



Financial performance of Australian sugar cane producers

2005-06 to 2007-08

Stephen Hooper

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Foreword

The Australian sugar cane industry is facing the challenge of enhancing producers' profitability during a period of increasing competition in export markets, rising input prices and declining returns. Industry stakeholders, government decision-makers and growers need to become better informed about the key factors likely to affect costs of production and financial performance. This information is critical in assessing the risks and challenges facing sugar cane growers and is particularly important for the future development of strategies, and research and development programs to improve the long-term viability of sugar cane production.

ABARE was commissioned by the Sugar Industry Oversight Group (IOG) and funded by the Australian Government Department of Agriculture, Fisheries, and Forestry to collect information from sugar cane growers on production, financial performance and management practices and the challenges they face. The main objective of the survey was to identify the distinguishing characteristics, in terms of production and financial performance, of sugar cane farms of varying sizes and the management practices used by farmers that are likely to be critical for the long-term viability of these producers.

This report contains a snapshot of farm performance for the 2005-06 to 2007-08 financial years, based on production and financial performance data collected in 2007 and 2008 from Australian sugar cane growers. It provides an insight into production and management issues faced by Australian sugar cane growers.



Phillip Glyde
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September 2008



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Contents

Summary	1
1 Introduction	3
2 Physical characteristics of sugar cane farms	5
3 Financial performance of sugar cane producers	8
Farm cash receipts	8
Sugar cash costs of production	8
Farm financial performance	12
Sugar cane cash gross margins	16
4 Farm management practices	19
5 Concluding comments	25
Appendix A	26
Target populations	26
Survey design and sample weighting	27
Reliability of estimates	27
Definition of terms	29
References	31
Figures	
a Sugar cane area and production	3
b Sugar cane price received, by scale of sugar cane production	8
c Average cost of sugar cane production, by scale of sugar cane production	11
d Cash cost of sugar cane production, by region	11
e Farm cash income, by scale of sugar cane production	12
f Farm business profit, by scale of sugar cane production	13
g Farm business profit, by region	14
h Proportion of farms with positive farm business profit, by region	14
i Rate of return excluding capital appreciation, by scale of sugar cane production	16
j Gross margin of sugar cane production, by region	16

k	Sugar cane gross margin, by scale of sugar cane production	18
l	Expected level of involvement of sugar cane producers in current enterprise in three years time	20
m	Proportion of farms intending to reduce sugar cane production in the next three years, by region	21
n	Impediments to expanding farm size	21
o	Source of irrigation water	22
p	Likely response to reduced irrigation water availability or higher water prices	23
q	Sources of information	23
r	Proportion of farmers who undertook activities to improve their management and technical skills	24

Tables

1	Distribution of farms, by quantity of cane produced, 2005-06 to 2007-08	4
2	Physical characteristics, sugar producers, 2005-06 to 2007-08	6
3	Sugar cane production by region	7
4	Farm cash receipts, sugar producers, 2005-06 to 2007-08	9
5	Farm cash costs, sugar producers, 2005-06 to 2007-08	10
6	Farm financial performance, sugar producers, 2005-06 to 2007-08	13
7	Farm financial performance, sugar producers, by region and size group, 2005-06 to 2007-08	15
8	Gross margin of sugar cane production, by region and size group, 2005-06 to 2007-08	17
9	Farms with a written farm business plan, by scale of sugar cane production	19
A1	Distribution of farms, by quantity of cane produced, 2005-06 to 2007-08	26

Summary

- Increased sugar supply from major exporting countries, in particular Brazil, has put pressure on prices in Australia's export markets over the past decade, and subsequently on returns for Australian sugar cane growers. In order for the Australian sugar cane industry to be viable and competitive, producers, millers and the sugar value chain need to continue improving productivity.
- The Australian sugar cane growing industry is in transition; the volume of production is relatively stable but has a reduced number of producers, which suggests a trend toward a smaller number of larger farms.

Sugar cane production

- Between 2005-06 and 2007-08 the number of sugar cane growers in Australia fell by around 15 per cent to slightly more than 4100.
- On average, sugar cane producers harvested 8249 tonnes of sugar cane per farm in 2007-08. There was a wide dispersion of farm sizes and sugar cane production around this average. Nearly two-thirds of growers produced less than 7500 tonnes of sugar cane per farm and accounted for slightly more than one-quarter of Australia's sugar cane production in 2007-08. In comparison, an estimated 3 per cent of growers produced more than 30 000 tonnes per farm and accounted for 22 per cent of national sugar cane production in the same period.
- In 2006-07, a small quantity of sugar cane was produced in the Ord River region of Western Australia, however closure of the mill meant sugar cane production ceased in this region in 2007-08. Sugar cane farms in the Ord River region tended to be larger than elsewhere in Australia.

Prices

- With sugar cane prices increasing relative to costs, farm cash incomes strengthened in 2006-07, averaging \$94 000 a farm, which is around 40 per cent higher than the average farm cash income in 2005-06. With the exception of producers growing less than 7500 tonnes of sugar cane per farm on average, producers of all scales of sugar cane production realised a positive farm business profit in 2006-07.
- In 2007-08, a sharp fall in sugar cane prices and further increases in input prices resulted in a marked deterioration in financial performance in the sugar cane growing industry. On average, farm cash incomes fell 91 per cent in 2007-08 to average around \$7000 a farm. Small to medium sized sugar cane growers - those producing

less than 22 500 tonnes of sugar cane per farm - realised on average negative or very small positive farm cash incomes.

Economies of scale

- The survey results for 2005-06 suggested there may be economies of scale, whereby average unit cash costs of production decline as farms expand production, in the Australian sugar cane growing industry. While the two additional years' data (2006-07 and 2007-08) indicates unit cash cost of production falls as production increases, the strength of the suggested economies of scale is much less, particularly when production exceeds 30 000 tonnes of sugar cane per farm.

Sugar cane gross margin

- In 2007-08 the average gross margin of sugar cane production is estimated to have been \$3.10 a tonne, well below the 2005-06 and 2006-07 levels of \$9.10 a tonne and \$11.30 a tonne, respectively. Sugar cane profitability fell in all regions, but regions with the highest concentration of large producers continued to realise the highest average gross margin.

Farm management

- In 2006-07, the proportion of producers intending to expand sugar cane production exceeded the number of producers intending to reduce sugar cane production. However, the decline in sugar cane profitability during 2007-08 resulted in more producers indicating their intention to reduce sugar cane production.
- The survey results suggest that sugar cane producers have actively sought information to better manage their farms. The most common sources of information on farm management and production used by sugar cane growers were family, friends and other growers. More than 80 per cent of sugar cane growers obtained information from industry organisations such as cane growers associations. Between 2006-07 and 2007-08 there was a large increase in the number of growers who used the internet as a source of information. The number of growers who used production groups and state government sources fell.
- In 2007-08, an estimated 30 per cent of sugar cane producers had a written farm management plan, with nearly all producers' plans containing information on production activities, natural resource management and business activities. Of the farms with management plans, the proportion of management plans containing information on people management and succession planning fell from 47 per cent in 2006-07 to 39 per cent in 2007-08. However, as was observed in 2006-07, the proportion of farm plans including people management and succession planning increased with sugar cane production, reflecting the greater reliance of larger producers on hired labour.

1 Introduction

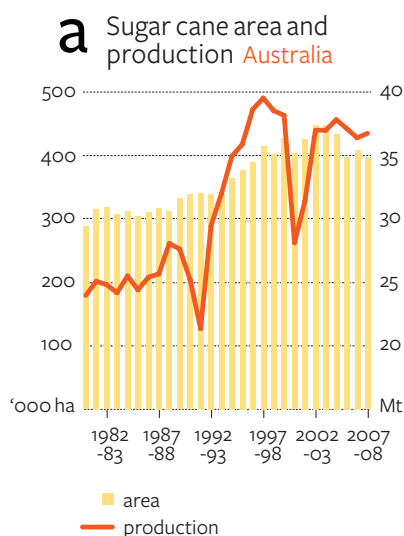
In April 2008, ABARE conducted a survey of sugar cane growers on behalf of the Sugar Industry Oversight Group (IOG) and in collaboration with CANEGROWERS. The survey was funded by the Australian Government Department of Agriculture, Fisheries and Forestry. This survey is a follow up to the 2005-06 survey, collecting data for the 2006-07 financial year from 328 growers. In addition, 313 growers provided detailed forecasts for the 2007-08 financial year.

This report presents detailed physical and financial performance indicators for sugar cane growers by region for the three financial years spanning 2005-06 to 2007-08. A more detailed set of regional estimates is available on ABARE's website (www.abare.gov.au). Results from the survey are designed to provide information about farm costs, production, financial performance management practices and future intentions.

The Australian sugar cane industry is located mainly along Australia's eastern coastline, from Mossman in far north Queensland to Grafton in northern New South Wales. In 2006-07, a small quantity of sugar cane was produced in the Ord River region of Western Australia. However, closure of the mill meant sugar cane production ceased in this region in 2007-08. Sugar cane farms in the Ord River tended to be larger than elsewhere in Australia.

Over the past decade, increased sugar supply from major exporting countries like Brazil has put downward pressure on prices in Australia's export markets, and subsequently on returns to Australian sugar cane growers. In part reflecting this, there has been a steady exit of growers from the sugar cane industry during the 2000s, resulting in the area planted to sugar cane in Australia falling by 12 per cent since its peak in 2003-04 at 448 000 hectares (figure a). However, Australian sugar cane production fell by only 1 per cent to 37 million tonnes in 2007-08, largely reflecting the exit of small producers and the expansion of larger producers who generally realise higher yields.

