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Salinity on Australian Farms

2002

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NOTES

This publication presents the first results of the Land Management and Salinity Survey which was conducted in May 2002 as a supplement to the 2001 Agricultural Census. Additional results from the survey will be made available at a later date with details to be advised in the ABS Release Advice at <<http://www.abs.gov.au>>.

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EFFECTS OF ROUNDING

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

ABBREVIATIONS AND OTHER USAGES

ABS	Australian Bureau of Statistics
AOH	Area Of Holding
ANZSIC	Australian and New Zealand Standard Industrial Classification
EVAO	Estimated Value of Agricultural Output
MDBC	Murray-Darling Basin Commission
NAP	National Action Plan for Salinity and Water Quality
NLWRA	National Land and Water Resources Audit
PMSEIC	Prime Minister's Science Engineering and Innovation Council
RSE	Relative Standard Error
SE	Standard Error
ha	hectares
km	kilometres
na	not available
*	subject to sampling variability of between 25–50%
**	subject to sampling variability of over 50%
—	nil or rounded to zero (including null cells)

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CHAPTER 1

INTRODUCTION

INTRODUCTION AND MAIN FINDINGS

This publication presents the first results of the Land Management and Salinity Survey which was conducted in May 2002 as a supplement to the 2001 Agricultural Census. Additional results from the survey will be made available at a later date with details to be advised in the ABS Release Advice at <<http://www.abs.gov.au>>. The additional results will include further information and analysis. Some Agricultural Census results have been included in this publication to provide contextual and other information, and Agricultural Census information is clearly identified where it is used.

The 2002 Land Management and Salinity Survey was mainly targeted at the reference population of farm establishments which answered yes to either or both questions in the 2001 Agricultural Census regarding having land affected by salinity or using salinity management strategies. The survey results in this publication are based on a sample of approximately 20,000 farm establishments and the results have been weighted to cover the full reference population.

Salinity naturally occurs in Australia, but the clearing of native vegetation and use of water for irrigated agriculture, domestic and other uses has caused the salt stored beneath the ground to surface in many areas. This has affected agricultural production and damaged civil infrastructure, such as roads.

Salinity is divided into two types, dryland and irrigated. Dryland salinity is far more widespread but, in both types of salinity, it is water imbalances that are the fundamental cause of salinisation. Primarily to address the issue of dryland salinity, the Commonwealth and state and territory governments have adopted the National Action Plan for Salinity and Water Quality (NAP). The NAP has identified 21 high priority regions and data for these regions are reported in this publication. A map of these regions can be found on the ABS website at <<http://www.abs.gov.au>>.

The 2002 Land Management and Salinity Survey collected information from farmers on the extent of land showing signs of salinity as well as the strategies used by farmers to manage and prevent salinity. Farmer assessments of the extent of salinity may differ from assessments made by scientific means, but are an indication of the level of salinity occurring on farms that can be provided rapidly and cost-effectively. The 2002 Land Management and Salinity Survey also has the advantage that farm management activities can be assessed in the context of economic and other information collected by the ABS and other agencies.

It is important to note that the 2002 Land Management and Salinity Survey provides information for agricultural land as defined for the ABS agricultural collections (see explanatory notes). Agricultural land defined in this way occupies approximately 460 million hectares, representing 60% of land use in Australia, but salinity and salinity management also occur on non-agricultural land. Non-agricultural land was out of scope for the 2002 Land Management and Salinity Survey.

Several of the strategies used to manage salinity as reported in this publication are also used by farmers for other reasons. For example, pastures are sown with lucerne, or trees planted, for reasons other than salinity. The results presented in this publication only refer to the activities specifically identified for salinity management by farmers. The activity may have more than one purpose and is only reported where it was wholly or partly for salinity management.

MAIN FINDINGS

- A little under 20,000 farms and 2 million hectares of agricultural land were reported by farmers as showing signs of salinity.
- Nearly 30,000 farms have implemented salinity management practices.
- Of the agricultural land showing signs of salinity, 800,000 hectares is unable to be used for agricultural production.
- The state most affected by salinity is Western Australia, with 7,000 farms and 1.2 million hectares showing signs of salinity.
- Farms within the regions identified in the National Action Plan for Salinity and Water Quality (NAP regions), account for 17,000 farms or 87% of farms showing signs of salinity and 1.3 million hectares or 66% of the area showing signs of salinity. The NAP region most affected by salinity was Avon (WA) with 2,279 farms and 450,000 hectares showing signs of salinity.
- Non-irrigated farms accounted for 1.8 million hectares or 93% of the agricultural land showing signs of salinity.
- Farms primarily involved with the production of beef cattle, sheep and grains accounted for 16,000 or 82% of the farms showing signs of salinity and 1.9 million hectares or 97% of the agricultural land showing signs of salinity.
- The most common salinity management practices employed were:
 - Crops, pastures and fodder plants for salinity management, 3.2 million hectares
 - Trees for salinity management, 776,000 hectares
 - Earthworks (levees, banks and drains) for salinity management, 208,000 km
 - Fencing for salinity management, with 466,000 hectares fenced
- Just over 7,000 irrigated farms had made changes to irrigation practices for salinity management purposes.
- The main motivations for implementation of salinity management practices were for:
 - farm sustainability (66% of farmers implementing change saying this was of high importance)
 - environmental protection (56%)
 - increase or maintain agricultural production (54%)

MAIN FINDINGS *continued*

- The main reported barriers to changing land management practices were lack of financial resources and lack of time (35% and 21% of all farmers reporting these as very limiting, respectively). Lack of information or doubts about likely success were not considered by the majority of farmers to be barriers to change (only 6% and 7% of all farmers reported these as very limiting, respectively).

Comparisons with other data

The results from the Land Management and Salinity Survey show a lower level of saline land than other sources (see table 1.5). Factors most likely to be contributing to differences are the different concepts, assessment methods and coverage used in each study. The ABS survey covered agricultural land as it is defined for ABS agricultural collections, which covers about 60% of Australian land, and collected information on all salinity (not just dryland salinity as in the other studies). In addition, in the ABS survey it was farmers who identified the land showing signs of salinity. While farmers' perceptions of the area will differ from scientific assessments, they are more or less consistent with the other studies, in terms of the relative area affected by salinity in each state and territory. In all studies, WA is the state most affected by salinity and NT, ACT and Tas. are the least affected.

The National Land and Water Resources Audit (NLWRA) 2001 used information on water table height to estimate the risk of land becoming saline affected. The area at risk of salinity is not equivalent to the area showing signs of salinity, but the two are correlated. The Prime Minister's Science, Engineering and Innovation Council (PMSEIC) 1999 estimate is based on expert assessments of the area affected by salinity and includes non-agricultural land.

1.1

LAND SHOWING SIGNS OF SALINITY — SUMMARY, BY STATE

State	Farms with land showing signs of salinity	Proportion of total farms in state(a)	Land showing signs of salinity	Proportion of total farm area in state(b)	Salinised land unable to be used for production	Proportion of land showing signs of salinity(c)	Proportion of total farm area in state(d)
	no.	%	'000 ha	%	'000 ha	%	%
NSW/ACT	3 108	7.4	124	0.2	44	35.6	0.1
Vic.	4 834	13.7	139	1.1	60	43.5	0.5
Qld	993	3.4	107	0.1	40	37.4	—
SA	3 328	21.6	*350	0.6	105	30.1	0.2
WA	6 918	51.3	1 241	1.1	567	45.7	0.5
Tas.	390	9.1	6	0.3	2	27.2	0.1
NT	8	2.0	2	—	2	97.3	—
Total Australia	19 579	13.9	1 969	0.4	821	41.7	0.2

(a) Farms with land showing signs of salinity as a proportion of total farms in the state/territory/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

(b) Land showing signs of salinity as a proportion of total farm land in the state/territory/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

(c) Salinised land unable to be used for production as a proportion of land showing signs of salinity.

