Australian Bureau of Statistics

2006–07

4620.0

NATURAL RESOURCE MANAGEMENT ON AUSTRALIAN FARMS

AUSTRALIA

EMBARGO: 11.30AM (CANBERRA TIME) WED 25 JUN 2008

CONTENTS

page

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 compiled from the second survey conducted by the Australian Bureau of Statistics dedicated to Natural Resource Management (NRM).

The survey asked managers of agricultural businesses to identify the extent and type of weed, pest, and land and soil problems present on their land, and the activities they undertook to prevent or manage them. It also asked managers of agricultural businesses to provide details of the costs and effort spent on addressing these problems.

The results provide an important perspective into NRM activities and problems occurring on Australian agricultural businesses during 2006–07. As as many of the data items on the NRM survey rely on the perceptions and attitudes of the person completing the form, care should be taken when comparing data from this publication to data from other sources (see paragraph 26 of the Explanatory Notes).

The ABS welcomes feedback on this publication in terms of relevance, usefulness, quality and range of data presented. Additional information accompanies this publication on the ABS website as datacubes, and more detailed information may be available on request. Please send any comments or questions to the National Information and Referral Service on 1300 135 070.

Brian Pink
Australian Statistician

LIST OF TABLES AND MAPS

page

page

ABBREVIATIONS

'000	thousand
$m	million dollars
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ANZSIC	Australian and New Zealand Standard Industrial Classification
Aust.	Australia
EVAO	Estimated Value of Agricultural Operations
ha	hectare
m	million
n.e.c.	not elsewhere classified
no.	number
NRM	natural resource management
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
RSE	relative standard error
SA	South Australia
SE	standard error
Tas.	Tasmania
Vic.	Victoria
WA	Western Australia

CHAPTER 1 NRM OVERVIEW

INTRODUCTION

Agricultural businesses (in scope for this survey) occupy approximately 425,449,000 ha, or 55.3% of Australia's area, and range from large pastoral holdings occupying millions of hectares, to small market gardens and undercover agriculture industries occupying less than 1 hectare.

This publication provides an overview of the Natural Resource Management (NRM) activities undertaken by this broad spectrum of Agricultural businesses, concerning the management of weed, pest, and land and soil issues.

The different geographical locations, management strategies and requirements of these various types of agricultural businesses are reflected in the difference of intensity of the management of weeds, pests, and land and soil across Australia.

Details of these agricultural industries for the period 2006–07 can be found in ABS publications [*Agricultural Commodities*, 2006-07 - cat. no. 7121.0, *Principal Value of Agricultural Commodities Produced, Australia, Preliminary*, 2006-07 - cat. no. 7501.0 and *Water Use on Australian Farms*, 2006-07 - cat. no. 4618.0].

WEED, PEST, AND LAND AND SOIL RELATED PROBLEMS AND ACTIVITIES

State and National

In 2006–07, 94.3% of Australian agricultural businesses reported undertaking NRM activities to prevent or manage weeds, pests, and land and soil. In total, undertaking these activities cost almost $3 billion, or $21,094 per agricultural business or $7,522 for each 1000 ha under management.

Of the approximately $3 billion spent, 32.8% ($982 million) was spent on herbicides, 14.4% ($430 million) on pesticides and insecticides, and 10.2% ($305 million) on soil conditioners (excluding fertilisers). The remaining 42.5% ($1.3 billion) was spent on payment to contractors (excluding herbicides, pesticides/insecticides and soil conditioners), labour, and other costs.

A total of almost 9.4 million person days was spent addressing these problems, an average of 66 person days per agricultural business reporting NRM activities or 24 person days per 1,000 ha under management.

Agricultural businesses in New South Wales spent the most overall on weed, pest, and land and soil activities ($933 million, or 31.2% of NRM expenditure nationally). On an individual basis, agricultural businesses in Western Australia spent the most on weed, pest, and land and soil activities, averaging $41,094. In comparison, agricultural businesses in Victoria and Tasmania spent an average of $16,156 and $14,193 respectively. However, on average, agricultural businesses in Tasmania and Victoria spent the most managing these NRM problems per thousand hectares ($38,644 and $44,822 respectively). These two states also spent the most amount of time per thousand hectares managing their weed, pest, and land and soil problems, both averaging 137 person days per 1,000 hectares.

State and National continued

Agricultural businesses in New South Wales invested over 3 million person days managing their weed, pest, and land and soil problems. On an individual basis, agricultural businesses in Queensland spent on average 84 person days managing their weed, pest, and land and soil problems, followed by Western Australia (75 person days) and the Northern Territory (74 person days).

Nationally, the most commonly reported NRM problems were pests (70.4% of agricultural businesses), followed by weeds (66.0%) and land and soil (56.4%). Weed related management activities were reported by 88.8% of agricultural businesses, followed by pest related management activities (80.4%) and land and soil related management activities (60.1%).

More agricultural establishments manage weeds, even though pest related problems were the most commonly reported NRM issue.

Typically, a higher proportion of farmers reported undertaking activities than those reporting a problem, indicating that NRM problems are managed preventatively as well as remedially.

LAND USE

In 2006–07, approximately 55.3% of Australia was managed by agricultural businesses. At the state level, the lowest proportion managed by agricultural businesses was in Tasmania (24.3% of state area) while the highest was in Queensland (83.1% of state area).

Of land managed by agricultural businesses, 67.9% was used for grazing on land other than improved pasture, 16.2% for grazing on improved pasture, 8.9% for crops, 3.4% for conservation and 3.2% for other uses (including forestry).

At the state/territory level, the percentage of land managed by agricultural businesses that was used for grazing on improved pasture ranged from 7.3% in Western Australia and 7.4% in the Northern Territory, to 43.8% and 52.7% in Victoria and Tasmania respectively. Areas used for grazing on land other than improved pasture ranged from 9.8% of agricultural land in Victoria, to 83.3% of agricultural land in the Northern Territory. The percentage of agricultural land used for crops ranged from less than 1% in the Northern Territory to 38.6% in Victoria.

In Tasmania, 8.4% of land managed by agricultural businesses was set aside for conservation, well above the national average of 3.4%. Similarly, the percentage of land managed by agricultural businesses that was used for other purposes, including forestry, was also higher in Tasmania, 10.0%, compared to 3.2% nationally.

CHANGES IN NATURAL RESOURCE MANAGEMENT

Reasons for improving NRM practices

Nationally, 65.8% of agricultural businesses reported that they had improved their NRM practices (including the management of weeds, pests, land and soil, water and native vegetation) during 2006–07.

Of the agricultural businesses reporting improving their NRM practices, 88.6% reported doing so to increase productivity, 88.4% for farm sustainability, and 74.5% to improve environmental protection.

Across all states and territories, increasing productivity and farm sustainability were the most commonly reported reasons for improving NRM practices.

Barriers to improving NRM practices

Nationally, 71.0% of agricultural businesses reported barriers to the improvement of their NRM practices (including the management of weeds, pests, land and soil, water and native vegetation) during 2006–07. Of the agricultural businesses reporting barriers, the most common reasons given were lack of financial resources (78.9%), lack of time (63.1%) and lack of government incentives (40.0%). Age and/or ill health was given as a reason by 22.2% of agricultural businesses nationally.

New South Wales had the greatest proportion of agricultural businesses reporting barriers to improving NRM practices (74.6%), while the lowest percentage was in the Northern Territory where 58.1% of agricultural businesses reported barriers.

1.1 NATURAL RESOURCE MANAGEMENT(a), Problems and Activities—by State—2006–07

	NSW(b)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
				NUMBER				
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
				AGRICULTURAL BUSINESSES REPORTING NRM PROBLEMS (NO.)				
Weed related problems	32 468	23 403	20 776	9 924	9 145	3 101	405	99 222
Pest related problems	33 932	24 356	22 308	11 100	10 306	3 482	462	105 947
Land and soil related problems	28 027	21 203	15 272	8 673	9 104	2 364	279	84 922
				AGRICULTURAL BUSINESSES REPORTING NRM ACTIVITIES (NO.)				
Weed related activities	43 278	33 552	26 168	14 443	11 610	3 979	548	133 578
Pest related activities	39 041	29 241	24 647	12 456	11 272	3 798	509	120 963
Land and soil related activities	29 709	22 723	16 739	9 530	8 942	2 473	253	90 368

(a) The management of weed, pest, and land and soil related problems. The management of other types of problems are not included.

