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Meat & Livestock Australia Management Practices Survey 2005-06

LPI Awareness and Adoption 2005-06 Executive Report

Executive Summary

Meat and Livestock Australia (MLA) track performance and adoption indicators in order to evaluate the effectiveness of a host of research and development activities. One invaluable method of obtaining detailed information on producers' awareness and adoption of new practices is to conduct regular surveys.

In 2006 ABARE was commissioned by MLA to undertake a supplementary survey of broadacre producers to gain insights into awareness and adoption of a range of practices by producers including:

- awareness of production costs;
- pasture and grazing management;
- farm management and planning;
- livestock production, finishing and marketing; and
- use of transport handling guidelines.

ABARE's survey was conducted in the second half of 2006 and targeted producers with more than 200 sheep or 50 beef cattle. Specific questions were asked of 201 specialist sheep producers, 336 specialist beef cattle producers and 638 mixed enterprise producers. Producers with more than 50 head of cattle in northern and southern Australia were asked a set of questions specific to their region in order to gain insights into the management practices used in areas that employ different production systems.

Detailed findings of the ABARE survey were presented in a series of tables separate to this report. This report highlights key results of ABARE's 2006 survey and presents a comparison of similar questions asked in 2005 by Axiom Research (Meat and Livestock Australia Program Adoption and Awareness survey).

Care needs to be taken in interpreting differences in the estimates generated from the Axiom Research survey in 2005 and the current ABARE survey due to differences in survey methodology and the way questions were asked. The absence of standard errors on the Axiom Research estimates also makes it difficult to assess significant differences.

The ABARE survey suggests that some of the changes since 2005 have been:

- an increase in the proportion of producers who calculate forage budgets in order to manage livestock stocking rates;
- greater focus on meeting market specifications;
- more producers with clearly defined breeding objectives;
- increased production of finished livestock, particularly amongst the specialist sheep and beef cattle producers;
- more producers altering their management practices in response to data received from abattoirs;
- fewer producers in the sheep and beef cattle industries regularly weighing their livestock to assess weight gain; and
- fewer producers using Estimated Breeding Values or indices for sire selection or purchases.

The results of the analysis provide no clear association between producers' adoption of management practices of interest to the MLA and total factor productivity and return on capital. For

the majority of practices, there is no statistically significant difference between the level of adoption amongst the producers with lowest and highest productivity or return on capital.

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1 Introduction

In order to evaluate the adoption of research and to gauge producers' awareness of new practices, Meat and Livestock Australia (MLA) regularly collects detailed information about sheep and beef cattle producers' adoption of new management practices. In 2006 MLA commissioned ABARE to conduct a survey of broadacre producers' adoption of a range of farm and livestock management practices.

This report contains detailed analysis of the results from the survey and presents a comparison of ABARE's results with the 2005 Axiom Survey results published in the Meat and Livestock Australia Program Adoption and Awareness survey. Differences in survey methodology and phrasing of questions make direct comparison of the two surveys difficult. However, where the questions in these two surveys were deemed comparable, the results have been summarized for the sheep and beef cattle producers and the key differences discussed. Detailed survey results for all of the questions asked in the ABARE survey were provided to MLA separately.

In this report, results are presented for different enterprise groups, and for subsets of producers within each group, based on profitability, size and productivity. Results for each subset that are statistically different (95 per cent confidence) from the average for the group as a whole have been indicated in bold.

2 The 2006 ABARE Survey

2.1 Target population

ABARE surveys are designed and samples selected from a frame drawn from the Australian Business Register maintained by the Australian Bureau of Statistics (ABS). This frame classifies agricultural establishments in each statistical local area by size and industry.

The estimates published in this report cover establishments with an estimated value of agricultural operations of $40 000 or more. The formal definition of the estimated value of agricultural operations is given in Australian Standard Industrial Classification (ABS 1983, cat. no. 1201.0). In addition, farms selected for the survey had to have more than 50 head of beef cattle or more than 200 head of sheep. In 2005-06, it is estimated that there were 52 720 broadacre farms that met this criterion, and ABARE surveyed 1 175 of these farms (table 1).

1 Target population and sample surveyed

	Sheep		Beef cattle		Sheep-beef producers		All farms	
	Population	Sample	Population	Sample	Population	Sample	Population	Sample
New South Wales	3 291	60	4 266	62	10 476	194	18 033	316
Victoria	3 267	50	3 216	28	5 172	131	11 654	209
Queensland	401	13	5 913	179	2 792	93	9 106	285
South Australia	1 378	28	580	13	4 091	107	6 050	148
Western Australia	1 618	22	898	23	4 072	85	6 589	130
Tasmania	347	28	421	8	388	28	1 155	64
Northern Territory			134	23			134	23
Australia	10 301	201	15 428	336	26 990	638	52 720	1 175

2.2 Definition of industries

ABARE's survey targets producers with selected Australian and New Zealand Standard Industrial Classifications (ANZSIC). These are:

- 121 – wheat and other crop specialists;
- 122 – mixed enterprise cropping and livestock producers;
- 123 – mixed sheep-beef producers;
- 124 – sheep specialist; and
- 125 – beef cattle specialist.

Information on ANZSIC and on the farming activities included in each of these industries is provided in Australian and New Zealand Standard Industrial Classification (ABS 1993, cat. no. 1292.0).

For the purposes of this report, a sheep producing farm is one with an ANZSIC of 124 and a beef cattle producing farm is one with an ANZSIC classification of 125. A mixed enterprise sheep or beef producing farm is one classified in either ANZSIC 121, 122 or 123 and had more than 50 head of cattle or 200 head of sheep, respectively. These producers operate a more diversified farm enterprise, generating income from a mix of cropping, sheep and/or beef cattle.

Results for specialist beef cattle and mixed enterprise producers have been presented for northern and southern Australia. Northern Australia includes Queensland, Northern Territory and the Kimberly and Pilbara regions of Western Australia. All other regions have been included in southern Australia.

3 Survey results

3.1 Physical and financial characteristics

3.1.1 Sheep producers

On average sheep producers operated almost 6 800 hectares and had a sheep flock in excess of 3 200 head at 30 June 2006 (table 2). The sale of sheep, lambs and wool were the most significant income items accounting, on average, for 33 per cent and 30 per cent of farm cash receipts, respectively. In 2005-06, the average sheep producer's farm cash income was $38 494 and the business generated a return on capital, excluding capital appreciation, of 0.2 per cent. In 2005-06, farms that earned higher rates of return in the sheep industry were generally much larger, enabling

them to run more sheep and generate significantly more revenue (table 2). Although production costs increased with enterprise size, total cash costs increased at a slower rate than revenue, resulting in the best performing sheep farms generating higher farm cash incomes and farm business profits.

2 Selected physical and financial performance indicators, sheep producers, 2005-06
Average per farm

		Bottom third a		Middle third a		Top third a		Average	
Physical characteristics									
Area operated, 30 June	ha	4 905	(18)	2 953	(17)	12 440	(23)	6 785	(15)
Number of sheep, 30 June	no	1 928	(16)	3 538	(12)	3 986	(18)	3 211	(9)
Financial performance indicators									
Total cash receipts	$	109 364	(18)	207 637	(15)	304 406	(29)	211 449	(15)
- beef cattle	$	5 506	(25)	13 417	(24)	14 098	(32)	11 289	(17)
- crops	$	4 885	(142)	39 966	(33)	65 828	(106)	38 353	(64)
- sheep and lambs	$	47 783	(25)	75 063	(16)	86 472	(12)	70 828	(9)
- wool	$	42 322	(19)	65 501	(14)	80 101	(20)	63 583	(11)
Total cash costs	$	112 513	(17)	189 810	(16)	207 962	(32)	172 955	(15)
Farm cash income	$	-3 149	(295)	17 827	(60)	96 445	(29)	38 494	(28)
Farm business profit	$	-82 523	(13)	-47 753	(25)	61 663	(39)	-20 654	(48)
Rate of return									
- excluding capital appreciation	%	-4.4	(6)	-0.6	(32)	3.5	(11)	0.2	(193)
- including capital appreciation	%	-1.3	(242)	2.5	(72)	10.6	(22)	4.8	(24)

a ranked by rate of return, excluding capital appreciation
Note : A guide to interpreting standard errors is in section 4 of this report.

3.1.2 Beef and mixed enterprise producers in northern Australia

Specialist beef cattle producers in northern Australia typically operate large properties, averaging almost 16 500 hectares and 1 266 head of cattle (table 3). On average, producers generated almost 90 per cent of cash receipts from the sale of cattle in 2005-06. Average farm cash income for northern beef producers in 2005-06 was $88 685 and they recorded an average return on capital excluding capital appreciation of 1.2 per cent. When the northern beef producers are ranked according to rate of return excluding capital appreciation, it is apparent that larger herd size is associated with better financial performance. However, this relationship is not as apparent between area operated and rate of return, as the bottom third of producers includes a small number of very large farms with relatively low beef cattle stocking rates (possibly as a result of these properties having been de-stocked in recent years due to drought).

3 Selected physical and financial performance indicators, northern beef producers, 2005-06 *(Average per farm)*

		Bottom third a		Middle third a		Top third a		Average	
Physical characteristics									
Area operated, 30 June	ha	10 810	(155)	5 093	(28)	32 278	(26)	16 431	(38)
Beef cattle, 30 June	no	462	(36)	735	(17)	2 514	(11)	1 266	(9)
Number of beef cattle sold	no	248	(36)	274	(18)	724	(12)	423	(11)
Financial performance indicators									
Total cash receipts	$	187 290	(32)	231 334	(42)	711 200	(11)	384 314	(12)
- sheep and lambs	$	0	(0)	448	(56)	1 021	(89)	502	(65)
- beef cattle	$	170 196	(32)	199 029	(23)	617 995	(13)	335 724	(11)
- wool	$	0	(0)	115	(109)	1 418	(60)	532	(56)
- crops	$	1 000	(98)	2 769	(78)	10 641	(61)	4 938	(48)
Total cash costs	$	199 445	(28)	201 612	(48)	473 291	(15)	295 629	(15)
Farm cash income	$	-12 155	(184)	29 723	(35)	237 909	(12)	88 685	(15)
Farm business profit	$	-113 402	(25)	-40 090	(24)	175 306	(11)	11 160	(106)
Rate of return									
- excluding capital appreciation	%	-5.7	(12)	-0.4	(41)	3.6	(8)	1.2	(24)
- including capital appreciation	%	21.6	(74)	14.8	(90)	15.2	(15)	16.0	(28)

a ranked by rate of return, excluding capital appreciation

Note : A guide to interpreting standard errors is in section 4 of this report.

Relative to the specialist producers, mixed enterprise producers in northern Australia operate highly diversified but smaller farms (table 4). On average, in 2005-06 northern mixed enterprise producers operated around 7 000 hectares, ran 235 head of beef cattle, 2 836 sheep and had 900 hectares sown to crops. On average, receipts from the sale of grain and hay crops accounted for over half of the mixed enterprise producers' farm cash receipts in 2005-06. The bulk of the mixed enterprise producers' remaining farm cash receipts was fairly evenly spread across beef cattle, sheep, lambs and wool.

Mixed enterprise producers in northern Australia had significant cash surpluses in 2005-06, on average, generating a farm cash income of $123 014. However, there was considerable variability in financial performance amongst these farms in northern Australia. While most producers recorded positive cash flows during the financial year, on average only producers in the top third of farms (ranked by rate of return) recorded positive farm business profits (table 4).

