

# Adoption of environmental assurance in pastoral industry supply chains – market failure and beyond

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**Abstract.** This paper describes adoption rates of environmental assurance within meat and wool supply chains, and discusses this in terms of market interest and demand for certified ‘environmentally friendly’ products, based on phone surveys and personal interviews with pastoral producers, meat and wool processors, wholesalers and retailers, and domestic consumers. Members of meat and wool supply chains, particularly pastoral producers, are both aware of and interested in implementing various forms of environmental assurance, but significant costs combined with few private benefits have resulted in low adoption rates. The main reason for the lack of benefits is that the end user (the consumer) does not value environmental assurance and is not willing to pay for it. For this reason, global food and fibre supply chains, which compete to supply consumers with safe and quality food at the lowest price, resist public pressure to implement environmental assurance. This market failure is further exacerbated by highly variable environmental and social production standards required of primary producers in different countries, and the disparate levels of government support provided to them. Given that it is the Australian general public and not markets that demand environmental benefits from agriculture, the Australian government has a mandate to use public funds to counter this market failure. A national farm environmental policy should utilise a range of financial incentives to reward farmers for delivering general public good environmental outcomes, with these specified and verified through a national environmental assurance scheme.

## Introduction

As defined by Pahl and Sharp (2007), the various combinations of environmental standards and auditing procedures, collectively referred to as environmental assurance, determine the credibility of assurances that accompany environmental claims about organisations and products. Consequently, environmental assurances based on international standards and independent certification have a high level of credibility, whereas the credibility of self-declarations made without reference to a widely agreed standard is low.

The most common form of environmental assurance promoted to Australian agricultural supply chains has been Environmental Management Systems (EMS). This commenced in the late 1990s (Carruthers and Tinning 1999) and intensified recently through the National EMS Pilot and Pathways to Industry EMS Programs (<http://www.daff.gov.au/ems>, verified 25 October 2006). However, at this stage, the level of uptake of EMS by farmers and other members of supply chains has been low, particularly in the broad-acre sectors of livestock and grain (Banney 2002; Thomson 2004; Sallur *et al.* 2007; Seymour *et al.* 2007). Although benefits of EMS implementation such as input cost savings, increased awareness of risks, and improvements in business management, human health and safety, and natural resource condition have been reported (Carruthers 2005; Sallur *et al.* 2007), these have been difficult to assess in financial terms (Carruthers 2005). Overall, the current internal business benefits arising from EMS implementation have not motivated primary producers to adopt this form of environmental assurance.

Ridley (2001) reported low adoption rates for farm environmental assurance programs in other countries, with 1% of farmers in the United States of America (USA) implementing Farm\*A\*Syst and less than 10% of farmers in the United Kingdom (UK) implementing LEAF (Linking Environment and Farm). In comparison, Ridley (2001) also reported that participation rates can increase markedly where a financial incentive is provided, noting that 43% of farmers in Canada implemented the Ontario Environmental Farm Plan, having been encouraged to do so by a government incentive payment of CAD\$1500.

In addition to incentive payments, market advantages such as maintaining or increasing market access, market share and product price may also encourage farmer adoption of environmental assurance (Cary *et al.* 2004; Toyne *et al.* 2004; Twyford-Jones *et al.* 2005; Sallur *et al.* 2007). This market-driven environmental assurance can be pursued at the consumer level using environmental labels, including the Type I or ISO 14024 (Anon. 1999a) environmental label referred to as an eco-label (Mech and Young 2001), or at the retailer or wholesaler level using standards such as EurepGAP ([http://www.eurepgap.org/Languages/English/index\\_html](http://www.eurepgap.org/Languages/English/index_html), verified 25 October 2006).

Stakeholders, including rangeland graziers, domestic consumers, members of supply chains, and environmental, consumer and industry organisations, expect environmental assurance to play an important role in improving the environmental, economic and social outcomes of Australian if not global agriculture, and many have well-developed views on

how this will occur (Pahl and Sharp 2007). This paper explores pastoral producer preparedness to adopt the form of environmental assurance required by key stakeholders and the extent to which markets can drive this. The aims of this paper are to describe and discuss:

- (i) Australian pastoral producer interest in environmental assurance and perceived advantages and disadvantages,
- (ii) the propensity for Australian consumers and meat and wool supply chains to drive the adoption of environmental assurance on livestock properties, and
- (iii) what is required by consumers and supply chains before they will adopt environmental assurance.

### Methods

The following sections describe the methods employed to record pastoral producer opinions on and requirements for adopting environmental assurance, and meat and wool supply chain and consumer interest in and demand for environmental assurance. The questions below that were posed to producers, supply chain companies and consumers are different to and in addition to those addressed by Pahl and Sharp (2007). As well as providing more detailed descriptions of the methods used to record stakeholder requirements, Pahl and Sharp (2007) note that because of the different survey instruments, including quantitative and qualitative surveys, different questions, and variable and often low sample sizes, qualitative comparisons rather than statistical analyses were used to compare stakeholder responses.

#### *Pastoral producer survey*

The methods used by ACNielsen to conduct a national phone survey of 300 pastoral producers throughout the rangelands of Australia are summarised by Pahl and Sharp (2007), and described in detail by Pahl (2003). Accreditation rather than certification or assurance was used in questions during the pastoral producer survey because this term was widely used by them in association with their industry quality assurance schemes. Focus groups run with producers before questionnaire design found that they used 'environmental accreditation' as a generic term for environmental standards and auditing procedures, and in this way it was equivalent with environmental assurance.

The questions posed to pastoral producers that are addressed in this paper were as follows.

- (i) Have you heard of environmental accreditation before today?
- (ii) Are you aware of the following accreditation schemes that can be used by graziers to produce quality assured or 'environmentally friendly' food and fibre?
  - (A) Organic certification
  - (B) Environmental Management Systems (also called EMS)
  - (C) Quality assurance schemes such as Flockcare and Cattlecare
  - (D) European Union (EU) accreditation
  - (E) Green Tick
  - (F) Environmental labelling
  - (G) ISO 14000
  - (H) Other (Specify)