In 2005-06, Australia had slightly more than 4800 sugar cane growers, with 65 per cent of these producers growing less than 7500 tonnes of sugar cane per farm. Collectively, these producers represented just 25 per cent of Australia's sugar cane production (table 1). In contrast, only 3 per cent of growers produced more than 30 000 tonnes of



sugar cane per farm, accounting for 22 per cent of national sugar cane production. In 2007-08, the decline in sugar cane profitability resulted in the number of sugar cane growers falling to around 4100, with a high proportion of small sugar cane producers having exited the industry (table 1). Between 2006-07 and 2007-08 the number of growers producing more than 30 000 tonnes per farm has remained at around 108 growers, or 20 per cent of national production, as some medium to large producers expanded and offset the impact of the loss of large producers in the Ord River.

1 Distribution of farms, by quantity of cane produced, 2005-06 to 2007-08

	sugar cane growers			number of growers surveyed		
	2005-06	2006-07	2007-08 ^a	2005-06	2006-07	2007-08 ^a
	no.	no.	no.	no.	no.	no.
Quantity of sugar cane produced						
Less than 7500 tonnes	3 130	2 643	2 622	106	147	143
7500 to 15 000 tonnes	1 035	1 013	1 044	89	106	99
15 000 to 22 500 tonnes	349	293	279	44	41	38
22 500 to 30 000 tonnes	151	83	85	22	14	13
30 000 to 50 000 tonnes	105	59	70	17	10	12
More than 50 000 tonnes	49	46	38	12	10	8
Total	4 819	4 138	4 138	290	328	313

	share of growers			share of production		
	2005-06	2006-07	2007-08 ^a	2005-06	2006-07	2007-08 ^a
	%	%	%	%	%	%
Quantity of sugar cane produced						
Less than 7500 tonnes	65	64	63	25	28	28
7500 to 15 000 tonnes	21	24	25	28	30	31
15 000 to 22 500 tonnes	7	7	7	16	16	15
22 500 to 30 000 tonnes	3	2	2	10	6	7
30 000 to 50 000 tonnes	2	1	2	10	6	8
More than 50 000 tonnes	1	1	1	12	14	12
Total	100	100	100	100	100	100

^a Includes producers who provided projection estimates for 2007-08.

2 Physical characteristics of sugar cane farms

In 2006-07, the average area operated by Australian sugar cane growers was 362 hectares. Sugar cane in Australia is normally grown on a four to five year rotation, with producers harvesting up to 80 per cent of the crop each year. However, in New South Wales, the growing season is between 18 and 24 months, resulting in a lower proportion of the area under cane being harvested each year.

On average, the area of sugar cane harvested in 2006-07 represented around a quarter of the farm area operated, down from almost 50 per cent in 2005-06. Sugar cane producers also grow a range of other crops - including soybeans, peanuts, bananas, tropical fruits and vegetables. In addition, many sugar cane producers have small beef cattle herds (table 2).

In 2005-06 and 2006-07, the largest sugar cane producers – in terms of sugar cane production – were in the Ord River region of Western Australia (table 3). However, with production halting in this region, the largest producers are now located in the Burdekin, Mackay and Herbert River regions of Queensland.

The smallest producers, on average, are located in southern Queensland, Bundaberg and New South Wales. Producers in the Burdekin, Mackay and Bundaberg regions are the most dependent on irrigation water for sugar cane production, with a majority of the crops receiving at least one application of water during the year (table 3).

With more than 15 per cent of producers exiting the industry between 2005-06 and 2007-08, the average size of sugar cane production in the various regions has changed markedly (table 3). For example, the average producer in the Herbert River, Bundaberg and New South Wales harvested more sugar cane land, but lower yields in these regions limited production growth between 2005-06 and 2007-08. In contrast, the average area harvested for sugar cane production in southern Queensland fell from 56 hectares in 2005-06 to 49 hectares in 2007-08.

New South Wales had the highest sugar cane yields, averaging 131 tonnes per hectare in 2007-08, reflecting the longer growing season in this state. In Queensland, the highest cane production and yields were achieved in the Burdekin, with producers on average harvesting between 115 and 118 tonnes per hectare in the three years to 2007-08.

2 Physical characteristics, sugar producers, 2005-06 to 2007-08

average per farm

		less than 7.5 kt			7.5 - 15 kt			15 kt - 22.5 kt			22.5 kt to 30 kt		
		2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s
Beef cattle number, 30 June	no.	20	7	na	30	15	na	54	5	na	14	0	na
Number of beef cattle sold	no.	na	7	na	na	13	na	na	14	na	na	143	na
Proportion of producers growing crops other than sugar cane													
Oilseeds	%	6	7	8	19	13	10	6	10	11	16	1	1
Bananas	%	3	2	2	1	1	1	0	0	0	0	0	0
Peanuts	%	0	1	0	4	2	3	1	0	0	0	0	0
Vegetables	%	11	11	5	12	11	2	3	12	4	4	0	5
Other crops	%	8	7	10	1	3	10	0	5	12	3	11	5
Milling sugar cane supply and disposal													
Area harvested	ha	37	47	46	109	114	113	193	200	199	251	283	275
- irrigated	ha	16	18	16	57	56	56	100	111	120	174	217	195
Production	t	3 121	3 582	3 636	10 504	10 230	10 087	18 324	18 145	17 910	25 388	25 969	26 029
Sugar cane yield a	t/ha	84	76	79	97	90	89	95	91	90	101	92	95
Quantity sold	t	3 122	3 521	3 578	10 203	10 073	9 927	17 843	17 816	17 617	25 004	25 425	25 553

		30 kt to 50 kt			more than 50 kt			average		
		2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s
Beef cattle number, 30 June	no.	17	13	na	79	1 023	na	25	20	na
Number of beef cattle sold	no.	na	12	na	na	157	na	na	13	na
Proportion of producers growing crops other than sugar cane										
Oilseeds	%	4	0	8	0	0	0	9	8	8
Bananas	%	0	0	0	8	0	0	2	2	1
Peanuts	%	4	0	8	13	9	9	1	2	1
Vegetables	%	6	14	6	13	23	13	11	11	4
Other crops	%	5	0	22	3	13	23	6	6	10
Milling sugar cane supply and disposal										
Area harvested	ha	417	349	403	790	949	997	87	93	93
- irrigated	ha	314	322	210	683	860	989	49	52	49
Production	t	38 453	35 167	37 971	93 091	101 271	104 148	8 195	8 233	8 184
Sugar cane yield a	t/ha	92	101	94	118	107	104	95	88	88
Quantity sold	t	38 047	34 743	37 384	92 135	99 601	102 506	8 066	8 097	8 052

a Tonnes per hectare harvested. s Provisional estimates. na Not available.

3 Sugar cane production by region

average per farm

	area harvested			yield			sugar cane produced			proportion irrigated		
	2005 -06	2006 -07	2007 -08 ^s	2005 -06	2006 -07	2007 -08 ^s	2005 -06	2006 -07	2007 -08 ^s	2005 -06	2006 -07	2007 -08 ^s
	ha	ha	ha	t/ha	t/ha	t/ha	t	t	t	%	%	%
Far North Queensland	74	94	84	90	71	80	6 714	6 719	6 717	12	11	8
Herbert river	93	102	111	98	84	77	9 163	8 573	8 571	13	11	5
Burdekin	121	132	130	118	115	117	14 274	15 173	15 183	100	100	100
Mackay	114	112	111	82	80	81	9 314	9 004	9 000	80	77	69
Bundaberg	64	65	76	84	87	74	5 411	5 632	5 622	95	98	99
Southern Queensland	56	58	49	69	83	77	3 867	4 802	3 784	10	22	33
New South Wales	31	33	36	153	143	131	4 695	4 740	4 753	3	9	8
Ord River	262	281	-	120	116	-	31 516	32 628	-	100	100	-
Australia	87	93	93	95	88	88	8 195	8 233	8 184	57	56	53

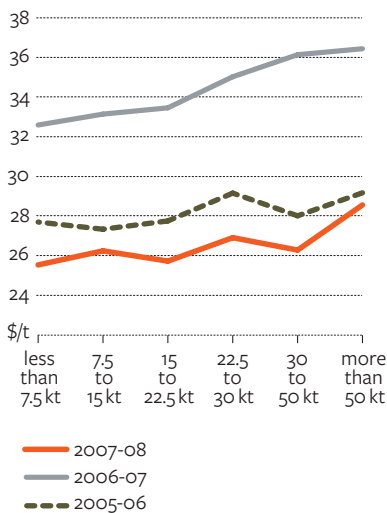
^sProvisional estimates.

3 Financial performance of sugar cane producers

Farm cash receipts

In 2006-07, farm cash receipts rose, on average, by 29 per cent to around \$363 000 a farm, principally because of increases in sugar cane production and prices (tables 2 and 4 and figure b). On average, sugar cane receipts accounted for three-quarters of total farm cash receipts, with the remainder being generated by the sale of other crops (particularly fruit and vegetables) and beef cattle.

b Sugar cane price received, by scale of sugar cane production



Larger sugar cane producers realised a greater increase in the average price received for sugar cane in 2006-07 (figure b). On average, growers producing more than 30 000 tonnes of cane per farm realised a price increase of between 25 and 29 per cent to average around \$36 a tonne. In contrast, growers producing less than 7500 tonnes per farm realised a price increase of 18 per cent to slightly more than \$32 a tonne.

In 2007-08, the sugar cane price received by growers fell, on average, by 21 per cent to \$26 a tonne, resulting in producers of all scales realising prices that are well below the 2005-06 levels (figure b). This is estimated to have resulted in farm cash receipts falling, on average, to \$295 800 a farm.