4 Selected physical and financial performance indicators, northern mixed enterprise producers, 2005-06 *(Average per farm)*

		Bottom third a		Middle third a		Top third a		Average	
Physical characteristics									
Area operated, 30 June	ha	10 532	(23)	5 066	(29)	5 624	(18)	7 010	(14)
Sheep numbers, 30 June	no	2 010	(27)	3 343	(12)	3 111	(14)	2 836	(10)
Number of sheep and lambs sold	no	348	(50)	1 068	(13)	1 710	(11)	1 056	(9)
Beef cattle, 30 June	no	170	(40)	182	(18)	348	(32)	235	(19)
Number of beef cattle sold	no	72	(47)	65	(21)	142	(36)	93	(23)
Financial performance indicators									
Total cash receipts	$	214 426	(23)	492 180	(7)	825 143	(9)	516 734	(6)
- sheep and lambs	$	37 611	(23)	61 902	(10)	72 420	(12)	57 701	(8)
- beef cattle	$	45 588	(50)	49 685	(22)	124 825	(38)	74 017	(24)
- wool	$	42 577	(30)	77 835	(11)	64 358	(15)	61 926	(10)
- crops	$	58 386	(45)	270 809	(10)	498 695	(11)	280 454	(8)
Total cash costs	$	199 357	(22)	422 288	(8)	548 092	(12)	393 720	(7)
Farm cash income	$	15 069	(126)	69 892	(17)	277 051	(8)	123 014	(8)
Farm business profit	$	-125 023	(15)	-35 733	(32)	184 129	(16)	10 669	(113)
Rate of return									
- excluding capital appreciation	%	-5.1	(16)	0.7	(30)	5.1	(9)	1.6	(16)
- including capital appreciation	%	2.6	(161)	8.7	(28)	10.0	(18)	8.2	(17)

a ranked by rate of return, excluding capital appreciation

Note : A guide to interpreting standard errors is in section 4 of this report.

3.1.3 Southern beef and mixed enterprise producers

On average specialist beef cattle producers in southern Australia operated almost 4 500 hectares and had 468 beef cattle at 30 June 2006 (table 5). The average farm cash income for specialist beef cattle producers in southern Australia was $50 554 in 2005-06, and they received an average rate of return of 0.2 per cent on farm capital, excluding capital appreciation. In 2005-06, specialist beef cattle producers with the highest rate of return had larger beef cattle herds, but not necessarily larger farm areas. While producers in the middle third of producers operated the smallest farms they, on average, generated significantly more revenue than their industry counterparts. This largely reflects these producers' higher stocking rates and turnoff rate for beef cattle. However, farm cash income was around half that of the top third of producers in 2005-06, reflecting higher farm cash costs as these producers spent, on average, $152 000 on purchasing beef cattle.

5 Selected physical and financial performance indicators, southern beef producers, 2005-06 *(Average per farm)*

		Bottom third a		Middle third a		Top third a		Average	
Physical characteristics									
Area operated, 30 June	ha	9 267	(17)	570	(15)	4 172	(14)	4 481	(11)
Beef cattle, 30 June	no	356	(17)	423	(10)	613	(13)	468	(8)
Number of beef cattle sold	no	185	(71)	382	(34)	242	(77)	273	(32)
Financial performance indicators									
Total cash receipts	$	140 971	(76)	336 062	(36)	264 954	(104)	251 684	(43)
- sheep and lambs	$	1 804	(48)	2 806	(77)	6 007	(288)	3 610	(168)
- beef cattle	$	117 203	(86)	315 885	(38)	190 498	(133)	211 571	(48)
- wool	$	909	(93)	223	(173)	2 263	(137)	1 140	(98)
- crops	$	6 151	(82)	5 195	(65)	38 141	(50)	16 920	(41)
Total cash costs	$	146 233	(82)	276 703	(40)	173 984	(142)	201 130	(50)
Farm cash income	$	-5 262	(308)	59 359	(30)	90 971	(32)	50 554	(25)
Farm business profit	$	-72 692	(26)	-24 663	(22)	57 239	(58)	-10 940	(119)
Rate of return									
- excluding capital appreciation	%	-3.8	(18)	0.0	(222)	2.7	(47)	0.2	(244)
- including capital appreciation	%	2.6	(112)	4.1	(64)	6.8	(32)	4.8	(31)

a ranked by rate of return, excluding capital appreciation

Note : A guide to interpreting standard errors is in section 4 of this report.

In contrast to the specialist producers, mixed enterprise producers in southern Australia typically operate relatively small but diversified farms (table 6). The average farm size is 2 400 hectares with almost 500 hectares sown to crops and the livestock enterprises comprise, on average 1 913 head of sheep and 187 head of cattle. Reflecting the relatively large amount of land sown to crops, sales of grain and hay represented, on average, 50 per cent of farm cash receipts. Sales of beef cattle and sheep and lambs accounted for a further 16 per cent and 14 per cent respectively. Sales of wool were the only other major source of revenue, accounting for 10 per cent of farm cash receipts.

In 2005-06, improved farm financial performance was associated with a general increase in farm size and a greater focus on cropping activities, with the top third of mixed enterprise producers recording significantly more revenue from the sale of grain than their industry counterparts. The top performing producers had larger cash margins, generating a receipts to costs ratio of 1.56 in 2005-06 (or $1.56 in receipts per dollar of costs) compared with 1.21 and 1.01 for the middle and bottom third of producers respectively (table 6).

6 Selected physical and financial performance indicators, southern mixed enterprise producers, 2005-06 *(Average per farm)*

		Bottom third a		Middle third a		Top third a		Average	
Physical characteristics									
Area operated, 30 June	ha	1 155	(9)	2 966	(17)	3 076	(19)	2 414	(11)
Sheep number, 30 June	no	1 154	(15)	2 346	(8)	2 215	(7)	1 913	(5)
Number of sheep and lambs sold	no	546	(17)	1 022	(8)	1 094	(7)	892	(5)
Beef cattle, 30 June	no	127	(12)	195	(12)	236	(20)	187	(10)
Number of beef cattle sold	no	76	(15)	72	(11)	107	(24)	85	(12)
Financial performance indicators									
Total cash receipts	$	173 638	(11)	319 655	(7)	649 290	(9)	385 645	(6)
- sheep and lambs	$	31 281	(20)	60 679	(8)	74 496	(8)	55 866	(6)
- beef cattle	$	47 869	(16)	51 220	(10)	80 888	(23)	60 347	(12)
- wool	$	21 812	(16)	46 689	(10)	43 873	(11)	37 620	(7)
- crops	$	61 357	(19)	127 153	(13)	382 891	(13)	193 811	(9)
Total cash costs	$	172 644	(13)	264 779	(8)	415 667	(7)	286 749	(5)
Farm cash income	$	994	(719)	54 876	(13)	233 623	(14)	98 896	(12)
Farm business profit	$	-73 066	(10)	-10 239	(46)	172 807	(13)	32 349	(26)
Rate of return									
- excluding capital appreciation	%	-3.1	(8)	0.5	(19)	5.6	(8)	1.9	(13)
- including capital appreciation	%	2.1	(71)	3.0	(23)	9.3	(15)	5.5	(13)

a ranked by rate of return, excluding capital appreciation

Note : A guide to interpreting standard errors is in section 4 of this report.

3.2 Changes in management practices since 2005

In order to assess the effectiveness of educational campaigns concerning producers' awareness and adoption of best farm management practices, the MLA has conducted regular producer surveys. In this section, some of the key findings in the 2005 Axiom Research and 2005-06 ABARE surveys are presented for the sheep and northern and southern beef cattle industries.

Direct comparison of all of the questions in the ABARE and Axiom Research surveys was not possible due to differences in survey methodology. Furthermore, it has not been possible to comment on the statistical significance of reported differences as estimated standard errors were not provided by Axiom Research.

3.2.1 Sheep producers

The ABARE survey indicates that sheep producers' adoption of a range of pasture and grazing management and farm management and planning practices was generally lower in 2005-06 than were observed in 2005 (table 7). This may be due to differences in survey design and the selection of farmers to participate in the two surveys. Alternatively, this result may be due to an improved understanding of what is involved in the effective implementation of the practices and a recognition that their management needs to be improved or changed in order to reach what they now consider to be effective adoption. One effective step toward improving producers' farm management is the apparent increase in the proportion of producers with a property management plan that incorporates information about the land types for each paddock, the carrying capacity of each paddock and weed management plans.

7 Farm and livestock management practices, specialist sheep producers

Proportion of farms

		2005 Axiom Research (a)	2005-06 ABARE	
Production costs awareness				
Calculate cost of production for sheep and lambs	%	53	44	(15)
Pasture and grazing management				
Use rotational grazing, regular movement of stock	%	35	15	(20)
Use the SOI and other seasonal forecasts when making stocking rate decisions	%	20	20	(16)
Have a set pasture utilisation target when adjusting stocking rates	%	34	28	(17)
Routinely assess the digestibility of feed	%	35	29	(13)
Never calculated a forage or pasture budget	%	65	52	(13)
Never fertilise pasture paddocks	%	22	35	(14)
Use soil tests to determine fertiliser requirements	%	37	55	(11)
Have a minimum green dry matter target at lambing of more than 1200kg per ha	%	20	14	(50)
Farm management and planning				
Participated in benchmarking programs	%	23	10	(34)
Sought specialist advice during 2005-06	%	30	29	(14)
Have prepared or updated a marketing plan	%	31	24	(25)
Aim to meet market specifications	%	83	71	(12)
Property management plan includes				
- land types for each paddock	%	41	79	(8)
- carrying capacity for each paddock	%	43	50	(17)
- weed management plan	%	25	54	(23)
Livestock finishing and marketing				
Weighed livestock to monitor weight gain	%	38	25	(18)
Sell finished cattle, sheep or lambs	%	53	63	(8)
Received carcass information on finished animals	%	47	47	(11)
Changed livestock management as a result of receiving carcass data	%	44	57	(15)
Livestock production management				
A clearly defined breeding objective	%	32	66	(7)
Animal health plan prepared with advice from an animal health advisor or vet	%	16	16	(22)
Used Estimated Breeding Values or index values in sire selection or purchase	%	39	29	(24)
Received a report on stock health status prior to purchasing (other than visual)	%	60	37	(11)
Vaccinate to prevent clostridial disease	%	83	68	(9)
Use fat or condition scoring	%	55	42	(12)
Routinely pregnancy scan ewes	%	25	21	(23)
Manage feed to ensure ewes are at minimum condition score (3) at joining	%	71	63	(9)
Management of rams				
Changed management of rams 8-12 weeks prior to joining	%	66	47	(11)
Drench resistance awareness				
Conducted a drench resistance test in the past 5 years	%	41	28	(16)

(a) Axiom Research 2005, Meat & Livestock Australia Program Adoption and Awareness survey

Note : A guide to interpreting standard errors is in section 4 of this report. Care needs to be taken in interpreting differences in the estimates generated from the Axiom Research survey in 2005 and the current ABARE survey due to differences in survey methodology and the way questions were asked.

There also appears to have been an increase in the proportion of sheep and lamb producers with clearly defined breeding objectives, and who are selling finished or fattened livestock (table 7). Furthermore, it also appears that a greater proportion of sheep producers who received carcass information changed their livestock management as a result of this information. However, in 2005-06 fewer sheep producers reported using fat or condition scoring to monitor the condition of livestock

prior to sale compared with the results of the Axiom survey. The proportion of producers who weighed livestock to monitor weight gain also appears to have fallen since 2005.

The majority of Australia's sheep producers improve pasture productivity by applying fertilisers (table 7). Over half of sheep producers fertilised their pastures on an annual or biannual basis, and the majority of these producers reported using soil tests to determine the fertiliser application rates.

