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and Water Resources**

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# **Wine grape farms in the Murray–Darling Basin**

Dale Ashton and Mark Oliver

**Research by the Australian Bureau of Agricultural  
and Resource Economics and Sciences**

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### Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)

Postal address GPO Box 858 Canberra ACT 2601

Switchboard +61 2 6272 3933

Email [info.abares@agriculture.gov.au](mailto:info.abares@agriculture.gov.au)

Web [agriculture.gov.au/abares](http://agriculture.gov.au/abares)

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# Summary

In this report data from the ABARES Murray–Darling Basin Irrigation Survey (MDBIS) are presented from 2006–07 to 2014–15, particularly 2012–13 to 2014–15. ABARES provides key farm performance measures for wine grape farms and data on water trading and use of irrigation technologies. This report focuses on wine grape farms in the southern Murray–Darling Basin, where most of the Basin’s wine grapes are produced.

The number of grape growing farms declined from 2006–07 to 2013–14, largely in response to a downturn in grape prices. Many farmers that exited the industry were those with less than 20 hectares of grape vines.

## Farm financial performance

Farm cash incomes of wine grape farms rose from 2006–07 to 2011–12 before falling in 2012–13 in response to lower grape production. An increase in production contributed to slightly higher average farm cash incomes in 2013–14 and 2014–15. Some grape growers reported low incomes and low farm business equity ratios in each year. These farms are likely to face the greatest short-term financial pressures, including debt servicing difficulties. Most were growers with less than 20 hectares of vines.

## Water use and technology

Grape crops in many areas of the Basin require regular irrigation because of the warm and relatively dry climate. From 2006–07 to 2014–15 the average volume of water used on wine grape farms mostly increased. This increase was mainly a result of an increase in average farm size; the trend in average water application rates per hectare was relatively flat. The proportion of grape farms using drip/trickle irrigation technologies has increased.

## Water trading

Water trading has provided grape growers with greater flexibility in managing their water use. Water trading allows grape growers to source additional water in response to prevailing seasonal conditions, particularly over the critical November to January period.

The number of grape growers trading temporary water allocations varied from year to year. The years with the highest proportions of net buyers were 2007–08 and 2008–09, while 2013–14 had the highest proportion of net sellers. The market for permanent water access entitlements has also provided irrigators with a tool for managing their farm businesses. Some grape growers sold all or part of their entitlements to the government and used part of the proceeds to reduce farm debt.

# Introduction

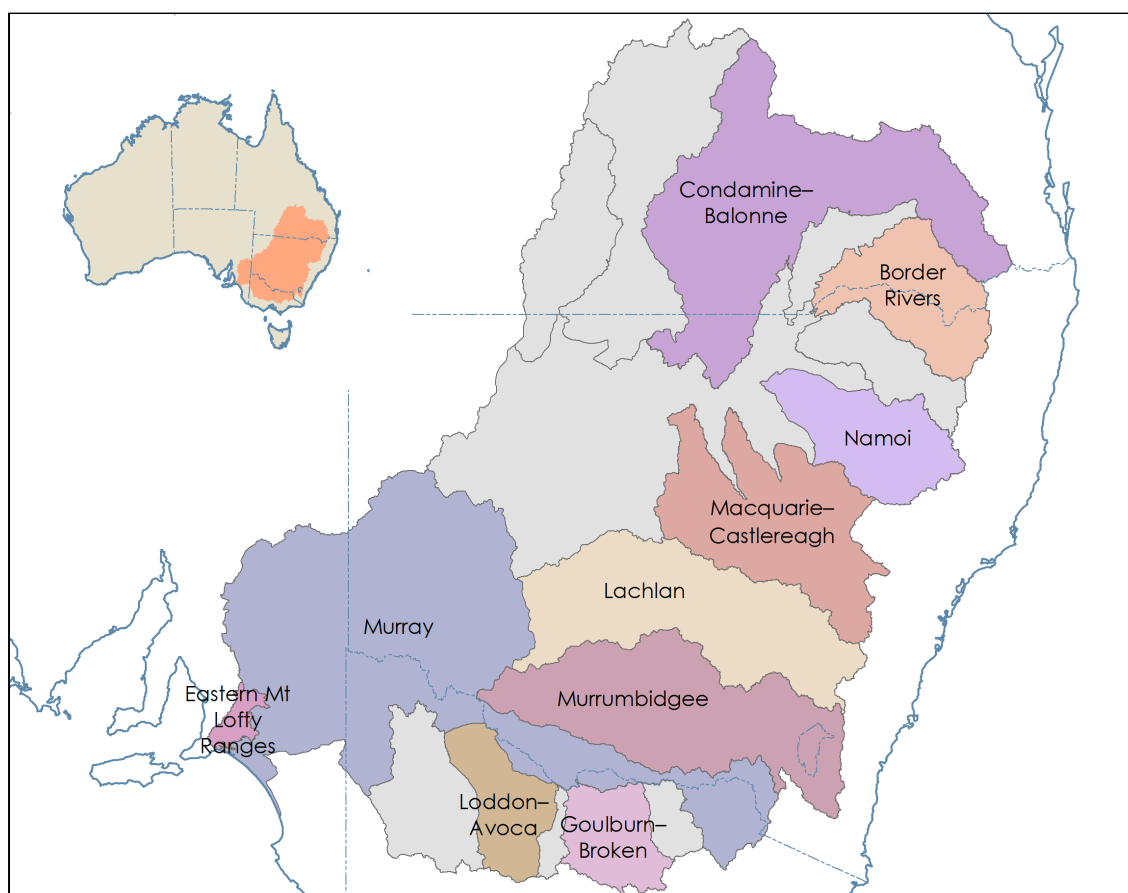
ABARES has conducted surveys of irrigation farms in selected industries and regions in the Murray–Darling Basin since 2006–07. The Murray–Darling Basin Irrigation Survey (MDBIS) provides broad information on the economic performance of farm business units in the Basin’s irrigated rural sector. The Murray–Darling Basin Authority (MDBA) funded the MDBIS for 2012–13 and 2013–14.

The MDBA is gathering information to better understand and assess the effect of Murray–Darling Basin Plan water reforms on Basin industries and communities. ABARES irrigation farm data will assist the MDBA with its assessments. Changing commodity prices, costs of farm inputs, and varying seasonal conditions and irrigation water availability are also important drivers of annual changes in farm incomes.

ABARES has prepared a series of reports based on MDBIS data for the major irrigated agricultural industries (cotton, dairy, horticulture, rice and wine grapes). This report focuses on wine grape farms in the Murrumbidgee, Murray and, to a lesser extent, Goulburn–Broken regions in the southern Murray–Darling Basin (Map 1). These three regions are a subset of the CSIRO regions in its Murray–Darling Basin Sustainable Yields Project (CSIRO 2007). See Box 1 for a brief explanation of ABARES survey methodology.

The MDBA and ABARES held workshops with wine grape growers at Mildura and Dareton in August 2015 to discuss the survey results and other important issues.

**Map 1 Reporting regions, Murray–Darling Basin**



Source: ABARES

### Box 1 Survey methodology

The ABARES survey of irrigation farms in the Murray–Darling Basin included irrigated wine grape growing farms in the Murrumbidgee, Murray and Goulburn–Broken regions. Farm financial and physical information collected included land area and value, crop and livestock production and sales, irrigation water use by crop and pasture, irrigation water delivery methods, farm receipts and costs, labour use, debts and assets, and market values of farm capital.

ABARES surveys are designed and samples selected on the basis of a framework drawn from the Australian Business Register, which is maintained by the Australian Bureau of Statistics. To be eligible for this survey, farms had to have engaged in irrigated agricultural activities during the survey year, had an estimated value of agricultural operations of \$40 000 or more and be defined as broadacre, dairy or horticulture industry farms.

