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Rural Industries Research and Development Corporation

EcoRange:
Market-Oriented Environmental Certification for Rangeland Pastoral Industries

2. A review of on-farm standards

*Part of the **EcoRange** project report series*

A report for the Rural Industries Research and Development Corporation

Edited by Lester Pahl

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In submitting this report, the researcher has agreed to RIRDC publishing this material in its edited form.

Foreword

EcoRange: Development of Market-Oriented Environmental Certification for Rangeland Pastoral Industries arose out of a desire of government, industry and community for market forces to encourage the adoption of on-farm environmental management and assurance standards. It is a collaborative project between Queensland Department of Primary Industry Agency for Food and Fibre Sciences and CSIRO Sustainable Ecosystems.

The EcoRange project provides marketing information and strategies for 'environment-friendly' food and fibre products, describes and contrasts a range of market-oriented environmental management and assurance standards that could be used on farms, and makes recommendations on the application of these to agricultural production. Recommendations were based on the views and expectations of the main stakeholders along the supply chain, agricultural industry organisations, and a number of community interest groups.

The outputs of this project, contained in the research reports listed on page v, are:
1.   a domestic marketing strategy for 'environmentally friendly' food and fibre products;
2.   an international market analysis, outlining market potential and the requirements of target markets for environmentally friendly food and fibre products;
3.   the outcomes, principles and broad practices for environmental certification of pastoral products;
4.   the identity of a suitable existing certification scheme or environmental management module that can be added to existing schemes.

This report consists of a review of the literature related to market-oriented environmental assurance in agriculture. It identifies trends in environmental and other market requirements for Australian food and fibre products and production practices, describes and compares on-farm standards and verification processes used to provide assurances, and identifies on-farm standards that will motivate and build the capacity of primary producers to improve their environmental performance.

This project was funded from RIRDC Core Funds which are provided by the Australian Government.

This report, a new addition to RIRDC's diverse range of over 1000 research publications, forms part of our Resilient Agricultural Systems R&D program, which aims to foster the development of agri-industry systems that have sufficient diversity, integration, flexibility and robustness to be resilient enough to respond opportunistically to continued change.

Most of our publications are available for viewing, downloading or purchasing online through our website:

*   downloads at www.rirdc.gov.au/reports/Index.htm
*   purchases at www.rirdc.gov.au/eshop

Simon Hearn
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Acknowledgements

EcoRange reports

The findings of the EcoRange project are presented in seven reports. The first of these, the project overview, is a synthesis of the project findings and, as such, recommends outcomes and procedures for market-oriented environmental assurance in the rangeland pastoral industries. These recommendations were informed by the results of extensive consultation. This included surveys of domestic consumers, rangeland pastoralists and members of environmental groups, interviews with companies in Australian and international meat and wool supply chains, interviews with representatives of agricultural industry, environmental and consumer organisations, and a review of on-farm standards that could be used to deliver the requirements of these stakeholders.

Full reports, as follows, can be accessed from the RIRDC website (http://www.rirdc.gov.au/fullreports/).

Research reports

EcoRange: Market-oriented environmental certification for rangeland pastoral industries   *1. Project overview* (Lester Pahl)
EcoRange: Market-oriented environmental certification for rangeland pastoral industries   *2. A review of on-farm standards* (Lester Pahl)
EcoRange: Market-oriented environmental certification for rangeland pastoral industries   *3. Australian consumer survey* (editors Kylie MacNamara and Lester Pahl)
EcoRange: Market-oriented environmental certification for rangeland pastoral industries   *4. Australian rangeland grazier survey* (editor Lester Pahl)
EcoRange: Market-oriented environmental certification for rangeland pastoral industries   *5. Australian environment group survey (*Jim Longworth and Craig James)
EcoRange: Market-oriented environmental certification for rangeland pastoral industries   *6. Market research report* (Peter Twyford-Jones, Lester Pahl, Kerry Miles, Guy Newell and Kylie MacNamara)
EcoRange: Market-oriented environmental certification for rangeland pastoral industries   *7. Perceptions from industry, conservation and consumer groups* (Christine King)

Other reports of the EcoRange project are available on request from Lester Pahl (lester.pahl@dpi.qld.gov.au), or by phoning 07 4688 1302.

Other project reports

Environmental marketing workshop for graziers 1, Cooladdi (Queensland), September 2000   (includes workshop proceedings)
Environmental marketing workshop for graziers 2, Cooladdi (Queensland), April 2001   (includes workshop proceedings)
'Consumer-oriented environmental certification for rangeland pastoral industries: a role for product labels':   paper presented to National Conference on Environmental Management Systems in Agriculture, Ballina,   November 2001
EcoRange stakeholder workshop, Brisbane, August 2002   (includes workshop proceedings)

Contents

Acronyms

AELA	Australian Environmental Labelling Association
AFFA	Agriculture, Fisheries and Forestry Australia
ALMS	Australian Landcare Management System
BFS	British Farm Standard
BRC	British Retail Consortium
CAP	Common Agricultural Policy
CEC	Commission for Environmental Cooperation
CTE	Committee on Trade and the Environment
EMAS	Eco-management and Audit Standard
EMS	environmental management system
EU	European Union
EUREPGAP	Euro-Retailer Produce Working Group for Good Agricultural Practice
FSQA	food safety and quality assurance
GATT	General Agreement on Tariffs and Trade
GEN	Global Eco-labelling Network
GMOs	genetically modified organisms
HACCP	Hazard Analysis at Critical Control Points
ICM	integrated crop management
IFP	integrated fruit production
IPM	integrated pest management
IPP	integrated product policy
ISO	International Organization for Standardization
LCA	life-cycle assessment
LEAF	Linking Environment And Farming
MLA	Meat and Livestock Australia
OECD	Organisation for Economic Co-Operation and Development
OH&S	occupational health and safety
PPMs	production and processing methods
SQF	Safe Quality Food Institute
TFA	The Food Alliance
TQM	Total Quality Management
TQW	Tasmanian Quality Wool
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
US	United States
USEPA	United States Environmental Protection Authority
VEMA	voluntary environmental management arrangement
WTO	World Trade Organization

Key terminology

The following explanations provide a guide to the use of these terms in this report.

'Environment-friendly' or 'Green'
'Environment-friendly' or 'green' products are those that result from production and processing practices that are less harmful to the environment compared with those for conventional products. Consequently they have a higher level of environmental performance than conventional products.

Standards
Standards are accepted specifications or codes or practice which define materials, methods, processes and practices. When effectively implemented, these ensure that consistent and acceptable levels of quality, performance, safety and reliability are achieved (Standards Australia 2001).

Standards have been developed for internal use by organisations (sometimes called process standards) and for specifying product attributes and production practices (product standards).

Assurance
The concept of assurance underlies all standards, environmental claims and verification processes. It sums up the motive or starting point for standards development — the desire or need for a guarantee or assurance that a product or organisation complies with the claims made about it.

It also describes the desired end result of the verification processes: that is, users or communities are *assured* that the products and organisations are as represented.

In practice, assurances about the environmental claims of products and organisations vary in their credibility. For example, third-party certified claims provide a high level of assurance, whereas self-declared claims may provide a low level of assurance.

Auditing
Auditing refers to the systematic examination of an entity, such as a firm, organisation, facility or site to determine whether, and to what extent, it conforms to a specified standard.

There are internal or self-audits (carried out by an organisation such as primary producer on itself); second-party audits (an external audit carried out by one organisation such as a processor, working on its own behalf, on another such as a primary producer); and third-party audits (an external audit carried out by an independent organisation on another organisation (Mech and Young 2001).

Certification
Certification is the successful result of the procedure whereby an accredited third party, such as a certification body or regulator, gives written assurance that they have methodically assessed, and are sufficiently confident with, the extent of compliance with a clearly identified standard.

If a certification body is accredited as being independent, competent and consistent, third-party certification can be used to provide public assurance that an organisation or product has complied with a standard (Mech and Young 2001).

Accreditation
Certification bodies are accredited by an Accreditation Body such as the Joint Accreditation System of Australia and New Zealand for the purpose of providing confidence in certification processes. 'Accreditation is the formal recognition of competence that an authoritative body gives another body or person in order to empower them to perform specified tasks such as third-party auditing against given standards for the purpose of certification' (Mech and Young 2001).

Harmonisation
Harmonisation occurs when the body responsible for a standard in one country recognises and accepts the criteria and verification processes associated with a standard in another country. This means that a product certified in accordance with a standard used by an exporting country would not need to be subjected to further verification by an importing country, avoiding these additional costs.

Intrinsic product quality
Intrinsic qualities of products are those that are tangible components of the product. For meat, this may include texture, colour, pH, and age (see AFFA 2002).

Extrinsic product quality
Extrinsic qualities are external to the product. They consist of production practices and their outcomes, such as environmental management, animal welfare, work place health and safety, and farm worker employment conditions. In this way they relate more to the ethics of food and fibre supply chains (see AFFA 2002).

Environmental management system (EMS)
An EMS is based on the continuous improvement cycle of 'plan, act, check and review'. The international standard for an EMS, ISO 14001, is a process standard that specifies the components of an environmental management system that are to be implemented by an organisation. It does not specify production practices or environmental performance targets, and instead allows the implementing organisation to do this.

Executive summary

In Australia and internationally, community and governments are placing increasing pressure on primary producers to protect the natural environment through implementing sound environmental practices. At the same time, despite the bewildering array of on-farm environmental management tools potentially available to primary producers, many of these are not currently used on properties. Without motivation and capacity building these low levels of adoption are likely to persist.

While primary producers are interested in the role that environmental management can play in their relationships with their supply-chain clients, particularly consumers, supply chains have traditionally been more concerned with price, safety and quality than with influencing the environmental performance of production systems.

Yet, worldwide, markets are emerging for ethically produced products that will continue to meet price, safety and quality requirements, but not at the expense of workers, livestock and the environment. Mainstream markets are beginning to expect that fresh food and fibre meet a wide range of consumer requirements, and are seeking assurances that these have been met. Consequently, there is a need for on-farm food and fibre standards that are capable of addressing the diverse requirements of markets, as well as the growing expectations of the wider community. Such standards have the potential to be powerful drivers of ecologically sustainable farming practices.

Purpose and objectives of this report

The purpose of this report is to review market-oriented on-farm standards that have the potential to motivate and assist Australian producers of food and fibre to improve their environmental management.

To achieve this, the review focuses on three specific objectives:
1. To identify trends in environmental and other market requirements for Australian food and fibre products and production practices;
2. To describe and compare on-farm standards and verification processes used to provide assurances for food and fibre products and production practices; and
3. To identify on-farm standards that will motivate and build the capacity of primary producers to improve their environmental performance.

While EcoRange was mainly focused on meat and wool, the major products of rangeland pastoral industries, much of its research findings are relevant to the production and marketing of 'environment-friendly' fresh foods and natural fibres generally. For this reason, this report mainly discusses environmental assurance in the context of food and fibre, with occasional more specific references to meat and wool.

Trends in market requirements for Australian food and fibre

Retailers and consumers now subject fresh food to considerable scrutiny, with more affluent markets expressing a need for assurances on the following attributes:
- Safety is of utmost importance in all food sectors, with assurances for food safety becoming a condition of access to many markets of fresh food, both in Australia and overseas.
- Intrinsic food quality, including attributes such as size, colour and ripeness for vegetables, and colour, tenderness and fat content for meat, is also a high priority of all markets. Specifications for intrinsic quality play a major role in determining prices paid to growers of fresh produce.
- Ethical production, sometimes referred to as extrinsic product quality, is an emerging market requirement. European Union (EU) markets are beginning to expect their fresh food suppliers to demonstrate compliance with legislation, farm worker conditions, animal welfare and environmental protection.

Market requirements for wool mirror those in the fresh food industries. Access to some markets may soon require raw wool to meet specified minimum levels for chemical residues, and intrinsic quality based on attributes such as fibre diameter, length and strength generally determines price. Specifications for extrinsic quality, while less well developed than those of fresh food markets, are now being considered by some wool supply chains.

An introduction to standards used for on-farm assurance of food and fibre

Standards Australia (2001) define standards as 'accepted specifications or codes or practice which define materials, methods, processes and practices that, when effectively implemented, ensure that consistent and acceptable levels of quality, performance, safety and reliability are achieved' (Mech and Young 2001). A combination of standards and verification procedures determine the level of assurance associated with claims about products or production processes (see page x for definitions of key terms used in this report). Independent or third-party auditing of an organisation in accordance with an accepted standard provides a highly credible form of assurance or confirmation regarding the accuracy of claims about internal environmental management processes or products.

A large and diverse range of environmental and other standards are available for use by primary producers and other sectors of food and fibre supply chains. These vary enormously in purpose and process, and considerable thought should be given to selecting the standards that will best suit a particular business.

Standards have been classified in a number of ways, and possibly no one form of classification is capable of accommodating all the standards or schemes currently available. In this review, standards have been separated into those that organisations use to achieve their own objectives, and those that are used to meet the requirements of a customer for products.

1. Organisation-oriented standards
Organisation-oriented standards prescribe management systems and processes to be adopted by a business. ISO 14001, an international standard for an environmental management system (EMS), is the best-known organisational standard for the environment, while ISO 9001 is an organisational standard for quality systems.

2. Product-oriented standards
Product-oriented standards, effectively production protocols, provide specifications relating to aspects of the production process, or to the product itself. In some cases these standards will prescribe environmental outcomes that must be achieved by producers, such as is the case with Type I environmental labels.

European standards for food safety, quality and environmental assurance

EU retailers are setting global benchmarks for the production of fresh food. This has been driven by their desire to protect the integrity, particularly safety, of the food they sell and also to present a responsible and ethical public image on matters of the environment. Currently, however, the principal focus of standards like EUREPGAP (Euro-Retailer Produce Working Group for Good Agricultural Practice) is food safety and quality, with environmental issues being secondary and voluntary. However, the importance of environmental criteria in these types of standards is likely to increase over time.

EU retailers have developed their own production standards (or protocols) that define the production practices that must be used on farms that supply their fresh food. Common food production standards have now been developed to make it easier for growers of fresh foods to comply with the requirements of retailers, with the British Retail Consortium (BRC) standard and EUREPGAP being the most widely known examples. EU retailers expect that all growers who supply fresh food will be certified to these or equivalent standards by the beginning of 2004.

Australian standards for food safety and quality assurance

Australian agriculture has many customised food safety and quality assurance (FSQA) standards that are based on ISO 9002 and HACCP. Examples of these are Freshcare, Cattlecare, Flockcare and Clipcare. A number of FSQA standards share common elements and, if necessary, can be successfully harmonised into one on-farm audit. Australian FSQA standards may in the future also be harmonised with export market standards like EUREPGAP, but this will require the development of additional customer-defined modules. It is important that additional modules remain optional, so that food producers can negotiate FSQA and product prices with respective supply-chain customers.

Harmonisation of standards is occurring to avoid situations where primary producers require multiple standards and audits. Ideally, this will result in a single standard and audit that simultaneously provides certification to other standards. This streamlining is intended to take much of the confusion and cost out of on-farm assurance, making it easier and more attractive for producers to achieve certification. However, this may mean that the requirements of standards grow over time for the purpose of being judged equivalent with a number of other standards, rather than being tailored to particular markets.

While several primary industry sectors have been very active in developing and promoting FSQA, relatively small numbers of producers have been certified, particularly in the livestock industries. Producers generally cite a lack of recognition and benefit from their certification as the main reason for not adopting quality assurance, and are unable to justify the participation costs. Processors and retailers in sheep and beef livestock industries have largely been unwilling to demonstrate a preference for certified producers, and price premiums are either very small or non-existent. Producers are unlikely to seek certification until market signals strengthen.

It is possible that some Australian government agencies and industry organisations associated with agriculture have over-reacted to emerging market requirements for fresh food in Europe, and have sought to introduce FSQA standards that go well beyond the requirements of current markets, particularly in Asia. In this respect, moves to develop tiers or levels of FSQA by the Meat and Livestock Australia (MLA) appear appropriate, as this enables producers to match on-farm assurance with variable market requirements.

Standards used for on-farm assurance of wool

Quality assurance, organic certification and environmental certification schemes can all be used by wool growers to provide assurances for wool.

Chemical residues in wool are the most prominent production-related issue for supply chains. Consequently, a first level of on-farm assurance, if required, could provide a guarantee that residue levels in wool have not exceeded a specified limit, particularly in view of impending European environmental legislation that specifies minimum levels of chemical residues for the effluent of wool processors. Accordingly, wool growers should consider adopting a simple standard that provides supply chains with assurances that residue limits have not been exceeded. The EU Eco-label for textiles could be used for this purpose.

The second level of on-farm assurance for wool production should be based on standards capable of defining and guaranteeing specified qualities of wool, with these negotiated with value-chain clients. These standards must be capable of being implemented in all sectors along the supply chain, be able to specify intrinsic qualities of products and production practices, be third-party audited, confer a product label, and be recognised by target markets.

Environmental labelling standards

Environmental labels or claims are widespread, and are typically associated with detergents, household cleaners, toilet paper, carpets, paint, white goods and motor vehicles. These labels fall into a number of different categories, with the most common form of classification as follows:

- Type I environmental labels, also known as a seal-of-approval label, are regarded as the model for eco-labels. They are based on life-cycle assessment (LCA) criteria developed by a multi-stakeholder body, and require audits by an independent third party. These are often regarded as the most credible label.
- Type II environmental labels are usually developed and applied by individual businesses, where they determine the nature of the claim and whether or not their products comply with it. Type II labels are typically little more than self-declared marketing claims made by businesses. They are the most widely used environmental label.
- Type III labels present quantitative information on the environmental aspects of a product to the consumer. The label is neutral in that it does not judge the environmental performance of the product, with this left to consumers.

Type I, II and III environmental labels have different strengths and weaknesses, and therefore suit different applications. The best performing environmental label for a business will be the one that suits its structure and resources, and most effectively services its goals and supply-chain relationships.

Environmental labels face many challenges, perhaps the greatest being their inability to improve the environmental performance of businesses to the degree and scale expected by community and government. Environmental performance criteria have proven very difficult to define for many product groups, let alone different industry sectors in different countries. Type I environmental labels are the clear leader in setting agreed environmental performance criteria that must be met by products that qualify for the labelling program. Type II labels address a number of environmental issues, but sometimes fall short of the claims being made and the expectations of stakeholders. Type III report-card labels do not have benchmark performance criteria, and thus the level of performance is determined by producers, and then judged by potential purchasers.

Even if environmental labels could be better adapted to setting environmental performance criteria, there is presently insufficient consumer demand worldwide to make a significant difference to the environmental performance of industry sectors. Typically, less than 10 per cent of consumers make environmental issues their top priority when purchasing products. Furthermore, many consumers are not willing to pay a premium for environmentally preferable products, and producers simply will not or cannot absorb the additional costs of compliance and certification.

Consumers are also discouraged from purchasing labelled products because of the confusion that has arisen from the large variety of labels on offer, and because of the frequently dishonest claims on products made by producers and retailers, who stand to benefit most from product sales.

Retailers are the gatekeepers between producers and consumers, and while they seem prepared to stock many products bearing some form of Type II environmental claim, eco-labelled products seem less attractive. Retailers appear to have only a minor interest in national and international eco-labels, as these compete with their own labels and brands, and challenge the quality of the large number of unlabelled products in their stores. However, they do stock a limited number of products carrying national or international environmental labels, with certified organic being the most prominent of these.

There are additional challenges associated with the labelling of food. First, national eco-labels may conflict with some international trade agreements, as they discriminate between products on the basis of production and processing methods, instead of intrinsic product qualities alone. Countries that are arguing strongly for greater access of their agricultural products in export markets are likely to be cautious about eco-labelling programs, as these could be used as a form of technical barrier to trade. However, the World Trade Organization (WTO) regulations only apply to national governments, and thus private companies cannot be prevented from discriminating food products on the basis of production practices.

Second, food comes in many shapes and sizes, originates in many and diverse parts of the world, and is produced by huge numbers of small businesses using many different production practices. This makes environmental labelling of food, particularly by national eco-labelling programs that utilise full life-cycle assessment, a highly complex, costly and difficult task. For these reasons the environmental labelling of food, using forms of Type I environmental labels, is largely confined to specifications for production practices.