While some of the differences observed between the ABARE survey and the Axiom survey reflect differences in survey methodology, the ABARE results indicate that, in 2005-06, fewer sheep producers:

- calculated their cost of production for sheep and lambs;
- participated in benchmarking programs;
- developed or updated a marketing plan;
- changed their management of their rams 8 – 12 weeks prior to joining (including moving them to better quality pasture, closer monitoring of the animals health and undertaking fertility tests);
- conducted a drench resistance test in the past 4 years.

3.2.2 Northern beef producers

ABARE's survey indicates that in 2006 there appear to have been some changes in producers' farm and livestock management practices. Most notably, there appears to have been a reduction in the proportion of producers who never calculated forage or pasture budgets and more producers routinely assessed the digestibility of their available feed (table 8).

The survey indicates that there was a rise in the proportion of specialist beef cattle and mixed enterprise producers in northern Australia seeking specialist advice during 2005-06, possibly reflecting producers' need to change their pasture management and production systems to better meet market specifications, develop farm plans and manage the impact of drought on their property.

The survey results suggest that producers are increasingly focusing on the quality of farm output. This has resulted in a greater proportion of producers aiming to meet market specifications, having clearly defined breeding objectives and changing management practices in response to receiving carcass data (table 8). However, there does not appear to have been any increase in the proportion of producers using estimated breeding values or indexes in sire selection or purchase.

The ABARE survey indicates that fewer beef cattle producers used the ABCD land condition assessment framework (a framework that classes all pastoral lands into one of four classes based upon the proportion of its forage production potential that is being realised) in 2005-06 than was observed in the Axiom survey in 2005. The ABARE estimates show that no mixed enterprise beef cattle producers used the framework in 2005-06, possibly reflecting the need to use different pasture management practices to increase flexibility for crop management.

In 2005-06, the ABARE survey suggests that there has been a decrease in the proportion of producers using controlled burns to manage their woody weeds. Mixed enterprise producers appear to be less likely to use controlled burns than their specialist beef cattle counterparts, possibly reflecting increased use of chemical and mechanical control methods as part of their crop management practices.

8 Farm and livestock management practices, northern beef cattle producers

Proportion of farms

	2005 Axiom Research survey (a)	2006 ABARE survey			
		Specialist beef producers		Mixed enterprise producers	
Production costs awareness					
Calculate cost of production for cattle	53	48	(9)	35	(16)
Pasture and grazing management					
Have a set pasture utilisation target when adjusting stocking rates	38	46	(10)	35	(16)
Routinely assess the digestibility of feed	35	55	(9)	39	(11)
Used Near Infra-red Reflectance Spectroscopy (NIRS) to measure diet quality	11	4	(75)	1	(46)
Never calculate a forage or pasture budget	70	43	(13)	48	(12)
Farm management and planning					
Participate in benchmarking programs	17	17	(32)	27	(16)
Sought specialist advice during 2005-06	17	45	(12)	45	(11)
Have prepared or updated a marketing plan	32	31	(28)	42	(26)
Aim to meet market specifications	38	92	(6)	93	(5)
Attended a formal training course in 2005-06	21	23	(22)	15	(34)
Use controlled burns to manage woody weeds	67	46	(11)	19	(29)
ABCD land condition assessment framework has been used	81	62	(8)	0	(0)
Property management plan includes:					
- land types for each paddock	50	80	(11)	51	(23)
- carrying capacity for each paddock	57	83	(8)	49	(11)
- weed management plan	25	68	(13)	80	(7)
Livestock finishing and marketing					
Weigh livestock to monitor weight gain	52	45	(12)	40	(16)
Sell finished cattle, sheep or lambs	66	62	(9)	78	(5)
Changed livestock management as a result of receiving carcass data	52	69	(11)	59	(16)
Livestock production management					
Clearly defined breeding objective for the herd	33	69	(7)	68	(10)
Joining percentage (bulls to cows)	11	5	(16)	4	(43)
Prior to mating, proportion of bulls that					
- underwent a Bull Breeding Soundness Examination (BBSE)	31	9	(28)	9	(44)
- BBSE assessment included semen morphology	56	84	(16)	91	(34)
Calf weaning percentages in 2005-06	85	81	(2)	46	(12)
Vaccinate to prevent clostridial disease	82	75	(6)	72	(7)
Used Estimated Breeding Values or index values in shire selection or purchase	38	37	(21)	38	(17)
Pregnancy test cows annually	41	36	(15)	40	(17)
Used controlled joining season	44	40	(14)	42	(15)
Routinely cull breeders that don't become pregnant or fail to raise a calf	88	74	(5)	62	(11)
Manage first calf heifers separate to the rest of the herd	62	46	(10)	63	(14)
Vaccinate against three-day sickness	11	19	(21)	15	(33)

(a) Axiom Research 2005, Meat & Livestock Australia Program Adoption and Awareness survey

Note : A guide to interpreting standard errors is in section 4 of this report. Care needs to be taken in interpreting differences in the estimates generated from the Axiom Research survey in 2005 and the current ABARE survey due to differences in survey methodology and the way questions were asked.

The survey results indicate that adoption of certain practices was higher amongst specialist producers than among mixed enterprises farmers. For example, a greater proportion of specialist producers routinely assessed the digestibility of available feed, set pasture utilisation targets and had a detailed property management plan. The higher adoption amongst specialists is not surprising given that specialists would stand to benefit most from any improvements they make to the management of their beef cattle enterprise and mixed enterprise producers potentially have conflicting land management issues between their various enterprises. Mixed enterprise producers were more likely to have participated in benchmark studies and developed or updated a marketing plan.

3.2.3 Southern beef producers

The 2005-06 survey suggests that there has been an increase in the adoption of some of the pasture and grazing management and farm management and planning practices listed in table 9. For example, in 2005-06, there appears to have been an increase in the proportion of producers aiming to meet market specifications and an associated increase in the number of producers with clearly defined breeding objectives. A significantly greater proportion of specialist producers had clearly defined breeding objectives, sold finished livestock and had changed their livestock management in response to receiving carcass data compared with their mixed enterprise counterparts.

9 Farm and livestock management practices, southern producers

Proportion of farms

			2005-06 ABARE survey			
		2005 Axiom Research survey (a)	Specialist beef producers		Mixed enterprise producers	
Production costs awareness						
Calculate cost of production for cattle	%	49	30	(19)	37	(10)
Pasture and grazing management						
Use rotational grazing, regular movement of stock	%	46	32	(18)	29	(14)
Have a set pasture utilisation target when adjusting stocking rates	%	37	31	(20)	26	(11)
Routinely assess the digestibility of feed	%	34	56	(11)	47	(7)
Never calculate a forage or pasture budget	%	66	46	(15)	54	(7)
Use soil tests to determine fertiliser requirements	%	37	66	(11)	60	(7)
Frequency with which pasture paddocks are fertilised						
- annually	%	51	43	(15)	27	(11)
- never	%	16	23	(27)	31	(10)
Farm management and planning						
Participate in benchmarking programs	%	16	6	(58)	13	(18)
Sought specialist advice during 2005-06	%	17	36	(16)	58	(6)
Have prepared or updated a marketing plan	%	24	50	(18)	32	(28)
Aim to meet market specifications	%	44	100	(0)	81	(9)
Property management plan includes:						
- land types for each paddock	%	48	44	(44)	74	(6)
- carrying capacity for each paddock	%	38	42	(40)	46	(17)
- weed management plan	%	25	39	(42)	71	(10)
Livestock finishing and marketing						
Weigh livestock to monitor weight gain	%	49	35	(22)	47	(9)
Sell finished cattle, sheep or lambs	%	58	61	(11)	20	(21)
Changed livestock management as a result of receiving carcass data	%	48	54	(15)	32	(16)
Livestock production management						
Clearly defined breeding objective for the herd	%	34	71	(11)	47	(9)
Main factor considered when choosing to wean calves						
- chance of breeder calving again next year	%	16	4	(44)	5	(37)
Vaccinate to prevent clostridial disease	%	72	77	(7)	81	(4)
Used Estimated Breeding Values or index values in shire selection or purchase	%	52	29	(25)	38	(9)
Manage second calvers separate from the main breeding herd	%	20	10	(31)	12	(28)
Assess cattle using fat or condition scoring	%	42	38	(18)	38	(14)
Pregnancy test cows each season	%	48	34	(15)	52	(8)
Use controlled joining season	%	76	61	(11)	49	(10)

(a) Axiom Research 2005, Meat & Livestock Australia Program Adoption and Awareness survey

Note : A guide to interpreting standard errors is in section 4 of this report. Care needs to be taken in interpreting differences in the estimates generated from the Axiom Research survey in 2005 and the current ABARE survey due to differences in survey methodology and the way questions were asked.

Although ABARE's survey estimates indicate that a higher proportion of specialist beef cattle producers and mixed enterprise producers had clearly defined breeding objectives, fewer of these producers used estimated breeding values or indices for sire selection.

In 2005-06, the ABARE survey estimates appear to indicate that there has been a contraction in the proportion of producers who have:

- used rotational grazing;
- participated in benchmarking programs;
- weighed livestock to monitor weight gain (particularly amongst specialist producers);
- pregnancy tested cows each season; and
- used a controlled joining season.

In addition, a smaller proportion of producers calculated their cost of production in 2005-06, than was observed in the Axiom survey. It is possible than many of these observations are due to differences in survey methodologies used by ABARE and Axiom Research.

3.3 Ranking by total factor productivity

Total factor productivity (TFP) is one of the main indicators used to monitor and analyse the performance of various sectors of the economy. Technological advances, improvements in management and efficient exploitation of economies of size all influence the rate of growth in productivity.

Total factor productivity expresses productivity as the growth in the value of outputs per dollar of expenditure on inputs. A detailed discussion of the TFP measure can be found in Alexander and Kokic 2005, *Productivity in the Australian Grains Industry*, ABARE eReport 05.3, Canberra.

In order to analyse the association between producers' productivity and their adoption of management practices, producers in each industry classification (sheep, beef and mixed enterprise) and location (northern and southern Australia) were ranked according to their total factor productivity. The results of this analysis for a subset of practices identified by the MLA as being of particular interest are summarised in this section. The results for the complete survey have been provided to the MLA separately to this report.

3.3.1 Sheep producers

The 2005-06 survey results indicate that sheep producers with the highest total factor productivity had adopted a host of management practices to boost the productivity of their sheep enterprise (table 10). For example, these producers spent considerable time managing their on-farm feed production and availability. In 2005-06, the most productive sheep producers were more likely to calculate forage or pasture budgets than their less productive counterparts. On average, the most productive producers who undertook a forage budget were more likely to have conducted it on a weekly basis, while the least productive producers were more likely to conduct it on an annual basis. In addition, the most productive producers were more likely to manage feed availability to ensure their ewes were at a minimum condition score of 3 at joining and used a formal measurement technique to assess pasture availability for ewes at lambing.

Animal health was also enhanced by the most productive producers through the greater use of a range of animal husbandry practices. For example, in 2005-06 these producers were more likely to monitor worm egg counts when deciding to drench their sheep and were more likely to have conducted a drench resistance test in the past 5 years than their industry counterparts.

One of the benefits of better managing animal health and feed availability and quality is apparent in weaning rates. In 2005-06, the average weaning rate was just 65 per cent amongst the least productive farms versus almost 85 per cent amongst the most productive farms.