Farm-level estimates published by ABARES are calculated by weighting the data collected from each sample farm and then using that data to calculate population estimates. Further information on ABARES farm survey methodology can be found on the [ABARES Surveys web page](#).

Some changes in farm businesses occur relatively quickly in response to movements in commodity prices, farm input prices, seasonal conditions and other factors. Other changes occur slowly because of past investment decisions, the fixed nature of many farm assets and the length of time for a return on new investments. It is therefore important to consider the full range of factors affecting an industry when considering the impacts of water policy reforms.

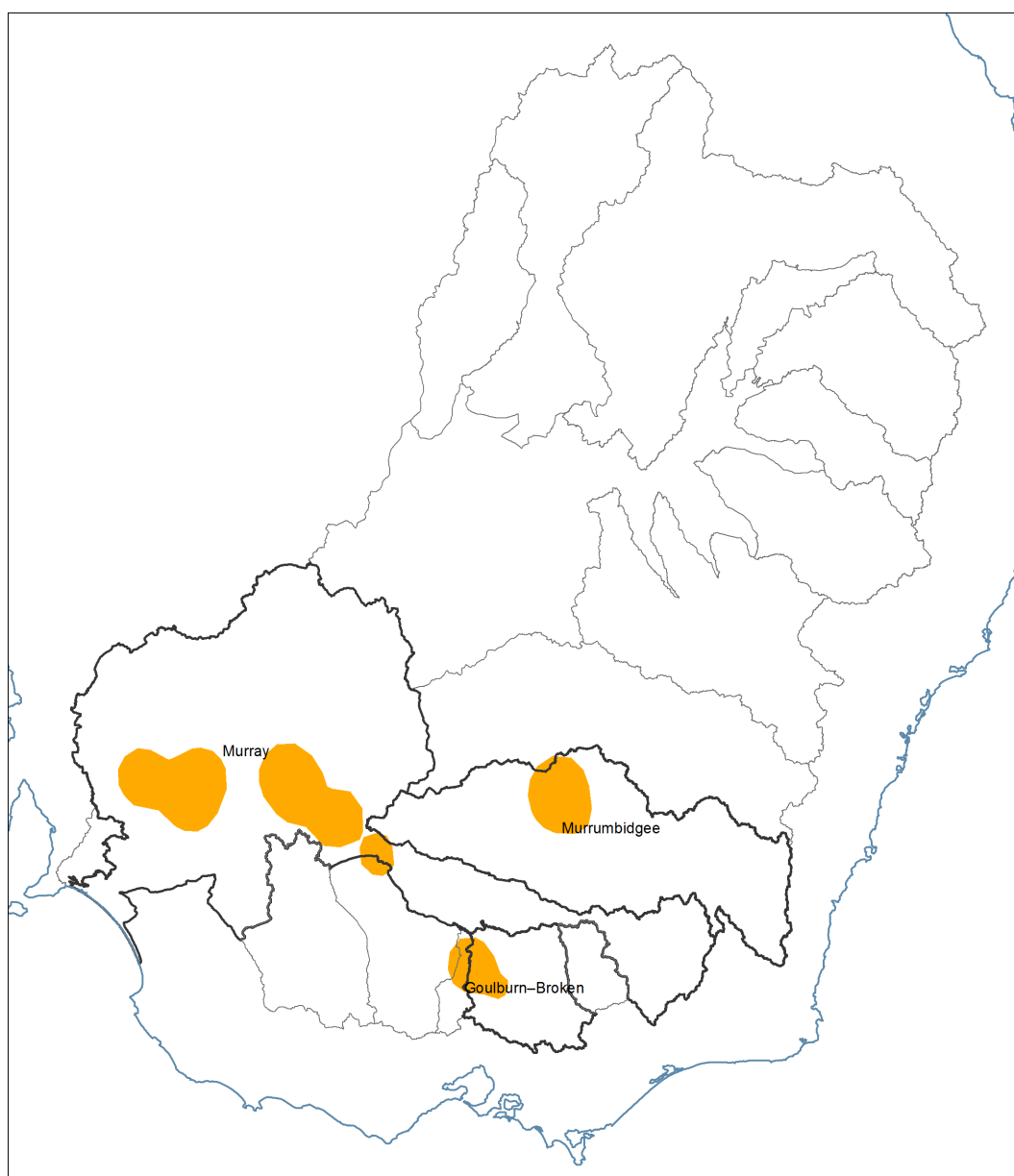
Water policy reform has included reducing barriers to water trade, changing pricing for water storage and delivery, funding for more efficient irrigation and water infrastructure, purchasing by government of permanent water entitlements and implementing the Murray–Darling Basin Plan. This report provides data on the economic performance of wine grape farms and includes data on participation in water trading and use of irrigation technologies.

# 1 Wine grape production in the Murray–Darling Basin

The Murray–Darling Basin accounts for around 75 per cent of Australia’s total irrigated grape production (MDBA 2015). More than 60 per cent of Australia’s total grapevine area is in the Basin, and grapes contributed an estimated 12 per cent of the total gross value of irrigated agricultural production (GVIAP) in the Basin in 2012–13 (ABS 2015a, b).

Grape growing occurs in many areas in the Murray–Darling Basin but production is concentrated in southern Basin areas along the Murray River in New South Wales, Victoria and South Australia and in the Riverina district of New South Wales (Map 2). Around 90 per cent of grapes grown in the Basin are used for making wine rather than for drying or fresh fruit.

