	(16)	27	(20)	42	(12)	33	(15)	38	(16)	40	(21)	44	(14)	29	(20)
2 ponds	%	15	(23)	17	(19)	22	(23)	25	(18)	28	(16)	28	(19)	28	(25)	38	(18)	45	(19)
Other systems	%	4	(43)	2	(36)	1	(52)	1	(59)	3	(68)	3	(59)	9	(44)	3	(43)	2	(74)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided.
Source: ADIS

TABLE 17 Rotary dairy characteristics, Australian dairy industry

average per farm or proportion of farms

		1993–94	1995–96	1997–98	1999–2000	2001–02	2004–05	2006–07	2008–09	2010–11
Shed characteristics										
Milking shed bails	no.	39 (8)	39 (5)	44 (3)	42 (10)	46 (4)	47 (4)	46 (4)	47 (2)	46 (3)
Milking time at peak season	mins	131 (8)	125 (6)	127 (8)	144 (7)	138 (6)	111 (6)	137 (6)	158 (6)	144 (8)
Numbers of operators at peak season	no.	2.1 (2)	2.1 (4)	1.9 (5)	1.9 (5)	2.0 (3)	2.0 (2)	2.1 (3)	1.8 (5)	1.8 (5)
Cows milked at peak season	hd	271 (15)	300 (8)	327 (8)	377 (13)	429 (7)	375 (6)	412 (5)	398 (5)	392 (7)
– per hour	hd/hr	124 (15)	144 (8)	155 (10)	157 (11)	187 (7)	203 (6)	180 (6)	151 (6)	163 (5)
– per operator	hd/op	130 (15)	141 (10)	172 (5)	196 (10)	214 (7)	186 (6)	198 (5)	216 (5)	212 (8)
Properties with automatic cup removers	%	12 (60)	12 (63)	16 (60)	16 (57)	21 (39)	31 (33)	26 (18)	56 (14)	48 (20)
Shed effluent disposal system										
Run-off into paddock	%	20 (63)	6 (79)	11 (86)	1 (97)	1 (111)	6 (84)	0 (63)	1 (91)	7 (54)
Pump and spray	%	27 (41)	16 (34)	23 (43)	24 (47)	16 (45)	22 (43)	13 (31)	17 (24)	9 (31)
1 pond	%	10 (35)	38 (29)	24 (35)	22 (44)	12 (57)	21 (48)	27 (27)	19 (35)	16 (50)
2 ponds	%	44 (18)	40 (28)	41 (21)	49 (31)	70 (14)	44 (27)	57 (14)	62 (12)	66 (13)
Other systems	%	0 (268)	0 na	1 (122)	4 (59)	2 (55)	7 (88)	5 (46)	1 (52)	3 (75)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided. **na** Not applicable.
Source: ADIS

TABLE 18 Supplementary feeding, Australian dairy industry average per farm or proportion of farms

