



FARM MANAGEMENT AND CLIMATE

EMBARGO: 11.30AM (CANBERRA TIME) FRI 12 SEP 2008

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INQUIRIES

For further information about these and related statistics, contact the National Information and Referral Service on 1300 135 070.

NOTES

ABOUT THIS PUBLICATION

This publication presents estimates from climate themed questions on the 2006–07 Natural Resource Management on Australian Farms Survey conducted by the Australian Bureau of Statistics (ABS). This is the second survey conducted by the ABS dedicated to Natural Resource Management (NRM), but the first to ask questions with a climate theme.

The results provide an important perspective into the views of land managers on changes to the climate, the effect of these changes, and the adaptability of land managers to such changes. Results are reported at a national and state/territory level, as well as for NRM regions. Results are further reported at the national level for different industries within the agricultural sector, as well as by the length of time the respondent had managed the agricultural holding.

Many of the data items reported in this publication rely on the perceptions and views of the person completing the form. Whilst they provide a useful source of information, they may not reflect reality and can be different to data collected by other means such as physical measurement. Furthermore, perceptions can be influenced by the circumstances prevailing at the time of the survey. For example, in 2006–07 parts of Australia were hotter and drier than normal, and this could have influenced responses to questions asked in this survey.

The ABS welcomes feedback on this publication in terms of its relevance, usefulness, quality and the range of data presented. Please direct feedback to the National Information and Referral Service on 1300 135 070.

APPENDICES

The addition of climatic conditions, agricultural water use and agricultural production data has been provided to give readers a more complete overview of the agriculture industry over the period 1 July 2006 to 30 June 2007.

ABBREVIATIONS

ACT	Australian Capital Territory
Aust.	Australia
n.e.c.	not elsewhere classified
NRM	natural resource management
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
Tas.	Tasmania
Vic.	Victoria
WA	Western Australia

Brian Pink
Australian Statistician

SUMMARY OF FINDINGS

CHANGES TO CLIMATE

Australia

Nationally, 65.6% of agricultural businesses reported that they considered the climate affecting their holding has changed and 62.4% reported that the perceived change in climate had an impact on their holding. Approximately half (49.5%) of agricultural businesses reported a change in the management practices on their holding in response to perceived changes in climate.

The most commonly reported perceived change in climate affecting the holding was a change in rainfall patterns (92.1%), followed by more extreme weather events (74.2%) and warmer temperatures (49.6%).

SUMMARY OF FINDINGS, by State—2006–07

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	Aust.
NUMBER								
Total agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
PERCENTAGE (b)								
Consider climate affecting holding has changed	63.6	74.2	60.6	67.3	58.5	69.4	31.8	65.6
Impact of perceived changes to climate on holding	60.7	71.2	57.3	63.4	54.6	65.8	25.0	62.4
Have changed management practices	47.1	58.0	46.1	50.7	41.8	50.2	14.9	49.5

(a) Includes ACT.

(b) Percentage of total agricultural businesses.

State/territory

Agricultural businesses in the Northern Territory were less likely to report that they considered the climate on their holding had changed (31.8%), compared to a high of 74.2% in Victoria. Of agricultural businesses in the Northern Territory reporting a perceived change in climate on their holding, 78.9% reported changes in rainfall patterns and 32.8% more extreme weather events. More agricultural establishments in the Northern Territory reported warmer temperatures had affected their holding than in other states and territories (61.2%). Of the Western Australian agricultural businesses that reported a perceived change in the climate affecting their holdings, 50.2% reported more extreme weather events.

NRM region

The Natural Resource Management regions with the highest percentage of agricultural businesses reporting that they considered the climate affecting their holding had changed were Northern Agricultural (WA) (83.4%), North (Tas.) (80.4%) and Goulburn Broken (Vic.) (78.6%). The regions with the lowest percentage of agricultural businesses reporting that they considered the climate affecting their holding had changed were Northern Territory (31.8%), Wet Tropics (Qld) (35.6%) and Northern Gulf (Qld) (39.7%).

Industry

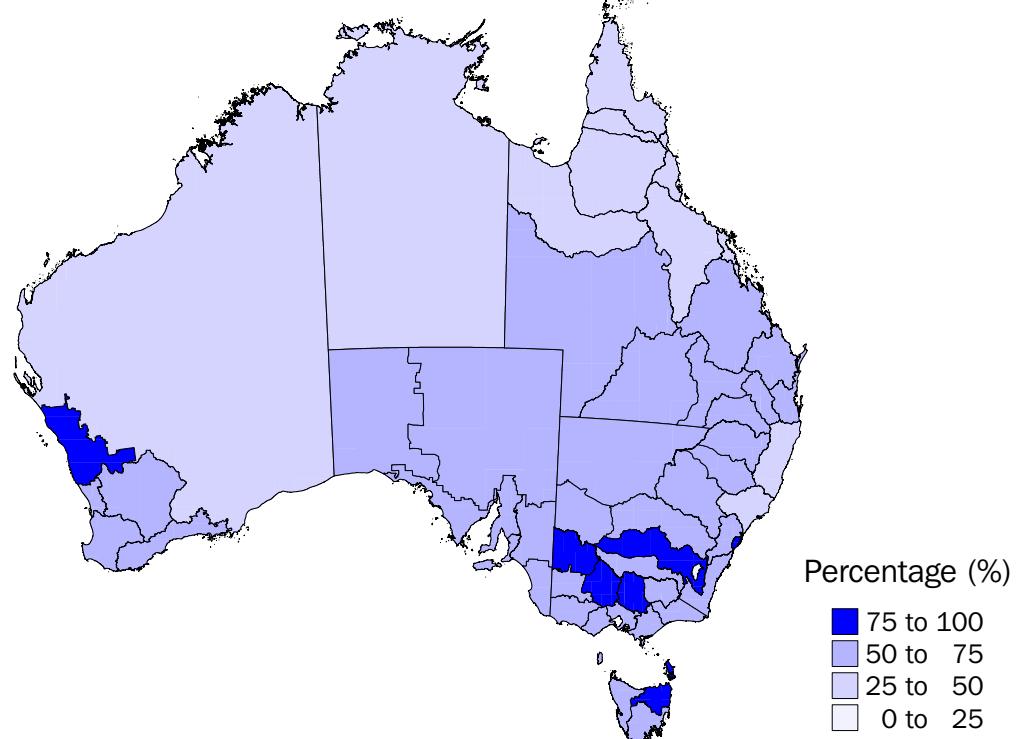
Agricultural industries with a high percentage of businesses reporting that they considered the climate affecting their holding had changed were citrus fruit growing (81.0%), apple and pear growing (77.3%), rice growing (74.7%), and dairy cattle farming (73.5%). In contrast, 41.5% of sugar cane growers considered the climate affecting their holding had changed.

SUMMARY OF FINDINGS *continued*

Years managing holding

The number of years that a respondent had been managing a holding had little influence on whether they considered that the climate affecting their holding had changed, or whether they had changed management practices in response to perceived changes in climate. The proportion of respondents to both these topics in each age category, when compared to the total number of respondents to these topics, was very similar.

1 PERCENTAGE OF AGRICULTURAL BUSINESSES THAT PERCEIVE CLIMATE AFFECTING HOLDING HAS CHANGED, by NRM region



IMPACTS ON HOLDING

Australia

Of all agricultural businesses, 65.6% reported that they considered the climate affecting their holding had changed and 62.4% reported the perceived change in climate had an impact on their holding. The most commonly reported impact to the holding was a decreased level of production (88.8%), followed by an increased frequency or extent of pests, weeds or disease (55.5%). In contrast, a small number of agricultural businesses reported a decreased frequency or extent of pests, weeds or disease (19.5%) and an increased level of production (15.2%).

State/territory

Of the 65.6% of agricultural businesses that reported they considered the climate affecting their holding had changed, a decreased level of production was the most commonly reported impact in all states and territories, ranging from 90.3% in Victoria to 66.4% in the Northern Territory.

SUMMARY OF FINDINGS *continued*

State/territory continued

Queensland and New South Wales reported the largest increase in frequency or extent of pests, weeds or disease (58.5% and 58.0% respectively) on their holding as a result of a perceived change to climate, while the Northern Territory reported the lowest (45.8%).

