

Water Use on Australian Farms

2004–05

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2004–05

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AUSTRALIAN BUREAU OF STATISTICS

EMBARGO: 11.30AM (CANBERRA TIME) TUES 25 JUL 2006

ABS Catalogue No. 4618.0

ISBN 0642479844

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INTRODUCTION

BACKGROUND

The agriculture industry is a major water consumer in the Australian economy. The Water Account Australia 2000-01 (cat. no. 4610.0) showed the agriculture industry accounted for 67% of water consumption in 2000-01.

This publication presents estimates of agricultural water use, sources of irrigation water, irrigation methods, and water traded in Australia in 2004-05. The estimates were compiled from data collected as part of the annual Agricultural Survey for the year ended 30 June 2005.

Comparisons with 2002-03 and 2003-04 estimates of agricultural water use, sources of irrigation water, irrigation methods, and water traded in Australia are included in this publication. Due to differences in collection methodology, care should be taken when comparing the results between 2002-03 and subsequent years.

Climatic conditions can affect the availability of water for irrigation and the need to irrigate in order to supplement rainfall. Information from the Bureau of Meteorology indicates that the period from July 2004 to June 2005 was dry and warm over most of Australia. More than 90% of the country had below-normal rainfall for the 12-month period, making it the 9th driest July-June period in 106 years of records. The national area-averaged rainfall was 367mm, 22% below the 1961-1990 long-term average. More information on climatic conditions for 2004-05 from the Bureau of Meteorology is included as an appendix.

CHANGES IN THIS ISSUE

In addition to water used for irrigation purposes, the Agricultural Survey 2004-05 collected water used for other agricultural purposes including stock drinking water, and dairy and piggery cleaning.

In response to feedback from users, volume estimates by source of water have been included instead of the number of agricultural establishments by source of water.

Improvements to survey procedures have resulted in the estimates of irrigating establishments and area of crop irrigated being more coherent with estimates of agricultural establishments and area under that crop.

Estimates of irrigation activity, by Statistical Division, have been included in this issue.

FEEDBACK ON PUBLICATION

The ABS welcomes feedback on the content of this publication in terms of the relevance, usefulness, quality and range of data presented. Also, more detailed information may be available on request. Please send any comments or questions to the Director, Environment and Energy Business Statistics Centre, GPO Box 66, Hobart, TAS 7001, or phone (03) 6222 5804.

CHAPTER 1

SUMMARY OF FINDINGS

AGRICULTURAL WATER USE

In 2004-05, Australian agricultural establishments used 11,147 gigalitres of water for agricultural production. Most water was used for irrigation of crops and pastures (10,085 gigalitres or 90.5%), while 1,062 gigalitres (9.5%) was used for other agricultural purposes such as stock drinking water, and dairy and piggery cleaning.

1.1 AGRICULTURAL WATER USE, BY STATE 2004-05

WATER USE				
	<i>Agricultural establishments</i>	<i>Irrigation</i>	<i>Other agricultural uses</i>	<i>Total</i>
	no.	ML	ML	ML
NSW(a)	40 162	3 716 557	259 551	3 976 108
Vic.	32 357	2 363 764	206 456	2 570 219
Qld	27 132	2 613 404	251 486	2 864 889
SA	14 111	877 818	^ 127 010	1 004 828
WA	11 915	267 098	162 274	429 372
Tas.	3 877	231 758	23 690	255 448
NT	380	14 198	31 440	45 638
Aust.	129 934	10 084 596	1 061 906	11 146 502

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

(a) Includes ACT.

Most states and territories followed the pattern of predominately more water used for irrigation than for other agricultural purposes. The Northern Territory was the only state or territory to use less water on irrigation (31.1%) than for other agricultural purposes (68.9%).

IRRIGATION WATER USE

The number of agricultural establishments irrigating continued to decline in 2004-05, with irrigation undertaken by 35,244 or 27.1% of Australia's agricultural establishments. This was a 12.8% decrease from 40,400 irrigating establishments in 2003-04, and followed a decrease of 3,374 between 2002-03 and 2003-04.

Despite this fall in the number of agricultural establishments irrigating, the total area of irrigated land remained steady at 2.4 million hectares.

The total volume of water used for irrigation fell by 357 gigalitres from 10,442 gigalitres in 2003-04 to 10,085 gigalitres in 2004-05. A substantial increase in irrigation of cotton (up by 570 gigalitres) offset decreases in most other crops, the three largest being the volume of water used for the irrigation of pasture for hay and silage (down by 206 gigalitres), rice (down by 195 gigalitres) and pasture for grazing (down by 188 gigalitres).

Victoria reported the largest number of Agricultural establishments irrigating (9,828), followed by New South Wales with 8,606 establishments and Queensland with 8,258 establishments. With 910,000 hectares irrigated and 3,717 gigalitres of irrigation water used, New South Wales remained the largest irrigating state, representing 37.8% of Australia's total area irrigated and 36.9% of Australia's total irrigation water used.

1.2 IRRIGATION ACTIVITY, By State—2002–03 to 2004–05

	Agricultural establishments no.	Agricultural establishments irrigating no.	Area of agricultural land '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha(a)
Australia						
2002–03	132 983	43 774	439 531	2 378	10 403 759	4.4
2003–04	130 526	40 400	440 110	2 402	10 441 515	4.3
2004–05	129 934	35 244	445 149	2 405	10 084 596	4.2
2004–05						
NSW(b)	40 162	8 606	64 404	910	3 716 557	4.1
Vic.	32 357	9 828	13 920	636	2 363 764	3.7
Qld	27 132	8 258	143 797	542	2 613 404	4.8
SA	14 111	4 739	54 107	184	877 818	4.8
WA	11 915	2 049	104 646	45	267 098	6.0
Tas.	3 877	1 654	1 803	86	231 758	2.7
NT	380	110	62 473	4	14 198	4.0

(a) Averaged across all irrigated pastures and crops.

(b) Includes ACT.

Average application rates remained relatively stable across Australia between 2003-04 and 2004-05. Three states reported application rates higher than the national average of 4.2 ML/ha. These were Western Australia with 6.0 ML/ha, and Queensland and South Australia, both with 4.8 ML/ha. Tasmania had the lowest average application rate of 2.7 ML/ha in 2004-05.

As in 2002-03 and 2003-04, the most extensive use of irrigation water was on pasture for grazing (28.7%) followed by cotton (18.0%) and sugar cane (11.6%).

Nationally, just over one third of irrigators irrigated pasture for grazing, a slight increase on both 2003-04 and 2002-03, while only 1.9% of irrigators irrigated cotton and 6.4% irrigated sugar cane.

IRRIGATION WATER USE

continued

Irrigation of cotton increased significantly during 2004-05, with both the area irrigated and volume used increasing by 46% on the previous year.

Rice crops continued to have the highest average application rate of 12.1 ML/ha in 2004-05. The next highest application rate was for cotton, which remained unchanged from the 2003-04 level of 6.7 ML/ha.

Differences in the types of crops and pastures irrigated between the states and territories continued to be apparent. Pasture for grazing was the dominant use of irrigation water in several States, but particularly in Victoria and Tasmania, with just over two-thirds (68.0%) of the irrigation water applied in Victoria and more than half (52.7%) in Tasmania being used for pasture for grazing. Sugar cane continued to be the predominant crop irrigated in Queensland (1,110 gigalitres), accounting for 42.5% of the total irrigation water applied in that state, a decrease from the 47.2% reported in 2003-04.

WATER SOURCES AND
TRADE

Nearly three quarters of all water used for agricultural production was surface water. Groundwater was the other major source of water used. Most states and territories followed this pattern, with South Australia and Northern Territory being the exception.

Extra water was purchased by 6,446 or 5.0% of agricultural establishments in Australia in 2004-05, while 4,748 or 3.7% of agricultural establishments sold water. The number of establishments buying extra water increased by 4.0% from the previous year, while the number of establishments selling water increased by 8.2%. As in 2003-04, Victoria reported the largest percentage of agricultural establishments trading water, with 8.1% purchasing extra water and 6.6% selling water. This accounted for 40.9% of the total number of establishments nationally which purchased extra water and 44.8% of those that sold water during 2004-05.

IRRIGATION WATER
MANAGEMENT

Surface irrigation continued to be the most common irrigation method used in Australia in 2004-05, with 30.4% of irrigating agricultural establishments using this method. Surface irrigation accounted for 60.2% of the total area irrigated.

The number of agricultural establishments using portable irrigator sprinklers fell 22.8% from 5,115 establishments in 2003-04 to 3,951 in 2004-05.

There were small increases in the area irrigated by above ground drip and trickle methods (up 2.6%) and solid set sprinklers (up 4.4%), while the area under hose sprinkler irrigation decreased by 22.1% from 281,000 hectares in 2003-04 to 219,000 hectares in 2004-05.

While Victoria continued to have the higher number of establishments using surface irrigation, the total area irrigated by this method was greater in New South Wales, with 678,000 hectares compared to 442,000 hectares in Victoria.

CHAPTER 2

IRRIGATION WATER USE

2.1 PASTURES AND CROPS IRRIGATED, Australia—2002–03 to 2004–05

	<i>Agricultural establishments no.</i>	<i>Agricultural establishments irrigating no.</i>	<i>Area under pasture or crop '000 ha</i>	<i>Area irrigated '000 ha</i>	<i>Volume applied ML</i>	<i>Application rate ML/ha (a)</i>
Total						
2002–03	132 983	43 774	439 531	2 378	10 403 759	4.4
2003–04	130 526	40 400	440 110	2 402	10 441 515	4.3
2004–05(b)	(c) 129 934	(c) 35 244	(d) 445 149	2 405	10 084 596	4.2
2004–05						
Pasture for grazing	101 956	12 101	382 306	842	2 896 543	3.4
Pasture for seed production	2 072	541	^ 161	33	^ 116 445	3.6
Pasture for hay and silage	29 449	4 449	1 021	151	579 292	3.8
Cereal crops cut for hay	14 092	910	579	^ 33	^ 80 158	2.4
Cereal crops for grain or seed(e)	37 476	2 329	20 533	309	814 368	2.6
Cereal crops not for grain or seed	10 414	^ 710	923	^ 19	^ 52 881	2.8
Rice	774	774	51	51	618 964	12.1
Sugar cane	4 837	2 264	533	213	1 171 933	5.5
Cotton	773	668	304	270	1 819 316	6.7
Other broadacre crops(f)	25 464	937	3 380	63	177 339	2.8
Fruit trees, nut trees, plantation or berry fruits(g)	10 246	6 500	165	122	608 138	5.0
Vegetables for human consumption	4 915	3 791	123	109	419 249	3.8
Vegetables for seed	592	416	5	5	15 142	2.9
Nurseries, cutflowers or cultivated turf	2 862	2 656	16	14	66 267	4.7
Grapevines	8 209	6 808	163	147	591 945	4.0

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

(a) Averaged across all irrigated pastures or crops.