		1993–94		1995–96		1997–98		1999–2000		2001–02		2004–05		2006–07		2008–09		2010–11	
Farms feeding concentrates, grain or by-products	%	85	(3)	89	(3)	90	(4)	91	(3)	89	(3)	94	(2)	89	(4)	98	(1)	100	(0)
Quantity of concentrates, grain, by-products fed																			
Self mix concentrates	t	13	(22)	6	(28)	16	(44)	15	(18)	22	(32)	46	(22)	41	(37)	22	(19)	33	(21)
Purchased concentrates	t	46	(8)	57	(11)	60	(10)	64	(10)	138	(9)	106	(11)	149	(9)	173	(10)	182	(9)
Grain	t	61	(8)	62	(10)	91	(9)	114	(9)	108	(10)	86	(11)	138	(9)	164	(9)	145	(10)
By-products	t	11	(62)	9	(27)	20	(25)	24	(30)	26	(29)	23	(45)	39	(26)	39	(24)	19	(32)
Total	t	130	(7)	134	(5)	187	(6)	217	(6)	293	(5)	262	(6)	366	(6)	397	(5)	378	(5)
Quantity of concentrates, grain, by-products fed per cow																			
Self mix concentrates	t/cow	0.1	(22)	0.0	(28)	0.1	(44)	0.1	(19)	0.1	(31)	0.2	(21)	0.2	(37)	0.1	(19)	0.1	(21)
Purchased concentrates	t/cow	0.4	(8)	0.4	(12)	0.4	(10)	0.4	(9)	0.6	(9)	0.5	(11)	0.7	(9)	0.8	(9)	0.8	(9)
Grain	t/cow	0.5	(8)	0.4	(10)	0.6	(8)	0.7	(8)	0.5	(10)	0.4	(12)	0.6	(8)	0.7	(8)	0.7	(9)
By-products	t/cow	0.1	(62)	0.1	(27)	0.1	(25)	0.1	(30)	0.1	(29)	0.1	(45)	0.2	(26)	0.2	(24)	0.1	(32)
Total	t/cow	1.0	(7)	0.9	(5)	1.1	(6)	1.3	(6)	1.4	(5)	1.3	(5)	1.7	(5)	1.8	(4)	1.7	(4)
Fodder and feedgrain costs	$/cow	183	(4)	254	(5)	249	(5)	263	(5)	365	(5)	375	(5)	647	(4)	839	(4)	566	(3)
Primary reason for feeding concentrates, grain or by-products																			
General lift in milk production	%	53	(7)	52	(6)	61	(6)	73	(4)	70	(5)	52	(9)	39	(12)	46	(7)	70	(7)
Fill gaps in pasture supply	%	30	(13)	32	(9)	23	(14)	22	(14)	19	(16)	18	(17)	21	(20)	30	(16)	12	(31)
Performance feeding on individual cow production	%	2	(40)	5	(44)	2	(26)	1	(41)	1	(41)	3	(53)	3	(49)	1	(34)	1	(81)
Seasonal, for winter or other incentive payments	%	10	(23)	6	(33)	4	(48)	2	(34)	4	(37)	1	(77)	0	(81)	0	(71)	0	na
Zero grazing	%	0	(103)	0	(69)	0	(194)	0	(99)	0	(107)	0	(72)	0	(70)	0	na	0	na
Enable increased stocking rate	%	0	na	0	na	0	na	0	na	0	na	8	(30)	8	(42)	1	(26)	2	(29)
Assist pasture management	%	0	na	0	na	0	na	0	na	0	na	9	(30)	13	(26)	18	(21)	4	(55)
Other	%	6	(24)	5	(20)	10	(26)	3	(59)	6	(36)	8	(31)	15	(29)	3	(37)	11	(30)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided. **na** Not applicable.
Source: ADIS

TABLE 19 Hay and silage, Australian dairy industry average per farm or proportion of farms

		1993–94		1995–96		1997–98		1999–2000		2001–02		2004–05		2006–07		2008–09		2010–11	
Farms purchasing hay or silage	%	48	(8)	53	(8)	56	(8)	55	(7)	52	(8)	42	(9)	39	(14)	61	(9)	42	(15)
Quantity of hay and silage purchased																			
Pasture hay	t	46	(11)	66	(11)	57	(10)	59	(13)	65	(11)	86	(15)	75	(18)	59	(20)	37	(50)
Other hay	t	29	(28)	19	(27)	32	(25)	50	(19)	31	(19)	45	(25)	95	(30)	163	(13)	81	(18)
Pasture silage	t	na	na	na	na	na	na	na	na	18	(25)	8	(33)	13	(32)	40	(29)	27	(38)
Other silage	t	na	na	na	na	na	na	na	na	18	(32)	10	(36)	39	(28)	45	(24)	28	(33)
On-farm production																			
Pasture hay	t	127	(6)	158	(8)	204	(8)	208	(8)	107	(8)	108	(10)	40	(19)	52	(14)	99	(18)
Other hay	t	42	(20)	39	(15)	47	(21)	57	(18)	29	(19)	27	(19)	14	(40)	21	(24)	36	(17)
Pasture silage	t	na	na	na	na	na	na	na	na	151	(11)	110	(11)	86	(15)	159	(11)	233	(10)
Other silage	t	na	na	na	na	na	na	na	na	44	(27)	41	(20)	49	(18)	66	(17)	84	(16)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided. **na** Not applicable.
Source: ADIS