(b) Includes ACT.

1.2 WEED, PEST, AND LAND AND SOIL MANAGEMENT, Expenditure and Effort—by State—2006–07

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
				NUMBER				
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting NRM activities(b)	45 243	35 127	28 519	15 110	12 809	4 386	600	141 794
				('000 HA)				
Area of holding	58 661	13 250	143 871	50 065	96 742	1 659	61 202	425 449
				AGRICULTURAL BUSINESSES REPORTING NRM ACTIVITIES(b)				
NRM expenditure								
Total expenditure ($m)	933	568	572	315	526	62	14	2 991
Average expenditure ($/agricultural business)(c)	20 632	16 156	20 067	20 826	41 094	14 193	24 004	21 094
Average expenditure ($/'000 ha)(d)	16 745	44 822	4 139	7 078	6 059	38 644	248	7 522
NRM effort								
Total effort (person days)	3 137 491	1 728 401	2 395 946	886 234	966 817	219 899	44 599	9 379 387
Average effort (person days/agricultural business)(e)	69	49	84	59	75	50	74	66
Average effort (person days/'000ha)(f)	56	137	17	20	11	137	1	24

(a) Includes ACT.

(b) Businesses reporting activities comprising weed, pest, and land and soil related activities. Other types of activity are not included.

(c) Total expenditure on weed, pest, and land and soil related activities, divided by the number of agricultural businesses reporting weed, pest, and land and soil related activities.

(d) Total expenditure on weed, pest, and land and soil related activities, divided by the total area ('000 ha) of agricultural businesses reporting weed, pest, and land and soil related activities.

(e) Total effort on weed, pest, and land and soil related activities, divided by the number of agricultural businesses reporting weed, pest, and land and soil related activities.

(f) Total effort on weed, pest, and land and soil related activities, divided by the total area ('000 ha) of agricultural businesses reporting weed, pest, and land and soil related activities.

1.3 NATURAL RESOURCE MANAGEMENT, Details of Expenditure—by State—2006–07

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
WEED MANAGEMENT ($M)								
Herbicides	279	162	130	144	253	^11	2	982
Payment to contractors	65	24	^38	^11	^16	^3	*1	159
Labour costs	66	32	52	25	32	4	^2	211
Other expenses	65	35	49	28	40	*4	^1	222
Total expenditure	***475***	***253***	***269***	***209***	***341***	***22***	***5***	***1 574***
PEST MANAGEMENT ($M)								
Pesticides/insecticides	132	85	105	37	55	^13	3	430
Payment to contractors	28	^13	^13	^7	^12	^3	^—	77
Labour costs	47	24	38	14	23	^5	1	153
Other expenses	34	^21	26	10	13	3	1	109
Total expenditure	***242***	***144***	***182***	***68***	***103***	***23***	***5***	***768***
LAND AND SOIL MANAGEMENT ($M)								
Soil conditioners	101	99	39	17	38	^9	^1	305
Payment to contractors	43	27	^23	^6	^15	^3	^—	117
Labour costs	23	^19	17	^6	^11	*2	2	81
Other expenses	49	^26	40	8	^18	^3	^1	146
Total expenditure	***216***	***171***	***121***	***37***	***82***	***^17***	***5***	***649***

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

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

— nil or rounded to zero (including null cells)

(a) Includes ACT.

1.4 LAND USE—by State—2006–07

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
				NUMBER				
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
				('000 HA)				
Area of holding	58 661	13 250	143 871	50 065	96 742	1 659	61 202	425 449
Total land area(b)	80 307	22 742	173 065	98 348	252 988	6 840	134 913	(c) 769 202
				LAND USED FOR AGRICULTURAL PRODUCTION (%)(d)				
Crops	17.0	38.6	3.0	12.3	^12.5	7.5	^0.1	8.9
Grazing - improved pasture	23.9	43.8	22.1	9.9	7.3	52.7	^7.4	16.2
Grazing - other land	51.4	9.8	68.6	71.6	73.8	21.3	83.3	67.9
Other agricultural purposes(e)	*0.5	^0.4	1.0	*0.2	^0.2	0.1	^-	0.5
				LAND NOT USED FOR AGRICULTURAL PRODUCTION (%)(d)(e)				
Land set aside for conservation purposes	^3.9	4.1	2.5	4.9	^3.2	^8.4	^3.6	3.4
Other land (including forestry)	^3.3	3.4	^2.7	1.1	^3.1	10.0	^5.6	3.2

(a) Includes ACT.

(b) Source: Geoscience Australia (2005) GEODATA 100k Coastline database, 1993.

(c) Total area of Australia includes Jervis Bay.

(d) As a percentage of total area of holding for each geographic classification.

(e) Land mainly used for other agricultural purposes includes land used for forestry, water bodies, land surrounding and occupied by buildings and other agriculturally unproductive land such as inaccessible areas or roads.

1.5 REASONS FOR IMPROVING NATURAL RESOURCE MANAGEMENT(a)—by State—2006–07

	NSW(b)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
	NUMBER							
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting improved NRM practices(a)	32 007	24 691	19 381	10 182	9 246	3 023	395	98 925
	REASONS FOR IMPROVING (%)(c)							
Increase productivity	88.0	88.4	91.0	88.1	88.3	84.4	79.4	88.6
Farm sustainability	88.3	87.7	89.3	88.0	89.6	89.5	75.8	88.4
Improve environmental protection	76.4	73.3	73.4	74.1	77.3	66.5	66.9	74.5
Increase land value	74.0	72.9	72.8	70.8	66.5	66.8	57.4	72.2
Improve risk management	64.4	59.9	67.2	65.2	68.8	55.1	64.5	64.0
Other reasons	^3.9	^5.0	^4.4	^3.8	^2.8	*4.6	^5.3	4.2

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

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

(a) The management of all NRM related problems, including native vegetation, weed, pest, land and soil, and water related problems.

(b) Includes ACT.

(c) The number of agricultural businesses reporting a reason for improving natural resource management as a percentage of agricultural businesses reporting improved natural resource management practices.

1.6 BARRIERS TO IMPROVING NATURAL RESOURCE MANAGEMENT(a)—by State—2006–07

	NSW(b)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
	NUMBER							
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting NRM barriers	35 525	26 115	21 034	11 090	9 465	3 124	372	106 725
	BARRIERS TO IMPROVING NRM (%)(c)							
Lack of financial resources	80.8	77.3	78.3	78.2	79.9	75.3	67.8	78.9
Lack of time	60.0	62.1	64.9	64.1	69.6	71.5	65.5	63.1
Lack of government incentives	38.1	40.9	41.3	39.1	43.1	39.6	42.4	40.0
Age and/or ill health	24.3	22.0	22.5	18.7	16.1	29.3	^13.3	22.2
Doubts about likely success	17.5	15.6	16.5	16.2	17.8	^14.1	^14.1	16.6
Conflicting information	11.0	9.3	11.4	^9.0	16.9	^7.2	^9.6	10.9
Insufficient or inadequate information	8.3	^8.1	9.1	^9.5	^11.3	^9.2	^16.8	8.9
Differing management views	9.3	^7.7	8.3	^8.1	^12.0	^6.8	^6.9	8.7

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

(a) The management of all NRM related problems, including native vegetation, weed, pest, land and soil, and water related problems.

(b) Includes ACT.

(c) The number of agricultural businesses reporting specific NRM barriers as a percentage of agricultural businesses reporting any NRM barriers.

CHAPTER 2 WEEDS

WEED RELATED PROBLEMS

In 2006–07, 66.0% of agricultural businesses reported weed related problems on their holdings. Of these, the most common weed related problem reported was decreased value of production (76.1%), followed by decreased value of holding (34.3%) and increased fire risk (32.0%). After decreased value of production (65.9%), increased fire risk was the second most commonly reported weed related problem in the Northern Territory, with 52.8% of agricultural businesses reporting weed related problems reporting this problem. Agricultural businesses in Tasmania and Western Australia also commonly reported increased fire risk as a weed related problem (44.0% and 46.0% respectively).

WEED RELATED ACTIVITIES

In 2006–07, 88.8% of agricultural businesses reported undertaking weed related activities to prevent or manage weeds on their holdings. Of all agricultural businesses undertaking weed related activities, the major method of control was the application of herbicides (88.5%), followed by pulling, manual removal or chipping (55.5%) and slashing, cutting or mowing (55.0%).