The survey suggests that the most productive farms were more likely to sell prime lambs and fattened sheep, resulting in these producers realising higher average sheep and lamb prices. In 2005-06, almost 80 per cent of the most productive sheep producers stated that they sold finished livestock (principally fattened livestock including prime lambs), compared with under half of the least productive producers. These producers' ability to produce sheep and lambs that better meet market specifications was enhanced by a greater use of livestock management practices like fat or condition scoring. In addition, a greater proportion of the more productive producers regularly weighed their sheep in order to monitor weight gain.

10 Summary of the key management practices, sheep industry

Farms ranked by total factor productivity index

		Bottom third		Middle third		Top third		Average	
Proportion of area sown to improved perennial pasture	%	19	(30)	28	(14)	39	(14)	29	(10)
Frequency of calculating forage or pasture budget									
- weekly	%	13	(54)	20	(24)	27	(36)	20	(21)
- monthly	%	3	(116)	12	(46)	6	(46)	7	(33)
- quarterly	%	3	(222)	24	(45)	6	(49)	11	(39)
- annually	%	17	(48)	3	(62)	9	(50)	9	(32)
- never	%	65	(15)	41	(27)	52	(20)	52	(12)
Proportion of producers who:									
- who calculate cost of production for sheep and lambs	%	40	(26)	57	(21)	34	(25)	44	(14)
- routinely assess the digestibility of feed	%	38	(28)	31	(22)	20	(22)	29	(15)
- weighed livestock to monitor weight gain	%	10	(77)	33	(27)	29	(25)	25	(19)
- sell finished livestock	%	48	(22)	62	(8)	78	(12)	63	(8)
- use fat or condition scoring	%	35	(30)	39	(25)	51	(15)	42	(13)
- used Estimated Breeding Values or index values in sire selection or purchase	%	42	(38)	16	(36)	33	(27)	29	(19)
- manage feed availability to ensure ewes are at minimum condition score (3) at joining	%	59	(15)	57	(19)	73	(13)	63	(9)
- use formal measurement technique to assess pasture available to ewes at lambing	%	9	(89)	13	(36)	27	(20)	16	(21)
- monitor worm egg counts when deciding to drench	%	23	(37)	33	(24)	31	(27)	30	(16)
- conducted a drench resistance test in the past 5 years	%	22	(41)	30	(24)	31	(27)	28	(17)
- have a set pasture utilisation target when adjusting stocking rates	%	27	(34)	32	(22)	25	(35)	28	(17)
- farm management plan includes a weed management plan	%	64	(37)	49	(53)	47	(11)	54	(24)
Method of grazing management used									
- set or fixed stocking rate	%	7	(63)	10	(25)	26	(37)	14	(25)
- rotational grazing, regular movement of stock	%	16	(63)	19	(24)	10	(35)	15	(24)
- time controlled grazing	%	1	(132)	0	(0)	0	(0)	0	(132)
- moves are based on prevailing circumstances	%	40	(24)	36	(31)	33	(26)	36	(16)
- other	%	36	(29)	35	(31)	31	(37)	34	(19)
Other than drought, significant environmental issues affecting producers are:									
- dryland salinity	%	4.2	(112)	10.3	(84)	17.0	(61)	10.4	(45)
- irrigation water quality	%	6.6	(82)	0.3	(131)	0.4	(79)	2.5	(75)
- water and wind erosion	%	15.0	(50)	15.4	(35)	9.4	(76)	13.2	(30)
- surface waterlogging	%	0.2	(79)	3.1	(89)	16.8	(39)	6.7	(36)
- irrigation salinity	%	0.0	(0)	0.0	(0)	0.3	(285)	0.1	(285)
- poor soil quality	%	16.9	(36)	30.6	(24)	20.9	(36)	22.6	(18)
- weeds or pest animals resulting in land degradation	%	47.3	(26)	39.7	(27)	30.5	(30)	39.2	(16)
Estimated cost of work carried out in 2004-05 for:									
- animal pest control	$	1363	(30)	2495	(24)	1054	(27)	1618	(16)
- landcare related earthworks	$	3	(176)	840	(37)	1351	(54)	722	(37)
- landcare related fencing	$	1634	(68)	490	(57)	1194	(43)	1122	(38)
- tree and shrub establishment/protection/regeneration	$	124	(99)	418	(34)	676	(61)	403	(38)
- changes to irrigation systems	$	0	(0)	213	(114)	0	(0)	68	(114)
- upgrading machinery to implement natural resource best practice	$	264	(142)	843	(65)	1712	(71)	935	(50)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

3.3.2 Northern beef producers

Of the key management practices highlighted by the MLA as being of particular interest, there is no clear pattern in the differences in adoption between the most and least productive northern beef cattle producers that could give insights into their divergent productivity outcomes in 2005-06 (table 11). However, the survey results do indicate that, of the producers who were aware of the ABCD

land conditions assessments, the least productive producers were more likely to have used the framework, though this result is based on a small number of farms. The least productive producers were also more likely to use controlled burns to manage their woody weeds than their industry counterparts.

Producers with total factor productivity indexes in the middle third of the population were more likely to use estimated breeding values or indexes in sire selection, manage first calf heifers separately to the rest of the herd and pregnancy test their cows annually.

11 Summary of the key management practices, northern beef industry *Farms ranked by total factor productivity index*

		Bottom third		Middle third		Top third		Average	
Proportion of producers who:									
- are aware of ABCD land condition assessments	%	3	(112)	7	(47)	5	(53)	5	(35)
- ABCD land condition assessment framework has been used	%	94	(8)	79	(8)	25	(40)	62	(7)
- use controlled burns to manage woody weeds	%	60	(20)	39	(21)	40	(21)	46	(12)
- used Estimated Breeding Values or index values in sire selection or purchase	%	10	(63)	53	(28)	40	(30)	37	(19)
- manage first calf heifers separately to the rest of the herd	%	41	(22)	51	(18)	45	(23)	46	(12)
- pregnancy test cows annually	%	20	(37)	51	(18)	38	(25)	36	(14)
Proportion of property spelled every wet season	%	21	(34)	22	(19)	12	(15)	18	(15)
Frequency of calculating forage or pasture budget									
- weekly	%	27	(36)	25	(32)	28	(29)	27	(19)
- monthly	%	13	(54)	10	(59)	10	(72)	11	(36)
- quarterly	%	11	(67)	6	(52)	14	(39)	11	(31)
- annually	%	8	(92)	9	(53)	7	(88)	8	(45)
- never	%	40	(28)	49	(20)	41	(20)	43	(13)
Main factor considered when choosing to wean calves									
- cow condition	%	29	(36)	24	(35)	15	(31)	23	(21)
- pasture condition	%	8	(55)	10	(56)	16	(45)	11	(30)
- time of year	%	22	(42)	16	(55)	19	(51)	19	(28)
- weight of calf	%	20	(43)	20	(41)	21	(41)	20	(24)
- chance of breeder calving again next year	%	5	(79)	5	(55)	0	(197)	3	(48)
- other	%	16	(56)	26	(25)	29	(25)	23	(19)
Ease with which cost effective supplementation strategies can be developed to address nutritional deficiencies									
- very high	%	45	(24)	34	(27)	41	(10)	40	(12)
- high	%	24	(46)	37	(25)	21	(19)	27	(18)
- some	%	12	(49)	11	(68)	4	(50)	9	(36)
- low	%	6	(82)	0	(0)	0	(0)	2	(82)
- very low	%	4	(87)	2	(119)	0	(111)	2	(68)
Vaccinate against:									
- tick fever	%	8	(21)	34	(23)	34	(23)	25	(15)
- botulism	%	30	(21)	37	(23)	26	(24)	31	(13)
- three-day sickness	%	11	(66)	24	(36)	22	(27)	19	(22)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

Amongst producers of high, intermediate and low productivity index values a very similar proportion of farms reported using management practices like:

- calculating forage or pasture budgets on a weekly basis;
- determining the time to wean calves based on cow condition, time of year and the weight of the calves; and
- easily or very easily developed cost effective supplementation strategies to address nutritional deficiencies in their herd.

3.3.3 Southern beef producers

In 2005-06, a greater proportion of southern beef producers with the highest total factor productivity index routinely assessed the digestibility of the feed available to their cattle, weighed livestock for weight gain and used estimated breeding values (EBV's) in sire selection or purchase (table 12) and dedicated a larger proportion of their farm's area to improved perennial pastures. These producers were also more likely to use rotational grazing and regular stock movement as their preferred method of grazing management. In contrast, the most commonly used grazing management method used by the least productive producers was to base livestock movements on the prevailing circumstances.

12 Summary of the key management practices, southern beef industry *Farms ranked by total factor productivity index*

		Bottom third		Middle third		Top third		Average	
Proportion of farm area sown to improved perennial pasture	%	33	(35)	26	(21)	46	(16)	35	(14)
Proportion of producers who calculate cost of production for cattle	%	36	(30)	27	(35)	28	(36)	30	(20)
Frequency of calculating forage or pasture budget									
- weekly	%	32	(41)	31	(30)	29	(26)	31	(19)
- monthly	%	4	(268)	6	(118)	13	(81)	8	(72)
- quarterly	%	0	(0)	19	(52)	6	(66)	8	(43)
- annually	%	8	(74)	7	(94)	6	(77)	7	(48)
- never	%	55	(33)	37	(33)	47	(23)	46	(17)
Method of grazing management used									
- set or fixed stocking rate	%	11	(120)	17	(57)	14	(49)	14	(42)
- rotational grazing, regular movement of stock	%	33	(28)	18	(19)	45	(26)	32	(16)
- time controlled grazing	%	0	(0)	10	(70)	0	(0)	3	(70)
- moves based on prevailing circumstances	%	53	(25)	43	(24)	38	(33)	44	(16)
- other	%	3	(63)	12	(68)	2	(63)	6	(49)
Proportion of producers who:									
- routinely assess the digestibility of feed	%	54	(18)	52	(28)	61	(19)	56	(12)
- weigh livestock to monitor weight gain	%	34	(41)	28	(41)	43	(28)	35	(21)
- used Estimated Breeding Values or index values in sire selection or purchase	%	13	(133)	23	(60)	40	(23)	29	(25)
- assess cattle using fat or condition scoring	%	40	(36)	30	(35)	43	(27)	38	(19)
- have a set pasture utilisation target when adjusting stocking rates	%	29	(44)	38	(34)	27	(36)	31	(22)
- weed management plan	%	3	(969)	60	(41)	31	(72)	39	(39)
Other than drought, significant environmental issues affecting producers are:									
- dryland salinity	%	0	(0)	0	(0)	0	(0)	0	(0)
- irrigation water quality	%	0	(0)	0	(0)	0	(0)	0	(0)
- water and wind erosion	%	4	(92)	2	(253)	26	(59)	12	(52)
- surface waterlogging	%	0	(0)	1	(135)	12	(100)	5	(95)
- irrigation salinity	%	0	(0)	0	(0)	1	(285)	1	(285)
- poor soil quality	%	15	(23)	40	(26)	57	(27)	38	(17)
- weeds or pest animals resulting in land degradation	%	54	(42)	38	(48)	58	(28)	51	(22)
Estimated cost of work carried out in 2004-05 for:									
- animal pest control	$	892	(68)	2093	(34)	2996	(30)	2018	(22)
- landcare related earthworks	$	0	(0)	957	(60)	927	(99)	612	(62)
- landcare related fencing	$	341	(175)	1006	(37)	768	(73)	684	(46)
- tree and shrub establishment/protection/regeneration	$	167	(154)	382	(82)	452	(45)	334	(44)
- changes to irrigation systems	$	0	(0)	0	(0)	546	(69)	208	(69)
- upgrading machinery to implement natural resource best practice	$	0	(0)	73	(50)	4577	(50)	1763	(50)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

Reflecting their higher farm cash incomes and business profits, the most productive beef cattle producers in southern Australia invested considerably more in 2004-05 on upgrading their machinery to implement natural resource best management practices and to address animal pest control issues.