(d) Salinised land unable to be used for production as a proportion of total farm land in the state/territory/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

1.2

SALINITY MANAGEMENT STRATEGIES — SUMMARY, BY STATE(a)

State	Crops, pastures and fodder plants	Trees	Land fenced from grazing	Earthworks
	'000 ha	'000 ha	'000 ha	'000 km
NSW/ACT	1 096	91	17	43
Vic.	*680	40	40	37
Qld	331	126	*27	15
SA	452	14	29	*13
WA	633	500	352	98
Tas.	*7	5	1	*3
NT	*6	—	—	—
Australia	3 205	776	466	208

(a) Any land management practice undertaken wholly or partly for the management or prevention of salinity.

1.3

REASONS FOR CHANGING LAND MANAGEMENT PRACTICES, AUSTRALIA(a)

Reason	Not a reason	Low importance	Medium importance	High importance	Total
	%	%	%	%	%
Increased productivity	18.6	6.7	20.5	54.2	100
Increased land value	28.8	15.4	27.7	28.1	100
Improved risk management	33.2	12.1	25.8	28.9	100
Farm sustainability	13.5	*3.9	16.3	66.3	100
Improved environment protection	12.6	5.1	26.8	55.6	100

(a) Farms managing for salinity and/or with land showing signs of salinity that have changed land management practices because of salinity or to prevent salinity.

1.4

BARRIERS TO CHANGING LAND MANAGEMENT PRACTICES, AUSTRALIA(a)

<i>Barrier</i>	<i>Not a factor</i>	<i>Not very limiting</i>	<i>Limiting</i>	<i>Very limiting</i>	<i>Total</i>
	%	%	%	%	%
Lack of financial resources	23.8	7.9	32.8	35.5	100
Lack of time	29.7	13.4	36.1	20.8	100
Insufficient or inadequate information	52.1	24.8	17.4	5.8	100
Doubts about likely success	51.8	23.1	18.3	6.8	100
Age or poor health	70.6	12.5	10.3	6.6	100

(a) Farms managing for salinity and/or with land showing signs of salinity.

1.5

AREA AFFECTED BY SALINITY, COMPARISON OF SURVEY RESULTS WITH OTHER ESTIMATES

<i>State</i>	<i>PMSEIC 1999</i>	<i>NLWRA 2001</i>	<i>ABS 2002</i>
	<i>Area of salinity affected land(a)</i>	<i>Area at risk of salinity(b)</i>	<i>Area showing signs of salinity(c)</i>
	'000 ha	'000 ha	'000 ha
NSW/ACT	120	181	124
Vic.	120	670	139
Qld	10	na	106
SA	402	390	*350
WA	1 802	4 363	1 241
Tas.	20	54	6
NT	—	—	2
Total Australia	2 476	5 658	1 969

(a) As determined by experts.

(b) As estimated from water table heights.

(c) As reported by farmers.

CHAPTER 2

LAND SHOWING SIGNS OF SALINITY

2.1 LAND SHOWING SIGNS OF SALINITY, BY STATE

State	<i>Farms with land showing signs of salinity</i>	<i>Proportion of total farms in state(a)</i>	<i>Land showing signs of salinity</i>	<i>Proportion of total farm area in state(b)</i>	<i>Salinised land unable to be used for production</i>	<i>Proportion of land showing signs of salinity(c)</i>	<i>Proportion of total farm area in state(d)</i>
	<i>no.</i>	<i>%</i>	<i>'000 ha</i>	<i>%</i>	<i>'000 ha</i>	<i>%</i>	<i>%</i>
IRRIGATED FARMS							
NSW/ACT	828	8.7	49	0.5	16	33.3	0.2
Vic.	1 574	14.5	48	2.2	20	41.1	0.9
Qld	392	4.1	5	0.1	2	49.6	—
SA	860	16.0	27	1.7	8	31.5	0.5
WA	240	9.8	7	0.7	*3	46.9	0.3
Tas.	155	8.5	3	0.3	—	5.0	—
NT	—	—	—	—	—	—	—
<i>Total Irrigated farms</i>	<i>4 049</i>	<i>10.2</i>	<i>138</i>	<i>0.6</i>	<i>50</i>	<i>36.6</i>	<i>0.2</i>
NON-IRRIGATED FARMS							
NSW/ACT	2 280	7.0	76	0.2	28	37.1	0.1
Vic.	3 260	13.4	90	0.8	40	44.7	0.4
Qld	601	3.0	102	0.1	*38	36.9	—
SA	2 468	24.6	*324	0.6	97	30.0	0.2
WA	6 678	60.6	1 234	1.1	564	45.7	0.5
Tas.	*235	—	3	0.3	—	6.0	—
NT	8	3.0	2	—	2	97.3	—
<i>Total Non-irrigated farms</i>	<i>15 530</i>	<i>15.4</i>	<i>1 831</i>	<i>0.4</i>	<i>771</i>	<i>42.1</i>	<i>0.2</i>
Total Australia	19 579	13.9	1 969	0.4	821	41.7	0.2

(a) Farms with land showing signs of salinity as a proportion of total farms in the state/territory/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each state/territory, as per irrigated/non-irrigated farm split in table.

(b) Land showing signs of salinity as a proportion of total farm land in the state/territory/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each state/territory, as per irrigated/non-irrigated farm split in table.

(c) Salinised land unable to be used for production as a proportion of land showing signs of salinity.

(d) Salinised land unable to be used for production as a proportion of total farm land in the state/territory/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each state/territory, as per irrigated/non-irrigated farm split in table.

2.2

LAND SHOWING SIGNS OF SALINITY — IRRIGATED FARMS, BY NAP REGION

NAP Region	<i>Irrigated farms with land showing signs of salinity</i>	<i>Proportion of total irrigated farms in region(a)</i>	<i>Land showing signs of salinity</i>	<i>Proportion of total irrigated farm area in region(b)</i>	<i>Salinised land unable to be used for production</i>	<i>Proportion of land showing signs of salinity(c)</i>	<i>Proportion of total irrigated farm area in region(d)</i>
	no.	%	'000 ha	%	'000 ha	%	%
Avoca-Loddon-Campaspe	777	39.1	30	4.3	10	32.5	1.4
Avon	18	73.6	*1	8.9	*1	85.8	7.6
Border Rivers	*13	1.7	na	—	na	na	0.3
Burdekin-Fitzroy	*56	4.0	1	0.1	*1	75.2	0.1
Condamine-Balonne-Maranoa	*13	1.2	*1	—	—	9.0	—
Darwin-Katherine	—	—	—	—	—	—	—
Glenelg-Hopkins-Corangamite	60	8.7	1	0.8	—	29.5	0.2
Goulburn-Broken	283	9.3	3	0.6	1	27.2	0.2
Lachlan-Murrumbidgee	353	14.6	*17	0.6	2	11.6	0.1
Lockyer-Burnett-Mary	87	3.3	1	0.1	—	38.4	—
Lower Murray	539	11.1	36	1.8	19	52.7	0.9
Macquarie-Castlereagh	*62	9.6	*2	0.3	**1	51.0	0.1
Midlands	130	15.1	2	0.4	—	19.9	0.1
Mt. Lofty-Kangaroo Island — Northern Agricultural District	*550	24.2	8	2.8	*3	31.8	0.9
Murray	202	12.2	8	0.4	2	20.2	0.1
Namoi-Gwydir	*51	8.1	*2	0.3	—	2.6	0.0
Northern Agricultural District	*10	7.8	**1	1.8	**1	96.0	1.8
Ord	*9	12.2	—	0.4	—	22.7	0.1
South Coast	74	40.3	1	1.5	1	47.9	0.7
South East	*57	5.4	*11	1.6	1	10.3	0.2
South West	112	8.9	3	1.4	1	22.6	0.3
<i>Total NAP</i>	<i>3 473</i>	<i>12.5</i>	<i>130</i>	<i>0.7</i>	<i>47</i>	<i>36.4</i>	<i>0.3</i>
<i>Total non-NAP</i>	<i>576</i>	<i>4.8</i>	<i>7</i>	<i>0.2</i>	<i>3</i>	<i>41.3</i>	<i>0.1</i>
Total Irrigated farms	4 049	10.2	138	0.6	50	36.6	0.2

(a) Irrigated farms with land showing signs of salinity as a proportion of total irrigated farms in the NAP region/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

(b) Land showing signs of salinity as a proportion of total irrigated farm area in the NAP region/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

(c) Salinised land unable to be used for production as a proportion of land showing signs of salinity.