(b) Totals Include other pastures or crops not elsewhere classified.

(c) Total does not equal the sum as many establishments grow or irrigate more than one crop or pasture.

(d) Total area of agricultural land does not equal the sum of area under pasture or crop as not all agricultural land is under pasture or crop.

(e) Excludes rice.

(f) Excludes sugar cane and cotton.

(g) Excludes grapevines.

2.2 PASTURES AND CROPS IRRIGATED, New South Wales(a)—2002–03 to 2004–05 .

	<i>Agricultural establishments no.</i>	<i>Agricultural establishments irrigating no.</i>	<i>Area under pasture or crop '000 ha</i>	<i>Area irrigated '000 ha</i>	<i>Volume applied ML</i>	<i>Application rate ML/ha(b)</i>
Total						
2002–03	41 184	11 230	65 175	939	4 272 705	4.6
2003–04	40 915	9 998	63 631	892	3 953 125	4.4
2004–05(c)	(d) 40 162	(d) 8 606	(e) 64 404	910	3 716 557	4.1
2004–05						
Pasture for grazing	33 685	3 088	50 898	277	706 139	2.5
Pasture for seed production	^ 382	*57	*46	*3	*10 538	^ 3.1
Pasture for hay and silage	6 842	1 454	223	48	^ 189 647	4.0
Cereal crops cut for hay	4 458	^ 318	174	^ 17	^ 47 139	^ 2.7
Cereal crops for grain or seed(f)	12 745	1 360	6 171	237	649 683	2.7
Cereal crops not for grain or seed	4 201	^ 240	326	^ 8	*23 143	^ 3.1
Rice	773	np	51	np	np	np
Sugar cane	508	**np	35	**np	**np	np
Cotton	342	^ 305	160	146	964 306	6.6
Other broadacre crops(g)	5 726	^ 317	694	^ 30	^ 94 925	3.2
Fruit trees, nut trees, plantation or berry fruits(h)	3 196	1 587	43	26	133 561	5.2
Vegetables for human consumption	882	580	^ 18	^ 16	^ 65 589	4.2
Vegetables for seed	*89	*50	^ 1	^ 1	^ 2 701	^ 5.0
Nurseries, cutflowers or cultivated turf	900	870	4	4	^ 20 712	5.1
Grapevines	1 682	1 405	^ 43	36	^ 171 629	4.7

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Includes ACT.

(b) Averaged across all irrigated pastures or crops.

(c) Totals include other pastures or crops not elsewhere classified.

(d) Total does not equal the sum as many establishments grow or irrigate more than one crop or pasture.

(e) Total area of agricultural land does not equal the sum of area under pasture or crop as not all agricultural land is under pasture or crop.

(f) Excludes rice.

(g) Excludes sugar cane and cotton.

(h) Excludes grapevines.

2.3 PASTURES AND CROPS IRRIGATED, Victoria—2002–03 to 2004–05

	Agricultural establishments no.	Agricultural establishments irrigating no.	Area under pasture or crop '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha(a)
Total						
2002–03	33 212	12 005	13 413	593	2 464 357	4.2
2003–04	32 463	10 844	13 619	619	2 559 385	4.1
2004–05(b)	(c) 32 357	(c) 9 828	(d) 13 920	636	2 363 764	3.7
2004–05						
Pasture for grazing	25 841	5 320	8 444	425	1 607 750	3.8
Pasture for seed production	^ 365	* np	* 48	^ np	^ np	np
Pasture for hay and silage	13 261	1 328	499	^ 63	^ 200 297	3.2
Cereal crops cut for hay	2 737	^ 234	92	* 7	* 11 398	^ 1.7
Cereal crops for grain or seed(e)	7 894	^ 312	2 566	^ 25	^ 44 067	1.8
Cereal crops not for grain or seed	1 490	* 64	^ 77	* 1	* 1 969	* 1.6
Rice	1	np	1	np	np	np
Sugar cane(f)	—	—	—	—	—	—
Cotton(f)	—	—	—	—	—	—
Other broadacre crops(g)	4 850	^ 131	723	^ 9	^ 15 367	^ 1.7
Fruit trees, nut trees, plantation or berry fruits(h)	1 767	1 230	37	30	159 047	5.3
Vegetables for human consumption	877	652	28	23	75 139	3.3
Vegetables for seed	157	128	2	2	^ 3 607	1.8
Nurseries, cutflowers or cultivated turf	552	487	4	3	11 262	3.6
Grapevines	2 537	2 115	38	36	^ 198 234	5.5

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Averaged across all irrigated pastures or crops.

(b) Totals include other pastures or crops not elsewhere classified.

(c) Total does not equal the sum as many establishments grow or irrigate more than one crop or pasture.

(d) Total area of agricultural land does not equal the sum of area under pasture or crop as not all agricultural land is under pasture or crop.

(e) Excludes rice.

(f) Data not collected.

(g) Excludes sugar cane and cotton.

(h) Excludes grapevines.

2.4 PASTURES AND CROPS IRRIGATED, Queensland—2002–03 to 2004–05

	Agricultural establishments no.	Agricultural establishments irrigating no.	Area under pasture or crop '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha(a)
Total						
2002–03	27 688	10 278	139 042	525	2 229 009	4.3
2003–04	26 785	9 520	144 288	561	2 420 048	4.3
2004–05(b)	(c) 27 132	(c) 8 258	(d) 143 797	542	2 613 404	4.8
2004–05						
Pasture for grazing	19 293	^ 1 536	131 385	^ 46	^ 113 672	^ 2.5
Pasture for seed production	^ 317	*102	^ 10	*1	*3 677	^ 2.5
Pasture for hay and silage	2 418	^ 1 044	^ 47	^ 22	^ 108 614	4.9
Cereal crops cut for hay	1 589	^ 261	^ 56	^ 7	^ 17 638	^ 2.6
Cereal crops for grain or seed(e)	3 948	^ 464	1 458	^ 38	^ 96 379	2.6
Cereal crops not for grain or seed	2 414	^ 289	^ 340	*8	*21 733	^ 2.8
Rice(f)	—	—	—	—	—	—
Sugar cane	4 319	2 244	494	209	1 109 917	5.3
Cotton	432	363	^ 144	^ 124	^ 855 009	6.9
Other broadacre crops(g)	6 687	^ 187	117	^ 11	^ 30 026	^ 2.6
Fruit trees, nut trees, plantation or berry fruits(h)	2 503	1 540	42	31	115 003	3.7
Vegetables for human consumption	1 514	1 173	35	31	101 136	3.3
Vegetables for seed	*77	*28	^ —	—	1 697	4.5
Nurseries, cutflowers or cultivated turf	742	702	4	4	16 123	4.3
Grapevines	^ 339	^ 231	*4	*4	^ 7 860	*2.2

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

— nil or rounded to zero (including null cells)

(a) Averaged across all irrigated pastures or crops.

(b) Totals include other pastures or crops not elsewhere classified.

(c) Total does not equal the sum as many establishments grow or irrigate more than one crop or pasture.

(d) Total area of agricultural land does not equal the sum of area under pasture or crop as not all agricultural land is under pasture or crop.

(e) Excludes rice.

(f) Data not collected.

(g) Excludes sugar cane and cotton.

(h) Excludes grapevines.

2.5 PASTURES AND CROPS IRRIGATED, South Australia—2002–03 to 2004–05

	Agricultural establishments no.	Agricultural establishments irrigating no.	Area under pasture or crop '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha(a)
Total						
2002–03	14 262	5 471	54 139	183	899 530	4.9
2003–04	14 238	5 494	52 520	185	957 163	5.2
2004–05(b)	(c) 14 111	(c) 4 739	(d) 54 107	184	877 818	4.8
2004–05						
Pasture for grazing	9 603	1 068	47 336	^ 46	^ 277 824	^ 6.1
Pasture for seed production	^ 433	^ 205	^ 38	^ 17	^ 74 707	^ 4.3
Pasture for hay and silage	2 928	^ 447	102	^ 13	^ 70 325	^ 5.3
Cereal crops cut for hay	2 298	* 69	113	* 2	** 3 172	** 1.7
Cereal crops for grain or seed(e)	6 269	^ 75	3 483	* 3	* 6 004	^ 2.1
Cereal crops not for grain or seed	1 153	* 62	86	* 1	* 3 236	^ 3.9
Rice(f)	—	—	—	—	—	—
Sugar cane(f)	—	—	—	—	—	—
Cotton(f)	—	—	—	—	—	—
Other broadacre crops(g)	3 740	* 65	603	* 3	* 9 373	3.0
Fruit trees, nut trees, plantation or berry fruits(h)	1 404	1 134	21	19	143 808	7.7
Vegetables for human consumption	465	402	16	16	76 237	4.9
Vegetables for seed	^ 65	^ 57	^ 1	^ 1	^ 3 668	^ 3.2
Nurseries, cutflowers or cultivated turf	^ 238	208	^ 1	^ 1	* 5 515	^ 5.4
Grapevines	2 723	2 383	67	61	^ 200 821	3.3

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

— nil or rounded to zero (including null cells)

(a) Averaged across all irrigated pastures or crops.

(b) Totals include other pastures or crops not elsewhere classified.