Sugar cash costs of production

In 2006-07, sugar cane production cash costs averaged \$181 000 a farm, ranging from almost \$80 000 a farm for small scale producers (those producing less than 7500 tonnes) to around \$2.2 million a farm for growers producing more than 50 000 tonnes (table 5). Across all farms, contract harvesting and fertilisers were the largest cost items, accounting for almost half of total sugar cane related production costs. Outlays on these inputs increased, on average, by 13 per cent and 28 per cent respectively as contract harvesters passed on higher labour and fuel costs and, in the case of fertilisers, because of further increases in world prices. Higher fuel prices also resulted in sugar cane producers, on average, spending 25 per cent more on freight and 23 per cent more on fuel, oil and grease in 2006-07. Sugar cane growers producing more than 50 000 tonnes of sugar cane per farm spent almost \$300 000 a farm on hired labour in 2006-07, which is around three times more than in 2005-06 (table 5).

4 Farm cash receipts, sugar producers, 2005-06 to 2007-08

average per farm

	less than 7.5 kt			7.5 - 15 kt			15 kt - 22.5 kt			22.5 kt to 30 kt		
	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s
Farm cash receipts												
Receipts from the sale of the 2005-06 sugar cane crop												
- milling sugar	\$ 2 726	6 644	5 794	10 006	16 683	13 508	13 401	29 064	19 502	21 653	40 890	24 007
Receipts from the sale of the 2006-07 sugar cane crop												
- milling sugar	\$ 82 164	109 655	87 113	265 993	319 076	248 283	473 152	576 222	440 255	665 522	857 967	676 547
- non-milling sugar	\$ 314	254	1 168	39	2 495	4 128	0	499	1 612	0	4 657	0
Total sugar receipts	\$ 85 205	116 553	94 075	276 038	338 254	265 920	486 552	605 785	461 368	687 175	903 514	700 554
Other crop receipts												
- peanuts	\$ 452	548	467	2 467	2 268	1 554	1 347	0	1 677	0	0	0
- oilseeds	\$ 976	283	854	1 238	1 347	2 065	877	998	1 273	2 839	190	750
- vegetables	\$ 2 720	8 886	9 405	568	5 495	5 370	3 426	2 525	2 670	1 479	2 746	0
- fruit	\$ 9 653	9 435	7 430	2 673	15 317	7 773	0	2 456	44 236	5 026	136 604	0
- other crops	\$ 0	493	291	3 069	3 576	2 679	0	5 134	6 049	0	0	0
Cattle receipts	\$ 1 000	3 717	5 067	2 241	6 538	5 625	18 07	9 527	12 993	0	93 408	523
Off farm sharefarming	\$ 727	168	na	7 093	3 316	na	13 049	879	na	0	0	na
Off farm contracts	\$ 3 818	13 766	na	17 144	14 744	na	32 669	28 387	na	16 116	33 192	na
Total cash receipts	\$ 123 378	168 486	141 850	341 720	412 873	331 623	593 682	683 446	561 950	804 059	1 217 849	770 694
	30 kt to 50 kt			more than 50 kt			average					
	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s			
Farm cash receipts												
Receipts from the sale of the 2005-06 sugar cane crop												
- milling sugar	\$ 27 145	46 475	41 768	56 698	120 501	106 273	6 739	13 218	10 564			
Receipts from the sale of the 2006-07 sugar cane crop												
- milling sugar	\$ 983 778	1 219 569	956 735	2 538 288	3 529 177	2 868 742	212 994	263 042	203 781			
- non-milling sugar	\$ 0	3 985	131	0	87	0	212	960	1 893			
Total sugar receipts	\$ 1 010 923	1 270 030	998 634	2 594 985	3 649 766	2 975 015	219 945	277 220	216 237			
Other crop receipts												
- peanuts	\$ 3 911	0	0	46 044	88 556	169 965	1 477	1 896	2 348			
- oilseeds	\$ 2 078	0	0	0	0	0	1 098	585	1 164			
- vegetables	\$ 21 935	0	0	21 031	231 728	293 370	2 877	9 849	10 163			
- fruit	\$ 0	30 110	17 507	209 968	1 338 147	1 423 115	9 150	28 096	22 892			
- other crops	\$ 97	1 851	1 080	0	0	0	661	1 581	1 286			
Cattle receipts	\$ 4 687	10 339	120 920	57 170	99 987	115 077	1 949	7 792	8 613			
Off farm sharefarming	\$ 0	0	na	0	0	na	2 940	981	na			
Off farm contracts	\$ 26 732	18 863	na	92 729	43 143	na	10 562	15 833	na			
Total cash receipts	\$ 1 159 214	1 374 228	1 237 604	3 321 008	5 594 141	5 224 804	280 920	363 718	295 830			

s Provisional estimates. na Not available.

5 Farm cash costs, sugar producers, 2005-06 to 2007-08

average per farm

	less than 7.5 kt			7.5 - 15 kt			15 kt - 22.5 kt			22.5 kt to 30 kt		
	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s
Sugar cane related production costs												
Contracts												
- planting	\$ 1203	1649	1584	2534	3238	3179	2487	4770	8008	4648	7241	8258
- harvesting	\$ 18796	21428	23540	47816	55432	55638	86026	94035	98513	105466	114614	136058
- other	\$ 1554	661	652	1562	3847	4751	5666	8653	9540	6631	5667	2595
Electricity	\$ 1268	1519	1721	4456	4128	4200	5062	6490	5332	12099	11387	10338
Fertiliser	\$ 13589	18827	23975	36808	52116	58790	78378	96450	111750	86412	145992	146127
Freight and mill charges	\$ 2365	3033	3514	7732	9490	9312	12042	13835	13498	16493	16084	18611
Fuel, oil and grease	\$ 6284	9571	11630	22633	25524	27315	37724	32419	38999	42504	66666	65312
Handling and marketing	\$ 1563	2059	2233	3765	6699	6137	8167	16247	18474	10762	15040	14348
Repairs and maintenance	\$ 6062	9533	8893	24505	27968	26660	32538	42062	35554	52027	72691	46290
Soil preparation	\$ 77	103	91	1162	751	526	1838	1447	1353	1029	3254	2746
Chemicals	\$ 2610	3287	3591	10133	8246	8875	14984	12317	16409	21472	25360	38440
Hired labour	\$ 1737	1760	2025	20012	15555	13873	24627	14638	19231	29979	45576	43430
Water	\$ 1521	1658	1716	4136	5003	6085	8278	16000	16680	25619	25581	11879
Total sugar costs	\$ 61901	79544	89491	199174	231973	239541	335393	375452	403561	445039	571131	560605
Non-sugar cane related costs	\$ 38223	48675	47969	54906	68316	86717	99937	131433	185481	181410	349068	141117
Total cash costs	\$ 100124	128219	137460	254080	300289	326258	435330	506886	589042	626449	920200	701722

	30 kt to 50 kt			more than 50 kt			average		
	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s	2005 -06	2006 -07	2007 -08 s
Sugar cane related production costs									
Contracts									
- planting	\$ 5404	194	2018	15818	56052	64517	1931	2960	3137
- harvesting	\$ 167983	240991	210183	130427	200464	197832	37003	41890	43760
- other	\$ 1608	10140	12033	155531	36772	31297	3588	2646	2796
Electricity	\$ 11566	29779	28548	53517	36482	46010	3325	3500	3626
Fertiliser	\$ 158588	149349	177923	418769	476359	496474	32853	42005	48101
Freight and mill charges	\$ 28680	21810	21463	64639	133633	152630	5872	7369	7622
Fuel, oil and grease	\$ 60748	64368	77555	149430	233786	278655	15857	19530	22087
Handling and marketing	\$ 15218	28364	26023	33394	35050	38173	3425	5204	5292
Repairs and maintenance	\$ 57431	80640	98569	104768	261260	220545	15508	21447	19390
Soil preparation	\$ 6403	1079	227	14543	14366	16475	753	594	492
Chemicals	\$ 31840	38050	49040	61160	122803	140458	6948	7415	8523
Hired labour	\$ 33820	32004	52931	106138	295568	308554	9970	10647	10680
Water	\$ 14679	33273	33114	147696	208839	223058	5107	6741	6582
Total sugar costs	\$ 615355	760908	812713	1525577	2202115	2315417	150213	181131	190741
Non-sugar cane related costs	\$ 206621	181997	361390	917643	1990769	2695034	63422	89006	98326
Total cash costs	\$ 821976	942905	1174103	2443220	4192885	5010451	213635	270137	289067

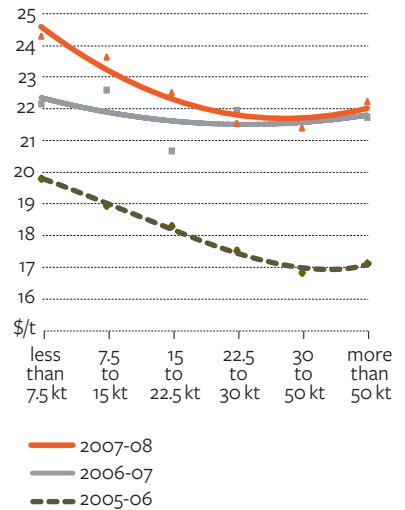
s Provisional estimates.

In 2007-08, further input price rises are estimated to have resulted in sugar cane cash production costs increasing, on average, by 5 per cent to around \$191 000 a farm. However, the survey results suggest many producers responded to an 80 per cent increase in fertiliser prices by reducing application rates in 2007-08 and purchasing less to be used on the 2008-09 crop. Despite this, higher input costs are estimated to have resulted in fertiliser costs rising by a further 15 per cent in 2007-08. Higher fuel costs also boosted outlays on fuel, oil and grease by 13 per cent and freight by 3 per cent. Producers responded to rising production costs by deferring non-essential repairs and maintenance and, in some cases, reducing outlays on hired labour.