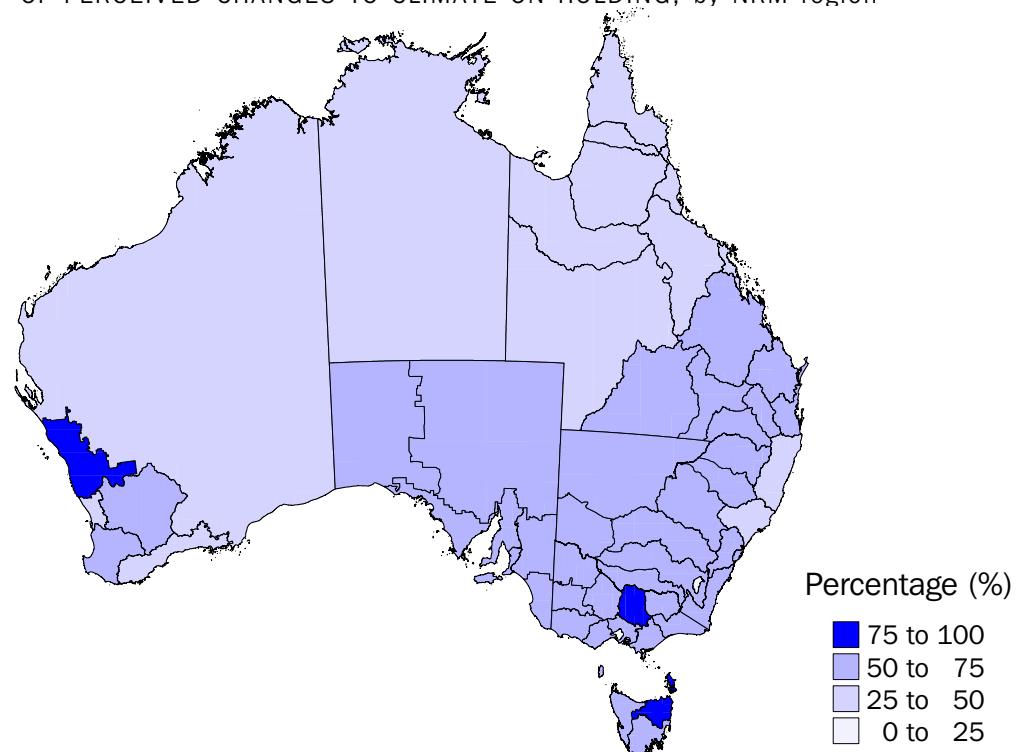
Agricultural businesses in South Australia reported the largest decrease in the frequency or extent of pests, weeds or disease (22.9%) on their holding as a result of a perceived change to climate, while Tasmania reported the lowest (10.4%).

In Western Australia, 20.4% of agricultural businesses reported an increase in the level of production on their holding as a result of a perceived change to climate, compared to just 13.5% of agricultural businesses in South Australia.

Industry

Agricultural industries with a high percentage of businesses reporting impacts to their holding as a result of a perceived change to climate were citrus growers (75.6%) followed by rice growers (74.7%) and sheep-beef cattle farmers (71.3%).

2 PERCENTAGE OF AGRICULTURAL BUSINESSES THAT REPORTED AN IMPACT OF PERCEIVED CHANGES TO CLIMATE ON HOLDING, by NRM region



SUMMARY OF FINDINGS *continued*

CHANGES TO MANAGEMENT PRACTICES *Australia*

Of the 98,661 agricultural businesses reporting that they considered the climate affecting their holding has changed, 75.4% reported that they had changed their management practices as a result of this perceived change.

The most commonly reported changed management practice was changed intensity of cropping (69.3%), followed by changed watering/irrigation practices (32.7%) and changed rotation or fallow practices (31.9%).

State/territory

The state or territory with the highest reported change in management practice in response to the perceived change in climate affecting their holding was Victoria (58.0% of all agricultural businesses) and the lowest was the Northern Territory (14.9% of all agricultural businesses).

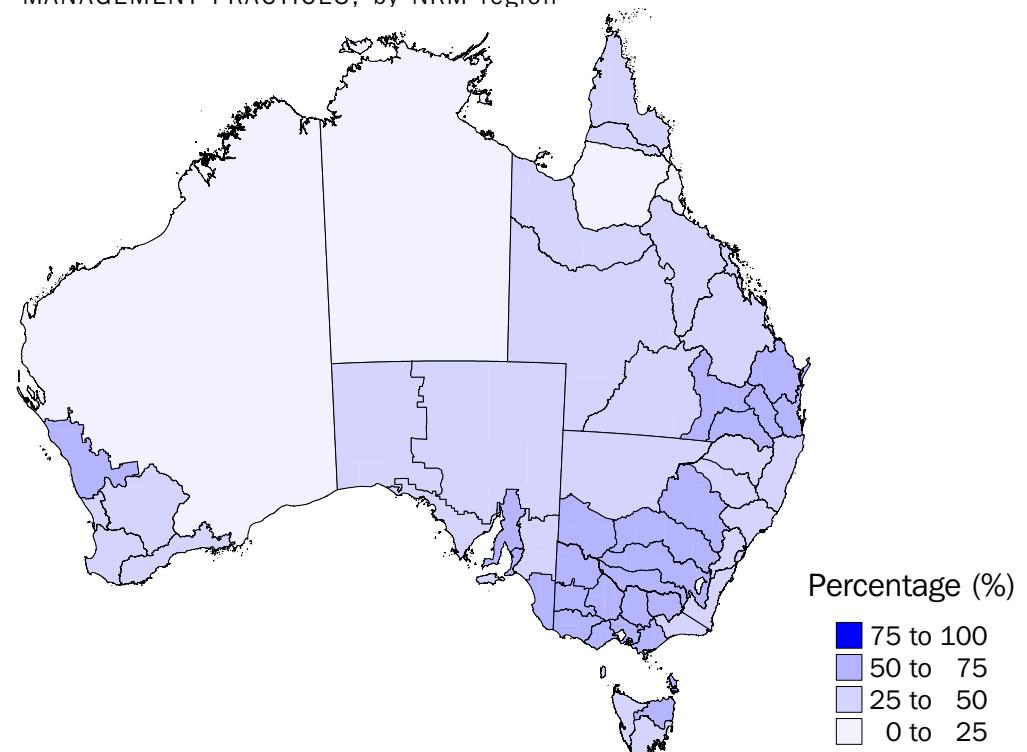
The management practice with the highest reported change, across all states and territories except the Northern Territory, was a change in the intensity of cropping and/or grazing. In the Northern Territory, changed watering/irrigation practices was the highest reported change in management practice (56.1%). A change in the time of planting and/or harvesting was most commonly reported in the Northern Territory (43.0%) and Western Australia (40.4%).

Industry

A high percentage of cotton growers (65.5%) reported changing their management practices as a result of a perceived change in climate affecting their holding. This was followed by Apple and Pear growers (61.9%) and Grape growers (60.5%).

SUMMARY OF FINDINGS *continued*

3 PERCENTAGE OF AGRICULTURAL BUSINESSES THAT HAVE CHANGED MANAGEMENT PRACTICES, by NRM region



1**PERCEIVED CHANGES TO CLIMATE EXPERIENCED ON HOLDING, by State—2006–07**

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	Aust.
NUMBER								
Total agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Consider climate affecting holding has changed	30 288	27 744	18 524	10 642	7 952	3 307	^ 203	98 661

PERCEIVED CHANGES TO CLIMATE EXPERIENCED ON HOLDING (%) (b)

Changes in rainfall patterns	91.1	93.2	90.0	93.5	95.5	91.6	78.9	92.1
More extreme weather events	79.6	75.1	76.7	72.4	50.2	70.4	^ 32.8	74.2
Warmer temperatures	46.7	55.9	44.3	53.2	44.6	51.6	61.2	49.6
Other changes	^ 4.5	^ 6.7	^ 4.8	^ 5.1	^ 3.8	* 4.5	* 7.5	5.2

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

(b) The number of agricultural businesses reporting specific perceived changes to climate as a percentage of agricultural businesses reporting a perceived change to the climate affecting their holding.

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

(a) Includes ACT.

2**IMPACT OF PERCEIVED CHANGES TO CLIMATE ON HOLDING, by State—2006–07**

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	Aust.
NUMBER								
Total agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Consider climate affecting holding has changed	30 288	27 744	18 524	10 642	7 952	3 307	^ 203	98 661
Impact of perceived changes to climate on holding	28 928	26 629	17 510	10 027	7 422	3 137	160	93 813

IMPACT OF PERCEIVED CHANGES TO CLIMATE ON HOLDING (%) (b)

Decreased level of production	89.3	90.3	88.5	88.9	82.4	87.7	66.4	88.8
Increased frequency or extent of pests, weeds or disease	58.0	55.9	58.5	48.1	49.3	51.6	45.8	55.5
Decreased frequency or extent of pests, weeds or disease	20.5	19.4	18.3	22.9	^ 18.8	^ 10.4	^ 15.2	19.5
Increased level of production	15.4	14.7	14.4	13.5	20.4	^ 14.2	^ 16.6	15.2
Other changes	^ 3.2	^ 3.4	^ 2.5	^ 5.0	^ 5.2	* 2.8	* 2.8	3.5

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

(b) The number of agricultural businesses reporting a specific impact of perceived changes to climate on their holding as a percentage of the total reporting any impact from perceived changes to climate on their holding.