TABLE 20 Herd information, Australian dairy industry

average per farm or proportion of farms

		1993–94		1995–96		1997–98		1999–2000		2001–02		2004–05		2006–07		2008–09		2010–11	
Dairy herd at 30 June	no.	195	(2)	227	(3)	243	(2)	256	(3)	310	(2)	293	(3)	310	(3)	342	(3)	347	(4)
Dairy cows	no.	127	(2)	143	(3)	160	(2)	168	(3)	204	(3)	196	(3)	211	(3)	220	(3)	214	(3)
Cows calved to artificial insemination	no.	66	(4)	80	(5)	87	(4)	87	(4)	109	(5)	100	(6)	121	(5)	118	(6)	132	(5)
Farms breeding replacement heifers	%	98	(2)	99	(1)	96	(2)	96	(2)	98	(1)	95	(2)	93	(4)	98	(1)	99	(0)
Replacement heifer calving age	months	26	(1)	26	(1)	26	(1)	26	(1)	26	(1)	26	(1)	25	(4)	25	(1)	24	(2)
Farms vaccinating against leptospirosis by stock type																			
– heifers	%	55	(7)	60	(8)	60	(6)	72	(5)	73	(5)	74	(5)	71	(7)	86	(4)	87	(4)
– milking cows	%	46	(7)	51	(9)	54	(8)	61	(7)	65	(6)	59	(7)	58	(8)	79	(4)	77	(4)
– dry cows	%	45	(8)	50	(9)	52	(8)	58	(7)	62	(6)	58	(7)	57	(8)	75	(4)	81	(4)

Notes: Figures for 2010–11 are preliminary estimates. Figures in parentheses are standard errors, expressed as a percentage of the estimates provided.
Source: ADIS

Survey methods and definitions

ABARES (and its predecessors) has conducted surveys of selected Australian agricultural industries since the 1940s. These surveys provide a broad range of information on the economic performance of farm businesses. This comprehensive set of information is widely used for research and analysis that forms the basis of many publications, briefing material and industry reports.

Target populations

The population list for the ADIS is sourced from the Levies Revenue Service and consists of dairy farms that have paid levies based on their milk deliveries. Dairy Australia provides the list, which consists of dairy businesses and their corresponding region and total milk production.

ABARES surveys target farming establishments that make a significant contribution to the total value of agricultural output (commercial farms). Farms excluded from the ABARES target population will be the smallest units, and in aggregate will contribute less than 2 per cent to the total value of agricultural production for the industries the surveys cover.

The 'size of operation' variable used in ABARES survey designs is usually 'estimated value of agricultural operations' (EVAO). However, some recent surveys have also used other measures of agricultural production. EVAO is a standardised dollar measure of the level of agricultural output. A definition of EVAO is given in *Agricultural Industries: Financial Statistics* (ABS 2001, cat. no. 7506.0). Since 2004–05, the ABARES survey has included establishments classified as having an EVAO of $40 000 or more. Between 1991–92 and 2003–04, the survey included establishments with an EVAO of $22 500 or more.

Survey design

The target population is grouped into strata defined by ABARES region, Australian and New Zealand Standard Industrial Classification (ANZSIC) and size of operation. The sample allocation is a compromise between allocating a higher proportion of the sample to strata with high variability in the size variable, and an allocation proportional to the population of the stratum.

A large proportion of sample farms are retained from the previous year's survey. The sample chosen each year maintains a high proportion of the sample between years to accurately measure change while meeting the need to introduce new sample farms to account for changes in the target population and reduce the burden on survey respondents.

The sample size for ADIS is around 300.

The main collection method for the survey is face-to-face interviews with the owner–manager of the farm. Detailed physical and financial information is collected on the operations of the farm business during the preceding financial year. Cooperating farms are required to provide detailed accounting information. Respondents to the ADIS are also contacted by telephone in October each year to obtain estimates of projected production and expected receipts and costs for the current financial year.