Overall, the average cost of production in 2005-06 is estimated to have been \$18.30 a tonne. The 2007-08 survey results indicate the average cash cost of production increased to \$22.0 a tonne in 2006-07 and \$23.20 a tonne in 2007-08. In all three years there was considerable variability in the estimated unit cash costs of production between sugar growing regions and size groups (figures c and d).

In 2005-06, average unit cash cost of production fell from almost \$20 a tonne for producers growing less than 7500 tonnes per farm to around \$17 a tonne for large producers (production exceeding 30 000 tonnes of sugar cane per farm). This suggested there was the possibility of relatively strong economies of scale in sugar cane production. While the two additional years' data also indicates that unit cash cost of production fell as production increased, the strength of the economies of scale is much less, particularly once production exceeds

C Average cash cost of sugar cane production, by scale of sugar cane production



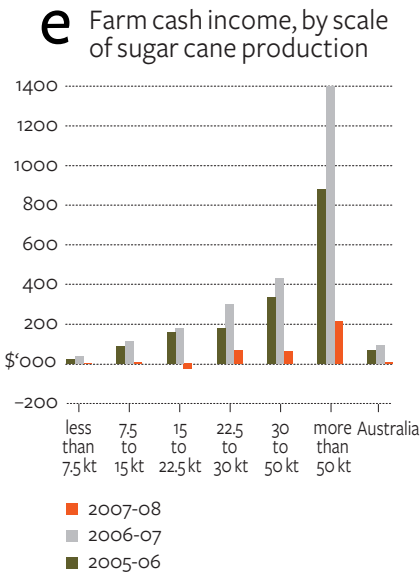
d Cash cost of sugar cane production, by region



30 000 tonnes of sugar cane per farm (figure c). In this analysis, data for producers in the Ord River was excluded from the 2005-06 estimates, so as to ensure a consistent basis for comparison over the 2005-06 to 2007-08 period.

Unit costs of sugar cane production were the lowest in the Herbert River region and highest in the Bundaberg region in 2005-06 (figure d). In 2007-08, the steady increase in the cost of some of the main inputs resulted in unit cash costs increasing in all regions, with the largest increases occurring in the regions with the highest concentration of small producers - for example southern Queensland and Bundaberg. While growers in the Herbert River region still have the lowest production costs in Queensland, unit costs in New South Wales are now the lowest in Australia. Producers in New South Wales have limited their cost increases in recent years by expanding the area sown and by deferring non-essential repairs and maintenance, and by reducing input use per hectare, particularly fertilisers and hired labour.

Farm financial performance



Sugar cane growers' farm cash incomes increased significantly in 2006-07, as higher prices and increased production more than offset the impact of rising input costs (table 6, figure e). On average, farm cash income rose from around \$67 000 a farm in 2005-06 to just less than \$94 000 a farm in 2006-07. Farm businesses of all scales of sugar cane production realised increased farm cash incomes, with farms producing more than 50 000 tonnes per farm realising the largest increase in average incomes, being up 84 per cent to \$1.4 million a farm.

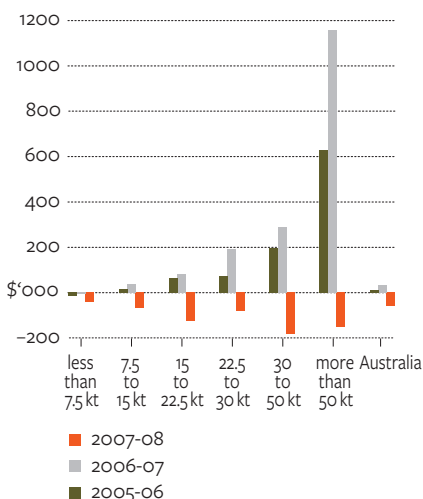
In 2007-08, lower prices and further increases in the main inputs are forecast to have had a significant impact on producers' farm cash incomes. On average, farm cash incomes fell by 93 per cent in 2007-08 to average around \$7000 a farm. Small to medium sized sugar cane growers (those producing less than 22 500 tonnes of sugar cane per farm) realised, on average, negative or very small positive farm cash incomes.

In 2007-08, producers growing between 15 000 and 22 500 tonnes of sugar cane per farm realised strong positive cash flows from sugar cane production. However, in recent years these producers appear to have diversified into other industries, particularly tropical fruit production (table 4), that generated significant large cash outflows in 2007-08, resulting in an overall farm cash income of around -\$27 000 per farm. In contrast, businesses producing more than 50 000 tonnes of sugar cane per farm realised a farm cash income on average of \$214 000, 85 per cent lower than the average realised in 2006-07.

Nationally, sugar cane growing farm business profitability fell on average from a profit of \$32 000 a farm in 2006-07 to a loss of \$58 400 a farm in 2007-08 (table 6 and figure f). Only 25 per cent of sugar cane businesses are estimated to have recorded a profit in 2007-08, compared with 49 per cent in 2006-07.

On average, sugar cane producing businesses in all regions are estimated to have realised a negative farm business profit in 2007-08, with losses being the greatest in far north Queensland and the least in southern Queensland and New South Wales (table 7 and figure g). Producers in the Burdekin region experienced the largest decline in profitability, with the average farm realising a loss of \$58 000 a farm in 2007-08, compared with a profit of \$130 000 a farm in 2006-07.

f Farm business profit, by scale of sugar cane production



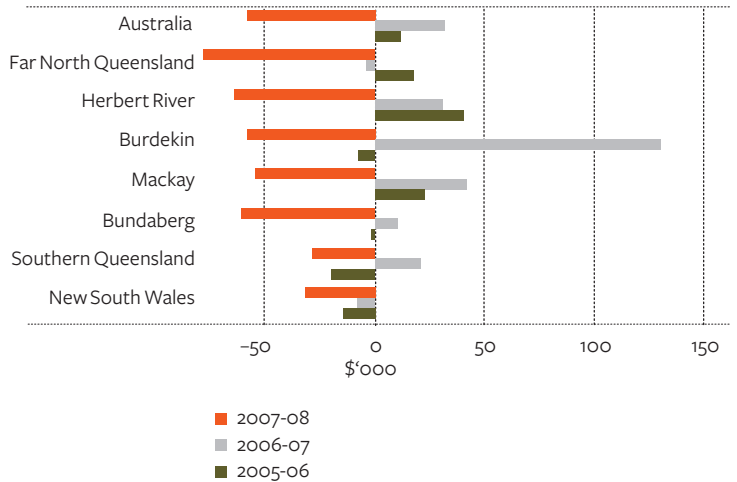
6 Farm financial performance, sugar producers, 2005-06 to 2007-08 ^a

average per farm

	less than 7.5 kt			7.5 - 15 kt			15 kt - 22.5 kt			22.5 kt to 30 kt		
	2005-06	2006-07	2007-08 s	2005-06	2006-07	2007-08 s	2005-06	2006-07	2007-08 s	2005-06	2006-07	2007-08 s
Total cash receipts	\$ 123 378	168 486	141 850	341 720	412 873	331 623	593 682	683 446	561 950	804 059	1 217 849	770 694
Total cash costs	\$ 100 124	128 219	137 460	254 080	300 289	326 258	435 330	506 886	589 042	626 449	920 200	701 722
Farm cash income	\$ 23 254	40 267	4 390	87 640	112 584	5 365	158 353	176 560	-27 091	177 610	297 649	68 972
Farm business profit	\$ -14 978	-6 101	-41 309	14 306	37 976	-69 671	62 936	81 337	-125 437	71 454	189 970	-82 151
Rate of return												
- excl. cap. appreciation %	-0.4	0.2	-1.7	1.5	2.3	-1.5	3.0	3.4	-1.5	2.8	3.8	0.0
- incl. cap. appreciation %	5.1	13.7	na	6.3	14.0	na	6.7	8.5	na	6.8	14.9	na
Farm capital \$m	1.4	1.7	na	2.5	3.1	na	3.5	3.8	na	4.9	8.3	na
Farm debt	\$ 136 865	102 273	na	189 729	204 206	na	428 753	517 958	na	667 644	1 394 929	na
Liquid assets	\$ 82 761	116 387	na	174 191	106 719	na	194 463	242 264	na	248 796	97 785	na
Off farm income	\$ 30 037	31 467	na	18 348	18 301	na	12 444	9 472	na	18 621	15 518	na
	30 kt to 50 kt			more than 50 kt			average					
	2005-06	2006-07	2007-08 s	2005-06	2006-07	2007-08 s	2005-06	2006-07	2007-08 s			
Total cash receipts	\$ 1 159 214	1 374 228	1 237 604	3 321 008	5 594 141	5 224 804	280 920	363 718	295 830			
Total cash costs	\$ 821 976	942 905	1 174 103	2 443 220	4 192 885	5 010 451	213 635	270 137	289 067			
Farm cash income	\$ 337 239	431 323	63 501	877 788	1 401 256	214 353	67 285	93 581	6 762			
Farm business profit	\$ 196 852	290 537	-182 551	628 066	1 157 153	-151 041	10 858	32 052	-58 366			
Rate of return												
- excl. cap. appreciation %	4.7	5.2	0.0	4.9	6.5	1.0	1.4	2.3	-1.2			
- incl. cap. appreciation %	28.8	6.3	na	8.0	12.9	na	7.4	12.9	na			
Farm capital \$m	7.3	7.3	na	19.2	26.4	na	2.2	2.7	na			
Farm debt	\$ 1 064 693	1 299 324	na	3 843 038	5 890 495	na	255 687	267 052	na			
Liquid assets	\$ 123 136	264 836	na	597 698	744 361	na	121 706	131 805	na			
Off farm income	\$ 131 221	28 349	na	7 849	829	na	27 283	26 136	na			