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

(a) Includes ACT.

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	Aust.
NUMBER								
Total agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Consider climate affecting holding has changed	30 288	27 744	18 524	10 642	7 952	3 307	203	98 661
Have changed management practices	22 412	21 712	14 092	8 013	5 684	2 390	^ 96	74 400

	CHANGES TO MANAGEMENT PRACTICES IN RESPONSE TO PERCEIVED CHANGES IN CLIMATE (%) (b)							
Changed the intensity of cropping and/or grazing	74.4	68.0	74.0	50.7	71.6	64.4	^ 34.0	69.3
Changed watering/irrigation practices	26.8	36.7	30.5	45.6	20.7	47.8	56.1	32.7
Changed rotation or fallow practices	34.4	28.9	36.3	26.1	32.2	^ 30.9	^ 9.6	31.9
Changed the type or variety of commodities that are produced	32.5	27.5	28.2	29.3	39.3	^ 22.5	*20.2	30.1
Changed the time of planting and/or harvesting	22.8	27.9	24.2	32.8	40.4	^ 32.3	^ 43.0	27.3
Other changes	11.1	11.2	^ 9.2	^ 7.5	^ 9.2	^ 12.4	^ 11.8	10.3

^ 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

(a) Includes ACT.

(b) The number of agricultural businesses reporting a specific change in management practice as a percentage of the total reporting any change in management practice in response to a perceived change in climate.

	Total agricultural businesses	Consider climate affecting holding has changed(a)	Impact of perceived changes to climate on holding(a)	Have changed management practices(a)
		no.	%	%
New South Wales(b)				
Border Rivers/Gwydir	3 070	62.3	61.7	46.3
Central West	5 919	74.0	73.6	58.2
Hawkesbury/Nepean	3 308	59.6	52.7	41.0
Hunter/Central Rivers	4 521	47.7	45.1	^ 34.4
Lachlan	5 779	70.0	66.6	52.3
Lower Murray/Darling	^ 707	63.2	^ 57.0	^ 50.4
Murray	3 264	72.2	70.2	58.7
Murrumbidgee(b)	6 078	75.7	72.9	60.7
Namoi	3 253	66.3	64.4	50.0
Northern Rivers	8 549	49.7	45.4	30.3
Southern Rivers	2 321	62.9	61.5	46.1
Sydney Metro	^ 139	78.4	^ 63.1	^ 45.6
Western	722	61.8	59.2	^ 41.6
<i>Total(b)</i>	<i>47 629</i>	<i>63.6</i>	<i>60.7</i>	<i>47.1</i>
Victoria				
Corangamite	3 474	72.3	68.6	54.4
East Gippsland	919	66.5	63.6	^ 43.0
Glenelg Hopkins	4 601	68.0	63.3	50.4
Goulburn Broken	5 893	78.6	77.8	66.1
Mallee	2 758	77.3	69.8	63.7
North Central	5 002	77.6	74.9	61.4
North East	2 832	74.5	73.2	60.8
Port Phillip and Westernport	5 149	74.7	71.5	56.2
West Gippsland	4 337	72.0	69.7	54.7
Wimmera	2 446	72.4	70.3	57.0
<i>Total</i>	<i>37 410</i>	<i>74.2</i>	<i>71.2</i>	<i>58.0</i>
Queensland				
Border Rivers	1 339	73.2	69.4	57.4
Burdekin	1 890	43.3	^ 38.7	^ 32.6
Burnett Mary	5 841	67.5	63.5	51.7
Cape York	72	47.4	^ 39.4	^ 28.1
Condamine	4 271	73.4	70.8	59.8
Desert Channels	844	50.2	^ 44.1	^ 40.2
Fitzroy	3 763	59.4	58.3	48.8
Mackay Whitsunday	1 636	42.9	42.0	^ 32.6
Maranoa Balonne	1 266	70.5	69.1	55.4
Northern Gulf(c)	461	^ 39.7	^ 34.0	^ 24.3
South East	5 178	69.9	64.9	50.5
South West	634	55.2	54.0	49.6
Southern Gulf	386	^ 39.8	^ 35.1	^ 34.6
Wet Tropics	2 968	35.6	^ 32.5	^ 17.9
<i>Total</i>	<i>30 551</i>	<i>60.6</i>	<i>57.3</i>	<i>46.1</i>

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

(a) Percentage of total agricultural businesses.

(b) Includes ACT.

(c) Includes Cape York-Northern Gulf.

	Total agricultural businesses	Consider climate affecting holding has changed(a)	Impact of perceived changes to climate on holding(a)	Have changed management practices(a)
	no.	%	%	%
South Australia				
Eyre Peninsula	1 471	60.9	57.9	44.0
Kangaroo Island	287	65.5	64.5	^ 48.7
Adelaide and Mount Lofty Ranges	3 244	64.5	58.3	50.3
Northern and Yorke	3 335	70.6	69.6	55.2
SA Arid Lands(b)	163	67.2	60.7	49.6
SA Murray Darling Basin	4 429	65.6	60.7	47.8
South East	2 886	72.6	68.8	54.0
<i>Total</i>	<i>15 815</i>	<i>67.3</i>	<i>63.4</i>	<i>50.7</i>
Western Australia				
Avon	2 871	58.4	56.3	43.8
Northern Agricultural Region	1 355	83.4	82.0	71.9
Rangelands	672	^ 40.0	^ 31.7	^ 22.6
South Coast Region	2 251	53.9	48.7	^ 34.8
South West Region	4 770	58.1	54.5	39.5
Swan	1 672	53.3	47.0	^ 37.7
<i>Total</i>	<i>13 592</i>	<i>58.5</i>	<i>54.6</i>	<i>41.8</i>
Tasmania				
North	1 751	80.4	77.4	58.6
North West	1 689	56.6	53.8	41.9
South	1 326	71.2	66.0	49.5
<i>Total</i>	<i>4 766</i>	<i>69.4</i>	<i>65.8</i>	<i>50.2</i>
Northern Territory				
<i>Total</i>	<i>640</i>	<i>31.8</i>	<i>25.0</i>	<i>^ 14.9</i>
Australia	150 403	65.6	62.4	49.5

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

(a) Percentage of total agricultural businesses.

(b) Includes Alinytjara Wilurara.

CHANGES TO MANAGEMENT PRACTICES IN RESPONSE TO PERCEIVED CHANGES IN CLIMATE, by Industry—2006–07

	Total agricultural businesses	Consider climate affecting holding has changed(a)	Impact of perceived changes to climate on holding(a)	Have changed management practices(a)
	no.	%	%	%
0111 Nursery Production (Under Cover)	^ 421	^ 59.5	^ 43.1	^ 53.9
0112 Nursery Production (Outdoors)	^ 780	64.3	58.8	^ 44.1
0113 Turf Growing	^ 301	^ 48.9	^ 39.6	^ 36.0
0114 Floriculture Production (Under Cover)	^ 258	^ 57.5	^ 54.9	^ 44.5
0115 Floriculture Production (Outdoors)	^ 479	^ 57.9	^ 47.5	^ 43.4
0121 Mushroom Growing	*97	*19.3	*11.0	*10.4
0122 Vegetable Growing (Under Cover)	913	59.2	^ 55.5	^ 27.2
0123 Vegetable Growing (Outdoors)	4 055	61.1	57.1	41.5
0131 Grape Growing	6 039	71.6	65.0	60.5
0132 Kiwifruit Growing	*46	^ 91.6	^ 91.6	**51.6
0133 Berry Fruit Growing	^ 465	^ 57.6	^ 56.0	^ 42.6
0134 Apple and Pear Growing	780	77.3	69.1	61.9
0135 Stone Fruit Growing	1 193	71.3	66.5	44.0
0136 Citrus Fruit Growing	1 388	81.0	75.6	59.1
0137 Olive Growing	^ 398	^ 63.3	^ 63.3	^ 41.5
0139 Other Fruit and Tree Nut Growing	3 271	51.1	46.8	^ 31.4
0141 Sheep Farming (Specialised)	12 150	70.4	66.5	54.6
0142 Beef Cattle Farming (Specialised)	44 957	64.6	61.7	50.1
0143 Beef Cattle Feedlots (Specialised)	*243	^ 66.9	^ 61.5	*35.5
0144 Sheep-Beef Cattle Farming	8 501	73.5	71.3	56.6
0145 Grain-Sheep or Grain-Beef Cattle Farming	14 131	68.0	66.5	51.0
0146 Rice Growing	^ 127	^ 74.7	^ 74.7	*55.0
0149 Other Grain Growing	11 358	65.7	64.5	49.3
0151 Sugar Cane Growing	3 975	41.5	38.1	26.7
0152 Cotton Growing	^ 526	69.2	69.0	65.5
0159 Other Crop Growing n.e.c.	2 472	59.6	57.3	48.8
0160 Dairy Cattle Farming	8 921	73.5	70.7	58.7
0171 Poultry Farming (Meat)	797	^ 43.9	^ 36.5	^ 21.3
0172 Poultry Farming (Eggs)	499	^ 45.1	^ 35.7	^ 18.2
0180 Deer Farming	*184	^ 77.5	^ 76.9	^ 69.3
0191 Horse Farming	3 019	69.0	65.7	52.8
0192 Pig Farming	894	68.6	59.0	47.1
0193 Beekeeping	*30	^ 73.6	*39.4	—
0199 Other Livestock Farming n.e.c.	^ 1 049	^ 49.5	48.6	34.3
All Agriculture	134 718	65.8	62.7	50.0
All Other Industries(b)	15 685	63.7	59.7	44.8
All Industries	150 403	65.6	62.4	49.5