(d) Salinised land unable to be used for production as a proportion of total irrigated farm area in the NAP region/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

2.3

LAND SHOWING SIGNS OF SALINITY — NON-IRRIGATED FARMS, BY NAP REGION

NAP Region	Non-irrigated farms with land showing signs of salinity	Proportion of total non-irrigated farms in region(a)	Land showing signs of salinity	Proportion of total non-irrigated farm area in region(b)	Salinised land unable to be used for production	Proportion of land showing signs of salinity(c)	Proportion of total non-irrigated farm area in region(d)
	no.	%	'000 ha	%	'000 ha	%	%
Avoca-Loddon-Campaspe	*477	19.0	8	0.6	3	37.4	0.2
Avon	2 279	79.9	450	5.8	284	63.2	3.6
Border Rivers	*137	5.0	na	0.2	na	na	0.3
Burdekin-Fitzroy	*96	3.0	**35	0.2	**20	55.8	0.1
Condamine-Balonne-Maranoa	*132	2.6	*28	0.2	**2	7.7	—
Darwin-Katherine	1	0.9	2	—	2	100.0	—
Glenelg-Hopkins-Corangamite	1 378	19.7	30	1.2	10	33.2	0.4
Goulburn-Broken	229	9.2	4	0.5	1	20.1	0.1
Lachlan-Murrumbidgee	1 124	14.8	*30	0.4	4	11.8	0.1
Lockyer-Burnett-Mary	168	3.8	*1	—	*1	54.4	—
Lower Murray	1 119	18.9	75	0.4	37	49.2	0.2
Macquarie-Castlereagh	435	8.4	7	0.1	*3	36.1	—
Midlands	*188	16.0	*3	0.4	**1	34.3	0.1
Mt. Lofty-Kangaroo Island — Northern Agricultural District	1 451	28.4	*51	1.2	*23	44.2	0.5
Murray	104	5.8	*3	0.2	—	14.4	—
Namoi-Gwydir	226	6.9	*5	0.2	*1	13.3	—
Northern Agricultural District	868	59.2	152	2.8	91	60.2	1.7
Ord	—	—	—	—	—	—	—
South Coast	1 354	63.6	74	2.4	42	57.4	1.4
South East	209	13.8	51	4.9	*9	18.3	0.9
South West	1 681	50.0	153	5.3	79	51.3	2.7
<i>Total NAP</i>	<i>13 658</i>	<i>19.8</i>	<i>1 171</i>	<i>0.9</i>	<i>624</i>	<i>53.2</i>	<i>0.5</i>
<i>Total non-NAP</i>	<i>1 873</i>	<i>5.9</i>	<i>660</i>	<i>0.2</i>	<i>147</i>	<i>22.3</i>	<i>0.1</i>
Total Non-irrigated farms	15 530	15.4	1 831	0.4	771	42.1	0.2

(a) Non-irrigated farms with land showing signs of salinity as a proportion of total non-irrigated farms in the NAP region/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

(b) Land showing signs of salinity as a proportion of total non-irrigated farm area in the NAP region/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

(c) Salinised land unable to be used for production as a proportion of land showing signs of salinity.

(d) Salinised land unable to be used for production as a proportion of total non-irrigated farm area in the NAP region/Australia. Source for the denominator is data from the ABS 2001 Agricultural Census.

2.4 LAND SHOWING SIGNS OF SALINITY, BY INDUSTRY

Industry	Farms with land showing signs of salinity		Land showing signs of salinity '000 ha	Proportion of total farm area in industry(b) %	Salinised land unable to be used for production '000 ha	Proportion of land showing signs of salinity(c) %	Proportion of total farm area in industry(d) %
	no.	Proportion of total farms in industry(a) %					
IRRIGATED FARMS							
Nurseries and Flowers	*35	1.6	*1	0.5	—	21.8	0.1
Vegetables	*349	8.3	3	0.3	1	43.4	0.1
Grapevines	*504	8.3	3	0.6	*1	41.0	0.2
Fruit	217	3.6	2	0.2	1	39.0	0.1
Grain	411	17.9	18	0.6	*11	57.6	0.3
Mixed Grain and Beef/Sheep	364	23.8	25	0.8	8	32.1	0.3
Beef and/or Sheep	698	11.7	58	0.6	14	23.5	0.2
Dairy	1 005	15.8	20	1.3	7	37.0	0.5
Other Livestock	*47	7.2	*1	0.4	*1	74.1	0.3
Cotton	81	10.4	na	0.1	na	na	0.2
Other Crops	287	9.0	4	0.6	2	36.2	0.2
Other industries	51	7.7	*1	0.7	—	34.2	0.2
Total Irrigated farms	4 049	10.2	138	0.6	50	36.6	0.2
NON-IRRIGATED FARMS							
Nurseries and Flowers	*57	4.3	—	0.4	—	49.2	0.2
Vegetables	*13	1.5	—	0.1	—	35.9	0.0
Grapevines	**84	11.0	**3	5.1	**3	97.5	4.9
Fruit	**18	0.7	—	0.2	—	98.9	0.2
Grain	4 692	33.5	628	2.5	399	63.5	1.6
Mixed Grain and Beef/Sheep	4 578	31.8	375	1.6	180	48.0	0.7
Beef and/or Sheep	5 396	10.5	809	0.2	181	22.4	0.1
Dairy	300	4.6	5	0.2	1	30.2	0.1
Other Livestock	125	4.1	5	0.1	*3	70.4	0.1
Cotton	**33	15.4	*1	0.4	—	2.5	0.0
Other Crops	173	4.9	2	0.2	*1	46.1	0.1
Other industries	63	1.7	3	0.2	*2	67.6	0.1
Total Non-irrigated farms	15 530	15.4	1 831	0.4	771	42.1	0.2
Total Agriculture	19 579	13.9	1 969	0.4	821	41.7	0.2

(a) Farms with land showing signs of salinity as a proportion of total farms in the industry. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each industry, as per irrigated/non-irrigated farm split in table.

(b) Land showing signs of salinity as a proportion of total farm land in the industry. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each industry, as per irrigated/non-irrigated farm split in table.

(c) Salinised land unable to be used for production as a proportion of land showing signs of salinity.

(d) Salinised land unable to be used for production as a proportion of total farm land in the industry. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each industry, as per irrigated/non-irrigated farm split in table.