- (iii) What do you consider could be the potential benefits of environmental accreditation for rangeland pastoral industries?
- (iv) What do you consider could be the potential disadvantages of environmental accreditation for rangeland pastoral industries? (After answering question (iv), respondents were provided with a definition of the term environmental accreditation, being 'a voluntary scheme for managing the environment, where a producer is accredited under the scheme if their environmental efforts and achievements comply with an industry standard'.)
- (v) What is your personal level of interest in environmental accreditation for the rangelands? Would you say you are:
  - (A) Not interested, as these schemes are not suitable for the rangelands
  - (B) Not interested, as these schemes will not work on my property, but may be suitable for other properties in the rangelands
  - (C) Interested, and would like to know more
  - (D) Would like to implement a scheme on my property
- (vi) What would you need or need to see happen before you implement an environmental accreditation scheme on your property?
- (vii) How likely is it that you would implement an environmental accreditation scheme if government provided you with an incentive of \$3000?
  - (A) Very likely
  - (B) Quite likely
  - (C) Not very likely
  - (D) Not at all likely
  - (E) Don't know
- (viii) How likely is it that you would implement an environmental accreditation scheme if you were given some assistance with training and work materials?
  - (A) Very likely
  - (B) Quite likely
  - (C) Not very likely
  - (D) Not at all likely
  - (E) Don't know
- (ix) How likely is it that you would implement an environmental accreditation scheme if there was substantial consumer demand for 'environmentally friendly' products?
  - (A) Very likely
  - (B) Quite likely
  - (C) Not very likely
  - (D) Not at all likely
  - (E) Don't know

#### *Domestic consumer survey*

The market research company, ACNielsen, conducted a national phone survey of 605 domestic consumers, covering regional and urban areas of each state and territory. The methods used in this survey are summarised by Pahl and Sharp (2007), and more detail is provided by MacNamara and Pahl (2004).

The questions that were posed to them that are addressed in this paper were as follows.

- (i) Which of the following terms best describes food that is 'environmentally friendly'?

- (A) Organic
  - (B) Natural and healthy
  - (C) No chemicals
  - (D) Produced with less harm to the environment
  - (E) Recycled
  - (F) Reduced impact of waste
  - (G) Don't know
- (ii) What 'environmentally friendly' food items do you buy?
  - (iii) If you were to buy 'environmentally friendly' meat what would be the main reason you would buy it?
    - (A) It's good for me
    - (B) It's good for the environment
    - (C) It's value for money
    - (D) Or some other reason (specify)
    - (E) Would not buy it
  - (iv) What are the factors that would stop you from buying 'environmentally friendly' food products?
  - (v) How likely are you to buy meat with an 'environmentally friendly' guarantee if it is the same price as your regular meat purchases?
    - (A) Very likely
    - (B) Quite likely
    - (C) Not at all likely
    - (D) Don't know
  - (vi) If a regular cut of meat is \$10.00 per kg, how likely would you be to purchase meat with an 'environmentally friendly' guarantee if it was \$12.50 per kg?
    - (A) Very likely
    - (B) Quite likely
    - (C) Not at all likely
    - (D) Don't know
  - (vii) If a regular cut of meat is \$10.00 per kg, how likely would you be to purchase meat with an 'environmentally friendly' guarantee if it was \$11.00 per kg?
    - (A) Very likely
    - (B) Quite likely
    - (C) Not at all likely
    - (D) Don't know

#### *Domestic meat supply chain interviews*

Representatives from 14 meat supply chain companies were interviewed in accordance with the methodology summarised by Pahl and Sharp (2007), with more detail provided by Twyford-Jones *et al.* (2005). Businesses included abattoirs (domestic and export), wholesalers (domestic and export) and major retailers across Queensland, New South Wales and Victoria.

Questions asked of these meat supply chain companies addressed in this paper were as follows.

- (i) At this time, do you have specifications for livestock or meat that the production system is capable of influencing?
- (ii) Do you have a procedure or system in place for communicating your production specifications to your meat suppliers?
- (iii) How do your suppliers of meat assure you that they have met your production specifications?
- (iv) Are your direct customers expressing a desire for particular characteristics of meat?

- (v) Are your direct customers showing an interest in environmental issues related to the production of meat?
- (vi) Do you see branding opportunities for Australian meat to become recognised by your customers as certified 'environment friendly' now or in the future?

#### *International meat supply chain interviews*

Members of meat supply chains in Japan, the European Union and the United States were interviewed to ascertain their interest and requirements for environmental assurance. The methods are detailed by Twyford-Jones *et al.* (2005).

#### *Japan*

Personal interviews were conducted during August 2002 with 18 businesses that trade in meat. As with most market research, respondents were told that their identities would remain confidential, and, therefore, the names of these businesses cannot be reported. However, of the 18 businesses interviewed, eight were importers and distributors, four were consumer cooperatives, two were super-market chains, two were restaurant chains, one was a delicatessen and one was a hotel chain. Questions asked of these meat supply chain companies that are addressed in this paper were as follows.

- (i) What are the characteristics of meat, meat production and meat supply that are most important to you?
- (ii) Please give a brief explanation of the assurance schemes that your current suppliers have to abide by?
- (iii) Do your assurance specifications include environmental specifications?
- (iv) Do you stock any 'environmentally friendly' or eco-label meat and how much?
- (v) Do you currently stock or are you interested in stocking products that carry a national or international eco-label? Why or why not?
- (vi) What is your opinion of EMS or some other form of environmental assurance for assuring that your production specifications are being met?
- (vii) Do you see market opportunities for Australian meat that carries an environmental or eco-label? Should it also address other attributes such as quality?

#### *European Union*

Personal interviews were conducted in March 2002 with Corimex, a large lamb importer and wholesaler in Belgium; Sheed Global, an importer and wholesaler of Australian beef in the UK; Sainsbury's, a large UK supermarket chain; the UK government Food Standards Agency; and the LEAF (Linking Environment and Farms) organisation in the UK. The questions used during the Japanese company interviews, except for question (v), were also used during interviews with these companies or organisations from the European Union.

#### *USA*

The Austrade office in Los Angeles interviewed four leading beef and lamb importers and wholesalers in the United States in January 2003. The four businesses were the Australian Lamb Co., Pilot Brands, Foodcomm International, and Superior Farms. Interviews were conducted by phone, and as Austrade

believed that interviews would need to be kept brief, these were restricted to the following three questions.

- (i) Do you trade in any form of environmentally assured meat and are you aware of other companies trading in this type of product?
- (ii) Do your customers differentiate between certified organic, naturally produced and environmentally assured meat?
- (iii) What is the extent of demand from customers and consumers for environmentally assured meat products?

*Domestic wool supply chain interviews*

The methods used to interview 13 members of wool supply chains, including brokers, scourers, top-makers, spinners, weavers, knitters, product manufacturers and retailers, are summarised by Pahl and Sharp (2007), and details are provided by Twyford-Jones *et al.* (2005).

Questions asked of these wool supply chain companies addressed in this paper were as follows.