^ 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

** 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) Percentage of total agricultural businesses.

(b) Consists of businesses with agricultural activities for which the main industry is other than agriculture.

YEARS MANAGING HOLDING

	0-10	11-20	21-30	31-40	41-50	51+	No response	Total
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NUMBER

Total agricultural businesses	41 540	36 288	30 952	20 999	11 007	5 857	3 804	150 403
Consider climate affecting their holding has changed	25 914	24 058	21 286	14 514	7 302	3 918	1 669	98 661
Have changed management practices	19 620	18 626	16 026	11 390	5 078	2 560	1 099	74 400

EXPLANATORY NOTES

INTRODUCTION

1 This publication presents results from the ABS Natural Resource Management Survey 2006–07. This is the second of an ongoing collection of natural resource management data.

SCOPE AND COVERAGE

2 The scope of the 2006–07 Natural Resource Management Survey was all agricultural businesses above a minimum size cut-off recorded on the Australian Business Register (ABR) maintained by the Australian Tax Office (ATO).

3 The measure of size used was the ABS's Estimated Value of Agricultural Operations (EVAO) where available, or where it was not available, a Business Activity Statement (BAS) turnover size was derived. A minimum size cut-off of \$5,000, based on either EVAO or BAS Turnover, was used to determine whether a unit was in scope of the Survey.

4 While the survey frame does not contain all agricultural businesses in Australia, it is expected to provide better coverage than previous non-ABR-based Agricultural Survey frames, since most businesses and organisations in Australia need to obtain an Australian Business Number (ABN) from the ATO for their business operations. The frame is also expected to be more up-to-date than previous frames, as it excludes agricultural businesses with cancelled ABNs and incorporates regularly updated information on agricultural businesses from the ATO.

5 A sample of 20,575 agricultural businesses was included in the Natural Resource Management Survey 2006–07. The businesses selected were a sub-sample of the 36,000 agricultural businesses included in the 2006–07 Agricultural Survey.

6 The sample was designed to ensure acceptable estimates at the National, State and Natural Resource Management (NRM) levels.

7 The Natural Resource Management Survey 2006–07, achieved a live response rate of 87%.

GENERAL

8 Where figures have been rounded, discrepancies may occur between sums of the component items and totals.

INDUSTRY CLASSIFICATION

9 Businesses in the Natural Resource Management Survey 2006–07 have been classified according to the agricultural subdivision of the 2006 edition of the *Australian and New Zealand Standard Industrial Classification (ANZSIC) (cat. no. 1292.0)* as follows:

- 01 Agriculture (Division A)
- 011 Nursery and Floriculture Production
- 012 Mushroom and Vegetable Growing
- 013 Fruit and Tree Nut Growing
- 014 Sheep, Beef Cattle and Grain Farming
- 015 Other Crop Growing
- 016 Dairy Cattle Farming
- 017 Poultry Farming
- 018 Deer Farming
- 019 Other Livestock Farming

REFERENCE PERIOD

10 Estimates in this publication relate to agricultural businesses within the survey scope (see paragraph 2), which operated in Australia at any time during the year ended 30 June 2007.

GEOGRAPHY

11 In response to the demand for more tailored, regionally-based output, estimates from the Natural Resource Management Survey 2006–07 have been produced at the Australian, state/territory and NRM levels. The 58 NRM regions across Australia were identified for the purposes of addressing natural resource management and sustainable agriculture priorities. Appendix 1 contains a map outlining the specific NRM regions used in this publication. The NRM regions are output as per the boundary specifications of

EXPLANATORY NOTES *continued*

August 2005. Further information on NRM regions can be found at the following website; <http://nrm.gov.au>

12 Natural resource management data have been collected for all 58 NRM regions, except Torres Straight. However, for a combination of data quality and confidentiality reasons, the estimates for three of the NRM regions have been merged with larger NRM regions. The NRM regions that have been merged are listed below:

- NRM region 801 (ACT) has been merged with NRM region 108 (Murrumbidgee). State totals for NSW also include the ACT;
- NRM region 401 (Alinytjara Wilurara) has been merged with NRM region 406 (SA Arid Lands); and
- NRM region 304,310 (Cape York, Northern Gulf) has been merged with NRM region 310 (Northern Gulf).

COMPARABILITY WITH AGRICULTURAL SURVEY

13 The Natural Resource Management Survey 2006–07 and the Agricultural Survey 2006–07 both produce estimates relating to the number of agricultural businesses and the area of agricultural land. In order to maintain coherence between the two estimates, the Natural Resource Management Survey estimates have been aligned to the Agricultural Survey estimates for NRM regions using a calibration algorithm which minimised the impact to the estimation weights. For further information, please contact the Director, Environment and Agriculture Surveys Business Statistics Centre, on (03) 6222 5850.

RELIABILITY OF DATA

14 Estimates in this publication are subject to sampling and non-sampling error.

SAMPLING ERROR

15 The estimates in this publication are based on information obtained from a sample drawn from the total agricultural business population in scope of the collection and are subject to sampling variability. That is, estimates may differ from figures that would have been produced if all agricultural businesses 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 complete enumeration had been conducted, and approximately nineteen chances in twenty that the difference will be less than two SEs.

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

17 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.

EXPLANATORY NOTES *continued*

SAMPLING ERROR *continued*

18 The following table contains RSEs for a selection of the statistics presented in this publication:

RELATIVE STANDARD ERRORS OF SELECTED ESTIMATES, by State—2006–07

	NSW(a)	Vic.	QLD	SA	WA	Tas.	NT	Aust.
	%	%	%	%	%	%	%	%
Agricultural Businesses	0.7	1.0	1.1	1.2	1.3	1.7	3.5	0.4
Consider climate affecting their holding has changed	3.9	3.0	4.2	4.3	6.0	7.2	10.1	1.9
Changed management practices in response to perceived changes in climate	2.4	2.4	2.8	3.5	5.5	5.2	13.7	1.3

(a) Includes ACT.

NON-SAMPLING ERRORS

19 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 errors and may occur in any collection whether it be a census or a sample. Every effort has been made to minimise non-sampling error by careful design and testing of questionnaires, operating procedures and systems used to compile the statistics.

20 The data for NRM Region 112 (Sydney Metro) should be used with caution as it does not truly represent agricultural businesses in the region due to deficiencies in the frame from which the sample was selected.

DATA QUALITY

21 The estimates in this publication rely on the perception of the person completing the survey form. Accordingly, the results may differ from that which may be derived from scientific analysis, observation or measurement.

RELATED PUBLICATIONS

22 A range of NRM and agricultural publications are produced by the ABS including:

- *Agricultural Commodities, Australia* (cat. no. 7121.0)
- *Agricultural Commodities: Small Area Data, Australia* (cat. no. 7125.0)
- *Water Use on Australian Farms* (cat. no. 4618.0)
- *Natural Resource Management on Australian Farms* (cat. no. 4620.0)

23 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.

ABS DATA AVAILABLE ON REQUEST

24 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 the National Information and Referral Service on 1300 135 070.