2.5

FARMS WITH LAND SHOWING SIGNS OF SALINITY, BY EVAO(a)

EVAO	<i>Farms with land showing signs of salinity</i>	<i>Proportion of total farms in EVAO range(b)</i>	<i>Land showing signs of salinity</i>	<i>Proportion of total farm area in EVAO range(c)</i>	<i>Salinised land unable to be used for production</i>	<i>Proportion of land showing signs of salinity(d)</i>	<i>Proportion of total farm area in EVAO range(e)</i>
	<i>no.</i>	<i>%</i>	<i>'000 ha</i>	<i>%</i>	<i>'000 ha</i>	<i>%</i>	<i>%</i>
IRRIGATED FARMS							
0–49,999	600	6.2	8	0.6	3	43.9	0.3
50,000–149,999	887	7.6	33	1.4	8	23.8	0.3
150,000–499,999	1 600	11.9	55	0.8	18	32.2	0.3
More than 500,000	962	18.8	42	0.3	21	51.4	0.2
<i>Total Irrigated farms</i>	<i>4 049</i>	<i>10.2</i>	<i>138</i>	<i>0.6</i>	<i>50</i>	<i>36.6</i>	<i>0.2</i>
NON-IRRIGATED FARMS							
0–49,999	1 971	5.2	*47	0.2	31	66.4	0.2
50,000–149,999	3 974	14.4	158	0.4	61	38.4	0.1
150,000–499,999	6 711	25.1	846	0.6	324	38.3	0.2
More than 500,000	2 875	35.7	780	0.4	355	45.5	0.2
<i>Total Non-irrigated farms</i>	<i>15 530</i>	<i>15.4</i>	<i>1 831</i>	<i>0.4</i>	<i>771</i>	<i>42.1</i>	<i>0.2</i>
Total Australia	19 579	13.9	1 969	0.4	821	41.7	0.2

(a) EVAO is Estimated Value of Agricultural Operations.

(b) Farms with land showing signs of salinity as a proportion of total farms in each EVAO range. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each EVAO range, as per irrigated/non-irrigated farm split in table.

(c) Land showing signs of salinity as a proportion of total farm land in each EVAO range. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each EVAO range, as per irrigated/non-irrigated farm split in table.

(d) Salinised land unable to be used for production as a proportion of land showing signs of salinity.

(e) Salinised land unable to be used for production as a proportion of total farm land in each EVAO range. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each EVAO range, as per irrigated/non-irrigated farm split in table.

2.6

LAND SHOWING SIGNS OF SALINITY, BY AOH(a)

Farm Size (ha)	Farms with land showing signs of salinity		Land showing signs of salinity '000 ha	Proportion of total farm area in AOH range(c) %	Salinised land unable to be used for production '000 ha	Proportion of land showing signs of salinity(d) %	Proportion of total farm area in AOH range(e) %
	no.	Proportion of total farms in AOH range(b) %					
Irrigated farms							
0-499	2 794	8.3	30	0.8	8	27.9	0.2
500-4999	1 103	19.8	59	0.8	25	42.9	0.3
More than 5000	152	22.4	49	0.4	*17	34.4	0.1
<i>Total Irrigated farms</i>	<i>4 049</i>	<i>10.2</i>	<i>138</i>	<i>0.6</i>	<i>50</i>	<i>36.6</i>	<i>0.2</i>
Non-irrigated farms							
0-499	3 790	6.5	58	0.6	20	34.6	0.2
500-4999	10 697	29.8	846	1.6	481	56.9	0.9
More than 5000	1 043	15.3	927	0.3	270	29.1	0.1
<i>Total Non-irrigated farms</i>	<i>15 530</i>	<i>15.4</i>	<i>1 831</i>	<i>0.4</i>	<i>771</i>	<i>42.1</i>	<i>0.2</i>
Total Australia	19 579	13.9	1 969	0.4	821	41.7	0.2

(a) AOH is Area of Holding.

(b) Farms with land showing signs of salinity as a proportion of total farms in each AOH range. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each AOH range, as per irrigated/non-irrigated farm split in table.

(c) Land showing signs of salinity as a proportion of total farm land in each AOH range. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each AOH range, as per irrigated/non-irrigated farm split in table.

(d) Salinised land unable to be used for production as a proportion of land showing signs of salinity.

(e) Salinised land unable to be used for production as a proportion of total farm land in each AOH range. Source for the denominator is data from the ABS 2001 Agricultural Census. The denominator is either total irrigated farms or total non-irrigated farms, within each AOH range, as per irrigated/non-irrigated farm split in table.

CHAPTER 3

SALINITY MANAGEMENT

3.1

CROPS, PASTURES AND FODDER PLANTS FOR SALINITY MANAGEMENT — FARMS, BY STATE(a)

State	<i>Farms with salt tolerant crops</i> no.	<i>Farms with pastures with lucerne</i> no.	<i>Farms with other deep rooted perennials</i> no.	<i>Farms with salt tolerant pastures</i> no.	<i>Farms with saltbush, bluebush</i> no.	<i>Farms with other fodder plants</i> no.
IRRIGATED FARMS						
NSW/ACT	344	1 030	175	140	182	*50
Vic.	248	705	265	314	*113	*154
Qld	48	98	*39	*80	**8	*52
SA	74	226	**244	**257	*70	*30
WA	21	23	36	**85	33	24
Tas.	**7	**39	13	26	*1	*3
NT	—	—	—	—	—	—
<i>Total Irrigated farms</i>	<i>741</i>	<i>2 121</i>	<i>772</i>	<i>903</i>	<i>407</i>	<i>312</i>
NON-IRRIGATED FARMS						
NSW/ACT	321	2 038	1 059	398	*233	128
Vic.	263	*1 153	1 367	927	259	93
Qld	**299	**349	117	72	25	*61
SA	235	*576	127	600	*931	*110
WA	1 406	1 031	504	1 160	1 455	956
Tas.	—	*9	**100	**92	—	**4
NT	1	*3	1	1	1	—
<i>Total Non-irrigated farms</i>	<i>2 526</i>	<i>5 158</i>	<i>3 276</i>	<i>3 250</i>	<i>2 905</i>	<i>1 353</i>
Total Australia	3 266	7 279	4 047	4 154	3 311	1 664

(a) Crops, pastures and fodder plants wholly or partly for the management or prevention of salinity. This includes all farms with crops, pastures and fodder plants for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.2

CROPS, PASTURES AND FODDER PLANTS FOR SALINITY MANAGEMENT — AREA, BY STATE(a)

State	Area of salt tolerant crops '000 ha	Area of pastures with lucerne '000 ha	Area of other deep rooted perennials '000 ha	Area of salt tolerant pastures '000 ha	Area of saltbush, bluebush '000 ha	Area of other fodder plants '000 ha	Total area of crops, pastures and fodder plants '000 ha
IRRIGATED FARMS							
NSW/ACT	58	160	24	**19	*18	*1	280
Vic.	14	*80	*29	10	2	*3	138
Qld	4	4	*7	*6	**1	*7	28
SA	8	76	*17	*26	*1	*1	129
WA	*3	1	1	**5	**7	*2	*19
Tas.	—	**1	*1	*1	—	*5	3
NT	—	—	—	—	—	—	—
<i>Total Irrigated farms</i>	88	321	79	68	*29	14	598
NON-IRRIGATED FARMS							
NSW/ACT	47	457	266	16	*25	*4	815
Vic.	44	83	*349	*58	5	*3	*542
Qld	*25	*32	157	*27	*2	**60	303
SA	32	122	*27	76	*61	**5	323
WA	266	74	51	61	123	39	614
Tas.	—	—	*4	—	—	—	4
NT	1	**5	—	—	—	—	*6
<i>Total Non-irrigated farms</i>	416	773	854	238	216	*110	2 607
Total Australia	503	1 094	933	306	245	*124	3 205

(a) Crops, pastures and fodder plants wholly or partly for the management or prevention of salinity. This includes all land under crops, pastures and fodder plants for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.3

CROPS, PASTURES AND FODDER PLANTS FOR SALINITY MANAGEMENT — AREA, BY NAP REGION(a)

