

Water and the Murray Darling Basin - A Statistical Profile

Australia

2000–01 to 2005-06

**Chapter 4 — Agriculture in the
Murray-Darling Basin**

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INTRODUCTION

The previous chapter provided details of water use by various industries, with a strong focus on agricultural water use. This chapter discusses other aspects of agricultural activity in the Murray-Darling Basin (MDB).

The chapter covers the following topics:

- the importance of agriculture in the MDB for Australia's food production;
- changes in Exceptional Circumstances declared areas over time;
- production of selected crops, and changes over time;
- irrigated and non-irrigated agriculture in the MDB;
- the location of irrigated production in the MDB; and
- the economic contribution of irrigated and total agricultural production.

Most of the data in this chapter are from the ABS Agricultural Censuses for 2000–01 and 2005–06 which collected information from Australian farmers on the areas and production of agricultural commodities. Additional information for this chapter is drawn from the ABS Apples and Pears Surveys of 2000–01 and 2005–06, and the ABS Vineyards Surveys of 2000–01 and 2005–06. Information for Exceptional Circumstances declared areas has been provided by the Australian Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF), and from the Bureau of Rural Sciences (BRS).

OVERVIEW

Agriculture is an important industry in the MDB, using 84% of the Basin's land in 2005–06 (see table 1.4 in Chapter 1). Moreover, 88.8 million hectares (ha) or 20% of Australia's agricultural land use occurred within the MDB (table 4.1). Approximately \$15 billion of Australia's total value of agricultural commodities were produced in the MDB. This represented 39% of the Australian value of agricultural commodity production. Of the Basin states, New South Wales made the most significant agricultural contribution, with 51.2 million ha or 58% of the Basin's agricultural land, and almost half (49%) of the farms in 2005–06.

OVERVIEW *continued***4.1** NUMBER OF FARMS AND AGRICULTURAL AREA—At 30 June 2006

	FARMS		AGRICULTURAL AREA	
	Number	Proportion of Australian farms	Area	Proportion of Australian agricultural area
Murray-Darling Basin				
New South Wales	29 803	19	51 214	12
Victoria	18 496	12	7 593	2
Queensland	7 881	5	23 421	5
South Australia	4 753	3	6 555	2
Australian Capital Territory	99	—	45	—
Total(a)	61 033	39	88 828	20
Balance of Australia				
New South Wales	19 034	12	10 906	3
Victoria	18 650	12	4 721	1
Queensland	24 331	16	122 098	28
South Australia	11 702	8	48 854	11
Western Australia	14 526	9	98 653	23
Tasmania	4 745	3	1 739	—
Northern Territory	659	—	59 127	14
Total(a)	93 648	61	346 097	80
Australia	154 681	100	434 925	100

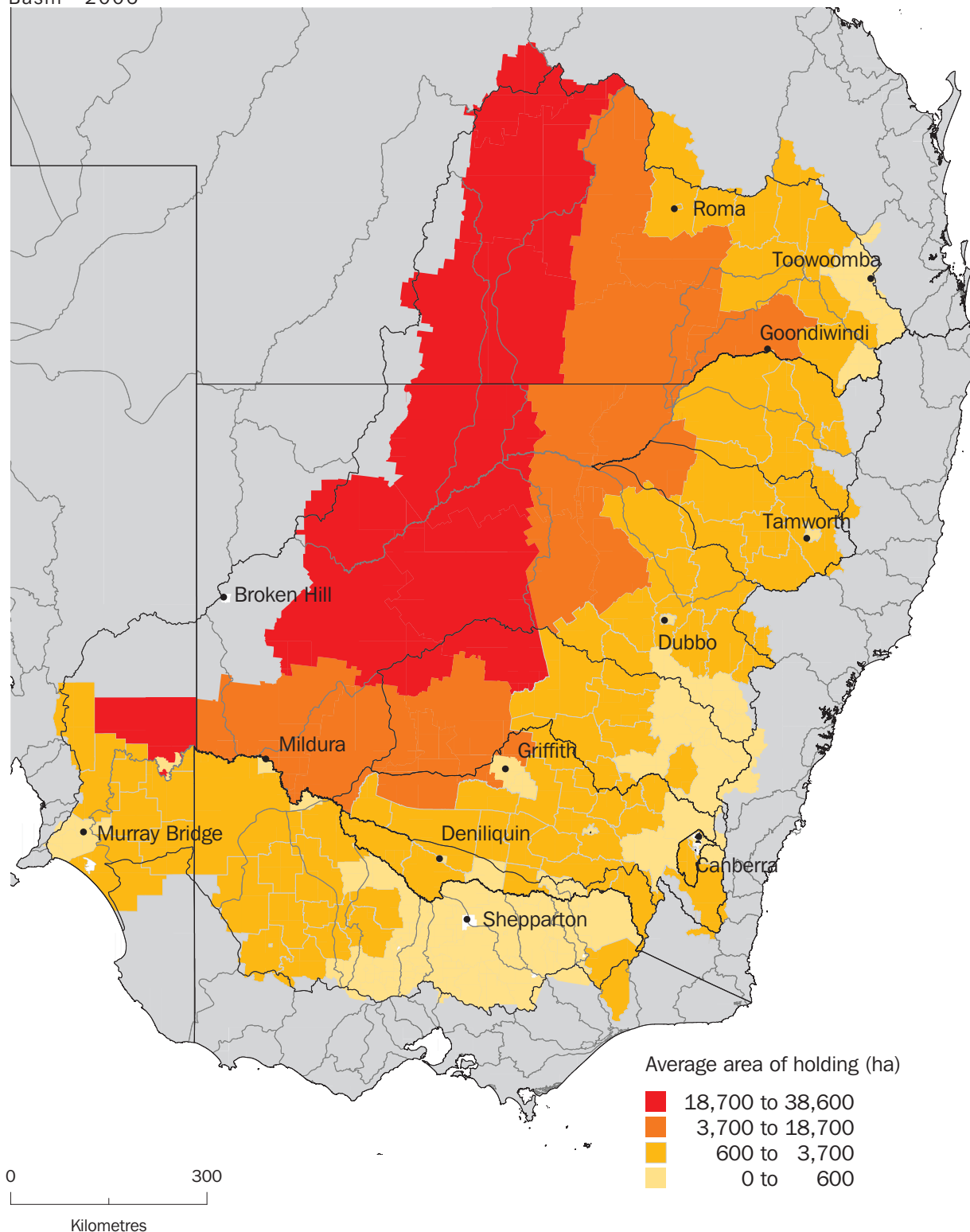
— nil or rounded to zero (including null cells)

(a) Components may not add to total due to rounding.

Source: Water Use on Australian Farms, 2005–06, ABS cat. no. 4618.0

Within the MDB, average farm size is smaller in Victoria than in the other states. Map 4.2 shows the average size of agricultural holdings across statistical local areas (SLAs) sourced from the Agricultural Census 2005–06. It illustrates that the largest farms are located in the north-west of the MDB and that farms generally have smaller areas in the south-eastern parts of the Basin.