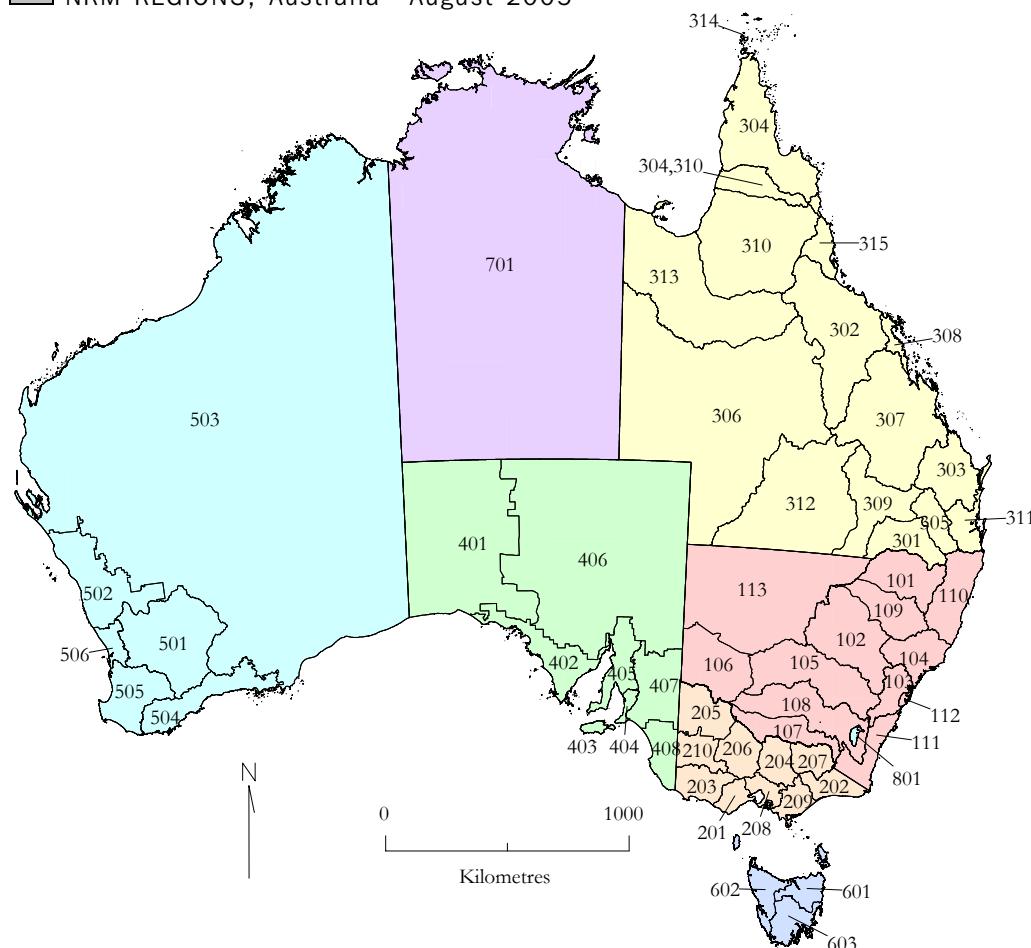
ACKNOWLEDGMENT

25 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. The Bureau of Meteorology's contribution of the Climate Conditions Appendix in this publication is especially acknowledged.

26 Information received by the ABS is treated in strict confidence, as required by the *Census and Statistics Act 1905*.

APPENDIX 1 NRM REGIONS

A1 NRM REGIONS, Australia—August 2005



APPENDIX 2 CLIMATE CONDITIONS

AUSTRALIAN CLIMATE IN 2006-07

Rainfall over Australia in 2006-07 was near normal, with the all-Australian average for the 12-month period finishing 4% below the long-term average. It was very dry over much of southern and eastern Australia during the second half of 2006, but the first half of 2007 was closer to normal in those areas, whilst wet-season rainfall was above normal over many tropical areas. These conditions were associated with an El Niño event which became established in the second half of 2006 before breaking down in early 2007.

In south-eastern Australia, the second half of 2006 was exceptionally dry. Parts of Victoria (especially in the north-eastern ranges and around Melbourne), north-eastern Tasmania and southern coastal South Australia had their driest six months on record, and most of these regions had rainfall 40-60% below normal. It was also rather dry over this period further north in eastern Australia, and much of the inland was seasonally dry. Rainfall returned to near-normal levels over most of the region in the first half of 2007, with good rains in many areas in April and May after initial falls from a system of tropical origin in late January. Coastal New South Wales, which had not been as dry as inland areas, and eastern Victoria received very heavy rains in June, with widespread flooding, which lifted 12-month totals in some areas into the above-normal range. There were some residual dry areas, especially around Melbourne and in northern Tasmania, with parts of both areas having their driest year on record. Tasmania (22% below normal) had its 8th driest year on record, whilst Victoria (27% below) ranked 9th.

After a dry start, many tropical and subtropical areas had an active wet season. January saw widespread heavy rains through central Australia associated with a tropical low, with Bedourie (Queensland) receiving 169 mm on one day, more than three times its total for all of 2006. There were further heavy rains in the Top End of the Northern Territory in late February and early March, with four-day falls exceeding 800 mm in places. Whilst it was a very quiet cyclone season, with only five cyclones in the Australian region (equalling the lowest number since at least 1944), the cyclones which did occur brought rainfalls well above normal to parts of Western Australia's northern interior. Many parts of the tropics received further unseasonal rains in June, especially in the northern half of the NT and northern inland Queensland. An area around Kakadu had its wettest 12 months on record, and parts of interior WA were more than 50% above normal. However, one subtropical area which missed out was southeastern Queensland, where continued dry conditions contributed to major water shortages. Most of the southeast was in the driest 10% of all years for the 12-month period.

The south-west of Western Australia received near-normal rainfall in August and September after an extremely dry first half of the winter rainfall season. However, early-season rains were again lacking in the first half of 2007, although not to quite such an extreme extent as in 2006. This resulted in below-normal rainfall through most of the region, with many parts of the west coast south of the tropics in the lowest decile, and some records set around Geraldton.

It was a very warm year through most of the continent, with only a very cool June (especially in the tropics) preventing Australia from having its warmest July-June period on record. Mean temperatures for the period were 0.71°C above the 1961-90 average, ranking third, with daytime maxima (+0.88°C) ranking third and overnight minima (+0.54°C) sixth.

Whilst temperatures in the northern tropics were generally close to normal, it was a very warm year in the southern two-thirds of the continent, with many areas having their warmest 12 months on record, especially for daytime maxima. South Australia, Victoria and New South Wales all had their warmest July-June periods on record. Maximum temperatures were more than 1°C over most areas outside the tropics, except for Tasmania and the eastern coastal fringe, and were 1.5-2.5°C above normal over most of northern Victoria and southern inland NSW. Minima were less extreme but were still 1-2°C above normal over a broad belt in central Australia extending from the southern

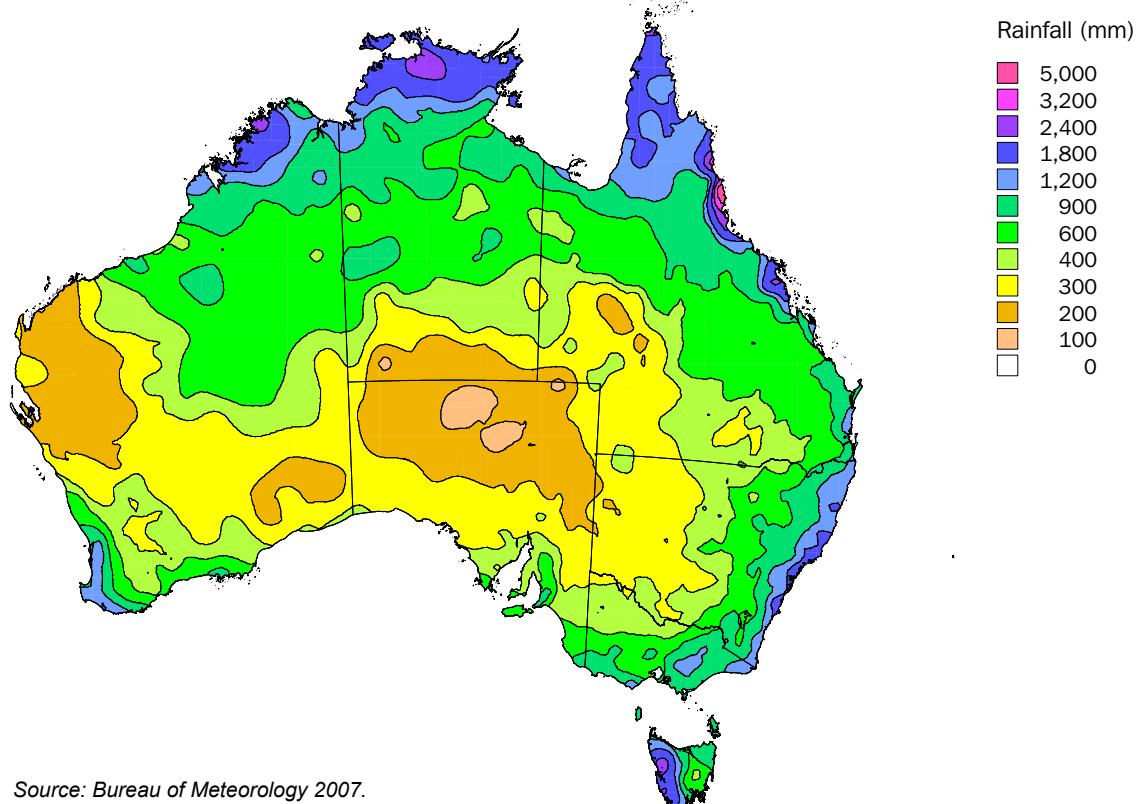
APPENDIX 2 CLIMATE CONDITIONS *continued*