- (i) How would you rate the influence of environmental issues on your decisions to buy, process or sell wool?
- (ii) How would you rate the influence of environmental specifications on the wool purchasing decisions of your current direct customers?
- (iii) Do your customers include environmental specifications when placing orders for wool? If yes what are they?
- (iv) Are you familiar with the purpose and processes of environmental assurance systems?
- (v) Does your organisation have an environmental assurance system in place? If yes, what system?
- (vi) What factors have motivated you or would motivate you to implement an environmental assurance system for your business?
- (vii) Would an environmental assurance system assist your business to maintain current customers or attain new customers?
- (viii) Do you see market opportunities for Australian wool to become recognised by our major customers as certified ‘environment friendly’?

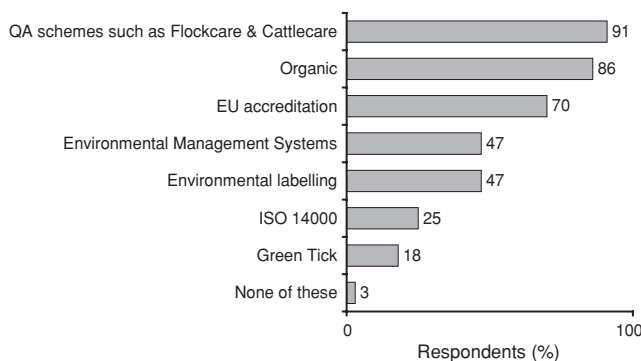
**Results**

*Pastoral producer survey*

The first four questions were posed to producers before any definition of environmental accreditation was provided to them, so as not to bias their responses on awareness and understanding of this term. When asked whether they had previously heard of the term ‘environmental accreditation’, 40% cent of pastoral producers said yes, 59% said no, and 1% were not sure.

They reported their awareness of a range of accreditation schemes that can be used for quality assurance and the environment (Fig. 1). ‘Quality assurance schemes such as Flockcare and Cattlecare’, ‘organic certification’ and ‘European Union (EU) accreditation’ were all very well known. Almost half of the respondents reported awareness of ‘Environmental Management Systems (EMS)’ and ‘environmental labelling’, dropping to 25% for ‘ISO 14000’.

When asked to identify the potential benefits of environmental accreditation for rangeland pastoral industries,



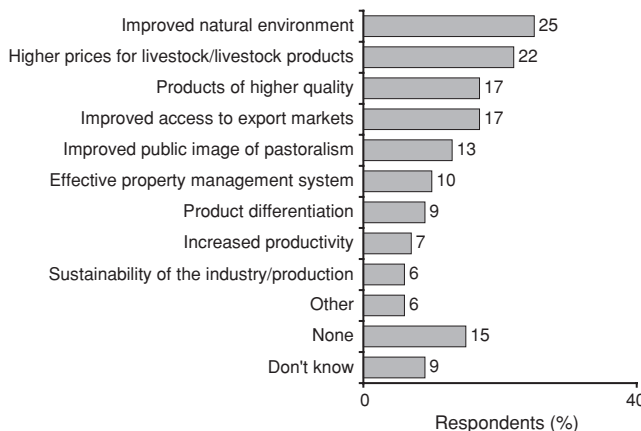
**Fig. 1.** National pastoral producer awareness of quality and environmental accreditation schemes.

76% of respondents identified one or more benefits (Fig. 2). No single potential benefit was dominant, although an improved natural environment and higher prices were raised by 25 and 22% of respondents, respectively. Pastoral producers also identified several potential business benefits, including higher quality products, improved market access and effective property management.

Pastoral producers were then asked to identify potential disadvantages of environmental accreditation for rangeland pastoral industries (Fig. 3), and 71% identified at least one potential disadvantage, with increased costs, more regulations and less flexibility being most common. Overall, most of the disadvantages identified fell into the categories of increased costs and more regulations or scrutiny.

At this stage of the survey, pastoral producers were provided with a definition of environmental accreditation, so that their responses after this question were all informed by and made in the context of a single definition. Respondents were then asked to rate their personal level of interest in this. The dominant response was they were ‘interested and would like to know more’ – only 26% were not interested (Fig. 4).

Pastoral producers identified several requirements that need to be satisfied before they would implement environmental



**Fig. 2.** Potential benefits of environmental accreditation identified by pastoral producers during the national survey.

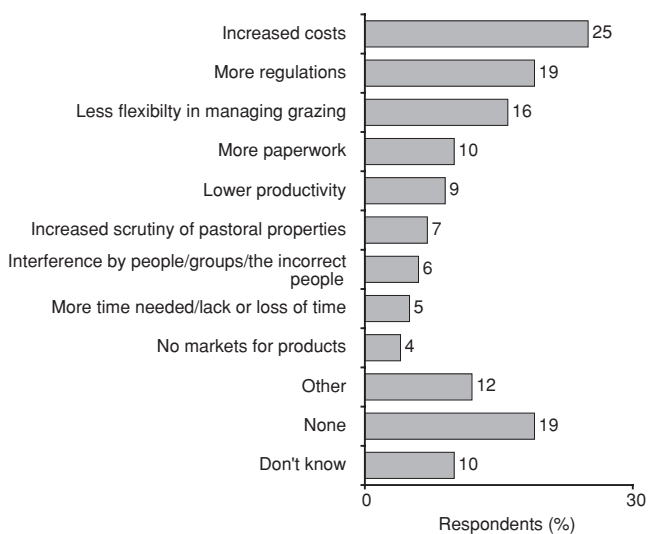


Fig. 3. Potential disadvantages of environmental accreditation identified by pastoral producers during the national survey.

accreditation (Fig. 5). The two key requirements are demonstration of advantages and more details on what is expected. Furthermore, most other requirements are related to economic returns and viability.

Respondents were then asked their likelihood of implementing environmental accreditation if they were provided with a \$3000 incentive, training and work materials, and if there was substantial consumer demand (Fig. 6). Almost half of the pastoralists said they were ‘very likely’ to adopt environmental accreditation if there was substantial consumer demand, falling to less than a quarter if given assistance or a \$3000 incentive. However, many respondents indicated they were ‘quite likely’ or ‘very likely’ to implement environmental accreditation if given assistance or a government incentive.

Domestic consumer survey

When consumers were asked which of the following terms best describes food that is ‘environmentally friendly’, 33% chose ‘organic’, 23% chose ‘no chemicals’, 19% chose ‘natural and healthy’, and 17% chose ‘produced with less harm to the environment’. Only 3% chose ‘reduced impact of waste’ and ‘recycled’.