(c) Total does not equal the sum as many establishments grow or irrigate more than one crop or pasture.

(d) Total area of agricultural land does not equal the sum of area under pasture or crop as not all agricultural land is under pasture or crop.

(e) Excludes rice.

(f) Data not collected.

(g) Excludes sugar cane and cotton.

(h) Excludes grapevines.

2.6**PASTURES AND CROPS IRRIGATED, Western Australia—2002–03 to 2004–05 ...**

	<i>Agricultural establishments no.</i>	<i>Agricultural establishments irrigating no.</i>	<i>Area under pasture or crop '000 ha</i>	<i>Area irrigated '000 ha</i>	<i>Volume applied ML</i>	<i>Application rate ML/ha(a)</i>
Total						
2002–03	12 270	2 731	102 728	48	313 248	6.5
2003–04	11 876	2 459	101 184	54	308 254	5.7
2004–05(b)	(c) 11 915	(c) 2 049	(d) 104 646	45	267 098	6.0
2004–05						
Pasture for grazing	9 903	^ np	89 834	^ np	^ np	np
Pasture for seed production	^ 388	np	^ 14	np	np	np
Pasture for hay and silage	1 887	*np	92	^ np	np	^ np
Cereal crops cut for hay	2 857	**7	144	**—	**246	**3.6
Cereal crops for grain or seed(e)	6 093	*17	6 835	**3	*12 239	**4.1
Cereal crops not for grain or seed	920	**9	^ 88	**—	**380	**4.7
Rice	—	—	—	—	—	—
Sugar cane	9	np	4	np	np	np
Cotton	—	—	—	—	—	—
Other broadacre crops(f)	3 714	*np	1 224	*np	*np	np
Fruit trees, nut trees, plantation or berry fruits(g)	1 031	747	*13	^ 9	^ 39 124	4.1
Vegetables for human consumption	479	404	8	7	50 682	6.9
Vegetables for seed	^ 60	^ 32	^ —	^ —	^ 928	^ 2.6
Nurseries, cutflowers or cultivated turf	320	291	^ 2	^ 2	11 427	^ 6.7
Grapevines	^ 785	^ 562	^ 9	^ 8	^ 8 982	^ 1.2

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Averaged across all irrigated pastures or crops.

(b) Totals include other pastures or crops not elsewhere classified.

(c) Total does not equal the sum as many establishments grow or irrigate more than one crop or pasture.

(d) Total area of agricultural land does not equal the sum of area under pasture or crop as not all agricultural land is under pasture or crop.

(e) Excludes rice.

(f) Excludes sugar cane and cotton.

(g) Excludes grapevines.

2.7 PASTURES AND CROPS IRRIGATED, Tasmania—2002–03 to 2004–05

	Agricultural establishments no.	Agricultural establishments irrigating no.	Area under pasture or crop '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha(a)
Total						
2002–03	3 969	1 923	1 771	87	208 956	2.4
2003–04	3 866	1 939	1 745	87	229 355	2.6
2004–05(b)	(c) 3 877	(c) 1 654	(d) 1 803	86	231 758	2.7
2004–05						
Pasture for grazing	3 423	786	1 333	39	122 148	3.1
Pasture for seed production	181	118	5	3	^ 6 419	1.9
Pasture for hay and silage	2 070	142	52	^ 3	^ 7 000	2.4
Cereal crops cut for hay	^ 150	^ 20	^ 2	^ —	* 563	^ 2.0
Cereal crops for grain or seed(e)	525	102	21	4	5 995	1.4
Cereal crops not for grain or seed	^ 235	^ 47	^ 5	2	^ 2 421	1.4
Rice(f)	—	—	—	—	—	—
Sugar cane(f)	—	—	—	—	—	—
Cotton(f)	—	—	—	—	—	—
Other broadacre crops(g)	713	226	16	8	17 140	2.2
Fruit trees, nut trees, plantation or berry fruits(h)	232	182	^ 7	^ 4	^ 10 173	^ 2.3
Vegetables for human consumption	682	566	17	16	49 241	3.0
Vegetables for seed	^ 145	^ 121	1	1	^ 2 541	3.3
Nurseries, cutflowers or cultivated turf	82	75	—	—	^ 1 029	3.6
Grapevines	^ 138	^ 105	* 1	* 1	* 1 600	1.3

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

— nil or rounded to zero (including null cells)

(a) Averaged across all irrigated pastures or crops.

(b) Totals include other pastures or crops not elsewhere classified.

(c) Total does not equal the sum as many establishments grow or irrigate more than one crop or pasture.

(d) Total area of agricultural land does not equal the sum of area under pasture or crop as not all agricultural land is under pasture or crop.

(e) Excludes rice.

(f) Data not collected.

(g) Excludes sugar cane and cotton.

(h) Excludes grapevines.

2.8**PASTURES AND CROPS IRRIGATED, Northern Territory—2002–03 to 2004–05 ...**

	<i>Agricultural establishments no.</i>	<i>Agricultural establishments irrigating no.</i>	<i>Area under pasture or crop '000 ha</i>	<i>Area irrigated '000 ha</i>	<i>Volume applied ML</i>	<i>Application rate ML/ha (a)</i>
Total						
2002–03	397	136	63 263	3	15 953	4.7
2003–04	382	145	63 124	4	14 186	3.8
2004–05(b)	(c) 380	(c) 110	(d) 62 473	4	14 198	4.0
2004–05						
Pasture for grazing	208	np	53 077	np	np	np
Pasture for seed production	5	np	—	np	np	np
Pasture for hay and silage	42	np	6	np	np	np
Cereal crops cut for hay	3	—	—	—	—	—
Cereal crops for grain or seed(e)	2	—	—	—	—	—
Cereal crops not for grain or seed	2	—	1	—	—	—
Rice	—	—	—	—	—	—
Sugar cane(f)	—	—	—	—	—	—
Cotton(f)	—	—	—	—	—	—
Other broadacre crops(g)	34	np	3	np	np	np
Fruit trees, nut trees, plantation or berry fruits(h)	114	79	2	2	7 422	3.0
Vegetables for human consumption	16	14	—	—	1 226	3.7
Vegetables for seed	—	—	—	—	—	—
Nurseries, cutflowers or cultivated turf	28	24	—	—	200	2.9
Grapevines	6	6	—	—	2 819	7.7

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Averaged across all irrigated pastures or crops.

(b) Totals include other pastures or crops not elsewhere classified.

(c) Total does not equal the sum as many establishments grow or irrigate more than one crop or pasture.

(d) Total area of agricultural land does not equal the sum of area under pasture or crop as not all agricultural land is under pasture or crop.

(e) Excludes rice.

(f) Data not collected.

(g) Excludes sugar cane and cotton.

(h) Excludes grapevines.

2.9**IRRIGATION ACTIVITY, By Statistical Division(a)—2004–05**

	Agricultural establishments no.	Irrigating agricultural establishments no.	Area of agricultural land '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha(b)
New South Wales(c)						
Sydney	1 623	869	^ 69	8	^ 35 708	4.7
Hunter	2 834	^ 834	^ 1 590	^ 32	^ 109 480	^ 3.4
Illawarra	929	^ np	104	*np	*np	np
Richmond-Tweed	2 921	^ 650	^ 384	**21	^ 22 138	**1.1
Mid-North Coast	2 751	^ 646	726	^ 12	^ 28 591	*2.3
Northern	6 172	^ 734	7 748	^ 151	^ 759 277	5.0
North Western	4 241	^ 438	^ 15 212	^ 50	^ 309 087	6.2
Central West	5 538	^ 436	5 957	^ 36	*137 833	^ 3.9
South Eastern(d)	4 454	^ 291	2 640	^ 18	^ 38 713	2.1
Murrumbidgee	4 613	1 600	6 387	247	1 178 077	4.8
Murray	3 763	1 959	^ 8 854	330	1 075 568	3.3
Far West	325	**np	14 733	np	np	np
<i>Total</i>	40 162	8 606	64 404	910	3 716 557	4.1
Victoria						
Melbourne	2 360	948	^ 185	17	40 442	2.4
Barwon	1 731	^ 169	469	^ 3	*6 936	^ 2.3
Western District	4 279	^ 393	1 776	*22	*102 019	^ 4.6
Central Highlands	1 930	^ 263	782	^ 8	^ 17 070	^ 2.2
Wimmera	2 684	*131	^ 2 644	^ 11	^ 27 967	2.6
Mallee	3 997	2 419	2 898	137	616 249	4.5
Loddon	1 950	676	1 074	^ 73	^ 211 238	2.9
Goulburn	5 623	3 053	1 714	280	1 045 080	3.7
Ovens-Murray	2 177	^ 712	686	^ 15	^ 44 849	3.0
East Gippsland	2 262	842	^ 1 202	65	242 870	3.7
Gippsland	3 364	*224	490	^ 5	^ 9 044	1.9
<i>Total</i>	32 357	9 828	13 920	636	2 363 764	3.7
Queensland						
Brisbane	842	423	^ 88	^ 3	^ 11 042	3.5
Moreton	3 306	1 413	^ 883	32	122 180	3.8
Wide Bay-Burnett	4 875	1 828	^ 3 675	85	266 156	3.1
Darling Downs	5 874	1 171	8 152	^ 116	^ 465 404	4.0
South West	1 625	^ 108	28 230	^ 68	^ 494 867	^ 7.3
Fitzroy	2 761	^ 348	^ 12 592	29	^ 133 164	4.7
Central West	671	**37	29 014	**2	**5 092	**3.0
Mackay	2 067	968	*11 095	78	*205 793	^ 2.6
Northern	1 790	872	^ 9 640	^ 90	^ 744 268	8.3
Far North	2 852	1 090	^ 15 234	38	^ 165 439	4.3
North West	469	—	^ 25 193	—	—	—
<i>Total</i>	27 132	8 258	143 797	542	2 613 404	4.8
South Australia						
Adelaide	888	695	34	10	22 284	2.3
Outer Adelaide	2 700	1 175	689	^ 30	^ 81 910	2.7
Yorke and Lower North	2 031	^ 174	2 370	*8	*6 373	^ 0.8
Murray Lands	3 323	1 768	3 087	63	390 666	6.2
South East	2 506	880	1 890	72	^ 375 427	5.2
Eyre	1 481	*np	4 692	*np	np	*np
Northern	1 181	*np	41 345	*np	*np	*np
<i>Total</i>	14 111	4 739	54 107	184	877 818	4.8

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- * estimate has a relative standard error of 25% to 50% and should be used with caution
- ** estimate has a relative standard error greater than 50% and is considered too unreliable for general use
- nil or rounded to zero (including null cells)
- np not available for publication but included in totals where applicable, unless otherwise indicated
- (a) See Appendix 2.
- (b) Averaged across all pastures and crops.
- (c) Includes ACT.
- (d) Includes Canberra and ACT balance.