**Map 2 Wine grape farm survey areas, 2012–13 to 2013–14, Murray–Darling Basin**



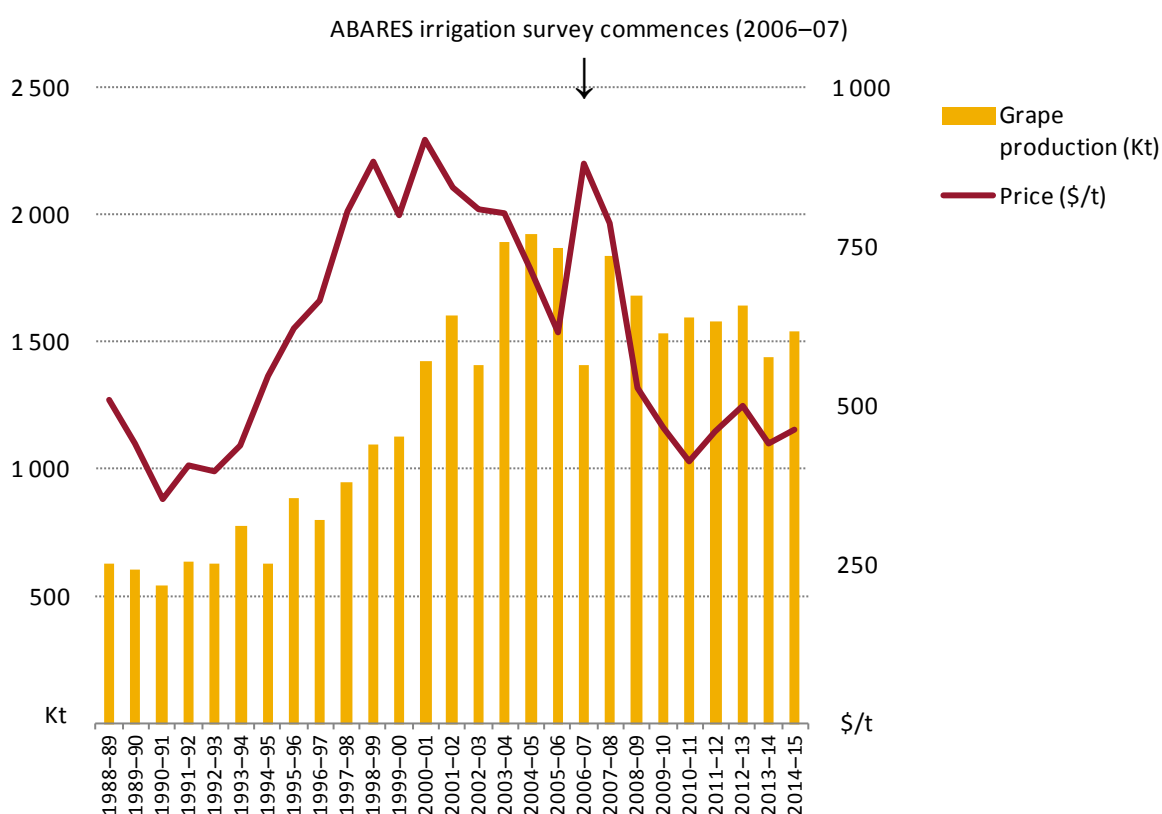
Source: ABARES



Griffith, Mildura and Loxton–Waikerie are import grape growing centres in the region. Wine grape production, wine making and wine tourism generate significant income and employment opportunities in regional economies throughout the Basin (Department of Agriculture and Water Resources 2015).

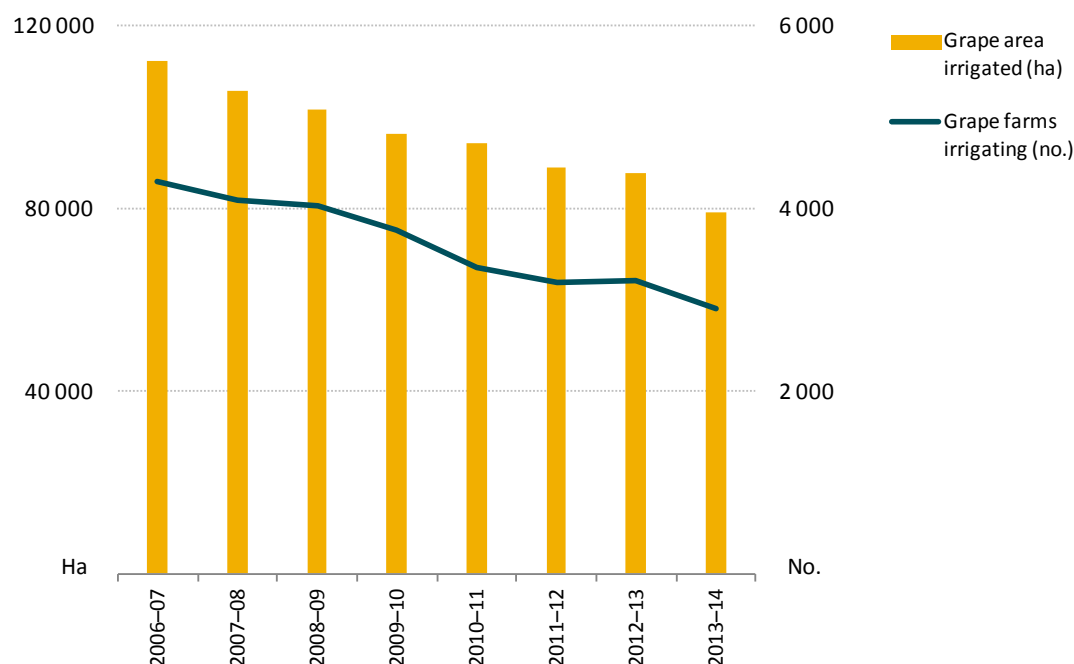
Wine grape production in Australia increased rapidly between 1992–93 and 2004–05 primarily driven by strong demand for Australian wine in export markets (Figure 1). Production peaked in 2004–05 at 1.94 million tonnes (Caboche et al. 2013). However, since 2001 wine grape prices have been generally trending downwards with increased competition in export markets and reduced demand for Australian wine (AGWA 2015; Caboche et al. 2013).

**Figure 1 Grape production and price, Australia, 1988–89 to 2014–15**



Source: ABARES 2015, 2014

Between 2006–07 and 2013–14, the number of irrigation grape farm businesses in the Basin declined by around 40 per cent (Figure 2). Many farmers that exited the industry were those with less than 20 hectares of grape vines. Total irrigated grapevine area fell by around 25 per cent (ABS 2015b). A comparatively higher rate of decline in farm numbers relative to grape area resulted in an increase in average grapevine area per farm.

**Figure 2 Grape area irrigated and grape farm businesses, Murray–Darling Basin, 2006–07 to 2013–14**

Source: ABS 2015b

ABARES first surveyed irrigation farms in the Murray–Darling Basin in 2006–07, a year of relatively high prices and low production (Figure 1). Australian grape production had fallen by almost a quarter from the previous year, which was attributed to a combination of drought, frosts and bushfire smoke taint (WFA 2007). It was also the sixth consecutive year of extreme drought, particularly in the southern Basin (MDBC 2007). In 2006–07 total inflows to the Murray system fell to a record low and subsequently water allocations also fell to record lows (MDBC 2007).

Wine grape prices fell each year from 2006–07 to 2010–11 and thereafter fluctuated at only moderately improved levels. Drought and associated low water allocations continued until seasonal conditions generally improved across the Basin in 2009–10. Seasonal conditions remained mostly favourable until 2012–13, when a return to drier conditions meant most of the Basin received below average rainfall. A moderate improvement in seasonal conditions in 2013–14 was followed by drier conditions again in 2014–15 in the southern Basin.

Australian wine producing areas are often categorised as either warm or cool climate zones. Wine Australia (2015) use geographical indications (GI) to classify wine zones—GIs identify wines as originating in a region or locality. Most wine grape production in the Basin occurs in warm zones, with the three largest zones (Wine Australia GIs Big Rivers, North West Victoria and Lower Murray) accounting for 67 per cent of Australia’s total wine grape production in 2011–12 (Caboche et al. 2013).

The ABARES survey regions for grape growers (the Murrumbidgee, Murray and Goulburn–Broken) mostly fall within the GI zones of Big Rivers, North West Victoria and Lower Murray. Grape production in warm climate zones relies on irrigation water. Crop yields are higher than in cool climate regions, but grape quality is usually lower. Therefore, warm region grape prices are also usually lower (Gunning-Trant & Shafron 2014).