Environmental labelling has the potential to motivate and build the capacity of producers to improve their environmental performance, as has been the case with organic certification. The most effective motivator of producers is market benefits, particularly where this leads to a stronger bottom line at the end of the financial year. Capacity building, involving natural resource training, expert advice and planning and management, requires time and money, and hence environmental labelling must be profitable.

Organic production
Organic certification is by far the market leader in sales of food products that carry some form of environmental label. Global markets for organic products have grown rapidly, with supply struggling to keep pace with demand. Consequently, growers of organic foods regularly receive price premiums.

Consumer demand for organic food continues to grow, due largely to the capacity of these products to meet consumer needs for safe, healthy and 'environment-friendly' food, all in one parcel. A good part of the market success of organic certification can also be attributed to the use of a single term, organic, which means much the same all over the world, making it relatively easy for consumers to understand and recognise organic products.

Organic standards have been successfully harmonised worldwide, which has also contributed to the presentation of a simple and consistent message. In contrast, environmental labels have many different names and claims, and come in many different forms. Consumers are confused by this, and are unlikely to purchase products they do not recognise or understand.

Environmental management systems
An environmental management system (EMS) consists of the continuous improvement cycle of 'plan, act, check and review', and as such is a very effective environmental management tool. EMS is probably the best-known form of environmental assurance in Australia, and is often used as an umbrella term for all forms of environmental claims, standards and verification processes. Australia has a very large interest in EMS, and is now developing a national framework to guide the application of EMS in business. The Australian Landcare Management System is also based on EMS, and plans to align the EMS of individual properties with the natural resource priorities of catchments.

The main benefits of an EMS are the internal operational efficiencies gained through the use of a management system by an organisation, rather than supply chain or marketing advantages.

ISO 14001 is the well-known international standard for EMS that has proven very useful in large organisations such as processing and manufacturing plants. Its strengths lie in the management system approach that provides an excellent tool for coordinating activities and staff, and achieving cost savings. However, many small businesses do not have the economies of scale to justify the expense of certification to this standard.

ISO 14001 does not appear suited to food and fibre supply-chain relationships, which possibly explains why it does not seem to be the favoured standard of retailers and processors. It does not specify production practices or intrinsic product attributes, and cannot guarantee that producers have met the requirements of markets, and so cannot result in a label that accompanies food and fibre as it passes along the supply chain; consequently it does not provide a mechanism for adding value to agricultural products. It is probably these reasons that prevent ISO 14001 from being benchmarked against EUREPGAP and other product standards, and consequently ISO 14001 cannot provide the one

on-farm audit that simultaneously provides certification to the standards commonly required by markets.

An EMS is easier to adapt to agricultural enterprises because it does not specify production practices and performance targets, and instead allows these to be customised by an organisation to suit local conditions. This approach is also unlikely to conflict with WTO rulings, making it possible for governments to play a large role in the development and implementation of EMS.

The greatest value of EMS is its continuous improvement management processes that adapt highly diverse and dynamic agricultural production to the ever-changing needs of community and consumers.

Conclusions

The extent to which markets for Australian food and fibre require environmental and other assurances is uncertain and probably not uniform, and it is not clear how these requirements can be most practically and effectively met, both now and in the future.

To address these issues it is first necessary to segment markets for Australian food and fibre. On-farm standards should be chosen for market segments, rather than agricultural markets as a whole. At a minimum, markets for Australian food and fibre should be segmented into mainstream commodity and niche markets, as these are likely to require very different forms of on-farm assurance.

Mainstream commodity markets are particularly sensitive to price, and demand safe food or low-residue wool of reasonable quality and at a reasonable price. This suggests that, apart from these issues, current needs for on-farm assurance in mainstream markets are minimal. National Vendor Declarations have been recommended for this first level of on-farm assurance, and perhaps a highly simplified EMS or quality assurance scheme could also serve this purpose.

Niche markets require a different form of on-farm assurance, due to their more exacting requirements for one or more quality attributes of food and fibre. In these instances on-farm assurances will be required for specific production practices and product attributes, and prospective customers may require independent verification that producers have complied with all specifications of the standard.

An on-farm standard used for value-chain trading should:
- specify intrinsic product qualities and extrinsic production practices;
- be customised to particular markets and regions through the addition of optional criteria;
- verify that specifications have been met through third-party auditing;
- be applied to all sectors of food and fibre supply chains;
- provide a label that identifies conforming product; and
- be recognised as the equivalent of standards required in major markets.

While a number of 'ideal' characteristics are proposed for standards used for market-oriented on-farm assurance, it is possible to add these to many existing standards so that they meet the requirements of Australian agriculture and their clients. Perhaps the most important factor to consider is the extent to which a standard is recognised and valued in target markets. Standards can be modified through the addition of processes and components, but this may all be to no avail if the standard is not regarded as equivalent with those used in export markets.

A number of Australian food safety and quality assurance (FSQA) standards of industry, such as Cattlecare and Flockcare, do not facilitate value-chain trading as they cannot guarantee the supply of specified product, they are not used along the entire supply chain, they do not result in a product label, and they are not regarded as equivalent with the standards of overseas markets.

In contrast, SQF 1000 is an FSQA standard that is much better suited to value-chain trading, as it can be used along the entire supply chain, and provide a label to differentiate conforming product.

However, SQF 1000 specifies few if any intrinsic product qualities and a limited number of extrinsic production practices.

EUREPGAP has strengths in its capacity to address the wide range of safety and production practice requirements of EU markets, third-party audits, and its acceptance by the majority of the large EU food retail chains. It is not suited to value-chain trading because it does not specify intrinsic product qualities, does not confer a label, and is only used at the farm level.

ISO 14001 does not appear to be suitable for value-chain trading by primary producers, as it does not specify production practices, environmental performance or intrinsic qualities of products, cannot provide a label for products, and cannot be recognised as equivalent with international food industry standards like EUREPGAP.

Organic standards are the success story of 'environment-friendly' marketing in the food industry. 'Organic' has the advantages of being a third-party audited, internationally recognised standard that is applied along the entire supply chain. It prescribes production practices that greatly reduce the risks of food contamination by chemical residues, and is widely understood and accepted in the market place.

Type II environmental labels are generally marketing claims that have low credibility due to their emphasis on single high-profile environmental issues instead of a more general life-cycle assessment, the absence of third-party verification, and lack of conformance with an agreed standard.

National eco-labels based on ISO 14024, the most onerous form of Type I environmental labelling, utilise full life-cycle assessment, and are thus very difficult and costly to apply to long, complex and highly variable food supply chains. However, some forms of Type I environmental labels have been customised for particular primary industries and regions. These tend to involve fewer stakeholders, use abbreviated life-cycle assessment, restrict themselves to a particular industry sector and region where production practices are more uniform, and focus more on production practices than environmental performance. Type I environmental labels have strengths associated with third-party auditing, compliance with an international standard, a capacity to involve key stakeholders in their development, and an ability to specify production practices, intrinsic product qualities and environmental performance.

Recommendations

The main aim of this review was to describe and compare market-oriented on-farm standards that have potential to motivate and assist producers to improve their environmental performance. For this reason, the focus is on identifying on-farm assurance that adds value to food and fibre pre-farm-gate. The following recommendations are made for on-farm environmental assurance in accordance with this aim.

1. Markets for Australian food and fibre should be divided into mainstream and niche, as these have different requirements for on-farm assurance.

2. Two levels of on-farm assurance are preferable. The first level, being self-declared assurance for mainstream markets could be a stepping-stone to a second level of assurance for higher-value market segments.

3. On-farm assurance for mainstream food markets that are sensitive to price should mainly concern practices and documentation associated with food safety, with assurances taking the form of self-declarations.

4. Similarly, the first level of on-farm assurance for wool production could provide assurances on minimum levels of chemical residues, which are emerging as a major issue in some markets.

5. The second level of on-farm assurance should be designed for particular market segments. It should provide credible assurances on food safety and chemical residues, and on a number of optional and negotiated intrinsic product qualities and extrinsic production practices.

6. Second-level on-farm standards should have the capacity to label food as it passes along the entire value chain, with the label being an identifier of safe food that has specified intrinsic and extrinsic qualities.

7. Consideration should be given to the inclusion of specified production practices and intrinsic product qualities within current industry quality standards, their implementation along the entire supply chain, and for conforming product to have an identifying logo or label.

8. Environmental labelling standards are also an appropriate model for on-farm assurance, as they specify production practices and intrinsic product qualities, and are well suited to value-chain trading. They are purposely designed for labelling products, and in effect take claims about production practices and product attributes right through to the consumer.

9. A form of Type I environmental label, based on the ISO 14024 standard, could be customised for particular primary industry sectors and regions. This type of environmental label is suitable for value-chain trading because it can specify production practices and intrinsic product qualities, is based on an international standard that is third-party audited, addresses the entire supply chain, and labels products.

1. Introduction

1.1 Natural resource management and agriculture

Natural resource management in agriculture has not been closely aligned with traditional food and fibre chains. Instead, nature conservation was to be accomplished within national parks and other reserves, and land outside these areas could be devoted to other practices, particularly agricultural production. However, it is now recognised that nature conservation cannot be accomplished by parks and reserves alone, and that contributions must be made by other lands.

The separation of production and conservation practices meant that natural resource management was not considered a function of food and fibre chains. These chains had little influence on the environmental performance of the production system, as consumer feedback largely concerned price and quality. As competition between primary producers forced them to cut their profit margins, they compensated for this by producing larger volumes of product. Degradation of the natural resource base was likely under these circumstances, as gains in productivity could be achieved at the expense of the environment without suffering a price discount in the market place.

Today, the failures of industrialised food chains and the implications for environmental degradation and other stresses are being recognised by increasing numbers of people worldwide. Markets are emerging for ethically produced products, initiating the establishment of more inclusive food chains that continue to pay attention to price, safety and quality, but not at the expense of workers, livestock and the environment.

This growing worldwide interest in ethically produced food and fibre is leading to the development of on-farm systems that can provide consumers with some form of assurance that their expectations for safety, quality and production practices have been met. These standards can also be a vehicle for enabling consumers to recognise, trust and reward retail food products that cause less stress on the environment. Thus, such standards have the potential to be a powerful driver of ecologically sustainable farming practices.

Environmental standards should also provide commercial opportunities for primary producers who implement the production practices and achieve the environmental outcomes expected by consumers. They should help producers to maintain or increase market share, and to obtain the best possible price for their products.

Australia has a very active interest in the development and application of environmental and other on-farm standards. This is demonstrated by recent conferences in Ballina (Carruthers & Tinning 1999, 2001), Launceston (Thomas & Rowland 2000), and Hobart (On-farm Food Safety and Quality Assurance Conference 2002), government/industry workshops (AFFA 2000, Whiteford 2000, Sharp 2003), and national initiatives such as the National Framework for Environmental Management Systems in Agriculture (NRMMC 2002), and the Australian Landcare Management System (Douglas & Gleeson 2001). Many industry sectors are also actively piloting a range of on-farm environmental standards.

1.2 Purpose and objectives of this report

The purpose of this report is to review market-oriented on-farm standards that have the potential to motivate and assist Australian producers of food and fibre to improve their environmental management.

To achieve this, the review focuses on three specific objectives:
1. to identify trends in environmental and other market requirements for Australian food and fibre products and production practices;

2. to describe and compare on-farm standards and verification processes used to provide assurances for food and fibre products and production practices; and
3. to identify on-farm standards that will motivate and build the capacity of primary producers to improve their environmental performance.

While EcoRange was mainly focused on meat and wool, the major products of rangeland pastoral industries, much of its research findings are relevant to the production and marketing of 'environment-friendly' fresh foods and natural fibres generally. For this reason, this report mainly discusses environmental assurance in the context of food and fibre, with occasional more specific references to meat and wool.

1.3   Overview of this report

Chapter 2 identifies major trends in environmental and other market requirements for Australian food and fibre.

Chapters 3–9 describe and compare a wide range of approaches to on-farm standards for food and fibre, exploring the capacity of food safety and quality assurance, environmental labelling, organic and environmental management system standards to meet market requirements and provide benefits for primary producers.

Chapter 10 draws conclusions and provides recommendations for types of on-farm standards that may suit broad commodity and niche markets for Australian food and fibre and assist primary producers to improve their environmental performance.

2. Trends in environmental and other market requirements for food and fibre

Australian primary producers are very interested in the role environmental management can potentially play in their relationships with their supply-chain clients, particularly consumers (see Pahl 2003). Environmental management, which is a priority issue for the wider community, is beginning to become an issue in supply-chain transactions along with a number of other market requirements for food and fibre.

This chapter gives a broad introduction to the emergence of environmental and other requirements in food and fibre production systems worldwide, and briefly outlines trends in market requirements for Australian food and wool. More detailed information on international and domestic supply-chain expectations for environmentally preferred food products can be found in Twyford-Jones et al. (2003) and MacNamara & Pahl (2003).

2.1 Environmental requirements in agriculture

The environmental requirements of food and fibre production systems vary depending on whose expectations are being addressed. For example, a retailer may have a production protocol that requires a wildlife habitat plan, governments will expect compliance with relevant legislation, and the producer or processor may wish to save money by being eco-efficient or increase profitability through price premiums. Clients, ranging from producers to consumers to regulators, will have different environmental expectations, and may or may not require assurances that their expectations have been met.

According to Starkey (1998), improved environmental management offers a number of potential advantages for businesses at any part of the value chain. It may allow them to:
- reduce input and output costs;
- comply with current legislation and anticipate future legislation;
- improve relationships with regulators;
- reduce environmental risk;
- meet supply-chain requirements and obtain market benefits; and
- improve their public image.

A significant benefit arising from improved environmental performance in medium to large businesses has been a reduction in the costs of doing business (Starkey 1998). Many companies have found that cost savings come from changes in product design, manufacturing processes, energy and water usage, waste disposal, sourcing of raw materials, packaging and transport. For example, Australian Country Choice, a beef processor and exporter, achieved significant reductions in processing costs by implementing the environmental management systems standard ISO 14001 at their Brisbane abattoir (P. Gibson, pers. comm.).

Good environmental management also appears to be an emerging requirement of some markets. Consumers in some countries are beginning to look for additional information about food, and are demanding to know how their food was produced and what it contains. Some are also becoming increasingly interested in production practices with respect to concerning animal welfare, the environment, traceability and social accountability, and are asking for information on chemical and other characteristics of food (AFFA 2002). However, while environmental aspects of food production are of interest to consumers, these are still less important than food safety, quality and price.

Nevertheless, some supply chains do have requirements for environmental management, and are specifying how these should be met and demonstrated. For example, some large companies are demanding that their suppliers demonstrate improved environmental performance. B&Q, one of the

largest home improvement and garden retailers in the United Kingdom (UK), developed a Supplier Environmental Audit standard in response to accusations by environmental groups of irresponsible timber sourcing (Starkey 1998). This forced B&Q suppliers to develop and implement environmental policies, a requirement that has also been seen in the fresh food retail sector of Europe (see Chapter 4).

However, while benefits may arise from environmental management, few small enterprises (less than ten employees) appear to be investing in this (Starkey 1998). Small business owner/operators are busy with many different tasks, and feel they do not have the time or money for environmental management.

Many primary production enterprises in Australia fall into the small business category. For example, managers of rangeland pastoral enterprises generally work 61 to 80 hours a week, and approximately half have no full-time staff to assist them (Marketshare 1999), even though the average property size is 22,000 ha and has 5350 sheep and 850 cattle (Hardman 1996). Managers of these properties are also likely to claim that they have neither the time nor resources to commit to a formal environmental management program.

However, 'given that there is likely to be increasing community, government and market pressure on businesses to demonstrate sound environmental performance, and given the benefits that this may produce, environmental management may be increasingly difficult to do without' (Starkey 1998).

2.2 National and international market requirements for Australian food

'The major influences and awareness raisers for environmental issues in the food industry have been lobby groups and the media, but increasingly food retailers are becoming a force to be reckoned with. The British supermarket chains dominate the interest in sustainable production issues, and have a major influence over consumer perceptions of product quality and other attributes' (Woodward-Clyde 2000).

European retailers have developed specifications for food safety and quality that may eventually become a requirement of doing business within fresh food markets around the world, as the European retail consortiums become established in other countries (AFFA 2002). General market requirements for food production can be divided into the categories of safety, intrinsic product quality and extrinsic product quality (AFFA 2002).

2.2.1 Food safety
All retailers believe that food safety is the responsibility of their supply chains, with many requiring independent third-party audits to HACCP (Hazard Analysis at Critical Control Points) or HACCP-related standards (AFFA 2002). Many retailers also consider traceability of products to be an important aspect of food safety programs.

2.2.2 Intrinsic food quality
Retailers generally specify a range of product quality attributes that must be met by their fresh food suppliers. Common fresh food specifications identified by AFFA (2002) are variety, freshness, size, colour, absence of damage and days to ripening for fruit and vegetables; and carcase grade, ageing, joints and cuts, and fat levels for meat.

2.2.3 Extrinsic food quality
Extrinsic qualities are based on production practices for fresh foods, and may have little bearing on the intrinsic quality attributes identified above. According to AFFA (2002), the main extrinsic quality issues are:
- animal welfare;
- protection of the natural environment;
- conservation of biodiversity;

- regulated harvesting of wild plants and animals; and
- ethical supply chains and social responsibility.

A common theme in discerning mainstream fresh food markets around the world is a requirement for food to be safe, to possess a number of specific intrinsic quality attributes, and to be derived through ethical production practices. For this reason the mainstream markets will increasingly demand fresh foods that contain a bundle of preferable attributes, rather than foods that have strengths in one area and weaknesses in others.

Niche markets have specific requirements, and in some cases may tolerate products that fall short in some areas. For example, consumers who demand organic vegetables because of their safe and natural attributes may accept produce that does not meet their full expectations for size and colour.

While the above European market signals dominate discussion about market requirements for Australian food and fibre, these are not the requirements of Australia's major markets in Asia. Asian markets demand safe food and show preferences for less intensively produced, low chemical residue food, and generally do not source fresh food in accordance with production protocols (see Twyford-Jones et al. 2003).

2.3   Market requirements for Australian wool

Trends in market requirements for wool mirror those in the fresh food industries, with intrinsic quality based on attributes such as fibre diameter, length and strength the main determinants of price.

While wool market requirements for extrinsic factors are less well developed compared with fresh food markets, there is an increasing trend, driven largely by legislation, to factoring environmental criteria into the purchasing decisions of wool processors. New environmental legislation in Europe will exert tight control over the textile industry, and will require minimisation of all biocide and pesticide emissions in wool textile processing (Shaw 1996). This will also require wool producers to play an important role in reducing the content of these residues to specified levels.

Eco-labelling may play a role in catalysing improvements in environmental performance of wool producers and the wool textile industry. However, apart from a few niche markets in Europe, there is no clear evidence of broad consumer demand for eco-labelled woollen products.

As in the fresh food industry, processors and retailers are defining the environmental requirements of wool production systems. They do this through procurement policies that contain environmental considerations, which are placing increasing pressure on suppliers and producers to provide evidence that their environmental and other performance criteria have been met.

2.4   Summary

Discerning mainstream fresh food markets around the world now expect food to be safe, to possess a number of specific intrinsic quality attributes, and to be derived through ethical production practices. Safety is of utmost importance in all food sectors, with assurances for food safety becoming a condition of access to many markets of fresh food, both in Australia and overseas.

Intrinsic food quality, including attributes such as colour, tenderness and fat content for meat, is also a high priority of all markets. Specifications for intrinsic quality play a major role in determining prices paid to growers of fresh produce.

Ethical production, sometimes referred to as extrinsic product quality, is an emerging market requirement. EU markets are beginning to expect their fresh food suppliers to demonstrate compliance with legislation, farm worker conditions, animal welfare and environmental protection.

Market requirements for wool mirror those in the fresh food industries. Access to some markets may soon require raw wool to meet specified minimum levels for chemical residues, and intrinsic quality based on attributes such as fibre diameter, length and strength generally determine price. Requirements for extrinsic quality, while less well developed compared with fresh food markets, are now being considered by some wool supply chains.

The pressure of community, government and markets on primary producers to demonstrate sound environmental performance combined with the benefits that may arise from this is likely to make it more and more difficult to do without environmental management.

3. An introduction to standards used for on-farm assurance of food and fibre

This chapter introduces the concept of a standard and explains the two main categories of standard that can be applied to the on-farm production of food and fibre.

