

## Drivers for uptake of environmental management systems by pastoralists in western Queensland

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**Abstract.** Pastoralists from 37 beef cattle and sheep properties in western Queensland developed and implemented an environmental management system (EMS) over 18 months. The EMS implemented by them was customised for the pastoral industry as part of a national EMS pilot project, and staff from this project encouraged and assisted pastoralists during this trial. The 31 pastoralists surveyed at the end of the pilot project identified few benefits of EMS implementation, and these were largely associated with environmental management and sustainability. In terms of the reasons for uptake of an EMS, these pastoralists identified drivers similar to those reported in other primary industry sectors. These included improving property and environmental management, financial incentives, a range of market benefits, assistance with red tape issues, access to other training opportunities and assistance and support with the development of their EMS. However, these drivers are weak, and are not motivating pastoralists to adopt an EMS. In contrast, barriers to adoption such as the time involved in developing and implementing EMS are tangible and immediate. Given a lack of effective drivers and that pastoralists are under considerable pressure from ongoing rural adjustment processes, it is not surprising that an EMS is a low priority. It is concluded that widespread uptake and on-going use of an EMS in the pastoral industry will not occur unless pastoralists are required or rewarded for this by markets, governments, financiers, and regional natural resource management bodies.

**Additional keywords:** benefits, EMS, evaluation, pastoral industry, survey, uptake.

### Introduction

The impact of agriculture on the natural environment in Australia and overseas is being increasingly scrutinised by regulators, non-government lobby groups, the general community and markets (Brah and Schelleman 2000; Heisswolf *et al.* 2003; Ridley *et al.* 2003). For this reason, environmental management systems (EMSs) have been promoted by industry organisations and government to Australian primary producers as a mechanism they can use to achieve and demonstrate responsible use of natural resources. An EMS, as specified in the international standard ISO 14001 (Anon. 2004), is a 17-step continuous improvement cycle involving planning, implementation, checking and reviewing (Carruthers 2005). As such, an EMS specifies a process that an organisation can use to identify and control its environmental impacts, rather than specifying the environmental performance targets that the organisation must meet.

EMSs have been previously trialled in several sectors of Australian agriculture, such as cotton, rice, dairy, cereal grains, horticulture, aquaculture and viticulture (Carruthers 2003; URS 2005). Carruthers (2005) reported benefits arising from this initial implementation of an EMS, such as input cost savings, increased awareness of risks, better business management,

improved human health and safety, and improved natural resource condition, but suggested that these were difficult to evaluate in financial terms.

EMSs have also been trialled by a small number of sheep and cattle pastoralists in the Australian rangelands (Taylor 2001; Banney 2002). These authors wrote that, although these pastoralists were attracted to EMS because of its international recognition, they found it time consuming and frustrating, and in the absence of financial incentives, concluded that most pastoralists would not adopt an EMS. Other studies (Carruthers 2005; Sallur *et al.* 2007; Seymour *et al.* 2007) have also noted that factors such as a dislike of paper work, a lack of time and resources, and an aversion to formal planning, documenting and monitoring processes, have acted as barriers to the uptake or continued use of EMSs by primary producers. In the absence of effective drivers, especially rewards, these barriers will significantly limit the adoption of EMSs and other related systems by primary producers (Pahl 2007).

This paper reports some of the key findings of an EMS trial in western Queensland. Over a period of 18 months, pastoralists from 37 properties implemented EMS with assistance from staff of the Pastoral EMS pilot project (Pahl *et al.* 2006). This project was one of 15 projects funded as part of the EMS National Pilot

Program<sup>1</sup>. The EMS implemented was an abridged version of ISO 14 001 that was customised for use in the pastoral industry. It consisted of the following seven elements: environmental policy, risk assessment, objectives and targets, action plans, implementation, monitoring and management review. Together, these elements formed a continuous improvement cycle (Sallur *et al.* 2007).

All participating pastoralists were cattle and sheep producers. Their large properties (up to 100 000 ha) were mainly family-owned and operated, contained large numbers but low densities of livestock, utilised minimal agricultural inputs, and only employed casual staff or contractors for labour intensive activities such as shearing, branding and mustering (Pahl 2003).

This paper identifies the benefits and drivers of EMS uptake as reported by this group of pastoralists, and describes the likely future uptake of an EMS within the pastoral industry, based on the results of this pilot project.

## Materials and methods

During this study the main methods used to record pastoralist views on the benefits, drivers and barriers to EMS uptake were a management review and an end-of-project survey. Although pastoralists from 37 properties were implementing EMS at the time this information was collected, a small number were unable to participate in the management review and surveys.

### Management review

The EMS pilot project staff conducted a management review through face-to-face meetings with pastoralists from 32 properties, after they had spent ~1 year developing and implementing their EMS. During these meetings they were asked several questions to stimulate discussion about individual elements of their EMS and their EMS overall. Their thoughts on the benefits and barriers of EMS adoption were also recorded.

