A survey of wine grape growing farms in the Murray Valley and Barossa regions, 2006-07

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Foreword

The Australian wine grape growing industry is of major importance to regional communities and the country as a whole. In 2007-08, the total value of wine grape production in Australia was more than $1.2 billion. The industry also forms an integral part of many regional communities across Australia.

Data collected at a regional level provide the industry, government and the service sector with information to assist decision-making, assess risks and achieve an improved understanding of the issues facing wine grape growers.

This report profiles wine grape growers in the Murray Valley region of Victoria and New South Wales and the Barossa region of South Australia as part of a series of ABARE reports commissioned by the Grape and Wine Research and Development Corporation (GWRDC). The objective of these studies is to identify the characteristics of farms of wine grape growers in terms of management, production and financial practices that are likely to be critical for the long-term viability of the industry.

In this report physical, financial, socioeconomic and environmental data are presented for wine grape growers for these regions. Growers in these two regions were surveyed between October 2007 and March 2008 to provide information for farm performance for the 2006-07 financial year.

Phillip Glyde
Executive Director
ABARE
December 2008

Dr John Harvey
Executive Director
GWRDC

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Summary

- This report presents the results of a survey of wine grape growers in the Murray Valley and Barossa regions conducted between October 2007 and March 2008. Detailed data were collected describing the physical, financial, environmental and socioeconomic characteristics of wine grape growing farms in these two regions as at the year ending 30 June 2007.

Murray Valley region

- The Murray Valley is a warm climate wine grape growing region located in the far north-west of Victoria and far south-west of New South Wales. Wine grape production in the Murray Valley accounts for around one-quarter of all wine grapes crushed in Australia.
- The 2006-07 growing season in the Murray Valley was hot and dry. Wine grapes are estimated to have been irrigated at a rate of 7 megalitres per hectare on average, using a combination of drip and trickle systems, sprinklers and flood irrigation. Yields are estimated to have been 13.5 tonnes per hectare for red wine grapes and 19.4 tonnes per hectare for white wine grapes, on average. Growers are estimated to have received, on average, $392 per tonne overall for red wine grapes and $389 per tonne for white wine grapes. These prices are characteristic of those received in warm climate grape growing regions in 2006-07.
- Total cash receipts are estimated to have been around $189 000, on average. Wine grape receipts accounted for an estimated 65 per cent of total cash receipts. Receipts from other tree and vine crops accounted for an estimated 27 per cent of total cash receipts. Total cash costs are estimated to have been $134 000 on average. The net result was farm cash incomes of around $56 000, on average. After deductions for depreciation and accounting for the value of family labour, the average farm business profit for Murray Valley wine grape growing farms is estimated to have been around $9000 in 2006-07.
- Farms with up to 20 hectares planted to wine grapes realised an estimated business loss on average of $10 000, with an estimated rate of return of 0.4 per cent excluding capital appreciation. Farms with more than 20 hectares planted to wine grapes realised estimated business profits on average of $91 000 with an estimated rate of return of 6.3 per cent excluding capital appreciation in 2006-07.

- Land use planning, labour shortages and the cost of irrigation infrastructure were identified as impediments to farm expansion by around one-quarter of growers surveyed. Some respondents also reported that a lack of irrigation water and the viability of the industry were impediments to farm expansion in the region.
- At the time of the survey it is that 30 per cent of growers had intentions to leave agriculture within five years. In addition, an estimated 10 per cent were intending to diversify or change their agricultural operation.

Barossa region

- The Barossa incorporates the Barossa Valley and Eden Valley wine regions, located 80 kilometres north-east of Adelaide. The Australian Bureau of Statistics (ABS) classifies the Barossa as a cool climate wine grape growing region. Wine grapes produced in the Barossa region account for about 5 per cent of all wine grapes crushed in Australia.
- Drought conditions and high temperatures during the growing season had a severe impact on wine grape production in the Barossa region in 2006-07. Wine grapes are estimated to have been irrigated at a rate of around 1 megalitre per hectare using drip and trickle irrigation systems. Some wine grape areas in the Barossa are unirrigated. Yields are estimated to have been 4.6 tonnes per hectare for red wine grapes and 6.5 tonnes per hectare for white wine grapes, on average. Growers received an estimated $1353 per tonne for red wine grapes and $824 per tonne for white wine grapes in 2006-07, on average.
- Total farm cash receipts in 2006-07 are estimated to have been $156 000, on average, of which receipts from wine grape sales accounted for an estimated 83 per cent. Total cash costs are estimated to have been around $125 000. The net result was farm cash income of around $31 000 in 2006-07. After deductions for depreciation and allowing for the value of family labour contributed, farms recorded estimated business losses, on average of -$29 000.
- The cost of irrigation infrastructure and regional land use planning were each agreed to be impediments to farm expansion by around 10 per cent of growers. A number of respondents also indicated the price of land and a lack of irrigation water were impediments to farm expansion in the region.
- At the time of the survey about three-quarters of growers expected to have a similar level of involvement in the industry in five years time. Around 8 per cent of growers expected to be semi-retired and about 3 per cent expected to be fully retired within five years.

Comparison

- Wine grape growers in the Murray Valley irrigated more intensively and achieved significantly higher yields in 2006-07 on average, than did growers in the Barossa region. However, producers in the Barossa region received higher prices.
- Among growers with more than 20 hectares planted to wine grapes, producers in the Murray Valley region received higher wine grape receipts per bearing hectare than producers in the Barossa region. In what would have been regarded as a difficult season for growers in both regions, growers with more than 20 hectares planted to wine grapes in the Murray Valley region received significantly greater total cash receipts on average and realised significantly higher rates of return excluding capital appreciation.
- Small to medium sized growers in the Murray Valley region had significantly higher debt on average, than small to medium sized growers in the Barossa region in 2006-07.
- The proportion of growers in the Murray Valley expecting to retire within five years was significantly higher than in the Barossa region. The proportion of growers in the Murray Valley expecting to diversify their agricultural operation was also significantly higher. In contrast, the proportion of growers expecting to have a similar level of involvement in the industry in five years' time was significantly higher in the Barossa region than in the Murray Valley.

1 Introduction

In the 10 years from 1992-93 to 2002-03, the total area of vines cultivated in Australia more than doubled from 62 709 hectares to 157 492 hectares (ABS 2005). The rate of planting has since moderated, reaching 163 951 hectares by 2006-07, but as newly planted vines have progressively borne fruit, national production has grown from 626 000 tonnes crushed in 1992-93 to around 1.90 million tonnes crushed in each of the three years from 2003-04 to 2005-06 (ABARE 2007). Wine grape production declined in 2006-07 because of drought and reduced irrigation water allocations in some regions.

For the most part the growth in Australia's annual wine production has been accommodated by increasing market share into a large, but slowly growing world wine market. The majority of Australian wine production is now exported with the bulk of export sales going to the United Kingdom, the United States and Canada.

The unit price of Australian wine exports has fallen markedly since the beginning of the decade and average wine grape prices received by growers have declined accordingly (ABARE 2007). Increased competition from countries such as the United States and Chile are likely to inhibit efforts to further increase Australia's share of the world wine market.

To some extent it is the composition of total wine grape production in Australia, as much as the volume, which has contributed to lower prices received by growers. New plantings have been predominantly in low-yield, high-cost cool climate regions. The growth in exports, on the other hand, has mostly been in bulk and popular-premium price ranges made from grapes normally sourced from the high-yield, warm climate regions (Sheales et al. 2006).

Accumulation of cool climate wine stocks in recent years has resulted in reduced prices received for cool climate wine grapes. In addition, wineries targeting bulk and popular-premium wine markets have been able to preferentially source excess cool climate wine grapes over warm climate wine grapes, which are generally considered to be of lower quality.

A return to higher wine grape prices depends on the development of substantial new wine markets, particularly for wine produced from cool climate grapes.

The Australian 2006-07 season

The 2006-07 national crush was estimated at 1.40 million tonnes (Jackson et al. 2008), its lowest level since 2000 and well short of the almost 1.90 million tonnes crushed in each of the three years previous. The sharp decline was in large part because of drought, widespread frosts and the reduced availability of irrigation water.

Drought conditions impacted negatively on yields broadly across the industry. Yields in some regions were down by as much as 50 per cent on the previous year. Severe frosts were a major cause of crop losses in the Limestone Coast region of South Australia as well as across much of Victoria.

Smoke from bushfires in north-east Victoria caused acute quality concerns for growers in the King Valley region in particular. Losses to wine production in the area because of wine grapes affected by smoke taint were estimated by Whiting and Krstic (2007) to have amounted to between $75 million and $90 million.

Conditions in 2006-07 were more favourable in Western Australia after a disappointing year for red wine grapes in 2005-06 (Halliday 2007).

Scope of report

This report provides estimates of detailed physical, financial, socioeconomic and environmental characteristics of wine grape growing farms in the Murray Valley region and the Barossa region in 2006-07. Estimates are based on data collected in a survey which involved face-to-face interviews with 29 wine grape growers in each region. The data collected relate to the 2006-07 wine grape growing season.

The Australian Bureau of Statistics (ABS) identifies the warm climate grape growing regions in Australia as the Big Rivers zone in New South Wales, north-west Victoria and the Lower Murray zones in South Australia. The Murray Valley region is identified as a warm climate region because it is located in the Big Rivers and north-west Victoria zones. The Barossa region is identified by the ABS as a cool climate region.

Similar ABARE studies have been conducted in recent years on the 2005-06 season in the Riverland (Henry et al. 2007) and the 2004-05 season in the McLaren Vale and Riverina regions (Oliver et al. 2006). In addition, a similar study of the 2005-06 growing season in the Mildura-Wentworth region was included in a report by Mues and Boero-Rodriguez (2007) on horticultural industries in the Mildura-Wentworth region.

2 The Murray Valley

The region

The Murray Valley region incorporates the local government areas of Mildura and Swan Hill in north-west Victoria as well as the local government areas of Wentworth and Balranald in south-west New South Wales. According to the 2006 ABS Agricultural Census, around 1300 wine grape growers were operating in this region.

The survey region is large (map 1), but viticulture in the area is restricted to a thin strip straddling the Murray River, and a smaller number of farms along the banks of the Darling River. Effectively, the survey can be considered to approximately represent wine grape growers from the Murray-Darling and Swan Hill regions (map 2) as classified according to the formal Geographical Indications (GI) classifications. Where externally sourced data are included or used, the region used is referred to in the report in accordance with the original source.

1 The Murray Valley region

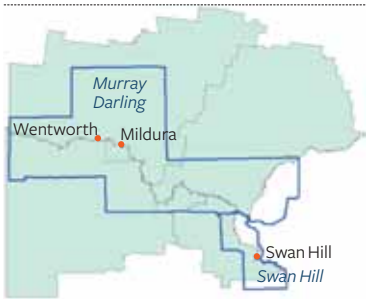
Characteristics

Mean January Temperature (MJT) in Mildura and in Swan Hill are 23.6°C and 23.9°C, respectively. Accordingly, the region can be classified as very hot (Smart and Dry 1980). The region is arid and receives little rain during the growing season. The wine grape growing industry in the Murray Valley is totally reliant upon irrigation (Halliday 1999).

The aridity of the Murray Valley means that, in general, disease is less of a problem than in wetter, cool climate regions. When supplied with sufficient irrigation water, vines in the area, grow vigorously and yield heavily. The region also benefits from low susceptibility to spring frosts. Flat to undulating topography facilitates low-cost production and harvesting.

Long, hot summers, high irrigation rates and the associated vigour of vine growth make achieving the fruit characteristics required to attract premium wine grapes prices difficult in the Murray Valley region.

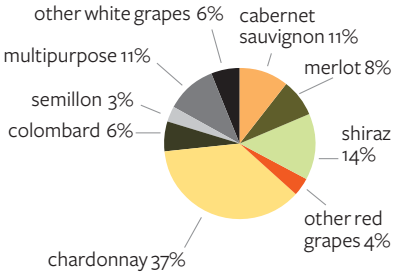
2 Murray Darling and Swan Hill GI regions



The 2006-07 season

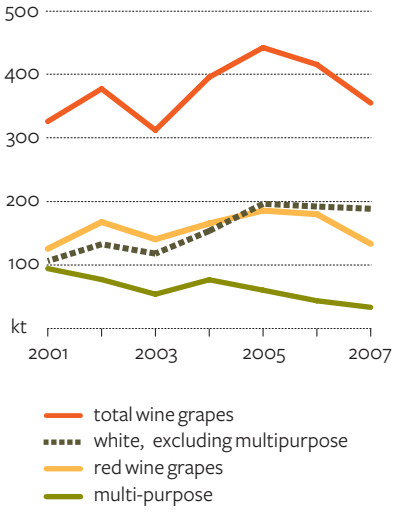
Winter and spring of 2006 were very dry in the Murray Valley. Just 26 millimetres of rain fell for the year after July. Temperatures were also unusually high throughout spring and summer (BOM 2008b).

a Wine grape production by variety, 2006-07
Murray Darling - Swan Hill region



Source: Jackson et al 2008.

b Wine grape production
Murray Darling-Swan Hill region



Source: AWBC 2008e.