ABARES surveys also allow supplementary questionnaires to be attached to the main survey or telephone surveys. These additional questions help address specific current issues.

Sample weighting

ABARES survey estimates are calculated by appropriately weighting the data collected from each sample farm and using the weighted data to calculate population estimates. Sample weights are calculated so that population estimates from the sample for numbers of farms, areas of crops and numbers of livestock correspond, as closely as possible, with the most recently available ABS estimates from data collected from Agricultural Census and Surveys. The weighting methodology for ADIS uses a model-based approach, with a linear regression model linking the survey variables and the estimation benchmark variables. Bardsley and Chambers described this method in 1984.

For ADIS, the benchmark variables Dairy Australia provided are total number of in-scope dairy farms and total milk production.

Generally, larger farms have smaller weights and smaller farms have larger weights, reflecting both the strategy of sampling a higher fraction of large farms than small farms (the former having greater variability of key characteristics and accounting for a much larger proportion of total output) and the relatively lower numbers of large farms.

Reliability of estimates

The reliability of estimates of population characteristics ABARES published depends on design of the sample and accuracy of the measurement of characteristics for individual sample farms.

Preliminary estimates and projections

Estimates for 2009–10 and all earlier years are final. All data from farmers, including accounting information, have been reconciled, final production and population information from the ABS has been included and no further change is expected in these estimates.

The 2010–11 estimates are preliminary, based on full production and accounting information from farmers. However, editing and addition of sample farms may be undertaken and ABS production and population benchmarks may also change.

The 2011–12 estimates are projections developed from the data collected through on-farm interviews and telephone interviews between October and December, as well as from preliminary estimates. Projection estimates include production, receipts and expenditure up to the date of interview together with expected production, and receipts and expenditure for the remainder of the projection year. Modifications are made to expected receipts and expenditure where significant production and price change has occurred post interview. Projection estimates are necessarily subject to greater uncertainty than preliminary and final estimates.

Preliminary and projection estimates of farm financial performance are produced within a few weeks of completion of survey collections. However, these may be updated several times at later dates. These subsequent versions will be more accurate, as they will be based on upgraded information and more accurate input datasets.

Sampling errors

Only a subset of farms of the total number of farms in a particular industry is surveyed. The data collected from each sample farm are weighted to calculate population estimates. Estimates derived from these farms are likely to be different from those that would have been obtained if information had been collected from a census of all farms. Any such differences are called 'sampling errors'.

The size of the sampling error is most influenced by the survey design and the estimation procedures, as well as the sample size and the variability of farms in the population. The larger the sample size, the lower the sampling error is likely to be. Hence, national estimates are likely to have lower sampling errors than industry and state estimates.

To give a guide to the reliability of the survey estimates, standard errors are calculated for all estimates ABARES published. These estimated errors are expressed as percentages of the survey estimates and are termed relative standard errors.

Calculating confidence intervals using relative standard errors

Relative standard errors (RSEs) can be used to calculate 'confidence intervals' that give an indication of how close the actual population value is likely to be to the survey estimate.

To obtain the standard error, multiply the RSE by the survey estimate and divide by 100. For example, if average total cash receipts are estimated to be $100 000 with a relative standard error of 6 per cent, the standard error for this estimate is $6000. This is one standard error. Two standard errors equal $12 000.

There is roughly a two-in-three chance that the 'census value' (the value that would have been obtained if all farms in the target population had been surveyed) is within one standard error of the survey estimate. This range of one standard error is described as the 66 per cent confidence interval. In this example, there is approximately a two-in-three chance that the census value is between $94 000 and $106 000 ($100 000 plus or minus $6000).

There is roughly a 19-in-20 chance that the census value is within two standard errors of the survey estimate (the 95 per cent confidence interval). In this example, there is approximately a 19-in-20 chance that the census value lies between $88 000 and $112 000 ($100 000 plus or minus $12 000).