### Surveys of pastoralists

Pastoralists were surveyed using two questionnaires: one developed by the pilot project team, and the other by URS<sup>2</sup>. These were complementary questionnaires that aimed to identify the motivations, benefits and barriers of EMS implementation. These back-to-back surveys were conducted by members of the pilot project team during face-to-face meetings with individual pastoralists from 31 properties, from December 2005 to February 2006. The questions posed to pastoralists during the end-of-project surveys are provided in Appendix 1. The topics covered by these questions were:

- (1) property and business issues addressed by EMS,
- (2) factors influencing current progress with EMS development and implementation,
- (3) factors that would encourage pastoralists to use EMS in the future,
- (4) pastoralist intentions to continue using EMS, and

- (5) pastoralist recommendations for the use of EMS in their region and industry.

### Collation and analysis of survey results

Respondent answers to the open-ended questions (Q4 and Q6) were categorised by the authors. For all other questions, pastoralist responses to individual questions or parts of questions were presented as totals.

For Questions 1 and 3, a chi-square test of contingency was used to determine if the numbers of pastoralists that agreed ('agree' + 'strongly agree') with the statements provided were significantly different ( $P < 0.05$ ) to the number that disagreed ('disagree' + 'strongly disagree'). Similarly, a chi-square test was used for Question 2 to determine if the number of pastoralists that responded 'none' + 'low' was significantly different ( $P < 0.05$ ) to the number that responded 'moderate' + 'high' + 'very high' with regard to the influence of various factors on their progress with EMS implementation. A chi-square test was also used for Question 5 to determine if the numbers of pastoralists that rated a factor useful ('useful' + 'very useful') were significantly different ( $P < 0.05$ ) to the number that rated it not useful ('not at all useful' + 'slightly useful').

Questions 4, 6, 7 and 8 were not subjected to statistical analyses due to their qualitative nature or simple yes/no responses.

## Results

### Management review

Only a small number of the pastoralists interviewed during the management review noted any benefits from EMS development and implementation. These benefits included:

- (1) the risk assessment process improved their knowledge of risks and encouraged them to address these,
- (2) monitoring and keeping records was valuable,
- (3) writing objectives and targets was useful because these provided a clear focus and timeframe to work to,
- (4) documented action plans and associated results were a good reference for the future, enabling pastoralists to compare future outcomes with what they set out to do,
- (5) the planning processes improved communication between husband and wife,
- (6) the EMS process has prompted some pastoralists to seek out new technical information, including the latest research findings and industry practices, and
- (7) the continuous improvement cycle of plan, do, check and review provided a good platform to work from, and could improve particular facets of their business.

In comparison, almost all pastoralists interviewed identified barriers to EMS implementation. These included:

- (1) the environmental policy element of their EMS was liked least of all, and they could not see a benefit in writing this,
- (2) terms such as risks and causes, action plans and monitoring plans, and objectives and targets were confusing,
- (3) major risks were already known, and would have been addressed without EMS,
- (4) time was being wasted planning and documenting actions, and could be better spent working on these on their property,

<sup>1</sup>The EMSNPP was an initiative of the Natural Heritage Trust managed by the Australian Government Department of Agriculture, Fisheries and Forestry.

<sup>2</sup>URS is an environmental and engineering consultancy firm that managed the EMS National Pilot Program on behalf of the Australian Government Department of Agriculture, Fisheries and Forestry.

- (5) writing plans was painstaking and frustrating, and there was little benefit in writing plans in an environment that was constantly changing,
- (6) Pastoralists only worked on their EMS when prompted and assisted by pilot project staff,
- (7) pastoralists seemed to think that because they had written plans, their EMS was complete, and they did not recognise that EMS is an on-going process of review and improvement,
- (8) several pastoralists had written plans that they had not implemented but still considered that they had and were using an EMS,
- (9) after 12–18 months of EMS development and implementation, very few pastoralists were interested in further developing their action plans or making other changes to their EMS, and
- (10) some pastoralists had implemented the first few actions in their action plans, but the majority had found or made little time for this.

*Survey of pastoralists*

The responses of pastoralists to each of the survey questions are reported below.

Q1. Now after being through the pilot project and knowing more about EMS, do you think EMS will address the issues below?

The issues that pastoralists believed EMS helped them address on their properties were almost all sustainability and environmental issues, and were those where there was significant positive agreement (chi-square test,  $P < 0.05$ ) (Table 1). Issues included: ‘helping me to learn more about EMS’, ‘motivating me to improve my property business management’, ‘helping increase my understanding of sustainable land management’, ‘helping me to sustainably manage my property for my children or for future sale’, ‘help me to demonstrate that I manage my property sustainably’, ‘motivating me to improve my on-property environmental management’, and ‘strengthening my ability to address environmental management issues’.