AUSTRALIAN CLIMATE IN 2006-07 *continued*

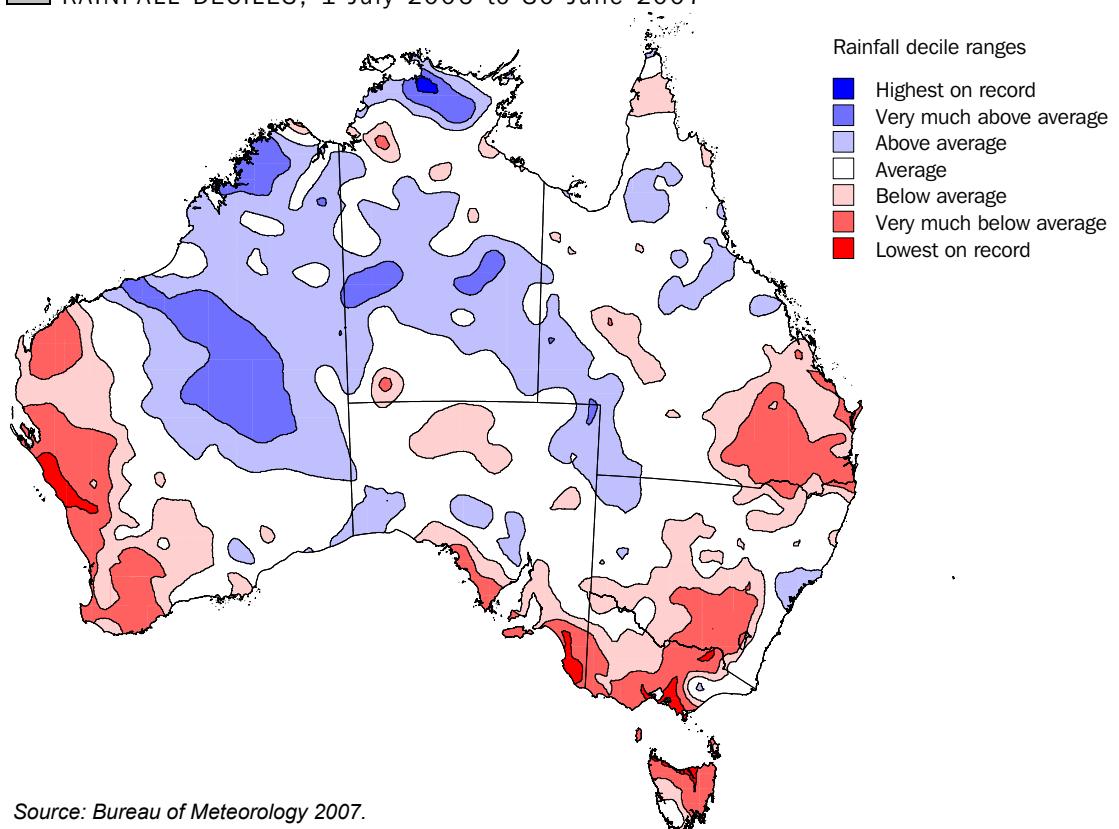
Northern Territory into southern inland Queensland. Spring and autumn were especially warm with records set in many areas, although there were also some damaging late-season frosts in September and October in parts of the southeast. Summer was also widely warmer than normal, although less so than autumn and spring. An exceptional cold spell in mid-June, associated with unseasonal rain, brought record low daytime temperatures to many parts of the tropics, with maximum temperatures below 10°C extending as far north as Tennant Creek and Mount Isa.