4.2 AVERAGE AREA OF AGRICULTURAL HOLDING, by Statistical Local Area—Murray–Darling Basin—2006



Source: ABS data available on request, ABS Agricultural Census, 2005–06, Geoscience Australia 2004

IMPORTANCE OF AGRICULTURE

Australia is one of the world's major agricultural producers of grain, beef and dairy, and has large export markets for a range of other commodities including cotton, wool, wine, and other horticulture. Agriculture for food production is an important issue globally. Food shortages, a result of food consumption relative to its production, present an enormous challenge, with some 37 countries currently considered to be "in crisis, requiring external assistance" (FAO 2008). Various factors contribute to this situation. These include changes in climate and/or extreme weather events, changes in land use (e.g. reduced agricultural food production in favour of bio-fuel production and other uses), and general increases in world food prices.

The Australian Agriculture industry is subject to some of the factors listed above. The variable climate is particularly challenging and has prompted a range of policy responses by the Australian Government. An example is Australia's National Drought Policy which was developed in the early 1990s to phase out direct subsidisation and underwriting of drought. It aimed to:

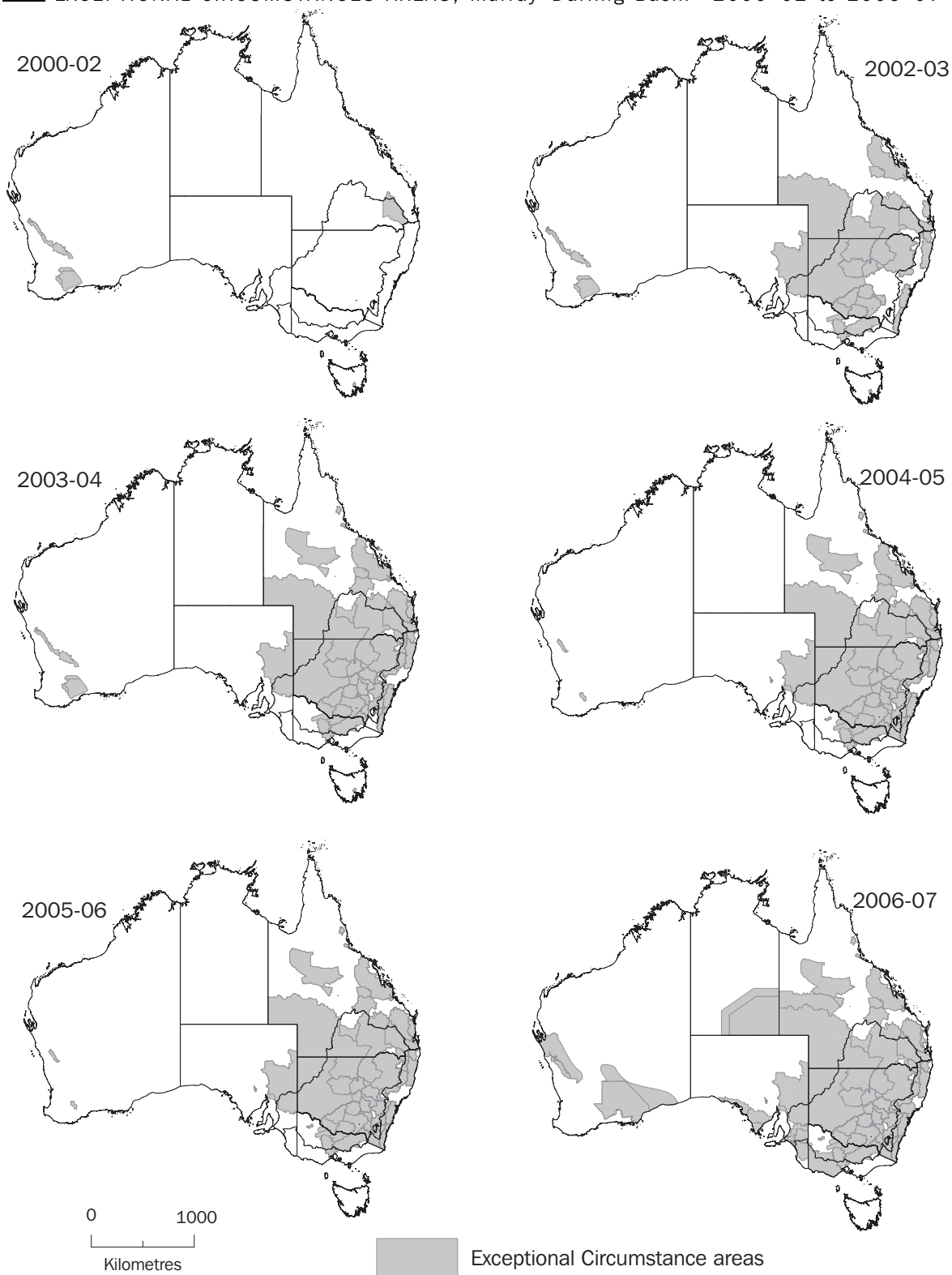
- encourage primary producers and other sections of rural Australia to be more self-reliant in managing climatic variability;
- maintain the agricultural and environmental resource base during periods of high climatic stress; and
- ensure the early recovery of agricultural and rural industries, consistent with long-term sustainable levels (DAFF 2007b).

DROUGHT AND EXCEPTIONAL CIRCUMSTANCES, 2000 TO 2007

Drought and Exceptional Circumstances policies have been initiated to mitigate the affects of rare and extreme events on agricultural production. Analysing the spatial distribution of Exceptional Circumstances (EC) declared areas from July 2000 to June 2007 across Australia provides insights into which Australian areas were affected by extreme events, how wide-spread the events (e.g. drought) were, and the time periods in which farmers required the most assistance to mitigate impacts of drought. For background to this policy refer to the Appendix.

The areas that were EC declared between July 1, 2000 and June 30, 2007 are shown in map 4.3. In the 2 year period from 2000 to 2002, all EC declared areas in Australia were located in Western Australia or within the MDB in south-eastern Queensland. During 2002–03 there were more new EC declared areas located within, and outside, the MDB than in any other year between July 2000 and June 2007. Between 2003–04 and 2006–07 some new areas were added while most EC declared areas maintained their status.

4.3 EXCEPTIONAL CIRCUMSTANCES AREAS, Murray–Darling Basin—2000–02 to 2006–07



Source: Commonwealth Department of Agriculture, Fisheries and Forestry, Bureau of Rural Sciences, Exceptional Circumstances History Database, Geosciences Australia 2004

AGRICULTURAL
PRODUCTION IN THE
MURRAY-DARLING BASIN

*Agriculture in the
Murray-Darling Basin,
2005–06*

The MDB is colloquially known as the nation's food bowl because of the volume of produce grown there, collectively generating a gross value of \$15 billion, or 39% of Australia's total value of agricultural production. For example, livestock (excluding dairy) contributed \$4 billion, cereals for grain (excluding rice) \$3 billion, and fruit and nuts \$1 billion (table 4.20). Although representing just 14% of Australia's total land area, the Basin contains 20% of Australia's agricultural land.