In contrast, the issues that pastoralists believed EMS did not help them with were those where the agreement score was significantly negative (chi-square test,  $P < 0.05$ ) (Table 1). These were ‘helping me to reduce my production costs’, ‘helping with succession planning and inclusion of others into business management’, ‘helping improve my time management to increase time spent with family and socially’, all five product value issues, and ‘helping me avoid more stringent and prescriptive regulatory standards’.

**Table 1. The number of respondents who strongly disagreed to strongly agreed that an EMS based approach to management was currently helping them address the following issues**  
\* $P < 0.05$  (chi-square test)

	Strongly disagree (1)	Disagree (2)	Unsure (3)	Agree (4)	Strongly agree (5)	Agreement score <sup>A</sup>
<i>Farm/business management</i>						
1. Helping me to learn more about EMS	0	2	1	21	7	26*
2. Helping me to improve my property’s productivity	2	9	6	13	1	3
3. Motivating me to improve my property business management	2	4	4	15	6	15*
4. Helping me to reduce my production costs	5	15	6	3	2	-15*
5. Helping me to manage for extreme seasonal/environmental conditions	4	8	3	14	2	4
6. Helping me to reduce my costs of environmental management	3	15	4	9	0	-9
7. Helping increase my understanding of sustainable land management	2	5	4	15	5	13*
8. Helping combine my management obligations into one system	2	9	5	10	5	4
9. Helping me to sustainably manage my property for my children or future sale	2	4	4	15	6	15*
10. Helping with succession planning and inclusion of others into business mgmt	5	13	6	6	1	-11*
11. Helping improve my time mgmt to increase time spent with family or socially	7	16	5	3	0	-20*
<i>Environmental management</i>						
12. Helping maintain access to natural resources on which my business is dependent	4	10	6	7	4	-3
13. Help me to demonstrate that I manage my property sustainably	2	3	4	14	8	17*
14. Motivating me to improve my on-property environmental management	2	0	2	20	7	25*
15. Strengthening my ability to address environmental management issues	2	0	5	17	7	22*
16. Improving my property’s contribution to catchment health	3	6	9	7	6	4
<i>Product value</i>						
17. Providing an eco-label for my product that recognises my environmental mgmt	4	18	4	5	0	-17*
18. Being required by my industry	6	18	3	4	0	-20*
19. Helping my business to maintain access to current markets	6	16	3	6	0	-16*
20. Helping my business gain access to new markets	6	16	2	6	1	-15*
21. Making it possible to ask for a price premium for my products	6	16	5	3	1	-18*
<i>Red tape</i>						
22. Helping me comply with current legal and legislative requirements	2	12	5	10	2	-2
23. Helping me avoid more stringent and prescriptive regulatory standards	4	13	8	4	2	-11*
24. Helping my business get better access to government funding and services	4	9	7	9	2	-2

<sup>A</sup>Agreement score is the number of respondents that (‘agree’ + ‘strongly agree’) minus the number that (‘disagree’ + ‘strongly disagree’).

For the remaining eight issues, the responses from pastoralists were mixed, with similar numbers agreeing and disagreeing (agreement scores from 4 to -9, chi-square test,  $P > 0.05$ ).

Q2. To what extent have the following factors influenced your current progress with developing and implementing the Pastoral EMS?

Two of the factors that had significant influence scores (chi-square test,  $P < 0.05$ ), ‘meetings’ (with project staff) and ‘assistance from project staff’ (Table 2), increased producer progress with EMS development and implementation. In contrast, the other factor with a significant influence (chi-square test,  $P < 0.05$ ), ‘available time’, limited their progress. Although responses to the other factors were mixed (chi-square test,  $P > 0.05$ ), the influence scores for ‘drought’ and ‘commitment to EMS’ were close to being significant.

Q3. What reasons might encourage you to use an EMS based management system in 5–10 years?

Pastoralists had good agreement on which factors would encourage them to use EMS in 5–10 years [positive and significant agreement scores for 20 of the 24 issues listed in Table 3 (chi-square test,  $P < 0.05$ )]. Agreement scores for these issues ranged from 11 to 27. However, for the remaining four issues, pastoralists had mixed opinions on the extent to which these factors would encourage them to use EMS in 5–10 years, with low agreement scores that were not significant (chi-square test,  $P > 0.05$ ). These were ‘help me reduce my production costs’, ‘help me to reduce my costs of environmental management’, ‘help with succession planning and inclusion of others into business management’ and ‘help improve my time management to increase time spent with family and socially.’

Q4. What would encourage you to further develop your EMS?