Producers who had intermediate total factor productivity index values were more likely to have calculated a forage or pasture budget than their industry counterparts. Amongst producers who calculated forage or pasture budgets, the majority calculated it on a weekly basis.

3.3.4 Mixed enterprise producers

The survey results for 2005-06 do not show a strong correlation between the practices highlighted by the MLA and farm productivity for mixed enterprise producers in either northern or southern Australia (tables 13 and 14). Producers with the lowest total factor productivity index were more likely to have adopted many of these practices than their industry counterparts. In particular, a greater proportion of the least productive mixed enterprise farms in northern and southern Australia:

- routinely assessed the digestibility of feed;
- assessed cattle using fat or condition scoring;
- weighed their livestock in order to monitor weight gain;
- calculated forage or pasture budgets; and
- used set pasture utilisation targets when adjusting stocking rates.

13 Summary of the key management practices, northern mixed enterprise producers *Farms ranked by total factor productivity index*

		Bottom third		Middle third		Top third		Average	
Proportion of producers who calculate cost of production for:									
- sheep and lambs	%	53	(27)	59	(9)	68	(10)	61	(8)
- cattle	%	39	(30)	34	(30)	29	(34)	35	(19)
Proportion of farm area sown to improved perennial pasture	%	12	(41)	25	(19)	14	(28)	17	(15)
Proportion of producers who:									
- routinely assess the digestibility of feed	%	50	(16)	41	(19)	25	(24)	39	(11)
- weigh livestock to monitor weight gain	%	58	(24)	29	(29)	34	(22)	40	(15)
- used Estimated Breeding Values or index values in sire selection or purchase	%	30	(39)	56	(24)	31	(26)	38	(17)
- use fat or condition scoring	%	65	(23)	27	(42)	38	(22)	43	(15)
- manage feed availability to ewes to ensure they are at a minimum condition score at joining	%	72	(23)	68	(14)	79	(9)	73	(9)
- use formal measurement technique to assess pasture availability for ewes at lambing	%	12	(70)	11	(62)	9	(37)	10	(34)
- monitor egg counts when deciding when to drench sheep	%	17	(47)	24	(51)	20	(31)	20	(25)
- conducted drench resistance tests in the past 5 years	%	27	(53)	36	(32)	21	(39)	27	(24)
- have a set pasture utilisation target when adjusting stocking rates	%	48	(27)	32	(27)	26	(19)	35	(15)
- weed management plan	%	83	(15)	81	(17)	78	(26)	80	(13)
Ease with which forage quality and quantity can be matched to animal requirements									
- very high	%	22	(29)	23	(14)	0	(0)	18	(16)
- high	%	48	(30)	46	(20)	39	(0)	45	(15)
- some	%	17	(78)	6	(55)	0	(0)	9	(60)
- low	%	0	(0)	0	(0)	0	(0)	0	(0)
- very low	%	0	(0)	0	(0)	0	(0)	0	(0)
- no response	%	13	(20)	25	(34)	61	(0)	27	(13)
Frequency of calculating forage or pasture budget									
- weekly	%	14	(49)	22	(30)	8	(45)	15	(23)
- monthly	%	29	(38)	26	(35)	10	(42)	21	(23)
- quarterly	%	5	(42)	12	(49)	4	(53)	7	(31)
- annually	%	14	(55)	5	(69)	9	(47)	9	(33)
- never	%	38	(33)	36	(28)	69	(8)	48	(12)
Method of grazing management used for sheep									
- set or fixed stocking rate	%	0	(140)	14	(62)	11	(65)	8	(45)
- rotational grazing	%	12	(52)	26	(28)	19	(38)	19	(21)
- time controlled grazing	%	1	(73)	0	(0)	0	(0)	0	(73)
- moves based on prevailing conditions	%	79	(14)	39	(21)	44	(23)	54	(11)
- other	%	7	(133)	21	(41)	26	(24)	19	(25)
Other than drought, significant environmental issues affecting producers are:									
- dryland salinity	%	17	(51)	30	(27)	43	(29)	29	(19)
- irrigation water quality	%	0	(0)	0	(0)	0	(0)	0	(0)
- water and wind erosion	%	21	(46)	28	(36)	21	(65)	24	(26)
- surface waterlogging	%	12	(66)	20	(44)	24	(55)	18	(31)
- irrigation salinity	%	0	(0)	0	(0)	0	(0)	0	(0)
- poor soil quality	%	23	(18)	17	(45)	26	(62)	22	(25)
- weeds or pest animals resulting in land degradation	%	48	(25)	33	(22)	34	(47)	39	(17)
Estimated cost of work carried out in 2004-05 for:									
- animal pest control	$	1775	(62)	1216	(33)	1280	(89)	1430	(36)
- landcare related earthworks	$	1435	(37)	2003	(44)	4315	(41)	2398	(25)
- landcare related fencing	$	554	(108)	744	(58)	1423	(48)	852	(38)
- tree and shrub establishment/protection/regeneration	$	1156	(64)	144	(86)	1529	(43)	859	(37)
- changes to irrigation systems	$	0	(0)	764	(108)	0	(0)	297	(108)
- upgrading machinery to implement natural resource best practice	$	1881	(103)	3928	(92)	4140	(99)	3259	(58)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

14 Summary of the key management practices, southern mixed enterprise producers *Farms ranked by total factor productivity index*

		Bottom third		Middle third		Top third		Average	
Proportion of farm area sown to improved perennial pasture	%	21	(17)	26	(11)	31	(12)	26	(8)
Proportion of producers who calculate cost of production for:									
- sheep and lambs	%	20	(29)	46	(11)	43	(12)	37	(9)
- cattle	%	37	(15)	29	(17)	45	(14)	37	(9)
Proportion of producers who:									
- weigh livestock to monitor weight gain	%	26	(27)	31	(15)	34	(14)	30	(11)
- routinely assess the digestibility of feed	%	55	(12)	39	(14)	46	(13)	47	(8)
- used Estimated Breeding Values or index values in sire selection or purchase	%	43	(20)	33	(17)	39	(12)	38	(9)
- assess cattle using fat or condition scoring	%	41	(27)	35	(22)	38	(16)	38	(14)
- manage feed availability to ewes to ensure they are at a minimum condition score at joining	%	70	(14)	65	(9)	74	(7)	70	(6)
- use formal measurement technique to assess pasture availability for ewes at lambing	%	13	(31)	15	(24)	18	(25)	15	(15)
- monitor egg counts when deciding when to drench sheep	%	22	(20)	30	(20)	31	(15)	28	(11)
- conducted drench resistance tests in the past 5 years	%	16	(22)	27	(20)	35	(15)	27	(10)
- have a set pasture utilisation target when adjusting stocking rates	%	29	(18)	26	(12)	21	(19)	26	(10)
- weed management plan	%	72	(11)	60	(22)	79	(16)	71	(10)
Frequency of calculating forage or pasture budget									
- weekly	%	28	(26)	20	(15)	23	(21)	24	(13)
- monthly	%	17	(31)	7	(33)	6	(37)	10	(20)
- quarterly	%	0	(56)	8	(45)	6	(33)	5	(29)
- annually	%	4	(54)	11	(19)	7	(30)	7	(17)
- never	%	50	(15)	54	(9)	58	(10)	54	(7)
Method of grazing management used for beef cattle									
- set or fixed stocking rate	%	10	(79)	23	(28)	14	(32)	16	(27)
- rotational grazing, regular movement of stock	%	28	(23)	26	(22)	36	(20)	29	(13)
- time controlled grazing	%	1	(113)	0	(639)	0	(0)	0	(130)
- moves based on prevailing circumstances	%	57	(18)	39	(15)	42	(21)	47	(11)
- other	%	3	(69)	11	(56)	7	(73)	7	(38)
Other than drought, significant environmental issues affecting producers are:									
- dryland salinity	%	8	(41)	9	(41)	10	(35)	9	(22)
- irrigation water quality	%	0	(115)	0	(0)	7	(53)	2	(51)
- water and wind erosion	%	23	(38)	19	(27)	15	(25)	19	(19)
- surface waterlogging	%	8	(50)	5	(54)	6	(42)	6	(29)
- irrigation salinity	%	0	(94)	1	(77)	0	(116)	0	(53)
- poor soil quality	%	44	(18)	39	(19)	22	(26)	34	(12)
- weeds or pest animals resulting in land degradation	%	54	(13)	35	(16)	44	(14)	44	(8)
Estimated cost of work carried out in 2004-05 for:									
- animal pest control	$	2269	(27)	4109	(39)	1985	(21)	2763	(21)
- landcare related earthworks	$	398	(62)	608	(58)	278	(51)	423	(35)
- landcare related fencing	$	817	(42)	863	(34)	1080	(24)	925	(19)
- tree and shrub establishment/protection/regeneration	$	273	(54)	645	(47)	869	(27)	606	(23)
- changes to irrigation systems	$	293	(233)	761	(164)	6360	(68)	2608	(62)
- upgrading machinery to implement natural resource best practice	$	1206	(72)	7969	(43)	8448	(47)	5979	(30)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

3.4 Ranking by rate of return

In order to analyse the association between producers' return on capital and their adoption of management practices, producers in each industry classification (sheep, beef and mixed enterprise) and location (northern and southern Australia) were ranked according to their rate of return on capital excluding capital appreciation. The results of this analysis for a subset of practices identified by the MLA as being of particular interest are summarised in this section. The results for the complete survey were provided to the MLA separately to this report.

The results of the analysis provide no clear association between producers' management practices and the rate of return achieved by sheep, beef cattle and mixed enterprise producers (tables 15 to 19). For the majority of practices, there is no statistically significant difference between the level of adoption amongst producers with the lowest and highest return on capital.

In addition, the results suggest that there may be a conflict between producers' adoption of management practices with regards to their productivity and return on capital outcomes. For example, the proportion of producers using fat or condition scoring amongst sheep producers was greatest for producers with the highest productivity index (table 10) and for those with the lowest rate of return (table 15). The reverse is true for burning woody weeds for beef producers in northern Australia – a greater proportion of producers with low productivity indexes and high rate of return burned woody weeds in 2005-06 (tables 11 and 16). Further in depth analysis of the survey results could be conducted to investigate the association between return and management practices.