Irrigators in Victoria received 95 per cent of their irrigation water entitlements, while New South Wales growers typically received around 50 per cent of their normal entitlements (De Palma 2007). Survey results suggest that overall wine grape growers in the region received 79 per cent of their irrigation entitlement on average. These allocations were sufficient to allow total wine grape production in the Murray Valley to be maintained to a greater extent than most other Australian wine grape growing regions in 2006-07.

The total regional crush in 2006-07 is estimated to have been 364 000 tonnes (Jackson et al. 2008), 13 per cent lower than the previous year's estimate and around 26 per cent of all wine grapes crushed in Australia in 2006-07. However, if unsold grapes are accounted for the year on year reduction in production in 2006-07 was a little greater than 13 per cent. ABARE estimates that roughly 33 500 tonnes of wine grapes were left on vines in the Murray-Darling – Swan Hill region in 2005-06 (Fletcher et al. 2007) compared with 10 700 tonnes in 2006-07 (Jackson et al. 2008).

White wine grapes, including multi-purpose, accounted for around 63 per cent of total wine grape production in 2006-07 (figure a). Chardonnay grapes are the dominant variety in the Murray Valley region and in 2006-07, 35 per cent of all chardonnay grapes crushed nationally were grown in the region.

Multipurpose grapes, mostly sultana and muscat gordo blanco (Crothers 2007), accounted for 17.5 per cent of the total white wine grapes grown in the region in 2006-07. The production of multipurpose varieties in the region has declined relative to other white wine grapes and red wine grapes since the beginning of the decade (figure b).

Regional wine grape prices, 2006-07

While grape harvests were lower than expected generally across Australia, the large wine stocks overhang led to only marginally higher prices received by growers for their 2006-07 crop. Prices received in the Murray-Darling – Swan Hill region in 2006-07 were typical of amounts received generally in the warm climate regions for all varieties (table 1).

The regional supply of chardonnay grapes has been surplus to regional demand for the past couple of seasons (Crothers 2007). De Palma (2006) suggests the average price received for chardonnay grapes decreased markedly in the two years prior to 2005-06.

Prices received for red wine varieties have generally been in decline since the beginning of the decade (figure c). Average prices for red wine varieties, shiraz, merlot and cabernet sauvignon decreased considerably in the two years prior to 2005-06 (De Palma 2006).

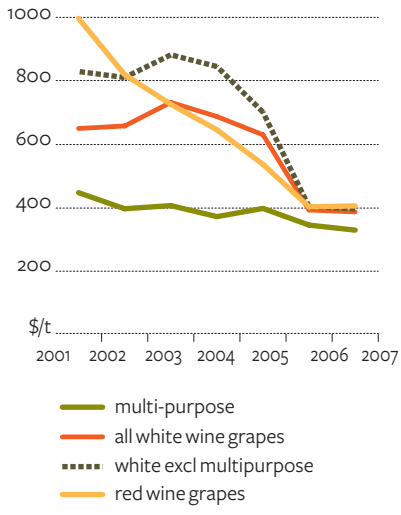
1 Weighted average prices for selected wine grape varieties, 2006-07

	Murray Darling – Swan Hill region $/tonne	warm climate regions of Australia $/tonne
Cabernet sauvignon	399	408
Grenache	376	310
Merlot	400	398
Petit verdot	321	329
Pinot noir	508	530
Ruby cabernet	302	331
Shiraz	424	411
All red wine	404	401
Chardonnay	396	400
Colombard	297	296
Crouchen	500	489
Muscat gordo blanco	374	372
Pinot gris	701	716
Riesling	367	366
Sauvignon blanc	524	553
Semillon	365	349
Sultana	241	241
All white wine	385	385

Source: AWBC 2008e.

Falling wine grape prices in the past few years have prompted some investigation of the economics of grape growers mothballing a proportion of their vines to reduce input costs. A study reported in Murray Valley Winegrowers (McGuire 2007) found an appreciable increase in the proportion of farmers who would consider mothballing part of a patch or an entire patch after 2005-06. Around one-quarter of the post 2005-06 season respondents indicated they would consider mothballing.

C Wine grape weighted average prices, Murray Darling - Swan Hill region



Source: AWBC 2008e.

Physical characteristics of farms

The average size of wine grape growing farms in the Murray Valley survey region in 2006-07 is estimated to have been roughly 40 hectares. On average, about 43 per cent of farm area was planted to wine grapes and of this an estimated 4 per cent was non-bearing. Around 80 per cent of growers in the Murray Valley region could be regarded as small to medium sized wine grapes producers having up to 20 hectares planted to wine grapes (table 2).

The average farm produces about 280 tonnes of wine grapes and in addition has around 5 hectares planted to tree and vine crops other than wine grapes. The most common additional crop was non-wine grapes, but some farms grew citrus crops and a few had substantial almond plantings.

Non-wine grapes are estimated to have accounted for around 10 per cent of the estimated 205 tonnes of total tree and vine crops produced on small to medium sized farms on average. By comparison, non-wine grapes are estimated to have accounted for just 2 per cent of the 970 tonnes of total tree and vine crops produced on large farms on average.

Across the region as a whole, average white and red wine grape yields are estimated to have been 19.4 and 13.5 tonnes per hectare respectively in 2006-07. The average irrigation rate for all wine grapes is estimated to have been 6.7 megalitres per hectare in 2006-07. The difference in irrigation rates and yields between small to medium sized producers and large producers was not statistically significant.

Financial performance

Murray Valley growers realised total cash receipts on average of $189 000 per farm in 2006-07. Wine grape receipts are estimated to have accounted for around 65 per cent of total cash receipts. Receipts from other tree and vine crops are estimated to have contributed around one-quarter of total farm cash receipts. Other cash receipts included income from off-farm contracting, government assistance paid to the farm business, rebates, occasional insurance claims and other incidental receipts (table 3).

Total cash costs incurred by Murray Valley growers in 2006-07 are estimated to have been $134 000 on average. Hired labour and contracting accounted for roughly one-quarter of total cash costs on Murray Valley wine grape farms. Interest repayments accounted for an estimated 14 per cent of total cash costs. Average farm equity is estimated to have been about 80 per cent in 2006-07.

Farm cash income on average is estimated to have been $56 000 in 2006-07. Small to medium sized wine grape growing farms realised a farm business loss of -$10 000 in 2006-07 on average. Large farms are estimated on average to have realised a farm business profit of $91 000.

Rates of return are calculated as the ratio of profit at full equity to the opening capital value of the business. Excluding capital appreciation, the average rate of return for large farms in 2006-07 is estimated to have been around 6 per cent. The corresponding estimate for small farms is 0.4 per cent. Rates of return were positively associated with wine grape yield and tree and vine crop yield more broadly.

Land zoning changes resulted in high rates of capital appreciation of some farms. As a consequence, rates of return inclusive of capital appreciation will have varied greatly between individual farms in the region according to location.

2 Key physical farm characteristics, by size of operation, 2006-07 Murray Valley region

average per farm

		all farms		small – medium [a]		large [a]	
Total area operated	ha	39.3	(29)	31.0	(45)	75.3	(68)
Wine grape areas							
Red grapes bearing	ha	6.7	(13)	3.8	(18)	19.0	(32)
Red grapes non-bearing	ha	0.3	(86)	0.3	(100)	0.2	(107)
Total red wine grapes	ha	7.0	(13)	4.2	(19)	19.2	(32)
White grapes bearing	ha	9.9	(11)	6.1	(13)	25.7	(21)
White grapes non-bearing	ha	0.4	(55)	0.3	(84)	0.8	(138)
Total white wine grapes	ha	10.2	(11)	6.5	(11)	26.5	(24)
Total wine grapes bearing	ha	16.5	(12)	10.0	(7)	44.7	(24)
Wine grapes non-bearing	ha	0.7	(50)	0.6	(67)	1.1	(115)
Total wine grapes	ha	17.3	(9)	10.6	(8)	45.8	(25)
Other grape areas							
Bearing	ha	1.8	(28)	2.0	(31)	1.2	(68)
Non-bearing	ha	0.1	(70)	0.1	(70)	0.0	–
Total	ha	1.9	(27)	2.1	(29)	1.2	(68)
Citrus							
Bearing	ha	1.3	(18)	0.8	(72)	3.5	(27)
Non-bearing	ha	0.0	–	0.0	–	0.0	–
Total	ha	1.3	(18)	0.8	(72)	3.5	(27)
Total tree and vine areas							
Bearing	ha	21.3	(9)	13.1	(6)	50.8	(22)
Non-bearing	ha	0.9	(42)	0.7	(55)	1.9	(43)
Total	ha	22.2	(9)	13.7	(8)	52.8	(22)
Production							
Red wine grapes	t	91	(15)	48	(18)	273	(41)
White wine grapes	t	192	(14)	107	(17)	555	(24)
Total wine grapes	t	283	(12)	156	(12)	828	(28)
Other grapes	t	8	(50)	9	(55)	4	(351)
Yield							
Red wine grapes	t/ha	13.5	(7)	12.5	(8)	14.4	(13)
White wine grapes	t/ha	19.4	(6)	17.3	(11)	21.6	(7)
Total wine grapes	t/ha	17.0	(6)	15.5	(10)	18.5	(8)
Other grapes	t/ha	17.0	(22)	12.0	(25)	34.1	(83)
Irrigation application rate							
Red wine grapes	Ml/ha	6.9	(8)	7.3	(14)	6.6	(18)
White wine grapes	Ml/ha	6.5	(6)	6.8	(7)	6.2	(20)
Total wine grapes	Ml/ha	6.7	(7)	7.1	(9)	6.4	(19)
Other grapes	Ml/ha	8.7	(23)	8.7	(27)	6.7	(137)

a small - medium farms defined as having up to 20 hectares planted to wine grapes, large farms defined as having more than 20 hectares planted to wine grapes.

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

3 Financial performance of wine grape growing farms, by size of operation, 2006-07 Murray Valley region

average per farm

		all farms		small – medium [a]		large [a]	
Cash receipts							
Chardonnay	$	38 987	(25)	17 973	(41)	129 234	(19)
Shiraz	$	16 744	(24)	10 800	(39)	42 269	(48)
Sultana (for wine)	$	8 891	(53)	7 991	(68)	12 758	(75)
Cabernet sauvignon	$	9 531	(40)	4 919	(85)	29 342	(48)
Other wine grapes	$	48 862	(18)	30 455	(27)	127 912	(45)
Total wine grapes	$	123 015	(16)	72 138	(12)	341 515	(28)
Other tree and vine crops	$	51 995	(46)	34 719	(23)	126 190	(44)
Other cash receipts	$	14 478	(24)	10 705	(36)	30 683	(29)
Total cash receipts	$	189 489	(15)	117 561	(9)	498 388	(11)
Cash costs							
Hired labour	$	16 582	(22)	8 488	(21)	51 344	(23)
Fertilizer	$	5 906	(29)	2 041	(28)	22 504	(19)
Crop and pasture chemicals	$	5 347	(24)	3 181	(22)	14 649	(21)
Fuel, oil and grease	$	7 367	(13)	4 849	(17)	18 177	(18)
Repairs and maintenance	$	11 705	(14)	7 251	(16)	30 835	(20)
Tree and vine replacement	$	370	(75)	105	(73)	1 510	(100)
Contracts	$	14 332	(29)	7 349	(19)	44 323	(25)
Interest	$	18 415	(19)	12 441	(19)	44 071	(20)
Other costs	$	53 672	(10)	37 151	(10)	124 622	(15)
Total cash costs	$	133 696	(13)	82 856	(9)	352 033	(8)
Farm cash income	$	55 793	(29)	34 705	(29)	146 355	(36)
plus buildup in trading stocks	$	0		0		0	
less depreciation	$	14 564	(11)	12912.454	(11)	21659.024	(28)
less imputed family labour	$	32 454	(9)	32188.163	(10)	33596.746	(18)
Farm business profit	$	8 774	(200)	-10 396	(130)	91 099	(55)
Capital appreciation [b]		186 758	(56)	179 437	(65)	225 690	(100)
Profit at full equity	$	28 596	(61)	3 127	(423)	137 975	(34)
Total capital value at 30 June	$	1282 986	(10)	952 352	(14)	2702 925	(27)
Rate of return							
– excl. capital appreciation	%	2.7	(59)	0.4	(424)	6.3	(32)
– incl. capital appreciation [b]	%	20.4	(50)	22.9	(64)	16.1	(71)
Total farm debt [c]	$	239 165	(17)	141706	(17)	657 712	(19)
Equity ratio [c]	%	79	(5)	80	(5)	71	(10)
Total liquid assets	$	35 140	(32)	21 030	(38)	96 007	(52)
Off farm income	$	46 991	(11)	54 820	(11)	11 325	(54)

a small - medium farms defined as up to 20 hectares planted to wine grapes, large farms defined as having more than 20 hectares planted to wine grapes. **b** Excludes farms that purchased or sold permanent irrigation entitlements. **c** Only includes farms that provided debt information.
Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

The average off-farm income earned by small to medium sized farms was significantly higher than that earned by larger farms. This suggests, on average, operators of smaller farms were less reliant on farm income than those operating larger farms.