This open-ended question prompted a wide variety of responses, with some pastoralists providing more than one answer (Fig. 1). However, the most commonly mentioned factor that would encourage further use of EMS was ‘financial incentives’, identified by 14 respondents. The next most common response, with six mentions, was ‘more assistance’ from people who could help them to develop their EMS. Following this, the

next most common responses, with four mentions each, were ‘good seasons’, ‘more time’, getting ‘recognition’ for what they were doing and if it was a ‘market requirement’. Several other factors were mentioned by three or fewer pastoralists.

Q5. On a scale of 1 to 5, rate how useful the following factors would be in encouraging you to further develop and implement the Pastoral EMS.

The usefulness scores for eight of the 11 factors listed in Table 4 were significant (chi-square test,  $P < 0.05$ ), indicating that pastoralists believed that these would encourage them to further develop and implement EMS. They included financial incentives, market benefits, national label or brand, continued assistance, industry support, business management training, continued meetings, and livestock management training.

The usefulness scores for the remaining three factors were not significant (chi-square test,  $P > 0.05$ ), suggesting that these would not encourage pastoralists to continue with EMS. These factors were ‘more information about EMS’, ‘more involvement from partner’ and ‘more direction from industry’.

Q6. Do you intend to continue using your EMS in managing your enterprise?

Twenty-seven of the 31 respondents said ‘yes’, they would continue to use EMS. When asked for reasons why they would continue using EMS, a wide range of responses were received (Fig. 2). The two most common responses were the ‘documentation’ benefits, particularly to demonstrate to others that they are looking after the environment, and ‘better management’ leading to improvements in production and the environment. ‘Marketing/financial’ reward was mentioned by five pastoralists and the ‘structural’ benefits provided by the EMS process (i.e. goal setting, action plans, records) was mentioned by four. Several other reasons were also mentioned by three or less pastoralists.

The two pastoralists that said they would not continue to use EMS believed that the time they had spent documenting their EMS was time wasted. Of the two pastoralists who said they were ‘unsure’ if they would continue to use EMS, one said they would continue if on-going assistance was provided, and the other said

**Table 2. The number of respondents who rated the following factors as having none to a very high influence on their progress with EMS development and implementation**

*\*P < 0.05 (chi-square test)*

Factors influencing progress	Ratings					Influence score <sup>A</sup>
	None	Low	Medium	High	Very high	
Access to funding	14	4	3	6	4	-5
Cost of implementation	12	5	4	6	4	-3
Available time	4	3	8	9	7	17*
Drought	6	2	2	3	18	15
Assistance from partner	7	4	7	7	6	9
Understanding of EMS process	8	5	6	9	3	5
Commitment to EMS	4	4	12	9	2	15
Group support	2	4	4	5	5	8
Meetings	4	1	7	9	10	21*
Assistance from project staff	1	1	1	17	11	27*
Other	0	0	1	3	2	n/a

<sup>A</sup>Influence score is the number of respondents that chose (‘medium’ + ‘high’ + ‘very high’) minus the number that chose (‘none’ + ‘low’).

**Table 3. The number of respondents who strongly disagreed to strongly agreed that the following reasons would encourage them to use an EMS based approach in 5–10 years**\* $P < 0.05$  (chi-square test)

	Strongly disagree (1)	Disagree (2)	Unsure (3)	Agree (4)	Strongly agree (5)	Agreement score <sup>A</sup>
<i>Farm/business management</i>						
1. Help me to learn more about EMS	4	3	6	16	2	11*
2. Help me to improve my property's productivity	1	2	6	18	4	19*
3. Motivate me to improve my property business management	1	2	6	17	5	19*
4. Help me to reduce my production costs	2	8	9	9	3	2
5. Help me to manage for extreme seasonal/environmental conditions	2	4	6	16	3	13*
6. Help me to reduce my costs of environmental management	3	5	6	15	2	9
7. Help increase my understanding of sustainable land management	3	2	3	18	5	18*
8. Help combine my management obligations into one system	3	2	6	15	5	15*
9. Help me to sustainably manage my property for my children or for future sale	2	3	6	16	4	15*
10. Help with succession planning and inclusion of others into business mgmt	4	7	7	10	3	2
11. Help improve my time mgmt to increase time spent with family or socially	5	8	10	7	1	-5
<i>Environmental management</i>						
12. Help maintain access to natural resources on which my business is dependent	1	2	6	13	9	19*
13. Help me to demonstrate that I manage my property sustainably	1	0	2	21	7	27*
14. Motivate me to improve my on-property environmental management	1	3	4	17	6	19*
15. Strengthen my ability to address environmental management issues	1	0	4	18	8	25*
16. Improve my property's contribution to catchment health	2	4	8	12	5	11*
<i>Product value</i>						
17. Provide an eco-label for my product that recognises my environmental mgmt	1	4	9	13	4	12*
18. Be required by my industry	2	2	7	15	5	16*
19. Help my business to maintain access to current markets	0	3	10	15	3	15*
20. Help my business gain access to new markets	0	2	8	17	4	19*
21. Make it possible to ask for a price premium for my products	0	6	8	13	4	11*
<i>Red tape</i>						
22. Help me comply with current legal and legislative requirements	0	2	3	22	4	24*
23. Help me avoid more stringent and prescriptive regulatory standards	1	3	6	17	4	17*
24. Help my business get better access to government funding and services	0	2	5	20	4	22*

<sup>A</sup>Agreement score is the number of respondents that ('agree' + 'strongly agree') minus the number that ('disagree' + 'strongly disagree').

that if EMS helped them to meet future legal requirements then they would also continue with it.