When asked ‘what environmentally friendly foods do you buy’, consumers reported a wide range of products, with free

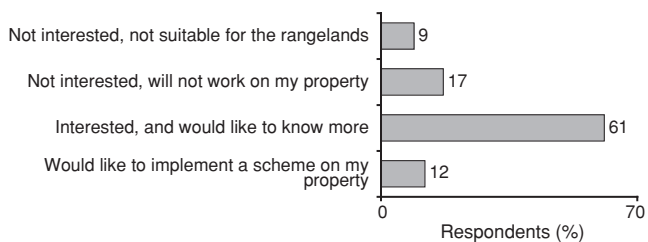


Fig. 4. Personal level of interest of pastoral producers in the application of environmental accreditation in the rangelands.

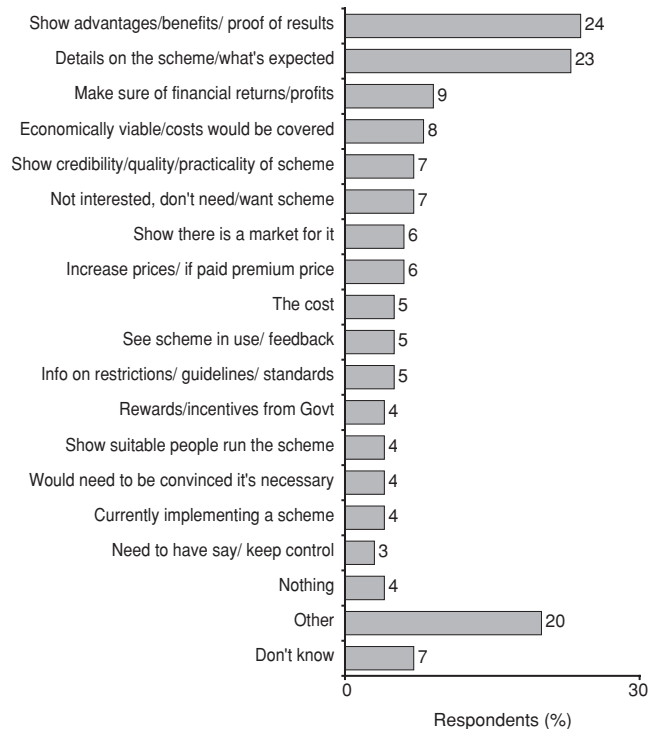


Fig. 5. Responses of pastoral producers to the question what do they require before implementing an environmental accreditation scheme.

range eggs, organic fruit and vegetables, and fresh and in season fruit and vegetables being the most common (Fig. 7).

Fifty-five per cent of consumers chose ‘it’s good for me’ as the main reason they would buy ‘environmentally friendly’ meat. About a quarter (26%) of consumers chose ‘it’s good for the environment’, 15% chose ‘it’s value for money’, 3% had other reasons, and 1% ‘would not buy’ this type of meat.

When asked what are the factors that would stop them from buying ‘environmentally friendly’ food products, 68% of consumers, by far the most common response, nominated price or expense (Fig. 8). Availability (15%) and quality (10%) were the next most common answers, and all other responses were less than 10%.

Consumers were then asked how likely they were to buy meat with an ‘environmentally friendly’ guarantee if it was the same price as their regular meat purchases. Eighty-two per cent of consumers said they would be ‘very likely’ to purchase ‘environmentally friendly’ meat if it was the same price, dropping to 60% if it was \$1.00 per kilogram more, and to 35%

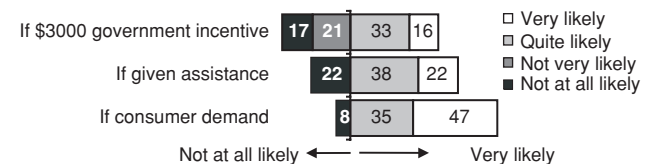


Fig. 6. Likelihood of pastoral producers implementing environmental accreditation (numbers shown within bars are percentages; the undecided respondents, ranging from 10 to 18%, are not included).

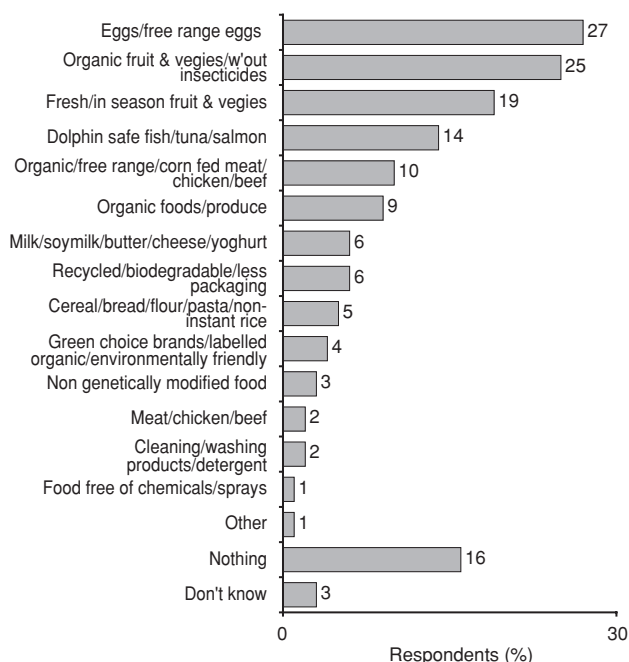


Fig. 7. Products purchased that are identified as 'environmentally friendly' by Australian consumers.

if it was \$2.50 per kilogram more (Fig. 9). Even with \$1.00 and \$2.50 per kilogram price premiums, more consumers said they were still 'quite likely' to buy the meat than those that said they were 'not at all likely'.

ACNielsen, who conducted this consumer survey, noted that consumers tend to overestimate their actual purchasing behaviour during interviews. To provide more realistic estimates of actual purchasing rates, reported consumer demand was adjusted downwards using an equation developed by ACNielsen. The equations applied to the data are as follows.

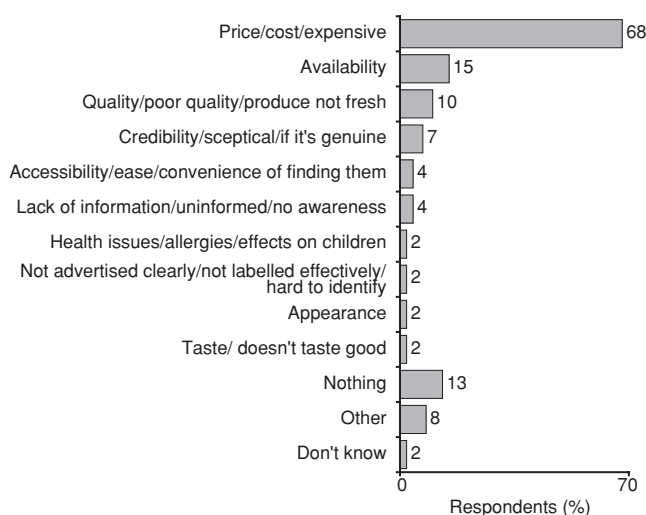


Fig. 8. Factors that would prevent purchase of 'environmentally friendly' food by Australian consumers.