## 2 Farm financial performance

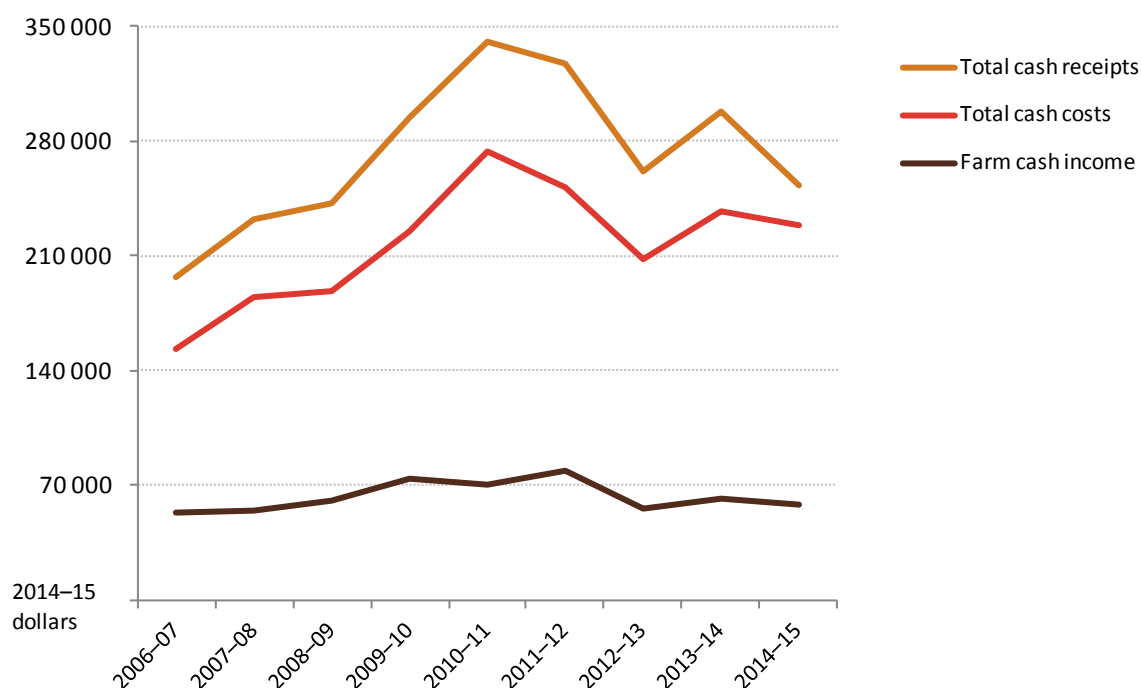
Farm financial performance is a key driver of change in the structure of the grape growing industry. The two main measures of farm financial performance used in this report are farm cash income and rate of return.

Farm cash income is defined as total cash receipts minus total cash costs. It is a short-term measure of the cash surplus available to a farm business for reinvestment or drawing family income after costs have been taken into account. Total cash receipts are the cash revenues received by a grape farm business. In most cases, sales of grapes and other horticultural crops are the largest receipt items. Other (usually minor) items include allocation water sales, contracting and government assistance payments.

Total cash costs are payments made for materials and services and include administration costs, crop-related expenses, interest and permanent and casual labour. Capital and household expenditures are not included in total cash costs. Detailed definitions of terms used in ABARES surveys appear in the glossary.

Average total cash receipts (in 2014–15 dollars) of wine grape farms in the Murray–Darling Basin increased from 2006–07 to 2010–11. They were lower thereafter but still at least 29 per cent higher than in 2006–07 (Figure 3). Average total cash costs trended similarly to receipts, meaning that average farm cash income was comparatively steady from 2006–07 to 2014–15.

**Figure 3 Farm cash income, wine grape farms, Murray–Darling Basin, 2006–07 to 2014–15 average per farm**



Note: 2014–15 data are provisional estimates.

Source: Murray–Darling Basin Irrigation Survey

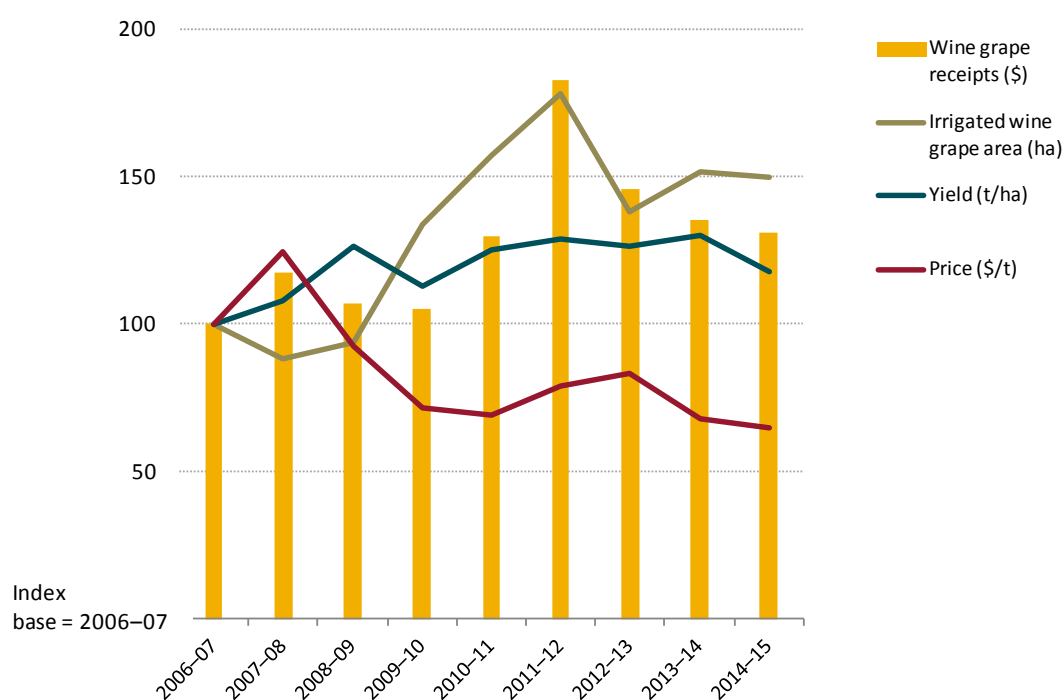
When expressed as an average of all survey years, grape growers received 84 per cent of average total cash receipts from perennial horticulture crops, with most (60 per cent) generated from

wine grapes. An average of 6 per cent of total cash receipts were derived from broadacre crops, indicating moderate diversification on some grape farms. Other receipt items such as off-farm contracting and temporary water sales made up the remaining contribution to average total cash receipts. The average off-farm income was almost \$40 000 a farm over that period.

Total cash costs for hired labour and contract labour averaged 13 per cent each for all survey years. These categories made up the two highest proportions of total cash costs. Interest, repairs and maintenance and water costs (including temporary water purchases) each made up around 10 per cent of total average cash costs.

Figure 4 shows indexes of average receipts from grape sales, irrigated grape area, grape yields and grape prices from 2006–07 to 2014–15. Average grape prices were around 20 to 30 per cent lower than 2006–07 in every year except 2007–08. Both average grape yields and average area irrigated per farm increased relative to 2006–07.

**Figure 4 Indexes for selected variables, wine grape farms, Murray–Darling Basin, 2006–07 to 2014–15**

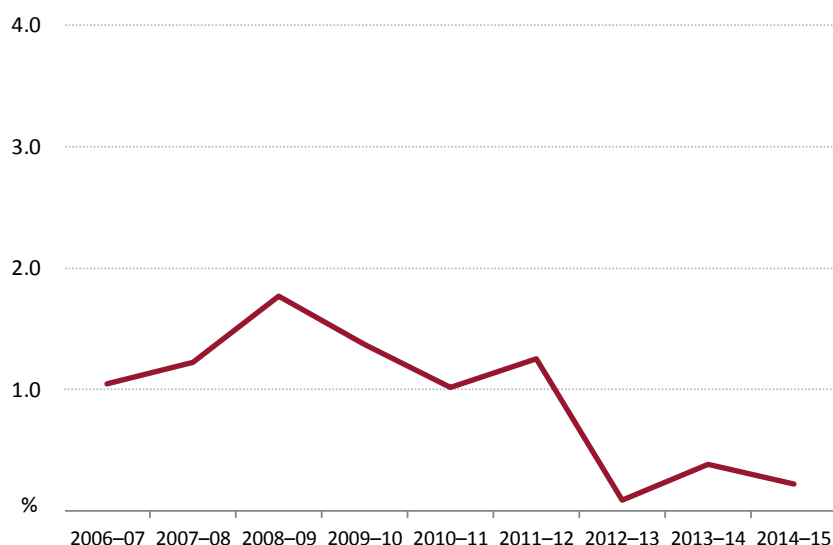


Note: 2014–15 data are provisional estimates.