2.9 IRRIGATION ACTIVITY, By Statistical Division(a)—2004–05 *continued*

	Agricultural establishments no.	Irrigating agricultural establishments no.	Area of agricultural land '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha(b)
.....						
Western Australia						
Perth	986	597	75	5	30 542	6.2
South West	2 450	837	948	18	^ 92 469	5.1
Lower Great Southern	2 037	^ 146	2 923	^ 3	^ 4 590	^ 1.4
Upper Great Southern	1 605	*54	3 851	**1	*408	**0.5
Midlands	2 884	^ 189	8 686	*8	^ 43 324	^ 5.1
South Eastern	603	np	^ 15 306	np	np	np
Central	1 151	^ 153	43 016	^ 2	^ 8 228	^ 4.9
Pilbara	61	**np	^ 15 101	**np	**np	np
Kimberley	140	^ 69	^ 14 740	7	87 480	12.1
Total	11 915	2 049	104 646	45	267 098	6.0
Tasmania						
Greater Hobart	^ 214	^ 118	^ 47	^ 2	^ 3 148	1.5
Southern	778	301	687	^ 16	^ 37 945	2.3
Northern	1 418	616	751	40	116 635	2.9
Mersey-Lyell	1 467	620	318	27	74 029	2.7
Total	3 877	1 654	1 803	86	231 758	2.7
Northern Territory						
Darwin	119	66	161	2	4 642	2.8
Northern Territory - Bal	261	44	62 312	2	9 556	5.0
Total	380	110	62 473	4	14 198	4.0
Australia	129 934	35 244	445 149	2 405	10 084 596	4.2

-
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- np not available for publication but included in totals where applicable, unless otherwise indicated
- (a) See Appendix 2.
- (b) Averaged across all pastures and crops.

2.10**IRRIGATION ACTIVITY, BY STATISTICAL DIVISION, 2002-03 TO 2004-05**

	AREA IRRIGATED			VOLUME APPLIED			APPLICATION RATE		
	2002-03	2003-04	2004-05	2002-03	2003-04	2004-05	2002-03(a)	2003-04(a)	2004-05(a)
	'000 ha	'000 ha	'000 ha	ML	ML	ML	ML/ha	ML/ha	ML/ha
New South Wales(b)									
Sydney	8	8	8	36 160	^ 33 692	^ 35 708	4.6	4.4	4.7
Hunter	^ 40	^ 35	^ 32	^ 143 438	^ 146 316	^ 109 480	3.6	^ 4.2	^ 3.4
Illawarra	np	np	*np	np	np	*np	np	*np	np
Richmond-Tweed	^ 8	^ 8	**21	^ 29 068	^ 26 588	^ 22 138	3.9	3.4	**1.1
Mid-North Coast	^ 15	^ 12	^ 12	^ 54 236	^ 46 387	^ 28 591	^ 3.5	^ 3.8	*2.3
Northern	^ 187	^ 129	^ 151	^ 891 364	^ 639 808	^ 759 277	4.8	5.0	5.0
North Western	^ 105	^ 47	^ 50	^ 650 617	^ 321 529	^ 309 087	6.2	6.8	6.2
Central West	^ 51	^ 28	^ 36	^ 228 575	^ 108 985	*137 833	^ 4.5	3.9	^ 3.9
South Eastern(c)	^ 15	^ 8	^ 18	^ 28 954	^ 30 850	^ 38 713	^ 1.9	3.7	2.1
Murrumbidgee	246	276	247	1 318 286	1 355 940	1 178 077	5.4	4.9	4.8
Murray	257	337	330	844 579	1 229 674	1 075 568	3.3	3.6	3.3
Far West	np	np	np	np	np	np	np	np	np
Total	939	892	910	4 272 705	3 953 125	3 716 557	4.6	4.4	4.1
Victoria									
Melbourne	26	23	17	^ 68 305	61 319	40 442	2.6	2.7	2.4
Barwon	*3	*5	^ 3	*7 430	**16 894	*6 936	^ 2.5	^ 3.2	^ 2.3
Western District	*28	^ 21	*22	*109 282	^ 74 421	*102 019	3.8	3.5	^ 4.6
Central Highlands	^ 8	^ 8	^ 8	^ 22 536	^ 22 215	^ 17 070	2.9	2.9	^ 2.2
Wimmera	*17	*15	^ 11	*65 712	*54 608	^ 27 967	^ 3.9	3.6	2.6
Mallee	142	131	137	731 131	578 786	616 249	5.1	4.4	4.5
Loddon	^ 55	^ 73	^ 73	^ 166 719	^ 230 227	^ 211 238	^ 3.0	3.2	2.9
Goulburn	209	249	280	947 408	1 115 098	1 045 080	4.5	4.5	3.7
Ovens-Murray	^ 17	^ 16	^ 15	^ 60 073	^ 50 034	^ 44 849	3.6	3.2	3.0
East Gippsland	^ 76	72	65	^ 255 338	^ 336 853	242 870	3.4	4.7	3.7
Gippsland	*12	^ 6	^ 5	*30 422	^ 18 930	^ 9 044	^ 2.5	^ 3.3	1.9
Total	593	619	636	2 464 357	2 559 385	2 363 764	4.2	4.1	3.7
Queensland									
Brisbane	^ 4	3	^ 3	^ 11 758	^ 11 786	^ 11 042	3.1	3.5	3.5
Moreton	42	^ 39	32	^ 134 234	^ 120 172	122 180	3.2	3.1	3.8
Wide Bay-Burnett	92	97	85	242 318	^ 286 536	266 156	2.6	3.0	3.1
Darling Downs	89	101	^ 116	^ 261 712	^ 314 930	^ 465 404	3.0	3.1	4.0
South West	^ 24	^ 34	^ 68	*125 246	^ 272 104	^ 494 867	^ 5.2	^ 8.0	^ 7.3
Fitzroy	^ 43	^ 61	29	^ 175 383	^ 239 523	^ 133 164	4.1	^ 3.9	4.7
Central West	np	**1	**2	np	**1 741	**5 092	**np	**1.2	**3.0
Mackay	89	95	78	^ 227 818	^ 193 652	*205 793	2.6	2.0	^ 2.6
Northern	^ 90	89	^ 90	^ 844 013	^ 804 345	^ 744 268	9.4	9.0	8.3
Far North	^ 50	40	38	^ 204 869	174 606	^ 165 439	4.1	4.4	4.3
North West	np	**—	—	np	*652	—	np	**1.8	—
Total	525	561	542	2 229 009	2 420 048	2 613 404	4.3	4.3	4.8
South Australia									
Adelaide	11	10	10	29 066	30 011	22 284	2.6	2.9	2.3
Outer Adelaide	^ 30	^ 31	^ 30	^ 76 406	^ 89 381	^ 81 910	2.5	2.8	2.7
Yorke and Lower North	^ 5	^ 6	*8	*5 174	^ 6 551	*6 373	^ 1.0	^ 1.1	^ 0.8
Murray Lands	61	59	63	443 984	414 926	390 666	7.3	7.1	6.2
South East	75	75	72	^ 341 295	^ 413 008	^ 375 427	4.6	5.5	5.2
Eyre	**—	*1	*np	**1 949	**522	np	**4.9	**0.9	*np
Northern	*—	**3	*np	**1 657	*2 765	*np	*3.7	**1.0	*np
Total	183	185	184	899 530	957 163	877 818	4.9	5.2	4.8

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* estimate has a relative standard error of 25% to 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Averaged across all irrigated pastures or crops.

(b) Includes ACT.

(c) Includes Canberra and ACT balance.

2.10

IRRIGATION ACTIVITY, BY STATISTICAL DIVISION, 2002–03 TO 2004–05

continued

	AREA IRRIGATED			VOLUME APPLIED			APPLICATION RATE		
	2002-03	2003-04	2004-05	2002-03	2003-04	2004-05	2002-03(a)	2003-04(a)	2004-05(a)
	'000 ha	'000 ha	'000 ha	ML	ML	ML	ML/ha	ML/ha	ML/ha
Western Australia									
Perth	5	5	5	36 006	32 860	30 542	6.6	6.2	6.2
South West	24	^ 25	18	112 814	^ 125 311	^ 92 469	4.8	^ 5.0	5.1
Lower Great									
Southern	*3	*5	^ 3	^ 4 770	*7 933	^ 4 590	*1.4	^ 1.6	^ 1.4
Upper Great									
Southern	np	*—	**1	np	*420	*408	**np	1.1	**0.5
Midlands	*6	*6	*8	*41 979	26 312	^ 43 324	^ 6.7	*4.3	^ 5.1
South Eastern	np	np	np	np	np	np	**np	*np	np
Central	^ 2	^ 3	^ 2	10 799	^ 8 576	^ 8 228	6.0	^ 3.4	^ 4.9
Pilbara	—	np	**np	—	np	**np	—	**np	np
Kimberley	7	9	7	106 525	106 671	87 480	14.5	11.3	12.1
Total	48	54	45	313 248	308 254	267 098	6.5	5.7	6.0
Tasmania									
Greater Hobart	^ 2	^ 2	^ 2	^ 3 555	4 426	^ 3 148	1.7	1.8	1.5
Southern	^ 18	16	^ 16	^ 48 576	48 101	^ 37 945	2.7	2.9	2.3
Northern	37	39	40	84 827	109 503	116 635	2.3	2.8	2.9
Mersey-Lyell	30	29	27	71 998	67 325	74 029	2.4	2.3	2.7
Total	87	87	86	208 956	229 355	231 758	2.4	2.6	2.7
Northern Territory									
Darwin	2	2	2	5 657	5 247	4 642	3.3	2.9	2.8
Northern Territory									
- Bal	2	2	2	10 296	8 938	9 556	6.1	4.5	5.0
Total	3	4	4	15 953	14 186	14 198	4.7	3.8	4.0
Australia	2 378	2 402	2 405	10 403 759	10 441 515	10 084 596	4.4	4.3	4.2

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Averaged across all irrigated pastures or crops.