Mech and Young (2001) provide a Standards Australia (2001) technical definition of standards: 'accepted specifications or codes of practice which define materials, methods, processes and practices that, when effectively implemented, ensure that consistent and acceptable levels of quality, performance, safety and reliability are achieved'. They also present useful definitions and explanations of other terms associated with voluntary environmental management arrangements (VEMAs). Definitions of key terms used in this report can be found on page x.

The growing global interest in 'environment-friendly' products has resulted in the development of international environmental standards for facilitating trade and for giving consumers confidence in environmental claims made on product labels (ISO 2000a). The principal goal of these standards is to encourage demand and supply of products that have less adverse impact on the environment, thereby stimulating market-driven continual environmental improvement (ISO 2000a).

On-farm standards vary enormously in their purpose and procedures, but can be broadly classified into two groups: organisation- and product-oriented standards.

1. Organisation-oriented standards
    Organisation-orientated standards (also called process standards) prescribe management systems and other processes to be adopted by a business. ISO 14001, the best-known process standard for environmental management, prescribes an environmental management system (EMS) that must be implemented by a business. This sets out internal organisational processes for companies to follow to improve their environmental management. An EMS does not specify production practices to be used, intrinsic product qualities to be achieved, or environmental performance targets to be met, as these are all determined by the organisation implementing the system. Similarly, ISO 9001 is an organisational standard for quality systems.

    Certification of these types of standards by a certification body must occur in accordance with ISO/IEC Guide 62:1998 (General requirements for bodies operating assessment and certification/registration of quality systems), and ISO/IEC Guide 66:1999 (General requirements for bodies operating assessment and certification/registration of environmental management systems). These two documents are to be combined and replaced with ISO/IEC 17021 (General requirements for bodies operating assessment and certification of management systems) (G. Drake, Head of Conformity Assessment, ISO, pers. comm.).

2. Product-oriented standards
    In contrast, product standards specify production practices and/or intrinsic product qualities that need to be met by the organisation implementing the standard. In some cases these standards will prescribe environmental outcomes that must be achieved by producers, such as is the case with Type I environmental labels.

    Production protocols developed by retailers, some environmental labelling standards, and organic standards are examples of standards that prescribe production practices for food and fibre. These do not specify management systems or processes, and generally do not specify or guarantee intrinsic attributes of products.

Other product standards specify intrinsic attributes of products. Type I environmental labelling standards contain specifications for product function, and the Meat Standards Association standard specifies attributes of meat related to eating quality.

Certification of product standards by a certification body needs to occur in accordance with ISO/IEC Guide 65:1996 (General requirements for bodies operating product certification systems).

The distinction between organisation- and product-oriented standards is important, as this has a large bearing on the capacity of these two categories of standards to deliver the requirements of markets. A vital question is: does the market want assurances on the process for managing the environmental and other aspects of food production, or does it want assurances on production practices and/or the intrinsic qualities of products? The answer to this question will determine the category of environmental standards to be used by producers of food and fibre.

A number of environmental and related standards are now being used in Australian agriculture. These include the organisation standard ISO 14001 that is the international standard for EMS, and product standards like organic and eco-labels, food safety and quality standards such as Flockcare and Cattlecare, and retailer production protocols such as EUREPGAP (Euro-Retailer Produce Working Group for Good Agricultural Practice). These vary enormously in their purpose, outcomes and procedures, and each will be considered in this review.

It is important for producers to consider all of the attributes of food and fibre that are required by customers and consumers. Since good environmental management is only one of many attributes that are expected by consumers, and often not the most important (MacNamara & Pahl 2003, Twyford-Jones et al. 2003), producers may wish to consider on-farm standards that are capable of addressing the broad range of attributes expected by markets.

The following chapters (4–9) discuss a number of on-farm standards that are used to meet the expectations of markets for food and fibre. The standards covered in this review are:
- food safety and quality assurance (in Europe and Australia);
- environmental labelling;
- organic; and
- environmental management systems.

The first three standards fall under the heading of product standards, while the fourth standard, EMS, is an organisation standard.

The discussion of these standards begins with the European food safety and quality assurance standards, as these are widely recognised as the global leaders in on-farm assurance for fresh foods.

4. European on-farm standards for food safety and quality assurance

This chapter outlines broad trends in the development of European standards for food safety and quality assurance. In particular, it describes EUREPGAP which is becoming a benchmark for on-farm food safety and quality assurance.

Retailer requirements for safety and quality have been major commercial drivers of the development and implementation of standards for food safety and quality assurance. Major supermarket chains in Europe and the UK are now sending clear signals to their suppliers on the need for them to be certified to safety and quality standards. For example, European retailers have recently stated that their growers of fresh food products will need to be certified to HACCP and quality standards by the end of 2003 (Macalpine 2002).

Visser (2002) notes that customers and stakeholders are increasingly demanding that each sector of the supply chain prove that processes are in place to ensure:
- product specifications are met;
- consistency and predictability are maintained;
- regulatory compliance is fulfilled;
- chemical and antibiotic limits are not exceeded; and
- food safety and traceability requirements are met.

A significant driver of these requirements is the 'own-label' products that account for close to half of all food purchased in UK supermarkets, and is much more pronounced in the fresh produce category (Newton 2000). The UK *Food Safety Act 1990* made retailers and not manufacturers responsible for all retail-branded (own-label) products. This means that retailers will demand safety through compliance with international standards as a condition of supply (Visser 2002). As the imperative to protect the integrity of brands increases, retailers take a more active role in controlling risk back through the production chain. UK retailers have now focused their attention right back to the farmer/grower end of the supply chain.

Clearly, UK retailers are setting the standard for their suppliers of fresh food. This is being looked at closely by major retailers around the world, and some of these are signalling that on-farm food safety and quality assurance with full product traceability will be a requirement for the future (Todd 2000, Visser 2002).

4.1 Proliferation of European food standards

Many of the UK retailers have developed their own food safety and quality standards and are encouraging their suppliers to comply with these. Sainsbury's developed a policy on Integrated Crop Management (ICM) that defined a number of crop production practices for their growers. This policy was then issued to all Sainsbury's suppliers, and over time evolved into production protocols for crops (Finlayson 1999). Other food retailers in the UK also responded to consumer pressure. For example, Tesco developed Nature's Choice for fresh fruit and vegetables, a grower's code of practice covering food safety, occupational health and safety, and environmental management. Tesco has also developed the Producer's Club for the production of pork, beef and lamb. In addition to complying with the codes of practice such as Nature's Choice or Producer's Club, growers are also required to meet stringent product quality specifications.

Many hundreds of quality assurance and food safety standards have been developed to suit particular circumstances. The Safe Quality Food (SQF) Institute estimates that there are over 800 food industry quality systems in use through out the world (SQF 2002a). The proliferation of standards and the

subsequent confusion, complexity, and multiple audit costs generated by this has brought about the need for harmonisation of standards.

The trend towards harmonisation of food safety and quality standards is most evident in Europe (Todd 2000). Major achievements in harmonisation of quality standards occurred in Britain with the British Farm Standard (BFS), which brought together a number of on-farm quality standards covering the meat, poultry, dairy, pork, and fresh produce sectors. A single and simple 'umbrella' logo, the red tractor, identifies products grown under a range of on-farm standards, with the aim of reducing consumer confusion arising from multiple standards and logos (Todd 2000).

Similar large-scale harmonisation of standards has occurred in the European food retail industry. Many of the individual quality and food safety standards of retailers have been harmonised, with two prominent common standards being the British Retail Consortium (BRC) Standard and EUREPGAP.

BRC, which has been in operation since 1996, is used by companies supplying branded fresh and processed food products for the retailer's own label (AFFA 2002). This standard covers basic safety and quality requirements, including HACCP. If required, additional quality attributes such as animal welfare or environmental protection are addressed through other standards used by the retailer.

EUREPGAP is rapidly becoming a benchmark for on-farm food safety and quality assurance, and is receiving considerable attention in Australia. Senior EUREPGAP representatives have visited Australia on two occasions in 2002 and, in particular, noted that certification to this standard would be a mandatory requirement for doing business with EU retailers from the beginning of 2004 onwards.

4.1.1 EUREPGAP

The EUREPGAP guidelines reflect a harmonisation of the existing safety, quality, and environmental guidelines of the Euro retailers, and are a response to increasing consumer interest in food safety and environmental issues (EUREP 1999). The detailed production protocols were first developed for fruit and vegetables and now cover flowers and grains. EUREPGAP is also developing a whole-farm model to cover mixed livestock and plant enterprises.

EUREPGAP has a growing membership of European and UK retailers, including leading food retailers such as Sainsbury's, Tesco, Safeway, Coop Italia, Belgian Wholesale Markets, Waitrose and Kesko. It hopes to become the global player in agricultural production standards and verification frameworks.

The EUREPGAP protocols (or standards) are being promoted as baseline market-entry standards. The main focus is food safety, but the protocols also address a number of issues concerning the environment (soil, water, and wildlife conservation), occupational health and safety (OH&S), complaint procedures and internal audits. Many of the latter elements of EUREPGAP are simply encouraged, meaning that growers do not have to comply with these at this stage. However, the attention given to these elements may indicate that certain environmental and OH&S issues will become more important in the future, and that the attention given to these issues during a certification audit is a mechanism for giving producers some warning of future developments of the standard.

An independent and accredited certification body audits growers to the relevant EUREPGAP standard. One announced annual audit is mandatory, and a further 10 per cent of growers will be audited each year on an unannounced basis. Grower groups can also apply for EUREPGAP certification, and are able to achieve some cost efficiencies through the group audit process. Only a sample of individual growers in the group are audited each year, equivalent to the square root of the total number of growers in the group. This can substantially reduce audit costs for individual properties, but does bring about the need for additional costs of group administration and internal auditing.

A draft EUREPGAP standard has recently been developed for livestock production, consisting of integrated farm assurance with a beef and sheep module and whole-farm compliance criteria. This

standard is for consultation only, and no decision has been made on how and when it will be implemented. The extensive compliance criteria (listed in a 78-page table) specific to livestock fall into a number of categories:

- staff health, safety, training, facilities and welfare;
- farm-related legislation;
- management of land and buildings including site history, chemical storage and use;
- livestock welfare, management, husbandry, traceability, and health;
- livestock road transport;
- medicine storage, use and recording;
- livestock feed storage and records;
- livestock management and housing;
- machinery and equipment records;
- waste and pollution management, and energy efficiency; and
- environmental management, including impact of agriculture on the environment, wildlife conservation, unproductive sites, nitrates and phosphates in groundwater.

EUREPGAP certification does not provide for product labelling, even though it is regarded as a product certification standard. Therefore, the EUREPGAP logo cannot appear on products at the point of sale to the final consumer, but it can be used in business-to-business interactions.

Differentiation of products through labelling is something that occurs beyond EUREPGAP (Moeller 2002), requiring additional specifications. For example, Tesco may attempt to differentiate its fresh produce from that of other similar retailers by adding additional production protocols through its Nature's Choice program. Similarly, the Certification de Conformité is used as the basic level on-farm quality standard for French producers, but this does not provide a label that identifies quality products in the market place. The latter occurs through the use of quality labelling standards such as Label rouge (AFFA 2002).

Retail members of EUREPGAP are moving towards a time when all their suppliers will need to be certified to EUREPGAP, and are setting deadlines for growers. For example, Sainsbury's is telling table grape growers in Australia that they must be certified to EUREPGAP by January 2004 if they wish to continue selling into that market (Tolson 2002). Some incentives, such as price premiums and selling certified produce first at auctions, are also being offered to encourage growers to meet these deadlines (Moeller 2002). However, during a visit to Australia in March 2002, Nigel Garbutt, the Chairman of EUREPGAP, made it clear that premiums would not be offered for EUREPGAP-certified product; instead, this would simply be a condition of market access. However, the benefits of access to at least some EU market segments could justify the costs associated with EUREPGAP certification, and hence primary producers should not dismiss this standard without a close examination of all costs and benefits.

While the EU retailers have set a date after which they will accept only EUREPGAP-certified produce, it may be difficult for them to enforce this. Retailers will not wish to disrupt supply chains, as this will impact on their capacity to keep shelves fully stocked with good quality and reasonably priced products. For this reason retailers are unlikely to restrict the supply of produce by an early declaration, and may need to review this if a high proportion of growers have not obtained EUREPGAP certification.

EUREPGAP does not wish to replace similar standards developed by other retailers, industry groups, or other countries, and instead has developed a process for harmonising with these standards. Producer certification to EUREPGAP must be undertaken by an accredited certification body in accordance with ISO/IEC Guide 65 for product certification systems. Accordingly, only standards that are certified in accordance with ISO Guide 62 can be judged equivalent with EUREPGAP (Moeller 2002). Standards that are certified in accordance with ISO/IEC Guides 62 and 66 for management systems such as ISO 9001 and ISO 14001 cannot be harmonised with EUREPGAP. This means that Australian

growers with ISO 9001 or ISO 14001 management systems would need to obtain an additional certification for EUREPGAP. However, it is possible that these two certifications could be done simultaneously by an auditor, providing that the auditor is accredited to both ISO Guide 65 and ISO Guides 62 or 66 (H. Hays, EUREPGAP Technical Manager, pers. comm.).

4.2   Summary

EU retailers are setting global benchmarks for the production of fresh food, and are sending clear signals that all their suppliers will need to be certified to safety and quality standards. Customers for fresh produce are increasingly demanding that supply chains implement processes to ensure that product specifications are met, consistency in quality is maintained, residue and antibiotic limits are not exceeded, and that safety is guaranteed.

Individual EU retailers first developed their own production standards (or protocols) that define the production practices that must be used on farms that supply their fresh food. The need to rationalise these led to the development of common food production standards, with the aim of making it easier for growers of fresh foods to comply with the requirements of retailers. The BRC standard and EUREPGAP are the most widely known examples of common EU standards. EU retailers expect that all growers who supply fresh food will be certified to these or equivalent standards by the beginning of 2004.

EUREPGAP is a model of on-farm assurance that is being promoted to growers of fresh food as a mandatory standard. It is regarded as a condition of entry to EU markets and is unlikely to provide price premiums. However, the prices received by growers in EU markets need to be considered, as these may justify the additional costs of compliance and certification. While the principal focus of EUREPGAP is food safety and quality, the importance of environmental criteria in these types of standards is likely to increase over time. The development of this standard is consistent with a global imperative for one standard that addresses major market requirements for food safety, quality and environmental issues, rather than this occurring through separate standards. Primary producer certification to EUREPGAP must be undertaken in accordance with ISO Guide 65, which covers product certification standards. EUREPGAP can only be harmonised with food safety and quality standards that are also certified in accordance with ISO Guide 65.

5. Australian standards for food safety and quality assurance on-farm

This chapter surveys standards used in Australia for food safety and quality assurance including the Safe Quality Food (SFQ) standard and the livestock standards, Flockcare and Cattlecare. It reviews existing producer adoption of food safety and quality assurance standards and likely future trends.

Like other countries, Australia uses a large number of food safety and quality assurance standards (FSQA). Many of these standards have been customised for specific industries and uses. A search of the AFFA Food Safety and Quality navigator web site (www.affa.gov.au/fsqnavigator) found many standards that are currently used in the meat and livestock industries. A sample of these include Australian Pork Industry Quality Program, Cattlecare, Coles Suppliers of Proprietary Brand Food Products, Flockcare, Foodsafe Quality Assurance Program, HACCP, ISO 9001, Livestock Export Accreditation Program, McDonald's Australia, Q-Safe, and SQF 1000 and 2000. A similar large number and range of standards are also used in the horticultural and grains industries.

Quality assurance standards used in Australian agriculture are generally based on international standards for quality systems (ISO 9002) and food safety systems (HACCP). Most Australian FSQA standards are designed to be less onerous and less costly than the ISO 9002 and HACCP standards, and have been customised for particular industries. This has occurred in an attempt to make these standards more attractive to producers, and result in more widespread adoption within industries.

Many of the Australian industry quality assurance standards share common elements and can be integrated for one on-farm audit (Clark 2002). Therefore, mixed farming enterprises such as those producing sheep, cattle and grain could develop an integrated quality assurance program, enabling them to acquire certification to all three standards through one audit.

International and national efforts at harmonisation or mutual recognition of quality assurance standards may make it easier and less costly for producers to meet requirements of multiple markets. This could make compliance with quality, safety and other market requirements more attractive to growers of food, and may lead to greater adoption of standards within Australian primary industries.

Three FSQA standards that are commonly used in Australian livestock industries are briefly discussed.

5.1 Safe Quality Food (SQF) Standard

The Western Australia Department of Agriculture developed the HACCP-based standard SQF 2000 as a less onerous and less costly alternative to ISO 9000 standards. Prior to this the ISO 9000 series of standards were the only third-party audited management standards readily available to all sectors of the food industry (SQF 2002a). These ISO standards were seen by the food sector, particularly small enterprises, as being too costly and complex for their operations, and they did not address the priority issue of food safety. Consequently, many of the principles of HACCP, an internationally recognised food safety standard, were incorporated in SQF 2000.

SQF is now administered in Switzerland by the SQF Institute. They claim that their standards fully integrate food safety and quality management systems that can be applied along the entire supply chain. SQF 2000 is designed specifically for the food industry, and all businesses in the supply chain can implement this standard. It is also designed to support industry- or company-branded products, as the SQF logo can be used on products and packaging as a means of branding and promoting produce.

SQF 1000 was released later in response to demands for a HACCP program that was more tailored to farms, particularly those considered a low safety risk. It is focused on quality and safety assurance in primary production, and adopts a staged approach designed to make it easier to implement (SQF

2002b). SQF 1000 is designed specifically for primary producers, and makes it possible for producers to demonstrate that they have implemented environmentally responsible practices, met animal welfare obligations, and addressed work place health and safety requirements. The SQF 1000 standard is now being modified with the addition of environmental management practices in the pastoral industry of Western Australia (Taylor 2001).

SQF 1000 has also been recently combined with the Great Grain quality assurance system of Pulse Australia to produce the Grains Quality Assurance Program for grain producers in Western Australia (Pietzner 2002). This combined quality assurance and food safety system for grain growers is designed to be farmer friendly, have international recognition, and be flexible enough to include other commodity groups in one on-farm quality assurance standard. A training program supported by FarmBis (State and Commonwealth Government program that provides training for primary producers) has been delivered to large numbers of grain growers throughout Western Australia, and at the end of the course an auditor visits the farm to conduct an audit of the quality system.

Visser (2002) of SGS Certification Services believes that Australia should adopt the SQF 1000 and 2000 standards and use these management systems to comply with the requirements of EUREPGAP and other relevant standards. He justifies this by saying that a recent survey conducted by the Royal Agriculture College in the UK rated SQF 2000 as the standard that compared best with EUREPGAP and the BRC, and that SQF is now being used in Europe, Asia, Africa and South America.

5.2 Livestock FSQA: Flockcare and Cattlecare

Flockcare and Cattlecare are also based on ISO 9002 and HACCP, and have been adapted for application to beef and sheep properties. The Cattlecare (2000) and Flockcare (2000) manuals note compatibility of these quality assurance standards with the ISO 9000 standards, allowing certified producers to upgrade to ISO 9002 or HACCP as the fundamentals of these latter programs are already in place.

A number of crises in the beef industry due to chemical residues prompted the Cattle Council of Australia to develop Cattlecare in 1996 (Toohey 2002). Cattlecare, one of the first on-farm FSQA programs, has 15 elements, most of which are management practices that are generic to farms, and have since been adopted by other industry FSQA programs such as Flockcare, Graincare and Freshcare. Cattlecare also contains specific cattle-related elements that target chemical and drug use that may be detrimental to meat quality and safety.

5.2.1 Evaluation of Flockcare

Pastoralists who are certified under Flockcare are eligible for a premium of 25c per sheep delivered to some abattoirs (L. Dunlop, pers. comm.). They argue that this premium, often amounting to less than 1 per cent of the livestock price, does not cover the costs of compliance and certification.

A survey of 47 sheep producers in Queensland identified a high level of dissatisfaction with the performance of Flockcare (L. Dunlop, pers. comm.). Survey findings included the following:
- The cost of auditors is a point of dissatisfaction for producers who are not receiving financial benefits from the program.
- Thirty-two (32) per cent of Flockcare members expressed a strong level of discontent with the standard.
- Seventy-five (75) per cent of members perceived they are getting no benefit from Flockcare membership.
- Thirty-four (34) per cent said there were no disadvantages from being a part of Flockcare.
- There appears to be limited awareness of the possible benefits of being a member of Flockcare.