Wine grape receipts per bearing hectare are estimated to have been around $7200 on average on small farms and around $7600 on average on large farms. Overall it was found that differences in wine grape receipts per bearing hectare were mainly associated with differences in yield for both red and white varieties (table 4).

Price differences were not found to be a significant determinant of differences in receipts per bearing hectare of red wine grapes in the Murray Valley. This is because of there being only minor variation in prices received for red wine grapes across the region in 2006-07. Among white wine grape varieties, price differences between growers did affect receipts per bearing hectare in 2006-07, but differences in yield had a stronger effect.

4 Prices and receipts per bearing hectare of wine grape growing farms by size of operation, 2006-07 Murray Valley region

average per farm

		all farms	small - medium a	large a
Total wine grape receipts per hectare wine grapes bearing	$/ha	7 416 (8)	7 183 (12)	7 641 (10)
Price – red wine grapes b	$/t	392 (3)	405 (4)	383 (4)
Price – white wine grapes b	$/t	389 (4)	373 (4)	400 (5)
Price – wine grapes b	$/t	390 (3)	383 (3)	395 (4)

a Small - medium farms defined as having up to 20 hectares planted to wine grapes, large farms defined as having more than 20 hectares planted to wine grapes. b Estimated average prices quoted are for grapes grown in the 2006-07 season including payments expected to be received after 30 June 2007. Receipts received from previous years' sales are not included in these calculations.

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

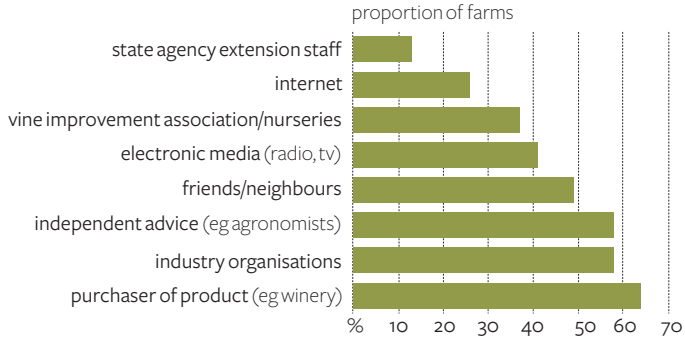
Farm management

As part of the wine grape growers' survey, growers were asked a range of supplementary questions seeking detailed information on farm management practices and growers' intentions. The results are highlighted in this section.

Sources of information and training

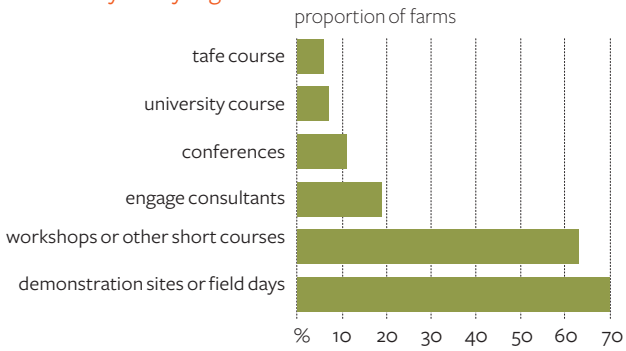
Growers in the Murray Valley region sourced farm production and management information from a wide range of sources. An estimated 64 per cent of growers obtained information and advice from their purchaser. An estimated 58 per cent of growers sought information from each of industry organisations and independent sources, such as agronomists. Roughly one-quarter of growers used the internet to source management and production information (figure d, appendix A).

d Sources of information, 2006-07
Murray Valley region



The majority of growers had attended field days or demonstration sites in the two years to 30 June 2007. The proportion of growers attending workshops or other short courses to improve farm management and technical skills in the same period is estimated to have been 63 per cent (figure e).

e Participation in activities to improve management and technical skills, 2006-07
Murray Valley region



Wine grapes sold on contract

Growers were asked the proportion of their 2006-07 wine grape harvest that was sold by contract to wineries and where applicable the proportion sold by fixed price contracts. Growers that had contracts to sell 2007-08 wine grapes to wineries were also asked to estimate the proportion of their next harvest that would be sold this way. An estimated 75 per cent of growers sold wine grapes on contract with wineries in 2006-07, with an estimated 65 per cent selling all of their wine grapes on contract. Many growers in the region enter into rolling contracts with terms fixed for three to five years into the future. In general growers that sold wine grapes by contract in 2006-07 planned to sell a similar proportion of their 2007-08 harvest by contract (table 5).

5 Farms selling wine grapes on contract to wineries, Murray Valley region

	2006-07		2007-08	
	%		%	
Proportion of farms with				
– no grapes contracted	25	(33)	25	(33)
– some grapes contracted	10	(60)	10	(60)
– all grapes contracted	65	(11)	65	(11)
– no grapes contracted at fixed price	57	(22)	57	(22)
– some grapes contracted at fixed price	10	(60)	10	(60)
– all grapes contracted at fixed price	33	(33)	33	(33)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

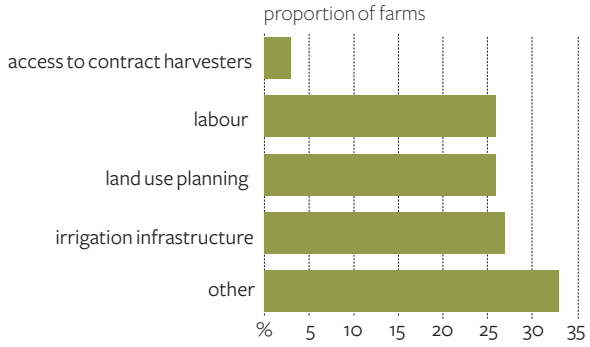
With respect to the 2005-06 growing season, De Palma (2006) suggested that whilst low prices had caused financial hardship, growers on contracts with reasonable conditions had mostly been able to get by, whereas growers that sold grapes on the spot market had difficulty securing a purchaser. Reduced wine grapes production in the region and elsewhere meant that growers had less difficulty selling their 2006-07 wine grapes. Survey results suggest that growers that did not sell any of their 2006-07 wine grapes on fixed price contracts were not, on average, adversely affected in terms of prices received for their wine grapes.

Impediments to farm expansion in the Murray Valley region

Land use planning, labour shortages and the cost of irrigation infrastructure were each identified as impediments to farm expansion by around 25 per cent of growers.

Apart from these issues, a significant proportion of growers suggested other impediments to farm growth in the region, among which were lack of water and the viability of the industry. The price of land was also suggested as an impediment (figure f).

f Impediments to farm expansion in the region, 2006-07
Murray Valley region



Fertilizer and chemical use

An estimated 78 per cent of farms had attempted to reduce chemical use in the three years ended 30 June 2007. The estimated 27 per cent average reduction achieved (table 6) was based on all farms including those that did not attempt to reduce chemical use. The average reduction achieved among farms that attempted to reduce chemical use is estimated to have been 35 per cent. Some growers suggested they were able to use lower quantities of chemicals in 2006-07 because of the dryness of the season.

The proportion of operators who had undertaken a course in chemical use in the three years ended 30 June 2007 is estimated to have been 38 per cent.

6 Chemical use on grape growing farms, 2006-07
Murray Valley region

	%	
Proportion of farms attempting to reduce chemical use	78	(11)
– percent reduction achieved	27	(18)
Proportion of farms that undertook a course on chemical use in the past three years	38	(30)
Proportion of farms mixing / applying sprays on the following basis:		
– rate per litre/100 litres	67	(16)
– a rate per hectare	45	(27)
As part of normal farm management program, propotion of farms using:		
– tissue or soil tests to determine fertilizer requirements	46	(26)
– irrigation water quality monitoring	20	(40)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

Around a half of all producers conducted plant tissue or soil tests to assess fertilizer requirements. An estimated 20 per cent of growers monitored the quality of their irrigation water.

Even though the dry climate of the Murray Valley tends to reduce the prevalence of most pests and diseases, it is estimated 80 per cent of growers monitored their vines at least weekly, with around half of these monitoring daily. All growers interviewed monitored for pests and diseases at least fortnightly (table 7).

7 Frequency of monitoring for pests and diseases, 2006-07 Murray Valley region

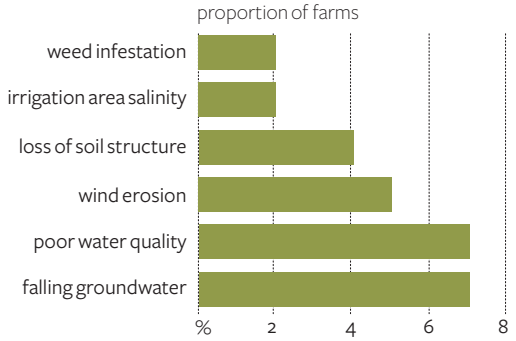
	%	
Proportion of farms monitoring		
– daily	41	(28)
– every 2–7 days	39	(32)
– every 1–2 weeks	19	(54)
– every 2–3 weeks	0	–
– every 3–4 weeks	0	–
– more than 4 weeks	0	–

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

Environmental issues

Few signs of environmental degradation were reported. Furthermore, where problems were indicated, these were generally not judged to be having a significant impact. Signs of poor water quality and falling ground water were present on an estimated 7 per cent of farms (figure g).

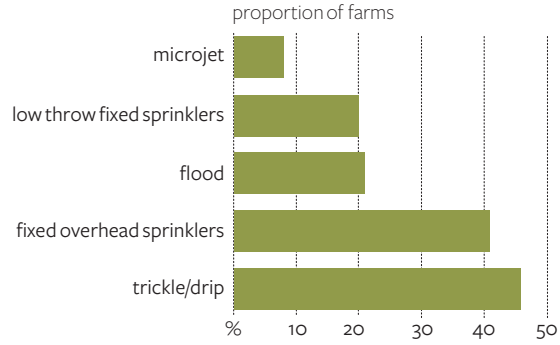
g Farms reporting signs of environmental problems, 2006-07
Murray Valley region



Irrigation management

The proportion of farms using trickle or drip irrigation on wine grapes is estimated to have been around 46 per cent in 2006-07. Overhead fixed sprinklers were also common, being used on an estimated 41 per cent of farms in the region. Some farms used more than one method of application to irrigate their wine grapes (figure h).

h Irrigation application methods, 2006-07
Murray Valley region



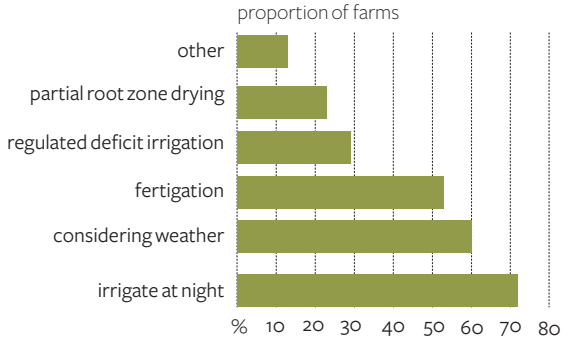
All of the respondents who reported using flood irrigation were of the small to medium size group. Given the incidence of spring frosts in the Murray Valley is relatively low, the appreciable use of overhead fixed irrigation suggests capital expenditure costs may have been an impediment to farmers installing drip and trickle systems.

Most growers used a range of irrigation management techniques. Irrigating at night and in consideration of the weather were both fairly typical. An estimated 53 per cent of growers used fertigation enabling increased efficiency of fertilizer application.

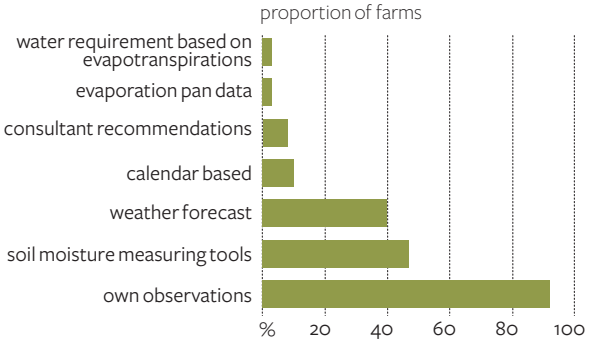
Newer techniques such as partial root zone drying and regulated deficit irrigation appear to be gaining some acceptance. Regulated deficit irrigation is estimated to have been used on about 30 per cent of farms (figure i). With the possibility of low water allocations in future years, it is likely growers in the region will need to adopt techniques which allow reductions in irrigation rates while maintaining yields.