Source: Murray–Darling Basin Irrigation Survey

Figure 5 shows average rate of return to capital (excluding capital appreciation) for grape growers. Rate of return is a measure of the annual profit generated by a business expressed as a percentage of the value of the capital used to generate that profit (see the glossary for ABARES survey definitions). Rate of return for wine grape farms can be compared with other investments or potential uses of farm capital (for example, other farm types, superannuation schemes, bank deposits) because it is expressed as a ratio. Average rate of return to capital for wine grape growers in the Basin has mostly trended downwards since 2006–07. The average rate of return for all survey years was around 1 per cent but has been considerably less than this in the period since 2012–13.

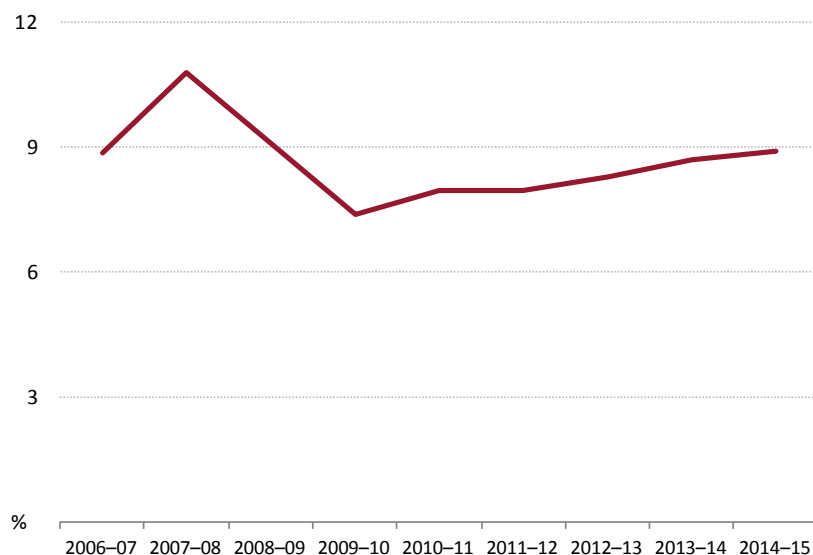
**Figure 5 Rate of return, wine grape farms, Murray–Darling Basin, 2006–07 to 2014–15**  
average per farm



Note: 2014–15 data are provisional estimates. Rate of return excludes capital appreciation.  
Source: Murray–Darling Basin Irrigation Survey

Farmers' ability to service debts from their revenue stream is an important aspect of farm viability. Figure 6 shows the ratio of interest payments to total farm cash receipts (debt servicing ratio). The ratio averaged around 8 per cent from 2009–10 to 2014–15 as average debt relative to total farm cash receipts remained relatively steady.

**Figure 6 Debt servicing ratio, wine grape farms, Murray–Darling Basin, 2006–07 to 2014–15**  
average per farm



Note: Debt servicing ratio is ratio of interest payments to total cash receipts. 2014–15 data are provisional estimates.  
Source: Murray–Darling Basin Irrigation Survey

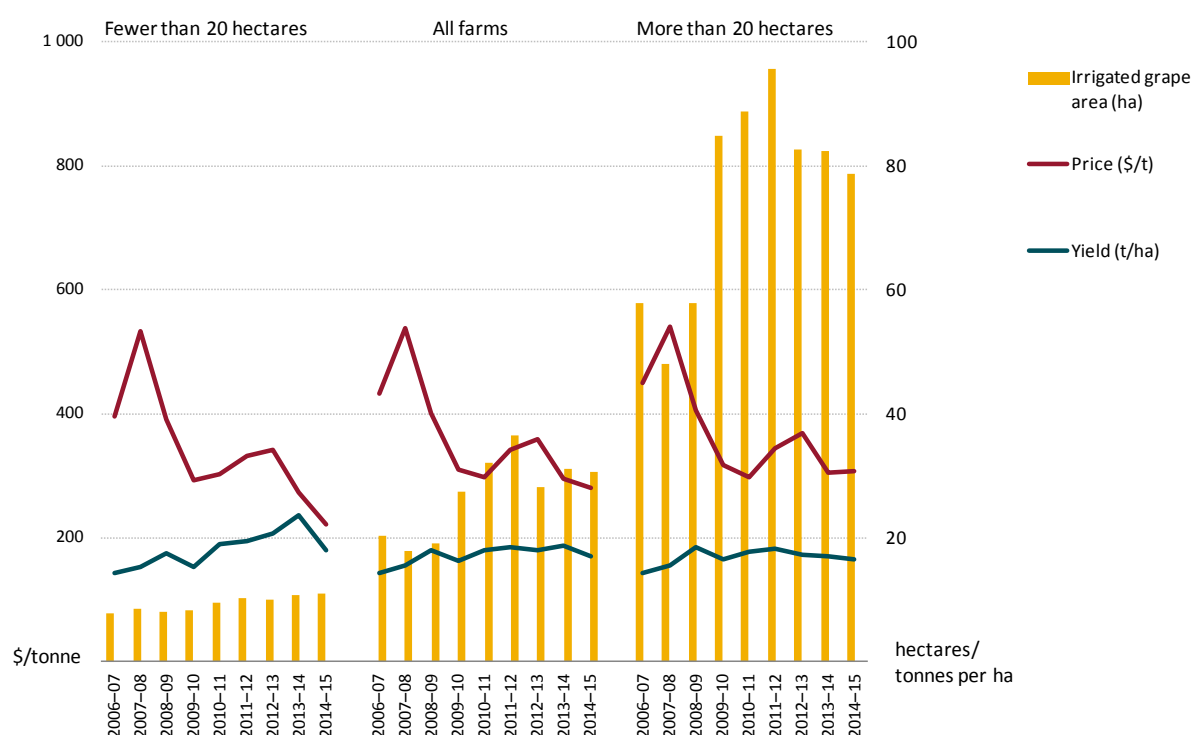
The area of vineyards across wine grape farms varies widely. In this report farms are allocated to one of two groups based on vineyard area to analyse differences between small and large farms (Figure 7). Small farms were defined as having fewer than 20 hectares of wine grape vines

and large farms as having more than 20 hectares of wine grape vines. In 2014–15 large farms (vineyard area more than 20 hectares) accounted for an estimated 29 per cent of the population of grape farms and 71 per cent of wine grape production in the southern Basin. Figure 7 also shows average areas, prices and yields for all farms and for small and large farms.

Average area irrigated by small farms was around 9 hectares. Over the survey period small farms recorded a slightly higher average crop yield per hectare than large farms but with greater annual variation. At the same time, large farms recorded a slightly higher average price than small farms.

**Figure 7 Irrigated areas, prices and yields by area, Murray–Darling Basin, 2006–07 to 2014–15**

average per farm



Note: 2014–15 data are provisional estimates.

Source: Murray–Darling Basin Irrigation Survey

Both small and large farms generated more than 80 per cent of total cash receipts from sales of grapes and other perennial horticulture crops, but small farms were less reliant on wine grapes than large farms. Large farms generated a significantly higher proportion of total receipts from wine grapes than the small farms group. Receipts from wine grape sales contributed 46 per cent of total farm cash receipts for growers with less than 20 hectares of vines and 69 per cent for those with more than 20 hectares (average of all survey years) (Figure 8).

**Figure 8 Major receipt components by area, Murray–Darling Basin, 2006–07 to 2014–15**  
average per farm



Note: 2014–15 data are provisional estimates.