EXPENDITURE AND EFFORT

The total expenditure on managing weeds by agricultural businesses in 2006–07 was approximately $1.6 billion. Those agricultural businesses undertaking weed related management activities reported spending an average of $11,785 per agricultural business. At the state/territory level, average expenditure per agricultural business undertaking weed related management activities ranged from $5,469 in Tasmania to $29,376 in Western Australia. Agricultural businesses in New South Wales spent the most overall on weed related activities ($475 million).

The cost of managing weeds per 1000 ha was the highest in Victoria ($20,701), and lowest in the Northern Territory ($102). At the national level, $5,490 was spent on weed management per 1,000 ha.

Almost two thirds of the total expenditure on weed related management ($1.6 billion) was spent on herbicides ($982 million) (see Table 1.3).

The management of weed related problems involved in excess of 4 million person days, or 31 person days per agricultural business reporting weed related activities, corresponding to an average effort of 14 person days per 1000 ha. While the average effort per agricultural business at the state/territory level was between 20 person days in Tasmania and 41 person days in Queensland, the average effort in person days per 1000 ha varied from below 1 in the Northern Territory, to 55 and 57 in Tasmania and Victoria respectively.

2.1 WEEDS, Problems and Activities—by State—2006–07

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	Aust.
				NUMBER				
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting weed related problems	32 468	23 403	20 776	9 924	9 145	3 101	405	99 222
Agricultural businesses reporting weed related activities	43 278	33 552	26 168	14 443	11 610	3 979	548	133 578
				WEED RELATED PROBLEMS - PROPORTION REPORTING (%)(b)				
Decreased value of production	78.5	74.2	74.9	77.9	73.9	73.9	65.0	76.1
Decreased value of holding	38.9	31.1	38.8	28.4	23.1	32.4	27.7	34.3
Increased fire risk	32.5	31.1	23.6	32.3	46.0	44.0	52.8	32.0
Decreased native plant or animal populations and distributions	29.2	20.3	27.5	19.2	21.3	^ 21.1	29.0	24.7
Blocked water courses	18.8	24.0	21.1	^ 12.9	20.5	34.7	^ 17.7	20.5
Poisoned stock	22.8	10.2	28.6	^ 12.0	21.2	^ 10.4	^ 16.1	19.4
Other weed related problems	44.3	43.0	41.0	39.6	38.0	43.9	^ 35.0	42.2
				WEED RELATED ACTIVITIES - PROPORTION REPORTING (%)(c)				
Application of herbicides	86.7	89.8	86.6	93.1	91.4	84.5	87.2	88.5
Pulling manual removal or chipping	60.3	53.2	54.3	51.9	52.1	55.8	39.9	55.5
Slashing, cutting or mowing	55.0	54.2	56.4	57.9	46.5	63.5	65.5	55.0
Crop or grazing management	41.2	36.9	31.1	47.3	53.1	32.6	17.8	39.5
Cultivation	33.9	30.1	43.2	39.9	30.6	32.0	^ 13.3	35.0
Burning	14.6	12.7	23.7	14.1	24.8	^ 20.4	24.5	17.0
Use of biological control	6.3	^ 2.4	^ 5.5	^ 5.3	^ 3.6	^ 8.7	^ 9.2	4.9
Other weed related activities	^ 1.9	^ 2.1	^ 2.9	*1.6	^ 1.9	*2.9	^ 4.1	2.2

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

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

(a) Includes ACT.

(b) The number of agricultural businesses reporting specific weed related problems as a percentage of those reporting any weed related problems.

(c) The number of agricultural businesses reporting specific weed related activities as a percentage of those reporting any weed related activities.

2.2 WEEDS, Expenditure and Effort—by State—2006–07

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
				NUMBER				
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting weed related activities	43 278	33 552	26 168	14 443	11 610	3 979	548	133 578
				('000 HA)				
Area of holding	58 661	13 250	143 871	50 065	96 742	1 659	61 202	425 449
				AGRICULTURAL BUSINESSES REPORTING WEED RELATED ACTIVITIES				
Expenditure								
Total expenditure ($m)	475	253	269	209	341	22	5	1 574
Average expenditure ($/agricultural business)(b)	10 986	7 542	10 296	14 463	29 376	5 469	8 332	11 785
Average expenditure ($/'000 ha)(c)	10 528	20 701	2 561	8 369	^ 6 431	15 163	102	5 490
Effort								
Total effort managing (person days)	1 396 019	701 868	1 085 904	458 305	395 808	78 750	17 836	4 134 490
Average effort (person days/agricultural business)(d)	32	21	41	32	34	20	33	31
Average effort (person days/'000 ha)(e)	31	57	10	18	^ 7	55	—	14

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

— nil or rounded to zero (including null cells)

(a) Includes ACT.

(b) Total expenditure on weed related activities, divided by the number of agricultural businesses reporting weed related activities.

(c) Total expenditure on weed related activities, divided by the total area ('000 ha) of agricultural businesses reporting weed related activities.

(d) Total effort on weed related activities, divided by the number of agricultural businesses reporting weed related activities.

(e) Total effort on weed related activities, divided by the total area ('000 ha) of agricultural businesses reporting weed related activities.

CHAPTER 3 PESTS

PEST RELATED PROBLEMS

Nationally, 70.4% of agricultural businesses reported that they had pest problems in 2006–07, while 84.3% reported some type of pest on their holding. The presence of feral and domestic animals was the most commonly reported pest type (76.7% of agricultural businesses reporting pests), followed by native animals and birds (69.4%), insect pests (61.9%) and other pests (including parasites, slugs, nematodes, mites etc.) (44.5%).

Native animals and birds were the most commonly reported pest types in Tasmania (83.4% of agricultural businesses reporting any pest), Queensland (78.5%), and the Northern Territory (68.8%), while feral and domestic animals were the most commonly reported pest type in the remaining states. Feral and domestic animals were reported as pests by 44.6% of agricultural businesses in the Northern Territory reporting pest related problems, against a national average of 76.7%. Insect pests were reported as common pests in South Australia (71.9%) and Western Australia (70.2%), compared to a national average of 61.9% and a low of 50.4% in Tasmania.

Of agricultural businesses reporting pest related problems, crop damage or decreased crop production was the most commonly reported problem (67.3%), followed by decreased livestock production (54.9%).

PEST RELATED ACTIVITIES

Nationally, 80.4% of agricultural businesses reported that they had undertaken activities to manage pest related problems in 2006–07. Of these, the use of pesticides and/or insecticides was the most commonly reported management activity (82.6%), followed by shooting/trapping (57.0%) and baiting (33.5%). In Tasmania, shooting/trapping was the most commonly reported activity (76.8%), while baiting was the lowest (10.8%).

EXPENDITURE AND EFFORT

Agricultural businesses reported spending a total of $768 million undertaking pest related management activities in 2006–07. Of this total, 56.0% ($430 million) was spent on pesticides and/or insecticides (see Table 1.3). Nationally, an average of $6,351 was spent by each agricultural business undertaking pest related activities. At the state/territory level, the corresponding averages ranged from $4,911 per agricultural business in Victoria to $10,388 in the Northern Territory.

However, as with the management of weeds, the highest cost of management by area was in Tasmania ($15,011 per 1,000 ha) and Victoria ($12,198 per 1,000 ha), and the lowest was $97 per 1,000 ha in the Northern Territory, against a national average of $2,012 per 1,000 ha.

In excess of 3.1 million person days was spent nationally undertaking pest related management activities. The effort in person days per agricultural business reporting pest related management activities ranged from 20 in Victoria to 37 in the Northern Territory, with agricultural businesses in Tasmania and Victoria again reporting the most intensive

EXPENDITURE AND EFFORT *continued*

pest related management by area, with 62 and 49 person days per 1,000 ha respectively, against a national average of 8 person days per 1,000 ha.