CHAPTER 3

WATER SOURCES AND TRADE

3.1 SOURCES OF AGRICULTURAL WATER, By State—2004–05

	Surface Water ML.	Groundwater ML.	Town or country reticulated mains supply ML.	Recycled or re-used water from off farm sources ML.	Other ML.	Total all sources ML(a)
.....						
NSW(b)	2 796 577	948 715	*21 395	^ 37 879	*5 576	3 810 140
Vic.	2 118 738	^ 302 589	*31 168	*50 546	*16 455	2 519 496
Qld	2 024 387	^ 607 540	^ 3 827	^ 28 309	*9 160	2 673 222
SA	^ 458 852	^ 468 584	^ 66 018	*10 036	^ 14 261	1 017 751
WA	^ 282 189	^ 107 537	^ np	**np	**np	^ 406 625
Tas.	223 693	^ 14 168	^ 2 724	^ 1 483	**411	242 479
NT	2 301	10 704	np	np	np	13 040
Aust.	7 906 737	2 459 836	140 520	128 388	47 272	10 682 753
.....						

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* estimate has a relative standard error of 25% to 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) See Explanatory Notes, paragraph 6.

(b) Includes ACT.

3.2**WATER TRADED, By State—2002–03 to 2004–05**

	<i>Agricultural establishments no.</i>	<i>Agricultural establishments purchasing extra water no.</i>	<i>Agricultural establishments selling water no.</i>
Australia			
2002–03	na	na	na
2003–04	130 526	6 200	4 388
2004–05	129 934	6 446	4 748
2004–05			
NSW(a)	40 162	1 935	1 741
Vic.	32 357	2 634	2 128
Qld	27 132	^ 953	^ 504
SA	14 111	^ 378	^ 285
WA	11 915	^ 377	*np
Tas.	3 877	^ 169	^ 45
NT	380	—	np

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

— nil or rounded to zero (including null cells)

na not available

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Includes ACT.

4.1 IRRIGATION METHODS, Number of Establishments(a)—By State—2002–03 to 2004–05

	AUSTRALIA			2004–05						
	2002–03 no.	2003–04 no.	2004–05 no.	NSW no. (b)	Vic. no.	Qld no.	SA no.	WA no.	Tas. no.	NT no.
Surface	12 970	12 119	10 726	3 011	5 122	1 708	^ 602	^ 230	^ np	np
Drip or trickle										
Above ground	9 632	8 939	8 121	1 714	1 699	1 406	1 939	1 061	280	22
Subsurface	1 156	1 090	1 091	^ 219	^ 213	^ 445	*101	^ 92	^ 15	7
Sprinkler										
Microspray	6 469	6 204	5 365	1 046	1 123	1 340	1 211	502	^ 80	64
Portable irrigators	6 231	5 115	3 951	^ 1 307	^ 608	1 277	^ 383	^ np	327	np
Hose irrigators	8 122	7 025	5 933	963	^ 933	2 683	^ 356	*69	930	—
Large mobile machines	2 730	2 823	2 360	^ 520	^ 456	^ 555	522	^ np	267	np
Solid set	5 487	4 563	4 184	802	1 269	922	796	250	^ 136	9
Other	^ 848	^ 1 116	^ 711	^ 227	*129	^ 182	*97	*53	^ np	np

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Establishments reporting irrigating by more than one method are shown against each method reported.

(b) Includes ACT.

4.2**IRRIGATION METHODS, Area Irrigated(a)—By State—2002–03 to 2004–05**

	AUSTRALIA			2004–05						
	2002–03	2003–04	2004–05	NSW	Vic	Qld	SA	WA	Tas.	NT
	'000 ha	'000 ha	'000 ha	'000 ha (b)	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha	'000 ha
Surface	1 344	1 393	1 447	678	442	274	^ 33	14	*np	np
Drip or trickle										
Above ground	180	189	194	^ 43	^ 46	^ 29	56	^ 14	^ 4	1
Subsurface	23	31	^ 31	^ 11	^ 6	^ 11	*1	^ 1	^ —	—
Sprinkler										
Microspray	80	80	71	^ 10	18	20	17	^ 4	^ 1	2
Portable irrigators	123	109	90	^ 32	^ 16	^ 25	^ 4	^ np	12	np
Hose irrigators	289	281	219	^ 31	^ 23	122	^ 5	**3	34	—
Large mobile machines	209	229	220	^ 63	^ 36	^ 48	45	np	27	np
Solid set	91	68	71	^ 12	^ 26	^ 14	^ 14	3	^ 2	—
Other	^ 14	^ 7	^ 5	*1	*1	*2	*—	*—	*np	np

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution

* estimate has a relative standard error of 25% to 50% and should be used with caution

** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) Areas reported as being irrigated by more than one method are shown against each method reported.

(b) Includes ACT.

EXPLANATORY NOTES

INTRODUCTION

1 This publication presents estimates of water use and management from the 2004-05 Agricultural Survey and Supplementary Collections (i.e. Apples and Pears Collection and Vineyards Collection). It contains detailed statistics on crops and pasture irrigated, irrigation methods and sources of water.

2 This publication also includes estimates for 2002-03 and 2003-04, derived from the Water Survey - Agriculture 2002-03 and the 2003-04 Agricultural Survey. Due to the differences in collection methodologies, care should be taken in comparing the results between 2002-03 and later years.

SCOPE AND COVERAGE

3 The scope of the 2004-05 Agricultural Survey is establishments undertaking agricultural activity with an estimated value of agricultural operations (EVAO) of \$5,000 or more.

4 The sample for the 2004-05 Agricultural Survey included the same 30,500 units selected for the 2003-04 Agricultural Survey.

AGRICULTURAL ESTABLISHMENTS

5 An agricultural establishment is the smallest accounting unit within a state or territory controlling its productive activities and maintaining a specified range of detailed data enabling value-added to be calculated. In general an establishment covers all operations at a physical location, but may consist of a group of locations provided they are within the same Statistical Local Area (SLA) or contiguous SLAs. The majority of agricultural establishments operate at one location only.

WATER USE

6 Due to a low response to the question on water use for agricultural purposes other than irrigation, a high level of imputation was required to produce estimates for this item. Industry information and feedback from respondents on stock drinking rates was used, where possible, to impute. Users should use estimates of water used for agricultural purposes other than irrigation with caution. The effect on estimates of water used for all agricultural purposes has been minimal.

WATER SOURCE

7 While volumes of water use for agricultural purposes other than irrigation were able to be imputed, the source of the water for other agricultural purposes could not be imputed. As a result, the volume estimates by source of water should be used with care when comparing with volume estimates of total water used for all agricultural purposes.

COMPARABILITY WITH AGRICULTURAL COMMODITIES AUSTRALIA

8 The estimates of agricultural establishments and area under pasture or crop for 2002-03 and 2003-04 in this publication have been drawn from *Agricultural Commodities, Australia* (ABS cat. no. 7121.0). These estimates were compiled from the annual Agricultural Survey and Supplementary Collections (i.e. Apples and Pears Collection and Vineyards Collection). The estimates of agricultural establishments and area under pasture or crop for 2004-05 in this publication differs from *Agricultural Commodities, Australia*, in that the estimates for grapevines in this publication are derived from the Agricultural Survey rather than the Vineyards Collection. For further information please contact the Director, Environment and Energy Business Statistics Centre, on Hobart 03 6222 5804.

COMPARABILITY WITH WATER
ACCOUNT AUSTRALIA

9 Estimates of water usage presented in this publication differ from those presented in *Water Account, Australia 2000-01* (cat.no. 4610.0). The water use estimates for 2004-05 represent water used for both the irrigation of pastures and crops and for other agricultural purposes such as stock drinking water, and dairy and piggery cleaning. Water use in the Water Accounts was determined by applying regional water application rates, obtained from water supplier surveys and state and territory or industry contacts, to the area of irrigated crops and livestock numbers.

RESPONSE RATE

10 The response rate for the Agricultural Survey 2004-05 is 81.7%.

RELIABILITY OF DATA

11 The estimates in this publication are subject to sampling and non-sampling errors.

SAMPLING ERRORS

12 The estimates in this publication are based on information obtained from a sample drawn from the total farm population in scope of the collection, and are subject to sampling variability; that is, they may differ from figures that would have been produced if all farms had been included in the survey. One measure of the likely difference is given by the standard error (SE), which indicates the extent to which an estimate might have varied by chance because only a sample of units was included. There are about two chances in three that a sample estimate will differ by less than one SE from the figure that would have been obtained if a census had been conducted, and approximately nineteen chances in twenty that the difference will be less than two SEs.

13 In this publication, 'sampling' variability of the estimates is measured by the relative standard error (RSE) which is obtained by expressing the SE as a percentage of the estimates to which it refers.

14 Where the RSE of an estimate included in this publication falls in the range of 10% to less than 25%, it has been annotated with the symbol '^' indicating that the estimate should be used with caution as it is subject to sampling variability too high for some purposes. Where the RSE of an estimate is 25% to 50%, it has been annotated with the symbol '*', indicating that the estimate should be used with caution as it is subject to sampling variability too high for most practical purposes. Where the RSE of an estimate exceeds 50%, it has been annotated with the symbol '**', indicating that the sampling variability causes the estimate to be considered too unreliable for general use. Separate indication of the RSEs of all estimates is available on request.