In spite of this discontent, membership appears to be loyal, with 70 per cent of certified producers with intentions to renew their accreditation. 'This survey shows that there is a small but dedicated group of producers who care about the industry, its image and their performance in it, and it is these people who

are loyal members of Flockcare' (L. Dunlop, pers. comm.). However, the large majority of sheep producers are still waiting for motivation to join Flockcare; only 71 of an estimated 3,000 sheep producers in Queensland are certified.

No producer in the survey cited a financial benefit from being in Flockcare, which is a primary cause of complaints. To receive benefits, producers may need to address issues additional to residues and contaminants, for which Flockcare was designed. Even the current small premiums being offered by processors for Flockcare sheep and lambs may be temporary, as processors could soon use Flockcare to identify and discount non-declared and non-conforming stock (L. Dunlop, pers. comm.).

Producers are more likely to obtain premiums by using ISO 9001 quality systems. These are able to specify livestock attributes that are valued by customers, and cover issues such as price, as determined and demonstrated by weight, fat score, numbers supplied, time of delivery, wool description and seed discounts (L. Dunlop, pers. comm.). These are elements of value-chain trading that can be assessed (by the owner or external assessor) before departure of stock from the property. When processors have confidence in the supply of livestock with these attributes, as described in the consignment papers, they are willing to pay higher prices for these preferred and valued stock. Producers also get feedback on the performance of mobs and know how to adjust consignments to meet customer requirements.

An example of a group that consistently receives top prices for prime lambs by adopting elements of ISO 9001 is the Border Lamb Producers Group at St George in south-west Queensland (L. Dunlop, pers. comm.). Members of this group weigh all of their lambs for sale and have them externally assessed by their agent, Dalgety Landmark, to provide conforming product.

Pastoralists who sell their stock to abattoirs under a contractual standard have obtained significantly improved prices. They provide a product with a guaranteed weight and fat score, and in numbers and at times required by the abattoir. These product attributes and supply issues are of commercial value to the abattoir, and have enabled producers to negotiate premium prices for their stock.

Primary producers are unlikely to obtain price premiums for products arising from forms of FSQA standards that only specify production practices, as is the case with Cattlecare and Flockcare. FSQA standards capable of specifying intrinsic qualities of livestock (weight, fat score, etc.) that are highly valued by customers are more likely to facilitate the market outcomes required by primary producers.

5.3   Producer adoption of Australian food safety and quality assurance

Some primary industry organisations have gone to considerable effort to encourage widespread adoption of FSQA amongst their growers. For example, in the horticulture industry, Freshcare training was provided to several thousand growers through a national network of trainers, using FarmBis funds to cover much of the costs to producers (Clark 2002). In spite of this, only 250 growers were certified to Freshcare by July 2002. However, many fruit and vegetable growers are certified to other quality assurance programs such as SQF 2000, and may not have required the additional certification of Freshcare.

The level of adoption of on-farm FSQA in the grains industry also appears to be low, in spite of the provision of training to grain producers over a number of years (Pietzner 2002). From a total grower base estimated at 45,000 growers, less than 1,000 were accredited to a FSQA program at the end of 2002 (Pietzner 2002).

Cattlecare, one of the first on-farm FSQA programs in Australia, has now been adopted by over 4,000 cattle producers, accounting for 20 per cent of the national cattle herd (Toohey 2002). While Cattlecare certifications are impressive, recent uptake by producers has plateaued, and this has been the subject of a national investigation by Meat and Livestock Australia.

According to Mech and Young (2001), the benefits of FSQA that are often promoted to producers to encourage adoption include:

- improved product consistency;
- food safety;
- livestock health;
- risk management;
- improved competitiveness;
- greater professionalism;
- preferred supplier status;
- international recognition and market access; and
- product differentiation.

Growers are mainly interested in market benefits, and in this respect FSQA has not been a strong performer. Certified and non-certified producers are generally treated equally in the market place, and thus certification has not been rewarded with either increased demand or price premiums. Growers identify lack of recognition as the single most important reason for failing to renew standards like Cattlecare (Toohey 2002), with other barriers being documentation requirements, certification costs, training, bureaucratic interference, and multiple audits for mixed enterprises (Lemmons 2002, Toohey 2002). For these reasons it is not surprising to hear comments like 'many farmers are in quality assurance regression since training — they feel cheated by quality assurance, as it gives no competitive advantage' (Tolson 2002).

In-principle support and/or the fear of losing markets are not sufficient to get adoption of FSQA by growers (Pietzner 2002). Growers consider FSQA in terms of an investment for their business, and thus the effort and cost required for certification needs to be repaid through management and/or market benefits.

The most effective driver of uptake of FSQA is the value chain, where the marketers and end-users obtain some benefit from the certified product. For example, a market for Shochu barley in Japan valued quality assurance to the extent that it paid a premium of $20/tonne for certified grain, and subsequently growers were quick to comply with their requirements (Pietzner 2002). Similarly, Toohey (2002) notes that Cattlecare must deliver the outcomes that consumers want, and then perhaps supply-chain demand for quality-assured product will drive the wide adoption of Cattlecare and other on-farm FSQA programs. So far, the offer of an additional $3 per beast by some processors for Cattlecare-certified cattle has not been a sufficient incentive for producers to adopt and stay in this program.

5.4   Future for Australian food safety and quality assurance

The On-Farm Quality Assurance and Food Safety Conference (2002) in Hobart had a consistent theme of harmonising on-farm assurance by building on existing standards, rather than creating new ones. There was an active interest in harmonising Australian and international on-farm standards by developing modules that address perceived shortfalls in the Australian standards. Hancock (2002) reaffirmed the strong market signals for food safety and quality, and noted emerging interest in environmental protection, biodiversity management, animal welfare, ethical trade and social responsibility. A number of conference delegates identified EUREPGAP as a useful model for harmonising on-farm production standards, and believed that similar models will develop in other markets, including Asia, which is the current destination for much Australian produce.

The administrators of major Australian standards such as Freshcare and SQF 2000 have also expressed a desire to harmonise with international standards. A comparison of Australian standards such as SQF 2000 and Freshcare with EUREPGAP found many common elements (Bennett 2002). The most notable gaps occurred in the areas of occupational health and safety, animal welfare and environmental management. SQF 2000 and Freshcare may now be expanded through the addition of modules that address gaps between them and global standards like EUREPGAP. This will enable a producer to

acquire dual certification to an Australian FSQA and EUREPGAP through one standard and one audit. Meat and Livestock Australia is also recommending that on-farm quality assurance for red-meat producers include optional customer-defined modules.

A number of factors favour the use of current FSQA programs for integrating and harmonising on-farm assurance standards. These are:
- major market requirements are food safety and food quality;
- a range of food safety and quality standards have been purpose-built for Australian agricultural industry sectors;
- Australian producers are familiar with industry FSQA standards, and many producers have received training;
- many producers are already certified to industry FSQA standards; and
- FSQA standards can be harmonised with current global benchmark standards like EUREPGAP, providing an opportunity for one standard and one audit.

While Australian FSQA standards can be harmonised with international retailer protocols, it is important not to overreact to market signals and implement assurance schemes that go beyond the requirements of most markets. Perhaps this is why two levels of quality assurance for red-meat production have been recommended by Meat and Livestock Australia (MLA 2002). The first level appears to be a vendor declaration approach with a focus on food safety, and could become mandatory. The second level is voluntary full quality assurance with optional customer-defined modules.

These two levels of FSQA could be aligned with different market segments. The first level, a form of vendor declaration, is more suited to the bulk or mainstream commodity markets, where assurances on the number one priority, food safety, may become a condition of market access in the short to medium term.

The second level of FSQA, full quality assurance plus customer-defined modules, is better suited to niche-market segments. This form of on-farm assurance, perhaps with third-party certification against a standard, should enable producers to give assurances that the specific production practices and/or product attributes required by a value-chain customer have been met. This type of on-farm assurance could be regarded as a contract between value-chain partners, where specified goods are delivered for a specified price.

The development and application of the second level of on-farm FSQA should be negotiated with value-chain partners, particularly processors and retailers. This demand-driven approach provides opportunities for producers to negotiate prices for certified product, and is therefore more likely to add value to plant and livestock products. The contractual arrangement between the Border Lamb Producer Group and a processor is a good example of this approach.

A supply-driven approach, where producers independently develop and implement their own standards, may inadequately target consumer and retailer requirements, and place producers in a poor negotiating position where there is little chance of recouping the costs of certification in the market place.

On-farm FSQA should be designed so that it adds value to primary production enterprises through relationships with supply chains. In this context it is useful to divide the market into bulk commodity and niche segments, and to choose different forms of FSQA for each pathway. The bulk commodity markets will always be sensitive to price, requiring that the costs of on-farm FSQA be kept to a minimum. Niche markets will have specific and higher requirements for food quality that should be negotiated with producers, and again FSQA should be designed in accordance with the benefits and costs of these transactions.

5.5   Summary

Australian agriculture has many customised FSQA standards that are based on ISO 9002 and HACCP, with livestock examples being Cattlecare and Flockcare. A number of FSQA standards share common elements and, if necessary, can be successfully harmonised into one on-farm audit. Australian FSQA standards may in the future also be harmonised with export market standards like EUREPGAP, but this will require the development of additional customer-defined modules.

SQF 1000 and 2000 appear to have a number of features that make them attractive as food safety and quality assurance standards for agriculture. They have a strong focus on safety, are designed specifically for the food industry, are well known in overseas markets, can be used along the entire supply chain, are third-party audited, and confer a label to conforming product.

While several primary industry sectors have been very active in developing and promoting FSQA, relatively small numbers of producers have been certified. Producers generally cite a lack of recognition and benefit from their certification as the main reason for not adopting quality assurance, and are unable to justify the participation costs.

It is possible that some Australian government agencies and industry organisations associated with agriculture have over-reacted to emerging market requirements for fresh food in Europe, and have sought to introduce FSQA standards that go well beyond the requirements of current markets, particularly in Asia. FSQA should be tailored for specific markets, and consist of two levels of assurance.

The first level of FSQA should focus on food safety for bulk commodity markets, and could take the form of a relatively simple vendor declaration, or in some cases a simple and uncertified EMS. Food safety is a must for all markets, and producers must accept responsibility for safety pre-farm-gate.

The second level of FSQA should be considered as a value-chain trading tool for delivering specified product to higher value market segments. These forms of FSQA with optional modules could be tailored to meet the exacting requirements of individual markets, with both the format of the standard and prices negotiated between supply-chain partners.

6. Standards for on-farm assurance of wool production

A number of on-farm standards are available for use along the wool supply chain. The most prominent of these are the quality assurance standards like Clipcare and Dalcare that are designed and applied specifically to wool production. Organic certification is another widely known form of on-farm standard that is used for wool production in Australia, although on a relatively small number of properties. Less common but emerging standards like environmental management systems (EMS) and environmental labels have been used on just a small number of wool-producing properties.

This chapter briefly discusses procurement policies and a range of standards such as organic production, environmental labels and EMS, with specific reference to their use in the wool-growing industry. Later chapters provide more detail on these approaches as they are applied in the wider context of Australian food and fibre.

6.1 Procurement policies

The procurement of textiles by large manufacturers and retailers is often guided by internal standards or policies, and in some cases these contain environmental criteria. Internationally, large retailers and garment manufacturers have led the way in terms of developing environmental criteria for their suppliers (UNCTAD 1999). These companies include Europe's largest garment manufacturer, Steilmann, Marks and Spencer, Next, Peek & Cloppenburg, and Patagonia. The procurement criteria of these companies are usually self-developed, as they believe that existing schemes are inappropriate because of their national focus, expense, inflexibility and narrow scope (Shaw 1996). The self-developed guidelines also tend to focus on the product as well as all aspects of production, and require assurance from suppliers that the guidelines have been met (Shaw 1996).

The Oko-Tex Standard 100 (German ecological and technical standard for textiles) has become the 'informal standard for many large department stores' and is leading to a 'gradual "greening" of textile products' (UNCTAD 1999). While eco-labelled textiles are not prominent on retail shelves, large department stores such as C&A will publicise in-store the award of Oko-Tex Standard 100 certification when this is achieved by their suppliers (UNCTAD 1999).

While the majority of wool growers will not be directly exposed to the specifications of manufacturers and retailers, it is likely that these will eventually be conveyed to them by wool buyers and processors. Consequently, on-farm standards should be able to guarantee that raw wool has met the specifications of supply chains for intrinsic wool quality and extrinsic production practices.

6.2 Quality assurance

Quality assurance is also used in the wool-growing industry. Clipcare, developed by Elders Ltd, and Dalcare, developed by Wesfarmers Dalgety Ltd, are the principal national standards for quality assurance in wool production. Little has been written about these standards, and levels of wool grower membership are not known.

A number of the other quality assurance standards for wool production operate at a regional scale. Tasmanian Quality Wool (TQW) was established in 1994, and is a third-party audited quality assurance program that markets wool under a brand name or label. TQW, assisted by wool industry funding, plays an important role for its 100 wool grower members by developing value-chain partnerships with companies along the wool supply chain (Macfarlane 2001). TQW provided a value chain that halved supply time, continuously reviewed and cut costs along the chain, and created a level of flexibility in supply that enabled processors to cut their costs. Growers also benefited through premiums of 5−16 per cent for greasy raw wool, increased demand for their wool, and forward orders. This was achieved through a shift to a more responsive value-chain approach, compared with the

traditional supply-chain focus. TQW developed an image for Tasmanian wool growers as a source of premium wool for up-market garments, and marketed this under the Tasmania woollen trouser label (Macfarlane 2001).

Another well-known regional example of quality assurance for wool producers is the Total Quality Management (TQM) program of Traprock Wool in southern Queensland. This program is internally audited against their own standard that is reviewed and improved annually. The Traprock Wool program label or brand, TQM, is used to identify wool from individual properties at auctions. TQM wool has become well known in the market place, and the brand is regarded as a sign of quality by wool buyers.

New Zealand has been active in developing and promoting its quality-assured wool as a point of difference in international markets. The Fernmark Quality Program, based on ISO 9000, is achieving 1 per cent premiums at auctions for its 1,500 wool grower members (Woodward-Clyde 2000), and as such provides little value for wool growers. However, Fernmark Gold, a quality brand or label for wool sourced entirely from the Fernmark Quality Program, is used in the manufacture of high quality textiles. To qualify for Fernmark Gold, all components of the supply chain must be accredited to the Fernmark Quality Program, with assurances given that wool production practices protect the environment, safeguard animal welfare, and result in minimal chemical residues (Woodward-Clyde 2000). The quality label of Fernmark Gold is likely to add value to wool produced in accordance with the Fernmark Quality Program.

6.3   Organic

Organic wool, while difficult to produce, also provides opportunities for differentiation of wool and niche marketing. There is an increasing demand for organic wool, with signs that this relatively small market will expand in the short term (Woodward-Clyde 2000). However, the production of certified organic wool is not easy, as wool producers must abide by restrictions on chemical use, meet animal welfare standards, and wait three years before they can sell their wool as certified organic (Couchman & Crowley 2001).

The Australian National Standard for Organic and Bio-dynamic Produce is the national standard for the production and processing of all organic produce, including wool. A number of certification bodies, such as Biological Farmers of Australia and National Association for Sustainable Agriculture Australia are available to audit wool-growing properties against this national standard. Organic wool production requirements and processes are well described by Baumann et al. (2001a).

6.4   Eco-labels

There are many eco-labelling schemes that cover textiles such as clothing and carpets, with some notable examples being Blue Angel, the EU Eco-label, White Swan, Ecoproof, Eco-tex, GuT, and Greenline (UNCTAD 1999). Most of these labels are based on the consumer health impacts of hazardous substances in textiles, and generally apply only to processing and manufacturing.

Some eco-labels have high market share. For example, 75 per cent of carpets manufactured in Europe are produced in accordance with GuT, the Association for Environmentally Friendly Carpets (Woodward-Clyde 2000). Other labels have niche market status only, and while there has been significant growth in sales of some eco-labelled products in countries such as Germany, these still account for only 1−2 per cent of the entire textile market in those countries (UNCTAD 1999).

The application of life-cycle eco-labels to textiles has proven difficult compared with other products. For example, the life-cycle assessment for domestic washing machines found that the water and energy consumption during use is by far the dominant impact, and that no other life-cycle criterion need be used (Shaw 1996). This abbreviated life-cycle assessment has also occurred with textiles. The EU Eco-label for textiles uses a simplified life-cycle assessment, with a focus on emissions and residues associated with processing and manufacturing. However, the chemical residue levels of wool

entering the supply chain will certainly influence the capacity of processors to meet emission targets, and thus there is an important role to be played by wool producers in the eco-labelling of woollen textiles.

Large mail-order companies that have issued their own eco-labels dominate the eco-textile market. Research conducted by the European Commission to determine opportunities for the uptake of the EU Eco-label, indicated that the use of their own eco-labels excludes any interest in additional environmental labels (UNCTAD 1999). Many of these firms have business practices characterised by strict adherence to high environmental standards and close, direct contact with suppliers.

The Environmental Choice program in New Zealand has a number of specifications that relate to the wool sector, including specifications for wool pile carpets and wool-rich pile carpets (Woodward-Clyde 2000). Specifications include both environmental and product characteristics, but only for processing and manufacturing; they do not address on-farm production.

The Environmental Choice eco-label of the Australian Environmental Labelling Association will also be applied to 100 per cent woollen carpets. This and the EU Eco-label for textiles are two possible eco-labelling options for Australian wool producers. At least one lot of Australian wool, 44 bales from the western division of New South Wales, has been certified to the European Eco-label for textiles, and marketed as eco-wool at auction in Melbourne (B. White, pers. comm.).

Wool producer groups may also develop their own Type II environmental labels, in accordance with the international standard ISO 14021 (see section 7.2), giving them further and more flexible options for labelling their wool 'environment-friendly'. However, in these instances they will need to promote their own labels to prospective markets.

6.5   Environmental management systems

Environmental management systems (EMS) are only now being applied to wool production in Australia, and accordingly little is known about their application to this industry sector. The Traprock Wool producer group in southern Queensland is developing an EMS that will be applied to wool production in conjunction with a TQM quality assurance program. Some wool processors in Australia are also considering implementing an EMS, and this may lead to the development of environmental specifications for wool supply chains (see Twyford-Jones et al. 2003).

In New Zealand, EMS has been adopted by only two wool processing companies as of July 1999, with at least one of these doing this to comply with legislation, rather than market requirements (Woodward-Clyde 2000). While the adoption of quality assurance is rapidly becoming a requirement of international markets, the requirement for a formal EMS appears less significant. The principal driver for EMS appears to be legislation, with no direct market pressure currently being experienced (Woodward-Clyde 2000).

6.6   Summary

Quality assurance, organic certification and environmental labels and EMS can all be used by wool growers to provide assurances for wool, although adoption of these in the wool-growing industry has been much less than that seen with fresh foods.

Chemical residues in wool are the most prominent production-related issue for supply chains. Organic certification and eco-labels are possibly the most suitable standards available to provide assurances that required minimum residue levels have been achieved by wool growers. Quality assurance standards appear to specify wool production practices, rather than a specific level of chemical residues, and therefore are of less value to wool supply chains. Similarly, EMS does not appear to be of value to supply chains, as it specifies neither production practices nor minimum residue levels.

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Standards used to provide assurances in the wool-growing industry should also be implemented in two levels. The first level of on-farm assurance, if required, could provide a guarantee that residue levels in wool have not exceeded a specified limit. Impending environmental legislation that comes into full effect in Europe in 2007 will place pressure on wool growers to supply raw wool with minimal levels of chemical residues. Accordingly, wool growers should consider adopting a simple standard that provides supply chains with assurances that residue limits have not been exceeded. The EU Eco-label for textiles could be used for this purpose.

The second level of on-farm assurance for wool production should be based on standards capable of defining and guaranteeing specified qualities of wool, with these negotiated with value-chain clients. It appears that a value-chain approach to the production and marketing of wool can deliver benefits along the entire wool supply chain, with some standards better suited to this value-chain trading than others. These standards must be capable of being implemented in all sectors along the supply chain, be able to specify production practices and intrinsic qualities of products, be third-party audited, confer a product label, and be recognised by target markets.