Comparing estimates

When comparing estimates between two groups, it is important to recognise that some of the differences are subject to sampling error. As a rule of thumb, a conservative estimate of the standard error of the difference can be constructed by adding the squares of the estimated standard errors of the component estimates and taking the square root of the result. An example is given below.

Suppose the estimates of total cash receipts were $100 000 in the dairy industry and $125 000 in the sheep industry—a difference of $25 000—and the relative standard error is given as 6 per cent for each estimate. The standard error of the difference can be estimated as:

$$\sqrt{(6 \times \$100\,000 / 100)^2 + (6 \times \$125\,000 / 100)^2} = \$9605$$

A 95 per cent confidence interval for the difference is:

$$\$25\,000 \pm 1.96 \times \$9605 = (\$6174, \$43\,826)$$

Hence, if a large number (towards infinity) of different samples were taken, in approximately 95 per cent of them the difference between these two estimates would lie between $6174 and $43 826. Also, since zero is not in this confidence interval, it is possible to say that the difference between the estimates is statistically significantly different from zero at the 95 per cent confidence level.

Glossary

Owner–manager	The primary decision-maker for the farm business. This person is usually responsible for day-to-day operation of the farm and may own or have a share in the farm business.

Physical items

Beef cattle	Cattle kept primarily for producing meat, irrespective of breed.
Dairy cattle	Cattle kept or intended mainly for producing milk or cream.
Hired labour	Excludes the farm business manager, partners and family labour, and work done by contractors. Expenditure on contract services appears as a cash cost.
Labour	Measured in work weeks, as estimated by the owner–manager or manager. It includes all work on the farm by the owner–manager, partners, family, hired permanent and casual workers and sharefarmers, but excludes work done by contractors.
Total area operated	Includes all land operated by the farm business, whether owned or rented by the business, but excludes land share farmed on another farm.

Financial items

Capital	The value of farm capital is the value of all the assets used on a farm, including the value of leased items but excluding machinery and equipment either hired or used by contractors. The value of 'owned' capital is the value of farm capital excluding the value of leased machinery and equipment. ABARES uses the owner–manager's valuation of the farm property. The valuation includes the value of land and fixed improvements used by each farm business in the survey, excluding land share farmed off the sample farm. Residences on the farm are included in the valuations. Livestock are valued at estimated market prices for the land use zones within each state. These values are based on recorded sales and purchases by sample farms. Before 2001–02, ABARES maintained an inventory of plant and machinery for each sample farm. Individual items were valued at replacement cost, depreciated for age. Each year, the replacement cost was indexed to allow for changes in that cost. Since 2001–02 total value of plant and machinery is based on market valuations vprovided by the owner–manager for broad categories of capital, such as tractors, vehicles and irrigation plant. The total value of items purchased or sold during the survey year was added to or subtracted from farm capital at 31 December of the relevant financial year, irrespective of the actual date of purchase or sale.
Change in debt	Estimated as the difference between debt at 1 July and the following 30 June within the survey year, rather than between debt at 30 June in consecutive years. It is an estimate of the change in indebtedness of a given population of farms during the financial year and is thus unaffected by changes in sample or population between years.
Farm business debt	Estimated as all debts attributable to the farm business, but excluding personal debt, lease financed debt and underwritten loans, including harvest loans. Information is collected at the survey interview and supplemented by information contained in the farm accounts.
Farm liquid assets	Assets owned by the farm business that can be readily converted to cash. They include savings bank deposits, interest bearing deposits, debentures and shares but exclude items such as real estate, life assurance policies and other farms or businesses.