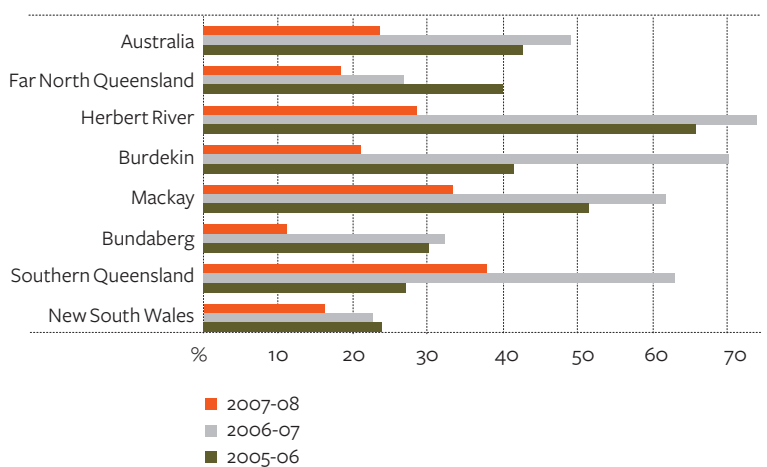
^a Financial performance of sugar cane producing farm businesses. na Not available. s Provisional estimates.

g Farm business profit, by region



In 2006-07, the Herbert River, Burdekin, Mackay and southern Queensland had the highest proportion of farms realising a profit – in excess of 60 per cent (figure h). However the proportion of profitable farms in these regions declined to around 25 per cent in 2007-08. Despite this, southern Queensland had the highest proportion of profitable sugar cane growing farms in 2007-08, at around 38 per cent. The Bundaberg region had the lowest proportion of profitable sugar cane producing farms at 10 per cent.

h Proportion of farms with positive farm business profit, by region

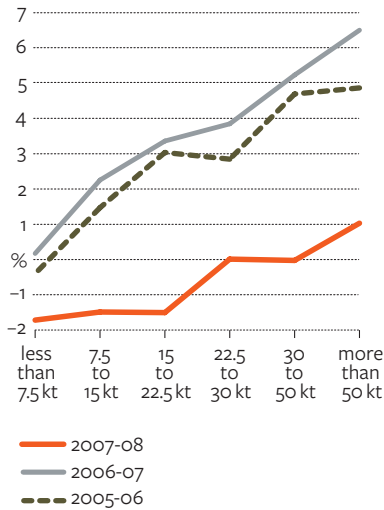


7 Farm financial performance, sugar producers, by region and size group 2005-06 to 2007-08 ^a average per farm

	less than 7.5 kt			7.5 - 15 kt			more than 15 kt			average		
	2005 -06	2006 -07	2007 -08 ^s	2005 -06	2006 -07	2007 -08 ^s	2005 -06	2006 -07	2007 -08 ^s	2005 -06	2006 -07	2007 -08 ^s
Farm cash income												
Far North Queensland \$	30 655	46 698	-7 507	79 826	69 148	1 665	240 765	149 131	-34 238	65 832	59 587	-7 909
Herbert River \$	45 215	48 239	2 554	80 488	101 591	-27 089	273 754	224 305	-5 135	88 298	87 960	-9 965
Burdekin \$	-18 135	37 822	-16 429	29 515	126 978	-3 975	251 663	550 902	84 713	61 289	202 871	13 670
Mackay \$	35 828	37 097	14 500	104 423	120 619	3 039	230 779	312 549	27 311	86 069	102 338	13 562
Bundaberg \$	13 515	42 876	8 378	129 491	166 286	16 533	315 233	307 921	ns	51 590	74 646	3 536
Southern Queensland \$	21 313	34 971	23 788	ns	ns	ns	ns	ns	ns	43 922	67 225	51 194
New South Wales \$	7 424	29 212	9 183	102 161	104 570	39 001	ns	ns	ns	33 064	44 694	15 258
Australia \$	23 254	40 267	4 390	87 640	112 584	5 365	253 094	346 181	22 362	67 647	93 375	6 677
Farm business profit												
Far North Queensland \$	1 132	-8 089	-61 963	-6 223	-390	-85 268	126 421	22 130	-201 270	17 524	-4 088	-78 208
Herbert River \$	10 682	9 187	-22 547	24 552	32 949	-99 450	188 255	120 570	-127 017	40 146	30 669	-64 162
Burdekin \$	-63 106	-12 066	-55 458	-38 356	56 959	-64 003	134 991	439 459	-54 709	-7 514	129 951	-58 368
Mackay \$	-3 713	-2 923	-28 035	24 486	46 877	-69 429	108 289	197 139	-130 993	22 342	41 613	-54 424
Bundaberg \$	-30 330	-10 560	-44 637	58 689	75 667	-68 931	193 646	154 643	ns	-1 613	10 314	-61 021
Southern Queensland \$	-33 563	6 647	-37 199	ns	ns	ns	ns	ns	ns	-19 908	20 818	-28 680
New South Wales \$	-31 145	-14 887	-30 963	29 848	17 986	-25 208	ns	ns	ns	-14 596	-8 133	-31 981
Australia \$	-14 978	-6 101	-41 309	14 306	37 976	-69 671	139 134	228 988	-128 851	11 795	31 895	-58 414
Rate of return excl. capital appreciation												
Far North Queensland %	0.3	-0.3	-4.2	1.3	0.8	-2.0	3.6	1.7	-3.6	1.7	0.5	-3.4
Herbert River %	2.0	1.6	-1.5	3.1	3.1	-4.7	6.3	5.5	-0.4	4.0	3.3	-2.5
Burdekin %	-1.2	0.8	-2.0	-0.6	3.3	-0.6	4.0	7.8	1.5	1.4	5.4	0.4
Mackay %	0.5	0.5	-0.9	1.5	2.7	-1.6	3.4	3.6	-0.6	1.8	2.3	-1.0
Bundaberg %	-1.4	0.1	-1.5	2.9	3.3	-1.1	3.4	2.3	ns	0.7	1.3	-1.3
Southern Queensland %	-1.8	0.3	-0.4	ns	ns	ns	ns	ns	ns	-0.6	0.6	-0.3
New South Wales %	-2.4	-1.0	-2.0	1.4	1.0	-0.5	ns	ns	ns	-0.5	-0.2	-1.4
Australia %	-0.4	0.2	-1.7	1.5	2.3	-1.5	3.9	4.8	-0.2	1.5	2.3	-1.2
Rate of return incl. capital appreciation												
Far North Queensland %	1.3	21.1	na	3.4	26.8	na	5.4	7.2	na	3.1	19.4	na
Herbert River %	8.1	4.4	na	10.4	0.7	na	13.0	10.2	na	10.7	4.5	na
Burdekin %	13.9	16.7	na	-3.1	7.3	na	7.1	12.0	na	7.1	11.3	na
Mackay %	3.4	9.9	na	7.5	5.7	na	19.1	10.2	na	9.9	9.1	na
Bundaberg %	4.3	12.5	na	5.7	14.9	na	6.8	13.9	na	5.2	13.3	na
Southern Queensland %	18.5	22.7	na	ns	ns	ns	ns	ns	na	21.2	33.3	na
New South Wales %	-2.0	3.0	na	7.6	1.9	na	ns	ns	na	2.8	2.6	na
Australia %	5.1	13.7	na	6.3	14.0	na	11.2	10.9	na	7.4	12.9	na

^a Financial performance of sugar cane producing farm businesses. ns Not supplied because of insufficient sample size. na Not available. s Provisional estimates.

i Rate of return excluding capital appreciation, by scale of sugar cane production



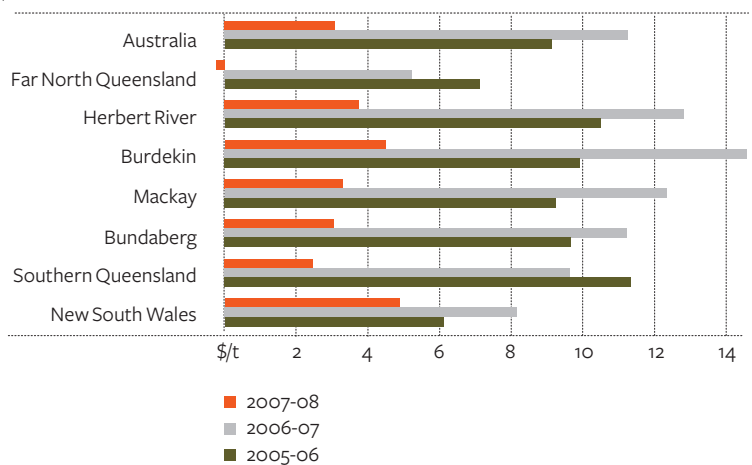
On average, sugar cane producers operate a business with capital worth \$2.7 million in 2006-07 (table 6). While the operational return on capital, excluding capital appreciation, was relatively low, averaging 2.3 per cent in 2006-07 and -1.2 per cent in 2007-08, strong growth in land values resulted in significant capital appreciation in these years. For example, in 2006-07, the total return on capital (rate of return including capital appreciation) was on average 12.9 per cent. This growth in capital values has resulted in producers maintaining relatively high equity levels, despite a steady increase in debt in recent years.

In the three years to 2007-08, operational returns on capital are estimated to have increased with farm size and sugar cane production (figure i). However, only growers producing more than 50 000 tonnes of sugar cane per farm realised a positive operational return on capital in 2007-08.