7. Environmental labelling

This chapter gives a broad introduction to environmental labelling as a form of environmental assurance. It then describes in more detail the broad label categories that are most widely used internationally, including their respective strengths and weaknesses and the product and market applications for which they are best suited.

Environmental labelling standards provide guidance for the development and application of environmental claims that are made on products or packaging. These environmental claims take the form of statements, symbols or graphics, and their main purpose is to increase sales by promoting 'environment-friendly' products to consumers.

The first environmental labelling standard, the Blue Angel, was introduced in Germany in 1977 (USEPA 1998). This labelling program awards the Blue Angel logo to products that are judged to be the most 'environment-friendly' products within a product category. For example, the Blue Angel logo has been awarded to some newspaper printing papers because they are produced from recycled-paper and without of chlorine bleach. In this way the labelling program identifies products that cause the least environmental impact during their manufacture.

Since then a large number of environmental labels have been developed and used throughout the world (see USEPA 1998, UNCTAD 1999, Thomas & Rowland 2000). Some labels, such as the private logos of a business, are little more than marketing messages; 'dolphin-friendly' tuna is an example of a private label that is based on a simple environmental message. Other environmental labels are much more complex and onerous. For example, the eco-labelling programs of some countries are developed and reviewed by multi-stakeholder working groups, and require products to be assessed against a number of stringent performance criteria. The Swedish White Swan and the European Union Eco-label are examples of national eco-labelling standards, and the Australian 'Good Environmental Choice' eco-label is being developed for several product categories by the Australian Environmental Labelling Association (AELA 2001).

'The overall goal of environmental labels is to encourage demand for and supply of those products that cause less stress on the environment, through communication of verifiable and accurate information on the environmental aspects of products to consumers' (ISO 2000a). If consumers buy environmentally preferable products due to environmental information on labels, then market forces will encourage the adoption of production practices that cause less harm to the environment. 'The "vote" for particular characteristics (including environmental) that consumers make through their purchasing decisions sends signals to producers and retailers about what to produce, how to produce it and for whom' (Jones & Lansdell 2000). While this concept is simple and appealing, neither retailers nor consumers have embraced it, with only small market segments worldwide demonstrating a strong preference for products bearing environmental labels.

An international study into 'green' claims found that environmental claims on products were widespread (Smallbone & Page 1999), commonly occurring on laundry detergents, household cleaners, paints, varnishes, household paper such as toilet rolls, paper towels and nappies, toiletries such as shampoos and bath/shower products, soft drinks, white goods, and some garden products. Environmental labels are also used on a similarly wide variety of Australian products (Jones & Lansdell 2000). Most of these are self-declared environmental claims, and are generally perceived as the private marketing strategies of individual businesses.

A number of important factors influence the design, application and administration of environmental labelling programs, with some major factors being the interests of the public and consumers, the commercial goals of retailers and producers, regulations and standards, and the procurement policies of large business and government (USEPA 1998). The strength of these factors varies between and within countries, resulting in the development of many different environmental labelling programs.

The many different environmental labels used throughout the world can be categorised in a number of ways, but the most widely used broad label categories are Type I, Type II and Type III.

7.1 Type I environmental labels

Type I labels (also called seal-of-approval) are based on environmental criteria established by a third party, such as a board or committee, in consultation with a broad range of stakeholders. Type I labels are usually awarded for a fixed period of time, and there is often a fee or cost involved in using the label on products. Products awarded the label are often restricted to 10–30 per cent of all products in the category (USEPA 1998).

Type I programs tend to have varying levels of government involvement, with most decisions made by an eco-labelling committee that consists of scientists and representatives from business and trade, consumer groups, environmental groups and government agencies. These committees also access technical advice from other expert committees, standards organisations and consultants.

Type I programs license the use of a logo on products that are considered to have less environmental impact than comparable products, based on specific award criteria. These programs follow a three-step process, beginning with the establishment of a product category, development of the award criteria, and then product evaluation (USEPA 1998).

The award criteria are usually based on some form of life-cycle assessment (LCA) and a number of product function attributes. These criteria tend to be reviewed every three years for the purpose of continuous improvement, and to ensure that only a small percentage of products actually qualify for the label (USEPA 1998). This provides an incentive for all manufacturers within product categories to improve the environmental attributes of their products. Overall, this is a complex task, requiring consideration of many factors, including environmental policy, consumer awareness of environmental issues, impact on imports and exports, and economic effects on domestic industry. Well-known Type I programs are Germany's Blue Angel, Canada's Environmental Choice, and the United States' (US) Green Seal.

The International Organization for Standardization (ISO) has developed the ISO 14020 series of standards, covering Type I, II and III voluntary environmental labels. These environmental labelling standards are global models for harmonising and guiding international environmental labelling practices.

The ISO international standard for Type I environmental labelling is ISO 14024.

7.1.1 ISO 14024 standard for Type I environmental labelling

This international environmental labelling standard for Type I environmental labels, ISO 14024:1999(E) (ISO 1999), is based on LCA, and requires independent third-party certification by an accredited certification body. Type I environmental labels are considered by many to be the only true eco-labelling standard.

Type I labelling standards are run by an eco-labelling body that can be government, a private company, a non-government organisation, or combinations of these. Eco-labelling bodies usually provide the resources needed to operate eco-labelling programs, although this tends to be sourced largely from government (USEPA 1998). While most of the funds needed to run a Type I labelling program come from government, income is also derived from fees paid by businesses for products awarded the eco-label.

The eco-labelling body authorises the use of an environmental label on products, indicating its overall environmental superiority based on some form of LCA. USEPA (1998) and Starkey (1998) identify a number of common Type I labelling principles and procedures:
- voluntary;

- run by non-profit organisations;
- product groups and environmental criteria determined by an independent broad stakeholder group;
- comply with relevant environmental legislation;
- environmental criteria are based on LCA, and on relevant local, regional and global environmental issues;
- have specifications for product function and performance, including health and safety;
- have a legally protected symbol or logo;
- accessible to companies from all countries;
- award criteria encourage the development of products and services that are significantly less damaging to the environment; and
- subjected to periodic reviews to update product groups and environmental criteria.

Stakeholder involvement in the environmental labelling process is encouraged during all stages of the Type I labelling program, and particularly with product category selection and development of environmental criteria. The extent of stakeholder involvement is an indication of the level of transparency of Type I labelling programs, and the degree to which they are balanced by including the needs of all interested parties (USEPA 1998).

Life-cycle assessment (LCA) is one of the main features that sets Type 1 labels apart from other environmental labels. LCA is intended to provide detailed information on the environmental impacts and performance of a product over its entire life cycle, including its manufacture, transport, use and disposal (USEPA 1998). This is conducted for the product group to determine the most significant environmental impacts, and is then used to identify and formulate the environmental criteria for the product category. LCA can be prohibitively expensive and time-consuming, and thus there is a tendency to focus on the part of the life cycle where there is greatest environmental impact. For example, the most important phase of the life cycle of a washing machine is its use where very large amounts of energy and water are consumed, and large amounts of waste water is generated. In this way a simplified LCA is often used to focus on key stages in the product's life cycle, and evaluation criteria are then developed for this stage only. Licences are awarded to products that comply with the general rules of the Type I labelling program, as well as the environmental and function criteria.

The most common products covered by Type I programs are paper products, detergents, office equipment, and household white goods (Jones & Landsdell 2000). It is relatively easy for programs to develop standardised criteria for these categories, hence their occurrence in almost all environmental labelling programs (USEPA 1998).

In Australia, an example of a Type 1 labelling standard is the Green Power Guarantee, accredited by the NSW Sustainable Energy Development Authority (Jones & Landsdell 2000). Electricity companies can use the government-approved Green Power logo providing they comply with certain criteria. The Australian Environmental Labelling Association is also developing an eco-label for Australia, known as 'Environmental Choice' (AELA 2001). This eco-labelling program is now identifying product categories and developing award criteria.

Another example of an Australian Type 1 environmental label is the Western Australian rock lobster fishery, certified under the Marine Stewardship Council. This fishery has been assessed against performance criteria by an independent, accredited certification organisation. Lobster products are then eligible to be labelled with the Marine Stewardship Council logo.

Some environmental labelling programs may also use non-environmental criteria in evaluating products. Social criteria such as environmental education, work conditions, product quality standards, and others can be used in labelling programs. The inclusion of non-environmental criteria broadens the type of information provided to consumers, and thus may appeal to a wider range of consumers (USEPA 1998).

7.1.2 Application of Type I environmental labels

Allison and Carter (2000) have conducted a detailed assessment of the strengths and weaknesses of Type I, II and III environmental labels, based on seven parameters that strongly influence label use and effectiveness. This assessment provides insight into the future application of environmental labels in Australia, where there is little experience with environmental labelling standards.

Type I environmental label strengths are:
- credibility due to multi-stakeholder involvement;
- validity due to third-party auditing;
- comprehensiveness due to a life-cycle assessment (LCA) approach;
- their capacity to deal with multiple environmental issues;
- their capacity to be used as benchmarks of environmental performance;
- consumer promotion costs are largely paid by the Type I labelling program; and
- transparency.

Type I environmental label weaknesses include:
- high costs of development and operation;
- potential for disclosure of sensitive commercial information;
- long periods of time needed to develop and revise criteria;
- application to a limited number of product groups and products;
- limited availability of labelled products;
- potential conflict with international trade agreements; and
- lack of flexibility that may stifle product and environmental innovation.

Based on these strengths and weaknesses, Allison and Carter (2000) believe that Type I labels are best suited to the following product and market applications:
- quick purchase decisions by individuals;
- products that have long life spans;
- product categories with uniform environmental aspects and impacts;
- complex environmental impacts that are not understood by consumers;
- use as a 'soft policy' tool instead of legislation;
- products that have multiple environmental impacts;
- when there is a high level of consumer concern for environmental impacts; and
- discrimination of products within major product categories.

7.2 Type II environmental labels

Type II labels are based on producers' or manufacturers' own claims that their products have specific 'environment-friendly' attributes. These are in effect self-declarations about the environmentally preferable features of a product. There are no pre-established environmental and other product criteria that Type II labels must comply with, although they need at least to comply with truth in advertising or other relevant product regulations. These are probably the most commonly used type of environmental label in the market place, and are generally concerned with a single high-profile environmental issue. Examples of these are labels bearing claims about recycling, biodegradability, phosphates, greenhouse gases and dolphins. Private companies have developed many of these with little reference to a standard, sometimes resulting in confusing and misleading claims. This prompted the development of standards to guide Type II labelling.

The ISO international standard for Type II environmental labelling is ISO 14021.

7.2.1 ISO 14021 standard for Type II environmental labelling

The least onerous and most widely used ISO environmental label is the international standard ISO 14021, which covers self-declared environmental claims. The Australian standard, AS/NZS ISO 14021:2000 (ISO 2000b) is based on this international standard (Jones & Landsdell 2000).

A self-declared environmental claim is made without independent third-party certification, by organisations that are likely to benefit from such a claim. For example, this could include primary producers, manufacturers, importers and retailers. However, these claims must still meet a number of criteria. Claims that are vague or non-specific cannot be used, including 'environment-friendly', 'sustainable' and 'green'.

The AS/NZS ISO 14021 standard states that self-declared environmental claims on labels and in marketing generally must be:
- accurate and not misleading;
- substantiated and verifiable using publicly available information;
- specific as to the environmental aspect or improvement claimed;
- relevant to the particular product and used only in appropriate contexts;
- true not only in relation to the final product but in relation to relevant aspects of the product life cycle; and
- unlikely to result in misinterpretation.

The AS/NZS ISO 14021 standard states that claimants are responsible for the evaluation and provision of data necessary for the verification of self-declared environmental claims. Evaluation of the product needs to be fully documented and retained by the claimant for the purpose of information disclosure. Claimants may voluntarily release to the public the information necessary for verification of the environmental claim, or this must be disclosed upon request to any person seeking to verify the claim.

Firms can align their Type II labels with industry standards and environmental codes of practice, and could have their claims verified by an independent third party (Jones & Landsdell 2000).

7.2.2 Application of Type II environmental labels
Type II environmental labels also have a number of strengths and weaknesses (Allison & Carter 2000). The strengths of Type II labels are:
- low cost;
- high consumer understanding of simple environmental claims;
- application to most product groups, products and markets;
- quick to develop and apply;
- low risk of conflicting with international trade agreements; and
- accessible to many producers and products.

Type II environmental label weaknesses include:
- low credibility;
- claims not made in accordance with agreed standards;
- risk of vague and/or invalid claims;
- low level of information available to support claims;
- high consumer promotion costs must be met by the business that owns the label; and
- no independent evaluation of claims.

Based on these strengths and weaknesses, Allison and Carter (2000) observe that Type II labels are suitable for:
- quick purchase decisions by individuals, but only when there is high recognition of claims on labels;
- products that have short or long life spans;
- improving the environmental performance of products that have a single high-priority environmental impact;
- sensitive commercial issues that need to remain confidential;
- cause-related marketing, related to a well-known and important environmental issues; and
- discrimination of products in niche and major product categories.

7.3 Type III environmental labels

Type III labels provide standardised information on environmental aspects of products, but do not make a judgement on their environmental performance relative to other products in the same category. Quantitative data on environmental aspects relevant to a product are often summarised on Type III labels, which are then interpreted by potential purchasers. These purchasers need to take time to consider labels, and have the capacity to interpret the quantitative information provided on the label. Hence, Type III labels are suitable for only some consumer purchasing decisions.

The ISO international standard for Type III environmental labelling is ISO/TR 14025.

7.3.1 ISO/TR 14025 standard for Type III environmental labelling

The third standard in this series, ISO 14025, has not been finalised by ISO, and is currently a technical report ISO/TR 14025:2000(E) (ISO 2000c). Type III labels provide quantitative environmental declarations, and thus differ significantly from Type I and II labels that are qualitative (a product is either awarded the label or it is not). As with ISO 14024, there is a requirement for open, transparent and ongoing consultation with interested parties.

The quantitative environmental information provided by a Type III environmental declaration is also based on LCA, in accordance with the ISO 14040 series of standards. Words, numbers or symbols are then used to convey this information to consumers.

The application of Type III labels faces a number of challenges, including the development of a uniform format for presenting information on labels, and the aggregation of different types of product life-cycle information into a few words or graphics that communicate environmental information to consumers.

Type III environmental labels can be applied to all products within a product category, rather than just those products that are deemed to have lower environmental impacts. In this way Type III declarations do not select products, and instead leave this decision to consumers.

A Type III environmental label uses a standard format to describe the impacts or burdens that products have on the environment, and often addresses multiple environmental attributes (USEPA 1998). Consumers then make a judgement based on their particular environmental concerns. An example of a Type III label is the Eco-Profile labels of the Scientific Certification Systems organisation in the US. The Eco-Profile labels summarise environmental impacts according to 15 environmental indicators that are the same for all products within a category (CEC 1999).

The mandatory energy rating labels for white goods could also be considered as a form of Type III environmental label.

7.3.2 Application of Type III environmental labels

Type III environmental labels also have a number of strengths and weaknesses (Allison & Carter 2000). The strengths of Type III labels are:
- high credibility through life-cycle assessment;
- based on transparent quantitative information;
- provide detailed information on a number of environmental issues; and
- can be applied to all products within a product category.

Type III environmental label weaknesses include:
- high cost of labelling program;
- high cost of data collection by participating businesses;
- potential for disclosure of sensitive commercial information;
- long periods of time needed to develop and revise criteria;
- consumers required to have a high level of environmental awareness and understanding; and
- restricted to just a few products and product groups.

As a result of the strengths and weaknesses of Type III labels, Allison and Carter (2000) note that they are best suited to:

- long and major purchase decisions by individuals;
- major rather than niche market product categories;
- purchases by government agencies and corporate business that have procurement policies;
- well informed markets that have a high level of environmental awareness;
- product categories with uniform environmental aspects and impacts; and
- products with multiple environmental impacts.

7.4   Other environmental labels

Environmental labels can also be classified on the basis of whether they convey positive, neutral or negative information to consumers about the environmental attributes of products. Essentially, these constitute alternative forms of classification to Type I, II and III labels.

Positive labels convey information only on the positive environmental attributes of a product. This type of label is synonymous with the Type I label (described above), where all products bearing the label have been judged to be environmentally superior. Single-attribute programs are also often positive labelling standards, which certify that claims made about a single attribute of a product meet some specified definition. These programs have specific definitions or terms such as 'recycled' or 'biodegradable', and product applications from companies must comply with these definitions (USEPA 1998).

Neutral labels contain information about the environmental attributes of products for purchasers to consider, and leave it up to the consumer to decide if this information is positive or negative. In this way they are very similar to the Type III labels described earlier. Information disclosure programs, a common form of neutral labels, present facts that are used by consumers to make purchasing decisions (USEPA 1998). One important component of information disclosure programs is that information is simplified and standardised across products. These programs tend to focus on a single environmental attribute such as recycled material content, or water- and energy-use efficiency. Examples of mandatory information disclosure programs are the fuel economy figures for motorcars and the energy-rating stars for white goods.

Negative labels warn purchasers about the negative or harmful aspects of a product. Hazard or warning labels are generally mandatory and appear on certain products that are potentially harmful or hazardous to consumers (USEPA 1998). Negative labelling programs are usually initiatives of government, where it is mandatory for manufacturers to disclose information to consumers for health and safety reasons. Products that contain pesticides, carcinogenic chemicals or allergens are often subject to mandatory negative labelling standards.

There are also environmental labels that do not fit neatly into any one category, and may be thought of as hybrid labels. For example, Tesco's Nature's Choice appears to be a hybrid of Type I and Type II labels. It was developed by Tesco rather than by an independent eco-labelling body, and in this regard is similar to a Type II label. However, it is often verified by an independent third-party auditor, similar to what is required for Type I labels. This is also the case with a number of other environmental labels that are applied to food (see section 7.5.6).

7.5   Challenges for environmental labelling of food

Environmental labelling of food must overcome a number of challenges before it can be judged successful. These include improving the environmental performance of organisations and products, overcoming consumer and producer confusion due to a proliferation of labels, presenting credible environmental claims, gaining acceptance from retailers, avoiding conflict with international trade regulations, overcoming complexities with applications to food, and minimising the costs of labelling.

7.5.1 Improving environmental performance

While the degree to which environmental performance has been strengthened through markets is not clear, many believe that this has fallen far short of expectations.

> In the past decade, the goal of harnessing the power of markets in support of environmental objectives has passed through a number of stages, from strong enthusiasm, cautious optimism, disappointment, and a refocussing of efforts towards achievable goals and defined market segments (CEC 1999).

> During this time, one fact remains at the centre of efforts to expand green markets: opinion polls in both developing and developed countries consistently show robust and unwavering public support for environmental protection. However, public concern and consumer behaviour are not identical. Often the public expect strong regulatory intervention by governments to protect the environment, and do not draw strong links between their individual purchasing decisions and the overall state of the environment. Hence, despite strong public concern for the environment, green markets have not grown (CEC 1999).

The small size of green markets means that the majority of environmental aspects associated with the production and use of products cannot be adequately addressed through environmental labelling. Niche markets for 'green' products are likely to drive improvements in the environmental performance of only small numbers of producers and manufacturers, and have limited capacity to influence performance at regional, national and global scales.

At present, the markets for products bearing environmental labels are immature, and thus market size is small and restricted to niche markets. Consumers are generally not aware of issues and benefits surrounding environmental labels, and typically only 10 per cent are willing to pay a price premium for products bearing an environmental label (McCoy & Parlevliet 2000, National Consumer Council 1997, UNCTAD 1999). However, the success rate of labelling programs is higher if it also focuses on direct health implications of products.

In a report based on consultation with a range of stakeholders in Europe, Allison and Carter (2000) identified a number of barriers to the success of environmental labelling programs. These barriers include:
- lack of consumer and retail interest;
- price sensitivity by consumers;
- confusing or false environmental claims;
- significant environmental impacts that are not known or understood by consumers;
- selective standards that only cover some products within some product groups;
- high costs to producers for developing, participating in, and promoting standards;
- consumer and producer overload from a proliferation of standards;
- impacts of products due to consumer behaviour rather than production;
- lengthy development times for standards that are longer than the life of products;
- a reluctance by producers to divulge confidential information about their products;
- stakeholder disagreement and subsequent lack of support for standards; and
- lengthy and inflexible development processes that stifle product innovation and/or prevent timely responses to significant environmental impacts.