A variety of crops and pasture are grown in the MDB for food, fibre, and more recently bio-fuel for domestic consumption and export. These include:

- cereals (e.g. wheat, barley, rice, sorghum);
- cotton;
- legumes (e.g. field peas);
- fruit and nuts (e.g. apples, oranges, almonds);
- grapes;
- vegetables (e.g. tomatoes, onions);
- canola; and
- livestock fodder (e.g. pasture for grazing or hay/silage).

Growing crops and pasture through irrigation is more common in the MDB than elsewhere in Australia. Irrigated agricultural land is a relatively small proportion of total agricultural land throughout Australia (0.6%), however in the MDB, 2% of agricultural land is irrigated. The MDB accounted for 66% of Australia's agricultural water consumption in 2005–06 (table 3.1 in Chapter 3).

*Change in agricultural
production in the
Murray-Darling Basin from
2000–01 to 2005–06*

The change in agricultural production over time can be influenced by many factors. Climate, and more importantly rainfall, significantly impacts on farmers' ability to grow annual crops, or sustain existing plantings. Government policies also encourage or discourage the production of particular agricultural commodities (NWC 2008). They can also affect irrigated agricultural production through water licence buyback schemes (Wong 2008). Changes in commodity prices influence agricultural production by impacting on the amount of money farmers can afford to spend on farming inputs (such as water, fertiliser, fuel, labour) to increase production. New technologies can improve productivity and reduce the quantity of inputs (e.g. water, fertiliser) required. These factors affect overall agricultural production in the MDB, and can instigate structural change in the industry, leading farmers to increase production of some commodities and reduce the production of others.

This section reports changes in agricultural activity between 2000–01 and 2005–06, including changes in agricultural area, production of crops and pasture, and livestock numbers. All data are from ABS Agricultural Censuses.

Care should be taken when making inferences on whether comparisons between 2000–01 and 2005–06 constitute long-term trends. The production of annual crops such as cotton, rice, and other cereals can vary significantly from year to year. Additionally, some caution should be exercised when evaluating these changes, due to the methodology used to derive 2000–01 data and changes in methodology for the ABS 2005–06 Agricultural Census (see Explanatory Notes).

The total area of Australian agricultural land decreased between 2000–01 and 2005–06 from 456 million hectares (ha) to 435 million ha. Australian irrigated agricultural land

*Change in agricultural
production in the
Murray-Darling Basin from
2000–01 to 2005–06
continued*

increased by 2%, to 2.5 million ha between 2000–01 and 2005–06, while irrigated land in the Basin decreased by 9%, to 1.7 million ha (ABS 2006a). As a result, agricultural production of many crops in the MDB decreased over this period. Production of a number of commodities such as cotton, rice, canola, tomatoes, melons, onions, lemons and limes was lower in 2005–06 than 2000–01. Conversely, the production of others such as barley, grain sorghum, grapes, almonds, nectarines and cherries, increased in the same period.

In terms of livestock, between 2000–01 and 2005–06 the number of milk cattle, and sheep and lambs in the MDB decreased by 12% and 17% respectively, while the number of meat cattle and pigs increased by 8% and 10% respectively in this period (table 4.15).

Cereal crops produced for grain

2005–06

Half of all Australian agricultural land dedicated to producing cereals for grain in 2005–06 was located in the MDB, accounting for over half (53%) of all cereal for grain production in Australia (table 4.4). Wheat produced for grain is an important commodity for the Australian economy, contributing \$5.1 billion to the total value of Australian crop production (\$20.8 billion) in 2005–06 (ABS 2008c). The MDB is a key region for wheat production, accounting for almost half (48%) of all wheat produced in Australia in 2005–06.

The MDB produced almost half (49%) of Australia's barley crop using 52% of the nation's barley growing land. The region accounted for 80% of land dedicated to grain sorghum in Australia, but produced 89% of the total grain sorghum crop, indicating that higher productivity was achieved in the MDB than in other regions of Australia. In 2005–06, all rice produced for grain in Australia (1,003,000 tonnes) was grown in the Basin.

4.4 PRODUCTION AND AREA OF CEREALS FOR GRAIN—2005–06

	PRODUCTION			AREA		
	Aust. '000 t	MDB '000 t	MDB as a proportion of Aust. %	Aust. '000 ha	MDB '000 ha	MDB as a proportion of Aust. %
Wheat	25 150	12 110	48	12 443	5 753	46
Barley	9 482	4 635	49	4 406	2 273	52
Grain sorghum	1 932	1 717	89	767	613	80
Rice	1 003	1 003	100	102	102	100
All other cereals	2 880	1 847	64	1 618	1 010	62
Total cereals for grain	40 447	21 312	53	19 336	9 751	50

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Census, 2005–06

Cereal crops produced for grain continued

Change from 2000–01 to 2005–06

Because cereals are annual crops, there can be significant year to year variation in both area under crop, and production levels, as a result of a number of factors such as climate conditions or commodity prices. The agricultural area for the production of cereals for grain in the MDB was 9.8 million ha in 2005–06 compared with 8.5 million ha in 2000–01 (table 4.5). The production of cereals for grain was 12% higher in 2005–06 compared with 2000–01. The production of cereals for grain in the MDB, as a proportion of Australian production, remained relatively stable between 2000–01 and 2005–06 (MDB cereal for grain production was 55% of Australian production in 2000–01; 53% in 2005–06).

In the MDB, production levels and the quantity of agricultural land used for growing wheat, barley and grain sorghum were higher in 2005–06 compared with 2000–01, but the area and production of rice was lower (table 4.5). Wheat production was slightly higher in 2005–06 (up 4%), but barley (up 44%) was significantly higher. The increase in production of grain sorghum over this period (up 44%) was significantly higher than the increase in land area devoted to sorghum, indicating an increase in productivity. Rice production was significantly lower (down 39%) reflecting reduced water availability for this water intensive crop in 2005–06 compared with 2000–01 (see Chapter 3).

4.5 PRODUCTION AND AREA OF CEREALS FOR GRAIN—Murray-Darling Basin—2000–01 and 2005–06

	PRODUCTION			AREA		
	2000–01	2005–06	Change	2000–01	2005–06	Change
	'000 t	'000 t	%	'000 ha	'000 ha	%
Wheat	11 610	12 110	4	5 610	5 753	3
Barley	3 211	4 635	44	1 594	2 273	43
Grain sorghum	1 189	1 717	44	472	613	30
Rice	1 638	1 002	–39	176	102	–42
All other cereals	1 346	1 848	37	681	1 010	48
Total cereals for grain	18 994	21 312	12	8 533	9 751	14

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Censuses, 2000–01 and 2005–06

*Selected Other crops and
pasture*

2005–06

The MDB accounted for almost half (47%) of Australia's land dedicated to growing hay (including pasture, cereals and other crops cut for hay) in 2005–06. Also, most Australian cotton was produced in the MDB (92%) and 93% of Australian land devoted to cotton growing was located in the Basin (table 4.6).

Field peas and canola were among other major crops produced in Australia in 2005–06. In that year, the MDB accounted for over one-third of the land dedicated to growing field peas for grain (38%) and canola (34%).