<i>NAP Region</i>	<i>Area of salt tolerant crops</i>	<i>Area of pastures with lucerne</i>	<i>Area of other deep rooted perennials</i>	<i>Area of salt tolerant pastures</i>	<i>Area of saltbush, bluebush</i>	<i>Area of other fodder plants</i>	<i>Total area of crops pastures and fodder plants</i>
	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>
Avoca-Loddon-Campaspe	15	*98	**210	11	3	*2	**339
Avon	148	*25	*16	9	68	14	280
Border Rivers	*14	*54	**26	**14	—	—	*108
Burdekin-Fitzroy	**6	**11	*30	**4	**1	**53	*105
Condamine-Balonne-Maranoa	*25	*13	*79	**20	*12	*6	155
Darwin-Katherine	—	—	—	—	—	—	—
Glenelg-Hopkins-Corangamite	4	4	74	15	—	—	97
Goulburn-Broken	*2	19	45	2	—	**1	*69
Lachlan-Murrumbidgee	33	327	132	12	*18	*3	525
Lockyer-Burnett-Mary	1	2	1	**1	—	*5	*10
Lower Murray	50	100	29	**55	*52	*3	290
Macquarie-Castlereagh	13	110	47	2	*1	—	173
Midlands	—	**1	*3	1	—	—	4
Mt. Lofty-Kangaroo Island — Northern Agricultural District	14	**26	*8	5	*10	—	*63
Murray	22	82	50	3	6	*2	165
Namoi-Gwydir	*19	50	*21	1	—	—	92
Northern Agricultural District	39	9	*16	5	34	11	114
Ord	—	—	—	—	—	—	—
South Coast	39	32	14	34	7	8	133
South East	3	99	*23	73	—	**3	202
South West	28	7	5	16	13	5	74
<i>Total NAP</i>	<i>476</i>	<i>1 068</i>	<i>828</i>	<i>285</i>	<i>224</i>	<i>*118</i>	<i>2 999</i>
<i>Total non-NAP</i>	<i>28</i>	<i>26</i>	<i>*105</i>	<i>20</i>	<i>*21</i>	<i>*6</i>	<i>206</i>
Total Australia	503	1 094	933	306	245	*124	3 205

(a) Crops, pastures and fodder plants wholly or partly for the management or prevention of salinity. This includes all land under crops, pastures and fodder plants for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.4

TREES FOR SALINITY MANAGEMENT — FARMS, BY STATE(a)

	<i>NSW/ACT Farms with trees no.</i>	<i>Vic. Farms with trees no.</i>	<i>Qld Farms with trees no.</i>	<i>SA Farms with trees no.</i>	<i>WA Farms with trees no.</i>	<i>Tas. Farms with trees no.</i>	<i>NT Farms with trees no.</i>	<i>Aust. Farms with trees no.</i>
Irrigated farms	646	796	*437	*355	145	51	—	2 430
Non-irrigated farms	1 301	2 078	266	792	4 112	32	na	8 582
Total Australia	1 946	2 874	704	1 147	4 257	83	na	11 012

(a) Trees planted wholly or partly for the management or prevention of salinity. This includes all farms with trees for salinity management, irrespective of whether they have land showing signs of salinity.

3.5

TREES FOR SALINITY MANAGEMENT — AREA, BY STATE(a)

<i>Trees</i>	<i>NSW/ACT Area of trees '000 ha</i>	<i>Vic. Area of trees '000 ha</i>	<i>Qld Area of trees '000 ha</i>	<i>SA Area of trees '000 ha</i>	<i>WA Area of trees '000 ha</i>	<i>Tas. Area of trees '000 ha</i>	<i>NT Area of trees '000 ha</i>	<i>Total Aust. Area of trees '000 ha</i>
Irrigated farms	19	8	17	2	4	*3	—	52
Non-irrigated farms	72	32	109	13	496	*2	—	724
Total	91	40	126	14	500	5	—	776

(a) Trees planted wholly or partly for the management or prevention of salinity. This includes all land under trees for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.6

TREES FOR SALINITY MANAGEMENT — AREA, BY NAP REGION(a)

<i>NAP region</i>	<i>Irrigated farms</i>	<i>Non-irrigated farms</i>	<i>Total farms</i>
	<i>Area of trees '000 ha</i>	<i>Area of trees '000 ha</i>	<i>Area of trees '000 ha</i>
Avoca-Loddon-Campaspe	3	5	9
Avon	—	*316	*316
Border Rivers	**5	*12	*16
Burdekin-Fitzroy	*5	*30	*36
Condamine-Balonne-Maranoa	*1	*16	*17
Darwin-Katherine	—	—	—
Glennelg-Hopkins-Corangamite	—	*13	*13
Goulburn-Broken	2	3	5
Lachlan-Murrumbidgee	4	*49	*53
Lockyer-Burnett-Mary	*2	*6	*8
Lower Murray	2	10	12
Macquarie-Castlereagh	*4	*7	11
Midlands	*3	*1	3
Mt. Lofty-Kangaroo Island— Northern Agricultural District	*1	4	4
Murray	*11	*3	*13
Namoi-Gwydir	—	*10	*10
Northern Agricultural District	—	48	48
Ord	—	—	—
South Coast	2	47	49
South East	—	**4	*4
South West	1	50	52
<i>Total NAP</i>	<i>47</i>	<i>633</i>	<i>680</i>
<i>Total non-NAP</i>	<i>*5</i>	<i>91</i>	<i>96</i>
Total Australia	52	724	776

(a) Trees planted wholly or partly for the management or prevention of salinity. This includes all land under trees for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.7

EARTHWORKS FOR SALINITY MANAGEMENT — FARMS, BY STATE(a)

State	<i>Farms with levees/banks</i> no.	<i>Farms with shallow open drains</i> no.	<i>Farms with deep open drains</i> no.	<i>Farms with subsurface drains</i> no.
IRRIGATED FARMS				
NSW/ACT	384	1 008	756	374
VIC	175	1 682	710	*855
Qld	113	198	128	188
SA	58	82	*37	179
WA	49	*161	56	**103
TAS	8	50	34	*18
NT	—	—	—	—
<i>Total Irrigated farms</i>	788	3 182	1 720	1 717
NON-IRRIGATED FARMS				
NSW/ACT	921	**756	*82	**158
VIC	*440	*894	*158	**250
Qld	*492	*63	*18	21
SA	197	284	62	*18
WA	3 356	1 992	1 370	184
TAS	*20	**141	33	*12
NT	*4	—	1	—
<i>Total Non-irrigated farms</i>	5 429	4 130	1 724	*643
Total Australia	6 217	7 312	3 444	2 360

(a) Earthworks constructed wholly or partly for the management or prevention of salinity. This includes all farms with earthworks for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.8

EARTHWORKS FOR SALINITY MANAGEMENT — LENGTH, BY STATE(a)

State	Length of levees/banks '000 km	Length of shallow open drains '000 km	Length of deep open drains '000 km	Length of subsurface drains '000 km	Total length of earthworks '000 km
IRRIGATED FARMS					
NSW/ACT	11	11	*4	3	29
Vic.	*2	15	*3	*11	30
Qld	—	*1	*1	*1	3
SA	—	2	—	*1	3
WA	—	*1	—	—	2
Tas.	—	1	—	—	1
NT	—	—	—	—	—
<i>Total Irrigated farms</i>	14	30	8	15	68
NON-IRRIGATED					
NSW/ACT	*10	*2	—	**2	14
Vic.	*2	*3	—	**1	7
Qld	*10	1	—	*1	*12
SA	*2	2	—	**5	*10
WA	67	17	11	1	96
Tas.	—	**1	—	—	*2
NT	—	—	—	—	—
<i>Total Non-irrigated farms</i>	92	25	13	*11	140
Total Australia	106	55	21	26	208

(a) Earthworks constructed wholly or partly for the management or prevention of salinity. This includes all land with earthworks for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.9

EARTHWORKS FOR SALINITY MANAGEMENT LENGTH, BY NAP REGION(a)