- (i) Minimum % of consumers likely to purchase this product = 25% of the consumers that said they were 'very likely' to purchase the product + 10% of those that said they were 'quite likely'.
- (ii) Maximum % of consumers likely to purchase this product = 50% of the consumers that said they were 'very likely' to purchase the product + 25% of those that said they were 'quite likely'.

This equation was then used to provide more realistic ranges (minimum and maximum) of consumer purchase rates for the three price levels of 'environmentally friendly' guaranteed meat.

Based on the levels of interest ('very likely' and 'quite likely') claimed by consumers for each of the three price categories of meat, assuming that all consumers will recognise and understand the 'environmentally friendly' guarantee, and that the product is always available, the estimated purchasing rates for meat with an 'environmentally friendly' guarantee becomes:

- (i) 22–44% when there is no price premium,
- (ii) 18–37% when the price premium is \$1.00 per kg, and
- (iii) 13–27% when the price premium is \$2.50 per kg.

Domestic meat supply chain interviews

When 14 companies operating within meat supply chains were asked whether they have specifications for livestock or meat that are influenced by the production system, nine replied weight and eating quality, three said chemical residues, one said Cattlecare, and one had no specifications.

When asked whether they have a procedure or system in place for communicating their production specifications to their meat suppliers, 10 said that they use a newsletter, document or manual that they provide to producer alliances, one said organic, and three did not have any procedure or system.

The 14 meat supply chain companies interviewed often have more than one method that is used to demonstrate compliance with their specifications. Ten businesses use inspection and test results to determine compliance with weight and eating quality specifications, and will discount or return non-conforming product. Seven businesses require their suppliers to provide a National Vendor Declaration (NVD), one requires organic certification, and one other inspects properties on a monthly basis.

When asked whether their direct customers were expressing a desire for particular characteristics of meat, there were six

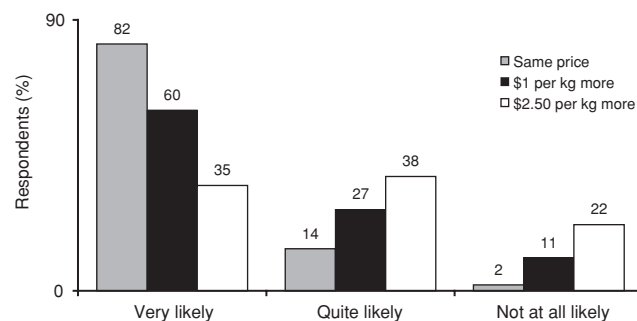


Fig. 9. Likelihood of Australian consumers purchasing 'environmentally friendly' meat at the same price, \$1.00 more and \$2.50 more than a regular cut of meat.

reports of disease, residues or safety, six of eating quality, two for certified organic, one for animal welfare, one for value for money, and one company said that their customers had not expressed any requirements.

The interviewees were then specifically asked about their direct customer interest in environmental issues. Only three of the companies reported customer interest in the environment where livestock were produced, with sustainability being the issue of concern. The other 11 companies said that their customers were much more interested in issues such as food safety, chemical residues, animal welfare and price.

When asked whether they see any branding opportunities for Australian meat to become recognised by their customers as certified 'environment friendly' now or in the future, seven said yes but in the future, three said yes and now, one said yes to now and the future, and three said they did not see any opportunities. Of those that saw opportunities, these were mostly in export markets of Japan, the European Union (EU) and the USA.

#### *International meat supply chain interviews*

The results of interviews with members of meat supply chains in Japan, the EU and the USA are reported below.

##### *Japan*

When asked what characteristics of meat were most important to them, there were 18 mentions of food safety, including traceability and low levels of chemicals (antibiotics, synthetic growth hormones). Eating quality was mentioned eight times, stability of supply three times, price was mentioned twice, and illegal employment practices and country of origin were each mentioned once. Only one company said that they expected environmental considerations to become part of future supplier specifications, and in fact, the company was thinking about how to do this.

Of the 18 companies interviewed, most did not require their suppliers to have some form of meat assurance system. However, nine companies mentioned that they prefer their suppliers to have Hazard Analysis and Critical Control Points (HACCP), six companies prefer suppliers to have ISO 9001, and trust developed over time was mentioned by three companies. Although six companies had ISO 14001 certification and another three were considering this, none required their suppliers of meat to have this.

None of the companies interviewed included environmental issues in their specifications for their meat suppliers, and said this was not an issue that was of particular interest to Japanese consumers and supply chains.

When asked whether they stock any 'environmentally friendly' meat, only four companies said they sell some low residue (pesticides, antibiotics, synthetic hormones) and certified organic meat. One company planned to develop its own eco-label, also based on low residue and organic principles.

All but one of the companies interviewed believed that EMS or some other form of environmental assurance was not required in Japan. They said that Japanese consumers had no understanding of an eco-friendly meat product, and that this was not important to them.

When asked whether they saw market opportunities for Australian meat that has an environmental or eco-label, all but one company said that there were no opportunities at the present time. They said that Japanese consumers are not aware of and do not understand eco-labels. Several companies said that if quality and safety were maintained, then an eco-label could add value and help sell the meat. However, if the eco-meat product had a price premium of 10% or more then it would not sell. Two companies thought that marketing Australian meat through eco-labelling may be possible in 4–5 years, but this would require widespread promotion by the Australian government so that the eco-label would be recognised and understood by the broad consumer audience. Two companies also recommended that animal welfare criteria be incorporated within an eco-label.

##### *European Union*

When the five organisations associated with meat supply chains were asked to identify the characteristics of meat, meat production and meat supply that were most important, the main mentions were price, eating quality and traceability (food safety). There were also single mentions of the need for stock feed that was not genetically modified (GMO), good levels of animal welfare, an absence of pesticides and a requirement for information on production methods related to food safety. It was noted that consumers in the UK preferred less intensive methods of farm production.

In relation to on-farm assurance required of suppliers, the most common mentions were for EurepGAP and The British Farm Standard, as there has been a strong push to have one all-encompassing standard in the EU. One major wholesaler also conducted its own testing of meat to confirm compliance with their specifications.