4.6 PRODUCTION AND AREA OF SELECTED OTHER CROPS AND PASTURE—2005–06

	PRODUCTION			AREA		
	Aust.	MDB	MDB as a proportion of Aust.	Aust.	MDB	MDB as a proportion of Aust.
	'000 t	'000 t	%	'000 ha	'000 ha	%
Pasture, cereals and other crops cut for hay	8 065	3 531	44	1 914	893	47
Cotton lint	560	516	92	327	303	93
Fieldpeas for grain	585	223	38	366	138	38
Canola	1 419	489	34	972	328	34

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Census, 2005–06

*Selected Other crops and
pasture continued*

Change from 2000–01 to 2005–06

As cotton, canola, field peas for grain and hay are annual crops, there can be significant year to year variation in area and production levels as a result of growing conditions, commodity prices and water availability.

The area planted to cotton in the MDB was 483,000 ha in 2000–01, compared to 303,000 ha in 2005–06 (table 4.7). Cotton production was only 15% lower in 2005–06 compared to 2000–01 despite the area of cotton growing land decreasing by 37%. The production of cotton in the MDB, as a proportion of Australian production, remained relatively stable between 2000–01 and 2005–06 (MDB cotton was 91% of Australian production in 2000–01; 92% in 2005–06).

In the MDB, the area of pasture, cereals and other crops cut for hay was higher (up 16%) in 2005–06 than in 2000–01, but the field peas for grain and canola areas were significantly lower (down by 23% and 55% respectively). Interestingly, despite having a lower area of field peas in 2005–06 compared with 2000–01, the production was 8% higher.

4.7 PRODUCTION AND AREA OF SELECTED OTHER CROPS AND PASTURE—Murray-Darling Basin—2000–01 and 2005–06

	PRODUCTION			AREA		
	2000–01	2005–06	Change	2000–01	2005–06	Change
	'000 t	'000 t	%	'000 ha	'000 ha	%
Pasture, cereals and other crops cut for hay	3 090	3 531	14	767	893	16
Cotton lint	604	516	-15	483	303	-37
Fieldpeas for grain	207	223	8	179	138	-23
Canola	1 114	489	-56	733	328	-55

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Censuses, 2000–01 and 2005–06

Fruit and nuts

2005–06

A wide variety of fruit and nuts (hereafter referred to as 'fruit') are grown in Australia. In 2005–06, the MDB accounted for 58% of all orchard trees in Australia, and 47% of the total area of fruit grown (table 4.8). Oranges were the most significant fruit crop in the MDB and Australia in terms of production weight (507,000 tonnes in Australia). The vast majority (95%) of Australian oranges were produced in the MDB, with 92% of all trees of bearing age located in the region. In 2005–06, there were more apple trees (8.8 million) in Australia than any other fruit-bearing tree. More than half (53%) of all apple trees of bearing age were located in the MDB and the Basin produced 54% of Australia's apples. The Basin also produced the majority of Australia's almonds (93% by weight and 90% by area).

High productivity levels were evident for a wide range of fruit crops in the MDB in 2005–06. While the region accounted for 82% and 81% of all peach and apricot trees respectively, the proportions of total production were higher, at 92% and 95%. These high production levels relative to tree numbers were also reflected for nectarines, plums and prunes, lemons and limes, and cherries. The widespread use of irrigation for fruit crops in the Basin would help to explain the high productivity levels. Refer to table 4.19 for the irrigated land area used for different crops in the MDB.

4.8 PRODUCTION AND NUMBER OF FRUIT AND NUT TREES—2005–06

	PRODUCTION			NUMBER OF TREES (a)		
	Aust.	MDB	MDB as a proportion of Aust.	Aust.	MDB	MDB as a proportion of Aust.
	'000 t	'000 t	%	'000	'000	%
Oranges	507	482	95	6 553	6 033	92
Apples	276	148	54	(b) 8 833	(b) 4 682	53
Pears (incl. nashi)	142	124	87	1 776	1 485	84
Peaches	91	83	92	2 245	1 850	82
Apricots	17	16	95	587	477	81
Almonds	12	12	93	1 336	1 188	90
Nectarines	49	42	86	1 652	1 232	75
Plums and prunes	26	22	82	1 742	1 303	75
Lemons and limes	33	15	45	490	186	38
Cherries	10	7	72	1 557	947	61
Total fruit and nut trees (c)(d)	..	..	..	37 446	21 743	58
Total area of fruit ('000 ha)(e)	188	88	47	..	..	..

.. not applicable

(a) Data is for bearing trees aged 6 years and over.

(b) 2005–06 data for bearing apple trees is for trees aged 4 years and over.

(c) No data available for total fruit and nut production.

(d) Total number of trees includes all orchard trees, not just those of bearing age. Includes all citrus, stone, pome, nut, avocado, mango and other orchard trees. Therefore, sub-totals for number of specific trees do not add to total.

(e) Includes all fruit trees, nut trees, plantation and berry fruit.

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Census, 2005–06

Fruit and nuts *continued**Change from 2000–01 to 2005–06*

Between 2000–01 and 2005–06, the agricultural area in the MDB used for the production of fruit increased from 77,000 ha to 88,000 ha, an increase of 14% (table 4.9). The area of fruit in the MDB as a proportion of the Australian total fruit area remained relatively stable (at 52% and 53%) during this period.

Changes in production levels varied across the range of fruit in the MDB. For example, between 2000–01 and 2005–06 there was a decrease in the production of lemons and limes (down 29%), pears (down 18%), oranges (down 7%) and apples (down 7%). There was essentially no change in the number of bearing trees for oranges and pears, indicating that the lower production was due to reduced yields. The decrease in lemon and lime production could, at least in part, be attributed to the reduced numbers of lemon and lime bearing trees.

The production of nectarines, almonds, and cherries increased from 2000–01 to 2005–06 (67%, 32%, and 29% respectively). This was influenced primarily by increases in the number of nectarine (72%), almond (44%), and cherry (68%) bearing trees. The increase in production of almonds and cherries was proportionally much less than the increase in number of bearing trees.

4.9 PRODUCTION AND NUMBER OF FRUIT AND NUT TREES—Murray-Darling Basin—2000–01 and 2005–06

	PRODUCTION			NUMBER OF TREES(a)		
	2000–01	2005–06	Change	2000–01	2005–06	Change
	'000 t	'000 t	%	'000	'000	%
Oranges	516	482	–7	6 043	6 033	—
Apples	158	148	–7	3 092	(b) 4 682	(c) na
Pears (incl. nashi)	152	124	–18	1 476	1 485	1
Almonds	9	12	32	824	1 188	44
Nectarines	25	42	67	715	1 232	72
Lemons and limes	21	15	–29	200	186	–7
Cherries	5	7	29	563	947	68
Total fruit and nut trees (d) (e)	..	..	..	16 862	21 743	29
Total area of fruit ('000 ha) (f)	77	88	14	..	..	..

.. not applicable

— nil or rounded to zero (including null cells)

na not available

(a) Data is for trees of bearing age, 6 years and over.

(b) 2005–06 data for bearing apple trees is for trees aged 4 years and over.