3.1 PESTS, Problems and Activities—by State—2006–07

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	Aust.
NUMBER								
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting type of pest	40 944	30 137	26 248	13 074	11 881	3 889	553	126 726
Agricultural businesses reporting pest related problems	33 932	24 356	22 308	11 100	10 306	3 482	462	105 947
Agricultural businesses reporting pest related activities	39 041	29 241	24 647	12 456	11 272	3 798	509	120 963
TYPE OF PEST - PROPORTION REPORTING(%) (b)								
Feral and domestic animals	80.6	81.0	67.1	78.0	78.2	61.5	44.6	76.7
Native animal and bird pests	73.4	54.3	78.5	62.2	76.4	83.4	68.8	69.4
Insect pests	61.4	58.6	59.6	71.9	70.2	50.4	62.2	61.9
Other pests	42.0	45.8	39.6	52.5	50.0	52.6	38.1	44.5
PEST RELATED PROBLEMS - PROPORTION REPORTING(%) (c)								
Crop damage or decreased crop production	63.7	69.3	57.7	78.9	78.4	81.1	58.3	67.3
Decreased livestock production	60.4	52.4	55.2	48.0	53.6	43.3	43.4	54.9
Decreased native plant or animal populations and distribution	32.9	26.1	22.4	23.0	28.3	25.3	19.7	27.3
Other pest related problems	18.7	17.0	16.4	17.3	21.5	^ 20.0	^ 19.5	18.0
PEST RELATED ACTIVITIES - PROPORTION REPORTING(%) (d)								
Use of pesticides and/or insecticides	83.3	83.1	78.9	87.1	85.7	74.3	75.8	82.6
Shooting/trapping	55.3	57.2	54.2	54.1	66.3	76.8	45.9	57.0
Baiting	40.4	22.2	34.9	41.5	34.2	^ 10.8	37.8	33.5
Crutching	37.0	32.6	^ 4.5	49.1	51.7	31.4	0.2	31.6
Fencing and/or netting	24.0	21.4	16.7	19.1	28.3	41.4	25.6	22.3
Crop or grazing management	20.1	19.3	17.7	23.0	23.9	^ 23.0	^ 9.4	20.1
Use of introduced biological control	7.7	5.0	7.9	^ 8.1	^ 5.7	^ 8.3	^ 16.3	7.0
Other pest related activities	8.7	8.4	^ 5.7	^ 9.2	^ 10.4	^ 7.2	^ 7.5	8.2

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

(a) Includes ACT.

(b) The number of agricultural businesses reporting specific pests expressed as a percentage of those agricultural businesses reporting any pests.

(c) The number of agricultural businesses reporting specific pest related problems expressed as a percentage of agricultural businesses reporting any pest related problems.

(d) The number of agricultural businesses reporting specific pest related activities expressed as a percentage of those agricultural businesses reporting any pest related activities.

3.2 PESTS, Expenditure and Effort—by State—2006–07

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
				NUMBER				
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting pest related activities	39 041	29 241	24 647	12 456	11 272	3 798	509	120 963
				('000 HA)				
Area of holding	58 661	13 250	143 871	50 065	96 742	1 659	61 202	425 449
				AGRICULTURAL BUSINESSES REPORTING PEST RELATED ACTIVITIES				
Expenditure								
Total expenditure ($m)	242	144	182	68	103	23	5	768
Average expenditure ($/agricultural business)(b)	6 207	4 911	7 394	5 485	9 167	6 086	10 388	6 351
Average expenditure ($/'000 ha)(c)	4 565	12 198	1 368	1 578	1 220	15 011	97	2 012
Effort								
Total effort (person days)	1 026 249	578 603	824 303	271 706	318 268	95 146	^ 18 856	3 133 131
Average effort (person days/agricultural business)(d)	26	20	33	22	28	25	^ 37	26
Average effort (person days/'000 ha)(e)	19	49	6	6	4	62	^ —	8

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

— nil or rounded to zero (including null cells)

(a) Includes ACT.

(b) Total expenditure on pest related activities, divided by the number of agricultural businesses reporting pest related activities.

(c) Total expenditure on pest related activities, divided by the total area ('000 ha) of agricultural businesses reporting pest related activities.

(d) Total effort on pest related activities, divided by the number of agricultural businesses reporting pest related activities.

(e) Total effort on pest related activities, divided by the total area ('000 ha) of agricultural businesses reporting pest related activities.

CHAPTER 4 LAND AND SOIL

LAND AND SOIL RELATED PROBLEMS

Nationally, 56.5% of agricultural businesses reported land and soil related problems in 2006–07. Of agricultural businesses reporting land and soil related problems, those most frequently reported were erosion (48.3%), soil compaction (43.3%) and soil acidity (42.0%). Dryland salinity was most commonly reported in Western Australia (44.9%) against a national average of 17.4%, while irrigation salinity was most commonly reported in South Australia (17.6%) against a national average of 7.3%.

While erosion was the most frequently reported land and soil related problem, the relative area affected was greatest for soil compaction (16.1 million ha of agricultural land or 3.8% of agricultural land nationally). Soil acidity was the next most widespread land and soil related problem (13.5 million ha, 3.2% of agricultural land nationally) followed by erosion (12.4 million ha, 2.9% of agricultural land nationally).

At the state level, Victoria reported the highest proportion of area affected by soil compaction (1.6 million ha, 12.5% of Victorian agricultural land), and the highest reported area of soil acidity (2.2 million ha, 16.6% of Victorian agricultural land). New South Wales (including the ACT) reported the highest proportion of area affected by erosion (3.3 million ha, 5.6% of New South Wales/ACT agricultural land).

Although reported to be affecting less than 0.6% of agricultural land nationally, dryland salinity was reported to be affecting 2.0% of agricultural land in Victoria.

LAND AND SOIL RELATED ACTIVITIES

Nationally, 60.1% of agricultural businesses reported activities to manage or prevent land and soil problems in 2006–07. Of these agricultural businesses, the most commonly reported activity was the selection of crop and/or pasture type (54.7%), followed by the addition of soil conditioners (excluding fertilisers) (50.9%) and grazing management (45.3%).

EXPENDITURE AND EFFORT

Nationally, $649 million was spent on activities to manage land and soil related problems in 2006–07. Of this total, approximately half ($305 million) was spent on soil conditioners (excluding fertilisers) (see Table 1.3).

Of agricultural businesses reporting the management of land and soil related problems, the average expenditure was $7,177 per agricultural business. At the state/territory level, the corresponding averages ranged from $3,933 in South Australia to $17,946 in the Northern Territory.

As with the management of weeds and pests, the cost of managing land and soil related problems by area was highest in Victoria ($17,356 per 1000 ha) and Tasmania ($15,723 per 1000 ha), with the lowest expenditure by area in the Northern Territory ($182 per 1000 ha), against a national average of $2,755 per 1000 ha.

EXPENDITURE AND EFFORT *continued*

Nationally, over 2 million person days were spent managing land and soil related problems in 2006–07. Agricultural businesses reporting activities to manage land and soil related problems reported spending an average of 23 person days of effort on the management of land and soil related problems.

Of agricultural businesses reporting the management of land and soil related problems, Tasmania and Victoria reported the most intensive levels of management (42 and 46 person days per 1,000 ha respectively). Less than 1 person day per 1,000 ha was spent managing land and soil related problems in the Northern Territory, against an average of 9 person days per 1000 ha nationally.