When asked whether they have assurance specifications that include environmental specifications, it was noted that EurepGAP has criteria for chemical storage, management of wastes, environmental impact assessment and wildlife conservation. Similarly, it was pointed out that the LEAF program also has environmental criteria that relate to livestock production, including soil management, waste management, water efficiency and wildlife and landscape management. One company also said that they have some product lines that require farmers to implement practices that maintain biodiversity and protect the environment.

The companies interviewed were asked whether they stock 'environmentally friendly' or eco-label meat and how much. Although product lines are limited and it was not clear whether these labels were used on meat as well as fruit and vegetables, labels identified were the LEAF marque, Nature's Choice and Organic. One retailer also said they had some premium products that were positioned using labels stating that they were produced under a biodiversity scheme.

When asked what was their opinion of using EMS or some other form of environmental assurance, one company said that ISO 14000 wouldn't mean much to them or their customers, as people are really only interested in the price, and retailers are not prepared to pay for these controls. Another interviewee said that agriculture is not ready for ISO 14000 because the auditing cost to farmers is too high, and one retailer said that they had not considered ISO 14000 at this stage. One company, Sainsbury's,

have two agriculture partnership programs with their suppliers, being biodiversity management, and environmental protection, both of which are based on continuous improvement and do not have minimum performance criteria.

The interviewees were then asked whether they see market opportunities for Australian meat that carries an environmental or eco-label. Three companies said that they do not see demand for environmentally assured Australian beef, now or in the future. Similarly, one other company said that consumers are overwhelmed with and are very cynical of environmental labels, and environmentally assured Australian meat would just get lost amongst the other labels.

### USA

When asked whether they traded in any form of environmentally assured meat and whether they were aware of other companies trading in this type of product, two companies said they do not trade in these products, one said they sell organic meat, and the other said they sell an 'all-natural' meat under the label of Country Meadow. Three companies were aware of this type of meat being sold by other companies in the USA, being the labels Natural Beef, Coleman Beef and Niman Ranch

The companies interviewed generally said that their customers cannot differentiate between certified organic, naturally produced and environmentally assured meat. It was mentioned that there was consumer confusion with the range of organic labels on offer, and that they could not differentiate between organic and environmentally assured, and between organic and natural.

When asked about the extent of demand from customers and consumers for environmentally assured meat products, all four companies said that they were not receiving enquiries, and one said that they receive more enquiries from suppliers than customers. Two companies said there were customer enquiries for the supply of natural beef (free of hormones and antibiotics), and one said they had lots of enquiries for organic meat. Two companies said that natural and organic products would always only have niche market status, as they are often priced out of the mainstream market. Two companies said that a large marketing budget would be needed before consumers would recognise and understand environmentally assured meat.

### *Domestic wool supply chain interviews*

When asked to rate the influence of environmental issues on their decisions to buy, process or sell wool, 8 of the 13 companies interviewed said environmental issues had little to no influence. Of the five companies that said environmental issues influenced them, all were early stage processors that produced waste effluent. One company said that environmental issues had medium influence, another said high because they used their effluent to irrigate land and required clean raw wool, and three other companies said high due to the need to comply with the effluent standards set by the Environmental Protection Agency.

Ten of the wool supply chain companies interviewed said that environmental specifications had no or low influence on the wool purchasing decisions of their current customers. One company said that their Japanese customers had a policy to recycle, another said that perhaps 10% of their customers have environmental specifications, and one company said that

environmental specifications had a high level of influence on their customers purchasing decisions.

When asked whether their customers include environmental specifications when placing orders for wool, nine said no, one said yes in relation to an organic order, and three said that they have a small number of UK or European customers that have some specifications for the chemicals used during processing. There were no specifications that related to the farm level.

When the wool supply chain companies were asked whether they were familiar with the purpose and processes of environmental assurance systems, 10 said yes, two said no, and one said a little.

In relation to environmental assurance systems, four companies had none, four had their own internal systems, two had ISO 14001, one had organic, one had Oeko-Tex, and one required vendor declarations stating that chemicals were used in accordance with the manufacturer's label.

When asked what factors had motivated or would motivate them to implement an environmental assurance system, five companies said customer demand, four said government regulation, one said cost, another said work-place health and safety, and two said that nothing would motivate them.

Ten of the companies interviewed said that an environmental assurance system would not help them maintain current customers, compared with three that said it would. In relation to attaining new customers, eight companies said that this would not help them, and five thought that it would.

When asked whether they see market opportunities for Australian wool to become recognised by our major customers as certified 'environmentally friendly', 11 thought that some time in the future there would be opportunities, particularly in Europe and the UK, and two thought that opportunities were possible but they were unsure.

### Discussion

The cattle and sheep industry sectors (the main forms of pastoral industry activity) do not have an industry standard for environmental assurance, although a description of what is expected by the main stakeholders is provided by Pahl and Sharp (2007). To summarise this, members of meat and wool supply chains (producers-retailers), the people that must implement and fund environmental assurance, want to lead its development, and they require it to:

- (i) be kept simple and low cost,
- (ii) be based on continuous improvement,
- (iii) be applied to commodity sectors,
- (iv) be built into their existing industry and export market quality assurance and food safety standards,
- (v) contain a range of auditing options,
- (vi) operate across the entire supply chain,
- (vii) confer product labels, and
- (viii) add value to their businesses.

In this regard, there appears to be industry and supply chain support for a form of environmental assurance that is a basic management system, combining continuous improvement, risk assessment and industry best management practice programs that can be built on over time to meet regulator, market and community expectations (Anon. 2005; Pahl and Sharp 2007).



In addition to this, other stakeholders, particularly environmental and consumer groups, require environmental assurance to be developed by a multi-stakeholder group, and they expect it to:

- (i) account for the full environmental and social costs of agriculture,
- (ii) be based on full life-cycle assessment,
- (iii) possess environmental performance criteria that are benchmarks of sustainability,
- (iv) be applied across regions or ecosystems,
- (v) be highly transparent with regard to processes and outcomes, and
- (vi) be verified through third-party certification.

However, apart from ISO 14001 EMS, there is little in the way of industry, national or international standards that livestock producers can use for providing environmental assurances (Pahl 2004).