(c) Change between years can not be calculated because of different definitions of bearing apple trees in 2000–01 and 2005–06.

(d) No data is available for total fruit and nut production.

(e) Total number of trees includes all orchard trees, not just those of bearing age. Includes all citrus, stone, pome, nut, avocado, mango and other orchard trees. Therefore, sub-totals for number of specific trees do not add to total.

(f) Includes all fruit trees, nut trees, plantation and berry fruit.

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Censuses, 2000–01 and 2005–06, and Apples and Pears Survey, 2000–01

Grapes

2005–06

Grapes are a key horticultural crop grown in the MDB. While over half (56%) of the total area of grapevines were located in the MDB (table 4.10), a greater proportion of grapes (76%) were produced in the region, indicating higher yields in the MDB. Around three-quarters (74%) of Australia's grapes produced for winemaking were grown in the MDB in 2005–06 and the region accounted for 94% of grapes produced for other purposes, such as drying and table grapes. The high productivity of grapevines located in the MDB is likely to be related to the relatively high proportion of irrigated area for grapes in the region. In 2005–06, 93% of grape growing land was irrigated (see table 4.19) compared with 87% outside the Basin.

4.10 PRODUCTION AND AREA OF GRAPES—2005–06

	PRODUCTION (a)			AREA OF VINES (b)		
	Aust.	MDB	MDB as a proportion of Aust.	Aust.	MDB	MDB as a proportion of Aust.
	'000 t	'000 t	%	'000 ha	'000 ha	%
Winemaking	1 782	1 320	74	na	na	na
Drying, table and other	200	188	94	na	na	na
Total grapes (c)	1 981	1 508	76	203	114	56

na not available

(a) Fresh weight.

(b) Area of vines data is not collected by purpose of production.

(c) Components may not add to total due to rounding.

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Census, 2005–06

*Grapes continued**Change from 2000–01 to 2005–06*

Between 2000–01 and 2005–06, the agricultural area in the MDB used for growing grapes increased by 35% (from 91,000 ha to 114,000 ha) while the production of grapes increased by 25% over the same period (table 4.11). The area of grapes in the MDB as a proportion of the total Australian area of grapes decreased from 61% in 2000–01 to 56% in 2005–06.

4.11 PRODUCTION AND AREA OF GRAPES—Murray-Darling Basin—2000–01 and 2005–06

	PRODUCTION (a)			AREA OF VINES (b)		
	2000–01	2005–06	Change	2000–01	2005–06	Change
	'000 t	'000 t	%	'000 ha	'000 ha	%
Winemaking	972	1 320	36	na	na	na
Drying, table and other	143	188	31	na	na	na
Total grapes	1 115	1 508	35	91	114	25

na not available

(a) Fresh weight.

(b) Area of vines data is not collected by purpose of production.

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Censuses, 2000–01 and 2005–06, and Vineyards Survey 2000–01.

Vegetables

2005–06

In Australia in 2005–06, around one-quarter (26%) of land dedicated to growing vegetables for human consumption was located in the MDB (table 4.12). In this period, potatoes were by far the largest Australian vegetable crop with 1.2 million tonnes produced, and around one-third (32%) of this production was in the MDB. The region accounted for more than two-thirds (68%) of total tomato production, and 56% of Australian tomato growing land area, indicating higher yields, potentially as a result of irrigation. Almost half (48%) of the land area dedicated to growing rockmelons and cantaloupes was situated in the MDB and 38% of land dedicated to growing onions (brown and white varieties) was located in the Basin.

4.12 PRODUCTION AND AREA OF VEGETABLES (a)—2005–06

	PRODUCTION			AREA		
	Aust.	MDB	MDB as a proportion of Aust.	Aust.	MDB	MDB as a proportion of Aust.
	'000 t	'000 t	%	'000 ha	'000 ha	%
Tomatoes	450	306	68	8	4	56
Potatoes	1 250	397	32	35	12	34
Melons (rock and cantaloupe)	85	37	44	3	2	48
Onions (brown and white)	196	66	33	3	1	38
Other vegetables	na	na	na	82	15	18
Total vegetables	na	na	na	131	34	26

na not available

(a) For human consumption.

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Census, 2005–06

*Vegetables continued**Change from 2000–01 to 2005–06*

Between 2000–01 and 2005–06, the agricultural area in the MDB used for the production of vegetables for human consumption decreased from 42,000 ha to 34,000 ha (table 4.13). In addition, the area of vegetables in the MDB as a proportion of the Australian total vegetable area decreased slightly from 30% to 26% during this period. Production levels and the area of agricultural land used for growing vegetables decreased for a range of vegetables in the MDB. For example, there was a decrease in the production of tomatoes (down 27%), melons (down 31%) and onions (down 35%), however potatoes showed no significant change over this period.

4.13 PRODUCTION AND AREA OF VEGETABLES (a)—Murray-Darling Basin—2000–01 and 2005–06

	PRODUCTION			AREA		
	2000–01	2005–06	Change	2000–01	2005–06	Change
	'000 t	'000 t	%	'000 ha	'000 ha	%
Tomatoes	419	306	–27	6	4	–33
Potatoes	401	397	–1	13	12	–8
Melons (rock and cantaloupe)	54	37	–31	2	2	—
Onions (brown and white)	102	66	–35	2	1	–50
Other vegetables	na	na	na	19	15	–21
Total vegetables	na	na	na	42	34	–19

— nil or rounded to zero (including null cells)

na not available

(a) For human consumption.

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Censuses, 2000–01 and 2005–06

Selected livestock

2006

At 30 June 2006, there were more sheep and lambs in Australia than any other type of livestock, and 45% of these were located in the MDB. The Basin accounted for 62% of pigs and 28% of cattle at this time (table 4.14).

4.14 SELECTED LIVESTOCK NUMBERS—At 30 June 2006

	Aust.	MDB	MDB as a proportion of Aust.
	'000	'000	%
Cattle			
Milk cattle	2 788	887	32
Meat cattle	25 605	7 085	28
Total cattle	28 393	7 972	28
Sheep and lambs	91 028	40 609	45
Pigs	2 733	1 707	62

Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Census, 2005–06

Change from 2001 to 2006

Between 30 June 2001 and 2006, some livestock numbers increased in the MDB while others decreased. The number of meat cattle increased by 8% (from 6.5 to 7.1 million) as did the number of pigs, by 10% (from 1.6 to 1.7 million). Numbers of dairy cattle decreased by 12% (from 1.0 to 0.9 million) and sheep and lambs decreased by 17% (48.8 to 40.6 million) (table 4.15).

4.15 SELECTED LIVESTOCK NUMBERS—Murray-Darling Basin—At 30 June 2001 and 2006

	2001	2006	Change
	'000	'000	%
Cattle			
Milk cattle	1 005	887	-12
Meat cattle	6 546	7 085	8
Total cattle(a)	7 552	7 972	6
Sheep and lambs	48 773	40 609	-17
Pigs	1 554	1 707	10

(a) Components may not add to total due to rounding.
Source: Agricultural Commodities, Australia, 2005–06, ABS cat. no. 7121.0; ABS data available on request, Agricultural Census, 2005–06

IRRIGATED AND
NON-IRRIGATED
AGRICULTURAL
PRODUCTION

The Murray-Darling Basin is a unique region in Australia because it contains the majority of Australia's irrigated agricultural land (65% in 2005–06) (table 4.16). One reason for the proliferation of irrigated crops and pasture in the MDB is the Basin's water storage and delivery infrastructure, enabling water to be captured and transported to farms.