Most growers relied on their own knowledge and experience rather than that of consultants when deciding on the timing of irrigation. An estimated 47 per cent of operators based their decisions on soil moisture tests and an estimated 40 per cent on weather forecasts. Calendar-based irrigation scheduling was less common, being used by an estimated 10 per cent of growers (figure j).

i Irrigation management practices, 2006-07
Murray Valley region



j Basis for timing of irrigation decisions, 2006-07
Murray Valley region



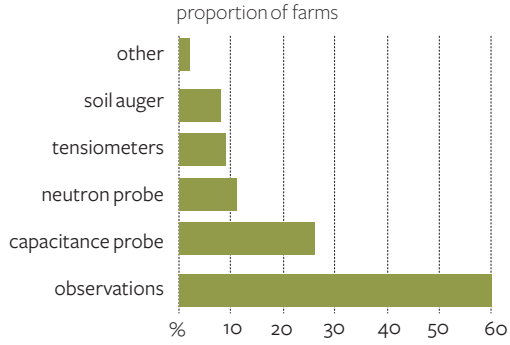
Aside from operators' observations, capacitance probes were the most commonly used soil moisture tool, being used by an estimated 26 per cent of growers. Neutron probes, tensiometers and soil augers are each estimated to have been used on around 10 per cent of farms (figure k).

An estimated 38 per cent of growers intended to change irrigation application methods on at least a portion of their farms in the next three years. This would represent a major investment in irrigation infrastructure in the region and is suggestive of a shift in local growers' perceptions in relation to the economics of irrigation application (figure l).

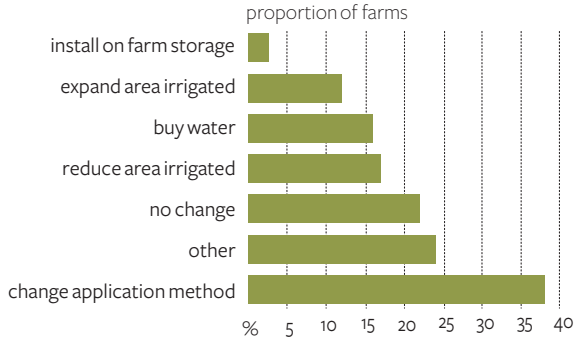
An estimated 15 per cent of growers planned to buy additional irrigation water. Around 17 per cent are estimated to have intended to reduce their irrigated area, while around 12 per cent are estimated to have been planning expansion of their current irrigated area.

Uncertainty of water allocations was clearly the most commonly identified constraint to growers increasing their irrigated area (figure m). The high proportion of growers indicating an intention to change water allocation methods (figure l) might be related to uncertainty of future allocations.

k Use of soil moisture measuring tools, 2006-07
Murray Valley region

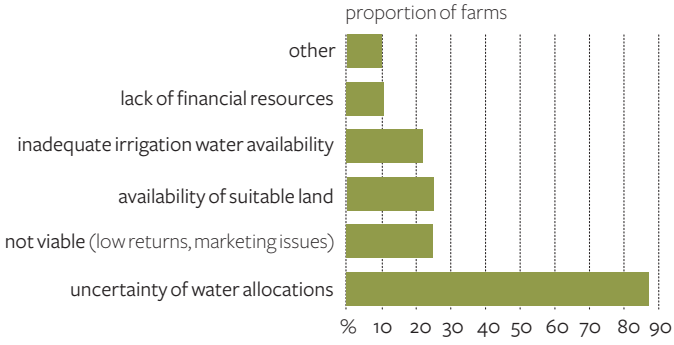


l Intended changes to irrigation practices, 2006-07
Murray Valley region



An estimated 25 per cent of growers believed increasing their irrigated area would have been unviable. A lack of suitable land available was also considered by some wine grape growers in the region to be a constraint to increasing irrigated area (figure m).

m Constraints to increasing irrigated area , 2006-07
Murray Valley region



Socioeconomic characteristics

The average age of operators of Murray Valley grape growing farms and their spouses is estimated to be 54 and 52 years of age, respectively. All respondents reported they received at least some formal schooling. Among those farms interviewed, all spouses received some high school education. About one-third of operators and spouses had attended university or other forms of tertiary education (table 8).

The average household expenditure of families operating wine grape growing farms in the Murray Valley region in 2006-07 is estimated to have been slightly more than $31 000. Purchases made locally accounted for around two-thirds of total household expenditure.

The proportions of expenditure on fertilizer, fuels and chemicals from purchases made locally are each estimated to have been about two-thirds. Businesses within the local town were sourced for services accounting for around 70 per cent of repairs and maintenance expenditure. Most of the balance of household and farm expenditure was spent in the operator's local regional centre (table 9).

8 Selected socioeconomic characteristics, 2006-07 Murray Valley region

Operator		
Age	54	(4)
Proportion attaining as their highest level of education:	%	
– primary school	6	(102)
– 1 to 4 years high school	33	(37)
– 5 to 6 years high school	24	(47)
– trade/technical/vocational	3	(105)
– university or other tertiary	35	(36)
Spouse		
Age	52	(3)
Proportion attaining as their highest level of education:	%	
– primary school	0	–
– 1 to 4 years high school	28	(39)
– 5 to 6 years high school	39	(36)
– trade/technical/vocational	3	(106)
– university or other tertiary	30	(42)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

9 Locality of farm expenditure, 2006-07 Murray Valley region average per farm

	local town		local regional centre		elsewhere	
	%		%		%	
Household expenditure a	65	(18)	33	(32)	2	(60)
Fertilizer expenditure	61	(21)	36	(35)	3	(104)
Chemicals expenditure	67	(19)	29	(43)	3	(104)
Fuels expenditure	66	(16)	31	(34)	3	(104)
Plant repairs and maintenance expenditure	69	(18)	27	(45)	3	(104)
Buildings repairs and maintenance expenditure	69	(18)	27	(45)	3	(104)

a Estimated average household expenditure in 2006-07 $31 304 (11).
Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

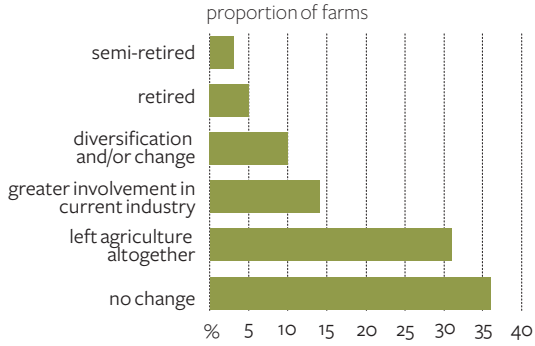
Future intentions

Survey results suggest considerable restructuring within the Murray Valley wine grape growing industry is likely in coming years. It is estimated around 30 per cent of growers intended to leave agriculture within five years, all of which were in the small to medium sized category.

The proportion of growers expecting to diversify or change is estimated at roughly 10 per cent, with an estimated 5 per cent planning to retire and around 3 per cent planning semi-retirement (figure n, appendix A).

An estimated 36 per cent of operators expected to have the same level of involvement in the industry within five years and around 14 per cent expected to increase their involvement in wine grape growing.

n Expected level of involvement in industry in 5 years time, 2006-07 Murray Valley region



3 Barossa Region

The region

For the purposes of this study, the Barossa region incorporates the district councils of Tanunda, Angaston and Barossa and the regional council of Light. According to the 2006 ABS Agricultural Census about 530 wine grape growers were operating in this region (map 3).

Within the survey area is the Barossa Valley GI wine region and most of the Eden Valley GI wine region. Much of the Light district council is outside (to the north and west) of both regions. The Eden Valley and Barossa Valley together form the bulk of the Barossa GI zone and are identified by the ABS as cool climate wine grape growing regions.

The eastern edge of the Eden Valley GI region lies in the Mid-Murray district council and so does not form part of the Barossa region studied here.

3 The Barossa region

Characteristics

The Barossa Valley region is located about 80 kilometres north-east of Adelaide, mostly having an elevation of around 300 metres. The area receives an average rainfall of around 500 millimetres. With an average of just 160 millimetres of rainfall during the growing season between October and April, some irrigation is desirable for wine grape production.

Soil types in the Barossa Valley vary widely. The most common are grey and brown clays, red-brown earths and black earths over red-brown clay subsoils, and yellow, mottled sands over red clay (Beeston 1999). The most fertile of these are the red-brown earths consisting of a loam over a clay subsoil, with some lime content (Evans 1984).

With a mean January temperature (MJT) of 21.3°C, Nuriootpa and the northern Barossa Valley would be classified as a hot viticulture region (Smart and Dry 1980). However, there are mitigating factors. Spring is usually mild and relatively wet, and in autumn temperatures start to fall significantly by the beginning of April (Halliday 1999).

The Eden Valley region lies adjacent on its eastern side to the Barossa Valley region. It is cooler, wetter and has generally higher elevations. Soils in the Eden Valley – Springton area, are podsolic, chiefly consisting of grey-

brown sandy loams over broken limestone, ironstone, quartz or yellow-brown clay (Evans 1984). In places soils tend to leached sands which have limited water holding capacity and are quite infertile (Beeston 1999).

The 2006-07 season

Wine grape production in the Barossa region in 2006-07 was severely affected by drought. The Bureau of Meteorology indicates rainfall between September and the end of December 2006 was less than 45 per cent of the long-term average (2008a). In addition, minimum and maximum temperatures were both unusually high over this period.

Increased temperatures over spring-summer hastened the ripening of light bunches of small, water stressed grapes. The unfavourable conditions led to a harvest some three weeks earlier than normal, with total production down by around 48 per cent on 2005-06. In 2006-07, the total quantity of red and white wine grapes crushed in the region was 53 per cent and 36 per cent lower than 2005-06, respectively (figure o) (AWBC 2008e).

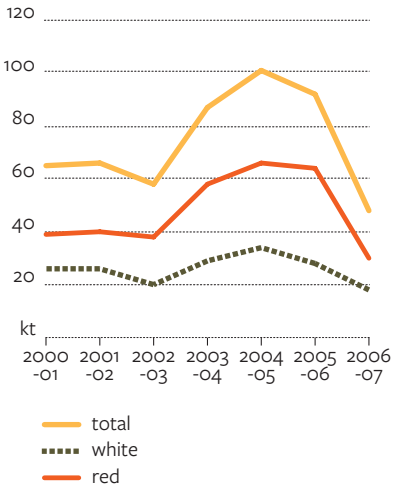
Grape quality was also affected, with sunburn resulting from poor canopies compounding the quality effects of water stress. When heavy rain did arrive in January 2007, some growers in the Barossa Valley suffered losses, particularly in white wine varieties because of grapes splitting (Clancy 2007).

The characteristic later ripening in the Eden Valley region meant grape splitting was less of a problem than in the Barossa Valley. Later ripening also allowed grape growers to take advantage of above average rainfall in January. Frequent, small volume irrigations following véraison resulted in increased red wine grape berry size and consequently above average yields for some growers (PGIBSA 2007b).

With national production lower than expected, prices received for most varieties increased marginally from the low prices received in 2005-06 (figure o).

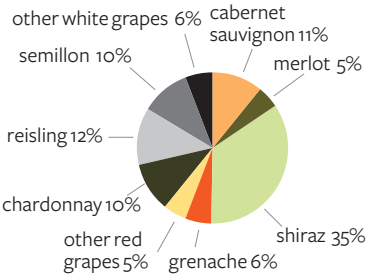
Red wine grapes accounted for 61 per cent of the 56 kilotonnes of wine grapes crushed from the Barossa region in 2006-07. The principal varieties produced in the region have traditionally been shiraz, cabernet sauvignon, riesling and semillon. These varieties made up 35 per cent, 11 per cent, 12 per cent and 10 per cent of wine grapes crushed from the Barossa region in 2006-07, respectively (appendix B) (Jackson et al. 2008).

o Wine grape production Barossa zone



Source: AWBC 2008e.

p Wine grape production by variety, 2006-07 Barossa zone



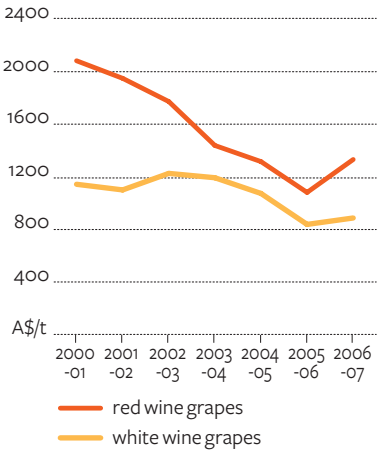
Source: Jackson et al 2008.