These barriers prevent voluntary environmental labelling standards from addressing many of the environmental impacts associated with the provision of products and services. For these reasons environmental labelling strategies should be bolstered through linkages to complementary policy tools (Allison & Carter 2000).

The integration of environmental labelling standards and complementary environmental policy tools could be guided by an integrated product policy (IPP), as has been proposed by the European

Commission (2001). The main aim of IPP is to ensure that environmental management tools available act in unison to bring about improvements in environmental performance. A number of policy tools that may complement environmental labelling are:

- environmental criteria factored in to public procurement purchasing policies;
- fiscal measures such as taxes and/or subsidies applied in a differential manner to support environmental labelled products which would then be cheaper, or at least no more expensive than conventional products;
- use of EMS to complement eco-labels as it often acts as a driver for incorporating environmental criteria into purchasing policy;
- use of mandatory product standards to ensure that certain requirements are built into product design when consumers are not aware of or concerned with the environmental impacts of products;
- development of voluntary agreements on environment targets between companies and regulators/government;
- conduct of environmental education programs to generate consumer awareness and concern for environmental issues;
- use of mandatory labels where the absence of a market incentive makes it unlikely that voluntary labelling will occur; and
- use of other mechanisms for communicating environmental impacts of products, such as environmental information help-lines, procurement guidelines, corporate environmental reports, and internet databases on product environmental performance.

Environmental performance targets have also proven difficult to define and apply in environmental labelling programs, due to potential conflict with international trade agreements, the complexity and variability of production and processing practices, and the costs of applying LCA to long supply chains. For these reasons environmental labelling programs tend to focus more on processing and manufacturing sectors where production practices tend to be uniform, or on management system procedures, and often avoiding difficult product categories such as fresh foods (see sections 7.5.5 and 7.5.6).

7.5.2 Confusion due to environmental label proliferation

The proliferation of environmental labels in Germany, with an estimated 1,000 different environmental labels in use in the mid-1990s, led to confusion amongst German consumers about the eco-advantages conveyed by a label (UNCTAD 1999). The large majority of these were private Type II labels developed and used to market products of companies, and little can be done to limit the number of these types of labels in circulation. Consequently, considerable effort has been put into the regulation of private Type II labelling in an attempt to limit confusing and misleading environmental claims. However, private Type II labels will remain common in the market place, and consumers will be presented with a diverse array of claims and labels.

Type I environmental labels, particularly national eco-labelling programs, have the potential to be more closely regulated and coordinated, and therefore present common messages and formats to consumers. Type I labels act as a 'seal of overall environmental approval', rather than make claims about a large range of individual environmental issues. In this way a national label or logo can cover all environmental aspects and impacts associated with products, and therefore present a single message of 'environmental-friendliness' to consumers. This mirrors the approach taken by organic standards, where a single term and a common standard are presented to consumers across the world. This consistent and simple message has allowed consumers to quickly understand and recognise the organic standard, and plays an important part in the success of certified organic food.

7.5.3 Credibility of environmental claims

In some countries environmental labelling programs have successfully raised public awareness of the environmental impacts of products, and have increased market share for products bearing an environmental label. These results are more likely in countries where environmental labels are endorsed by government and are subject to some form of verification to maintain their credibility.

In other countries, however, there is little appreciation of the linkages between environmental protection and consumption patterns, and misleading or false environmental claims have damaged the credibility of environmental labels and caused consumer confusion. Starkey (1998) writes 'that of the manufacturer claims about the environmental attributes of their products, many have been confusing, a fairly large proportion are misleading, and some were dishonest'. Many of these claims were unverifiable and vague, and included phrases such as 'easy on the environment'.

The existence of dishonest environmental claims undermines the development of markets for credible products, as this prevents consumers from making informed choices when purchasing products (Smallbone & Page 1999). Consumers will only purchase environmentally preferable products if they trust the information present on products.

Dolphin Safe, Bird Friendly, Eco-OK, Fair Trade, Protected Harvest, and Nature's Friend are examples of environmental claims that are becoming more common in the market place. Many critics argue that these are just feel-good slogans that offer no guarantee of environmental protection, as the standards are not rigorous enough and claims are not verified (Fulmer 2001).

Smallbone and Page (1999) report a number of problems with green claims or statements:
*   they are often not based on LCA;
*   claims are vague, unconvincing and not verifiable;
*   reasons for the superiority of a product are not clear;
*   claims are not relevant to the market in which they are sold;
*   there are too many symbols and logos on products and packaging; and
*   consumers do not trust the official eco-labels because of dishonest labels.

In many cases the environmental claims of food companies do not conform to any recognised standard, as they either create their own standard and label, or they simply pay for a logo (Fulmer 2001). For example, General Mills paid $115,000 to the Nature Conservancy for the right to use its oak-leaf logo on boxes of Nature Valley granola bars. However, the logo offers no environmental promises or benefits, other than signifying that General Mills' paid the Nature Conservancy for its use (Fulmer 2001).

The Landcare logo, the caring hands, is used in a similar manner in Australia. Several companies pay for the use of this logo on their products, and perhaps the most obvious environmental benefit arising from the purchase of the product is the fee paid by these companies to the Natural Heritage Trust. However, there are risks to Landcare through making its logo available for products, as companies using the logo are not producing products in accordance with an environmental standard, and therefore their environmental performance is questionable.

In the UK, the high public profiles and reputations of non-government organisations are also used to promote products, although in some cases this is done in accordance with an agreed standard. An example of this is the RSPCA's Freedom Foods standard that brands products that meet its conditions for animal welfare (AFFA 2002). In this instance there is less risk to the organisation that endorses products, as endorsements occur in accordance with a standard of production.

It is possible that consumers believe that endorsements are made on the basis of industry standards and environmental performance, and hence the credibility of product endorsements by high-profile organisations is placed at risk when endorsements are based only on fees.

ISO is standardising marketing claims internationally, by harmonising the use of self-declared environmental claims, and by providing guidance to avoid misleading and inaccurate claims. ISO 14021 is now being used as a benchmark for regulating self-declared environmental claims by a number of countries, including Australia (Ure 1999). However, a shopping survey in Australia suggests that a number of environmental claims do not conform to this international standard. Smallbone and Page (1999) collected 52 products bearing some form of environmental claim from Coles, David Jones, Harvey Norman and K-Mart in Sydney. Shoppers were provided with a copy of ISO 14021, and then they were asked to determine if the claims on products complied with this standard. Of the 52 products collected, 11 were judged by shoppers to comply with the ISO 14021 standard, 36 were non-compliant, and 5 were borderline. Common cases of non-compliancy were associated with vague use of terms such as green, biodegradable, sustainability, recyclable and renewable.

However, some consumers also lack confidence in international standards. At a conference in November 2000, Consumers International, a global federation of 273 consumer organisations from 121 countries debated the value of global standards to consumers, particularly ISO (Consumers International 2002). ISO standard formulation was criticised as being secretive, with a large number of standards produced without consumer input. Some argued that the standards process was so heavily dominated by industry representatives that it should be abandoned. Consumer participation in standards making was regarded as critical, otherwise manufacturers from developed countries would dominate this process. Consumer groups from many countries demanded stronger representation in the development of standards, and even questioned whether ISO is the appropriate body to do this (Consumers International 2002).

Most consumers cannot tell the difference between legitimate and deceptive programs (Fulmer 2001), and therefore Consumers Union in the US, Healthwell (1997), and Consumers International (2001) offer the following advice to consumers for evaluating environmental claims:
- Be wary of vague claims as these can be misleading; for example, dolphin safe does not mean that no dolphins are killed in fishing nets.
- Claims should have meaningful standards that can be verified by an independent or third-party organisation.
- The standard should have originated from an independent body, not those benefiting from the sale of the product.
- Where self-declared environmental claims are made, these should be accurate, verifiable, relevant and non-deceptive.
- The evaluation criteria of the labelling program should be based on life-cycle considerations.
- Product function characteristics should also be included in environmental labelling programs.
- Development of evaluation criteria should be open and done in participation with key stakeholders.
- Information on the labelling standard should be made available to consumers, producers and others upon request.
- The labelling program should result in an environmental benefit, and not just address one aspect of green production, which may be overshadowed by impacts in other parts of the product's life cycle.

7.5.4 Retailer acceptance of environmental labels
Retailers will, without doubt, play a major role in the success or otherwise of products with environmental labels. On one hand they can play a significant role in nurturing environmental labelling programs by selecting labelled products (USEPA 1998). For example, the US retailer Home Depot has made a commitment to stocking products considered to be environmentally preferable, such as products bearing a national eco-label.

However, a number of retailers believe that the presence of products with an environmental endorsement on their shelves will indicate that other in-store products are inferior in some way. Such retailers will be reluctant to carry products with environmental labels.

Woodward-Clyde (2000) report that a survey of retailers and other stakeholders conducted by the UK Department of Environment, Transport and the Regions in 1998 found that many retailers planned to move away from environmental labelling of individual products to creating strong company brands or images. Their intention was to assure consumers that quality and environmental impact had already been considered by the retailer, and that best practice applied to all goods on the shelves.

However, some retailers have their own environmentally preferred lines, including some labelled products. For example, Tesco carries products bearing the Nature's Choice logo, and may therefore be reluctant to carry an independent environmentally labelled product that may compete with their own label.

While food retailers may not wish to stock national or industry eco-labels, they do stock many products that bear Type II environmental claims and logos. Dolphin Friendly, Dolphin Safe, Natural, Biodegradable, Environmentally Aware, Safe for our Planet, 100% Recycled, Earth Choice, Planet Ark, Green Choice, OzGreen, and Nature's Way are present on many products in Australian super-markets. These labels tend to make claims about specific environmental issues rather than provide a 'stamp of approval' of a product's overall environmental superiority. These types of claims, which are typically self-declared marketing statements, are likely to have less impact on other in-store products that do not carry environmental labels, and therefore to be tolerated more by retailers.

While retailers may play a prominent role in the promotion of environmentally labelled products, these are likely to be their own labels rather than an industry or national label. Consequently, retailers may be looking to producers to adopt on-farm assurance programs that underpin either their own in-store labels or their overall store reputation for providing safe, quality and ethical food. This is an important issue to consider for Australian government agencies and industry organisations that may wish to develop on-farm assurance or environmental labelling programs. The point at which labelling and subsequent value adding occurs in the supply chain could become a contentious issue for producers.

7.5.5 Conflict with international trade regulations

Woodward-Clyde (2000) noted that the inclusion of environmental considerations in trading decisions may be counter to the principles of free trade, and thus may not be widely applied in the future. USEPA (1998) has noted that 'some concerns have been expressed about potential conflicts between provisions of international trade agreements and certain aspects of environmental labelling programs. The World Trade Organization (WTO) Agreements contain provisions precluding discrimination among like-products.' This has been interpreted as preventing the discrimination of products on the basis of production, processing and manufacturing processes. However, many environmental labelling programs, due to their life-cycle approach, consider process or production methods (PPMs), and for this reason some organisations believe that these labels violate WTO provisions. However, others believe that it is inevitable that WTO will allow for recognition of environmental impacts of PPMs (USEPA 1998).

Most concern appears to be with the government-operated or publicly run environmental labelling standards, with tensions developing between the European Union, where these standards are common, and the United States, where there is no government-operated environmental labelling program (Isaac & Woolcock 1999). Australia and Canada also have expressed concern with labelling standards that use production and processing methods to discriminate between products, as they believe that these provide a mechanism to circumvent the General Agreement on Tariffs and Trade (GATT) and place trade restrictions on agricultural products (Isaac & Woolcock 1999). 'Government operated environmental labelling standards are thought most likely to create defacto barriers to competitive market access, because they display national environmental preferences for particular processing and production methods' (Isaac & Woolcock 1999).

Related to these tensions between the US and the EU are impending changes to the Common Agricultural Policy (CAP), with part of the production subsidies redistributed on the basis of environmental management and animal welfare. The EU is effectively using public funds to increase the capacity of its primary producers to implement and demonstrate sound environmental practices, and at the same time it is involved in the development and administration of eco-labelling schemes that discriminate between products on the basis of production methods. In these ways the EU is playing a major role in establishing environmental benchmarks for products and improving the environmental practices of its primary producers. Currently, the major EU eco-labelling programs do not cover fresh foods, and thus the assistance provided to primary producers does not help them qualify for these eco-labels. However, the EUREPGAP production protocols of the major EU retailers, which are not subject to WTO rulings, may be able to set more onerous environmental protocols as a result of the government assistance provided to EU primary producers.

Environmental labelling may also have some undesirable social consequences. Each national eco-labelling standard has award criteria that can be met by fewer than 30 per cent of producers in that country, and thus producers from developing countries may be incapable of complying with these high standards (USEPA 1998). It is argued that these methods may be inappropriate or unavailable to exporters in developing countries, preventing them from exporting products to countries with some types of eco-labelling standards.

Proponents of eco-labels believe that they are not a trade issue because they are voluntary, and market access is still possible without the eco-label. They argue that the effectiveness of eco-labels would be greatly reduced if they did not consider production and processing methods, and thus international trade agreements should not be used to this effect. They claim that environmental sustainability objectives should not be subordinated to trade principles, and instead trade should take proper account of the environment.

At WTO, eco-labelling standards have been on the agenda of the Committee on Trade and the Environment (CTE), which has been asked to decide on the applicability of non-product-related processing and production methods under the Technical Barriers to Trade Agreement (Isaac & Woolcock 1999). This decision is crucial because eco-labelling standards utilise non-product-related processing and production methods in their life-cycle assessments. However, a decision on the compatibility between PPMs and multilateral trade agreements has not been made, and thus the fate of eco-labelling standards remains unclear (Isaac & Woolcock 1999).

Isaac and Woolcock (1999) believe that national eco-labelling standards do not appear to affect trade significantly, and hence there is no need to restrain their use in accordance with GATT and WTO trade principles. However, it may be possible to reduce potential trade tensions over eco-labelling standards by harmonising international labelling programs (Isaac & Woolcock 1999). In this way each country would recognise as equivalent the eco-labelling standards of other countries, making it much easier for producers and exporters to access export markets.

However, the globalisation of standards is often not supported by developing countries. Several delegates at an international consumer conference (Consumers International 2002) held the strong view that poor consumers obtain no benefits from globalisation and global standards, and may even by negatively affected by them. Delegates argued that while 73 per cent of ISO members come from developing countries, only 5 per cent of them are represented on the critical ISO technical committees.

WTO provisions are largely controlled by and are in force between governments, rather than the private sector. It needs to be recognised that retailers can support and create consumer demand, and are able to choose goods for sale based on process and production methods, a course of action not available to governments due to WTO rules (Woodward-Clyde 2000). This is why EUREPGAP, a production protocol developed by the EU retailers that specifies processes used to producer food, can be used by them to discriminate against non-conforming products from other countries. These EU

retailers have stated publicly that all suppliers from around the world will need to be certified to EUREPGAP by the end of 2003, otherwise they will lose access to these markets.

International trade in agricultural goods is a very sensitive issue, and countries that argue for freer trade are unlikely to develop eco-labelling programs that in any way limit access of products from other countries. Australia, which actively operates within WTO for the purpose of liberalising trade in agricultural and other products, is likely to be cautious about eco-labelling schemes that could be judged to discriminate against imports, and this is particularly sensitive given the current free-trade negotiations with the US.

7.5.6 Application of environmental labelling to food

Few environmental labelling standards, particularly Type I labelling, include food as a product category. For example, in a shopping survey of green claims, only 43 or 2.5 per cent of 1,748 green product claims were found on food (Smallbone & Page 1999). Similarly, only 40 or 3.6 per cent of a total of 1,115 products carrying green logos were food products. This prompts the question: Is there some problem or difficulty with the application of environmental labelling to food products and production systems, or is there little consumer demand for 'green' claims on food?

As noted above, there is potential for environmental labelling standards to conflict with WTO and GATT rulings. There is some concern about the interplay between government funding of environmental management programs for farms and government involvement in the eco-labelling of food, as this could make it difficult for primary producers from other countries to access these markets. Tensions between the major trading blocks of the EU and the US do not appear to have been resolved, and may continue for some time, making the inclusion of food in eco-labelling programs a contentious political issue.

Further difficulties in the application of environmental labels to fresh food production arise from the many different foods produced, the wide range of production practices used, the many and diverse environments in which food production occurs, the large number and diversity of environmental aspects and impacts that would need to be covered, and the huge number of producers involved. This makes it extremely difficult and costly to develop standardised evaluation criteria that can be effectively applied to food. Most Type I environmental labelling programs focus on processing and manufacturing sectors where the more limited and uniform range of practices makes it possible to develop standardised evaluation criteria.

Of the 26 national eco-labelling programs described in detail in the eco-labelling report of the USEPA (1998), only four address food products. These are the Eco-Mark program in India, the Stichting Milieukeur program in the Netherlands, the Eco-OK program in the US, and the Scientific Certification Systems Nutriclean Food Safety program in the US. Even the oldest eco-labelling standards, the German Blue Angel originating in 1977 and the Japanese EcoMark in 1989, do not cover food. The Blue Angel program considers around 150 applications for new product categories each year, and only six are selected (USEPA 1998). At least 88 product categories and 4,135 products are covered by the Blue Angel, and after 25 years of consideration, food still has not made it on to the list. Similarly, the Japanese EcoMark awards its label to 69 product categories and 2,031 products, none of which are food.

Many of the national eco-labelling standards are based on life-cycle assessment of products, adding further to the cost and difficulty of applying these types of labelling standards to food. Food has enormous complexity in its product range, its production and processing processes, and its geographical and biological origin. The huge amount of resources required for an eco-labelling program based on a life-cycle assessment of food may be beyond the means of many eco-labelling bodies. Hence, only a small number of eco-labelling standards address food (van Ravenswaay & Blend 1997).

For the above reasons it is often difficult to apply government operated Type I eco-labels to food products and production systems, as these would need to consider the processing and production methods in the country of origin of food products. Instead, less onerous and privately owned environmental labelling standards appear to be better suited to making environmental claims about food production. These tend to be an abridged form of Type I environmental labelling standards that are customised for local or regional conditions, and are more concerned with production practices than particular environmental performance outcomes. Most of the US environmental labelling programs for food appear to be based on production practices (e.g. best management practice) rather than environmental performance (e.g. environmental impact) (van Ravenswaay & Blend 1997).

A number of the US environmental labelling programs have developed their own Type I labelling standards that instruct growers on what they must do to qualify for that label. Apart from Conservation Beef, the following summaries are based on van Ravenswaay and Blend (1997).

Stemilt's Responsible Choice Program
Stemilt, a fruit-supply company in the north-west United States, has contracts with 250 growers. Fruit stickers and box labels carry the registered trademark of Responsible Choice®. The Responsible Choice program requires all growers to follow the European Integrated Fruit Production guidelines, where points are given for each pesticide used on a particular crop. Stemilt provides technical assistance on a one-to-one basis to growers, administers a grower newsletter, and organises grower meetings.

Core Values Program
The Core Values program was developed by north-eastern US apple growers in conjunction with the consumer group called Mothers and Others for a Liveable Planet. Growers are required to follow the Northeastern Stewardship Alliance guidelines, largely based on integrated fruit production (IFP).

The guidelines stipulate that farm managers must have up-to-date training in all aspects of IFP, so that they can minimise herbicide use, use chemicals with least ecological disruption, protect the orchard environment, improve crop quality, and keep an accurate logbook of all major farm activities.

California Clean Growers
The California Clean Grower program is underpinned by grower commitment to ecologically sound practices, strengthening of farm soils through natural enrichment, cooperation with other farmers to create wildlife refuges, encouragement of natural biological pest control, creation of good working conditions for farm workers, production of produce with superior taste and nutrition, and good communication with consumers. Like a number of other environmental labels for food, the criteria behind this label appear to be based largely on production practices rather than environmental performance.

Wegman's Food Stores
Wegman's food stores in Rochester New York sell canned produce that is labelled with integrated pest management (IPM). They have contracted a company to coordinate growers and produce particular food items according to the IPM practices recommended by Cornell University. The company selects growers, enforces and collects grower records, and makes sure that what is in the can is a product grown using IPM techniques. As well, an additional private consultant has been engaged to inspect grower records and determine whether the criteria have been met, thus serving a certification function. Wegman's have an agreement with Cornell University on how the logo should be used on products and how growers should be educated and trained, and on the documentation and monitoring processes required by the company that coordinates the growers.