Of the 27 pastoralists that said they would continue using EMS, only four agreed that they might progress to ISO 14001 certification in the future; 11 said they would not, and 12 were unsure.

Q7. Have you or would you recommend this process to other farmers in your industry/regions?

Twenty-three of the 31 pastoralists said 'yes' to this question, seven said 'no' and one was uncertain. Of the pastoralists that said yes, several of them qualified this by saying, 'only if there is a benefit and this is not currently great enough'; 'it would depend on the individual' and 'I cannot think of anyone that would do it'. Of those that said they would not recommend EMS to others, one person said 'not until we can show real results', and two said 'they did not want to interfere in other people's operations'.

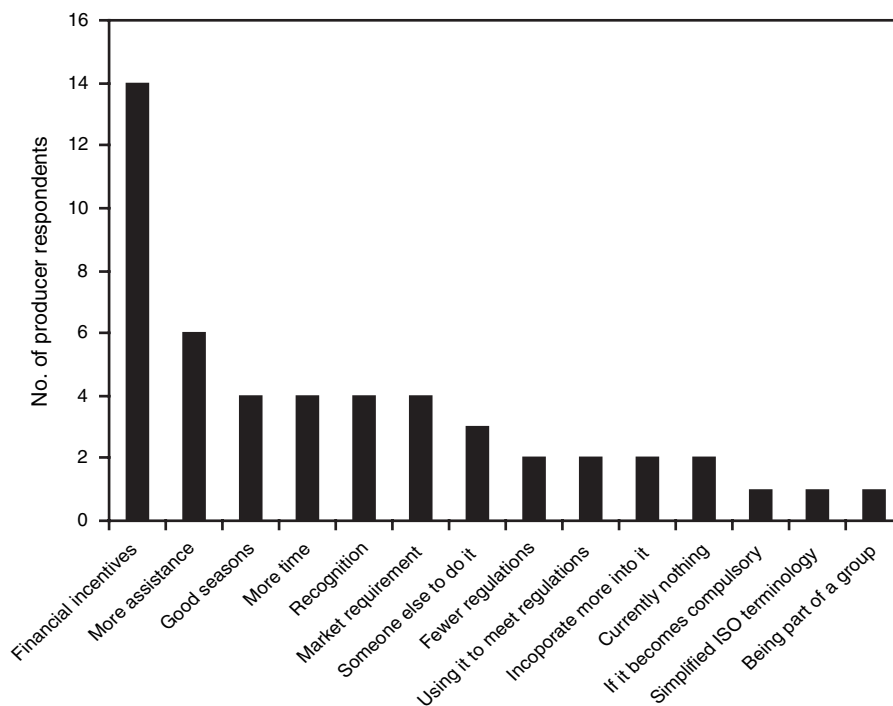
Q8. Do you think an EMS process should be promoted for widespread adoption in your industry/region?

Of the 31 pastoralists asked this question, 19 said 'yes', 11 said 'no' and one was unsure. Comments from those that said yes included that we need to do this to create uniformity across our industry, as the more pastoralists that do EMS, the better

it would be for gaining funding and government recognition. Of those that said no, some of the comments were: 'it should never be compulsory, and instead be an individual or personal management decision'; 'it is unlikely that a large number of pastoralists would take it up as it could become an expensive waste of time'; and 'there are currently not enough benefits arising from EMS, but perhaps this will change in the future if government recognised its importance'.

## Discussion

Although most pastoralists said that they would continue with EMS after the pilot project ended, their levels of interest and activity suggested otherwise. Most of them were not actively working on their EMS at the end of the project, and when they did, this only occurred with the prompting and assistance from pilot project staff. In addition to this, most pastoralists seemed to think that because they had written plans, their EMS was complete, and they did not recognise that EMS was an on-going process of review and improvement. Also, pastoralists that had not implemented their written plans still considered that they had and were using an EMS. The doubts the project team had about pastoralists continuing with EMS were confirmed in May 2007.