Regional wine grape prices in 2006-07

Wine grape prices recovered slightly in 2006-07, with average prices received for red wine grapes increasing slightly more than for white wine grapes. However, the weighted average price received for red wine grapes remains low when compared with that received at the beginning of the decade (figure q, appendix B).

The difference in weighted average price between red and white varieties was less pronounced in the Eden Valley region, which is renowned for its riesling in particular (table 10).

q Wine grapes weighted average prices, 2006-07
Barossa zone



Source: AWBC 2008e.

Physical characteristics

The average size of wine grape growing farms in the Barossa region is estimated to have been around 73 hectares. The average area planted to wine grapes in 2006-07 is estimated to have been 20.4 hectares, of which non-bearing areas are estimated to have been around a hectare per farm on average. Around 65 per cent of growers in the Murray Valley region could be regarded as small to medium sized wine grapes producers having up to 20 hectares planted to wine grapes (table 11).

10 Weighted average prices for selected wine grape varieties, 2006-07

	Barossa Valley $/tonne	Eden Valley $/tonne	cool climate regions of Australia $/tonne
Cabernet franc	1 153	1 594	855
Cabernet sauvignon	1 037	1 208	1 105
Grenache	1 170	783	1 100
Malbec	834	-	1 070
Merlot	873	946	978
Petit verdot	932	1 181	925
Pinot noir	816	1 138	1 654
Shiraz	1 522	1 576	1 224
All red wine grapes	1 325	1 370	1 169
Chardonnay	818	1 034	1 048
Chenin blanc	558	-	837
Muscadelle	469	-	1 293
Pinot gris	635	1 200	1 653
Riesling	746	1 252	1 067
Sauvignon blanc	1 006	1 438	1 520
Semillon	690	952	1 057
Traminer	900	1 099	901
Verdelho	850	750	1 016
All white wine grapes	763	1 200	1 128

Source: AWBC 2008e.

11 Key physical farm characteristics, by size of operation, 2006-07 Barossa region average per farm

		all farms		small – medium [a]		large [a]	
Total area operated	ha	73.3	(28)	54.8	(39)	108.1	(40)
Wine grape areas							
Red grapes bearing	ha	13.6	(13)	7.0	(27)	26.8	(13)
Red grapes non-bearing	ha	0.2	(45)	0.2	(62)	0.3	(69)
Total red wine grapes	ha	13.8	(13)	7.2	(27)	27.1	(13)
White grapes bearing	ha	5.8	(19)	1.8	(36)	13.6	(20)
White grapes non bearing	ha	0.7	(88)	0.0	–	2.1	(88)
Total white wine grapes	ha	6.5	(25)	1.8	(36)	15.7	(28)
Total wine grapes bearing	ha	19.4	(12)	8.8	(17)	40.4	(14)
Wine grapes nonbearing	ha	0.9	(72)	0.2	(62)	2.4	(83)
Total wine grapes	ha	20.3	(14)	8.9	(17)	42.8	(18)
Total fruit tree and vine areas							
Bearing	ha	19.4	(12)	8.8	(17)	40.5	(14)
Nonbearing	ha	1.0	(68)	0.2	(62)	2.6	(77)
Total	ha	20.4	(14)	8.9	(17)	43.1	(17)
Production							
Red wine grapes	t	63.2	(15)	35.4	(28)	118.3	(17)
White wine grapes	t	37.4	(28)	9.9	(28)	92.1	(33)
Total wine grapes	t	100.7	(17)	45.3	(20)	210.5	(23)
Yield							
Red wine grapes	t/ha	4.6	(7)	5.1	(7)	4.4	(10)
White wine grapes	t/ha	6.5	(13)	5.6	(20)	6.8	(14)
Total wine grapes	t/ha	5.2	(8)	5.2	(8)	5.2	(11)
Irrigation application rate							
Red wine grapes	Ml/ha	0.7	(15)	0.4	(29)	0.8	(14)
White wine grapes	Ml/ha	0.9	(18)	0.4	(29)	1.0	(17)
Total wine grapes	Ml/ha	0.8	(15)	0.4	(25)	0.9	(150)

a small - medium farms defined as having up to 20 hectares planted to wine grapes, large farms defined as having more than 20 hectares planted to wine grapes.
Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

Most, but not all, farms used some irrigation on their vines. It is estimated, on average, irrigators in the Barossa region received 88 per cent of their water entitlements in 2006-07. Irrigation rates were low despite the hot and dry conditions which prevailed throughout the growing season. Large farms used slightly higher irrigation rates, on average, than small to medium sized farms.

As a consequence of hot, dry conditions and frugal irrigation rates, 2006-07 wine grape production in the Barossa zone was markedly lower than in 2005-06. Average grape yields in 2006-07 are estimated to have been 4.6 tonnes per hectare for red wine grapes and 7.1 tonnes per hectare for white wine grapes.

There is little commercial production of tree and vine crops other than wine grapes among wine grape growers in the Barossa region.

Financial performance

Total cash receipts per farm in the Barossa region are estimated to have been around $156 000 on average in 2006-07, with wine grape receipts accounting for an estimated 83 per cent of this (table 12).

Other farm receipts were important for some small to medium sized grape growers in the Barossa region. These are estimated to have contributed about one-quarter of the estimated $95 000 in total cash receipts realised by small to medium sized producers in 2006-07. Some small producers earned a substantial proportion of their total farm income from off-farm contracting, with a few growers selling small quantities of grains or hay. Other cash receipts include government assistance paid to the farm business, rebates, occasional insurance claims and other incidental receipts.

Among all wine grape growing farms in the Barossa region, total cash costs are estimated to have been $125 000 on average in 2006-07. About one-third of total cash costs were attributable to hired labour and contracting costs. Hired labour costs accounted for a significantly higher proportion of total cash costs on large farms than on small to medium sized farms. Repairs and maintenance costs were also a considerable contributor to cash costs, particularly on small to medium sized farms. Interest repayments accounted for around 7 per cent of total cash costs.

Estimated farm cash income, expressed as the difference between farm cash receipts and farm cash costs, was higher, on average, for small to medium sized farms in 2006-07, at around $36 000, than that for larger farms, at around $21 000.

On average, small to medium sized farms realised a farm business loss of around -$13 000 in 2006-07. Large farms, on average, are estimated to have realised a farm business loss of around -$61 000 in 2006-07.

Wine grape growers typically receive a portion of proceeds from their wine grapes crop in the financial year sold, with the remainder usually coming in the next financial year. As a result, the full impact of the poor 2006-07 season was more severe than suggested by the growers' 2006-

12 Financial performance of wine grape growing farms, by size of operation, 2006-07 Barossa region average per farm

		all farms		small – medium [a]		large [a]	
Cash receipts							
Shiraz	$	58 726	(26)	41 095	(51)	93 687	(21)
Riesling	$	13 649	(53)	5 459	(86)	29 887	(64)
Cabernet sauvignon	$	11 014	(31)	7 037	(63)	18 900	(29)
Chardonnay	$	9 859	(26)	2 140	(48)	25 166	(30)
Semillon	$	7 912	(18)	2 663	(44)	18 321	(22)
Other wine grapes	$	28 356	(20)	14 961	(32)	54 915	(25)
Total wine grapes	$	129 516	(15)	73 355	(25)	240 875	(19)
Other tree and vine crops	$	186	(97)	0	–	555	(98)
Other cash receipts	$	26 266	(30)	21 338	(42)	36 038	(43)
Total cash receipts	$	155 968	(15)	94 693	(25)	277 468	(19)
Cash costs							
Hired labour	$	24 500	(41)	6 216	(95)	60 753	(46)
Fertilizer	$	4 103	(26)	1 672	(36)	8 924	(34)
Crop and pasture chemicals	$	4 045	(30)	2 345	(51)	7 415	(38)
Fuel, oil and grease	$	6 523	(18)	3 188	(30)	13 135	(22)
Repairs and maintenance	$	18 131	(21)	11 874	(32)	30 537	(29)
Tree and vine replacement costs	$	3	(97)	0	–	9	(98)
Contracts	$	16 896	(16)	10 481	(21)	29 617	(22)
Interest	$	9 272	(33)	4 665	(59)	18 409	(41)
Other costs	$	41 611	(26)	18 294	(19)	87 846	(36)
Total cash costs	$	125 083	(21)	58 734	(22)	256 644	(29)
Farm cash income	$	30 885	(70)	35 959	(62)	20 824	(227)
plus buildup in trading stocks	$	0	0	0			
less depreciation	$	20 242	(16)	15 901	(28)	28 849	(15)
less imputed family labour	$	39 933	(9)	33 247	(14)	53 191	(10)
Farm business profit	$	–29 290	(72)	–13 189	(164)	–61 215	(76)
Capital appreciation		10 101	(120)	15 356	(91)	486	(4715)
Profit at full equity	$	–16 420	(122)	–8 525	(245)	–32 075	(136)
Total capital value at 30 June	$	2114 156	(12)	1495 108	(21)	3341 637	(13)
Rate of return							
– excl. capital appreciation	%	–0.8	(123)	–0.6	(250)	–1.0	(134)
– incl. capital appreciation	%	–0.3	(365)	0.5	(325)	–1.0	(162)
Total farm debt [b]	$	174 468	(34)	70 814	(48)	364 101	(43)
Equity ratio [b]	%	85	(4)	90	(4)	76	(11)
Total liquid assets	$	89 393	(25)	74 107	(34)	119 702	(37)
Off farm income	$	36 077	(33)	43 996	(40)	20 375	(46)

[a] small - medium farms defined as having up to 20 hectares planted to wine grapes, large farms defined as having more than 20 hectares planted to wine grapes. [b] Only includes farms that provided debt information.

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

07 financial statements. Growers' cash income was also affected in the 2007-08 financial year because of relatively low carryover payments.

Overall, small to medium sized producers received significantly higher wine grapes prices, on average, than large producers in the Barossa region in 2006-07. Prices received for wine grapes varied greatly between growers. Some producers in the region had high price contracts with wineries stipulating maximum allowable yields. Sourcing grapes exclusively from low yielding vines enabled these wineries to target the exclusive super premium/specialty wine price point market of more than $50 per bottle. However, the survey did not reveal evidence of a relationship between price and yield. The harsh 2006-07 growing season is likely to have impacted negatively on both yield and price on some farms. This might have had the effect of confounding any relationship that might normally exist between yield and price (table 13).

Small to medium farms realised wine grape receipts per bearing hectare of an estimated $8369 per hectare in 2006-07 on average. In comparison, large farms are estimated to have realised wine grape receipts per bearing hectare of an estimated $5964 per hectare. The difference was statistically significant for red wine grapes, but not for white wine grapes.

Across red wine grape varieties, differences in wine grape receipts per bearing hectare were associated with price and yield. Furthermore, the strength of the effect of yield and price are estimated to have been roughly the same.

Price and yield were also both associated with differences in white wine grape receipts per bearing hectare. However, in this case the effect of yield was stronger than the effect of price.

13 Prices and receipts per bearing hectare of wine grape growing farms by size of operation, 2006-07 Barossa Valley region average per farm

		all farms		small – medium a		large a	
Wine grape receipts per bearing hectare	$/ha	6 687	(7)	8 369	(12)	5 964	(8)
Price – red wine grapes b	$/t	1 353	(7)	1 680	(13)	1 247	(9)
Price – white wine grapes b	$/t	824	(4)	934	(14)	805	(3)
Price – wine grapes b	$/t	1 141	(6)	1 458	(13)	1 051	(6)

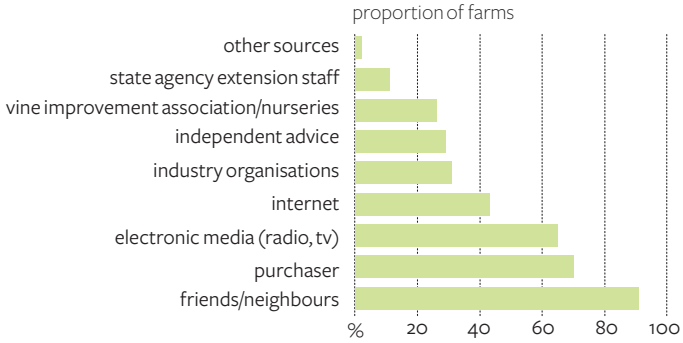
a small - medium farms defined as having up to 20 hectares planted to wine grapes, large farms defined as having more than 20 hectares planted to wine grapes. b Estimated average prices quoted are for grapes grown in the 2006-07 season including payments expected to be received after 30 June 2007. Receipts received from previous years' sales are not included in these calculations.