15 Summary of the key management practices, sheep industry

Farms ranked by rate of return excluding capital appreciation

		Bottom third		Middle third		Top third		Average	
Proportion of farm area sown to improved perennial pasture	%	28	(18)	28	(19)	31	(16)	29	(10)
Frequency of calculating forage or pasture budget									
- weekly	%	14	(43)	17	(22)	30	(37)	20	(22)
- monthly	%	8	(50)	8	(58)	6	(45)	7	(31)
- quarterly	%	6	(111)	21	(46)	5	(39)	11	(37)
- annually	%	16	(54)	3	(80)	10	(45)	9	(34)
- never	%	56	(23)	51	(20)	48	(23)	52	(13)
Proportion of producers who:									
- who calculate cost of production for sheep and lambs	%	46	(25)	44	(27)	43	(23)	44	(15)
- routinely assess the digestibility of feed	%	38	(22)	28	(23)	23	(20)	29	(13)
- weighed livestock to monitor weight gain	%	23	(46)	28	(26)	23	(24)	25	(18)
- use fat or condition scoring	%	47	(26)	39	(19)	41	(17)	42	(12)
- used Estimated Breeding Values or index values in sire selection or purchase	%	30	(58)	21	(40)	36	(34)	29	(24)
- manage feed availability to ensure ewes are at minimum condition score (3) at joining	%	60	(19)	61	(17)	67	(13)	63	(9)
- use formal measurement technique to assess pasture available to ewes at lambing	%	10	(58)	9	(32)	29	(21)	16	(18)
- monitor worm egg counts when deciding to drench	%	35	(29)	34	(23)	20	(28)	30	(15)
- conducted a drench resistance test in the past 5 years	%	30	(35)	30	(18)	24	(29)	28	(16)
- have a set pasture utilisation target when adjusting stocking rates	%	36	(27)	26	(23)	25	(37)	28	(17)
- farm management plan includes a weed management plan	%	60	(39)	31	(61)	62	(31)	54	(23)
Method of grazing management used									
- set or fixed stocking rate	%	8	(55)	16	(40)	19	(45)	14	(27)
- rotational grazing, regular movement of stock	%	26	(32)	15	(29)	6	(39)	15	(20)
- time controlled grazing	%	1	(89)	0	(0)	0	(0)	0	(89)
- moves are based on prevailing circumstances	%	32	(25)	37	(29)	40	(25)	36	(16)
- other	%	34	(23)	33	(35)	35	(34)	34	(18)
Other than drought, significant environmental issues affecting producers are:									
- dryland salinity	%	8	(100)	5	(94)	19	(54)	10	(45)
- irrigation water quality	%	6	(76)	0	(309)	0	(79)	3	(71)
- water and wind erosion	%	9	(60)	19	(32)	14	(56)	13	(27)
- surface waterlogging	%	0	(232)	14	(75)	9	(92)	7	(58)
- irrigation salinity	%	0	(0)	0	(257)	0	(0)	0	(257)
- poor soil quality	%	19	(30)	25	(35)	26	(53)	23	(23)
- weeds or pest animals resulting in land degradation	%	43	(25)	43	(28)	30	(40)	39	(17)
Estimated cost of work carried out in 2004-05 for:									
- animal pest control	$	1310	(21)	2788	(34)	930	(32)	1618	(19)
- landcare related earthworks	$	61	(94)	754	(60)	1615	(56)	722	(41)
- landcare related fencing	$	1402	(69)	416	(63)	1407	(49)	1122	(41)
- tree and shrub establishment/protection/regeneration	$	156	(69)	555	(49)	601	(78)	403	(41)
- changes to irrigation systems	$	0	(0)	238	(56)	0	(0)	68	(56)
- upgrading machinery to implement natural resource best practice	$	219	(128)	2790	(78)	161	(145)	935	(68)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

16 Summary of the key management practices, northern beef industry *Farms ranked by rate of return excluding capital appreciation*

		Bottom third		Middle third		Top third		Average	
Proportion of producers who:									
- are aware of ABCD land condition assessments	%	3	(116)	1	(114)	11	(27)	5	(29)
- ABCD land condition assessment framework has been used	%	100	(0)	0	(0)	60	(10)	62	(8)
- use controlled burns to manage woody weeds	%	46	(26)	36	(22)	56	(9)	46	(11)
- used Estimated Breeding Values or index values in sire selection or purchase	%	17	(101)	49	(28)	47	(16)	37	(21)
- manage first calf heifers separately to the rest of the herd	%	42	(25)	42	(20)	53	(10)	46	(10)
- pregnancy test cows annually	%	28	(44)	45	(21)	35	(15)	36	(15)
Proportion of property spelled every wet season	%	20	(36)	16	(23)	18	(11)	18	(15)
Frequency of calculating forage or pasture budget									
- weekly	%	40	(28)	23	(29)	18	(45)	27	(19)
- monthly	%	10	(71)	16	(52)	6	(37)	11	(34)
- quarterly	%	7	(95)	4	(84)	20	(25)	11	(29)
- annually	%	9	(91)	11	(60)	5	(46)	8	(42)
- never	%	33	(33)	46	(20)	50	(18)	43	(13)
Main factor considered when choosing to wean calves									
- cow condition	%	24	(45)	31	(30)	14	(23)	23	(21)
- pasture condition	%	4	(96)	9	(51)	20	(40)	11	(30)
- time of year	%	17	(44)	23	(41)	16	(46)	19	(25)
- weight of calf	%	42	(20)	6	(69)	13	(27)	20	(16)
- chance of breeder calving again next year	%	2	(189)	5	(56)	3	(43)	3	(46)
- other	%	11	(76)	25	(35)	34	(15)	23	(19)
Ease with which cost effective supplementation strategies can be developed to address nutritional deficiencies									
- very high	%	38	(28)	38	(22)	44	(11)	40	(12)
- high	%	26	(46)	19	(45)	36	(13)	27	(18)
- some	%	5	(98)	18	(44)	5	(51)	9	(35)
- low	%	6	(76)	0	(0)	0	(0)	2	(76)
- very low	%	3	(72)	2	(105)	1	(63)	2	(53)
Vaccinate against:									
- tick fever	%	13	(59)	29	(23)	34	(25)	25	(17)
- botulism	%	23	(25)	28	(27)	40	(21)	31	(14)
- three-day sickness	%	14	(57)	22	(37)	21	(24)	19	(21)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

17 Summary of the key management practices, southern beef industry *Farms ranked by rate of return excluding capital appreciation*

		Bottom third		Middle third		Top third		Average	
Proportion of farm area sown to improved perennial pasture	%	28	(40)	39	(16)	38	(17)	35	(13)
Proportion of producers who calculate cost of production for cattle	%	45	(26)	24	(43)	21	(36)	30	(19)
Frequency of calculating forage or pasture budget									
- weekly	%	33	(41)	27	(23)	32	(29)	31	(19)
- monthly	%	9	(23)	9	(91)	6	(119)	8	(48)
- quarterly	%	6	(53)	8	(104)	11	(56)	8	(46)
- annually	%	9	(73)	8	(80)	5	(91)	7	(47)
- never	%	43	(35)	48	(29)	47	(16)	46	(15)
Method of grazing management used									
- set or fixed stocking rate	%	12	(74)	19	(61)	12	(60)	14	(38)
- rotational grazing, regular movement of stock	%	37	(28)	30	(40)	32	(25)	32	(18)
- time controlled grazing	%	0	(0)	0	(0)	10	(62)	3	(62)
- moves based on prevailing circumstances	%	49	(20)	41	(31)	44	(19)	44	(14)
- other	%	2	(178)	11	(59)	3	(46)	6	(47)
Proportion of producers who:									
- routinely assess the digestibility of feed	%	68	(15)	50	(27)	51	(13)	56	(11)
- weigh livestock to monitor weight gain	%	45	(34)	21	(56)	40	(32)	35	(22)
- used Estimated Breeding Values or index values in sire selection or purchase	%	11	(65)	22	(65)	45	(23)	29	(25)
- assess cattle using fat or condition scoring	%	48	(33)	29	(35)	37	(26)	38	(18)
- have a set pasture utilisation target when adjusting stocking rates	%	38	(37)	22	(48)	35	(23)	31	(20)
- weed management plan	%	24	(216)	75	(27)	21	(101)	39	(42)
Other than drought, significant environmental issues affecting producers are:									
- dryland salinity	%	0	(0)	0	(0)	0	(0)	0	(0)
- irrigation water quality	%	0	(0)	0	(0)	0	(0)	0	(0)
- water and wind erosion	%	4	(152)	22	(81)	9	(61)	12	(54)
- surface waterlogging	%	1	(151)	13	(114)	1	(106)	5	(99)
- irrigation salinity	%	0	(0)	2	(464)	0	(0)	1	(464)
- poor soil quality	%	21	(32)	49	(38)	42	(21)	38	(19)
- weeds or pest animals resulting in land degradation	%	36	(46)	47	(46)	67	(16)	51	(18)
Estimated cost of work carried out in 2004-05 for:									
- animal pest control	$	1502	(58)	976	(38)	3335	(35)	2018	(26)
- landcare related earthworks	$	482	(518)	601	(57)	727	(197)	612	(153)
- landcare related fencing	$	800	(217)	718	(51)	559	(61)	684	(82)
- tree and shrub establishment/protection/regeneration	$	359	(39)	258	(69)	378	(56)	334	(32)
- changes to irrigation systems	$	0	(0)	0	(0)	557	(157)	208	(157)
- upgrading machinery to implement natural resource best practice	$	0	(0)	1285	(112)	3614	(48)	1763	(45)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

18 Summary of the key management practices, northern mixed enterprise producers *Farms ranked by rate of return excluding capital appreciation*

		Bottom third		Middle third		Top third		Average	
Proportion of producers who calculate cost of production for:									
- sheep and lambs	%	54	(25)	75	(5)	52	(20)	61	(9)
- cattle	%	35	(33)	38	(20)	31	(23)	35	(16)
Proportion of farm area sown to improved perennial pasture	%	19	(32)	20	(20)	12	(35)	17	(16)
Proportion of producers who:									
- routinely assess the digestibility of feed	%	45	(20)	36	(20)	36	(19)	39	(11)
- weigh livestock to monitor weight gain	%	49	(29)	28	(24)	43	(26)	40	(16)
- used Estimated Breeding Values or index values in sire selection or purchase	%	34	(47)	47	(15)	33	(33)	38	(17)
- use fat or condition scoring	%	61	(27)	27	(37)	41	(18)	43	(16)
- manage feed availability to ewes to ensure they are at a minimum condition score (3) at joining	%	68	(22)	71	(11)	81	(6)	73	(8)
- use formal measurement technique to assess pasture availability for ewes at lambing	%	15	(64)	9	(41)	7	(46)	10	(35)
- monitor egg counts when deciding when to drench sheep	%	12	(52)	35	(22)	14	(40)	20	(19)
- conducted drench resistance tests in the past 5 years	%	23	(59)	42	(26)	17	(37)	27	(23)
- have a set pasture utilisation target when adjusting stocking rates	%	52	(25)	35	(26)	19	(30)	35	(16)
- weed management plan	%	94	(8)	69	(15)	81	(11)	80	(7)
Ease with which forage quality and quantity can be matched to animal requirements									
- very high	%	17	(40)	9	(44)	28	(31)	18	(22)
- high	%	63	(32)	31	(17)	41	(24)	45	(17)
- some	%	15	(114)	13	(28)	0	(0)	9	(64)
- low	%	0	(0)	0	(0)	0	(0)	0	(0)
- very low	%	0	(0)	0	(0)	0	(0)	0	(0)
Frequency of calculating forage or pasture budget									
- weekly	%	8	(98)	24	(25)	11	(36)	15	(24)
- monthly	%	36	(41)	17	(32)	12	(33)	21	(24)
- quarterly	%	6	(62)	10	(49)	5	(43)	7	(31)
- annually	%	8	(87)	13	(34)	7	(42)	9	(31)
- never	%	41	(35)	36	(19)	66	(9)	48	(12)
Method of grazing management used for sheep									
- set or fixed stocking rate	%	7	(111)	13	(50)	5	(83)	8	(44)
- rotational grazing	%	4	(54)	29	(33)	24	(49)	19	(27)
- time controlled grazing	%	0	(0)	0	(0)	1	(92)	0	(92)
- moves based on prevailing conditions	%	79	(12)	31	(33)	50	(25)	54	(12)
- other	%	10	(67)	27	(22)	19	(35)	19	(20)
Other than drought, significant environmental issues affecting producers are:									
- dryland salinity	%	23	(70)	32	(32)	32	(33)	29	(25)
- irrigation water quality	%	0	(0)	0	(0)	0	(0)	0	(0)
- water and wind erosion	%	21	(30)	23	(36)	27	(45)	24	(23)
- surface waterlogging	%	29	(53)	10	(65)	15	(58)	18	(35)
- irrigation salinity	%	0	(0)	0	(0)	0	(0)	0	(0)
- poor soil quality	%	17	(28)	26	(28)	22	(53)	22	(22)
- weeds or pest animals resulting in land degradation	%	32	(27)	44	(14)	40	(29)	39	(14)
Estimated cost of work carried out in 2004-05 for:									
- animal pest control	$	1057	(83)	935	(50)	2290	(70)	1430	(44)
- landcare related earthworks	$	438	(73)	3438	(43)	3337	(24)	2398	(23)
- landcare related fencing	$	467	(28)	772	(57)	1315	(43)	852	(29)
- tree and shrub establishment/protection/regeneration	$	861	(71)	1110	(48)	609	(50)	859	(34)
- changes to irrigation systems	$	0	(0)	902	(117)	0	(0)	297	(117)
- upgrading machinery to implement natural resource best practice	$	511	(163)	6133	(73)	3184	(95)	3259	(55)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