**Fig. 1.** Factors that would encourage further EMS development and implementation.

**Table 4.** The number of respondents who rated the usefulness of the following factors in encouraging them to further develop and implement the Pastoral EMS

\* $P < 0.05$  (chi-square test)

Encouraging factors	Ratings					Usefulness score <sup>A</sup>
	Not at all useful (1)	Slightly useful (2)	Unsure (3)	Useful (4)	Very useful (5)	
Continued meetings	6	2	4	14	5	11*
Continued assistance	1	2	4	12	12	21*
More information about EMS	8	9	5	6	3	-8
Business management training	4	3	5	14	5	12*
Livestock management training	3	5	5	14	4	10*
More involvement from partner	13	6	3	5	4	-10
Industry support	3	1	7	12	8	16*
More direction from industry	8	2	8	9	4	3
Financial incentives	1	1	1	12	16	26*
Market benefits	1	2	2	13	13	23*
National label or brand	0	2	4	9	16	23*
Other	0	0	0	2	5	n/a

<sup>A</sup>Usefulness score is the number of respondents that chose ('useful' + 'very useful') minus the number that chose ('not at all useful' + 'slightly useful').

Phone calls to 17 of the pastoralists who participated in the project found that only 2 of them had continued with their EMS since the project ended in June 2006.

*Benefits of EMS uptake*

When surveyed during this study, pastoralists identified a small number of benefits that arose from EMS implementation. These were primarily related to the sustainable and environmental

management of their properties, and were similar to the results of other national EMS pilot projects as reported by URS (2006).

In comparison, the 17 Australian and New Zealand farmers interviewed by Carruthers (2005) reported a much wider range of benefits arising from EMS implementation. These included improved financial performance, human health and safety, and communication, more confidence in management and greater

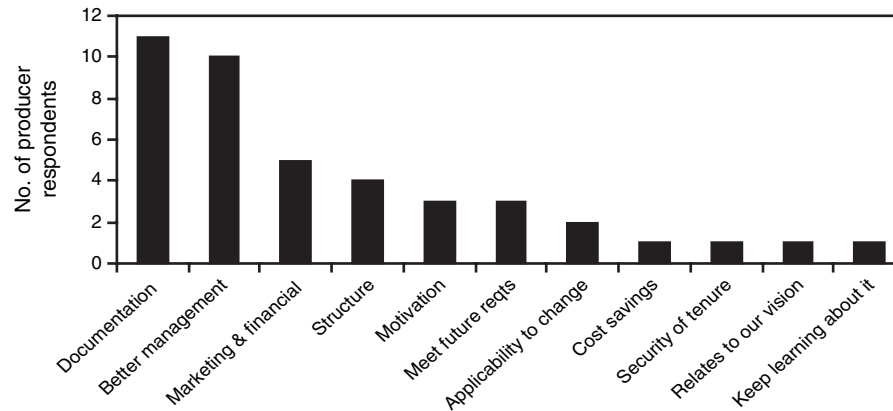


Fig. 2. Reasons identified by pastoralists for continuing to use EMS.

peace of mind, better neighbourhood/community relations, higher profits, better yields and improved stock/crop health, reduced input costs, increased market share, lower levels of risks and liabilities, and more success in obtaining finance. Of the 17 farmers interviewed, 16 operated intensive farms, including fruit and vegetables, feedlots, cereal crops, aquaculture, cotton, vineyards, tea-tree oil, and dairy cows. The remaining farm was also a comparatively intensive sheep and cattle property with cultivation in New Zealand. Compared with the low-input pastoral enterprises of western Queensland, intensive farms use much more herbicide, pesticide, fertiliser, irrigation water, and fuel, they employ more staff, modify landscapes more extensively, need to comply with more regulations, and be more mindful of their immediate neighbours.

Similarly, Steger (2000), Halkos and Evangelinos (2002) and Strachan *et al.* (2003) identified a wide range of benefits that have accrued from EMS implementation in the industrial sectors. These include more efficient use of human and other resources, financial savings, increased innovation, improved awareness of legislation and reduced incidents of non-compliance, reduced liabilities, improved company image and external recognition, improved environmental awareness and performance, increased competitive advantage through use as a marketing tool, increased motivation of employees, and a more transparent and effective organisation. The industrial sectors and intensive agriculture both have high levels of inputs, outputs, risks, and liabilities, and therefore are likely to gain more benefit from the application of an EMS compared with the pastoral industry.

#### Drivers of EMS uptake

The drivers for EMS implementation include the realised benefits described above, and the potential benefits of implementing EMS in the future. When surveyed, pastoralists identified many drivers of EMS uptake. These included improving their property and environmental management, financial incentives, a range of market benefits, assistance with red tape issues, access to other training opportunities and assistance and support with the development of their EMS. These drivers of EMS implementation are similar to those reported in other sectors of Australian agriculture (Ridley 2001; Heisswolf

*et al.* 2003; Carruthers 2005; Tee and Boland 2005; Seymour *et al.* 2007). These authors also reported the additional drivers of reduced licence fees, and tax and rate relief.