NAP Region	Length of	Length of	Length of	Length of	Total length of earthworks
	levees/banks	shallow open drains	deep open drains	subsurface drains	
	'000 km	'000 km	'000 km	'000 km	'000 km
Avocca-Loddon-Campaspe	**2	*7	*1	—	10
Avon	29	6	*7	—	42
Border Rivers	**3	*1	—	—	*4
Burdekin-Fitzroy	*2	—	—	—	*3
Condamine-Balonne-Maranoa	*6	—	—	—	*7
Darwin-Katherine	—	—	—	—	—
Glenelg-Hopkins-Corangamite	*1	*2	—	**1	*4
Goulburn-Broken	—	*5	*1	*1	*7
Lachlan-Murrumbidgee	9	3	**2	*2	15
Lockyer-Burnett-Mary	—	—	—	—	*1
Lower Murray	*1	**3	—	6	10
Macquarie-Castlereagh	2	**1	—	—	3
Midlands	—	1	—	—	*1
Mt. Lofty-Kangaroo Island — Northern Agricultural District	—	*1	—	—	2
Murray	4	*7	2	—	13
Namoi-Gwydir	**3	—	—	—	*3
Northern Agricultural District	12	3	2	—	16
Ord	—	—	—	—	—
South Coast	8	3	1	—	13
South East	—	1	—	—	2
South West	13	5	2	1	20
Total NAP	96	50	18	13	176
Total non-NAP	11	5	*3	*13	32
Total Australia	106	55	21	26	208

(a) Earthworks constructed wholly or partly for the management or prevention of salinity. This includes all land with earthworks for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.10

FENCING FOR SALINITY MANAGEMENT — FARMS, BY STATE(a)

Stubs	NSW/ACT	Vic.	Qld	SA	WA	Tas.	NT	Total
	Farms	Farms	Farms	Farms	Farms	Farms	Farms	Farms
	no.	no.	no.	no.	no.	no.	no.	no.
Irrigated farms	199	470	*47	92	120	45	—	973
Non-irrigated farms	1 024	2 033	60	1 147	4 186	*39	1	8 490
Total Australia	1 223	2 503	107	1 239	4 306	84	1	9 463

(a) Fencing constructed wholly or partly for the management or prevention of salinity. This includes all farms with land fenced for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.11 FENCING FOR SALINITY MANAGEMENT — AREA, BY STATE(a)

<i>Fencing</i>	NSW/ACT		VIC		Qld		SA		WA		Tas.	NT	<i>Total</i> <i>Area fenced</i> <i>'000 ha</i>
	<i>Area fenced</i> <i>'000 ha</i>												
Irrigated farms	4	12	*5	*3	3	*1	—	29					
Non-irrigated farms	13	28	*21	25	349	*1	—	438					
Total Australia	17	40	*27	29	352	1	—	466					

(a) Fencing constructed wholly or partly for the management or prevention of salinity. This includes all farms with land fenced for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.12 FENCING FOR SALINITY MANAGEMENT — AREA, BY NAP REGION(a)

<i>NAP Region</i>	<i>Irrigated Farms</i> <i>Area fenced</i>	<i>Non-irrigated Farms</i> <i>Area fenced</i>	<i>Total Farms</i> <i>Area fenced</i>
	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>
Avoca-Loddon-Campaspe	9	3	13
Avon	—	137	137
Border Rivers	—	*1	*1
Burdekin-Fitzroy	*5	**1	*6
Condamine-Balonne-Maranoa	—	—	—
Darwin-Katherine	—	—	—
Glenelg-Hopkins-Corangamite	—	13	13
Goulburn-Broken	*1	1	2
Lachlan-Murrumbidgee	*1	6	7
Lockyer-Burnett-Mary	—	—	—
Lower Murray	2	8	10
Macquarie-Castlereagh	—	*3	*3
Midlands	*1	1	1
Mt. Lofty-Kangaroo Island — Northern Agricultural District	—	*14	*14
Murray	2	1	3
Namoi-Gwydir	—	1	1
Northern Agricultural District	—	63	64
Ord	—	—	—
South Coast	2	58	60
South East	*2	*1	*3
South West	*1	63	64
<i>Total NAP</i>	<i>27</i>	<i>376</i>	<i>403</i>
<i>Total non NAP</i>	<i>*2</i>	<i>61</i>	<i>63</i>
Total Australia	29	438	466

(a) Fencing constructed wholly or partly for the management or prevention of salinity. This includes all land fenced for salinity management, irrespective of whether the farm has land showing signs of salinity.

3.13 IRRIGATION METHODS, BY STATE(a)

State	<i>Farms with spray or Sprinkler (excluding micro spray)</i>	<i>Farms with drip or micro spray</i>	<i>Farms with furrow or flood</i>	<i>Farms with other</i>	<i>Total</i>
	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>
NSW/ACT	1 117	1 175	2 666	*81	5 039
Vic.	1 383	1 056	3 644	*118	6 201
Qld	1 199	*1 006	710	102	3 017
SA	976	1 439	392	101	2 908
WA	*263	382	91	23	759
Tas.	256	54	*16	21	347
NT	*5	10	—	2	17
Total Australia	5 199	5 122	7 518	448	18 288

(a) Irrigated farms managing for salinity and/or with land showing signs of salinity.

3.14 IRRIGATION METHODS — AREA, BY STATE(a)

State	<i>Spray or sprinkler (excluding micro spray)</i>	<i>Drip or micro spray</i>	<i>Furrow or flood</i>	<i>Other</i>	<i>Total</i>
	<i>Area irrigated '000 ha</i>	<i>Area irrigated '000 ha</i>	<i>Area irrigated '000 ha</i>	<i>Area irrigated '000 ha</i>	<i>Area irrigated '000 ha</i>
NSW/ACT	53	*55	697	*7	813
Vic.	53	36	403	*7	500
Qld	59	21	162	6	248
SA	33	38	27	3	102
WA	4	6	9	*1	19
Tas.	24	1	*3	1	28
NT	—	*1	—	—	*1
Total Australia	226	157	1 302	26	1 712

(a) Irrigated farms managing for salinity and/or with land showing signs of salinity.

3.15 IRRIGATION METHODS — AREA, BY NAP(a)

<i>NAP Region</i>	<i>Spray or sprinkler (excluding micro spray) area irrigated</i>	<i>Drip or micro spray area irrigated</i>	<i>Furrow or flood area irrigated</i>	<i>Other area irrigated</i>	<i>Total area irrigated</i>
	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>	<i>'000 ha</i>
Avoca-Loddon-Campaspe	5	10	195	*1	211
Avon	—	—	—	—	—
Border Rivers	4	*2	*56	—	*62
Burdekin-Fitzroy	**16	*2	*36	*1	*54
Condamine-Balonne-Maranoa	4	*1	23	**1	28
Darwin-Katherine	—	—	—	—	*1
Glenelg-Hopkins-Corangamite	4	—	**2	—	*6
Goulburn-Broken	4	13	149	*1	167
Lachlan-Murrumbidgee	8	11	263	**4	285
Lockyer-Burnett-Mary	14	*4	*1	—	20
Lower Murray	36	24	25	*5	90
Macquarie-Castlereagh	3	**5	59	—	67
Midlands	20	*1	*2	1	24
Mt. Lofty-Kangaroo Island — Northern Agricultural District	*4	*20	*1	—	25
Murray	13	**33	283	*2	331
Namoi-Gwydir	**11	**1	*54	—	66
Northern Agricultural District	**1	—	—	—	*2
Ord	—	—	*5	—	5
South Coast	—	2	—	—	2
South East	*14	7	*22	*1	43
South West	2	2	3	—	7
<i>Total NAP</i>	<i>163</i>	<i>138</i>	<i>1 179</i>	<i>17</i>	<i>1 498</i>
<i>Total non NAP</i>	<i>63</i>	<i>19</i>	<i>123</i>	<i>*9</i>	<i>214</i>
Total Australia	226	157	1 302	26	1 712

(a) Irrigated farms managing for salinity and/or with land showing signs of salinity.