19 Summary of the key management practices, southern mixed enterprise producers *Farms ranked by rate of return excluding capital appreciation*

		Bottom third		Middle third		Top third		Average	
Proportion of farm area sown to improved perennial pasture	%	23	(14)	32	(13)	22	(14)	26	(8)
Proportion of producers who calculate cost of production for:									
- sheep and lambs	%	23	(28)	45	(12)	42	(14)	37	(9)
- cattle	%	28	(19)	47	(14)	36	(18)	37	(10)
Proportion of producers who:									
- weigh livestock to monitor weight gain	%	24	(28)	32	(16)	34	(12)	30	(10)
- routinely assess the digestibility of feed	%	56	(12)	43	(8)	42	(13)	47	(7)
- used Estimated Breeding Values or index values in sire selection or purchase	%	33	(24)	43	(14)	36	(12)	38	(9)
- assess cattle using fat or condition scoring	%	45	(28)	27	(23)	44	(19)	38	(14)
- manage feed availability to ewes to ensure they are at a minimum condition score (3) at joining	%	65	(14)	71	(9)	72	(6)	70	(6)
- use formal measurement technique to assess pasture availability for ewes at lambing	%	13	(31)	19	(21)	14	(30)	15	(16)
- monitor egg counts when deciding when to drench sheep	%	18	(22)	36	(17)	29	(12)	28	(10)
- conducted drench resistance tests in the past 5 years	%	16	(22)	38	(14)	26	(19)	27	(10)
- have a set pasture utilisation target when adjusting stocking rates	%	29	(19)	26	(20)	22	(19)	26	(11)
- weed management plan	%	79	(9)	59	(29)	73	(17)	71	(10)
Frequency of calculating forage or pasture budget									
- weekly	%	27	(27)	23	(19)	21	(23)	24	(14)
- monthly	%	15	(34)	6	(34)	8	(29)	10	(20)
- quarterly	%	5	(44)	5	(55)	5	(35)	5	(26)
- annually	%	7	(30)	10	(26)	5	(28)	7	(16)
- never	%	46	(17)	57	(10)	60	(9)	54	(7)
Method of grazing management used for beef cattle									
- set or fixed stocking rate	%	15	(57)	16	(44)	17	(36)	16	(27)
- rotational grazing, regular movement of stock	%	29	(25)	31	(22)	27	(28)	29	(14)
- time controlled grazing	%	1	(148)	0	(0)	0	(66)	0	(128)
- moves based on prevailing circumstances	%	54	(13)	43	(14)	46	(18)	47	(9)
- other	%	0	(97)	11	(51)	10	(52)	7	(36)
Other than drought, significant environmental issues affecting producers									
- dryland salinity	%	11	(38)	9	(47)	6	(36)	9	(24)
- irrigation water quality	%	0	(101)	0	(115)	7	(56)	2	(52)
- water and wind erosion	%	20	(41)	16	(23)	20	(22)	19	(18)
- surface waterlogging	%	5	(68)	11	(38)	3	(52)	6	(30)
- irrigation salinity	%	0	(101)	0	(0)	1	(86)	0	(70)
- poor soil quality	%	45	(16)	31	(24)	28	(24)	34	(12)
- weeds or pest animals resulting in land degradation	%	50	(15)	36	(17)	47	(15)	44	(9)
Estimated cost of work carried out in 2004-05 for:									
- animal pest control	$	1959	(27)	4200	(38)	2056	(20)	2763	(21)
- landcare related earthworks	$	296	(70)	722	(40)	235	(41)	423	(30)
- landcare related fencing	$	942	(39)	881	(27)	955	(32)	925	(19)
- tree and shrub establishment/protection/regeneration	$	249	(49)	1070	(32)	478	(25)	606	(22)
- changes to irrigation systems	$	278	(176)	3576	(103)	3980	(76)	2608	(62)
- upgrading machinery to implement natural resource best practice	$	1235	(73)	5179	(55)	11739	(48)	5979	(35)

Note: Figures in parenthesis are relative standard errors. A guide to interpreting standard errors is in section 4 of this report.

4 Survey methodology

4.1 Survey design and sample weighting

ABARE's survey sample is selected to provide data that are representative of the broadacre industries. This is done by ensuring the sample is drawn from different size classes, based on the farm's estimated value of agricultural output (EVAO), within each industry within the broadacre sector. That is, the population is stratified by industry first; then each stratum is stratified by operation size using EVAO. The sample allocation to each stratum is done using a mixture of Neyman allocation, which takes into account the variability within strata of the auxiliary variable, in this case EVAO, and proportional allocation, which considers the population in each stratum. Neyman allocation allocates large proportions of sample to strata with large variability.

The ABARE estimates presented in this report are calculated by weighting the data collected from each sample farm and then using these data to calculate population estimates. Generally, larger farms have small weights and smaller farms have larger weights, reflecting the strategy of sampling a higher fraction of the large farms than small farms (the former having a wider range of variability of key characteristics).

4.2 Reliability of estimates

4.2.1 Sampling errors

Only a small number of farms out of the total number of farms in a particular industry are surveyed. The data collected from each sample farm are weighted to calculate population estimates. Estimates derived from these farms are likely to be different from those that would have been obtained if information had been collected from a census of all farms. Any such differences are called 'sampling errors'.

The size of the sampling error is most influenced by the survey design and the estimation procedures, as well as the sample size and the variability of farms in the population. The larger the sample size, the lower the sampling error is likely to be. Hence, sub-industry estimates are likely to have greater sampling errors than industry estimates.

To give a guide to the reliability of the survey estimates, standard errors have been calculated for all estimates in this report. These estimated errors, expressed as percentages of the survey estimates and termed 'relative standard errors' are given next to each estimate inside parentheses.

4.2.2 Comparing estimates

When comparing estimates between two groups, it is important to recognise that some of the differences are subject to sampling error. As a rough rule of thumb, a conservative estimate of the standard error of the difference can be constructed by adding the squares of the estimated standard errors of the component estimates and taking the square root of the result. An example is given below.

The estimates of farm cash income are $80 522 for northern beef producers and $48 786 for southern beef producers — a difference of $31 736 — and the relative standard errors are given as 18 and 26 per cent respectively, then the standard error of the difference can be estimated as:

$$\sqrt{(18\times\$80522/100)^2+(26\times\$48786/100)^2}=\$19260$$

A 95 per cent confidence interval for the difference is:

$31 736 ± 1.96*$19 260 = (-$6 015, $69 487)

Hence, if 100 different samples are taken, in 95 of them, the difference between these two estimates is between -$6 015 and $69487. Also, since zero is in this confidence interval, it is possible to say that the difference between the estimates is not statistically significantly different from zero at the 95 per cent confidence level.

Care needs to be taken in interpreting differences in the estimates generated from the Axiom Research survey in 2005 and the 2005-06 ABARE survey due to differences in survey methodology and the way questions were asked. Also, the absence of standard errors on the Axiom Research estimates makes it difficult to assess significant differences.

5 Appendix A

In 2006 ABARE was commissioned by MLA to undertake a supplementary survey to the Australian Agricultural and Grazing Industries Survey (AAGIS) on broadacre farms to gain insights into awareness and adoption of a range of practices by producers. This appendix contains the results for two additional questions asked in the survey and is intended to be read in conjunction with the main consultancy report (Meat and Livestock Australia Management practices 2005-06) provided to the MLA in 2007. These questions are:

1. The extent to which producers perceived they could change management practices to reduce livestock production costs; and
2. Producers perceived ability to improve management of the environment.

The results are presented for 5 industry classifications:

- Southern beef producers;
- Northern beef producers;
- Southern mixed enterprise producers;
- Northern mixed enterprise producers; and
- Sheep producers.

In addition, these industries groups were divided into three sub-groups (bottom third, middle third and top third) ranked by farms' rate of return on capital, excluding capital appreciation, and again using the farms' total factor productivity. More information on these subgroups and industry definitions can be found in the main consultancy report.

Care needs to be taken in interpreting differences in the estimates generated from the Axiom Research survey in 2005 and the current ABARE survey due to differences in survey methodology and the way questions were asked.

5.1 Producers perceived ability to reduce production costs

Overall, the majority of producers in the broadacre industries perceived they had the ability to change management practices to reduce production costs, with the perceptions ranging from some to very high (tables 1 to 5). The southern beef cattle industry had the highest proportion of producers' who perceived they had a very high ability to reduce costs, while the sheep industry had the highest proportion of producers with a very low ability to reduce production costs. Producers in the sheep industry also had the greatest difficulty in providing an answer to this question, with 13 per cent of producers' being unable to provide a response. Of the producers who were unable to prove a response, those with the highest rate of return and productivity index had the most difficulty answering this question in most of the industries.

There was no statistically significant difference between producers' perceived ability to reduce production costs as rate of return or productivity increased in any of the industries reported (tables 1 to 5). However, in the southern beef and southern mixed enterprise industries there was evidence of a general increase in producers' ability to reduce costs as rate of return or productivity increased. Amongst the northern mixed enterprise farms, there is some evidence to suggest that producers' ability to reduce production costs is highest amongst farms with the lowest rate of return and productivity index.

In 2005-06, over half of beef industry producers in northern and southern Australia perceived that they had a high to very high ability to reduced production costs, a similar level to the industry average in 2004-05 (table 6). However, the proportion of producers in the sheep industry who perceived that they had a very high ability to reduce production costs was three times higher in 2005-06 than was estimated in 2004-05 (table 7).

5.2 Producers perceived ability to improve management of the environment

Between 60 and 70 per cent of broadacre producers' indicated that they highly or very highly perceived their ability to improve their management of the environment (tables 1 to 5). The proportion was highest in the northern beef industry in 2005-06, at 73 per cent of producers, well above the industry average of 60 per cent observed in 2004-05 (table 6). The proportion of producers indicating that they very highly perceived there ability to improve their management of the environment appears to have increased in 2005-06, relative to what was observed in the 2004-05 survey (table 7).

In 2005-06, there was no statistically significant link between producers' perceived ability to improve management of the environment as rate of return or productivity increased in any of the industries reported. However, the results indicate that there may be a general increase in producers' perceived ability to better manage the environment in southern Australia as rate of return and productivity increases.

In the Australian sheep industry and northern Australian beef industry there is no clear pattern when comparing the answers of producers with high and low returns on capital. As producers' productivity increases in the Northern beef industry, however, the proportion of producers who perceived that they had a very high ability to enhance their management of the environment increased steadily.