So far in this chapter the focus has been on total agricultural production. The following section looks more closely at irrigated agricultural production in the MDB.

*Irrigated farms and area
in the Murray-Darling
Basin*

More than 1.4 million ha (or 56%) of Australia's irrigated agricultural land is in the New South Wales and Victorian parts of the MDB (table 4.16). Approximately 90% (or 0.9 million ha) of the total New South Wales irrigated area, and 81% (or 0.5 million ha) of Victoria's total irrigated area occurs in the MDB.

4.16 IRRIGATED AND NON-IRRIGATED LAND—2005–06

	IRRIGATED		NON-IRRIGATED		TOTAL

	Area	Proportion of Australian irrigated land	Area	Proportion of Australian non-irrigated land	Area
	'000 ha	%	'000 ha	%	'000 ha
Murray-Darling Basin					
New South Wales	914	36	50 300	12	51 214
Victoria	522	20	7 071	2	7 593
Queensland	147	6	23 275	5	23 421
South Australia	71	3	6 484	1	6 555
Australian Capital Territory	—	—	45	—	45
Total(a)	1 654	65	87 174	20	88 828
Balance of Australia					
New South Wales	80	3	10 825	3	10 906
Victoria	126	5	4 595	1	4 721
Queensland	393	15	121 706	28	122 098
South Australia	145	6	48 708	11	48 854
Western Australia	60	2	98 592	23	98 653
Tasmania	81	3	1 658	—	1 739
Northern Territory	7	—	59 120	14	59 127
Total(a)	893	35	345 205	80	346 097
Australia	2 546	100	432 378	100	434 925

— nil or rounded to zero (including null cells)

(a) Components may not add to total due to rounding.

Source: Water Use on Australian Farms, 2005–06, ABS cat. no. 4618.0

Within the MDB, more irrigated farms are located in Victoria compared with each of the other states. This concentration of irrigators indicates that the average area of irrigated farms is smaller in the Victorian part of the MDB compared with New South Wales (table 4.17).

*Irrigated farms and area
in the Murray-Darling
Basin continued*

4.17 IRRIGATED FARMS—2005–06

	Proportion of state/territory irrigated farms		Proportion of state/territory irrigated area	
	Number	Area	Area	irrigated area
	no.	%	'000 ha	%
Murray-Darling Basin				
New South Wales	6 651	57	914	92
Victoria	7 915	68	522	81
Queensland	1 536	16	147	27
South Australia	2 514	40	71	33
Australian Capital Territory	17	100	—	100
Total(a)	18 634	..	1 654	..
Balance of Australia				
New South Wales	4 936	43	80	8
Victoria	3 706	32	126	19
Queensland	8 324	84	393	73
South Australia	3 783	60	145	67
Western Australia	3 173	100	60	100
Tasmania	1 919	100	81	100
Northern Territory	351	100	7	100
Total(a)	26 193	..	892	..
Australia(a)	44 826	..	2 546	..

.. not applicable

— nil or rounded to zero (including null cells)

(a) Components may not add to total due to rounding.

Source: Water Use on Australian Farms, 2005–06, ABS cat. no. 4618.0

*Irrigated and non-irrigated
crops*

In 2005–06, the MDB accounted for a greater proportion of Australia's non-irrigated agricultural land than it did in 2000–01 for a range of commodities including cotton (80% in 2000–01, 98% in 2005–06) and cereals other than rice (48% in 2000–01, 51% in 2005–06). In this period, the Basin's non-irrigated agricultural land decreased as a proportion of the Australian total for fruit, grapes and vegetables (table 4.18).

The MDB accounted for a lower proportion of Australia's irrigated land in 2000–01 compared with 2005–06 (decreasing from 73% to 65%). In this period, the only irrigated crop or pasture in the MDB that increased as a proportion of Australian irrigated area was fruit (from 51% to 53%).

*Irrigated and non-irrigated
crops continued*

4.18 CONTRIBUTION OF MURRAY-DARLING BASIN IRRIGATED AND
NON-IRRIGATED LAND TO AUSTRALIA, by crop(a)—2000–01
and 2005–06

	IRRIGATED		NON-IRRIGATED	
	2000–01	2005–06	2000–01	2005–06
	%	%	%	%
Rice	100	100	..	..
Cereals (excl. rice)	90	88	48	51
Cotton	93	92	80	98
Grapes	63	58	44	43
Fruit (excl. grapes)	51	53	33	12
Vegetables(b)	32	28	22	13
Total Agriculture	73	65	18	20

.. not applicable

(a) Irrigated land as a proportion of total Australian irrigated crop land;
non-irrigated land as a proportion of total Australian non-irrigated crop
land.

(b) For human consumption.

Source: Water Use on Australian Farms, 2005–06, ABS cat. no. 4618.0; ABS
data available on request, Agricultural Census, 2000–01 and 2005–06

Many of the crops and pasture grown in the MDB rely on irrigation to facilitate production. In 2005–06, more than 80% of the MDB area of cotton and fruit, and more than 90% of grapes and vegetables for human consumption were irrigated (table 4.19).

The irrigated proportion of the total area for most crops showed minimal change between 2000–01 and 2005–06. However, for fruit crops, there was an increase from 77% to 85%.

All rice grown in Australia is irrigated and located in the MDB. The land area utilised for growing rice was less in 2005–06 than in 2000–01. Only 3% of area for cereals other than rice were irrigated in the MDB in 2005–06. While this proportion remained the same as in 2000–01, the irrigated and non-irrigated areas increased. Irrigated and non-irrigated cotton areas in the MDB both decreased in this period.

*Irrigated and non-irrigated
crops continued*

4.19 IRRIGATED AND NON-IRRIGATED AGRICULTURAL LAND, by crop
and pasture—Murray-Darling Basin—2000–01 and 2005–06

	2000–01			2005–06		
	<i>Irrigated</i>	<i>Non-irrigated</i>	<i>Irrigated proportion</i>	<i>Irrigated</i>	<i>Non-irrigated</i>	<i>Irrigated proportion</i>
	'000 ha	'000 ha	%	'000 ha	'000 ha	%
Pasture (native or sown)	760	na	na	717	na	na
Rice	178	. .	100	102	. .	100
Cereals (excl. rice)	260	8 835	3	329	10 053	3
Cotton	405	78	84	247	56	81
Grapes	84	7	92	106	8	93
Fruit (excl. grapes)	59	18	77	75	13	85
Vegetables(a)	37	5	89	31	3	92
Total Agriculture	1 824	81 685	2	1 654	87 174	2

. . not applicable

na not available

(a) For human consumption.