Source: Murray–Darling Basin Irrigation Survey

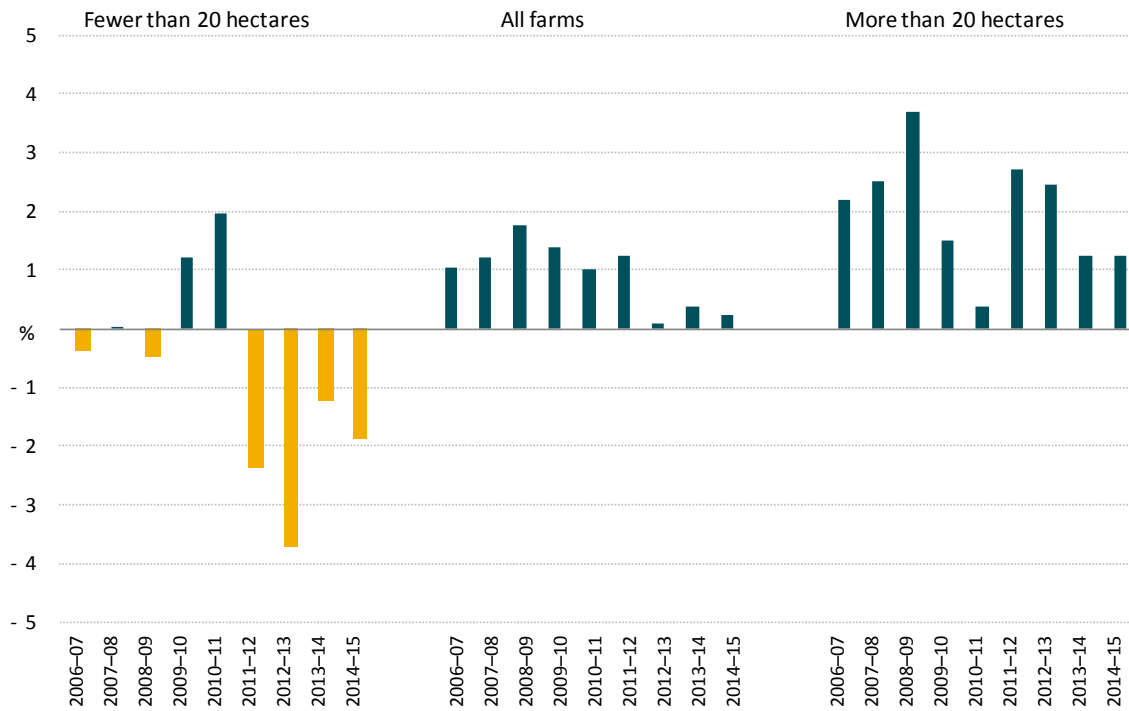
Some grape growers reported farm incomes of less than \$50 000 and farm business equity ratios of less than 70 per cent in each year. These farms are likely to face the greatest short-term financial pressures, including debt servicing difficulties. In 2014–15 around 20 per cent of grape growers with less than 20 hectares of vines had both low incomes and low equity compared with 5 per cent of the larger growers.

Most irrigated grape growers in the southern Murray–Darling Basin (90 per cent of small farms and 56 per cent of large farms) reported some form of off-farm income. Forty-six per cent of grape growers obtained more than 50 per cent of total family income (defined as farm cash income plus off-farm wages/salaries and other non-farm income) from off-farm sources. Most were growers with less than 20 hectares of vines.

Average rates of return (excluding capital appreciation) for small farms were mostly lower than for all farms and large farms (Figure 9). Small farms recorded an average return of –0.7 per cent over all survey years. Large farms recorded 2 per cent and the average for all farms was around 1 per cent.

**Figure 9 Rate of return by area, Murray–Darling Basin, 2006–07 to 2014–15**

average per farm



Note: 2014–15 data are provisional estimates.

Source: Murray–Darling Basin Irrigation Survey



### 3 Water use and technology

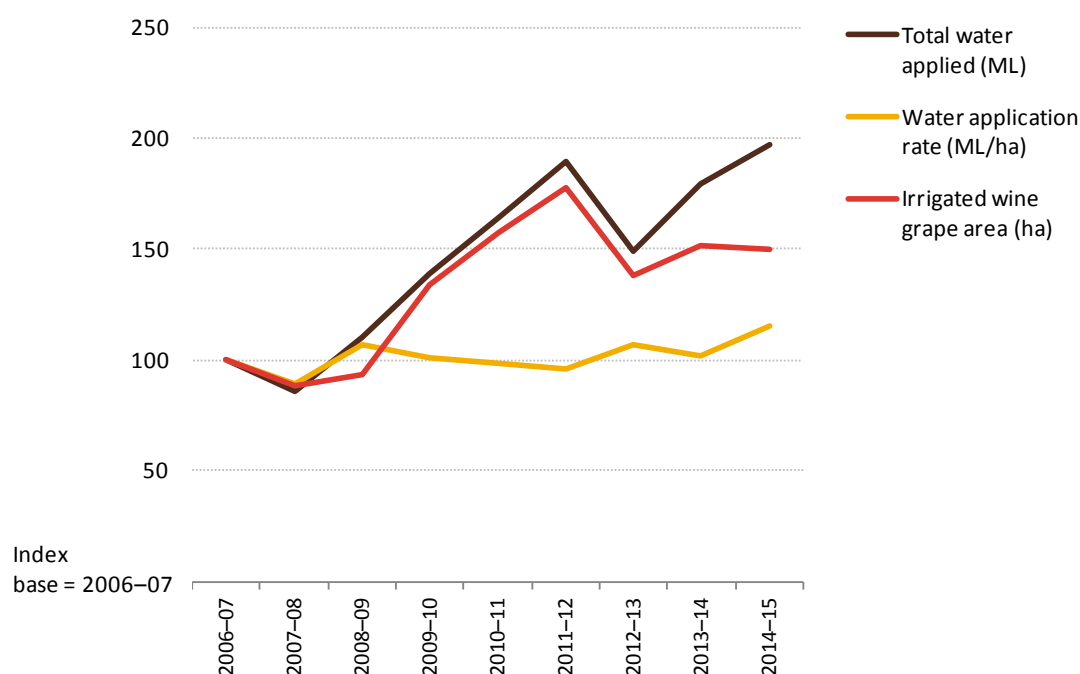
Grape growers in the Murray–Darling Basin usually rely on irrigation water to supplement rainfall. The average volume of water used by grape growers in an irrigation season depends on allocations, price of water on the temporary market and seasonal conditions (that is, evapotranspiration and rainfall). ‘Allocation water’ is the volume of water that is actually made available to an irrigator in a given year and is usually expressed as a percentage of that irrigator’s water access entitlement. A ‘water access entitlement’ is a legal right (sometimes referred to as a permanent right) to a specified volume of water under conditions stipulated by an irrigation water management authority. Allocation water can be used or traded and water access entitlements can also be bought and sold.

Prevailing seasonal conditions and market prices over summer can significantly influence grape growers’ total water use because the November to January period is critical for grape production in the Basin. Rainfall was extremely low from 2006–07 to 2009–10 and resulted in low inflows to water storages. Water allocations to irrigators were reduced accordingly. As the drought worsened, many grape growers purchased temporary allocation water to maintain production or keep grapevines alive.

From 2006–07 to 2014–15 the average volume of irrigation water used by grape growers mostly increased (Figure 10). This was mainly the result of increases in average farm size, because average water application rates per hectare followed a relatively flat trend.

**Figure 10 Indexes of water applied, application rate and grape area, wine grape farms, Murray–Darling Basin, 2006–07 to 2014–15**

average per farm



Note: 2014–15 data are provisional estimates.