The Food Alliance
The Food Alliance (TFA) in the United States (Oregon and Washington) is an example of a regional environmental label that is applied to food. TFA is a standard that specifies production practices validated by a third-party approval procedure for farmers, and has awarded its label to over 200

varieties of fresh fruits, vegetables, nuts and grain. Farmers who meet the eligibility criteria such as producing healthy food, protecting clean drinking water, conserving soil, reducing pesticide use, and caring for the wellbeing of farm workers, qualify for the TFA-Approved label that can be displayed on their produce. Consumers look for the TFA-Approved label when they shop, and buy with the knowledge that they are supporting 'environment-friendly' and socially responsible farming practices (Kane 2000). TFA has 76 certified farmers and 32 participating retail partners who carry and promote TFA-Approved products.

Conservation Beef

Conservation Beef claims to be a landscape conservation program (Conservation Beef 2002). Its goal is to conserve un-fragmented landscapes or catchments that have been designated high priority by the Nature Conservancy. Participating beef producers are required to abide by conditions that act as a disincentive to subdivision of their properties, and to prepare and submit stewardship plans in accordance with Conservation Beef Standards. This program has at least four standards covering:

- soils, hydrology and water quality;
- riparian and wetland condition;
- upland condition; and
- wildlife habitat.

Participating beef producers must also abide by government legislation relevant to the Conservation Beef label claims of 'natural', 'free range', 'no artificial hormones', and 'not raised with antibiotics'.

The stewardship plans must include substantial management practices that aim to achieve the principles of each of the four standards, and must be approved by a Stewardship Review Panel. Producers are also required to conduct monitoring of ecological conditions every three to five years, using methods of their choice, and results must be submitted for assessment by the program. Each year representative parts of the property are assessed by a designated natural resource auditor, and include an evaluation of the extent to which the stewardship plans have been implemented.

Other food labelling programs

Other environmental labelling programs for food include California Clean (http://www.californiaclean.com/who.html); Communities Organised in Respect for the Environment in the Northeast US (http://www.corevalues.org); Milieukeur which is managed by an independent organisation in the Netherlands and is applied to fruit, vegetables and meat (http://www.milieukeur.nl/); Partners with Nature in Massachusetts (http://www.massgrown.org/how_to/partners.htm); Salmon-Safe in Oregon (http://www.pacrivers.org); and The Rainforest Alliance's Eco-OK Program (http://www.rainforest-alliance.org/programs/cap/index.html).

Many other environmental and organic labelling programs can be accessed at http://www.eco-labels.org/productindex.cfm.

7.5.7 Environmental labelling costs

Growers that participate in environmental labelling standards are subject to a range of additional costs. These can include registration and certification costs, labelling fees, record-keeping requirements, lost productivity and higher input costs, particularly labour (van Ravenswaay and Blend 1997).

The development and administration costs of environmental labelling standards also need to be considered, as at some time these costs are likely to be passed onto growers. Van Ravenswaay and Blend (1997) believe that the use of standards that specify production practices for agricultural systems in the US are a deliberate attempt to minimise the costs of environmental labelling, as the costs of developing performance criteria are prohibitive.

Standards that specify performance criteria would need to consider a wide range of environmental aspects of a property, including the concentrations of nitrates and other chemicals in soil and water, levels of beneficial soil organisms, the toxicity of farm chemicals, levels and plant and animal biodiversity, energy use, water use and air emissions (van Ravenswaay & Blend 1997). Performance criteria may also require more onerous monitoring and measurement on farms, and this combined with data handling and storage requirements adds significant further costs to environmental labelling programs. Then there are the complications of comparing different cropping and livestock systems in different regions, requiring multiple performance criteria (van Ravenswaay & Blend 1997). For these reasons the costs associated with performance criteria are likely to be quite high, compared with the costs of complying with production practices.

For growers, record keeping and data handling costs can be substantial. Van Ravenswaay and Blend (1997) estimate that a horticultural grower with 20 fields would spend around 11 hours per week on data and record keeping, and this substantial time requirement would prevent many growers from participating or keeping honest records.

Marketing costs can also be substantial for growers and labelling bodies, due to the need for extensive consumer research and advertising campaigns.

Many of the costs of environmental labelling programs are fixed costs, such as development and revision of the standard and consumer marketing (van Ravenswaay & Blend 1997). Consequently the actual cost to growers will depend on the number of growers participating in a standard, with large numbers required to keep costs down. This final requirement seems at odds with environmental labels which generally involve limited numbers of growers servicing niche markets.

Overall, the short-term costs of growing food in accordance with environmental labelling programs are higher than those for food grown in conventional farming systems. The extent of costs depends upon the type of crop grown, the practices required to lower environmental impacts, and the type of environmental standard used (van Ravenswaay & Blend 1997). Less comprehensive and less precisely measured environmental labels may have costs that are only slightly higher than conventional practices. In the long term, the cost of growing food in accordance with an environmental labelling standard may be less than those for some forms of conventional farming practices if environmental degradation and reparation is taken into account.

Grower costs of participating in labelling programs can also be reduced by harmonisation and mutual recognition of standards. A number of environmental labelling programs have engaged in international standardisation and harmonisation efforts. The EU Eco-labelling program has been revised to incorporate international trade principles in an effort toward mutual recognition of other environmental labelling programs, both within and beyond EU borders (USEPA 1998). Similarly, the Global Eco-labelling Network (GEN) has been formed in an effort to achieve equivalency, harmonisation, and/or mutual recognition of environmental labelling standards. The long-term goals of GEN are to create an ongoing mechanism for information exchange, provide a forum for regular meetings of eco-labelling programs, and further progress in the harmonisation of eco-labels. GEN has enabled the eco-label programs of different countries to harmonise by recognising each other's product categories and criteria (USEPA 1998). That is, a product having received a label in one program is eligible for a label from the second program, typically in another country or market.

It is inevitable that participation in labelling programs will involve significant costs, and consequently producers expect to gain a premium for their products. While it is always difficult to obtain a premium for produce, this does occur in some instances. Granatstein (1997) reports that consumers in the Netherlands are paying a small premium (up to 10 per cent) for products certified under the Agromilieukeur label. This label uses environmental benchmarks in relation to pests, nutrients, waste and energy to evaluate farms. Also, apple growers in the US certified under the Responsible Choice program receive a premium of $1 to $3 per box.

However, in other cases the additional costs of certification have been absorbed by the producer. For example, 40 per cent of pome fruit producers in western Europe are certified under the Integrated Fruit Production (IFP) program, and in most cases their only reward has been market access (Granatstein 1997).

Similarly, the EU retailers participating in EUREPGAP have stated that certification to this food production protocol is required for market entry, and that premiums will not be paid (Nigel Garbutt, Chairman EUREPGAP, pers. Comm. March 2002).

7.6   Choosing an environmental label

Community, industry, government and individual businesses often express preferences for different types of environmental labels (Allison & Carter 2000). It is likely that these different preferences are a function of the different labelling goals of these organisations, and it is in this context that they identify strengths and weaknesses in labels.

Environmental and consumer organisations and some retailers strongly favour Type I labels over other claim types, and are highly critical of the low credibility of Type II labels and their negative impacts on other labels. In comparison, a number of producers and retailers are highly critical of Type I standards and felt that the time and resources needed to develop these standards would not be recouped. They favoured Type II standards with sufficient control to limit invalid claims, as these were more flexible and developed in response to consumer demand.

The only stakeholder consensus achieved was in the form of general support for the ISO standards and their use to improve the current performance of Type I, II and III labels (Allison & Carter 2000). These ISO standards are recognised and well received worldwide, and should be regarded as the basis for environmental labelling programs.

There are environmental labels for all occasions, and prospective primary producers should carefully choose the environmental label that best suits their business structure, available resources and objectives for use, particularly with regard to the needs of their customers. They should also carefully consider the processes and strategies required to deliver the benefits they desire, as this will help identify the most appropriate labelling standard for their business. In effect, the selection and use of an environmental labelling program should be done in the context of a thorough business plan.

With environmental labels 'one size does not fit all'. Consequently, businesses will need to conduct a comprehensive assessment of the roles, strengths and weaknesses of labels in accordance with their own clearly defined business goals.

7.7   Summary

Environmental labels or claims are widespread, and are typically associated with detergents, household cleaners, toilet paper, carpets, paint, white goods and motor vehicles. These labels fall into a number of different categories, with the most common form of classification being Type I, Type II and Type III labels, which are represented by the international standards of ISO 14024, ISO 14021, and ISO 14025 respectively. At present the majority of environmental labelling standards are voluntary, with the most widely used being the Type II, self-declared environmental label.

Type I environmental labels, also known as a seal-of-approval label, are regarded as the model for eco-labels. They are based on life-cycle assessment (LCA) criteria developed by a multi-stakeholder body, and require audits by an independent third party. These are often regarded as the most credible label as the formulation of award criteria and assessment of compliance are carried out by independent third parties in a fully transparent process.

Type II environmental labels are usually developed and applied by individual businesses, where they determine the nature of the claim and whether or not their products comply with it. Type II labels are typically little more than self-declared marketing claims made by businesses.

Type III labels present quantitative information on the environmental aspects of a product to the consumer. The label is neutral in that it does not judge the environmental performance of the product, with this left to consumers.

Type I, II and III environmental labels have different strengths and weaknesses, and therefore suit different applications. These different types of environmental labels need to be matched to the circumstances in which a business is operating. The best performing environmental label for a business will be the one that suits its structure and resources, and most effectively services its goals and supply-chain relationships.

Type I labels are most suited to products that have a range of environmental impacts over their life cycle that are not easily understood by consumers. These impacts are amalgamated by the labelling program into a pass or fail result for products, with products that pass given the eco-label 'seal-of-approval' that is easily recognised by consumers. Type II labels are suited to products that have a high profile and easily understood environmental impact, and are promoted to consumers on the basis of this single recognisable issue. Type III labels do not provide a 'seal-of-approval' label, and instead present a report card of quantitative environmental information for the consumer to judge.

Environmental labels face many challenges, perhaps the greatest being their inability to improve the environmental performance of businesses to the degree and on a scale expected by community and government. Environmental performance criteria have proven very difficult to define for many product groups, let alone different industry sectors in different countries. Only Type I environmental labels specify agreed environmental performance criteria that must be met by products.

Even if environmental labels had a greater capacity to specify environmental performance criteria, there is presently insufficient consumer demand worldwide to make a significant difference to the environmental performance of industry sectors. Typically, less than 10 per cent of consumers make environmental issues their top priority when purchasing products. Hence, this low level of demand will not bring about the scale of change in production practices and products expected by the wider community.

Environmental labels are common in the marketplace, making a wide range of claims about their good environmental performance, resulting in consumer confusion about the meaning of these claims. Furthermore, a number of claims on products are vague or misleading, leading to considerable consumer scepticism about the truthfulness of claims. In contrast, organic certification has presented a much more controlled and uniform message to consumers, and has suffered less from highly diverse self-declarations about the organic nature of products. Claims of being organic are largely based on national and international standards with verification provided by independent third parties, giving the consumer much confidence in this label.

There are additional challenges associated with food. First, national eco-labels may conflict with some international trade agreements, as they imply that governments are discriminating between products on the basis of production and processing methods, instead of intrinsic product qualities alone. Countries that are arguing strongly for free world trade in agricultural products are likely to be cautious about eco-labelling programs, as these can potentially be used as a technical barrier to trade. However, the World Trade Organization (WTO) regulations only apply to national governments, and thus private companies cannot be prevented from discriminating food products on the basis of production practices.

Second, food comes in many shapes and sizes, originates in many and diverse parts of the world, and is produced by huge numbers of small businesses using many different production practices. This

makes environmental labelling of food, particularly by national eco-labelling programs that utilise standardised life-cycle assessment, a highly complex, costly and difficult task. For these reasons the environmental labelling of food, using forms of Type I environmental labels, is largely confined to specifications for production practices, usually in a particular region.

Environmental labelling has the potential to motivate and build the capacity of producers to improve their environmental performance, as has been the case with organic certification. They provide a highly visible market mechanism for identifying and rewarding products that have the highest levels of environmental performance. Consumer demand for these value-added products is an effective driver of the implementation of ecologically sustainable production practices, although current levels of demand prevent these practices from being implemented on a broad scale.

8. Organic production

The use of standards that provide assurances on the status of 'clean and green' products is most apparent in the growing demand for certified organic food that is emerging as a distinct segment that has penetrated mainstream food markets. Organic certification programs in agriculture have been in place in many countries for many years, compared with environmental standards such as EMS and environmental labelling which are generally in their formative stages.

Organic sales have grown at the rate of 20 per cent per year for the past five years, and this has spurred a commensurate increase in acreage managed with organic production techniques (Granatstein 1997). Worldwide, the organic industry is estimated to be worth about US$20 billion, with continued growth estimated to be 20–50 per cent per year. In Australia, the value of organic production has grown from AUS$28 million in 1990 to AUS$200–250 million in 1999. While this seemingly exponential growth rate may not be sustainable over the long term, there are clear market signals indicating continued growth in the domestic and export markets for organic food. Current price premiums for organic products are 10–40 per cent above equivalent non-organic products, and retailers throughout Europe are competing to provide the widest range of organic products on store shelves (Baumann et al. 2001a). However, it is anticipated that price premiums will decline as supply increases, particularly in countries that have policies to encourage organic farming (Woodward-Clyde 2000).

The organic industry in Australia is also well established. Australia has between 2,000 and 2,200 organic producers, constituting 1–1.5 per cent of all producers and accounting for around 0.2 per cent of domestic food production (Monk 2002).

'Organic production is a market-driven phenomenon that owes its success to meeting the requirements of an ever-increasing group of consumers with primary concerns for both their health and the environment' (McCoy & Parlevliet 2000). The key factors motivating consumer demand for organic products are the following:
- *Safety*. Organic products are perceived to be free from chemical residues or additives, growth promotants, biological contaminants or other perceived harmful agents or treatments such as irradiation or genetically modified organisms (GMOs).
- *Health*. Organic products are perceived to have superior nutritional qualities and reduced health-risk agents.
- *Taste*. Organic food, especially fresh fruit, vegetables and meats, are perceived to taste better.
- *Environment*. Organic production reduces the impact on the environment and is related to the sustainability of production systems.
- *Social*. Organic production is seen as a favourable alternative to industrialised agriculture that is associated with rural social decline and corporatisation of supply chains.

The organic experience is a unique and important working model of certification and labelling of agricultural products (Alexandra 1999). Organic products are the market leader in the alliance between on-farm certification and consumer demand in the fresh food category. This success demonstrates that consumers are willing to pay a premium for products that are perceived to provide a superior range of attributes.

8.1 Organic standards

There are many organic labels and standards, but these are generally similar, at least from a consumer perspective. The Australian National Standard for Organic and Bio-dynamic Produce (2002) stipulates minimum requirements for products placed on the market with labelling that states or implies they have been produced under organic or bio-dynamic systems.

According to this National Standard, organic means the application of practices that emphasise:

- use of renewable resources;
- conservation of energy, soil and water; and
- environmental maintenance and enhancement, while producing optimum quantities of produce without the use of artificial fertiliser or synthetic chemicals.

The Australian standard provides a framework for the organic industry covering production, processing, transportation, labelling and importation, and is thus a whole-of-supply-chain assurance program.

The Australian and other organic standards are prescriptive in nature, in that they specify a number of practices that must be or should be implemented by producers. The wide application of organic standards across Australia and the world is at least partly due to their focus on production practices rather than environmental or other performance criteria. This allows the organic standard to be applied across many primary industry sectors and environments.

Further references
The production practices and other requirements of organic standards are not described here, and instead these can be accessed from the following documents.

Organic production systems guidelines: beef, wheat, grapes and wines, oranges, and carrots.
S. McCoy & G. Parlevliet, Report no. 00/189, Rural Industries Research and Development Corporation, April 2001.

Organic and biodynamic produce: comparing Australian and overseas standards
Rod May & Andrew Monk, Report no. 01/05, Rural Industries Research and Development Corporation, March 2001.

Organics for wheat and sheep/beef farmers
Robyn Neeson, Alternative Farming Systems Officer, Yanco, Agnote DPI/30, second edn, New South Wales Agriculture, March 1998.

Organics, opportunities and options: sheep meat and wool: a guide for producers considering organic sheep meat and wool production.
T. Baumann, M. Gronold, A. Hamilton, K. MacNamara, A. Mills, G. Newell & P. Thomas, Department of Primary Industries, Queensland, 2001a.

Organics, opportunities and options: beef: a guide for producers considering organic beef production.
T. Baumann, E. Gomez, A. Greenup, B. Holmes & P. Knights, Department of Primary Industries, Queensland, 2001b.

Australian National Standard for Organic and Bio-Dynamic Produce
3rd edn, Organic Produce Advisory Committee, Canberra, 2002.

Organic Farming in Australia
Kondinin Group, Report no. 00/97, Rural Industries Research and Development Corporation, 2000.

8.2   Summary
Consumer demand for organic food continues to grow, due largely to the capacity of these products to meet consumer needs for safe, healthy and 'environment-friendly' food, all in one parcel. A good part of the market success of organic certification can also be attributed to the use of a single term, organic, which means much the same all over the world. This simple and consistent message has built consumer awareness of what is effectively a single product label, making it relatively easy for consumers to understand and recognise organic products. Third-party certification of organic growers

is the predominant form of assurance in the organic industry, and this has given consumers and the community confidence in claims of being organic.

Organic standards have been successfully harmonised worldwide, which has also contributed to the presentation of a simple and consistent message. The Australian standard for organic produce addresses the whole supply chain, ensuring that mechanisms are in place to take this product from paddock to plate, adding further to the utility of organic labelling.

In contrast, environmental labels have many different names and claims, and come in many different forms. Consumers are confused by this, and are unlikely to purchase products they do not recognise or understand. Furthermore, environmental labels are not easily applicable to food production, and often only address processing or manufacturing sectors.

Organic certification has dealt with the complexity and diversity in agriculture by focusing on production methods that will deliver 'natural' products, instead of specifying levels of performance that either products or production systems must meet.

9. Environmental management systems

This chapter introduces environmental management systems (EMS), a tool used by organisations to identify and manage their environmental aspects. It focuses in particular on one of the best-known forms of EMS, ISO 14001, notes the extent of adoption in Australia and elsewhere, and assesses its potential for use within agricultural supply chains.

An environmental management system (EMS) is a procedure used to continually manage and reduce the environmental impacts of an organisation. It is based on the continuous improvement cycle of 'plan, act, check and review', and is an effective action-learning tool. This same cycle is also the core of other well-known management approaches, such as adaptive management and the 'Best Prac' producer program developed in Queensland.

While EMS is the best-known environmental management standard in Australia, and thought by many to be the only internationally recognised standard available for producers, there are actually many other international standards available for use. As well, people commonly use EMS as an umbrella term for all environmental standards and verification procedures.

The high level of interest in EMS in Australia has resulted in a range of ISO 14001/EMS trials on farms, including those for beef, wool, grain, fruit and vegetables, prawns, and grapes, and has prompted the development of a national framework for EMS by the Federal Government agency of Agriculture, Fisheries and Forestry Australia (AFFA). AFFA have also developed an EMS Navigator, which is a web site that provides information on EMS and related activities to the public (http://www.affa.gov.au/emsnavigator). Furthermore, the Australian Landcare Management System (ALMS) is being widely promoted as a strategy for aligning the EMS of an individual property with the natural resource management priorities of catchments (Douglas et al. 2002).

The two best-known forms of EMS are ISO 14001 and Eco-management and Audit Standard (EMAS). EMAS is not considered further as it is not available for use by Australian primary producers, and is not used in agriculture.

9.1   Overview of ISO 14001

ISO 14001 provides a systematic approach in the form of an environmental management system that helps businesses determine their environmental policy, objectives and targets (ISO 1998a). It is an international standard that specifies the requirements for an EMS that can be objectively audited for self-declaration or third-party certification (ISO 1996). This standard does not specify absolute requirements for environmental performance beyond compliance with applicable legislation and regulations, and with a process of continual improvement. ISO 14001 prescribes a management system that is to be used for managing the environmental aspects of an organisation, but does not specify production practices to be used. Hence, two firms involved in similar activities but with different levels of environmental performance can both comply with and gain ISO 14001 certification (Starkey 1998).