Receipts and costs	Receipts for livestock and livestock products sold are determined at the point of sale. Selling charges and charges for transport to the point of sale are included in the costs of sample farms. Receipts for crops sold during the survey year are gross of deductions made by marketing authorities for freight and selling charges. These deductions are included in farm costs. Receipts for other farm products are determined on a 'farm gate' basis. All cash receipt items are the revenue received in the financial year. Farm receipts and costs relate to the whole area operated, including areas operated by on-farm sharefarmers. Thus, cash receipts include receipts from the sale of products produced by sharefarmers. If possible, on-farm sharefarmers' costs are amalgamated with those of the sample farm. Otherwise, the total sum paid to sharefarmers is treated as a cash cost. Some sample farm businesses engage in off-farm contracting or share farming, employing labour and capital equipment also used in normal on-farm activities. Since it is not possible to accurately allocate costs between off-farm and on-farm operations, the income and expenditure attributable to such off-farm operations are included in the receipts and costs of the sample farm business.
Total cash costs	Payments made by the farm business for materials and services and for permanent and casual hired labour (excluding owner–manager, partner and other family labour). It includes the value of livestock transfers onto the property as well as any lease payments on capital, produce purchased for resale, rent, interest, livestock purchases and payments to sharefarmers. Capital and household expenditures are excluded from total cash costs. Handling and marketing expenses include commission, yard dues, and levies for farm produce sold. Administration costs include accountancy fees, banking and legal expenses, postage, stationery, subscriptions and telephone. Contracts paid, refers to expenditure on contracts such as harvesting. Capital and land development contracts are not included. Other cash costs include stores and rations, seed purchased, electricity, artificial insemination and herd testing fees, advisory services, motor vehicle expenses, travelling expenses and insurance. While 'other cash costs' may comprise a relatively large proportion of total cash costs, individually the components are relatively small overall and, as such, have not been listed.

Total cash receipts	Total of revenues received by the farm business during the financial year, including revenues from sale of livestock, livestock products and crops, plus the value of livestock transfers off a property. It includes revenue received from agistment, royalties, rebates, refunds, plant hire, contracts, share farming, insurance claims and compensation, and government assistance payments to the farm business.

Financial performance measures

Build-up in trading stocks	The closing value of all changes in the inventories of trading stocks during the financial year. It includes the value of any change in herd or flock size or in stocks of wool, fruit and grains held on the farm. It is negative if inventories are run down.
Depreciation of farm improvements	Estimated by the diminishing value method, based on replacement cost and age of each item. The rates applied are standard rates allowed by the Commissioner of Taxation.
Farm business equity	The value of owned capital, less farm business debt at 30 June. The estimate is based on those sample farms for which complete data on farm debt are available.
Farm business profit	Farm cash income plus build-up in trading stocks, less depreciation and the imputed value of the owner–manager, partner(s) and family labour.
Farm cash income	The difference between total cash receipts and total cash costs.
Farm equity ratio	Calculated as farm business equity as a percentage of owned capital at 30 June.
Imputed labour cost	Payments for owner–manager and family labour may bear little relationship to the actual work input. An estimate of the labour input of the owner manager, partners and their families is calculated in work weeks and a value is imputed at the relevant Federal Pastoral Industry Award rates.
Off-farm income	Collected for the owner–manager and spouse only, including income from wages, other businesses, investment, and government assistance to the farm household and social welfare payments.
Plant and equipment	For items purchased or sold during the financial year, depreciation is assessed as if the transaction had taken place at the midpoint of the year. Calculation of farm business profit does not account for depreciation on items subject to a finance lease because cash costs already include finance lease payments.

Profit at full equity	Farm business profit, plus rent, interest and finance lease payments, less depreciation on leased items. It is the return produced by all the resources used in the farm business.
Rates of return	Calculated by expressing profit at full equity as a percentage of total opening capital. Rate of return represents the ability of the business to generate a return to all capital used by the business, including that which is borrowed or leased. The following rates of return are estimated: rate of return, excluding capital appreciation; and rate of return, including capital appreciation.

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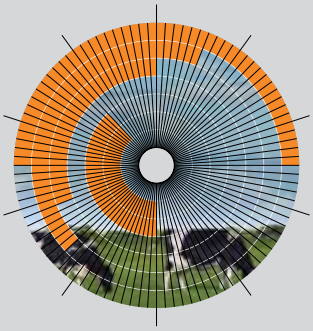
The 'Biosphere' Graphic Element
The biosphere is a key part of the department's visual identity. Individual biospheres are used to visually describe the diverse nature of the work we do as a department, in Australia and internationally.



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