#### *Pastoral producer adoption of environmental assurance*

Although 73% of pastoral producers surveyed in 2001 were interested in environmental assurance and wanted to know more about it, including 12% that said they would implement this now, this has not been realised in adoption rates. For example, although EMS was extensively promoted to more than 1500 livestock producers in western Queensland in 2004, only 37 pastoral businesses implemented the 7-step Pastoral EMS, and the large majority of these have indicated that they will stop implementing EMS when the National EMS pilot project assisting them ends in 2006 (Sallur *et al.* 2007). These producers cite a lack of immediate and tangible benefits, particularly financial and market incentives, and a dislike of planning and documentation as the main reasons for not wanting to continue with EMS. In 2001, at the time of the pastoral producer survey reported here, only 4% of respondents identified a lack of markets for products as a disadvantage of environmental assurance (see Fig. 3), possibly explaining their high level of interest in this at that time (Fig. 4). In 2006, markets have not materialised, and because this is one of or perhaps the most important requirement for adoption (Fig. 6; Sallur *et al.* 2007), it is not surprising that adoption rates remain low.

A study of Australian grains and livestock producers by Seymour *et al.* (2007) also concluded that broad-acre industries were not ready for ISO 14001 EMS, and Ridley (2001), who reviewed several environmental assurance programs in several countries, reported that one of the lessons learnt was that a full ISO 14001 EMS is not practical for most family farms.

Similarly, Banney (2002) reported difficulties with the development and implementation of a full ISO 14001 EMS by cattle producers, noting that this was challenging, time consuming and frustrating. He concluded that the majority of beef producers would not adopt EMS owing to the additional time and paper work required, an absence of financial and market incentives and the high cost of audits.

Overall, in the absence of clear and tangible benefits, particularly those associated with economic viability (Fig. 5), broad-acre livestock producers are unlikely to implement EMS or other forms of environmental assurance. Although potential business benefits of environmental assurance, particularly EMS, have been identified and include improved productivity,

increased efficiencies, more confidence in management, reduced exposure to risks, better neighbourhood relations and a greater capacity to meet market requirements (Cary *et al.* 2004; Carruthers 2005; Carruthers *et al.* 2005), these are not always obvious or certain, and this is especially true for low-input broad-acre agriculture (Thomson 2004). It was concluded that the benefits for producers of implementing EMS and other recommended sustainable natural resource management practices are often unclear, have high information and management costs and have long time lags (Anon. 2003; Tee and Boland 2005).

By comparison, the costs of environmental assurance are more evident. Toyne *et al.* (2004) noted that the transaction costs could be a key factor limiting producer interest. These include the costs of developing and documenting the scheme, labelling and certification fees, record keeping, the risk of reduced yields, and the transition to an altered production system.

Overall, although many livestock producers find environmental assurance attractive, they are concerned about costs, less control, lower productivity, and increased paper work. In contrast, however, benefits that are important to them, such as improved public image, continued access to natural resources and substantial consumer demand, all remain vague and elusive. Consequently, the majority of pastoral producers have not been motivated to implement environmental assurance at this stage.

#### *Consumer purchasing of environmentally assured produce*

Levels of consumer interest in 'environmentally friendly' products often appear high, suggesting that markets may be a driver of the adoption of environmental assurance within agricultural supply chains. However, it is common for surveys that record stated consumer intentions to over-estimate actual purchasing behaviour. For example, 11 consumer surveys in a range of countries have recorded consumer willingness to pay 10–20% premiums for eco-friendly foods such as corn, apples, lamb, pork and vegetables (Bougherara and Grolleau 2004; MacNamara and Pahl 2004), but this willingness to pay often does not translate into purchasing decisions (Twyford-Jones *et al.* 2005). Giraud (2003) pointed out that consumer surveys generally measure attitudes, and that measurements of attitude towards foods often do not match purchasing behaviour. In this French study Giraud (2003) reported that 59% of consumer panellists declared a positive attitude towards the purchase of origin-labelled food products, but only 13% actually purchased them. Similarly, a UK survey (Anon. 1997) found that although one in three consumers claimed to be committed to organic or green shopping, only 9% of the population bought organic food, and McCoy and Parlevliet (2000) noted that although 70% of German consumers reported an interest in purchasing organic food, the market share for organic foods was only 2% of the total food market.

The Australian consumer survey reported in this paper also recorded a high level of interest in 'environmentally friendly' meat, with 87% saying they would purchase this at a 10% premium, and 73% still willing to purchase at a 25% premium. However, the actual number of consumers that purchase this product will be much less. Consumers over-estimate their

‘green’ purchasing behaviour because there is strong social pressure for them to be supportive of the natural environment, most do not understand or trust the marketing concept of ‘environmentally friendly’, and the product they want to buy is not always available. Taking all this into account (as per the equations presented in the results for the domestic consumer survey), it is likely that only 13–18% of consumers will actually purchase higher priced meat and other foods that are certified ‘environment friendly’.

It is apparent that many consumer surveys in Australia and overseas, particularly phone and mail surveys of households, could be regarded more as surveys of general public opinion on environmental assurance instead of consumer purchasing behaviour. In these situations individuals are interviewed at a time and place that is far removed from their normal shopping experience, and consequently they respond more as a member of the general community than as a consumer. The large gap between expressed purchasing intentions and actual purchasing behaviour suggests that responses are more in tune with overall community expectations rather than individual purchasing actions.

It seems that consumers place greater value on the private benefits they gain from food, particularly those associated with health and safety, than they do on general public good environmental outcomes. This is demonstrated by more than twice as many Australian consumers (55%) choosing ‘it’s good for me’ as the main reason for buying ‘environmentally friendly’ meat, compared with 26% who chose ‘it’s good for the environment’. Similarly, the main reason consumers purchase certified organic food is because it is perceived to be good for them (Anon. 1997; McCoy and Parlevliet 2000).

Given that consumer interest in ‘environmentally friendly’ products is much lower than what is claimed during surveys, it is not surprising that as many as 68% of consumers in Australia (Fig. 8), New Zealand, UK and the USA believe that ‘environmentally friendly’ products were over priced (Cary *et al.* 2004; MacNamara and Pahl 2004). It is evident that mainstream consumers are unwilling to pay higher prices for food or fibre that is certified ‘environmentally friendly’.

Environmental considerations remain the primary motivator for only small groups of highly committed consumers. This niche of discerning consumers, representing about 7% of the population in the USA and 5–15% in the UK and Germany, is willing to sacrifice other attributes and convenience in order to purchase ‘green products’, often at higher prices (Anon. 1997, 1999b; McCoy and Parlevliet 2000).

#### *Processor or retailer adoption of environmental assurance*

Overall, meat and wool supply chain demand for environmental assurance in Australia, Japan, the EU and USA was low to non-existent. Although processors and retailers had specifications for meat and wool, the only issue that was remotely related to the environment was chemical residues, which was frequently mentioned, and certified organic, which was occasionally mentioned. Food safety, eating quality of meat, residues in meat and wool, reliability of supply and price were of utmost importance, and were the main determinants of trade. Similarly, Backshall (2000) found that several large Australian produce companies rated availability of supply and compliance with

product specifications as the two factors out of a list of 10 that most influenced their decisions to buy produce – environmental criteria were the least important of all 10 factors. The only exception to this appears to be several retailers in the EU that currently sell several product lines that carry an environmental assurance, such as Nature’s Choice. However, the companies interviewed in the EU did not see market opportunities for similar Australian product, and neither did members of meat supply chains in Japan and the USA.