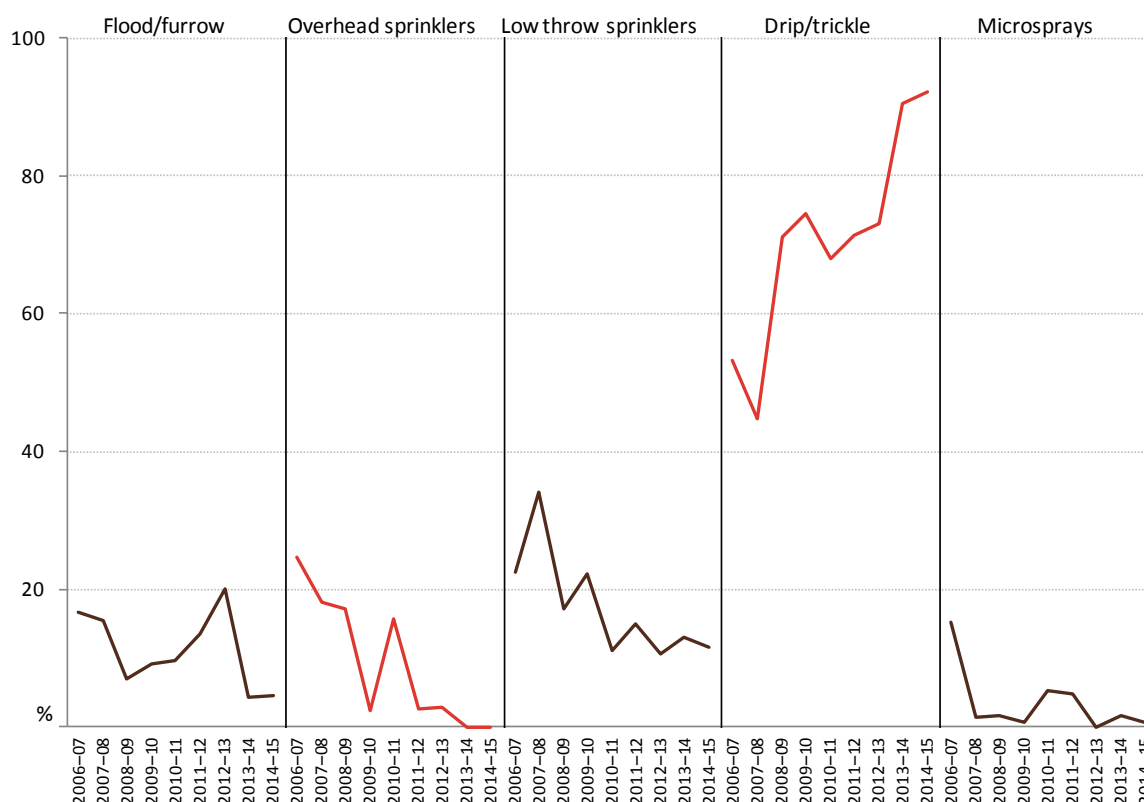
Source: Murray–Darling Basin Irrigation Survey

Drip/trickle systems were the most common method of applying irrigation water to grapevines (Figure 11). The proportion of wine grape farms using drip/trickle systems mostly trended upwards over the survey period.

The increasing use of drip/trickle irrigation does not appear to have coincided with reduced water application rates. Growers at the MDBA–ABARES workshops suggested that water application rates may not have declined because more frequent watering is required with drip/trickle system irrigation and grapevines require a minimum volume of water each year irrespective of application method.

**Figure 11 Main irrigation technologies used, wine grape farms, Murray–Darling Basin, 2006–07 to 2014–15**

proportion of farms



Note: 2014–15 data are provisional estimates.

Source: Murray–Darling Basin Irrigation Survey

## 4 Water trading

The southern Murray–Darling Basin is Australia’s main water market. In 2012–13 the Basin accounted for around 94 per cent of the total volume of permanent entitlement and allocation trade in Australia (NWC 2014). The southern Basin contains several hydrologically connected water systems, which cross the borders of New South Wales, Victoria and South Australia. The southern Basin has around 80 per cent of the Basin’s total water storage capacity and interstate trading is possible, so it accounts for more than 80 per cent of total Basin trade (BOM 2011; NWC 2014).

Water policy reform in Australia has driven growth in both the number of irrigators participating in water markets and the total volume of water traded each year relative to total entitlements. New entrants to the southern Murray–Darling Basin water market—using water for agricultural and non-agricultural purposes—are competing for a reduced pool of water. This has affected market prices and the amount of water available for grape growers.

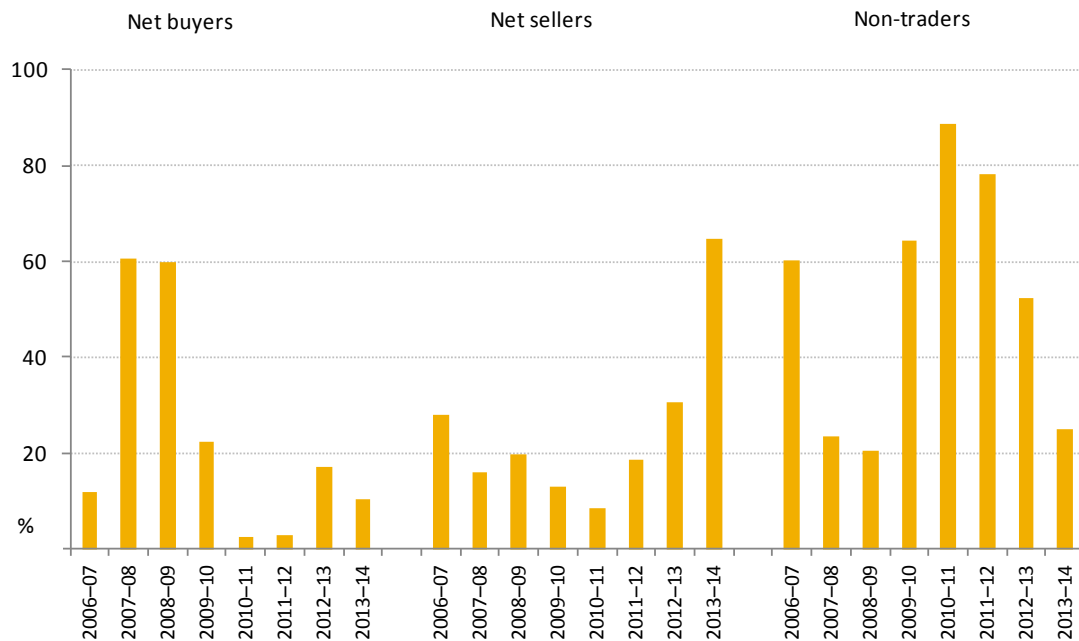
Water trading has provided wine grape growers with greater flexibility in managing their water use and consequently their farm business outcomes. The survey results show that water trading allowed some grape growers to purchase water to maintain grape production during the drought. Other growers reduced crop production and sold surplus water allocations. Grape growers in the Victorian and SA parts of the Murray region, and in the Goulburn–Broken region, were major purchasers of allocations and entitlements during the drought (NWC 2014). Grape growers in the Murrumbidgee and NSW parts of the Murray region were among sellers of allocations and entitlements because they had higher security entitlements and had removed unproductive crops. This enabled them to make more water available for sale.

Estimated numbers of surveyed grape farms trading water allocations varied from year to year from 2006–07 to 2013–14 (Figure 12). Around 60 per cent of grape growers bought temporary water in 2007–08 and 2008–09 in response to low water allocations and severe drought, to keep grape vines alive and water crops at critical times of the growing season.