Sugar cane cash gross margins

The sugar cane gross margin is a measure of the cash surplus generated from the production of sugar cane. It is calculated as the difference between the average price received and the unit sugar cane production cash costs. In 2005-06, the average gross margin of sugar cane production is estimated to have been \$9.10 a tonne (table 8 and figure j). Sugar cane production was most profitable in the Ord River of Western Australia, and southern Queensland and Herbert River regions of Queensland. In contrast, sugar cane production was least profitable in New South Wales and far north Queensland, as producers in these regions received the lowest average price in 2005-06.

j Gross margin of sugar cane production, by region



8 Gross margin of sugar cane production, by region and size group, 2005-06 to 2007-08

average per farm

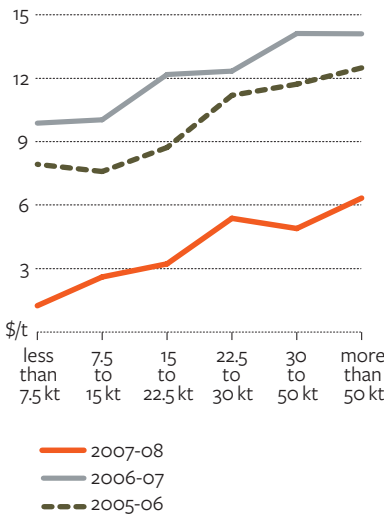
	less than 7.5 kt			7.5 - 15 kt			more than 15 kt			average		
	2005 -06 \$/t	2006 -07 \$/t	2007 -08 s \$/t	2005 -06 \$/t	2006 -07 \$/t	2007 -08 s \$/t	2005 -06 \$/t	2006 -07 \$/t	2007 -08 s \$/t	2005 -06 \$/t	2006 -07 \$/t	2007 -08 s \$/t
Average sugar cane price												
Far North Queensland	27	30	24	26	28	24	27	30	24	26	30	24
Herbert River	26	33	27	27	33	25	26	32	25	26	33	26
Burdekin	29	36	27	27	37	27	30	38	27	29	37	27
Mackay	30	35	26	28	35	27	29	36	28	29	36	27
Bundaberg	30	36	28	32	35	26	27	29	ns	30	33	29
Southern Queensland	28	33	23	ns	ns	ns	ns	ns	ns	29	33	30
New South Wales	23	26	25	24	26	24	ns	ns	ns	24	26	24
Australia	28	33	26	27	33	26	28	35	27	28	34	26
Average sugar cane cash cost of production												
Far North Queensland	18	25	24	18	23	23	20	24	24	19	24	24
Herbert River	15	18	21	17	21	24	15	18	20	16	20	22
Burdekin	21	23	26	23	23	24	16	22	21	18	22	22
Mackay	21	23	25	20	24	25	18	22	23	19	23	24
Bundaberg	25	25	29	19	21	23	14	19	ns	19	22	26
Southern Queensland	19	21	29	ns	ns	ns	ns	ns	ns	17	23	28
New South Wales	21	16	18	17	19	21	ns	ns	ns	19	17	19
Australia	20	22	24	19	23	24	17	21	22	18	22	23
Sugar cane gross margin												
Far North Queensland	8.0	5.0	-0.6	7.5	5.0	0.9	6.5	5.7	-0.9	7.1	5.2	-0.2
Herbert River	11.2	14.2	6.3	9.3	11.4	1.5	11.0	13.7	5.1	10.5	12.8	3.8
Burdekin	7.3	12.4	1.3	2.0	13.9	3.8	12.9	15.2	5.4	9.9	14.6	4.5
Mackay	8.4	11.2	1.0	8.0	10.1	2.1	10.4	14.3	5.2	9.2	12.3	3.3
Bundaberg	4.6	11.4	-1.3	12.8	13.8	3.4	12.7	9.5	ns	9.7	11.2	3.0
Southern Queensland	8.5	12.2	-6.2	ns	ns	ns	ns	ns	ns	11.3	9.7	2.5
New South Wales	5.4	9.3	7.2	6.5	6.8	2.6	ns	ns	ns	6.1	8.2	4.9
Australia	7.9	9.9	1.2	7.6	10.0	2.6	10.7	13.1	4.8	9.1	11.3	3.1

ns Not supplied because of insufficient sample size. s Provisional estimates.

In 2006-07, the average gross margin of sugar cane production is estimated to have increased to \$11.30 a tonne, as prices increased relative to costs of production. The strongest increase in profitability occurred in the regions with the greatest concentration of large producers, for example the Burdekin, Herbert River and Mackay regions of Queensland. Producers in far north Queensland and New South Wales again had the lowest gross margin as a result of receiving below average prices.

In 2007-08, the average gross margin of sugar cane production is estimated to have fallen to \$3.10 a tonne, as a result of weaker prices and higher input costs. Sugar cane profitability fell in all regions, but regions with the highest concentration of large producers continued to realise the highest average gross margin. The exception is New South Wales which has a large concentration of small producers but had the highest

K Sugar cane gross margin, by scale of sugar cane production



average sugar cane gross margin. In New South Wales, sugar cane price volatility was lower and the impact of input price increases was minimised by producers changing their farm management practices (for example, reduced fertiliser application rates). In far north Queensland, sugar cane producers realised a small negative gross margin in 2007-08.

Sugar cane gross margins have varied considerably between years, with producers of all scales of production experiencing increased profitability in 2006-07 and markedly lower profitability in 2007-08 (figure k). In the three years to 2007-08, sugar cane profitability increased with the scale of sugar cane production. For example, in 2007-08, growers producing less than 7500 tonnes per farm realised an average gross margin of \$1.24 a tonne compared with \$6.30 a tonne for producers growing more than 50 000 tonnes of sugar cane per farm.

4 Farm management practices

As part of the sugar cane producers' surveys in 2007 and 2008, ABARE asked a range of supplementary questions to gather detailed information on sugar cane management practices and producers' production intentions and information sources. Some of the key results are highlighted in this section.

Farm management plan

In 2007-08, an estimated 30 per cent of sugar cane producers had a written farm management plan (table 9), with nearly all producers' plans containing information on production activities, natural resource management and business activities. Of the farms with management plans, the proportion with a plan containing information on people management and succession planning fell from 47 per cent in 2006-07 to 39 per cent in 2007-08. However, as was observed in 2006-07, the proportion of farms with plans including people management and succession planning increased significantly with sugar cane production, reflecting the greater reliance of larger producers on hired labour.

9 Farms with a written farm business plan, by scale of sugar cane production

proportion of farms

	less than 7.5 kt		7.5 - 15 kt		15 kt - 22.5 kt		22.5 kt to 30 kt	
	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08
Proportion of farms with a plan	28	25	41	33	42	47	45	45
Proportion of farms with plans including								
- production activities	100	99	100	97	88	89	93	100
- management of natural resources	85	78	75	78	69	58	90	100
- business activities	88	83	93	95	92	89	84	100
- people management/succession plan	41	32	51	44	56	55	58	50
	30 kt to 50 kt		more than 50 kt		average			
	2006-07	2007-08	2006-07	2007-08	2006-07	2007-08		
Proportion of farms with a plan	24	37	43	73	32	30		
Proportion of farms with plans including								
- production activities	100	100	100	100	99	97		
- management of natural resources	72	38	100	73	81	76		
- business activities	100	70	71	81	89	87		
- people management/succession plan	71	0	100	73	47	39		

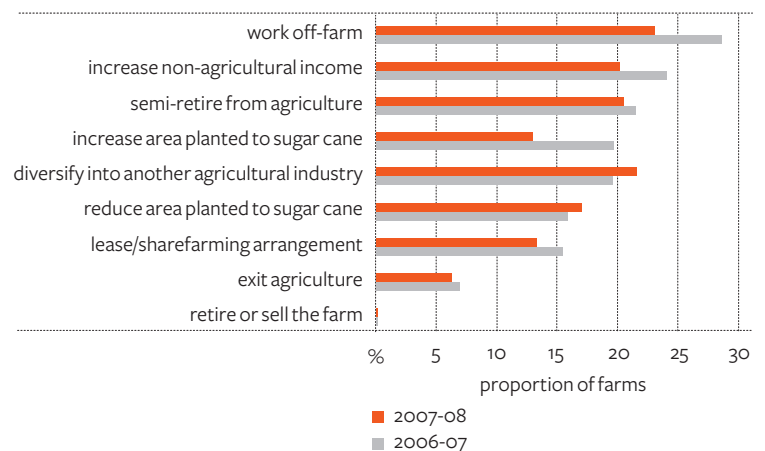
Between 2006-07 and 2007-08 a greater proportion of producers indicated that a severe downturn in sugar cane prices, disease management and a sharp increase in input prices were of critical importance to their farm planning. In 2007-08, the proportion of producers who considered themselves unprepared for a downturn in sugar cane prices or rise in input prices doubled to 32 per cent and 45 per cent respectively. Drought management is critical to one-third of sugar cane growers but many of these producers consider themselves to be under prepared to deal with the impact of drought on their business.