Source: Water Use on Australian Farms, 2005–06, ABS cat. no. 4618.0; ABS data available on request, Agricultural Census, 2000–01 and 2005–06

*Location of irrigated
agricultural production in
the Murray-Darling Basin*

Irrigation activity occurs over a relatively small area of the MDB; only 2% of the total agricultural land. Irrigated crops and pasture are generally grown downstream from major water storages and delivery infrastructure, adjacent to major rivers, and often within specified irrigation districts (see Map 1.16).

In 2005–06, some irrigated crops, rice and cotton for example, were grown in relatively confined areas of the MDB.

- Rice was predominantly grown in the Riverina region of southern New South Wales, around Griffith and Deniliquin.
- Approximately 39% of irrigated pasture in 2005–06 was used for dairy farming (see Chapter 3). This occurred predominantly in the northern Victorian and southern New South Wales areas of the MDB.
- Irrigated cotton was predominantly grown in the northern New South Wales and southern Queensland areas of the MDB.

Irrigated crops such as fruit, grapes, vegetables and cereals other than rice were dispersed over a larger area than cotton and rice, in 2005–06. Irrigated pasture for non-dairy livestock was also distributed over a broad area of the MDB.

- Irrigated fruit areas in the MDB followed the Murray River in the South Australian 'Riverland' region and in north-west Victoria. Irrigated fruit was also grown around Shepparton, Griffith and south-east Queensland.
- Areas of irrigated grapes were scattered along the Murray River in the 'Riverland' region of South Australia and in north western Victoria. Irrigated grapes were also grown in the southern MDB in Victoria and the eastern MDB in New South Wales.
- Irrigated vegetables were located across northern Victoria, southern New South Wales, and parts of south-east South Australia and south-east Queensland.
- Irrigated cereals other than rice were grown in northern Victoria and southern New South Wales, and around Griffith, Toowoomba, Dubbo and Tamworth.

Location of irrigated agricultural production in the Murray-Darling Basin continued

- In 2005–06, approximately 61% of irrigated pasture was used for non-dairy livestock. Irrigated pasture used for non-dairy livestock occurred broadly across much of the MDB, with particular concentration in northern Victoria and southern New South Wales.

Economic value of Agriculture in the Murray-Darling Basin

This section presents estimates of the value of agricultural production in the MDB along with estimates of the value of irrigated agricultural production. The gross value of agricultural production in 2005–06 was published in the ABS *Value of Agricultural Commodities Produced, Australia, 2005–06* (cat. no. 7503.0).

Australia's Agriculture industry not only produces food and fibre for domestic consumption and export, but in 2005–06 represented approximately 3% of Australia's Gross Domestic Product (GDP) (ABS 2006b). In 2005–06, Agriculture in the Murray-Darling Basin produced a gross value of agricultural production (GVAP) of \$14,991m, 39% of Australia's total GVAP (\$38,541m, see table 4.20).

Of all agricultural commodities, livestock (excluding dairy, \$4,225m) and cereals other than rice (\$3,436m) produced the most economic value, followed by dairy farming (\$1,172m) and fruit (\$1,111m).

4.20 GROSS VALUE OF AGRICULTURAL PRODUCTION (a), by commodity—2005–06

	MDB	MDB as a proportion of Aust.	
		Aust.	%
	\$m	\$m	%
Dairy farming	1 172	3 603	33
Other livestock	4 225	10 987	38
Rice	274	274	100
Cereals (excl. rice)	3 436	7 320	47
Cotton	861	933	92
Grapes	777	1 377	56
Fruit (excl. grapes)	1 111	2 627	42
Vegetables	602	2 923	21
Other agricultural commodities(b)	2 533	8 494	30
Total agricultural commodities(c)	14 991	38 541	39

(a) In current price terms, see Explanatory Notes.

(b) Includes other broadacre crops and nurseries.

(c) Components may not add to total due to rounding.

Source: ABS data available on request, Value of Agricultural Commodities Produced, Australia, 2005–06

*Economic value of
Agriculture in the
Murray-Darling Basin
continued*

In the 5 years from 2000–01 to 2005–06, the GVAP in the Murray-Darling Basin increased 7.3%, from \$13,964m to \$14,991m in current price terms (table 4.21). This was lower than the general increase in the cost of living over this period when compared with the All Groups Consumer Price Index which increased by 14.7% between 2000–01 and 2005–06 (ABS cat. no. 6401.0). Furthermore, the increase in Australian GVAP (12%) was more than the increase in MDB GVAP over the same period (7%). From 2000–01 to 2005–06, the GVAP of some commodities increased (e.g. dairy farming, other livestock and fruit), however others decreased (e.g. rice, cotton and grapes).

4.21 GROSS VALUE OF AGRICULTURAL PRODUCTION (a), by commodity—2000–01 and 2005–06

	MURRAY-DARLING BASIN		AUSTRALIA	
	2000–01	2005–06	2000–01	2005–06
	\$m	\$m	\$m	\$m
Dairy farming	1 037	1 172	3 283	3 603
Other livestock	2 817	4 225	8 364	10 987
Rice	349	274	350	274
Cereals (excl. rice)	3 565	3 436	7 327	7 320
Cotton	1 184	861	1 305	933
Grapes	874	777	1 517	1 377
Fruit (exc. grapes)	839	1 111	2 020	2 627
Vegetables	603	602	2 251	2 923
Other agricultural commodities(b)	2 695	2 533	7 723	8 494
Total agricultural commodities(c)	13 972	14 991	34 164	38 541

(a) In current price terms, see Explanatory Notes.

(b) Includes other broadacre crops and nurseries.

(c) Components may not add to total due to rounding.

Source: ABS data available on request, Value of Agricultural Commodities Produced, Australia, 2005–06

Economic value of irrigated agricultural production

Maximising economic benefit from irrigation is a key theme emerging from recent water policies. There is strong interest in estimating the value generated from irrigating crops. A central component of the federal government's National Water Initiative (NWI) concerns the flow of water to its highest value use (see Appendix). Integrating the volume of water used with a measure of the return to the Australian economy provides one indication of the economic benefit obtained from applying water to certain agricultural commodities. The change over time provides an indication of whether water is being utilised by relatively higher value users.

Allocative efficiency refers to how well water is allocated across industries in terms of the production value returned to the economy per quantity of water used. Allocative efficiency is achieved when it is not possible to increase the value added for the economy as a whole by transferring water from one activity to another (The Treasury: Roberts, Mitchell and Douglas 2006).

The following section provides an analysis of the Gross Value of Irrigated Agricultural Production (GVIAP) in the MDB generated by different agricultural commodities, including a comparison with the volume of water consumed in the same period. The irrigated value of production is compared to non-irrigated value of production, and the change in GVIAP between 2000–01 and 2005–06 is also presented.

GVIAP should not be used as a proxy for determining the highest value water use, because water is not the only input to agricultural production from irrigated land (ABS 2006a). Land, fertiliser, labour, machinery and other inputs are also used, and their contribution to agricultural production cannot be separately identified. Estimates of GVIAP are derived from agricultural commodity values in the 2000–01 and 2005–06 editions of *Value of Agricultural Commodities Produced, Australia* (ABS cat. no. 7503.0). Further details on the methods used to derive the estimates are presented in the Explanatory Notes.