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

Farm management

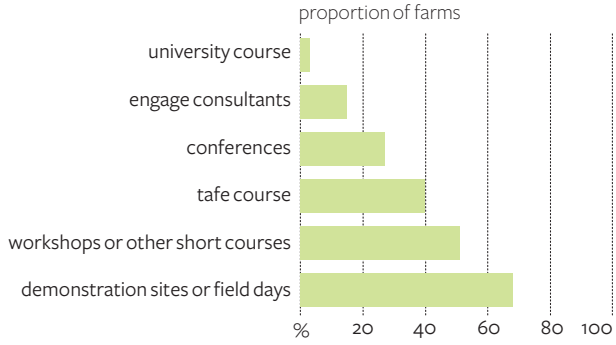
Growers in the region referred to a variety of information sources for production and management advice, with many using friends and neighbours. An estimated 70 per cent of growers used advice from their purchasers when making production and management decisions. The proportion of growers using some form of electronic media to source information is estimated to have been 68 per cent. An estimated 43 per cent sourced information from the internet (figure r, appendix B).

r Sources of information, 2006-07
Barossa region



Growers in the Barossa region participated in a range of activities to improve management and technical skills in the two years to 30 June 2007. While consultants were used by a minority of growers in that time, survey results suggest their contribution to farm management in the area was important (figure s).

S Participation in activities to improve management and technical skills, 2006-07 Barossa region



An estimated 68 per cent of producers sold all of their wine grape production on contract in 2006-07. At the time of the survey an estimated 62 per cent had all of their 2007-08 harvest contracted to a winery (table 14).

14 Farms selling wine grapes on contract to wineries, Barossa region

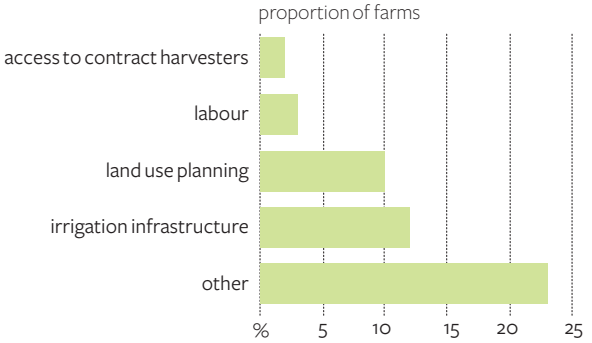
	2006-07		2007-08	
	%		%	
Proportion of farms with				
– no grapes contracted	14	(53)	14	(53)
– some grapes contracted	18	(34)	24	(28)
– all grapes contracted	68	(14)	65	(14)
– no grapes contracted at fixed price	89	(4)	85	(5)
– some grapes contracted at fixed price	2	(97)	5	(55)
– all grapes contracted at fixed price	10	(39)	7	(46)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

Most producers did not sell any of their wine grapes production on fixed price contracts. An estimated 10 per cent of producers sold all of their 2006-07 grapes on fixed priced contracts. A similar proportion is estimated to have had all of their 2007-08 grapes on fixed price contracts at the time of the survey.

The estimated proportion of growers who believed the cost of irrigation infrastructure was an impediment to expansion was roughly 12 per cent. Around 10 per cent are estimated to have felt land use planning was an impediment to farm expansion (figure t).

t Impediments to farm expansion in the region, 2006-07
Barossa region



A small minority of farmers agreed labour shortages or access to contract harvesting were an impediment to farm expansion in the Barossa region.

Among respondents nominating other impediments, the most commonly nominated were the price of land and a lack of water. The 'oversupply' of wine grapes was also nominated as an impediment to expansion.

Fertilizer and chemical use

The proportion of growers who have made attempts to reduce on-farm chemical use in the past three years was estimated at 45 per cent. The overall reduction in chemical use achieved by wine grape growers in that period is estimated to have been 18 per cent (table 15). The estimated average reduction in chemical use among growers attempting to reduce chemical use is estimated to have been 39 per cent.

15 Chemical use on grape growing farms, 2006-07 Barossa region

	%	
Proportion of farms attempting to reduce chemical use	45	(27)
– percent reduction achieved	18	(39)
Proportion of farms that undertook a course in chemical use in the past three years	43	(29)
Proportion of farms mixing/applying sprays on the following basis:		
– rate per litre/100 litres	67	(17)
– a rate per hectare	43	(28)
As part of normal farm management program, proportion of farms using:		
– tissue or soil tests to determine fertilizer requirements	52	(24)
– irrigation water quality monitoring	40	(28)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

The estimated proportion of farms monitoring irrigation water quality was substantial at 40 per cent. An estimated 52 per cent of farms used soil tests or tissue tests to estimate fertilizer demands.

The frequency of growers' pest and disease monitoring programs varied widely. The results suggest one-quarter of farms did not have a regular pest and disease monitoring program. Among growers who did regularly monitor pests and diseases, the most common interval was two to three weeks (table 16).

16 Frequency of monitoring for pests and diseases, 2006-07 Barossa region

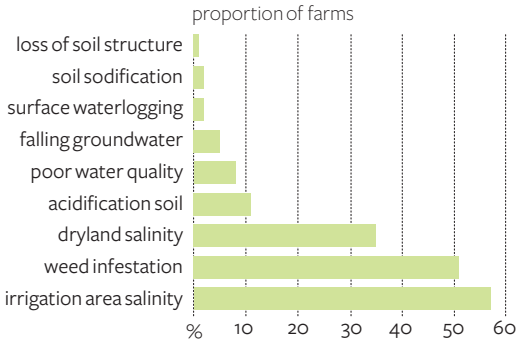
	%	
Proportion of farms monitoring		
- daily	13	(43)
- every 2-7 days	14	(41)
- every 1-2 weeks	10	(71)
- every 2-3 weeks	34	(38)
- every 3-4 weeks	14	(66)
- more than 4 weeks	0	–

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

Being a relatively dry region, the Barossa Valley tends to be less susceptible to many pests than wetter regions. The importance of regular monitoring is likely to be higher in more elevated parts of the Eden Valley.

Signs of irrigation salinity and weed infestation on wine grape farms in the Barossa region were widespread. An estimated 57 per cent of farms showed signs of salinity because of irrigation and an estimated 51 per cent showed some signs of weed infestation. Some dryland salinity was present on an estimated 35 per cent of farms. On most farms where these problems did exist, their impact was not considered to have been severe (figure u).

u Farms reporting signs of environmental problems, 2006-07 Barossa region



An estimated 98 per cent of growers in the region irrigated at least some of their wine grapes in 2006-07 with drip irrigation being the only reported method used (table 17).

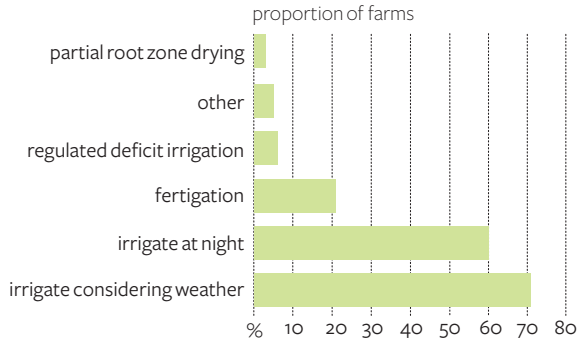
17 Irrigation application methods, 2006-07 Barossa region

	%	
Wine grapes irrigated using		
– trickle/drip	98	(2)
– fixed overhead sprinklers	0	–
– flood	0	–
– low throw fixed sprinklers	0	–
– microjet	0	–
– movable spray lines	0	–
– travelling irrigators	0	–
– other	0	–
Wine grapes not irrigated	2	(105)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

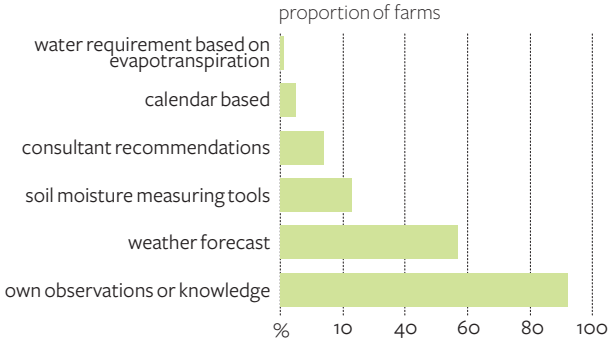
Irrigating considering weather conditions was fairly typical. Around 60 per cent of Barossa growers are estimated to have irrigated at night to reduce losses because of evaporation. The proportion who used fertigation is estimated to have been roughly 20 per cent. Techniques such as partial root zone drying and regulated deficit irrigation were less widely used (figure v).

V Irrigation management practices, 2006-07
Barossa region



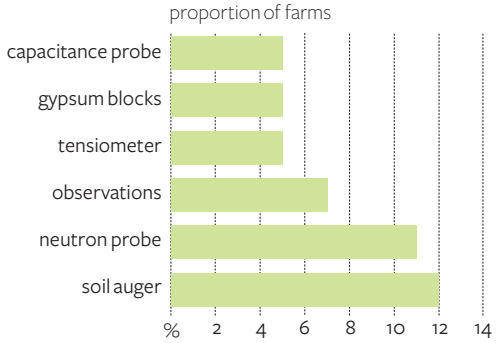
Most respondents claimed they based decisions on the timing of irrigation on their own knowledge or observations. An estimated 57 per cent used weather forecasts to decide irrigation timing. Around 23 per cent are estimated to have used soil moisture measurement tools as a basis for irrigation timing decisions (figure w).

W Basis for decisions on the timing of irrigation , 2006-07
Barossa region



Soil auger probes and neutron probes were each used to measure soil moisture on an estimated 12 per cent of farms. The proportion of farms using tensiometers, capacitance probes and gypsum blocks are each estimated to have been about 5 per cent (figure x).

X Use of soil moisture measuring tools, 2006-07
Barossa region



Most growers did not intend to make considerable changes to their current irrigation setup in the next three years. Around 10 per cent planned to buy additional water entitlements. On-farm dams were used to capture winter rainfall in the Eden Valley. A small number of farms planned to add additional on-farm storage in the next three years (table 18).

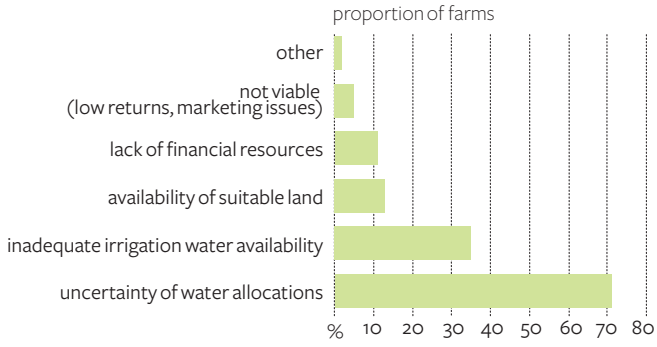
An estimated 71 per cent of those surveyed felt uncertainty of water allocations was a constraint and 36 per cent of growers believed inadequate irrigation water availability constrained future increases in irrigation area. A smaller proportion felt a lack of suitable land constrained increases in irrigation area (figure y).

18 Intended changes to irrigation practices, 2006-07 Barossa region

	%	
In next three years intend to		
– buy water	11	(52)
– expand area irrigated	3	(105)
– install on farm storage	3	(104)
– reduce area irrigated	2	(105)
– water reuse changes	1	(106)
– other	3	(105)
– no change	73	(13)
– sell water	0	–
– water application	0	-

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

y Constraints to increasing irrigated area, 2006-07 Barossa region



Socioeconomic characteristics

The average age of operators and spouses in the Barossa region is estimated to have been 54 years and 52 years of age, respectively (table 19).

Overall, grape growers in the Barossa region received a relatively high level of formal education. Most growers attended high school for five to six years. It is estimated 55 per cent of spouses attended university or other forms of tertiary education compared with an estimated 19 per cent of operators.

Household expenditure in the Barossa region is estimated to have been around $27 000 in 2006-07, on average. Purchases accounting for roughly two-thirds of household expenditure are estimated to have

19 Selected socioeconomic characteristics, 2006-07 Barossa region

	%	
Operator		
Age	55	(6)
Proportion attaining as their highest level of education:		
– primary school	2	(105)
– 1 to 4 years high school	8	(50)
– 5 to 6 years high school	68	(16)
– trade/technical/vocational	2	(105)
– university or other tertiary	19	(56)
Spouse		
Age	52	(3)
Proportion attaining as their highest level of education:		
– primary school	0	–
– 1 to 4 years high school	5	(65)
– 5 to 6 years high school	33	(34)
– trade/technical/vocational	7	(66)
– university or other tertiary	55	(23)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

been made in the operator's local town. The proportions of expenditure on farm inputs from purchases made in the operator's local town are estimated to have ranged from 50 per cent for chemicals and fertilizer to 70 per cent for repairs and maintenance. Most of the other expenditure is estimated to have been spent in the local regional centre (table 20).