Production intentions

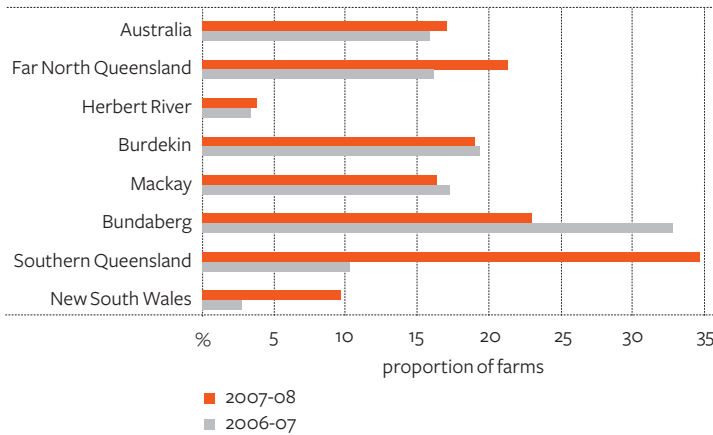
The proportion of sugar cane producers intending to expand sugar cane production fell from just less than 20 per cent in 2007 to 13 per cent in 2007-08. In contrast, the proportion of producers intending to reduce sugar cane production increased from 16 per cent to 17 per cent during the same period (figure 1). In 2007-08, the sentiment of many producers of all scales of sugar cane production swung strongly away from expanding sugar cane production. Many of these producers indicated an intention to either maintain the current enterprise mix or reduce sugar cane production and diversify into other agricultural industries, or reduce their involvement in agriculture over the next three years.

In 2007-08, between 20 and 30 per cent of sugar cane producers in the southern Queensland, Bundaberg and far north Queensland regions indicated they intended to reduce their area planted to sugar cane (figure m). These were the least profitable sugar cane producing regions in 2007-08 (table 8). In contrast, in the Herbert River (one of the most profitable

Expected level of involvement of sugar cane producers in current enterprise in three years time



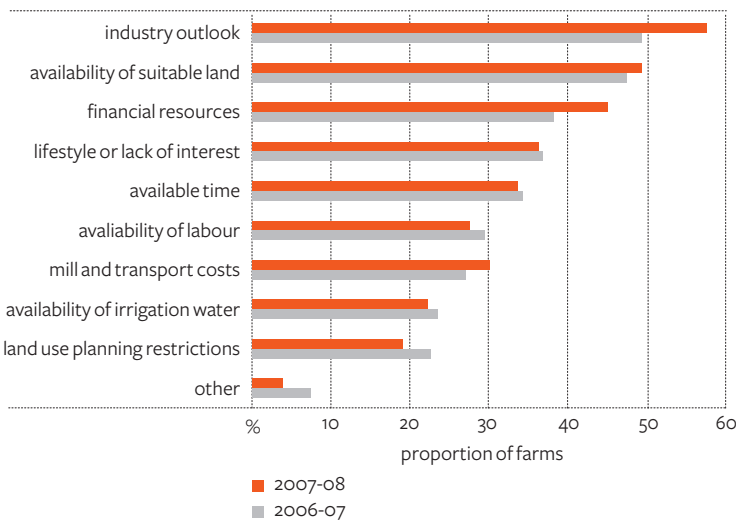
m Proportion of farms intending to reduce sugar cane production in the next three years, by region



sugar cane producing regions), only 4 per cent of producers indicated an intention to reduce their sugar cane area over the next three years.

The most significant impediments to producers expanding their farming business in 2006-07 and 2007-08 are the sugar industry's outlook, the availability of suitable land and producers' financial resources. Many producers also indicated they did not intend to expand because their current scale of production suited their lifestyle or they lacked the interest to expand (figure n).

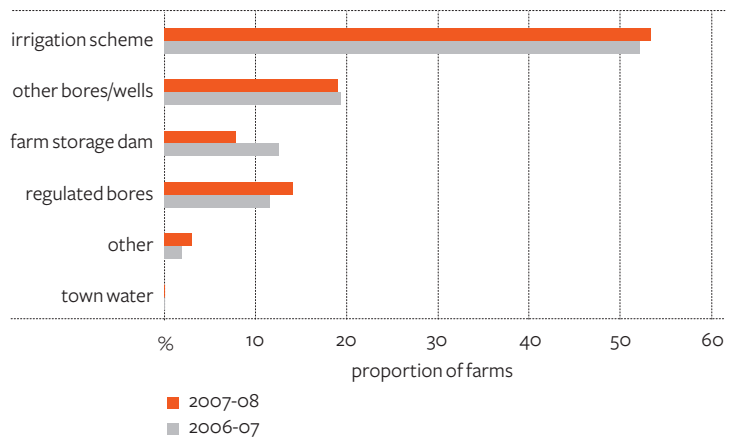
n Impediments to expanding farm size



Irrigation management

Irrigation is an important input into sugar cane production, with around 60 per cent of farms irrigating crops at least once in 2006-07 and 2007-08. The most common source of irrigation water used by sugar cane producers was from an irrigation scheme (figure o). However, in the Herbert River and the Burdekin regions, unregulated bores and wells were the dominant source of irrigation water.

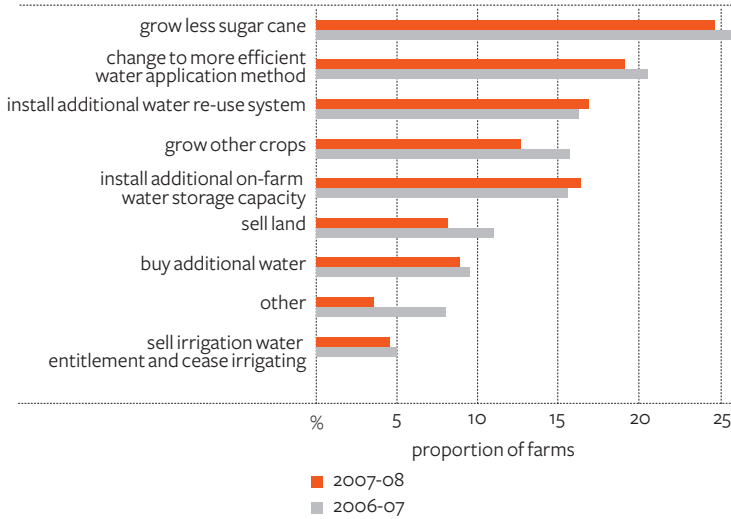
O Source of irrigation water



As part of the survey, producers were asked what changes they would make in the event of a reduction in irrigation water availability or increased water prices. At the national level, around one-quarter of producers indicated they would reduce sugar cane production, and 20 per cent of producers indicated they would change to a more efficient irrigation water application method (figure p). Many producers also indicated they would invest in water re-use systems and expand their on-farm water storage capacity.

In the regions where the use of irrigation water is more common, being Bundaberg, Burdekin and Mackay, more than 70 per cent of crops are irrigated at least once. In the Bundaberg and Burdekin regions, many producers indicated they would respond to reduced water availability or higher water prices by reducing sugar cane production. Only one-quarter of producers in the Mackay region indicated they would also reduce sugar cane production, compared to 50 per cent and 81 per cent in Bundaberg and Burdekin respectively. One possible reason for this is that a larger proportion of these producers source their irrigation water from unregulated on-farm water sources. As a result, farmers in this region are not as exposed to regulatory changes that affect water availability or price.

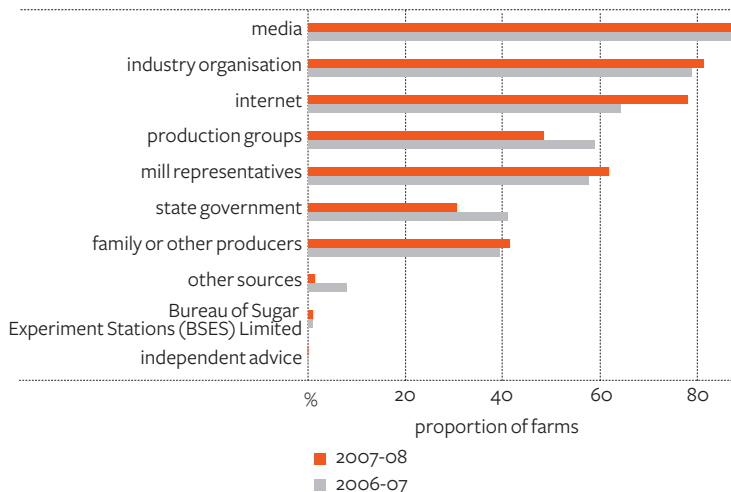
p Likely response to reduced irrigation water availability or higher water prices



Information sources

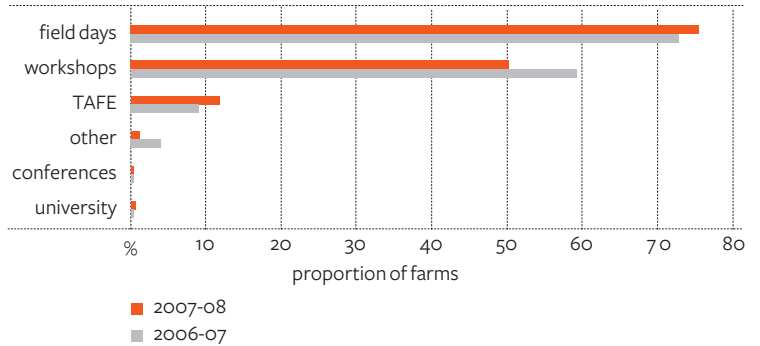
The survey results show that sugar cane producers have actively sought information to better manage their farms. More than 80 per cent of growers obtained information from the media and industry organisations such as cane growers associations (figure q). Between 2006-07 and 2007-08 there was a large increase in the use of the internet as a source of information, and an equally large reduction in the use of production groups and state government sources.

q Sources of information



In addition to the varied information sources, a large proportion of sugar cane producers reported they participated in educational events to improve their farm management and technical skills. In 2006-07 and 2007-08, field days and workshops were identified as the most important educational events attended by producers (figure r).

r Proportion of farmers who undertook activities to improve their management and technical skills



5 Concluding comments

The sugar cane industry experienced a significant decline in profitability in 2007-08, with prices easing and input costs rising.