APPENDIX 2 CLIMATE CONDITIONS *continued*

A2 ANNUAL RAINFALL, 1 July 2006 to 30 June 2007

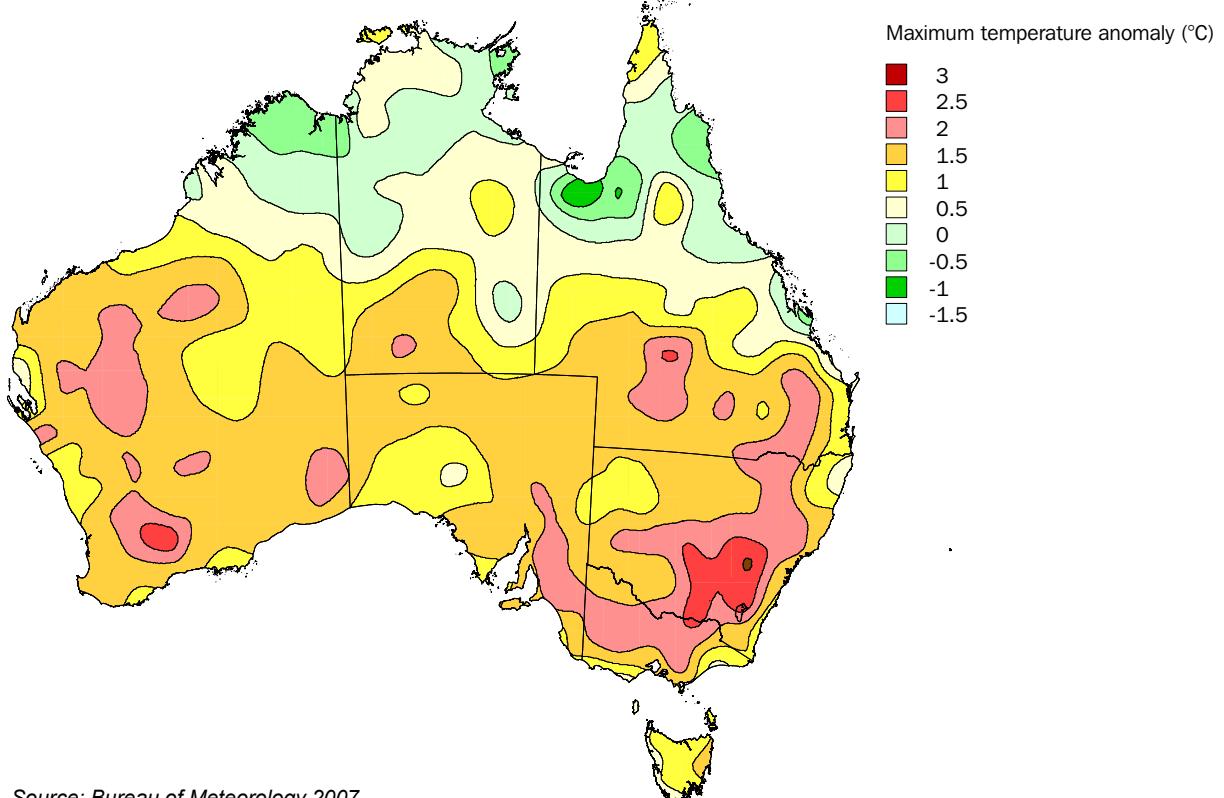


A3 RAINFALL DECILES, 1 July 2006 to 30 June 2007



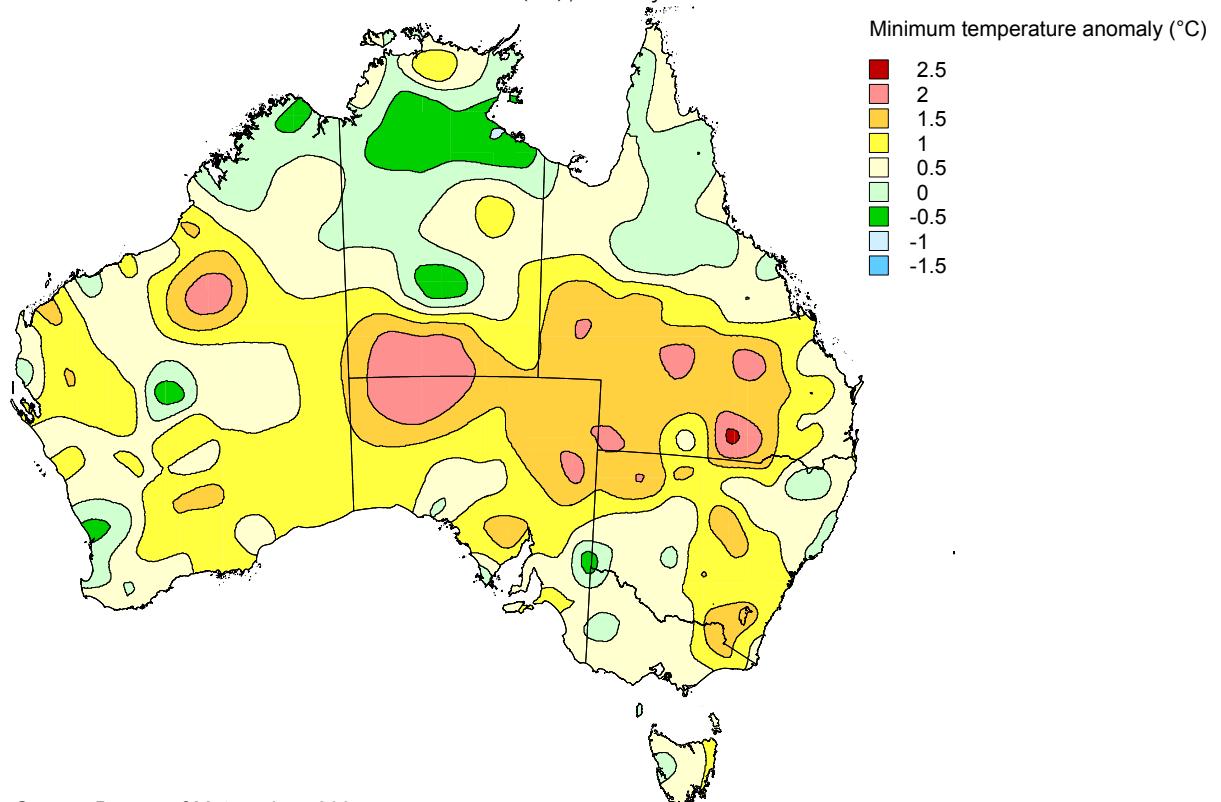
APPENDIX 2 CLIMATE CONDITIONS *continued*

A4 MAXIMUM TEMPERATURE ANOMALY (°C), 1 July 2006 to 30 June 2007



Source: Bureau of Meteorology 2007.

A5 MINIMUM TEMPERATURE ANOMALY (°C), 1 July 2006 to 30 June 2007



Source: Bureau of Meteorology 2007.

APPENDIX 3 WATER USE

A6 SOURCES OF AGRICULTURAL WATER, by State—2006–07

	Water supplied by government or private irrigation schemes		Groundwater	Town or country reticulated mains supply	Recycled or re-used water from off-farm sources		Other	Total all sources
	Surface water	ML			ML	ML		
		ML	ML	ML	ML	ML	ML	ML
NSW(a)	677 388	1 073 085	1 027 323	^ 10 897	^ 13 255	^ 43 134	2 845 082	
Vic.	338 530	1 051 603	^ 337 065	^ 9 821	^ 58 068	^ 28 198	1 823 285	
QLD	682 232	757 416	607 595	^ 2 418	^ 21 098	^ 13 473	2 084 231	
SA	183 805	221 849	592 652	*18 789	^ 9 487	*8 198	1 034 780	
WA	138 754	133 459	130 969	^ 2 916	*1 003	4 891	411 992	
Tas.	225 393	^ np	^ 22 452	^ np	*1 424	185	287 845	
NT	10 825	^ np	21 954	^ np	—	—	34 215	
Aust.	2 256 927	3 275 943	2 740 011	^ 46 133	^ 104 335	98 078	8 521 428	

^ 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) Includes ACT.

APPENDIX 3 WATER USE *continued*

A7 IRRIGATION ACTIVITY, By NRM region—2006–07

	Agricultural businesses no.	Agricultural businesses irrigating no.	Area of agricultural land '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha
New South Wales(a)						
Border Rivers/Gwydir	3 087	245	4 084	59	292 128	5.0
Central West	6 002	845	6 778	^ 46	^ 229 846	5.0
Hawkesbury/Nepean	3 303	1 537	430	11	^ 40 236	3.6
Hunter/Central Rivers	4 581	1 424	1 589	^ 40	^ 99 894	2.5
Lachlan	5 802	614	7 172	^ 60	^ 233 713	^ 3.9
Lower Murray/Darling	710	484	5 504	^ 18	^ 85 379	4.7
Murray	3 269	1 277	2 737	147	366 480	2.5
Murrumbidgee(a)	6 111	1 854	6 317	198	847 528	4.3
Namoi	3 263	595	2 836	66	296 223	4.5
Northern Rivers	8 573	1 332	2 416	^ 21	^ 46 814	^ 2.3
Southern Rivers	2 306	371	747	^ 9	^ 31 830	3.4
Sydney Metro	139	83	9	^ 1	^ 1 650	2.8
Western	722	27	18 041	*4	*33 298	8.2
<i>Total</i> (a)	47 869	10 689	58 661	680	2 605 019	3.8
Victoria						
Corangamite	3 478	437	806	8	28 129	3.4
East Gippsland	920	160	455	^ 6	^ 12 047	2.0
Glenelg Hopkins	4 604	448	2 036	^ 16	^ 54 914	3.5
Goulburn Broken	5 859	3 071	1 375	150	595 962	4.0
Mallee	2 774	1 439	2 354	^ 47	^ 297 702	6.3
North Central	5 025	2 024	2 216	123	411 780	3.4
North East	2 832	613	751	^ 14	^ 44 390	3.1
Port Phillip and Westernport	5 153	1 473	458	20	49 374	2.5
West Gippsland	4 342	758	683	^ 42	^ 123 333	2.9
Wimmera	2 443	136	2 117	*12	31 282	*2.6
<i>Total</i>	37 429	10 557	13 250	438	1 648 914	3.8
Queensland						
Border Rivers	1 341	333	3 817	23	118 189	5.2
Burdekin	1 890	964	11 881	94	722 883	7.7
Burnett Mary	5 858	1 749	4 091	81	240 064	3.0
Cape York	71	14	3 312	^ 1	6 425	9.6
Condamine	4 292	940	2 191	50	130 543	2.6
Desert Channels	846	18	44 962	^ 1	^ 3 648	^ 6.3
Fitzroy	3 773	531	16 032	^ 57	180 603	^ 3.2
Mackay Whitsunday	1 640	817	568	68	107 337	1.6
Maranoa Balonne	1 267	91	6 412	^ 10	^ 47 239	^ 4.6
Northern Gulf(b)	452	228	11 415	^ 7	^ 27 548	4.2
South East	5 207	2 176	1 324	38	^ 117 607	3.1
South West	636	19	17 527	^ 1	^ 5 966	^ 4.6
Southern Gulf	390	7	18 188	1	^ 8 983	11.4
Wet Tropics	2 977	869	1 190	27	123 216	4.6
<i>Total</i>	30 650	8 757	143 871	458	1 840 252	4.0

^ 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

(a) Includes ACT.

(b) Includes Cape York - Northern Gulf.