CHAPTER 4

DRIVERS AND BARRIERS TO LAND MANAGEMENT CHANGE

4.1

CHANGED LAND MANAGEMENT PRACTICES — SUMMARY, BY STATE(a)

State	Irrigated farms			Non-irrigated farms			Total farms		
	Changed	Not changed	Total	Changed	Not changed	Total	Changed	Not changed	Total
	no.	no.	no.	no.	no.	no.	no.	no.	no.
NSW/ACT	3 077	1 397	4 474	4 823	3 685	8 508	7 899	5 082	12 981
Vic.	3 804	1 789	5 593	4 809	3 572	8 381	8 613	5 361	13 974
Qld	1 690	983	2 673	1 342	1 818	3 160	3 032	2 801	5 833
SA	1 586	962	2 548	1 672	1 575	3 247	3 258	2 537	5 795
WA	434	245	679	6 019	2 145	8 164	6 453	2 390	8 843
Tas.	188	146	334	*201	*224	425	390	370	760
NT	*7	9	16	16	13	29	24	22	46
Total Australia	10 786	5 531	16 317	18 883	13 032	31 914	29 669	18 563	48 232

State	Proportion of total irrigated farms			Proportion of total non-irrigated farms			Proportion of total farms		
	Changed	Not changed	Total	Changed	Not changed	Total	Changed	Not changed	Total
	%	%	%	%	%	%	%	%	%
NSW/ACT	69.0	31.0	100.0	56.7	43.3	100.0	60.9	39.1	100.0
Vic.	68.0	32.0	100.0	57.4	42.6	100.0	61.6	38.4	100.0
Qld	63.0	37.0	100.0	42.5	57.5	100.0	52.0	48.0	100.0
SA	62.0	38.0	100.0	51.5	48.5	100.0	56.2	43.8	100.0
WA	64.0	36.0	100.0	73.7	26.3	100.0	73.0	27.0	100.0
Tas.	56.0	44.0	100.0	47.3	52.7	100.0	51.3	48.7	100.0
NT	44.0	56.0	100.0	55.2	44.8	100.0	52.2	47.8	100.0
Total Australia	66.0	34.0	100.0	59.0	41.0	100.0	61.5	38.5	100.0

(a) Farms managing for salinity and/or with land showing signs of salinity.

4.2

TYPES OF LAND MANAGEMENT PRACTICES CHANGED — FARMS, BY STATE(a)

	<i>Land management practice changed</i>						
	<i>Crops</i>	<i>Pastures</i>	<i>Grazing</i>	<i>Earthworks</i>	<i>Irrigation</i>	<i>Trees & shrubs</i>	<i>Other</i>
IRRIGATED FARMS (no.)							
NSW/ACT	1 357	1 235	722	1 948	2 350	1 666	*86
Vic.	571	1 171	576	2 933	2 623	1 780	*149
Qld	*585	*267	*270	586	817	*835	47
SA	*491	*344	92	*404	1 194	*704	**248
WA	58	*140	78	241	165	271	21
Tas.	63	59	51	94	76	146	*4
NT	—	—	1	*3	*6	*3	*1
Total Irrigated farms	3 124	3 217	1 790	6 208	7 232	5 406	556
PROPORTION OF TOTAL IRRIGATED FARMS (%)							
NSW/ACT	43.4	38.4	40.3	31.4	32.5	30.8	*15.5
Vic.	18.3	36.4	32.2	47.2	36.3	32.9	*26.8
Qld	18.7	8.3	15.1	9.4	11.3	15.4	*8.5
SA	15.7	10.7	5.1	6.5	16.5	13.0	*44.6
WA	1.9	4.4	4.4	3.9	2.3	5.0	*3.8
Tas.	2.0	1.8	2.8	1.5	1.1	2.7	*0.7
NT	—	—	0.1	—	0.1	0.1	*0.2
Total Irrigated farms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NON-IRRIGATED FARMS (no.)							
NSW/ACT	1 485	2 652	1 587	1 273	*135	3 511	*189
Vic.	932	2 264	2 021	1 605	**208	3 682	125
Qld	*388	417	613	437	*8	767	39
SA	*541	553	479	489	**32	1 434	*82
WA	2 429	2 085	1 883	4 224	23	4 912	333
Tas.	*14	**133	**123	79	*21	84	*3
NT	*5	*9	*9	*7	—	2	1
Total Non-irrigated farms	5 793	8 023	6 715	8 114	*428	14 393	771
PROPORTION OF TOTAL NON-IRRIGATED FARMS (%)							
NSW/ACT	25.6	31.9	23.6	15.7	31.5	24.4	*24.5
Vic.	16.1	28.2	30.1	19.8	48.6	25.6	*16.2
Qld	6.7	5.2	9.1	5.4	1.9	5.3	*5.1
SA	9.3	6.9	7.1	6.0	7.5	10.0	*10.6
WA	41.9	26.0	28.0	52.1	5.4	34.1	*43.2
Tas.	0.2	1.7	1.8	1.0	4.9	0.6	*0.4
NT	0.1	0.1	0.1	0.1	—	—	*0.1
Total Non-irrigated farms	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(a) Farms managing for salinity and/or with land showing signs of salinity that have changed land management practices because of salinity or to prevent salinity.

4.3

REASONS FOR LAND MANAGEMENT CHANGE — FARMS, AUSTRALIA(a)

<i>Reason</i>	<i>Not a reason</i>	<i>Low importance</i>	<i>Medium importance</i>	<i>High importance</i>	<i>Total</i>
IRRIGATED FARMS (no.)					
Increased productivity	1 184	*493	2 044	7 012	10 733
Increased land value	2 833	1 533	3 234	3 106	10 706
Improved risk management	2 934	1 343	2 689	3 707	10 673
Farm sustainability	*1 335	*408	1 772	7 222	10 737
Improved environment protection	1 776	652	2 908	5 363	10 699
Other	na	*4	*52	411	467
PROPORTION OF TOTAL (%)					
Increased productivity	11.0	4.6	19.0	65.3	100.0
Increased land value	26.5	14.3	30.2	29.0	100.0
Improved risk management	27.5	12.6	25.2	34.7	100.0
Farm sustainability	12.4	3.8	16.5	67.3	100.0
Improved environment protection	16.6	6.1	27.2	50.1	100.0
Other	na	0.9	11.1	88.0	100.0
NON-IRRIGATED FARMS (no.)					
Increased productivity	4 221	1 455	3 908	8 746	18 330
Increased land value	5 518	2 943	4 794	5 024	18 279
Improved risk management	6 612	2 125	4 713	4 601	18 051
Farm sustainability	2 582	*731	2 966	12 050	18 329
Improved environment protection	1 864	815	4 839	10 701	18 219
Other	na	*6	**249	619	874
PROPORTION OF TOTAL (%)					
Increased productivity	23.0	7.9	21.3	47.7	100.0
Increased land value	30.2	16.1	26.2	27.5	100.0
Improved risk management	36.6	11.8	26.1	25.5	100.0
Farm sustainability	14.1	4.0	16.2	65.7	100.0
Improved environment protection	10.2	4.5	26.6	58.7	100.0
Other	na	0.7	28.5	70.8	100.0

(a) Farms managing for salinity and/or with land showing signs of salinity that have changed land management practices because of salinity or to prevent salinity.