4.1 LAND AND SOIL, Problems and Activities—by State—2006–07

	NSW(a)	Vic.	Qld	SA	WA	Tas.	NT	Aust.
NUMBER								
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting land and soil related problems	28 027	21 203	15 272	8 673	9 104	2 364	279	84 922
Agricultural businesses reporting land and soil related activities	29 709	22 723	16 739	9 530	8 942	2 473	253	90 368
LAND AND SOIL RELATED PROBLEMS - PROPORTION REPORTING (%)(b)								
Erosion	52.5	37.4	59.4	43.7	46.1	47.8	59.4	48.3
Soil compaction	42.0	43.2	50.2	42.0	39.4	37.2	^ 15.0	43.3
Soil acidity	47.9	48.0	17.7	30.4	60.4	49.1	^ 13.6	42.0
Surface waterlogging	15.8	24.9	19.0	18.3	42.8	41.2	^ 30.8	22.6
Dryland salinity	13.1	16.8	^ 6.4	24.4	44.9	^ 13.6	*2.4	17.4
Soil sodicity	13.8	17.3	11.7	23.4	24.1	^ 8.1	^ 8.5	16.2
Irrigation salinity	^ 4.2	^ 9.7	^ 5.6	17.6	^ 4.7	*6.0	*4.3	7.3
Other land and soil related problems	8.4	^ 8.6	^ 8.4	^ 8.9	^ 6.4	^ 11.3	*9.3	8.4
LAND AND SOIL RELATED ACTIVITIES - PROPORTION REPORTING (%)(c)								
Crop and/or pasture type or management	56.3	54.8	45.6	58.5	63.7	50.3	37.1	54.7
Addition of soil conditioners	47.8	60.5	39.4	45.7	60.9	62.4	52.8	50.9
Grazing management	48.6	41.2	42.0	45.1	49.9	50.8	33.5	45.3
Soil testing	37.6	40.4	27.2	32.4	52.1	44.8	37.6	37.5
Changed cultivation methods or practices	33.6	27.9	30.9	42.9	34.9	^ 23.7	^ 12.7	32.4
Tree or shrub planting or maintenance	34.9	33.6	14.7	27.7	39.6	^ 30.1	^ 16.9	30.4
Construction of earthworks	31.6	24.5	38.5	14.2	30.8	30.5	42.6	29.2
Construction or maintenance of fencing	29.0	29.3	19.9	23.2	34.4	37.8	^ 18.0	27.5
Changed fertilisation methods or practices	23.2	25.3	17.0	20.1	25.9	^ 27.4	^ 17.9	22.6
Changed irrigation methods or practices	8.3	10.4	9.2	14.0	^ 4.0	^ 15.9	*6.4	9.4
Other land and soil related activities	^ 6.8	^ 5.6	10.7	^ 6.6	^ 5.7	*8.9	^ 14.3	7.1

^ 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 specific land and soil related problems as a percentage of those reporting any land and soil related problems.

(c) The number of agricultural businesses reporting specific land and soil related activities as a percentage of those reporting any land and soil related activities.

4.2 LAND AND SOIL, Area Affected—by State—2006–07

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
	('000 HA)							
Area of holding	58 661	13 250	143 871	50 065	96 742	1 659	61 202	425 449
	AREA AFFECTED ('000 HA) (b)							
Soil compaction	3 152	1 650	^ 4 323	1 247	*5 543	^ 67	*90	16 073
Soil acidity	4 628	2 198	348	975	5 245	161	^ 4	13 559
Erosion	3 306	^ 609	^ 4 172	^ 1 322	^ 2 388	37	^ 564	12 399
Soil sodicity	^ 1 012	^ 608	^ 684	^ 764	853	^ 20	^ —	3 941
Dryland salinity	*417	^ 268	^ 310	395	989	np	np	2 433
Surface waterlogging	^ 274	^ 390	^ 218	^ 207	^ 747	^ 46	*93	1 975
Irrigation salinity	^ 45	^ 64	^ 30	46	*7	*9	^ —	201
Other land and soil related problems	^ 1 374	*413	^ 2 436	^ 399	**3 369	**34	*28	^ 8 054

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

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

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

— nil or rounded to zero (including null cells)

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

(a) Includes ACT.

(b) Total area of land affected by land and soil problems cannot be calculated, as land may be affected by more than one problem.

4.3 LAND AND SOIL, Expenditure and Effort—by State—2006–07

	NSW(a)	*Vic.*	*Qld*	*SA*	*WA*	*Tas.*	*NT*	*Aust.*
				NUMBER				
Agricultural businesses	47 629	37 410	30 551	15 815	13 592	4 766	640	150 403
Agricultural businesses reporting land and soil related activities	29 709	22 723	16 739	9 530	8 942	2 473	253	90 368
				('000 HA)				
Area of holding	58 661	13 250	143 871	50 065	96 742	1 659	61 202	425 449
				AGRICULTURAL BUSINESSES REPORTING LAND AND SOIL RELATED ACTIVITIES				
Expenditure								
Total expenditure ($m)	216	171	121	37	82	^ 17	5	649
Average expenditure ($/agricultural business)(b)	7 260	7 519	7 206	3 933	9 172	^ 7 025	17 946	7 177
Average expenditure ($/'000 ha)(c)	5 672	17 356	1 426	1 698	^ 1 496	^ 15 723	182	2 755
Effort								
Total effort (person days)	715 224	447 930	485 739	156 223	252 742	46 002	^ 7 907	2 111 766
Average effort (person days/agricultural business)(d)	24	20	29	16	28	19	^ 31	23
Average effort (person days/'000ha)(e)	19	46	6	7	^ 5	^ 42	^ —	9

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

— nil or rounded to zero (including null cells)

(a) Includes ACT.

(b) Total expenditure on land and soil related activities, divided by the number of agricultural businesses reporting land and soil related activities.

(c) Total expenditure on land and soil related activities, divided by the total area ('000 ha) of agricultural businesses reporting land and soil related activities.

(d) Total effort on land and soil related activities, divided by the number of agricultural businesses reporting land and soil related activities.

(e) Total effort on land and soil related activities, divided by the total area ('000 ha) of agricultural businesses reporting land and soil related activities.

CHAPTER 5 NRM BY REGION

NRM REGION

For the majority of NRM regions, weed and pest problems were the most commonly reported NRM related problems, with some exceptions. In Western Australia, Avon had the greatest percentage of agricultural businesses with land and soil related, and weed related problems (87.3% and 82.5% and respectively), whereas the South West (Qld) region reported the greatest percentage of agricultural businesses with pest related problems (86.8%).

Relative to the total number of agricultural businesses, Namoi in New South Wales reported the highest incidence of weed related activities (96.2%), the Eyre Peninsula in South Australia reported the highest percentage of agricultural businesses undertaking pest related activities (94.1%), and the Northern Agricultural Region in Western Australia reported the highest incidence of land and soil related activities (80.6%).

Further data for NRM regions is available from the datacubes accompanying this publication on the ABS web site <http://www.abs.gov.au>.

5.1 NATURAL RESOURCE MANAGEMENT(a), Problems and Activities—by NRM region—2006–07

		AGRICULTURAL BUSINESSES REPORTING NRM RELATED PROBLEMS (NO.)			AGRICULTURAL BUSINESSES REPORTING NRM RELATED ACTIVITIES (NO.)		
	Agricultural businesses no.	*Weed related problems*	*Pest related problems*	*Land and soil related problems*	*Weed related activities*	*Pest related activities*	*Land and soil related activities*
New South Wales(b)							
Border Rivers/Gwydir	3 070	2 208	2 398	1 861	2 811	2 646	2 092
Central West	5 919	3 986	4 647	3 744	5 376	5 089	3 686
Hawkesbury/Nepean	3 308	1 974	1 860	1 493	2 867	2 254	1 584
Hunter/Central Rivers	4 521	2 985	2 821	2 393	3 988	3 237	2 765
Lachlan	5 779	3 937	4 371	3 656	5 152	4 889	3 859
Lower Murray/Darling	^ 707	^ 404	^ 474	320	^ 612	^ 545	^ 391
Murray	3 264	2 351	2 449	2 171	3 050	2 767	2 348
Murrumbidgee(b)	6 078	4 047	4 266	3 761	5 535	4 993	4 156
Namoi	3 253	2 456	2 498	1 999	3 131	2 970	2 131
Northern Rivers	8 549	6 000	5 916	4 766	8 033	7 067	4 823
Southern Rivers	2 321	1 611	1 624	1 388	2 185	1 879	1 449
Sydney Metro(c)	^ 139	^ 77	^ 72	^ 53	^ 123	^ 112	^ 55
Western	722	^ 431	^ 537	^ 423	^ 416	593	^ 371
Total(b)	***47 629***	***32 468***	***33 932***	***28 027***	***43 278***	***39 041***	***29 709***
Victoria							
Corangamite	3 474	1 992	2 214	2 162	2 966	2 477	2 131
East Gippsland	919	553	573	543	808	735	^ 500
Glenelg Hopkins	4 601	2 541	3 143	2 494	3 801	3 920	2 858
Goulburn Broken	5 893	3 687	3 937	3 300	5 316	4 604	3 532
Mallee	2 758	1 613	1 554	1 559	2 528	2 036	1 688
North Central	5 002	3 486	3 531	2 820	4 557	4 229	3 150
North East (VIC)	2 832	2 190	2 072	1 971	2 687	2 395	1 927
Port Phillip and Westernport	5 149	2 976	3 068	2 368	4 634	3 616	2 649
West Gippsland	4 337	2 757	2 590	2 388	4 016	3 166	2 481
Wimmera	2 446	1 607	1 675	1 597	2 240	2 062	1 808
Total	***37 410***	***23 403***	***24 356***	***21 203***	***33 552***	***29 241***	***22 723***
Queensland							
Border Rivers	1 339	^ 958	1 186	^ 764	1 050	1 163	^ 745
Burdekin	1 890	1 354	1 356	1 113	1 608	1 513	1 229
Burnett Mary	5 841	3 763	4 349	2 692	5 026	4 831	2 877
Cape York	72	58	53	44	68	66	54
Condamine	4 271	2 859	2 875	2 276	3 882	3 116	2 467
Desert Channels	844	541	680	^ 348	624	772	^ 383
Fitzroy	3 763	2 624	2 662	2 078	3 033	3 059	2 147
Mackay Whitsunday	1 636	1 151	1 181	1 007	1 474	1 317	918
Maranoa Balonne	1 266	^ 913	1 070	^ 610	^ 949	1 119	^ 666
Northern Gulf(d)	461	314	381	^ 267	388	396	^ 286
South East (QLD)	5 178	3 483	3 474	2 063	4 758	4 063	2 596
South West (QLD)	634	^ 370	^ 550	^ 343	^ 351	583	^ 313
Southern Gulf	386	274	273	^ 137	287	327	^ 174
Wet Tropics	2 968	2 114	2 218	1 532	2 671	2 321	1 884
Total	***30 551***	***20 776***	***22 308***	***15 272***	***26 168***	***24 647***	***16 739***