APPENDIX 3 WATER USE *continued*

A7 IRRIGATION ACTIVITY, By NRM region—2006–07 *continued*

	Agricultural businesses no.	Agricultural businesses irrigating no.	Area of agricultural land '000 ha	Area irrigated '000 ha	Volume applied ML	Application rate ML/ha
South Australia						
Eyre Peninsula	1 476	21	3 951	*—	*127	*1.5
Kangaroo Island	290	12	200	*—	**522	**4.1
Adelaide and Mount Lofty Ranges	3 246	2 348	361	32	80 055	2.5
Northern and Yorke	3 344	364	3 412	^8	^10 373	^1.2
SA Arid Lands(a)	163	1	34 854	—	15	5.9
SA Murray Darling Basin	4 429	2 456	4 932	73	390 631	5.4
South East	2 888	1 245	2 354	87	484 334	5.6
Total	15 835	6 447	50 065	201	966 057	4.8
Western Australia						
Avon	2 878	76	8 270	**3	**3 832	**1.5
Northern Agricultural Region	1 361	58	5 186	*1	*6 218	6.1
Rangelands	672	279	76 208	10	92 342	9.1
South Coast Region	2 246	151	3 417	^3	*4 574	*1.4
South West Region	4 781	1 445	3 129	27	^123 152	4.6
Swan	1 670	926	532	10	^63 068	6.6
Total	13 608	2 935	96 742	53	293 186	5.5
Tasmania						
North	1 752	723	751	41	132 789	3.3
North West	1 705	759	270	29	82 872	2.8
South	1 327	579	638	17	47 368	2.7
Total	4 783	2 060	1 659	87	263 029	3.0
Northern Territory						
Total	643	342	61 202	6	19 737	3.2
Australia	150 817	41 787	425 449	1 923	7 636 194	4.0

^ 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) Includes Alinytjara Wilurana.

APPENDIX 4 PRODUCTION

A8 PRODUCTION, Selected agricultural commodities, by NRM region—2006–07

	Rice for grain (t)	Cotton lin (kg)	Sugar cane cut for crushing (t)	Sheep (no.)	Dairy cattle (no.)	Beef cattle (no.)
New South Wales						
Border Rivers-Gwydir	—	95 949 510	—	2 122 154	**66	692 668
Central West	—	^ 30 932 219	—	5 096 945	^ 8 899	665 624
Hawkesbury-Nepean	—	—	—	^ 401 709	*12 679	^ 133 113
Hunter-Central Rivers	—	—	—	^ 280 645	59 324	514 555
Lachlan	—	^ 6 248 159	—	6 493 017	^ 13 182	507 541
Lower Murray Darling	—	—	—	^ 817 437	**15	^ 18 683
Murray	*28 973	—	—	2 555 207	^ 81 630	^ 328 686
Murrumbidgee	^ 131 615	6 931 443	—	5 526 462	*8 116	633 545
Namoi	—	^ 65 842 634	**3 983	^ 1 144 318	*2 672	^ 710 734
Northern Rivers	—	—	2 973 455	^ 1 357 502	69 128	1 072 505
Southern Rivers	—	—	—	^ 799 622	69 937	205 160
Sydney Metro	—	—	—	^ 1 941	—	*3 711
Western	—	**7 029 647	—	2 009 916	**26	122 476
Total	^ 160 588	212 933 612	2 977 438	28 606 874	325 673	5 609 002
Victoria						
Corangamite	—	—	—	1 486 781	268 579	^ 240 257
East Gippsland	—	—	—	255 735	^ 16 905	130 851
Glenelg Hopkins	—	—	—	6 748 343	284 560	665 372
Goulburn Broken	**2 219	—	—	1 569 615	344 477	348 931
Mallee	—	—	—	718 027	—	^ 9 860
North Central	—	—	—	3 162 763	^ 167 485	139 786
North East	—	—	—	^ 339 526	^ 61 082	416 252
Port Phillip and Westernport	—	—	—	243 414	^ 128 999	196 375
West Gippsland	—	—	—	^ 453 396	^ 393 951	361 299
Wimmera	—	—	—	2 195 971	*1 656	^ 66 267
Total	**2 219	—	—	17 173 570	1 667 696	2 575 249
Queensland						
Border Rivers	—	23 980 226	—	^ 636 242	**266	365 728
Burdekin	—	—	8 455 965	**13 420	**5 007	^ 1 657 731
Burnett Mary	—	—	3 715 555	*12 798	^ 59 204	943 386
Cape York	—	—	—	—	—	^ 96 057
Cape York - Northern Gulf	—	—	—	—	—	^ 27 728
Condamine	—	^ 22 871 605	—	^ 71 271	^ 32 259	424 067
Desert Channels	—	—	—	1 939 885	**2	1 465 603
Fitzroy	—	^ 16 553 124	*106 372	13 126	*3 562	2 816 857
Mackay Whitsunday	—	—	9 965 192	—	*3	^ 141 440
Maranoa Balonne	—	4 898 322	—	*581 936	—	^ 615 680
Northern Gulf	—	—	^ 87 970	*2 376	—	602 176
South East	—	—	^ 383 049	*4 792	^ 62 119	361 283
South West	—	*762 444	—	998 381	—	475 301
Southern Gulf	—	—	10 344 381	^ 103 711	*36	1 311 998
Wet Tropics	—	—	—	**490	^ 26 285	189 838
Total	—	69 065 721	33 058 484	4 378 429	188 743	11 494 873
South Australia						
Alintyjara Wilurara	—	—	—	*4 107	—	2 500
Eyre Peninsula	—	—	—	1 673 150	**2	^ 29 396
Kangaroo Island	—	—	—	^ 746 299	**6	^ 22 689
Adelaide and Mount Lofty Ranges	—	—	—	^ 382 793	^ 36 582	^ 108 444
Northern and Yorke	—	—	—	2 274 893	*5 545	^ 79 539
SA Arid Lands	—	—	—	1 013 380	—	114 805
SA Murray Darling Basin	—	—	—	1 799 822	^ 58 430	^ 106 241
South East	—	—	—	3 746 360	^ 74 952	603 227
Total	—	—	—	11 640 804	175 516	1 066 841

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution ** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

* estimate has a relative standard error of 25% to 50% and should be used with caution — nil or rounded to zero (including null cells)

APPENDIX 4 PRODUCTION *continued*

A8 PRODUCTION, Selected agricultural commodities, by NRM region—2006–07 *continued*

	Rice for grain (t)	Cotton lin (kg)	Sugar cane cut for crushing (t)	Sheep (no.)	Dairy cattle (no.)	Beef cattle (no.)
Western Australia						
Avon	—	—	—	6 226 423	**3	^ 92 964
Northern Agricultural	—	—	—	2 346 011	—	119 191
Rangelands	—	—	361 075	^ 768 524	—	1 039 974
South Coast	—	—	—	4 667 258	*4 714	^ 407 436
South West	—	—	—	6 621 409	^ 99 542	480 180
Swan	—	—	—	506 633	**226	^ 83 081
Total	—	—	361 075	21 136 257	^ 104 485	2 222 825
Tasmania						
North	—	—	—	1 336 629	^ 62 596	210 337
North West	—	—	—	94 740	133 351	201 874
South	—	—	—	1 285 410	^ 5 320	68 950
Total	—	—	—	2 716 779	201 267	481 162
Northern Territory						
Total	—	—	—	*9	—	1 912 233
Australian Capital Territory						
Total	—	—	—	58 465	*1	*11 033
Australia	^ 162 806	281 999 333	36 396 997	85 711 187	2 663 382	25 373 218

^ estimate has a relative standard error of 10% to less than 25% and should be used with caution ** estimate has a relative standard error greater than 50% and is considered too unreliable for general use

* estimate has a relative standard error of 25% to 50% and should be used with caution — nil or rounded to zero (including null cells)

GLOSSARY

Australian and New Zealand Standard Industrial Classification (ANZSIC)	A classification of industry produced by the Australian Bureau of Statistics and the New Zealand Department of Statistics for the use in the collection and publication of statistics in the two countries. ANZSIC 2006 was used in this publication.
Climate affecting holding has changed	Perceived changes in climate (land managers) that affected agricultural business land during the time the farmer owned the property. These are perceived changes over time such as changes to average temperature, rainfall patterns, and evaporation.
Estimated value of agricultural operation (EVAO)	An estimation of the value of agricultural activity undertaken by an agricultural business. 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.
Impact of climate change	Is an increase or decrease in the level of production or an increase or decrease in the frequency/extent of pests, weeds or disease due to a perceived change in the climate affecting the holding.
Modified management practices in response to changing climate	Modified management practices (land managers) in response to changes in climate during the time the manager owned their holding. These changes in climate are perceived changes over time such as changes to average temperature, rainfall patterns, and evaporation.
Natural Resource Management (NRM)	Management of our natural resources - land, soil, native vegetation, biodiversity and water.
Natural Resource Management regions	Fifty-eight regions identified across Australia for the purposes of addressing natural resource management and sustainable agriculture priorities. The boundaries for each region have been established by agreement between the Australian Government, and State and Territory Governments. A map outlining the specific NRM regions used in this publication is provided in Appendix 1. Data at the NRM region level is as per the boundary specifications of August 2005.
Pest	A noxious, destructive or troublesome animal or insect.
Weed	A plant that interferes with the management objectives at a particular location. It is a plant growing where it is not wanted. Weeds may damage crops or poison livestock when growing in pasture.

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