Again, the more highly geared, larger scale and potentially more environmentally-damaging industrial sectors have additional drivers, including internal business efficiencies, improved investor confidence, reduced incidents and liabilities, improved staff attitudes towards environmental management, more efficient use of staff resources, use of the continuous improvement cycle to develop innovative strategies, and reduced insurance costs (Halkos and Evangelinos 2002; Strachan *et al.* 2003).

Overall, many internal and external business benefits of EMS implementation have been reported in the intensive agricultural and industrial sectors. However, at this point in time, many of these benefits do not accrue to pastoral producers due to their small scale, low input, low risk and form of trading practices (store animals sold through auctions). Compared to the more intensive industries, the low-input pastoral industry presents significant challenges for the adoption of EMS.

#### Barriers to EMS uptake

In this study, pastoralists reported that a lack of time was the main factor that limited their development and implementation of EMS. This is not surprising, as a lack of time is commonly cited as a barrier to EMS implementation across a range of agricultural industries (Starkey 1998; Halkos and Evangelinos 2002; Carruthers 2005). Carruthers (2005) also reported that primary producers had identified the need to spend more time in the office and a fear of increased paper work as barriers to EMS implementation.

Given that the significant amounts of time required to develop and implement an EMS is a common barrier, it is not surprising that Starkey (1998) and Halkos and Evangelinos (2002) have reported that small businesses are much less likely to implement EMS compared with large companies. Large businesses can more readily afford to dedicate specialised staff to the task of EMS development and EMS implementation, which is a significant advantage over owner-operated small businesses. Thus it is not surprising that Mech (2002) noted that the small

size of many farms was a barrier to the uptake of EMS, and given that 99% of broad-acre farms in Australia are family owned and operated (Ridley 2001), the lack of time and other resources available is a significant barrier to EMS uptake in these industries. Williams *et al.* (2000) wrote that for an EMS to be suitable for small business, it must be simple, inexpensive, low maintenance, consist of minimal paperwork, and not take significant time away from production or service duties.

Although pastoralists and other primary producers have identified a lack of time as a barrier to EMS uptake, the actual underlying barrier may well be that an EMS is a low priority for them. Both Mech (2002) and Muller (2005) have noted that EMS uptake can be a low priority when farmers are under considerable pressure from ongoing rural adjustment processes. Muller (2005) wrote that EMS did not help Australian fruit and vegetable farmers deal with the immediate pressures they faced from market requirements, regulatory changes and economics. She reported that it has been difficult to introduce EMS when farmers have been responding to complex water reforms, new native vegetation management legislation, encroachment of urban areas on to farms, emerging regional natural resource management plans, drought, disease outbreaks, food safety and QA, and a competitive market place. This was similar to the situation facing pastoralists in western Queensland during the EMS trial. Without commitment, Kirkland and Thompson (1999) wrote that EMS development may not be initiated, it may be abandoned or it may become an ineffective 'paper exercise'. These authors stated that loss of commitment to EMS during its design and implementation on-farm was a common occurrence as individuals become fully aware of what is involved in the process.

During this study, pastoralists reported that EMS had not provided them with market benefits. It did not provide them with an eco-label that recognised their environmental management, and it did not help them maintain access to current markets, access new markets, or gain price premiums for their products. This lack of market-based/product-value drivers was also noted by other pilot projects in URS (2006). Given that these are some of the main factors that pastoralists said would encourage them to further develop and implement EMS, a lack of market benefits can be considered a significant barrier to EMS uptake in the pastoral and other broad-acre industries (Seymour *et al.* 2007). Tee and Boland (2005) also noted that wine and grape industry markets have not given clear signals on the need for EMS.

Other commonly reported barriers to EMS implementation in the agricultural industries are costs, the overly bureaucratic nature of the standard, confusing terminology, peer or industry disapproval, and a lack of guidance, relevant information and other resources (Starkey 1998; Halkos and Evangelinos 2002; Mech 2002; Ridley *et al.* 2003; Strachan *et al.* 2003; Carruthers 2005).

It seems that the tenets for the uptake of natural resource management technologies by Australian farmers developed by Guerin and Guerin (1994) apply particularly well to EMS implementation. They predicted that uptake would be constrained if the technologies were complex and difficult to comprehend, if the outcomes of adoption took long periods of time to emerge or were difficult to observe, if the financial costs

were high, if there was a poor perception of the technology, and if motivation was low.

#### *Future uptake of EMS in the pastoral industry*

Given the elusiveness of benefits and the strength of the barriers associated with EMS implementation, is it not surprising that there is considerable pessimism about the uptake of EMS in the pastoral and other broad-acre industries (Taylor 2001; Banney 2002; Seymour *et al.* 2007). URS (2006) also reported that there are presently insufficient drivers for EMS to provide a framework that will achieve notable increases in environmental performance and sustain EMS development and implementation.