15 The following table contains estimates of RSEs for a selection of the statistics presented in this publication.

RELATIVE STANDARD ERRORS OF SELECTED ESTIMATES, By State—2004–05

	NSW(a)	Vic	QLD	SA	WA	TAS	NT	Aust.
	%	%	%	%	%	%	%	%
Total area irrigated (ha)	3.4	4.0	4.0	4.8	7.6	3.2	—	1.9
Total volume applied (ML)	3.3	3.9	6.7	6.9	5.5	3.7	—	2.4
Cereal crops for grain or seed - area irrigated (ha)	5.2	15.7	11.7	25.1	65.9	6.0	—	4.5
Cereal crops for grain or seed - volume applied (ML)	6.5	10.8	12.3	27.7	48.6	9.9	—	5.5
Vegetables for human consumption - area irrigated (ha)	14.4	2.3	4.6	5.6	3.7	2.8	—	2.7
Vegetables for human consumption - volume applied (ML)	10.5	2.9	5.7	6.2	5.0	3.8	—	2.6
Nurseries cutflowers or cultivated turf - area irrigated (ha)	7.6	3.3	6.2	19.0	16.0	5.5	—	3.7
Nurseries cutflowers or cultivated turf - volume applied (ML)	14.0	3.7	5.9	31.9	7.6	10.0	—	5.5
Irrigation methods - sprinkler - microspray - area irrigated (ha)	11.2	8.3	5.4	7.1	10.3	19.1	—	3.5

— nil or rounded to zero (including null cells)

(a) Includes ACT.

NON-SAMPLING ERRORS

16 Errors other than those due to sampling may occur because of deficiencies in the list of units from which the sample was selected, non-response, and errors in reporting by providers. Inaccuracies of this kind are referred to as non-sampling error, which may occur in any collection, whether it be a census or a sample. Every effort has been made

NON-SAMPLING ERRORS

continued

to reduce non-sampling error to a minimum by careful design and testing of questionnaires, operating procedures and systems used to compile the statistics.

ABS DATA AVAILABLE ON REQUEST

17 As well as the statistics included in this and related publications, the ABS may have other relevant data available on request. Inquiries should be made to either the National Information and Referral Service on 1300 135 070 or Ron Just on (03) 6222 5842.

RELATED PUBLICATIONS

18 A range of environmental and agricultural publications is produced by the ABS, including:

- *Water Account, Australia* (cat. no. 4610.0)
- *Natural Resource Management on Australian Farms (Preliminary)* (cat. no. 4624.0)
- *Land Management: Eurobodalla Shire NSW* (cat. no. 4651.0)
- *Land Management: Fitzroy and Livingstone Shires QLD* (cat. no. 4651.0)
- *Agricultural Commodities, Australia* (cat. no. 7121.0)
- *Environment Expenditure Local Government* (cat. no. 4611.0)

19 Current publications and other products released by the ABS are listed in the *Catalogue of Publications and Products* (cat. no. 1101.0). The Catalogue is available from any ABS office or the ABS web site <<http://www.abs.gov.au>>. The ABS also issues a daily Release Advice on the web site which details products to be released in the week ahead.

ACKNOWLEDGMENT

20 ABS publications draw extensively on information provided freely by individuals, businesses, governments and other organisations. Their continued cooperation is very much appreciated; without it, the wide range of statistics published by the ABS would not be available. Information received by the ABS is treated in strict confidence, as required by the *Census and Statistics Act 1905*. The Bureau of Meteorology's contribution of the Climate Conditions Appendix in this publication is especially acknowledged.

ABBREVIATIONS

'000	thousand
ACT	Australian Capital Territory
Aust.	Australia
EVAO	Estimated Value of Agricultural Operations
ha	hectare
mm	millimetre
ML	megalitre
ML/ha	megalitres per hectare
no.	number
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
RSE	relative standard error
SA	South Australia
SE	standard error
Tas.	Tasmania
Vic.	Victoria
WA	Western Australia
°C	degrees Celsius

CLIMATE CONDITIONS IN
2004-05

The period from July 2004 to June 2005 was a dry and warm one over most of Australia. More than 90% of the country had below-normal rainfall for the 12-month period, making it the 9th driest July-June period in 106 years of records. The national area-averaged rainfall was 367 mm, 22% below the average for the 1961-90 reference period. The period from January to May 2005 was especially dry (the second driest on record, after 1965)

Mean temperatures for Australia were the highest on record for a July-June period, being 0.76°C above the 1961-90 mean, which broke the previous record of 0.72°C, set in 1997-98.

The most significant contributor to the dry and warm conditions was a weak tropical monsoon in the summer of 2004-05. Wet season rainfall was well below normal through most of the tropics and subtropics, except for those areas directly under the paths of tropical cyclones. In particular, there were no episodes during the summer in which there was significant penetration of tropical moisture into central Australia. The only widespread rain through central Australia in 2004-05 fell in June 2005, which was a rather wet month through much of the country. Despite the June rains, it was the driest July-June period on record in parts of interior Western Australia, and large parts of the inland had less than 100 mm for the 12 months, with some areas receiving less than 50 mm. Before June rains lifted their July-June total to 68 mm, Alice Springs had only 36.6 mm for the 12 months from June 2004 to May 2005, only 14% of normal and a record low for this period.

Much of Queensland was also drier than normal, whilst another notably dry area was northern Tasmania, where some locations had their driest 12-month period on record. Autumn 2005 was very dry through much of eastern and central Australia, particularly in Victoria and South Australia which both had their driest autumn on record.

There were few substantial areas of above-normal rainfall. The most significant was around Carnarvon on the west coast of Western Australia, where 215 mm fell in July 2004, almost matching the annual average of 226 mm. Another area of above-average rainfall was in parts of northern inland New South Wales, which was particularly wet in October and December 2004, with some associated flooding in parts of the upper Murray-Darling basin. Victoria's rainfall for the 12-month period was generally close to normal, as was that in the south-west of Western Australia, where a wet autumn in 2005 offset a dry finish to 2004.

Temperatures in 2004-05 were well above normal, particularly from November 2004 onwards. Autumn 2005 was especially warm. April 2005 (2.58°C above average) was Australia's warmest month on record, in terms of the difference from the long-term average, with about two-thirds of the country having its warmest April on record. Influenced by the relatively low rainfall and reduced cloud cover, temperatures in northern Australia during the tropical wet season (October-April) were also the highest on record.

Daytime maximum temperatures were particularly warm. In parts of the western Northern Territory they were more than 2°C above normal, whilst anomalies in the 1-2°C range occurred across extensive areas of New South Wales, the southern half of Queensland, the southern Northern Territory and the interior of Western Australia.

CLIMATE CONDITIONS IN
2004–05 *continued*

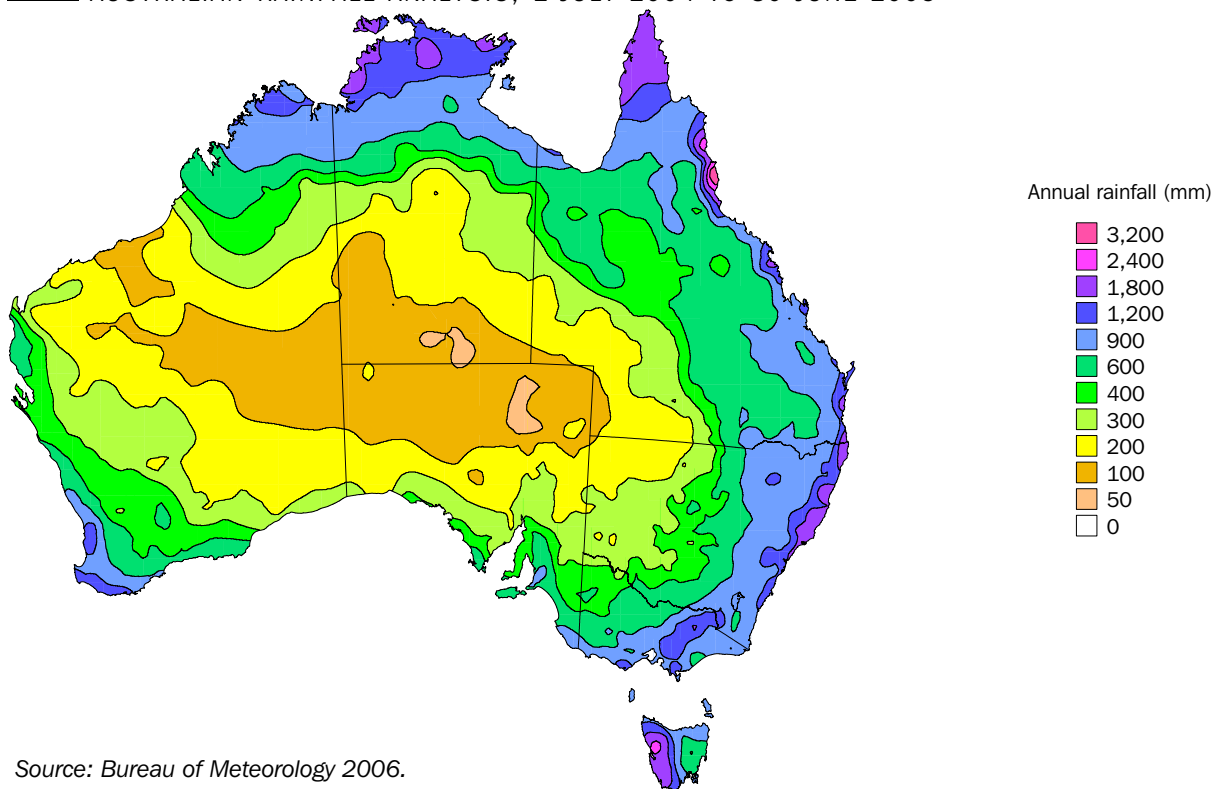
There were no significant areas of below-normal maximum temperatures. Overnight minimum temperatures were closer to normal (the generally dry conditions and reduced cloud cover leading to a wider-than-normal daily temperature range). They were 0.5–1.0°C above normal in most of Western Australia and south-western Queensland, but within 0.5°C of normal in most other areas.