In 2005–06, nearly \$4.6 billion, or 44% of Australia's GVIAP originated in the MDB (table 4.22). The majority of the GVIAP for rice (100%), cotton (92%), and cereals other than rice (84%) was generated in the Basin.

Economic value of irrigated agricultural production continued

4.22 GROSS VALUE OF IRRIGATED AGRICULTURAL PRODUCTION (a), by commodity—2005–06

	MDB		MDB as a proportion of Aust.
	\$m	Aust. \$m	%
Dairy farming	938	1 812	52
Other livestock	132	180	73
Rice	274	274	100
Cereals (excl. rice)	92	109	84
Cotton	797	869	92
Grapes	722	1 228	59
Fruit (excl. grapes)	898	1 820	49
Vegetables	530	2 473	21
Other agricultural commodities(b)	193	1 722	11
Total agricultural commodities(c)	4 576	10 486	44

- (a) In current price terms, see Explanatory Notes
 (b) Includes sugar and other broadacre crops and nurseries.
 (c) Components may not add to total due to rounding.

In 2005–06, the highest GVIAP was generated from dairy farming (\$938m or 20% of the MDB GVIAP), fruit (\$898 or 20%), cotton (\$797m or 17%), and grapes (\$722m or 16%) (table 4.23).

4.23 GROSS VALUE OF IRRIGATED AGRICULTURAL PRODUCTION (a), by commodity—Murray-Darling Basin—2005–06

	Proportion of total GVIAP	
	GVIAP \$m	%
Dairy farming	938	20
Other livestock	132	3
Rice	274	6
Cereals (excl. rice)	92	2
Cotton	797	17
Grapes	722	16
Fruit (excl. grapes)	898	20
Vegetables	530	12
Other agricultural commodities(b)	193	4
Total agricultural commodities(c)	4 576	100

- (a) In current price terms, see Explanatory Notes
 (b) Includes other broadacre crops and nurseries.
 (c) Components may not add to total due to rounding.

Although the MDB generated 44% of Australia's GVIAP in 2005–06, this was achieved with 66% of Australia's agricultural water consumption (see Chapter 3). Cotton consumed a significant volume of water (20% of agricultural water consumption in the MDB) to generate 17% of the MDB GVIAP. Rice also accounted for a significant volume of agricultural water consumption in the MDB (16%), but generated only 6% of GVIAP. Vegetables generated 13% of GVIAP but consumed only 2% of MDB water consumption (see table 4.24 and graph 4.25).

Economic value of irrigated agricultural production continued

4.24 GROSS VALUE OF IRRIGATED AGRICULTURAL PRODUCTION AND WATER CONSUMPTION, by commodity—Murray-Darling Basin—2005–06

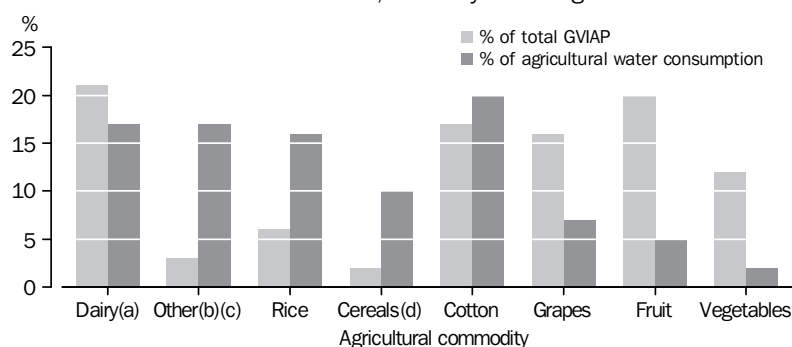
	GVIAP(a)	Proportion of total GVIAP	Water consumption	Proportion of total water consumption
		\$m	%	GL
Dairy farming	938	21	1 287	17
Other livestock	132	3	1 284	17
Rice	274	6	1 252	16
Cereals (excl. rice)	92	2	782	10
Cotton	797	17	1 574	20
Grapes	722	16	515	7
Fruit (excl. grapes)	898	20	413	5
Vegetables	530	12	152	2
Other agricultural commodities(b)	193	4	460	6
Total agricultural commodities(c)	4 576	100	7 720	100

(a) In current price terms, see Explanatory Notes.

(b) Includes other broadacre crops and nurseries.

(c) Components may not add to total due to rounding.

4.25 GROSS VALUE OF IRRIGATED AGRICULTURAL PRODUCTION AND WATER CONSUMPTION, Murray-Darling Basin—2005–06



(a) Dairy farming

(b) GVIAP represents other livestock.

(c) Water consumption represents irrigated pasture for livestock (excl. dairy).

(d) Excludes rice.

In 2005–06, the value generated from irrigated agricultural production contributed a greater proportion of the value of total agricultural production in the MDB (31%) than for the whole of Australia (27%). In the MDB, GVIAP represented 33% of the total GVAP in 2000–01, however this decreased to 30% in 2005–06. GVIAP made up 26% of Australia's total GVAP in 2000–01 and 27% in 2005–06.

In the 5 years from 2000–01 to 2005–06, the GVIAP in the MDB did not change significantly, remaining at approximately \$4.6 billion in current price terms. In comparison, the GVIAP for Australia increased by 18% in this period (table 4.26).

Economic value of irrigated agricultural production continued

4.26 GROSS VALUE OF IRRIGATED AGRICULTURAL PRODUCTION AND GROSS VALUE OF AGRICULTURAL PRODUCTION (a)—2000–01 and 2005–06

	Total GVIAP	Total GVAP	GVIAP as a proportion of GVAP
	\$m	\$m	%
2000–01			
Murray-Darling Basin	4 585	13 972	33
Australia	8 895	34 164	26
2005–06			
Murray-Darling Basin	4 576	14 991	31
Australia	10 486	38 541	27

(a) In current price terms, see Explanatory Notes.

Changes in GVIAP between 2000–01 and 2005–06 varied for different agricultural commodities (table 4.27). Caution should be made when assessing whether the movement from 2000–01 to 2005–06 constitutes a long-term trend, because the GVIAP of annual crops like rice and cotton may fluctuate significantly from year to year depending on water availability.

4.27 GROSS VALUE OF IRRIGATED AGRICULTURAL PRODUCTION (a), by commodity—2000–01 and 2005–06

	MURRAY-DARLING BASIN		AUSTRALIA	
	2000–01	2005–06	2000–01	2005–06
	\$m	\$m	\$m	\$m
Dairy farming	926	938	1 811	1 812
Other livestock	62	132	83	180
Rice	349	274	350	274
Cereals (excl. rice)	106	92	118	109
Cotton	1 105	797	1 215	869
Grapes	809	722	1 352	1 228
Fruit (excl. grapes)	630	898	1 313	1 820
Vegetables	486	530	1 803	2 473
Other agricultural commodities(b)	112	193	850	1 722
Total agricultural commodities(c)	4 585	4 576	8 895	10 486

(a) In current price terms, see Explanatory Notes.

(b) Includes other sugar, broadacre crops and nurseries.

(c) Components may not add to total due to rounding.

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