20 Locality of farm expenditure, 2006-07 Barossa region

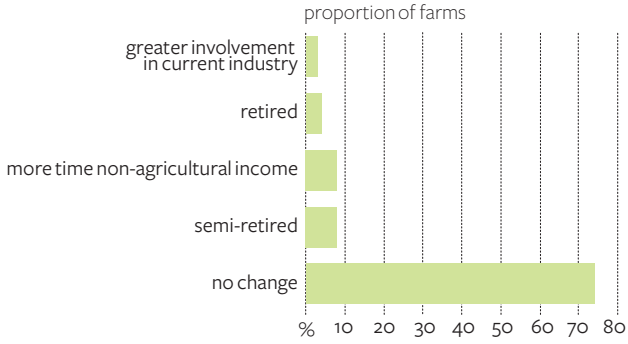
	local town		local regional centre		elsewhere	
	%		%		%	
Household expenditure a	68	(12)	24	(30)	7	(37)
Fertilizer expenditure	54	(23)	41	(29)	4	(70)
Chemicals expenditure	58	(20)	41	(27)	1	(106)
Fuels expenditure	60	(17)	28	(32)	12	(44)
Plant repairs and maintenance expenditure	70	(12)	27	(31)	3	(67)
Buildings repairs and maintenance expenditure	67	(13)	26	(30)	7	(42)

a Estimated average household expenditure per farm in 2006-07, $27 157 (6).
Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

Future intentions

An estimated 74 per cent of wine grape growers in the Barossa region expected no considerable change in their level of involvement in the industry. The proportion of those who were expecting to spend more time earning non-agricultural income or planning semi-retirement is each estimated to have been around 9 per cent. The estimated proportion planning to be involved in the industry to a greater extent was just 4 per cent. An estimated 3 per cent expected to retire in the next five years (figure z).

Z Expected level of involvement in current enterprise in 5 years time, 2006-07 Barossa region



4 Comparison of the regions

Wine grape growers in the Murray Valley and the Barossa region experienced difficult financial conditions in 2006-07. Regional production was appreciably lower than for preceding seasons, particularly in the Barossa region. Prices received by growers did not recover substantially from the low 2005-06 levels that were as a result of steady decline over a number of seasons.

Many wine grape growers in the Murray Valley produce other tree and vine crops such as table grapes, grapes for drying, citrus fruits and almonds. In comparison, there is little commercial production of other tree and vine crops by wine grape growers in the Barossa region. The proportion of farm area planted to all tree and vine crops including wine grapes, was higher in the Murray Valley than in the Barossa region.

As a consequence of generally higher yields achieved, Murray Valley grape growing farms produced significantly larger quantities on average of red and white wine grapes in 2006-07. Red wine grape varieties accounted for a higher proportion of total wine grape production on Barossa farms than on Murray Valley farms. Equivalently, white wine grapes typically accounted for a higher proportion of total wine grape production on Murray Valley than on Barossa wine grape farms.

In 2006-07, on average growers in the Barossa region received higher prices for both red and white wine grapes than producers in the Murray Valley region.

Murray Valley wine grape growers with more than 20 hectares planted to wine grapes realised greater wine grape receipts per bearing hectare than did Barossa growers in the same size category. In particular, bearing areas planted to white wine grapes on large Murray Valley farms in 2006-07 on average realised significantly greater receipts per hectare than large Barossa farms.

Large Murray Valley wine grape growing farms realised greater total cash receipts and higher rates of return excluding capital appreciation, on average, than did large Barossa wine grape growing farms in 2006-07.

Small to medium sized farms in the Barossa on average had significantly less debt than small to medium sized farms in the Murray Valley in 2006-07.

On average, growers in the Murray Valley used higher irrigation application rates in 2006-07 than did growers in the Barossa region. Wine grape production in Australia's warm inland wine grape growing regions is characteristically more irrigation intensive than in cooler regions. Additionally, whereas growers in the Barossa tend to irrigate using drip and trickle systems, a variety of irrigation application methods were used in the Murray Valley.

An estimated 70 per cent of growers in the Murray Valley believed their farm profitability or productivity could have been improved through improvements in irrigation technology used on farm. This is significantly higher than in the Barossa region where this was estimated at 10 per cent.

The proportion of growers expecting to diversify their agricultural operation and the proportion expecting to leave agriculture in the next five years were both higher in the Murray Valley region than in the Barossa region. In contrast, the proportion of wine grape growers who expected to have a similar level of involvement in the industry in five years was higher in the Barossa region than in the Murray Valley.

appendix A

Tables not included in report, Murray Valley region

A1 Wine grape production as a proportion of national production for selected varieties, 2006-07 Murray Darling – Swan Hill region

Proportions of Australian wine grapes production for selected varieties, 2006-07

Murray Darling – Swan Hill regions

			proportion of	
		Murray Darling - Swan Hill	Australian warm climate production	Australian production
		tonnes	%	%
Premium varieties				
Red	Cabernet franc	146	38	6
	Cabernet sauvignon	39 376	39	21
	Malbec	15	4	1
	Merlot	28 638	50	30
	Petit verdot	2 562	22	17
	Pinot noir	1 970	21	7
	Ruby cabernet	2 646	19	17
	Shiraz	51 978	31	18
	Total	127 334	35	20
White	Chardonnay	133 805	45	35
	Chenin blanc	861	19	11
	Colombard	22 720	40	40
	Muscadelle (tokay)	107	32	12
	Pinot gris	4 082	44	29
	Riesling	2 276	22	7
	Sauvignon blanc	6 966	45	18
	Semillon	11 780	23	15
	Traminer	311	5	4
	Verdelho	1 028	13	7
	Total	183 940	40	29
Nonpremium varieties				
Red	Grenache	1 158	15	7
	Mataro (mourvedre)	150	4	2
	Total	1 308	11	6
White	Crouchen	1 939	94	94
	Doradillo	1	0	0
	Palomino	3	1	1
	Trebbiano	0	0	0
	Total	1 944	28	27
Multipurpose				
White	Total	40 337	62	62
minor varieties				
Red	Total	5 524	42	26
White	Total	3 717	32	21
All wine grapes				
Red	total	134 168	35	20
White	Total	229 940	43	32
	Total	364 108	39	26

Source: Jackson et al. 2008.

A2 Wine grape production and weighted average price data, 2000-01 to 2006-07 Murray Darling - Swan Hill region

wine grapes production, Murray Darling – Swan Hill region

		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07 a
White (excl multipurpose)	kt	106	133	118	154	197	192	189
Red wine grapes	kt	126	168	141	166	186	180	133
Multi-purpose	kt	94	77	54	77	60	44	33
All wine grapes	kt	326	378	312	396	443	416	355

Wine grapes prices received, Murray Darling – Swan Hill region

		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Red wine grapes b	$	846	737	653	595	485	390	404
Multi-purpose b	$	377	355	363	340	358	333	327
White (excl multipurpose)b	$	703	728	793	779	635	390	395
All white wine b	$	550	591	658	633	570	380	385

a 2006-07 production data sourced from Jackson et al. are believed to be more reliable, but are not directly comparable with earlier years' AWBC data. **b** All prices adjusted to 2006-07 equivalents.
Source: AWBC 2008e.

A3 Farm management and environmental issues, 2006-07 Murray Valley region

Sources of farm production and management information, 2006-07

Proportion of farms that farms that sourced information from	%	
– electronic media (radio, tv)	41	(32)
– friends/neighbours	49	(25)
– independent advice (eg agronomists)	58	(21)
– industry organisations	58	(20)
– internet	26	(44)
– purchaser	64	(18)
– state agency extension staff	13	(51)
– vine improvement association/nurseries	37	(33)
– print media	0	–
– other sources	0	–

Participation in activities to improve management and technical skills, 2006-07

Proportion of farms attending	%	
– conferences	11	(46)
– demonstration sites or field days	70	(16)
– engage consultants	19	(45)
– TAFE course	6	(62)
– university course	7	(78)
– workshops or other short courses	63	(17)
– other training	0	–

Impediments to farm expansion in the region, 2006-07

Proportion of farms citing	%	
– access to contract harvesters	3	(81)
– irrigation infrastructure	27	(34)
– labour	26	(39)
– land use planning	26	(42)
– other	33	(39)

Farms reporting signs of environmental problems, 2006-07

Proportion of farms reporting signs of	%	
– falling groundwater	7	(62)
– irrigation area salinity	2	(106)
– loss of soil structure	4	(75)
– poor water quality	7	(62)
– weed infestation	2	(106)
– wind erosion	5	(102)
– acidification soil	0	–
– dryland salinity	0	–
– soil sodicity	0	–
– surface waterlogging	0	–
– water erosion	0	–

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

A4 Irrigation management, 2006-07 Murray Valley region

Irrigation application methods, 2006-07

Farms irrigating wine grapes using	%	
– fixed overhead sprinklers	41	(30)
– flood	21	(62)
– low throw fixed sprinklers	20	(46)
– microjet	8	(76)
– trickle/drip	46	(26)
– movable spray lines	0	–
– travelling irrigators	0	–
– other	0	–

Irrigation management practices, 2006–07

Proportion of farms using	%	
– considering weather	60	(22)
– fertigation	53	(23)
– irrigating at night	72	(18)
– partial root zone drying	23	(42)
– regulated deficit irrigation	29	(41)
– other	13	(79)

Basis for timing of irrigation decisions, 2006–07

Timing of irrigation decisions based on	%	
– calendar based	10	(59)
– consultant recommendations	8	(74)
– own observations	92	(7)
– evaporation pan data	3	(104)
– soil moisture measuring tools	47	(26)
– weather forecast	40	(29)
– water requirement based on evapotranspiration	3	(102)

Use of soil moisture measuring tools, 2006–07

Proportion of farms using	%	
– capacitance probe	26	(36)
– heat probe	0	–
– neutron probe	11	(58)
– observations	60	(21)
– soil auger	8	(74)
– tensiometers	9	(65)
– other	2	(106)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

A4 Irrigation management, 2006-07 Murray Valley region

Intended changes to irrigation practices, 2006-07

In next three years intend to	%	
– buy water	16	(42)
– expand area irrigated	12	(47)
– install on farm storage	2.6	(105)
– reduce area irrigated	17	(62)
– water application	38	(31)
– other	24	(53)
– no change	22	(43)
– sell water	0	–
– water reuse changes	0	–

Constraints to increasing irrigated area, 2006-07

Proportion of farms citing		
– availability of suitable land	25	(46)
– inadequate irrigation water	22	(49)
– lack of financial resources	11	(58)
– not viable (low returns, marketing issues)	25	(43)
– uncertainty of water allocations	87	(11)
– other	10	(96)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

A5 Expected level of involvement in industry in five years, 2006-07 Murray Valley region

Expected level of involvement in industry in 5 years, 2006-07

In next five years expect to	%	
– diversification and/or change	10	(60)
– greater involvement in current industry	14	(51)
– left agriculture altogether	31	(41)
– retired	5	(102)
– semi-retired	3	(104)
– no change	36	(32)
– more time non-agricultural income	0	–

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

appendix B Tables not included in report, Barossa region

B1 Wine grape production as a proportion of national production, 2006-07

			proportion of	
		Barossa zone	Australian cool climate production	Australian production
		tonnes	%	%
Premium varieties				
Red	Cabernet franc	141	6	5
	Cabernet sauvignon	6 063	7	3
	Malbec	74	4	3
	Merlot	2 701	7	3
	Petit verdot	147	4	1
	Pinot noir	822	4	3
	Ruby cabernet	0	0	0
	Shiraz	19 238	16	7
	Total	29 189	11	5
White	Chardonnay	5 776	7	2
	Chenin blanc	188	6	2
	Colombard	0	0	0
	Muscadelle (tokay)	94	18	11
	Pinot gris	135	3	1
	Riesling	6 869	31	21
	Sauvignon blanc	1 276	5	3
	Semillon	5 768	23	7
	Traminer	220	11	3
	Verdelho	36	1	0
	Total	20 366	12	3
Nonpremium varieties				
Red	Grenache	3 068	41	20
	Mataro (mourvedre)	803	27	12
	Total	3 871	37	17
White	Crouchen	0	0	0
	Doradillo	2	5	0
	Palomino	84	75	17
	Trebbiano	6	6	0
	Total	93	35	1
Multipurpose				
White	Total	5	1	0
Minor varieties				
Red	Total	812	10	4
White	Total	1 184	19	7
All wine grapes				
Red	Total	33 873	12	5
White	Total	21 649	12	3
	Total	55 523	12	4

Source: Jackson et al. 2008.