Notable short-term weather events in 2004–05 included:

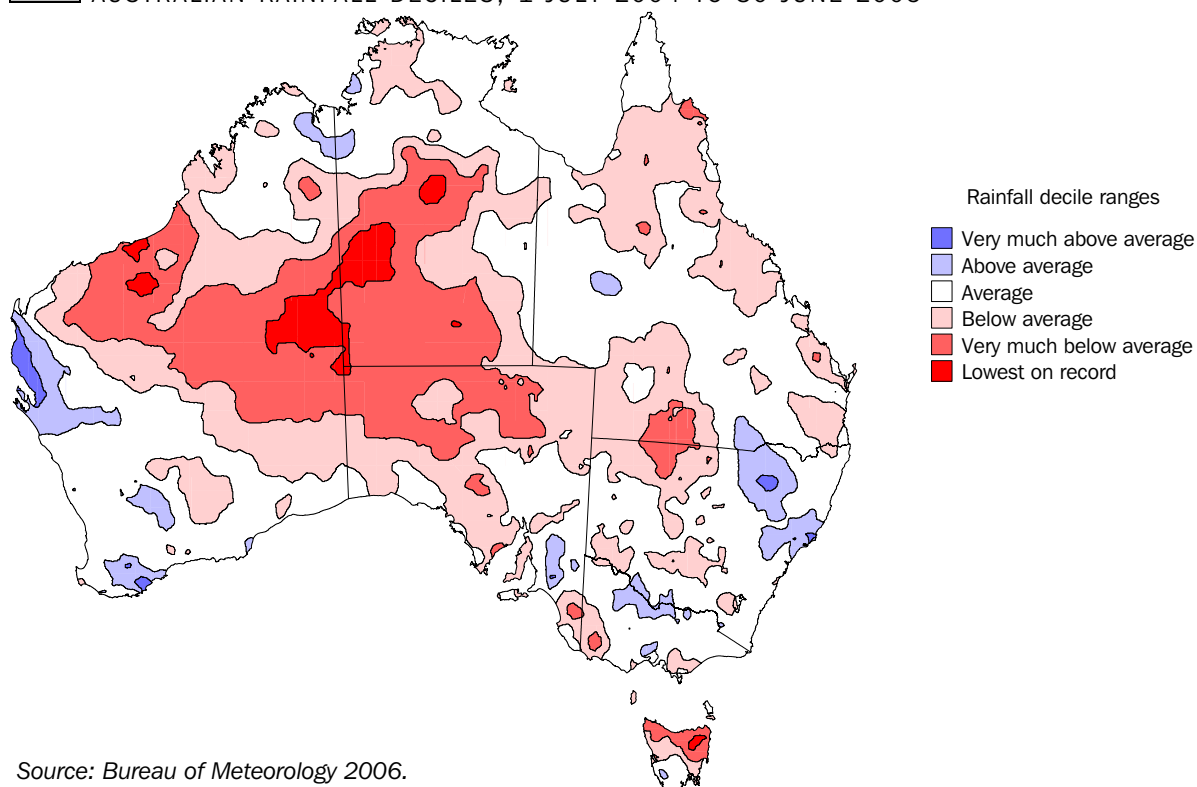
- A heavy low-elevation snowfall in eastern Victoria and far southern New South Wales from 17–19 July, with up to 43 cm at Bonang (Victoria). Some communities were cut off for several days and there were substantial stock losses.
- Severe spring frosts in southern Western Australia on 11–12 September. The lowest temperature was -4.5°C at Kellerberrin, the second-lowest on record for the state. There was substantial crop damage.
- Two major spring heatwaves in eastern Australia. The first mainly affected western New South Wales, with Wanaaring setting a state September record of 39.6°C on 28 September. The second, in mid-October, was more widespread, and saw a Victorian state monthly record of 40.2°C at Mildura and Walpeup on the 12th, followed by an October record of 38.2°C at Sydney on the 13th.
- A prolonged thundery period in eastern Australia from 5–14 December. Particularly damaging storms, with flash flooding, large hail, or both, occurred in Clermont (Queensland) on the 6th, Murray Bridge (SA) on the 11th, and metropolitan Sydney and Brisbane on the 13th. Narrabri West had its highest daily rainfall on record, 159 mm, on the 10th, resulting in widespread flooding.
- High temperatures, strong winds and low humidity in much of South Australia on 11 January. These were associated with major bush fires on the Eyre Peninsula in which there were nine deaths. Temperatures on most of the Eyre Peninsula were near 45°C, with peak wind gusts of 60–80 km/h.
- Heavy rain, high winds and low temperatures in much of south-eastern Australia on 2–3 February, associated with an intense low-pressure system in Bass Strait. Melbourne (113.4 mm) had its wettest day on record, with significant local flooding, whilst high winds caused significant damage, particularly in northern Tasmania. It was also unseasonably cool, with up to 30 cm of snow on the highest peaks. Mount Hotham had a maximum of -0.2°C on the 3rd, an Australian record for February.
- Tropical Cyclone *Ingrid*, which tracked from the Coral Sea westwards across Cape York Peninsula and north of the Northern Territory coast, before finally making landfall near Kalumburu (WA) on 16 March. The cyclone reached category 5 strength on several occasions and was the first recorded cyclone to be classified as severe (category 3 or above) in all three of Queensland, the Northern Territory and Western Australia. Property damage was limited by the sparse populations of the areas where it made landfall, but Emma Gorge (WA) received 445 mm of rain in 24 hours on 17 March, the state's second-highest March daily rainfall, with resultant severe local flooding.
- A major severe thunderstorm and tornado outbreak in south-western Western Australia on 16 May. Several tornadoes moved through metropolitan Perth, and Bunbury was also hit. There was widespread damage to buildings and other property.
- Extreme local rainfalls and flash flooding on the Gold Coast and adjacent far northern New South Wales on 30 June. A number of locations experienced 12-hour rainfalls exceeding 500 mm. The highest 24-hour total at a Bureau site was 587 mm at Loder Creek Dam, but there were private reports of totals exceeding 700 mm.

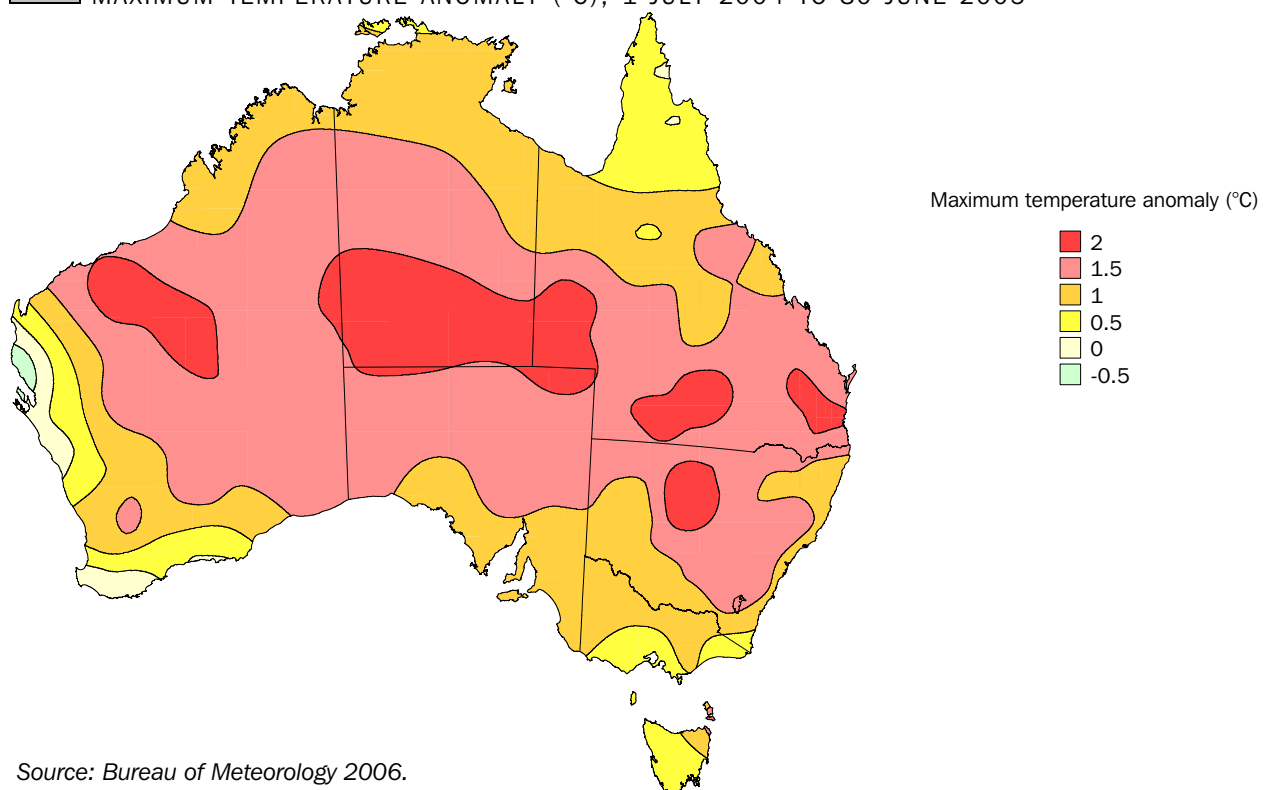
Source: Bureau of Meteorology 2006.