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

(a) The management of weed, pest, and land and soil related problems. The management of other types of problems are not included.

(b) Includes ACT.

(c) Refer paragraph 24 in the Explanatory Notes.

(d) Includes units from Cape York-Northern Gulf.

5.1 NATURAL RESOURCE MANAGEMENT(a), Problems and Activities—by NRM region—2006–07 *continued*

		AGRICULTURAL BUSINESSES REPORTING NRM RELATED PROBLEMS (NO.)			AGRICULTURAL BUSINESSES REPORTING NRM RELATED ACTIVITIES (NO.)		
	Agricultural businesses no.	*Weed related problems*	*Pest related problems*	*Land and soil related problems*	*Weed related activities*	*Pest related activities*	*Land and soil related activities*
South Australia							
Eyre Peninsula	1 471	1 041	1 228	1 011	1 356	1 385	1 088
Kangaroo Island	287	^ 140	227	236	^ 184	248	^ 186
Adelaide and Mount Lofty Ranges	3 244	1 866	1 999	1 611	2 917	2 148	1 790
Northern and Yorke	3 335	2 396	2 501	1 987	3 143	2 787	2 211
SA Arid Lands(b)	163	114	121	^ 92	^ 97	147	^ 79
SA Murray Darling Basin	4 429	2 513	2 842	2 015	4 151	3 228	2 374
South East (SA)	2 886	1 854	2 182	1 721	2 595	2 514	1 801
Total	***15 815***	***9 924***	***11 100***	***8 673***	***14 443***	***12 456***	***9 530***
Western Australia							
Avon	2 871	2 370	2 141	2 506	2 671	2 467	2 299
Northern Agricultural Region	1 355	1 030	1 086	1 117	1 191	1 228	1 092
Rangelands (WA)	672	^ 350	519	^ 234	440	508	^ 277
South Coast Region	2 251	1 466	1 943	1 516	1 827	1 986	1 537
South West Region	4 770	2 994	3 450	2 897	4 040	3 859	2 971
Swan	1 672	935	1 166	^ 834	1 441	1 223	^ 766
Total	***13 592***	***9 145***	***10 306***	***9 104***	***11 610***	***11 272***	***8 942***
Tasmania							
North (TAS)	1 751	1 223	1 308	1 004	1 501	1 447	1 076
North West (TAS)	1 689	938	1 132	^ 682	1 398	1 233	739
South (TAS)	1 326	940	1 043	678	1 080	1 118	658
Total	***4 766***	***3 101***	***3 482***	***2 364***	***3 979***	***3 798***	***2 473***
Northern Territory							
Total	***640***	***405***	***462***	***279***	***548***	***509***	***253***
Australia	**150 403**	**99 222**	**105 947**	**84 922**	**133 578**	**120 963**	**90 368**

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

(a) The management of weed, pest, and land and soil related problems. The management of other types of problems are not included.

(b) Includes Alinytjara Wilurara.

CHAPTER 6 NRM BY INDUSTRY

INDUSTRY

Of the agricultural businesses comprising the beef cattle or sheep farming industries (53.2% of agricultural businesses nationally), 73.7% reported pest related problems (70.4% average across all industries), 69.1% reported weed related problems (66.0% national average), and 59.9% reported land and soil related problems (56.5% national average).

The highest levels of weed related activities were reported for agricultural businesses in the rice and cotton growing industries (100% and 96.4% respectively).

The highest proportion of pest related activities were undertaken by agricultural establishments in the apple and pear growing industry (98.1%), the sheep-beef cattle industry (92.8%) and the sheep industry (91.1%).

The highest proportion of agricultural businesses reporting land and soil related activities were those in the rice growing industry (78.7%), the grain-sheep and grain-beef growing industries (77.2%) and the cotton growing industry (75.5%).

6.1 NATURAL RESOURCE MANAGEMENT(a), Problems and Activities—by Industry

		AGRICULTURAL BUSINESSES REPORTING NRM RELATED PROBLEMS (NO.)			AGRICULTURAL BUSINESSES REPORTING NRM RELATED ACTIVITIES (NO.)		
	Agricultural businesses no.	*Weed related problems*	*Pest related problems*	*Land and soil related problems*	*Weed related activities*	*Pest related activities*	*Land and soil related activities*
0111 Nursery Production (Under Cover)	^ 421	^ 191	^ 363	*97	^ 345	^ 371	*123
0112 Nursery Production (Outdoors)	^ 780	^ 425	^ 579	^ 265	^ 750	^ 625	^ 345
0113 Turf Growing	^ 301	^ 185	^ 162	^ 164	^ 271	^ 197	^ 174
0114 Floriculture Production (Under Cover)	^ 258	*99	^ 168	*68	^ 208	^ 199	*108
0115 Floriculture Production (Outdoors)	^ 479	^ 342	^ 374	^ 222	^ 446	^ 379	^ 206
0121 Mushroom Growing	*97	np	*47	np	*51	*61	np
0122 Vegetable Growing (Under Cover)	913	^ 493	^ 530	^ 329	^ 710	^ 600	^ 392
0123 Vegetable Growing (Outdoors)	4 055	2 528	2 890	2 026	3 584	3 224	2 467
0131 Grape Growing	6 039	3 012	3 281	2 696	5 553	4 012	3 188
0132 Kiwifruit Growing	*46	**44	np	**41	np	np	**27
0133 Berry Fruit Growing	^ 465	^ 275	^ 361	^ 267	^ 440	^ 380	^ 272
0134 Apple and Pear Growing	780	^ 539	^ 684	^ 341	742	765	^ 456
0135 Stone Fruit Growing	1 193	^ 704	878	^ 604	1 134	1 051	^ 641
0136 Citrus Fruit Growing	1 388	^ 769	992	^ 712	1 254	1 141	703
0137 Olive Growing	^ 398	^ 180	^ 262	*215	^ 369	^ 285	*224
0139 Other Fruit and Tree Nut Growing	3 271	2 147	2 599	1 978	3 077	2 654	2 071
0141 Sheep Farming (Specialised)	12 150	8 447	9 932	7 889	10 468	11 069	7 899
0142 Beef Cattle Farming (Specialised)	44 957	30 547	30 371	24 597	39 232	35 337	24 822
0143 Beef Cattle Feedlots (Specialised)	*243	*151	*158	*148	*191	*167	*160
0144 Sheep-Beef Cattle Farming	8 501	5 808	7 004	5 577	7 446	7 887	5 544
0145 Grain-Sheep or Grain-Beef Cattle Farming	14 131	10 318	11 485	9 707	12 985	12 706	10 911
0146 Rice Growing	^ 127	*74	*81	*77	^ 127	*109	*100
0149 Other Grain Growing	11 358	8 070	8 387	7 774	10 543	9 355	8 252
0151 Sugar Cane Growing	3 975	2 891	2 835	2 334	3 634	2 870	2 607
0152 Cotton Growing	^ 526	317	^ 418	314	^ 507	^ 467	^ 397
0159 Other Crop Growing n.e.c.	2 472	1 536	1 628	^ 1 193	2 163	1 651	^ 1 281
0160 Dairy Cattle Farming	8 921	5 503	5 708	4 642	7 964	6 956	5 384
0171 Poultry Farming (Meat)	797	^ 350	^ 302	^ 190	595	541	^ 249
0172 Poultry Farming (Eggs)	499	^ 217	^ 209	^ 139	^ 392	^ 323	^ 118
0180 Deer Farming	*184	*83	*118	*103	*152	*141	*101
0191 Horse Farming	3 019	1 947	^ 1 456	^ 1 314	2 706	2 048	^ 1 671
0192 Pig Farming	894	^ 481	559	^ 431	768	755	^ 421
0193 Beekeeping	*30	np	np	np	np	np	np
0199 Other Livestock Farming n.e.c.	^ 1 049	^ 599	^ 632	^ 428	^ 734	^ 566	^ 464
All agriculture	***134 718***	***89 304***	***95 499***	***76 906***	***119 598***	***108 943***	***81 806***
All Other Industries(b)	***15 685***	***9 918***	***10 448***	***8 016***	***13 981***	***12 020***	***8 563***
Total All Industries	**150 403**	**99 222**	**105 947**	**84 922**	**133 578**	**120 963**	**90 368**