1 Southern beef cattle producers, 2005-06

Proportion of farms

		Bottom third		Middle third		Top third		Average	
Farms ranked by rate of return, excluding capital appreciation									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	0	(59)	0	(0)	0	(0)	0	(59)
- low	%	1	(215)	0	(0)	0	(171)	0	(198)
- some	%	52	(19)	44	(26)	37	(19)	44	(13)
- high	%	37	(24)	19	(27)	50	(17)	35	(12)
- very high	%	9	(50)	28	(34)	11	(44)	16	(24)
- no response	%	1	(204)	10	(68)	2	(95)	4	(58)
Producers perceived ability to improve management of the environment									
- very low	%	0	(0)	0	(0)	0	(0)	0	(0)
- low	%	0	(0)	1	(69)	0	(0)	0	(69)
- some	%	48	(27)	23	(52)	21	(38)	30	(21)
- high	%	42	(29)	33	(35)	64	(15)	46	(14)
- very high	%	9	(50)	33	(38)	13	(40)	19	(26)
- no response	%	1	(204)	10	(68)	2	(95)	4	(58)
Farms ranked by total factor productivity index									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	0	(82)	0	(0)	0	(0)	0	(82)
- low	%	1	(212)	0	(58)	0	(0)	0	(194)
- some	%	44	(31)	41	(35)	47	(24)	44	(17)
- high	%	50	(28)	26	(31)	31	(30)	35	(17)
- very high	%	4	(56)	23	(46)	21	(44)	16	(30)
- no response	%	2	(115)	10	(74)	1	(107)	4	(60)
Producers perceived ability to improve management of the environment									
- very low	%	0	(0)	0	(0)	0	(0)	0	(0)
- low	%	0	(0)	1	(75)	0	(0)	0	(75)
- some	%	40	(39)	37	(35)	14	(50)	30	(24)
- high	%	54	(29)	35	(21)	50	(26)	46	(15)
- very high	%	4	(56)	16	(59)	35	(30)	19	(26)
- no response	%	2	(115)	10	(74)	1	(107)	4	(60)

2 Northern beef cattle producers, 2005-06

Proportion of farms

		Bottom third		Middle third		Top third		Average	
Farms ranked by rate of return, excluding capital appreciation									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	7	(96)	0	(0)	0	(93)	3	(90)
- low	%	1	(156)	6	(75)	3	(73)	3	(53)
- some	%	29	(35)	25	(28)	27	(14)	27	(16)
- high	%	49	(25)	59	(12)	59	(8)	56	(9)
- very high	%	9	(83)	2	(120)	3	(54)	5	(58)
- no response	%	5	(98)	8	(63)	8	(35)	7	(35)
Producers perceived ability to improve management of the environment									
- very low	%	0	(0)	0	(0)	1	(157)	0	(157)
- low	%	0	(0)	2	(91)	0	(0)	1	(91)
- some	%	21	(42)	15	(38)	20	(22)	19	(20)
- high	%	52	(19)	59	(18)	64	(7)	58	(8)
- very high	%	23	(31)	17	(49)	6	(50)	15	(25)
- no response	%	5	(98)	8	(63)	8	(35)	7	(35)
Farms ranked by total factor productivity index									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	7	(97)	1	(95)	0	(0)	3	(91)
- low	%	0	(0)	4	(63)	5	(74)	3	(51)
- some	%	27	(35)	18	(41)	36	(26)	27	(19)
- high	%	59	(17)	67	(12)	43	(9)	56	(8)
- very high	%	0	(98)	3	(69)	10	(75)	5	(59)
- no response	%	7	(69)	9	(52)	5	(44)	7	(33)
Producers perceived ability to improve management of the environment									
- very low	%	0	(0)	0	(0)	1	(126)	0	(126)
- low	%	0	(0)	1	(94)	1	(88)	1	(70)
- some	%	24	(37)	17	(42)	15	(28)	19	(22)
- high	%	61	(16)	57	(15)	57	(14)	58	(9)
- very high	%	8	(85)	16	(46)	21	(34)	15	(27)
- no response	%	7	(69)	9	(52)	5	(44)	7	(33)

3 Southern mixed enterprise producers, 2005-06

Proportion of farms

		Bottom third		Middle third		Top third		Average	
Farms ranked by rate of return, excluding capital appreciation									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	0	(0)	3	(63)	1	(107)	1	(55)
- low	%	2	(70)	3	(56)	5	(43)	3	(30)
- some	%	53	(11)	27	(22)	20	(15)	33	(9)
- high	%	40	(13)	50	(10)	56	(9)	49	(6)
- very high	%	2	(64)	10	(30)	9	(43)	7	(24)
- no response	%	3	(109)	8	(43)	10	(29)	7	(25)
Producers perceived ability to improve management of the environment									
- very low	%	0	(0)	0	(0)	1	(107)	0	(107)
- low	%	0	(124)	0	(92)	1	(116)	1	(80)
- some	%	45	(16)	20	(28)	15	(19)	27	(12)
- high	%	49	(13)	62	(8)	60	(9)	57	(6)
- very high	%	3	(53)	10	(31)	12	(33)	8	(21)
- no response	%	3	(109)	8	(43)	10	(28)	7	(25)
Farms ranked by total factor productivity index									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	0	(99)	2	(73)	1	(101)	1	(54)
- low	%	1	(121)	6	(34)	3	(49)	3	(28)
- some	%	47	(11)	30	(15)	23	(17)	33	(8)
- high	%	46	(11)	46	(10)	55	(10)	49	(6)
- very high	%	5	(26)	5	(38)	12	(34)	7	(22)
- no response	%	1	(60)	11	(33)	7	(39)	7	(24)
Producers perceived ability to improve management of the environment									
- very low	%	0	(0)	1	(107)	0	(0)	0	(107)
- low	%	0	(126)	2	(79)	0	(0)	1	(68)
- some	%	42	(16)	21	(21)	18	(20)	27	(11)
- high	%	54	(13)	59	(8)	59	(9)	57	(6)
- very high	%	3	(78)	7	(32)	16	(29)	8	(22)
- no response	%	1	(60)	11	(33)	8	(39)	7	(24)

4 Northern mixed enterprise producers, 2005-06

Proportion of farms

		Bottom third		Middle third		Top third		Average	
Farms ranked by rate of return, excluding capital appreciation									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	0	(403)	1	(128)	2	(81)	1	(72)
- low	%	10	(99)	13	(52)	6	(49)	10	(42)
- some	%	29	(43)	28	(25)	42	(26)	33	(18)
- high	%	49	(15)	40	(20)	37	(28)	42	(12)
- very high	%	11	(73)	16	(42)	6	(60)	11	(34)
- no response	%	0	(291)	3	(59)	7	(45)	4	(36)
Producers perceived ability to improve management of the environment									
- very low	%	0	(0)	6	(80)	0	(0)	2	(80)
- low	%	10	(91)	0	(0)	3	(54)	4	(71)
- some	%	21	(58)	27	(23)	34	(30)	27	(20)
- high	%	69	(14)	51	(16)	48	(22)	56	(10)
- very high	%	0	(0)	13	(50)	8	(46)	7	(36)
- no response	%	0	(291)	3	(55)	7	(45)	4	(35)
Farms ranked by total factor productivity index									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	0	(134)	0	(0)	3	(46)	1	(43)
- low	%	6	(91)	15	(43)	8	(61)	10	(33)
- some	%	29	(46)	37	(24)	33	(29)	33	(19)
- high	%	49	(27)	31	(30)	45	(21)	42	(15)
- very high	%	13	(64)	14	(45)	5	(65)	11	(34)
- no response	%	3	(205)	2	(71)	5	(51)	4	(64)
Producers perceived ability to improve management of the environment									
- very low	%	0	(0)	5	(76)	0	(0)	2	(76)
- low	%	1	(137)	9	(51)	2	(58)	4	(42)
- some	%	21	(60)	29	(29)	31	(32)	27	(22)
- high	%	73	(20)	38	(25)	58	(18)	56	(12)
- very high	%	2	(75)	16	(43)	3	(87)	7	(36)
- no response	%	3	(205)	3	(66)	5	(51)	4	(63)

5 Sheep producers, 2005-06

Proportion of farms

		Bottom third		Middle third		Top third		Average	
Farms ranked by rate of return, excluding capital appreciation									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	8	(56)	2	(103)	1	(115)	4	(45)
- low	%	1	(116)	13	(67)	12	(71)	9	(48)
- some	%	31	(42)	22	(48)	18	(12)	23	(23)
- high	%	44	(24)	41	(19)	43	(18)	42	(12)
- very high	%	6	(83)	10	(27)	10	(34)	9	(24)
- no response	%	11	(61)	11	(45)	15	(60)	13	(33)
Producers perceived ability to improve management of the environment									
- very low	%	4	(101)	0	(0)	0	(0)	1	(101)
- low	%	1	(116)	9	(63)	10	(76)	7	(48)
- some	%	26	(44)	13	(69)	15	(33)	18	(28)
- high	%	53	(20)	57	(21)	48	(16)	53	(11)
- very high	%	6	(79)	9	(29)	11	(31)	9	(23)
- no response	%	11	(61)	11	(45)	15	(60)	13	(33)
Farms ranked by total factor productivity index									
Producers perceived abilility to change management practices to reduce livestock production costs									
- very low	%	10	(51)	2	(105)	0	(0)	4	(46)
- low	%	1	(90)	12	(70)	13	(63)	9	(45)
- some	%	20	(40)	33	(38)	16	(35)	23	(24)
- high	%	47	(22)	39	(21)	42	(16)	42	(11)
- very high	%	9	(56)	6	(36)	12	(40)	9	(27)
- no response	%	12	(52)	9	(60)	17	(52)	13	(32)
Producers perceived ability to improve management of the environment									
- very low	%	4	(100)	0	(0)	0	(0)	1	(100)
- low	%	1	(130)	9	(56)	9	(79)	7	(47)
- some	%	11	(49)	27	(46)	15	(38)	18	(29)
- high	%	61	(16)	49	(24)	49	(16)	53	(11)
- very high	%	11	(46)	7	(38)	9	(30)	9	(23)
- no response	%	12	(52)	9	(60)	17	(52)	13	(32)

6 Beef industry, 2004-05 and 2005-06

Proportion of farms

		2004-05		2005-06			
				Northern		Southern	
Producers perceived abilility to change management practices to reduce livestock production costs							
- very low	%	2	(74)	3	(90)	0	(59)
- low	%	7	(44)	3	(53)	0	(198)
- some	%	37	(13)	27	(16)	44	(13)
- high	%	42	(12)	56	(9)	35	(12)
- very high	%	11	(31)	5	(58)	16	(24)
- no response	%	ns		7	(35)	4	(58)
Producers perceived ability to improve management of the environment							
- very low	%	0	(95)	0	(157)	0	(0)
- low	%	5	(57)	1	(91)	0	(69)
- some	%	35	(14)	19	(20)	30	(21)
- high	%	47	(9)	58	(8)	46	(14)
- very high	%	13	(27)	15	(25)	19	(26)
- no response	%	ns		7	(35)	4	(58)

ns not supplied

7 Sheep industry, 2004-05 and 2005-06

Proportion of farms

		2004-05		2005-06	
Producers perceived abilility to change management practices to reduce livestock production costs					
- very low	%	2	(83)	0	(0)
- low	%	5	(53)	0	(0)
- some	%	43	(11)	44	(26)
- high	%	41	(10)	19	(27)
- very high	%	9	(34)	28	(34)
- no response	%	ns		10	(68)
Producers perceived ability to improve management of the environment					
- very low	%	2	(73)	0	(0)
- low	%	4	(57)	1	(69)
- some	%	38	(13)	23	(52)
- high	%	46	(10)	33	(35)
- very high	%	9	(28)	33	(38)
- no response	%	ns		10	(68)

ns not supplied