4.4

FACTORS THAT HELPED LAND MANAGEMENT CHANGE — FARMS, AUSTRALIA(a)

<i>Factor</i>	<i>Not a factor</i>	<i>Low importance</i>	<i>Medium importance</i>	<i>High importance</i>	<i>Total</i>
IRRIGATED FARMS (no.)					
Tax advantages	5 602	1 994	1 740	1 291	10 627
Government financial assistance	6 885	1 189	1 163	1 277	10 514
Your financial resources	2 725	1 166	2 968	3 789	10 648
Information	2 913	1 269	3 216	3 082	10 480
Community groups	5 010	1 529	2 295	1 655	10 489
Previous success	4 213	*737	2 877	2 666	10 493
Other	na	**10	*57	697	764
PROPORTION OF TOTAL (%)					
Tax advantages	52.7	18.8	16.4	12.1	100.0
Government financial assistance	65.5	11.3	11.1	12.1	100.0
Your financial resources	25.6	11.0	27.9	35.6	100.0
Information	27.8	12.1	30.7	29.4	100.0
Community groups	47.8	14.6	21.9	15.8	100.0
Previous success	40.2	7.0	27.4	25.4	100.0
Other	na	1.3	7.5	91.2	100.0
NON-IRRIGATED (no.)					
Tax advantages	10 988	3 037	2 345	1 695	18 065
Government financial assistance	9 260	2 226	3 529	3 065	18 080
Your financial resources	4 776	1 956	5 245	6 189	18 166
Information	5 850	2 043	6 032	4 144	18 069
Community groups	6 058	2 035	4 657	5 390	18 140
Previous success	7 844	1 516	4 680	3 954	17 994
Other	na	*22	**173	1 035	1 230
PROPORTION OF TOTAL (%)					
Tax advantages	60.8	16.8	13.0	9.4	100.0
Government financial assistance	51.2	12.3	19.5	17.0	100.0
Your financial resources	26.3	10.8	28.9	34.1	100.0
Information	32.4	11.3	33.4	22.9	100.0
Community groups	33.4	11.2	25.7	29.7	100.0
Previous success	43.6	8.4	26.0	22.0	100.0
Other	na	1.8	14.1	84.1	100.0

(a) Farms managing for salinity and/or with land showing signs of salinity that have changed land management practices because of salinity or to prevent salinity.

4.5

BARRIERS TO LAND MANAGEMENT CHANGE — FARMS, AUSTRALIA(a)

<i>Barrier</i>	<i>Not a factor</i>	<i>Not very limiting</i>	<i>Limiting</i>	<i>Very limiting</i>	<i>Total</i>
IRRIGATED FARMS (no.)					
Lack of financial resources	3 517	976	4 596	5 679	14 768
Lack of time	4 693	2 232	4 904	2 637	14 466
Insufficient or inadequate information	7 889	3 341	2 142	825	14 197
Doubts about likely success	7 996	3 586	1 850	838	14 270
Age or poor health	10 113	1 921	1 562	929	14 525
Other	na	*59	137	334	530
PROPORTION OF TOTAL (%)					
Lack of financial resources	23.8	6.6	31.1	38.5	100.0
Lack of time	32.4	15.4	33.9	18.2	100.0
Insufficient or inadequate information	55.6	23.5	15.1	5.8	100.0
Doubts about likely success	56.0	25.1	13.0	5.9	100.0
Age or poor health	69.6	13.2	10.8	6.4	100.0
Other	na	11.1	25.8	63.0	100.0
NON-IRRIGATED FARMS (no.)					
Lack of financial resources	6 927	2 505	9 769	9 880	29 081
Lack of time	8 061	3 495	10 592	6 284	28 432
Insufficient or inadequate information	14 075	7 105	5 190	1 621	27 991
Doubts about likely success	14 028	6 248	5 927	2 042	28 245
Age or poor health	19 972	3 413	2 808	1 899	28 092
Other	na	81	226	969	1 276
PROPORTION OF TOTAL (%)					
Lack of financial resources	23.8	8.6	33.6	34.0	100.0
Lack of time	28.4	12.3	37.3	22.1	100.0
Insufficient or inadequate information	50.3	25.4	18.5	5.8	100.0
Doubts about likely success	49.7	22.1	21.0	7.2	100.0
Age or poor health	71.1	12.1	10.0	6.8	100.0
Other	na	6.3	17.7	75.9	100.0

(a) Farms managing for salinity and/or with land showing signs of salinity.

SAMPLING ERRORS

8 Since the estimates in this publication are based on information obtained from a sample drawn from units in the survey population, the estimates are subject to sampling variability. That is, they may differ from figures that would have been obtained if all units 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 19 chances in 20 that the difference will be less than two SEs.

9 Sampling variability can be measured by the relative standard error (RSE) which is obtained by expressing the standard error as a percentage of the estimate to which it refers. The RSE is a useful measure in that it provides an immediate indication of the percentage errors likely to have occurred due to sampling, and this avoids the need to refer also to the size of the estimate.

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

LAND SHOWING SIGNS OF SALINITY — SUMMARY, BY STATE

State	Farms with land showing signs of salinity		RSE of farms with land showing signs of salinity		Land showing signs of salinity		RSE of land showing signs of salinity		Salinised land unable to be used for production		RSE of salinised land unable to be used for production	
	no.	%	'000 ha	%	'000 ha	%	'000 ha	%				
NSW/ACT	3 108	5	124	11	44	17						
Vic.	4 834	6	139	6	60	10						
QLD	993	7	107	22	40	33						
SA	3 328	12	350	27	105	13						
WA	6 918	3	1 241	9	567	11						
Tas.	390	21	6	17	2	28						
NT	8	24	2	10	2	11						
Total Australia	19 579	5	1 969	8	821	8						

11 As an example of the above, the estimate of agricultural land showing signs of salinity in Australia is 1,967,000 hectares (ha) and the RSE is 8% giving a standard error of 157,000 ha. Therefore, there would be two chances in three that, if all units had been included in the survey, a figure within the range of 1,810,000 ha to 2,124,000 ha would have been obtained and 19 chances in 20 that the figure would have been within the range of 1,653,000 ha to 2,281,000 ha (a confidence interval of 95%).

SAMPLING ERRORS

continued

12 Where the RSE of an estimate included in this publication exceeds 25%, it has been annotated with an asterisk (*) as a warning to users. Where the RSE of an estimate exceeds 50%, it has been annotated with a double asterisk (**), which suggests the estimate is so unreliable as to be not useful for most purposes.

NON-SAMPLING ERRORS

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

RELEASE OF ADDITIONAL INFORMATION

14 As well as the statistics included in this publication, other unpublished data from the environment management survey are also available on request. For information on the provision of unpublished data please contact Bob Harrison on 02 6252 7369.

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15 The following reference material was drawn upon in the preparation of this publication:

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16 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*.

GLOSSARY

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.
Deep open drains	Open drains that are more than one metre deep.
Deep rooted perennials	Perennial plants with deep roots, excluding lucerne.
Earthworks	Earthworks consist of levees/banks, shallow open drains, deep open drains and subsurface drains.
Estimated value of agricultural operations (EVAO)	An estimate of the value of agricultural activity undertaken by an agricultural establishment. Three-year average weighted prices are applied to livestock turnoff (disposals) 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 on individual farms but rather an indicator of the extent of agricultural activity.
Fodder species	Shrubs specifically grown for fodder in areas with saline soils; for example, tree lucerne/tagasaste.
Land showing signs of salinity	Land with dead trees, salt scalds or salt tolerant plants (e.g. sea barley grass, red weed, beadbush and samphire), land where crops and pastures are unable to be grown and land that is waterlogged for significant parts of the year.
Levees/banks	Includes contour, graded and interceptor banks.
National Action Plan for Salinity and Water Quality (NAP)	A policy adopted by Commonwealth and state and territory governments that supports targeted land management actions by regional communities and landholders in the catchments highly affected by salinity.
Salinity management practices	Earthworks, drains, water pumping, planting trees and shrubs, crops and pastures, fencing, grazing, irrigation and the monitoring of water and soil salinity levels specifically for the purpose of managing salinity.
Salt tolerant crops	Crops specifically grow in areas with saline soils; for example, barley can be grown in slightly saline soils.
Salt tolerant pastures	Pastures specifically grow in areas with saline soils; for example, tall wheat grass, kikuyu, puccinellia, veldt grass.
Shallow open drains	Open drains that are less than one metre deep.
Subsurface drains	Drains that are buried for removal of subsurface water; for example, excavator-built buried tyre, pipe or tube drains
Wooded or treed areas	Areas that are densely treed, planted for timber production or shelter and treed areas not primarily used for grazing. Excludes fruit and nut trees, garden trees and shrubs and areas primarily used for grazing.

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