A1.1 AUSTRALIAN RAINFALL ANALYSIS, 1 JULY 2004 TO 30 JUNE 2005

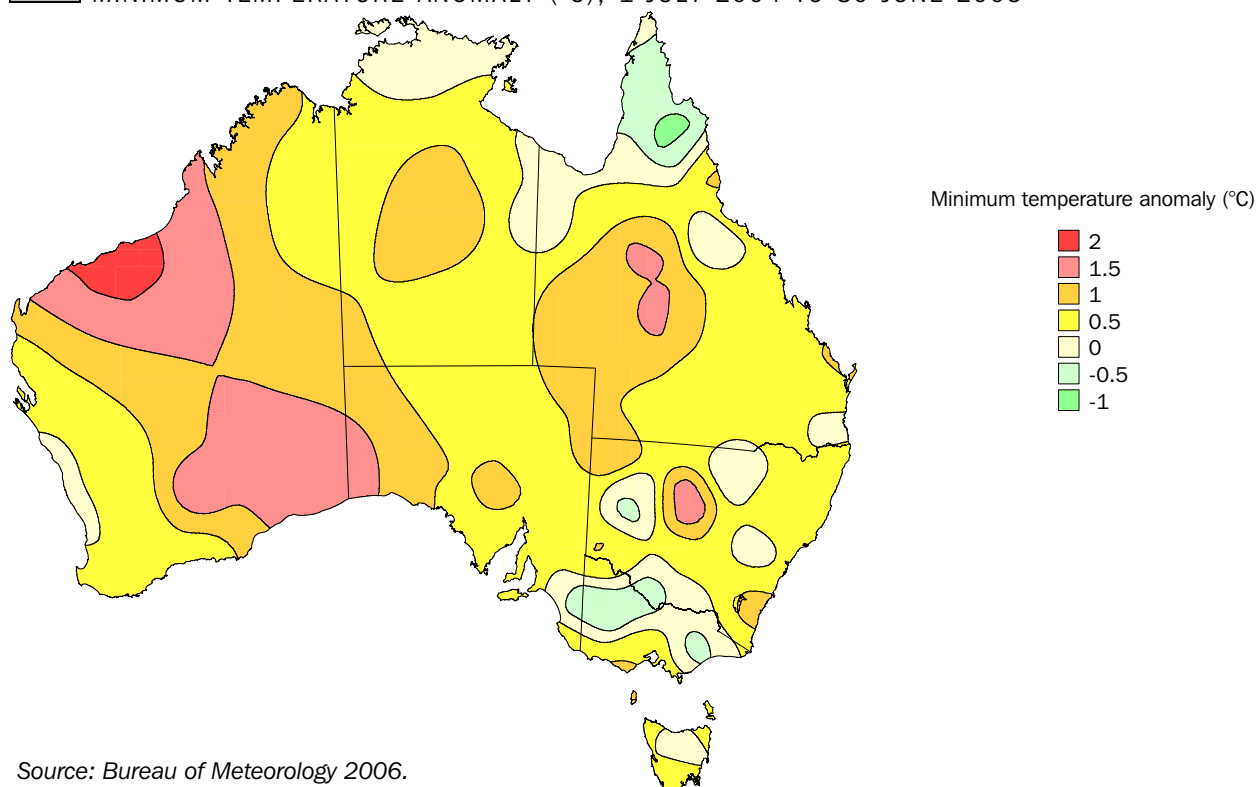


A1.2 AUSTRALIAN RAINFALL DECILES, 1 JULY 2004 TO 30 JUNE 2005

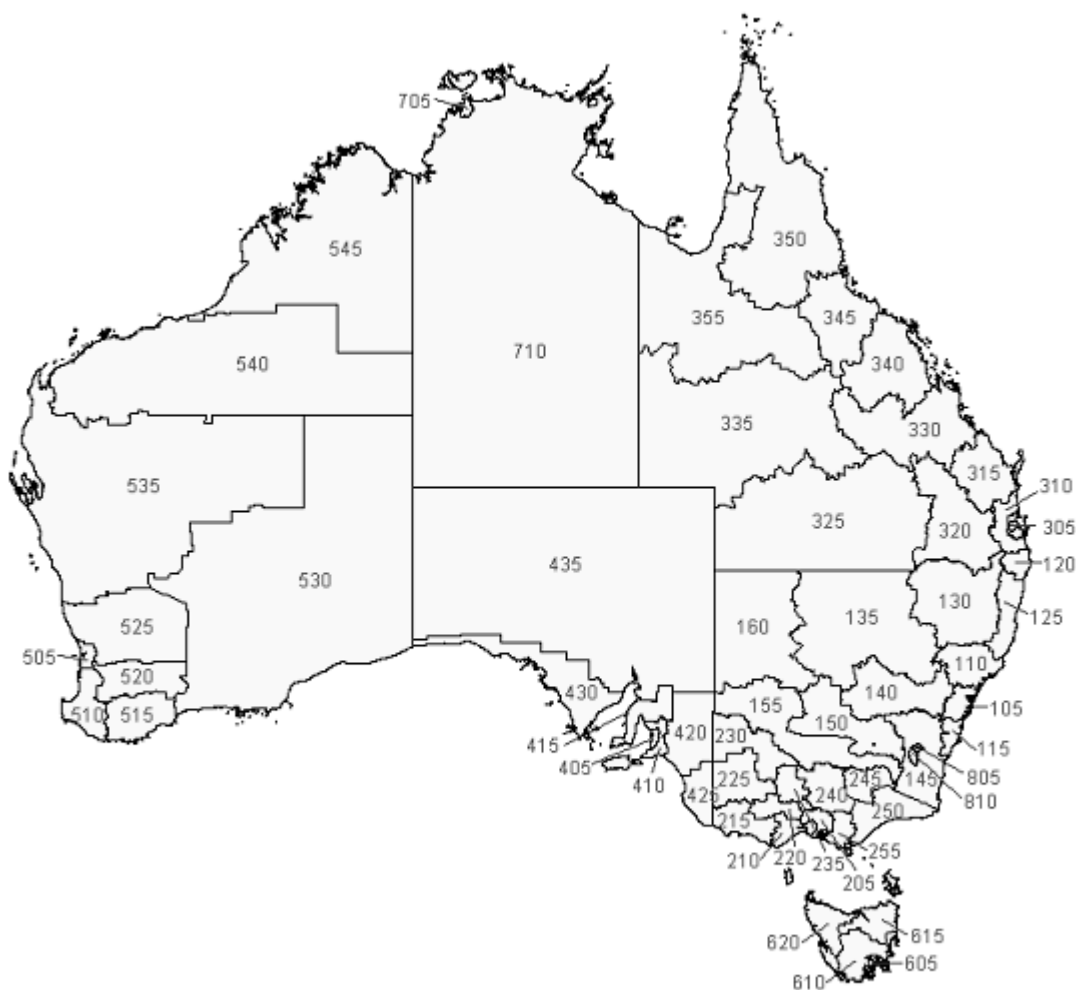


A1.3 MAXIMUM TEMPERATURE ANOMALY (°C), 1 JULY 2004 TO 30 JUNE 2005

Source: Bureau of Meteorology 2006.

A1.4 MINIMUM TEMPERATURE ANOMALY (°C), 1 JULY 2004 TO 30 JUNE 2005

Source: Bureau of Meteorology 2006.

A2.1 STATISTICAL DIVISIONS, AUSTRALIA, 2004-05

A2.2 STATISTICAL DIVISIONS, Australia—2004–05**New South Wales**

105 Sydney
 110 Hunter
 115 Illawarra
 120 Richmond-Tweed
 125 Mid-North Coast
 130 Northern
 135 North Western
 140 Central West
 145 South Eastern
 150 Murrumbidgee
 155 Murray
 160 Far West

Victoria

205 Melbourne
 210 Barwon
 215 Western District
 220 Central Highlands
 225 Wimmera
 230 Mallee
 235 Loddon
 240 Goulburn
 245 Ovens-Murray
 250 East Gippsland
 255 Gippsland

Queensland

305 Brisbane
 310 Moreton
 315 Wide Bay-Burnett
 320 Darling Downs
 325 South West
 330 Fitzroy
 335 Central West
 340 Mackay
 345 Northern
 350 Far North
 355 North West

South Australia

405 Adelaide
 410 Outer Adelaide
 415 Yorke and Lower
 North
 420 Murray Lands
 425 South East
 430 Eyre
 435 Northern

Western Australia

505 Perth
 510 South West
 515 Lower Great
 Southern
 520 Upper Great
 Southern
 525 Midlands
 530 South Eastern
 535 Central
 540 Pilbara
 545 Kimberley

Tasmania

605 Greater Hobart
 610 Southern
 615 Northern
 620 Mersey-Lyell

Northern Territory

705 Darwin
 710 Northern Territory -
 Bal

Australian Capital Territory

805 Canberra
 810 Australian Capital
 Territory - Bal

GLOSSARY

Agricultural establishment	An establishment which is engaged mainly in agricultural activities.
Application rate	Rate at which water is applied to an area or crop, measured in megalitres per hectare.
Area of holding	Includes all occupied and maintained land owned, leased or rented, land worked by sharefarmers and all road permits by a particular agricultural establishment. Excludes land leased or rented to others.
Drip irrigation	An irrigation technique that applies water to crops by methods that deliver the water to individual plants or rows of crops (also termed 'trickle' techniques).
Estimated value of agricultural operations (EVAO)	An estimation of the value of agricultural activity undertaken by an agricultural establishment. Three-year average weighted prices are applied to livestock turnoff and livestock numbers on the farm, and to area and production data for crops. The resultant aggregation of these commodity values is the EVAO. It is not an indicator of the value of receipts of individual farms but rather an indicator of the extent of agricultural activity.
Gigalitre	One thousand million litres.
Groundwater	Water occurring below the ground's surface.
Megalitre	One million litres.
Micro spray/micro-irrigation	System of irrigation designed to use low pressure and small flows of water to mini-sprays, mini-sprinklers, drippers and piping with a series of small openings.
Recycled or re-used water (off-farm)	Waste water, that may have been treated to some extent, that is used again without first being discharged to the environment eg. sewage water brought onto a property for the purpose of irrigation.
Sprinkler irrigation	Irrigation applied from various forms of overhead sprays (also known as spray irrigation).
Surface irrigation	Irrigation in the form of controlled flooding of paddocks or irrigation bays.
Surface water	Water flowing or held in streams, rivers and other wetlands in the landscape.
Town or country reticulated mains supply	Water supplied, often through a non-natural network, where an economic transaction has occurred for the exchange of this water.
Trickle irrigation	As for drip irrigation.
Water trading	The process of buying and selling water entitlements, where entitlements can include water supplied as part of a licence, allocation or other entitlement.

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ISBN 0642479844

RRP \$29.00