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

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

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

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

(a) The management of weed, pest, and land and soil related problems. The management of other types of problems are not included.

(b) Consists of agricultural businesses where the main industry is one other than agriculture.

EXPLANATORY NOTES

INTRODUCTION

1 This publication presents results from the ABS Natural Resource Management Survey 2006–07 which was conducted from September 2007. This is the second of an ongoing biennial collection of natural resource management data.

SCOPE AND COVERAGE

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

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 establishments was included in the Natural Resource Management Survey 2006-07; this being a sub-sample of the 30,500 establishments 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) region level. The survey results in this publication have been weighted to cover the full reference population.

GENERAL

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

8 Expenditure managing or preventing a particular NRM problem does not include the value of agricultural production lost due the the particular NRM problem.

9 Average expenditure and effort per 1000 hectares is provided in certain tables. It should be noted that area includes the entire area of holding of the agricultural business reporting expenditure and effort, not the area on which the activities were undertaken, as this was not collected in this survey.

STATISTICAL UNIT

10 The unit for which statistics were reported in the survey was the business unit. For the Natural Resource Management Survey 2006–07, the concept of a business unit is the same as that used in the Agricultural Census and the Agricultural Survey.

11 Since 2005-06, the ABS has used an economic statistics units model on the ABS Business Register (ABSBR) to describe the characteristics of businesses and the structural relationships between related businesses. The units model is used within large and diverse business groups to define reporting units that can provide data to the ABS at suitable level.

12 Respondents to the 2006-07 Natural Resource Management Survey were drawn from the ABS Business Register.

INDUSTRY CLASSIFICATION

13 Establishments 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

14 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

15 In a response to the demand for more tailored, regional-based output, estimates from the Natural Resource Management Survey 2006–07 have been produced at the Australian, State and Natural Resource Management (NRM) region level. The 57 NRM regions across Australia were identified for the purposes of addressing natural resource management and sustainable agriculture priorities. The Appendix contains a map outlining the specific NRM regions used in this publication. The NRM regions are output as per the boundary specifications of August 2005. A description of these regions can be found at the following NRM website <http://nrm.gov.au/nrm/region.html>.

16 With the exception of NRM region 314 (Torres Strait), natural resource management data have been collected for all 57 NRM regions. 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 Land); and
- NRM region 304,310 (Cape York, Northern Gulf) has been merged with NRM region 310 (Northern Gulf).

COMPARABILITY WITH AGRICULTURAL SURVEY

17 The Natural Resource Management Survey 2006–07 and the Agricultural Survey 2006–07 both produce estimates relating to the number of agricultural establishments 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 at natural resource management level 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

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

SAMPLING ERROR

19 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.

20 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.

21 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.

22 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.*
Area of holding ('000 ha)	3.9	2.1	3.2	2.3	6.7	4.4	5.1	2.0
Any NRM activity (no.)	0.9	1.2	1.3	1.2	1.6	2.4	3.7	0.5
Total NRM expenditure ($m)	2.6	3.5	3.2	3.6	4.2	6.6	4.4	1.6
Total NRM effort (person days)	2.6	3.0	3.6	4.2	4.6	5.2	7.8	1.6
Any weed related activity (no.)	1.0	1.3	1.5	2.1	1.5	3.1	4.1	0.6
Total weed cost ($m)	3.3	3.9	3.7	4.4	4.9	8.1	7.3	1.9

(a) Includes ACT.

NON-SAMPLING ERRORS

23 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.

24 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.

25 At the time of production of final estimates for the Natural Resource Management Survey 2006–07, a live response rate of 87% had been achieved.

DATA QUALITY

26 Much of the Natural Resource Management Survey 2006–07 was perception-based, asking agricultural businesses to identify the extent and type of NRM related problems present on their land and the activities they undertook to prevent or manage these problems. While the results may differ from other sources of NRM monitoring and information, they provide an important perspective into the NRM problems and activities prevalent for Australian agricultural businesses during 2006–07.

27 The term 'NRM problems' refers to agricultural businesses reporting one or more NRM problem on their holding. The reporting of NRM problems does not necessarily

DATA QUALITY *continued*

mean any management activity has been undertaken. The NRM problems identified may have affected part or all of the holding and may have been of varying severity.

28 Final estimates in this publication were validated against a number of internal and external NRM data sources, including:

- ABS, Agricultural Survey 2006–07
- ABS, Agricultural Census 2005–06
- ABS, Water Survey 2002–03
- ABS, Land Management and Salinity Survey 2002
- ABS, Land Management: Eurobodalla Shire NSW 2003–04
- ABS, Land Management: Fitzroy and Livingstone Shires Queensland 2004–05
- State of the Environment Reporting
- DAFF, Australian Agriculture Fisheries and Forestry at a Glance 2007
- ABARE, Natural Resource Management Survey 2004–05
- DEH, NRM regional expenditure 2004–05

RELATED PUBLICATIONS

29 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)
- *Land Management: Eurobodalla Shire NSW* 2003-2004 (cat. no. 4651.0)
- *Land Management: Fitzroy and Livingstone Shires Queensland* 2004–2005 (cat. no. 4651.0)
- *Salinity on Australian Farms 2002* (cat. no. 4615.0)
- *Water Account, Australia* (cat. no. 4610.0)
- *Water Use on Australian Farms* (cat. no. 4618.0)

30 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.