Given that environmental assurances for meat and wool are a low priority for consumers and supply chains, and that few market opportunities currently exist for these types of products, processors and retailers are concerned about costs of implementing assurance systems. A wide range of produce companies interviewed by Backshall (2000) and Cary *et al.* (2004) believed that significant additional costs would be incurred through development and compliance with environmental assurance protocols, certification and marketing. Further insights into the challenges facing the development of an environmentally assured food sector are apparent from the experiences of processors and retailers that trade in organic food. Representatives of large Australian processing and retailing companies reported difficulties in developing markets for organic foods, saying that this was constrained by low consumer demand (1–2% of sales), high production costs, diseconomies of scale, shortages of certified raw materials, an unwillingness of consumers to pay higher prices and the low profit margins in the food industry (Cary *et al.* 2004). Price is also an issue for wool supply chains, with a German company that specialises in garments made from certified organic and natural fibres recently reporting a preference for purchasing raw wool from countries such as Argentina where production costs are lower. A representative of this company suggested that the Australian government should provide subsidies for their wool growers to help them compete with wool growers from other countries (M. Boehme, pers. comm.).

Agricultural food and fibre chains, which operate under global conditions of supply and demand, are driven by the need to reliably supply safe, high quality food at the most competitive price (Brah and Schelleman 2000). In addition to this, Granatstein (2001) wrote that agricultural products are generally in oversupply at a global scale, driving prices paid to producers to record low levels. These low profit margins make it difficult for processors and retailers to provide financial incentives to growers of environmentally preferable products (Backshall 2000). Although high quality food products such as certified organic or ‘environmentally friendly’ command higher prices, this can only occur within niche rather than broad-scale or mass markets, as these products cannot provide both a high rate of return and a high turnover (Giraud 2003). In this respect, environmental assurance is not attractive to food processing or retailing companies that cater for large numbers of mainstream consumers.

#### *Market failure for environmental assurance*

Chang (2002) wrote that “the term, ‘market failure’, refers to a situation when the market does not work as is expected of the ideal market”. In the context of this paper, the ‘ideal market’ is

expected to account for all of agriculture's environmental costs and benefits. However, markets largely do not account for the costs and benefits associated with the provision of environmental and other services to the general public, constituting a potential source of market failure (Hediger and Lehmann 2003). Currently, and in the foreseeable future, there is market failure with regard to the implementation of environmental assurance by meat and wool supply chains. Specifically, although producers have a high level of interest in environmental assurance, they and other members of supply chains are not willing to fund this, and neither are consumers.

The market failure in the pastoral industries reported in this paper is also apparent in the fresh and processed food sectors generally. Cary *et al.* (2004) concluded that due to low profit margins across supply chains, high production costs, diseconomies of scale, and low consumer demand, it appears that production and marketing of products produced in an 'environmentally friendly' way is not commercially viable.

The extent of market failure would be considerably greater for the form of agricultural environmental assurance required by environmental and consumer groups, as reported by Pahl and Sharp (2007). These groups are mostly concerned with achieving general public-good outcomes, and accordingly want environmental assurance to account for the full environmental, social and economic costs of production. If this was to occur, then the cost of certified food and fibre would rise well beyond what markets are willing to pay today.

#### *Beyond market failure*

The failure of markets to fully account for the environmental, social and economic costs of production is common throughout the world. Hediger and Lehmann (2003) wrote that 'some OECD (Organisation for Economic Co-Operation and Development) member countries are concerned about the consequences of trade liberalisation upon the multiple benefits of their agricultural systems, and particularly the effects on the rural landscape from further reducing domestic agricultural support and border protection'. As a solution to this, these authors recommend that it is first necessary to internalise the environmental externalities of agriculture, where governments pay farmers for the environmental benefits provided by them, and charge them for environmental costs. In this way policy provides incentives that counter market failure with regard to the provision of environmental benefits by agriculture.

Although government support for agriculture is a contentious issue worldwide, all levels of government in Australia do this to some extent. Government fiscal instruments commonly used to assist agricultural sectors include funding for market development, industry reconstruction, and drought assistance, and the exemption of fresh foods from Goods and Services Tax. Local, State and Federal governments also have a range of other policy instruments that can be used in differential manner to support individual producers, such as general taxation, rates on properties, leasehold land rentals, natural resource management funding and general business training. Ridley (2001) also wrote that a mix of existing and new government policy tools are needed to reward farmers for the provision of appropriate public good environmental

stewardship, to cost and trade in ecosystem services and to penalise those who degrade natural resources unacceptably.

The uptake of environmental assurance by Australian supply chain businesses could be made more attractive if this was rewarded through fiscal and other policy instruments of all levels of government. In this way, the costs of implementing environmental assurance are spread across the whole community, which is appropriate, given that it is the whole of community rather than consumers and supply chains that set the objectives for rural landscape management. Accordingly, the application of environmental assurance to agriculture needs to be facilitated by government through the differential application of fiscal and other policy tools, coordinated and implemented through dedicated single national policies and a national environmental assurance scheme.

#### **Conclusions**

Rates of adoption by producers of recommended sustainable natural resource management practices and programs, including EMS and other forms of environmental assurance, are invariably low, owing mainly to a lack of private benefit. Although significant public investment has encouraged development and testing of a wide range of NRM initiatives, this has mainly been short term, with implementation by producers faltering when the short-term public support is withdrawn.

In particular, markets have failed to account for the environmental and other production costs, and currently provide a disabling environment for the implementation of environmental assurance by Australian producers and other members of supply chains. Global markets consist of nations with very different standards of living, agricultural practices, cost structures, and trade and market tools, and it is unreasonable to expect that they will all fall into line with Australia's expectations for Australian agriculture.

Owing to market failure, and the increasing expectations of the general public for agriculture to be ecologically, socially and economically sustainable, there is a role for Australian governments, in partnership with several agricultural industry service providers, to create an enabling environment for the implementation of environmental assurance by supply chains. This enabling environment should be facilitated through dedicated national policy instruments that reward members of supply chains for implementing environmental assurance. Regulatory relief, improved access to natural resources, market advantages, lower interest rates or insurance premiums and ecosystem services funding should all be possible benefits derived through the implementation of a single national environmental assurance scheme.

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