Without external recognition or some type of financial incentives from markets, government or industry, it is unlikely that many pastoralists will make the effort to develop, document or maintain their EMS. Even with these incentives, it is likely that pastoralists will need some form of assistance, such as a structured training program, to prompt and guide their development and implementation of an EMS (Pahl *et al.* 2006).

#### **Conclusions**

The uptake and on-going implementation of EMS by pastoralists in western Queensland will be largely reliant on external drivers. However, obvious external drivers, such as pastoralists being required and/or rewarded for having an EMS by markets, governments, financiers, and regional natural resource management bodies, do not exist. Therefore, current circumstances do not favour the uptake and on-going use of EMS in this industry. At this time, there are few net benefits of adopting EMS in the mainstream pastoral industry.

To a limited extent, and for a short period of time, this can be alleviated by government agency and industry organisation promotion of EMS and the provision of free training and development assistance to producers. However, only a small proportion of producers, probably less than 10%, are likely to take up EMS as a result of this activity, and in the absence of external rewards, it is likely that implementation would falter soon after training and assistance ceased.

At this time, when financial, market and regulatory drivers are weak, it seems that the uptake and continued use of EMS will be limited to the relatively small number of motivated pastoralists who value the internal business benefits of continually documenting and reviewing their management, and who have a strong personal desire to improve their environmental management.

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## Appendix 1

### The questions used during the end-of-project survey of pastoralists

Q1. Now after being through the pilot project and knowing more about EMS, do you think EMS will address the issues below? (Tick one of the boxes from 1–5; 1 = strongly disagree, 2 = disagree, 3 = neither agree or disagree, 4 = agree, 5 = strongly agree)

#### Farm/Business Management

1. Help me learn more about EMS
2. Help me improve my property's productivity
3. Motivate me to improve my property business management
4. Help me to reduce my production costs
5. Help me to manage for extreme seasonal/environmental conditions
6. Help me to reduce my costs of environmental management
7. Help increase my understanding of sustainable land management
8. Help combine my management obligations into one system (such as QA, OH&S)
9. Help me sustainably manage my property for my children, or for future sale
10. Help with succession planning and inclusion of others into the business mgt
11. Help improve my time management to increase time spent with family, or socially

#### Environmental Management

12. Help maintain access to natural resources on which my business is dependent e.g. leasehold, vegetation, water
13. Help me demonstrate that I manage my property sustainably
14. Motivate me to improve my on-property environmental management
15. Strengthen my ability to address environmental management issues
16. Improve my property's contribution to catchment health

#### Product Value

17. Provide an eco-label for my product that recognises my environmental mgt
18. Be required by my industry
19. Help my business to maintain access to current markets
20. Help my business to gain access to new markets
21. Make it possible to ask for a price premium for my products

#### Red Tape

22. Help me comply with current legal and legislative requirement
23. Help me avoid more stringent and prescriptive regulatory standards
24. Help my business to get better access to government funding and services

Q2. To what extent have the following factors influenced your current progress with developing and implementing the Pastoral EMS? (Please rate on a scale of 1–5; 1 = none, 2 = low, 3 = medium, 4 = high, 5 = very high).

- a) Access to funding for on ground works
- b) Available time
- c) Cost of implementation
- d) Drought
- e) Understanding of the EMS process
- f) Group support (groups only)
- g) Commitment to EMS
- h) Assistance from partner
- i) Assistance from project staff
- j) Meeting schedule
- k) Other (please specify)

Q3. What reasons might encourage you to use an EMS based management system in 5–10 Years? (Tick one of the boxes from 1–5.)  
The options for this question were the same as those presented in Q1 above.

Q4. What would encourage you to further develop your EMS?

Q5. On a scale of 1–5, rate how useful the following factors would be in encouraging you to further develop and implement the Pastoral EMS. (1 = not at all useful, 2 = slightly useful, 3 = unsure, 4 = useful, 5 = very useful.)

- a) Continued, organised meetings
- b) Continued assistance from project staff

- c) Industry support (financial)
- d) More involvement from partner
- e) More information about EMS
- f) More direction from industry
- g) Business management training
- h) Livestock management training
- i) Market benefits
- j) Financial incentives
- k) A national program that has a national label or brand (such as a green tick)
- l) Other (please specify)

Q6. Do you intend to continue using your EMS in managing your enterprise? (Yes/Not sure/No). Then give reasons why or why not? If you answered yes, do you think you might progress to ISO 14 001 certification in the future? (Yes/Not sure/No).

Q7. Have you or would you recommend this process to other farmers in your industry/region? (Yes/No).

Q8. Do you think an EMS process should be promoted for widespread adoption in your industry/region? (Yes/No).