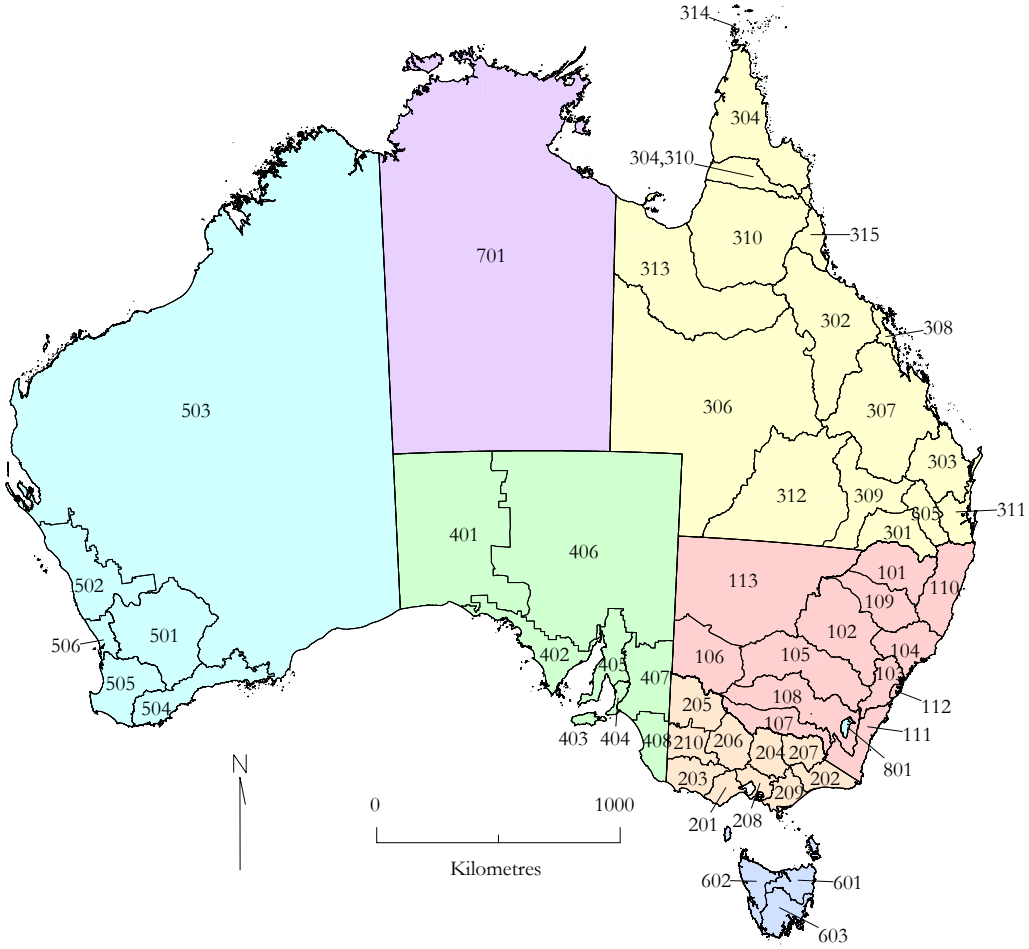
ABS DATA AVAILABLE ON REQUEST

31 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

32 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*.

A1.1 NRM REGIONS, Australia—2006–07



NRM Region *

- NSW
  - 101: Border Rivers-Gwydir
  - 102: Central West
  - 103: Hawkesbury-Nepean
  - 104: Hunter-Central Rivers
  - 105: Lachlan
  - 106: Lower Murray-Darling
  - 107: Murray
  - 108: Murrumbidgee
  - 109: Namoi
  - 110: Northern Rivers
  - 111: Southern Rivers
  - 112: Sydney Metro
  - 113: Western
- VIC
  - 201: Corangamite
  - 202: East Gippsland
  - 203: Glenelg Hopkins
  - 204: Goulburn Broken
  - 205: Mallee
  - 206: North Central
  - 207: North East (VIC)
  - 208: Port Phillip and Westernport
  - 209: West Gippsland
  - 210: Wimmera
- QLD
  - 301: Border Rivers
  - 302: Burdekin
  - 303: Burnett Mary
  - 304: Cape York
  - 304,310: Cape York-Northern Gulf
  - 305: Condamine
  - 306: Desert Channels
  - 307: Fitzroy
  - 308: Mackay Whitsunday
  - 309: Maranoa Balonne
  - 310: Northern Gulf
  - 311: South East (QLD)
  - 312: South West (QLD)
  - 313: Southern Gulf
  - 314: Torres Strait
  - 315: Wet Tropics
- SA
  - 401: Alinytjara Wilurara
  - 402: Eyre Peninsula
  - 403: Kangaroo Island
  - 404: Adelaide and Mount Lofty Ranges
  - 405: Northern and Yorke
  - 406: SA Arid Lands
  - 407: SA Murray Darling Basin
  - 408: South East (SA)
- WA
  - 501: Avon
  - 502: Northern Agricultural Region
  - 503: Rangelands (WA)
  - 504: South Coast Region
  - 505: South West Region
  - 506: Swan
- TAS
  - 601: North (TAS)
  - 602: North West (TAS)
  - 603: South (TAS)
- NT
  - 701: Northern Territory
- ACT
  - 801: ACT

*Numbers used are NRM codes.

Source: Department of the Environment and Heritage - 2006.

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 use in the collection and publication of statistics in the two countries. ANZSIC 2006 was used in this publication.
Barriers to Natural Resource Management	Circumstances which impact on the extent to which landholders undertake improvements to their natural resource management practices. Typical barriers include lack of financial resources, lack of time, lack of incentives, age and/or ill health, and insufficient or inadequate information.
Biological control	The practice or process by which an undesirable organism is controlled by means of another (beneficial) organism.
Dryland Salinity	Salinity that results when groundwater (and the salts it contains) rises to the soil surface. It is largely the consequence of the clearing of deep-rooted native vegetation for rain-fed crop and pasture production. cf. Irrigation salinity.
Earthworks	Operations involved in moving, loosening, depositing, shaping, compacting and stabilising soil and rock. It includes operations associated with levees/banks, shallow open drains, deep open drains and subsurface drains.
Erosion	The wearing away of land or soil by the action of wind, water, or ice.
Estimated value of agricultural operations (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.
Farm sustainability	Considers the environmental, social and financial issues affecting an agricultural business. Environmental issues include resource condition, resource use efficiency and management of resources. Social issues are concerned with the wellbeing of the business from a personal, staff and community perspective. Financial issues consider the profitability, financial efficiency and resilience of financial resources.
Herbicide	Chemical substances or living organisms (called bioherbicides) used to kill or control vegetation such as brush, weeds, and competing or undesirable trees.
Improved pasture	Land where activities have been undertaken to promote the growth of pasture species. These activities usually include reseeding and application of fertiliser.
Irrigation salinity	A form of salinity resulting from the increasing build-up of salts in irrigated soils. It results from raised water table levels that bring soil salts to the upper levels of the soil profile, as well as the repeated use of saline river water or bore water for irrigation. cf. Dryland salinity.
Native vegetation	Any indigenous plant community, either naturally occurring or regenerated with human assistance. Native vegetation covers a range of vegetation types, including forests, woodlands, scrub, native grasslands, wetlands, and remnant and regrowth. It excludes commercial plantations.

Natural Resource Management regions	Fifty-seven 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 the Appendix. Data at the NRM region level is as per the boundary specifications of August 2005. For the purposes of this publication, the ACT region has been combined with the Murrumbidgee region, the SA Arid Lands region with the Alinytjata Wilurara region, and Cape York-Northern Gulf region with the Northern Gulf region. Recent changes to NRM region boundaries combined Border Rivers and Maranoa Balonne NRM regions in Queensland. These are however treated as 2 distinct regions in this publication.
Natural Resource Management (NRM)	Management of our natural resources - land, soil, native vegetation, biodiversity and water.
Pest	A noxious, destructive or troublesome animal or insect.
Pesticide	Any substance or mixture of substances intended for killing, controlling, or managing insects, rodents, fungi, weeds, and other forms of plant or animal life that are considered to be pests. Herbicides, insecticides, fungicides and rodenticides are all pesticides. In this publication, herbicides are treated separately, and not included as pesticides.
Salinity	Soil salinity is the presence of concentrations of salt in the soil profile and can be a form of land degradation. See Dryland salinity and Irrigation salinity.
Soil acidity	An important soil chemical characteristic that influences plant growth, soil microbial activity, and the physical structure of the soil. Land affected by soil acidity is land where the surface soil pH is less than pH 5.5.
Soil compaction	Reduction of the total pore space in soil, resulting from applied loads, vibration or pressure. Compacted soil retains less water and resists root penetration.
Soil sodicity	The build up of sodium in the soil resulting in poor water infiltration, surface crusting, erosion and water-logging.
Surface waterlogging	The lowering of land productivity through the rise in ground-water close to the soil surface. Soil is waterlogged when it is saturated with water, causing air to be displaced from soil pores to the point that there is not enough oxygen for full root activity.
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.

FOR MORE INFORMATION . . .

INTERNET **www.abs.gov.au** the ABS website is the best place for data from our publications and information about the ABS.

INFORMATION AND REFERRAL SERVICE

Our consultants can help you access the full range of information published by the ABS that is available free of charge from our website. Information tailored to your needs can also be requested as a 'user pays' service. Specialists are on hand to help you with analytical or methodological advice.

PHONE 1300 135 070

EMAIL client.services@abs.gov.au

FAX 1300 135 211

POST Client Services, ABS, GPO Box 796, Sydney NSW 2001

FREE ACCESS TO STATISTICS

All statistics on the ABS website can be downloaded free of charge.

WEB ADDRESS www.abs.gov.au