B2 Wine grape production and weighted average prices, 2000-01 to 2006-07

Wine grape production, Barossa zone

		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07 a
Red wine grapes	kt	39	40	38	58	66	64	30
White wine grapes	kt	26	26	20	29	34	28	18
All wine grapes	kt	65	66	58	87	101	92	48

Wine grapes prices received, Barossa zone

		2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Red wine grapes b	$	2 084	1 950	1 773	1 438	1 315	1 080	1 331
White wine grapes b	$	1 142	1 099	1 225	1 192	1 072	836	885

a 2006-07 production data *sourced* from Jackson et al. are believed to be more reliable, but are not directly comparable with earlier years' AWBC data. b All prices adjusted to 2006-07 equivalents.
Source: AWBC 2008e.

B3 Management practices and environmental issues, 2006-07 Barossa region

Sources of farm production and management information, 2006-07

Proportion of farms that sourced information from	%	
– electronic media (radio, tv)	65	(17)
– friends/neighbours	91	(5)
– independent advice	29	(31)
– industry organisations	31	(30)
– internet	43	(28)
– purchaser	70	(16)
– state agency extension staff	11	(44)
– vine improvement association/nurseries	26	(38)
– other sources	2	(106)
– print media	0	–

Participation in activities to improve management and technical skills, 2006-07

Proportion of farms attending	%	
– conferences	27	(32)
– demonstration sites or field days	68	(17)
– engage consultants	15	(43)
– TAFE course	40	(32)
– university course	3	(76)
– workshops or other short courses	51	(25)
– other training	0	–

Impediments to farm expansion in the region, 2006-07

Proportion of farms citing	%	
– access to contract harvesters	2	(105)
– irrigation infrastructure	12	(51)
– labour	3	(78)
– land use planning	10	(63)
– other	23	(38)

Farms reporting signs of environmental problems, 2006-07

Proportion of farms reporting signs of	%	
– acidification soil	11	(83)
– dryland salinity	35	(39)
– falling groundwater	5	(63)
– irrigation area salinity	57	(20)
– loss of soil structure	1	(106)
– poor water quality	8	(51)
– soil sodification	2	(106)
– surface waterlogging	2	(106)
– weed infestation	51	(24)
– water erosion	0	–
– wind erosion	0	–

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

B4 Irrigation management, 2006-07 Barossa region

Irrigation management practices, 2006-07

Proportion of farms using	%	
– considering weather	71	(15)
– fertigation	21	(34)
– irrigating at night	60	(20)
– partial root zone drying	3	(80)
– regulated deficit irrigation	6	(57)
– other	5	(63)

Basis for timing of irrigation decisions, 2006-07

Timing of irrigation decisions based on	%	
– calendar based	5	(66)
– consultant recommendations	14	(47)
– own observations	92	(5)
– soil moisture measuring tools	23	(41)
– water requirement based on evapotranspiration	1	(106)
– weather forecast	57	(22)
– evaporation pan data	0	–

Use of soil moisture measuring tools, 2006-07

Proportion of farms using	%	
– capacitance probe	5	(76)
– gypsum blocks	5	(83)
– heat probe	0	–
– neutron probe	11	(86)
– observations	7	(58)
– soil auger	12	(63)
– tensiometer	5	(66)

Constraints to increasing irrigated area, 2006-07

Proportion of farms citing	%	
– uncertainty of water allocations	71	(15)
– lack of financial resources	11	(63)
– availability of suitable land	13	(50)
– no water	35	(31)
– not viable (low returns, marketing issues)	5	(65)
– other	2	(105)

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

B5 Expected level of involvement in industry in five years, 2006-07 Barossa region

Expected level of involvement in industry in five years, 2006-07

In next five years expect to	%	
– greater involvement in current industry	4	(103)
– more time non-agricultural income	8	(77)
– retired	3	(104)
– semi-retired	8	(66)
– no change	74	(13)
– left agriculture altogether	0	–
– diversification and/or change	0	–

Note: Figures included in parentheses are standard errors, expressed as percentages of the estimates. A guide to interpreting this measure of sample variation is included in Appendix C. The survey included only wine grape growing farms with an estimated value of agricultural operations of more than $40 000.

appendix C 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 $40 000 or more. A definition of the estimated value of agricultural operations is given in Australian and New Zealand Standard Industrial Classification 2006 (ABS 2006, cat. no. 1292.0).

Definition of the grape growing industry

The grape growing industry definition is based on the Australian and New Zealand Standard Industrial Classification (ANZSIC). This classification is consistent with an international standard applied comprehensively across Australian industry, permitting 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 grape 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 0131. This class consists of units mainly engaged in growing table or wine grapes; or sun-drying grapes. Primary activities of establishments with this ANZSIC include grape growing and sun-drying, table grape growing, vineyard operation and wine grape growing. Amongst farms identified in ANZSIC 0131, to be eligible for the survey, the units must have had at least a part of their operation devoted to the production of wine grapes.

Survey design and sample weighting

The population was stratified by operation size using the estimated value of agricultural operations (EVAO). The size of each stratum was determined using the Dalenius-Hodges method (Lehtonen 2004). The sample allocation to each stratum was conducted using a mixture of the Neyman allocation, which takes into account variability within strata of the auxiliary variable, in this case EVAO, and proportional allocation, which

only considers the population number in each stratum. The Neyman allocation gives 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 are dependent on the design used to select the sample, the amount of variation in the measured characteristics and the accuracy of their measurement.

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 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 inside parentheses.

Example of use of relative standard errors

To obtain the standard error from the relative standard error, multiply the relative standard error by the estimate and divide by 100.

For example, the estimate of average total cash receipts on Murray Valley grape growing farms in 2006-07 was $189 489 with a relative standard error of 15 per cent. So the standard error for this estimate is $28 423.

There is roughly a two in three chance that the 'census value' (the value which would have been obtained if all farms in the target population had been surveyed) is within one standard error of the survey estimate.

There is roughly a 19 in 20 chance that the 'census value' is within two standard errors of the survey estimate.

Thus, in the above example, there is an approximately two in three chance that the 'census value' for the average farm cash receipts of grape growers in the Murray Valley was between $161 066 and $217 912, and an approximately 19 in 20 chance that the census value lies between $132 643 and $246 335.

Comparing estimates

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

The average wine grape yield on grape growing farms in the Murray Valley region in 2006-07 is estimated to have been 17.0 tonnes per hectare, the average wine grape yield on farms in the Barossa region in the same year is estimated to have 5.2 tonnes per hectare – a difference of 11.2 tonnes per hectare. The estimated relative standard errors of the wine yield estimates are given as 6 per cent for Murray Valley farms and 8 per cent for Barossa farms. The standard error of the difference can be estimated as:

$$\sqrt{(0.06 \times 17.0)^2 + (0.08 \times 5.2)^2} \text{ tonnes per ha} = 1.1 \text{ tonnes per ha}$$

Then, it is possible to calculate a 95 per cent confidence interval for the difference as:

$$11.2 \pm 1.96 \times 1.1 = (9.0, 13.4)$$

Hence, if 100 different samples were taken from the populations of Murray Valley and Barossa grape growers, it would be expected that in about 95 of them, the estimated average yield on Murray Valley farms would be between 9 tonnes and 13.4 tonnes per hectare more than the estimated yield on Barossa farms. Since zero is not between the limits of the confidence interval, it can be said the estimated average wine grape yield on Murray Valley farms in 2006-07, is significantly higher than the estimated average wine grape yield on Barossa farms in 2006-07 assessing significance at the 95 per cent confidence level.

When more than one pair wise comparison was made the Bonferroni inequality was used to construct the confidence intervals.

Statistical significance

For the purpose of this report, statistical significance has been assessed at the 90 per cent significance level. If an observed difference in survey estimates between two groups is likely to be present in 90 per cent of samples that would be taken from the same populations, the difference is said to be statistically significant. If the observed difference is likely to be present in less than 90 per cent of samples, the difference is said not to be statistically significant. It should be noted that finding the difference between two estimates to not be statistically significant does not imply the quantities are the same. It merely implies the study did not find strong evidence that the quantities were different.

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.

Capital appreciation: Change in the value of land and improvements, plant, livestock and other tradeable stocks, such as wool and grain, arising from changes in their prices during the financial year.

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 grapes (wine and table), citrus, grain and hay crops, livestock and livestock products. It 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. Other cash costs include relatively small cost items like stores, advisory services and travelling expenses.

Farm cash income: Total cash receipts less total cash costs.

Depreciation: Estimated by applying the diminishing value depreciation method to the market value of capital items at 30 June 2006. 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 buildup 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: 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.

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

ABARE (Australian Bureau of Agricultural and Resource Economics) 2007, *Australian commodity statistics 2007*, Canberra.

ABS (Australian Bureau of Statistics) 2005, *2005 Year Book Australia*, Number 87, cat. no. 1301.0, Canberra.

—— 2007, *Australian Wine and Grape Industry*, cat. no. 1329.0, Canberra (and previous issues).

Australian Wine Board, 1979, *Wine Australia*, Australian Wine Board, Adelaide.

AWBC (Australian Wine and Brandy Corporation) 2008a, *Barossa Valley*, Adelaide, (www.wineaustralia.com/Australia).

—— 2008b, *Eden Valley*, Adelaide.

—— 2008c, *Murray Darling*, Adelaide.

—— 2008d, *Swan Hill*, Adelaide.

—— 2008e, *Wine Facts*, Adelaide.

Beeston, J 1999, *Wine regions of Australia*, Allen & Unwin, St. Leonards, New South Wales.

BOM (Bureau of Meteorology) 2008a, *Australian Rainfall and Surface Temperature Data*, Canberra. (www.bom.gov.au).

—— 2008b, *Climate statistics for Australian locations*, Canberra.

Clancy, P 2007, 'Vintage Snapshots: Barossa Valley', *Australian & New Zealand Grapegrower & Winemaker*, No. 519, April, p.22.

Crothers, S 2007, *Australian Regional Wine Grape Crush Survey 2007 Murray Darling/Swan Hill*, Department of Primary Industries, Irymple, Victoria, August.

De Palma, M 2006, 'Chairman's Annual Report', *Murray Valley Winegrowers' Grapevine*, September/October, Mildura. (http://murrayvalleywinegrapes.com.au/)

—— 2007, 'Chairman's Annual Report', *Murray Valley Winegrowers' Grapevine*, July/September, Mildura.

Evans, L 1984, *Complete book of Australian wine*, Lansdowne Press, Sydney.

Fletcher, S, Shaw, I and Currey, N 2007, *Australian Wine Grape Production Projections to 2008-09*, ABARE Research Report 07.10 prepared for the Grape and Wine Research and Development Corporation, Canberra, May.

Halliday , J 1999, *Wine Atlas of Australia and New Zealand*, Harper Collins, Sydney.

Halliday , J 2008, *Australian vintage 2007: a snapshot – James Halliday Australian Wine Companion*, (http://winecompanion.com.au/page/14/Australian+vintage+2007+a+snapshot)

Henry, C, Shafron, W and Lubulwa, M 2007, *Wine Grape Growing Farms in the Riverland, South Australia: Financial Performance of Farms, 2005-06*, ABARE Research Report 07.15, Canberra, September.

Jackson, T, Shaw, I and Dyack, B 2008, *Australian wine grape production projections to 2009-10*, ABARE Research Report 08.5 prepared for the Grape and Wine Research and Development Corporation, Canberra, May.

McGuire, L 2007, 'Measuring the Impacts', *Murray Valley Winegrowers' Grapevine*, Mildura, January – March.

Mues, C and Boero Rodrguez, V 2007, *Mildura-Wentworth – A Case Study of Horticulture Farm Performance*, ABARE Research Report 07.6 Prepared for the Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, March.

Oliver, M, Hooper, S, Gordon, W and Galeano, D 2006, *McLaren Vale and Riverina Regions: A Survey of Wine Producers, 2003-04 and 2004-05*, ABARE, Canberra.

(PGIBSA) Phylloxera and Grape Industry Board South Australia, 2007a, *Barossa Valley Wine Region Regional summary report 2007*, Adelaide.

—— 2007b, *Eden Valley Wine Region Regional summary report 2007*, Adelaide.

Sheales, T, Apted, S, Dickson, A, Kendall, R, and French, S 2006, *Australian Wine Industry: Challenges for the Future*, ABARE Research Report 06.16, Canberra, October.

Smart, R E, and Dry, P R 1980, 'A Climatic Classification for Australian Viticultural Regions', *Australian Grapegrower & Winemaker*, 196, 8 – 12.

South Australian Wine Industry Council, 2006, *The Over-supply of Cool Climate Wine Grapes*, Discussion paper prepared by the Cool Climate Study Steering Committee, Adelaide, October.

Stanford, L, Bailey, P and Cargin, R 2006, *AUSTRALIAN WINE SECTOR Supply and Demand Assessment – 2006*, (www.wineaustralia.com).

Whiting, J and Krstic, M 2007, *Impacts of bushfire smoke on grape and wine quality – Scoping study*, Department of Primary Industries, Knoxfield, Victoria, July.

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10.08

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Dairy Australia

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

Horticulture Australia

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Meat and Livestock Australia

Murray Darling Basin Commission

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