Low profitability is likely to continue to be a major challenge for sugar cane producers in coming years. For some producers, this will result in diversification into alternative agricultural industries, or exiting agriculture entirely. However, the presence of economies of scale gives small and medium sized producers a significant economic incentive to expand the scale of production in order to reduce costs and enhance sugar cane profitability.

In coming years, there is a need to continue monitoring the impact of global price changes and further changes in input costs on sugar cane producers' profitability. Such information is vital for developing sound government and industry policies to help guide a viable sugar industry in Australia.

appendix **A** Survey methodology and definitions

Target populations

ABARE surveys are designed, and samples selected, on the basis of a framework drawn from the Business Register maintained by the Australian Bureau of Statistics (ABS). This framework includes agricultural establishments in each statistical local area classified by size and major industry. The estimates published in this report cover establishments with an estimated value of agricultural operations of \$5000 or more. A definition of the estimated value of agricultural operations is given in Australian Standard Industrial Classification (ABS 1983, cat. no. 1201.0).

A1 Distribution of farms, by quantity of cane produced, 2005-06 to 2007-08

	sugar cane growers			number of growers surveyed		
	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08
	no.	no.	no.	no.	no.	no.
Quantity of sugar cane produced						
Less than 7 500 tonnes	3 130	2 643	2 622	106	147	143
7 500 to 15 000 tonnes	1 035	1 013	1 044	89	106	99
15 000 to 22 500 tonnes	349	293	279	44	41	38
22 500 to 30 000 tonnes	151	83	85	22	14	13
30 000 to 50 000 tonnes	105	59	70	17	10	12
More than 50 000 tonnes	49	46	38	12	10	8
Total	4 819	4 138	4 138	290	328	313

Definition of the sugar growing industry

The sugar cane growing industry definition is based on the Australian and New Zealand Standard Industrial Classification (ANZSIC). This classification is consistent with an international standard that is applied comprehensively across Australian industry, which permits comparisons between industries, both within Australia and internationally. Farms assigned to a particular ANZSIC class have a high proportion of their total output characterised by that class. Further information on ANZSIC and on the sugar cane growing industry is provided in Australian and New Zealand Standard Industrial Classification (ABS 2006, cat. no. 1292.0).

For the purpose of this survey, farms in the sample were selected from units classified in ANZSIC 0151. This class consists of units mainly engaged in growing sugar cane. That is, primary activities which include sugar cane growing.

Survey design and sample weighting

The population was stratified by operation size using the estimated value of agricultural operation (EVAO). The size of each stratum was determined using the Dalenius-Hodges method (Lehtonen 2004). The sample allocation to each stratum was done using a mixture of the Neyman allocation, which takes into account variability within strata of the auxiliary variable, in this case EVAO, and proportional method, which only considers the population number in each stratum. The Neyman method allocates large proportions of sample to strata with large variability, in the case of this survey, strata of larger farms (Lehtonen 2004).

The estimates presented in this report are calculated by appropriately weighting the data collected from each sample farm and then using the weighted data to calculate population estimates. Generally, larger farms have small weights and smaller farms have larger weights, reflecting the strategy of sampling a higher fraction of the larger farms than of small farms (the former having a wider range of variability of key characteristics).

Reliability of estimates

The reliability of the estimates of population characteristics presented in this report depends on the design of the sample and the accuracy of the measurement of characteristics for the individual sample farms.

Sampling errors

Only a small number of farms out of the total number of farms in a particular industry are 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 smaller sampling errors than industry and state estimates.

To give a guide to the reliability of the survey estimates, sampling errors have been calculated for all estimates in this report. These estimated errors, expressed as percentages of the survey estimates and termed 'relative standard errors', are given next to each estimate in parentheses.

Calculating confidence intervals using relative standard errors

Relative standard errors (RSE) 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 relative standard error 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 = \$12 000.

t. For a 95 per cent confidence interval, there is roughly a 19 in 20 chance that the census value is within two standard errors of the survey estimates (the 95 per cent confidence interval). In this example, there is an approximately 19 in 20 chance that the census value lies between \$88 000 and \$112 000, {\$100 000 + or - \$12 000}.

The size of the RSE is mainly influenced by the design of the survey, the sample size and the variability in the population. For example, the larger the sample size, the lower the RSE is likely to be.

Comparing estimates

When comparing estimates between two groups, it is important to recognise that the differences are subject to sampling error. As a rough rule of thumb, a conservative estimate (an over-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.

For example, if the estimates of farm cash income are \$59 334 for sugar cane growers in Region 1 and \$51 664 for sugar cane growers in Region 2, with the relative standard errors given as 38 per cent and 42 per cent respectively, the difference between these two estimates is \$7670. The standard error of the difference can be estimated as:

$$\sqrt{(38 \times \$59\,334/100)^2 + (42 \times \$51\,664/100)^2} = \$31\,292$$

A 95 per cent confidence interval for the difference is:

$$\$7670 - 1.96 \times \$31\,292 = (-\$53\,662, \$69\,002)$$

Hence, if 100 different samples are taken, in 95 of them, the difference between these two estimates is between -\$53 662 and \$69 002. Also, since zero is in this confidence interval, it is possible to say that the difference

between the estimates is not statistically significantly different from zero at the 95 per cent confidence level.

Definition of terms

Owner manager: The primary decision-maker for the business. This person is identified by discussion between interviewer and interviewee as (one of) the key decision maker(s). This person is usually responsible for the day-to-day operation of the business and may own or have a share in the business.

Area of land at business premises: Includes all land operated by the business, whether owned or rented by the business.

Labour: Measured in work-weeks, as estimated by the owner manager. It includes all work on the business by the owner manager, partners, family, hired permanent and casual workers, but excludes work done by contractors.

Hired labour: Excludes the owner manager, partners and family labour, and work undertaken by contractors. Expenditure on contract services appears as a cash cost.

Capital: The value of capital employed by the business is the market value of all the assets used, including leased items but excluding machinery and equipment either hired or used by contractors. Market valuations were provided by the owner manager of surveyed businesses and included the market value of land and fixed improvements used by the business, excluding the value of the owner manager's house. The house value deducted from the total value of land and fixed improvements was the present day replacement cost, depreciated for age.

Gross margin: is the cash surplus generated from the production of a commodity. It is calculated as the difference between the average price received and the unit production cash costs.

Debt: Estimated as business debt. It includes all debts attributable to the business excluding personal debt and underwritten loans. Information collected at the survey interview was supplemented by information in the business accounts.

Total cash receipts: Total of revenues received by the business during the financial year, including revenues from the sale of sugar cane, other crops, livestock and livestock products. This includes revenue received from royalties, rebates, refunds, plant hire, contracts, insurance claims and compensation, and government assistance payments.

Total cash costs: Payments made by the business for materials and services and for permanent and casual hired labour (excluding partner and other family labour). It includes the value of any lease payments on capital, produce purchased for resale, rent, interest, cropping and livestock related purchases. Capital and household expenditures are excluded from total cash costs. Handling and marketing expenses include commission, levies etc. for business produce sold. Administration costs include accountancy fees, banking and legal expenses, postage, stationery, subscriptions and telephone costs. Other cash costs include relatively small cost items like stores, advisory services and travelling expenses.

Depreciation: Estimated by applying the diminishing value depreciation method to the market value of capital items at 30 June. Capital items are categorised into several groups and relevant depreciation rates are applied. The capital groups include vehicles; handling, harvesting and packing equipment; cultivation and sowing equipment; computers, electronic and communications equipment; other plant and equipment; and buildings on the business premises.

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.

Farm business profit: Cash operating surplus plus build-up in trading stocks, less depreciation, less the imputed value of the owner manager, partner(s) and family labour.

Profit at full equity: Return to capital and management plus interest, rent and finance lease payments. It is the return produced by all the resources used in the business.

Rate of return: Is the return to all capital used. It is computed by expressing farm business profit at full equity as a percentage of the total opening capital of the business.

Equity ratio: Calculated as business equity as a percentage of owned capital at 30 June.

Off-farm income: Income not derived from the surveyed farm business. It includes all off-farm income from wages and salaries, other businesses, other investments and Commonwealth social support payments. It is estimated for the owner manager and spouse only.

References

Lehtonen, R and Pahkinen, E (2004), *Practical methods for design and analysis of complex surveys*, John Wiley and Sons, 2nd edition, Finland.

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02.08

Asia Pacific Economic Cooperation Secretariat	Meat and Livestock Australia
Association of Southeast Asian Nations – secretariat	Murray Darling Basin Commission
AusAid	National Australia Bank
Australian Centre for Excellence in Risk Analysis	NSW Sugar
Australian Centre for International Agricultural Research	Rural Industries Research and Development Corporation
Australian Fisheries Management Authority	University of Queensland
Department of Climate Change	Wheat Export Authority
Australian Government Department of the Environment, Water, Heritage and the Arts	
Australian Government Department of Resources, Energy and Tourism	
Australian Government Department of Prime Minister and Cabinet	
Australian Government Department of Infrastructure, Transport, Regional Development and Local Government	
CRC Plant Biosecurity	
CSIRO (Commonwealth Scientific and Industrial Research Organisation)	
Dairy Australia	
Department of Business, Economic and Regional Development, Northern Territory	
Department of Primary Industries, Victoria	
Fisheries Research and Development Corporation	
Fisheries Resources Research Fund	
Forest and Wood Products Research and Development Corporation	
Grains Research and Development Corporation	
Grape and Wine Research and Development Corporation	
Independent Pricing and Regulatory Tribunal	
International Food Policy Research Institute	