The proportion of grape growers buying water declined from 2009–10 to 2011–12 as seasonal conditions improved, but increasingly dry seasonal conditions in 2012–13 and 2013–14 resulted in an increase in the proportion of growers buying water. Part of this increase was the result of some growers having sold entitlements to the government or other irrigators.

The number of grape growers selling water fluctuated over the survey period. A large proportion of growers did not trade water, except in 2007–08, 2009–10 and 2013–14.

**Figure 12 Percentage of wine grape farms by water allocation trading activity, Murray–Darling Basin, 2006–07 to 2013–14**



Note: Net buyers/sellers are farms that bought/sold more water than they sold/bought.

Source: Murray–Darling Basin Irrigation Survey

Figure 13 shows the proportion of total available water purchased by net buyers and sold by net sellers. From 2006–07 to 2013–14 net buyers purchased, on average, around 40 per cent of their total water used. Net sellers sold an average of 38 per cent of their total available water.

**Figure 13 Water traded as percentage of water available by trading group, Murray–Darling Basin, 2006–07 to 2013–14**

average per farm



Note: Net buyers/sellers are farms that bought/sold more water than they sold/bought.

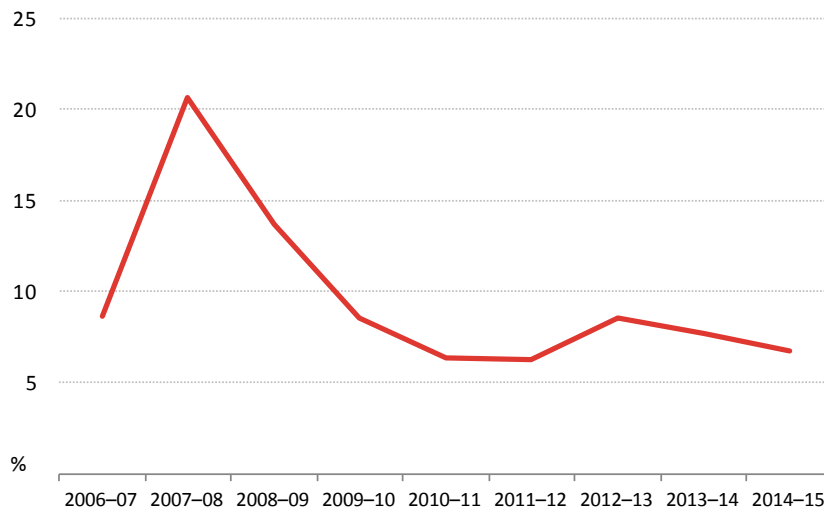
Source: Murray–Darling Basin Irrigation Survey

Purchases of seasonal water allocations as a proportion of total cash costs reached a high of 21 per cent in 2007–08 (Figure 14) largely because of high water prices. They fluctuated at around 8 per cent from 2009–10 to 2014–15.

The market for permanent water access entitlements has also provided irrigators with a tool for managing their farm businesses. Around 5 per cent of grape growers on average sold part or all of their permanent water access entitlements each year. This ranged from a low of 1 per cent in 2006–07 to 9 per cent in 2011–12 (Figure 15).

**Figure 14 Temporary water costs as a proportion of total cash costs, wine grape farms, Murray–Darling Basin, 2006–07 to 2014–15**

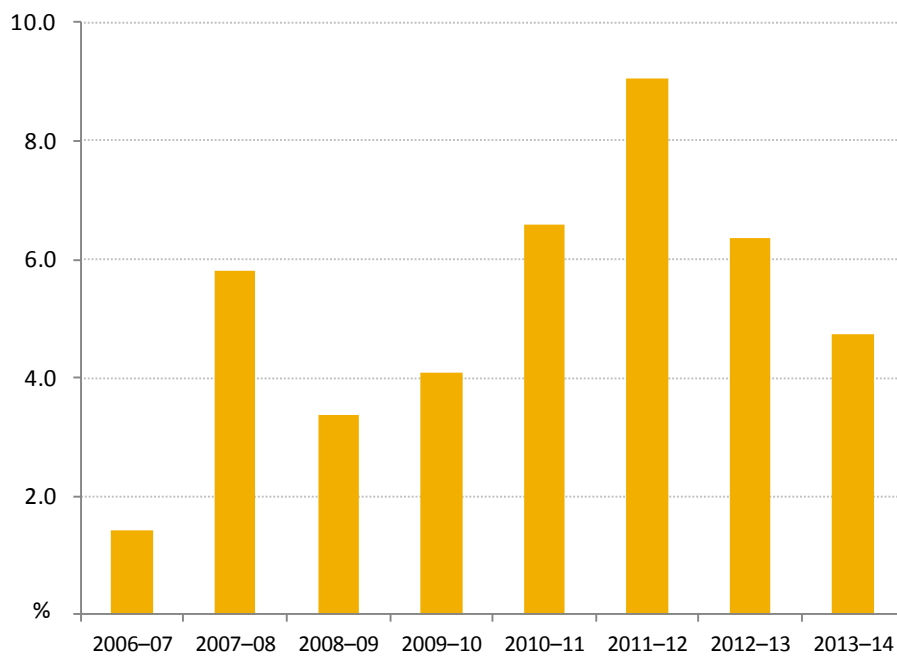
average per farm



Note: 2014–15 data are provisional estimates.

Source: Murray–Darling Basin Irrigation Survey

**Figure 15 Percentage of grape growers selling permanent water entitlements, Murray–Darling Basin, 2006–07 to 2013–14**



Source: Murray–Darling Basin Irrigation Survey

# Glossary

Term	Definition
Area of land at business premises	Includes all land operated by the business, whether owned or rented.
Capital	Value of capital employed by the business is market value of all 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. Included market value of land and fixed improvements used by the business but excluded value of the owner–manager’s house. House value deducted from total value of land and fixed improvements was the present day replacement cost, depreciated for age.
Debt	Estimated as business debt. 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.
Depreciation	Estimated by applying diminishing value depreciation method to market value of capital items at 30 June. Capital items are categorised into several groups and relevant depreciation rates are applied. 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.
Equity ratio	Calculated as business equity as a percentage of owned capital at 30 June.
Farm business profit	Cash operating surplus plus build-up in trading stocks, less depreciation, less the imputed value of the owner–manager, partners and family labour.
Hired labour	Excludes owner–manager, partners and family labour, and work undertaken by contractors. Expenditure on contract services appears as a cash cost.
Imputed labour cost	Payments for owner–manager and family labour may bear little relationship to 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 Pastoral Award 2010 rates.
Labour	Measured in work weeks, as estimated by the owner–manager. Includes all work on the business by the owner–manager, partners, family and hired permanent and casual workers but excludes work done by contractors.
Off-farm income	Income not derived from the surveyed farm business. Includes all off-farm income from wages and salaries, other businesses, other investments and Commonwealth social support payments. Estimated for owner–manager and spouse only.
Owner–manager	Primary decision-maker for the business. This person is identified by discussion between interviewer and interviewee as (one of) the key decision-maker(s). Primary decision-maker usually responsible for day-to-day operation of business and may own or have a share in the business.
Profit at full equity	Return to capital and management plus interest, rent and finance lease payments. It is the return produced by all resources used in the business.

Term	Definition
Rate of return	Return to all capital used. Computed by expressing farm business profit as a percentage of total opening capital of the business.
Total cash costs	Payments made by business for materials and services and for permanent and casual hired labour (excluding partner and other family labour). Includes 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 and levies 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.
Total cash receipts	Total of revenues received by the business during the financial year, including revenues from sale of crops, livestock and livestock products. Includes revenue received from royalties, rebates, refunds, plant hire, contracts, insurance claims and compensation, and government assistance payments.



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