Manufacturing industries appear to have been amongst the first to apply ISO 14001, and the industry sectors with the largest numbers of certifications are those of electrical, chemical, pharmaceuticals, machinery and engineering (Woodward-Clyde 2000). It is likely that public and subsequent government concerns about the environmental impacts of these high-risk industries persuaded them to demonstrate improvements in their environmental performance. ISO 14001 is ideal for this purpose, and may also provide other significant benefits such as:

* a management system for integrating activities and coordinating staff;
* reduced cost of waste management;
* savings in consumption of energy and other inputs;
* lower distribution costs; and
* a framework for continuous improvement in environmental performance.

9.2   Application of ISO 14001 in Australia

Agriculture in Australia is demonstrating a preference for EMS, particularly the internationally recognised standard ISO 14001. However, fewer than 1 per cent of all ISO 14001 certificates in the world during 2000 were for agriculture- and fisheries-related industries (ISO 2001). The reasons for the low number of certificates in agriculture are not obvious. Perhaps the relevance of ISO 14001 to agriculture is only now being recognised, and the number of certifications will grow with time. Alternatively, the low number of certificates may suggest that ISO 14001 is not favoured by or suited to agricultural enterprises.

Allison and Carter (2000) noted that stakeholders did not believe that environmental management systems (EMS) such as ISO 14001 were synonymous with good environmental performance. The adoption of EMS only requires continuous improvement rather than specific levels of performance, and for this reason an EMS does not guarantee that a business is ecologically sustainable. Similar reservations have also been expressed by a number of Australian consumer and conservation organisations (see King 2003).

In fact, there is considerable divergence of opinion in Australia about the application of ISO 14001 to agriculture, possibly stemming from a lack of clarity on the role this standard can play. There is little doubt that ISO 14001 is an excellent planning and management tool for use in managing environmental risks and impacts. Also, there is little doubt that the application of an ISO 14001 in large organisations with many inputs and outputs can result in significant cost savings, and more than pay for the costs of development and application. This is discussed in more detail in section 9.3.

However, there is considerable doubt about its effectiveness in supply-chain relationships or as a marketing tool, and there are wide concerns about its application in small business. Woodward-Clyde (2000) noted that it was mainly large corporations that were interested in ISO 14001, rather than small- to medium-sized enterprises that were struggling with relatively high compliance costs. In spite of this, a number of organisations in Australia have put considerable effort into promoting the use of EMS and ISO 14001 in agriculture.

9.3   Application of ISO 14001 in Europe

Perhaps this preference for ISO 14001 has stemmed from its use by prominent EU food retailers as a management system for their stores. (As noted earlier, food retailers desire to improve their public image on environmental issues, and increase sales by providing an opportunity for customers to express their environmental concerns through their choice of retailer.) However, while ISO 14001 is well suited to improving the environmental operations of a giant food retail store, such retailers have not stipulated its use for the primary producers and pack-houses that supply these stores with fresh produce. ISO 14001 is not the on-farm standard of choice for retailers and growers in the EU. Instead, the preferred standards appear to be retailer production protocols such as the BRC and EUREPGAP, and industry quality assurance programs that fall under the British Farm Standard.

Voluntary environmental management standards such as Linking Environment And Farming (LEAF) are also prominent in the UK farming arena. There is more land under LEAF than there is under organic farming, and numbers of participating farmers are growing (Pexton 2001). There is also some acceptance of the LEAF standard by retailers such as Sainsbury's and Birdseye, who give preference to suppliers in this scheme.

9.4   Application of ISO 14001 in Asia

In Japan, by contrast, there has been considerable government interest in ISO 14001, with companies requested by the Ministry for International Trade and Industry to prepare an EMS that conforms with ISO 14001 (Woodward-Clyde 2000). Exporters, who generally need good cooperation from government, have embraced ISO 14001 and appear to be using this to position themselves in global markets.

The impact of the Japanese government's encouragement of ISO 14001 is now evident in supply chains, as many ISO 14001-certified companies have adopted EMS-type procurement policies, and may require their suppliers to conform with the same standard (Woodward-Clyde 2000).

China, Taiwan, Indonesia and South Korea also appear to believe that ISO 14001 will become a requirement of access to global markets, and are encouraging uptake of this standard (Woodward-Clyde 2000). However, it is not clear if the requirement for ISO 14001 is being relayed right back to the farm.

9.5   Potential for use of ISO 14001 in on-farm assurance

It is unlikely that retailers will require their suppliers of fresh food to be certified to ISO 14001, as this does not provide assurances on their most pressing need, food safety. ISO 14001 does not specify performance criteria, and therefore cannot be used as a guarantee of production practices or product attributes specified by retailers. 'No product label, advertisement or other promotional material should give the impression that a product is ISO 14001-certified or ISO 14001-registered' (ISO 1998b). Certification of the management system that was used to produce a product is not the same as certification of a product or production practice, and it is unacceptable to mislead consumers by giving them the impression that ISO 14001 is a product environmental label. The International Organization for Standardization states unequivocally that 'ISO 14001 cannot be used as a label signifying a "green" or "environment-friendly" product,' and the same principles apply to food safety and food quality.

The inability of ISO 14001 to provide assurances on product attributes and production practices is one possible reason why food retail chains have developed production protocols such as Nature's Choice and EUREPGAP. Unlike ISO 14001, a production protocol enables the retailer to procure foods from production systems with specified features. These foods can then be marketed to consumers under the retailer's label, providing commercial advantages for the retailer. Therefore, a food product aligned with a label is likely to be more highly valued by the retailer because it has specified environmental attributes that can be marketed to its customers through the use of a label on products at the point of sale. The same food product aligned with ISO 14001 may be of less value to the retailer, because it has unspecified environmental and other attributes that cannot be marketed to customers via a label on products at the point of sale. Hence, a food retailer is unlikely to purchase more or pay more for products procured from a primary producer with ISO 14001 certification.

Thus, the commercial and other benefits of using ISO 14001 largely accrue to the organisation that implements it, with the most common benefit being the efficiencies achieved through the use of a comprehensive management system.

It was notable that ISO 14001/EMS was rarely mentioned at the 2002 national On-farm Food Safety and Quality Assurance Conference in Hobart, and then only by people from the floor rather than invited speakers. Hancock (2002), when asked why ISO 14001 had not been proposed as a suitable model for harmonising on-farm standards, replied that ISO 14001 is not something that is required in international horticultural markets.

ISO 14001 may experience the same fate in Australia as industry quality assurance standards, commencing with considerable producer interest and adoption, to be followed by disappointment and the development of a range of less onerous schemes. Most quality assurance standards have produced little in the way of verifiable production and product claims, and so provide little that can be used to add value to products at the point of sale. Consequently, participating producers have gained little recognition for the additional expenses and efforts required for certification to a quality standard. In these cases producers have paid for assurances that either fall short of or are not relevant to the needs of retailers and other supply-chain clients. Producers who do not receive recognition then either opt out of quality assurance completely, or look for simpler and cheaper on-farm alternatives.

9.6   Product-oriented EMS

EMS has been a significant factor in the overall 'greening' of European retailing. Retailers have become more aware of environmental issues generally, and the environmental impacts of their suppliers, through their use of EMS as management systems in their own stores (Allison & Carter 2000). Nevertheless, at this time an EMS cannot be used to guarantee good environmental performance, and is not seen to have a role in the certification and labelling of products.

EMAS is a European Commission EMS that has been operating since 1993 (Starkey 1998). It is based on an EMS that is very similar to ISO 14001, although some minor modifications are required. According to Starkey (1998), EMAS differs from ISO 14001 in that only EU members can participate in EMAS, only individual sites can be registered under EMAS, and only companies performing industrial activities specified in the EMAS regulation are able to participate in EMAS.

EMAS has some additional features to ISO 14001 and, in particular, the new version of EMAS requires products to be considered within the EMS (European Commission 2001). This enables companies to make environmental claims about products, and to use the new EMAS logo to this effect. This integrates EMS and product labelling, and is likely to drive improvements in the environmental performance of products (Allison & Carter 2000).

Similar consideration could also be given to the development of product-oriented ISO 14001. Perhaps an optional module could be added to ISO 14001 that considers products and provides a product label. Alternatively, a simplified and uncertified form of EMS could be used as a management framework for complying with the requirements of environmental labels. In this way the environmental control provided through the implementation of an EMS can be used by an organisation to comply with the requirements of an environmental label. The adoption of industry best management practices and environmental codes of practice may also enable an EMS to make claims on product labels, making them much more relevant to consumers.

However, where third-party auditing is required, producers need to consider if it is possible or efficient to use ISO 14001 as the one audit that meets the requirements of other standards. As mentioned earlier (section 4.1.1), certification of ISO 14001 must occur in accordance with ISO Guide 66, and therefore cannot be used to harmonise food safety and quality assurance standards that are certified in accordance with ISO Guide 65.

9.7   EMS as a management framework for producers

While ISO 14001 is not well suited to supply-chain relationships, primary producers should nevertheless consider the management efficiencies and capabilities gained through its use. A large and intensive farm with high-input costs and many staff is likely to benefit from the use of an EMS. With its 'plan, act, check and review' cycle, an EMS provides an effective monitoring and management framework that can be used to continually improve many aspects of a business.

ISO 14001 also shares common management system features with ISO 9001, and enterprises can use their ISO 9001 management system as the basis for their EMS (Starkey 1998). This provides potential for the integration of EMS and ISO quality management systems by primary producers, providing a powerful management system for a business.

An EMS can also greatly assist producers prepare for future customer and regulator requirements, as these can be more easily dealt with by an existing management framework, containing environmental policy, goals and strategies. This could be used to integrate a range of requirements, rather than address these in a separate and ad hoc manner.

Also, further consideration should be given to the use of simplified and uncertified forms of EMS. ISO 14004 provides guidance for an enterprise to establish and implement an EMS (ISO 1998a), and similarly it is possible to use ISO 14001 without going through to certification. This less costly form

of an EMS can be used to improve environmental performance, comply with relevant legislation, reduce environmental risks, and achieve cost savings. However, the performance of an uncertified EMS will depend on the effort invested in its development, implementation and review, and possibly the level of assistance obtained from specialists.

It is interesting that the weakness of EMS in terms of its inability to specify product attributes and production practices is a strength in relation to its implementation as an environmental standard for food and fibre production. An EMS does not involve the very difficult task of developing standardised environmental and other performance criteria for complex and diverse agricultural systems, and instead allows these to be defined for local conditions. Slaughter (2003) argues that achieving sustainable development is best achieved through the use of a management process that continually adapts to the needs of a dynamic environment (natural, built, social and political), as well as our ever-changing knowledge and economic and physical circumstances. Agricultural environments, management practices, and associated industry and community priorities are particularly dynamic, and it is in this context that an EMS seems well suited to the pursuit of ecological sustainable development. The inclusion of industry best management practices and environmental codes of practice in an EMS, combined with constant benchmarking, would make EMS a powerful and effective tool for managing the environmental aspects of agriculture.

9.8   Summary

An environmental management system (EMS) consists of the continuous improvement cycle of 'plan, act, check and review', and as such is a very effective environmental management tool. Australia has a very large interest in EMS, and is now developing a national framework to guide the application of EMS in business.

ISO 14001 is the well-known international standard for EMS that has proven very useful in large organisations such as processing and manufacturing plants. Its strengths lie in the management system approach that provides an excellent tool for coordinating activities and staff, and achieving cost savings. However, many small businesses do not have the economies of scale to justify the expense of certification to this standard, but may gain some advantages from the use of a non-certified EMS.

ISO 14001 does not appear suited to food and fibre supply-chain relationships, which possibly explains why it does not seem to be the favoured standard of retailers and processors. This standard does not specify production practices or intrinsic product attributes, and cannot guarantee that producers have met the requirements of markets. For this reason, ISO 14001 cannot result in a label that accompanies food and fibre as it passes along the supply chain, and consequently does not provide a mechanism for adding value to agricultural products. It is probably these reasons that prevent ISO 14001 from being benchmarked against EUREPGAP and other product standards, as certification of these standards is controlled by different ISO Guides. This means that ISO 14001 cannot provide the one on-farm audit that simultaneously provides certification to the standards commonly required by markets.

Modifications to the UK form of EMS, EMAS, will allow it to consider products and provide an EMAS logo that can be used to make environmental claims about products. It is possible to do this with an uncertified form of EMS in Australia, where this is used to provide the environmental control needed to achieve the environmental and other performance criteria of an environmental label.

An EMS is easier to adapt to agricultural enterprises because it does not specify production practices and performance targets, and instead allows these to be customised by an organisation to suit local conditions. This approach is also unlikely to conflict with WTO rulings, making it possible for governments to play a large role in the development and implementation of EMS.

The main benefits of an EMS are the internal operational efficiencies gained through the use of a management system by an organisation, rather than supply-chain or marketing advantages.

10. Conclusions and recommendations

The following paragraphs taken from Woodward-Clyde (2000) neatly describe a strong dichotomy of views in New Zealand on the need for environmental assurance in agriculture. Some see an urgent need to develop specific environmental and product standards to meet the growing number of markets with these requirements; others are critical of the systems, practices and standards currently available for use on the grounds of cost and perceived lack of quantitative evidence of consumer demand.

> Producers and exporters of food and fibre face a range of consumer preferences, company purchasing policies and regulatory requirements in foreign markets that are increasingly likely to reflect environmental considerations. With an increasing level of global awareness and understanding of environmental concerns, a reliance on a widely held but very general perception of a 'clean and green' image will no longer be sufficient to guarantee market access.

> People holding this view have grave concerns about the general level of complacency with which New Zealand exporters are communicating environmental performance to consumers, retailers and regulatory agencies in overseas markets. They warn that New Zealand is in danger of not being prepared for the rapid development of environmental consciousness and the increasing demand for environmental product information. They urge the uptake of sustainable production practices, EMS, environmental labelling and other certification standards as a means of accessing the growing number of markets that have environmental requirements.

> Conversely, other commentators express deep scepticism and significant doubt about the strength and future impact of green market signals in New Zealand's export markets. They point to consumer surveys that show only a weak translation of environmental consciousness into purchasing decisions by consumers. They observe the vested interests of government agencies and conservation groups in raising the environmental consciousness of the community well beyond the levels exhibited by consumers. They also criticize the systems, practices or standards that are available for use on the grounds of cost, credibility and lack of consumer interest, and warn that the export profile of New Zealand could be compromised were it to invest in such initiatives without first undertaking an appropriate analysis of need.

> There are mixed, divergent and sometimes completely contradictory signals regarding the existing potential influence of 'green purchasing power' in New Zealand's main export markets. For most sectors there is little quantitative information available and a heavy reliance on anecdotal evidence, hearsay and the experience of individuals.

This poses two important questions that are relevant to the development of on-farm assurance in Australian agriculture:
1. To what extent do markets for Australian food and fibre require environmental and other assurances?
2. How can these requirements be met, both now and in the future?

To answer these questions it is first necessary to segment markets for Australian food and fibre since on-farm standards should be chosen for market segments, rather than agricultural markets as a whole. At a minimum, markets for Australian food and fibre should be segmented into bulk commodity and niche markets. These markets have very different requirements, and to confuse these will prevent the formulation of effective strategies for the production and marketing of Australian farm produce. In this respect the two levels of on-farm assurance proposed by Meat and Livestock Australia seems appropriate. A choice of two levels of standards allows primary producers to select an on-farm standard that is appropriate for particular market segments, and to adjust this as market requirements change over time.

10.1 On-farm standards for different market segments

Bulk commodity markets are particularly sensitive to price. These markets demand safe products of reasonable quality and at a reasonable price. While commodity markets in the EU are flagging emerging requirements for extrinsic qualities, such as animal welfare, environmental protection, and farm-worker health and safety, Australian producers send very little of their produce to this destination. In contrast, there appear to be few strong signals on the need for this type of comprehensive on-farm assurance coming out of Asia, our traditional agricultural markets. While there is a need to be prepared for the day when full on-farm assurance becomes a condition of trade, there does not appear to be a need to implement comprehensive standards at the present time. This suggests that current on-farm assurance for mainstream markets should be primarily, if not solely, concerned with food safety, with assurances provided through self-declarations. Meat and Livestock Australia (2002) suggest that the current National Vendor Declarations may be an appropriate standard for this first level of on-farm assurance for livestock. However, components of FSQA standards, or a basic EMS that is supported by the appropriate documentation could also serve this purpose.

Niche markets will require a different form of on-farm assurance, due to their more exacting requirements for one or more quality attributes of food. This form of on-farm assurance could be considered as a contract between value-chain partners, where agricultural products of specified quality are exchanged for a negotiated and specified price.

On-farm standards used to supply value-added products to niche markets should:
- specify intrinsic product qualities and extrinsic production practices;
- be customised to particular markets through the addition of optional modules or specifications;
- verify that specifications have been met through third-party auditing;
- be applied to all sectors of food and fibre supply chains;
- provide a label that identifies conforming product as it passes along the supply chain to the end-consumer; and
- be recognised as the equivalent of standards required in major markets.

10.2 Evaluating Australian standards for use in niche markets

While a number of 'ideal' characteristics have been proposed for standards used for market-oriented on-farm assurance, it is possible to add these to many existing standards so that they meet the requirements of Australian agriculture and their clients. Perhaps the most important factor to consider is the extent to which a standard is recognised and valued in target markets. Standards can be modified through the addition of processes and components, but this may all be to no avail if the standard is not regarded as equivalent with those used in export markets.

A number of Australian FSQA standards of industry, such as Cattlecare, Flockcare and Clipcare are capable of specifying production practices, and will therefore meet some requirements of some niche markets. However, these industry standards do not specify all of the production practices valued by markets, such as those that address issues concerned with the environment and OH&S, and they do not specify intrinsic product qualities. Flockcare, Cattlecare and Clipcare are not conducive to value-chain trading as they cannot guarantee the supply of specified product, and they are not visible to most parts of the supply chain as they operate only at the farm level. Also, they do not result in a product label and they are not regarded as equivalent to the standards used in overseas markets.

In contrast, SQF 2000 and 1000 are FSQA standards that are much better suited to value-chain trading since they are designed for use along the entire supply chain, provide a label to differentiate conforming product, are third-party audited, and are becoming internationally recognised through their use in many countries. However, SQF 2000 and 1000 specify few if any intrinsic product qualities and only a limited number of extrinsic production practices. Nevertheless, environmental aspects have been introduced into SQF 1000, demonstrating that additional components can be added to FSQA standards to make them more equivalent with international standards like EUREPGAP. It may also be

possible to introduce intrinsic product quality specifications into an FSQA standard, as appears to have occurred with the Tasmanian Quality Wool program.

Quality standards such as ISO 9001, with its capacity to address customer requirements and integrate with ISO 14001, also have potential as level-two standards.

EUREPGAP, developed and adopted by many EU food retail chains, is regarded as a baseline market-entry standard and is not expected to provide price premiums for conforming product. Strengths of the EUREPGAP standard are its capacity to address the wide range of safety and production practice requirements of EU markets, third-party auditing, and its acceptance by the majority of the large EU food retail chains. It is also an international standard that can be harmonised with many other similar standards used by industry sectors in other countries. However, it is not suited to value-chain trading because it does not specify intrinsic product qualities, does not confer a label, and is only used at the farm level. However, access to some EU market segments provided by this standard may afford adequate recompense for EUREPGAP certification.

ISO 14001, an EMS standard, does not appear to be suitable for value-chain trading by primary producers, as it is primarily designed for improving the environmental management and internal efficiencies of an organisation. Strengths of this standard include its wide recognition as an international standard, third-party auditing, compliance with relevant environmental legislation, and continuous improvement in environmental performance. However, ISO 14001 does not specify production practices or intrinsic qualities of products, cannot provide a label for products, and cannot be recognised as equivalent with international food industry standards like EUREPGAP. However, its use as a management process that continually adapts highly diverse and dynamic on-farm production to the ever-changing needs of community and consumers may be more highly regarded in time, leading to more widespread use within supply chains.

Organic standards are the success story of 'environment-friendly' marketing in the food industry, and are well suited to the second level of assurance in a number of respects. Organic standards have the advantages of being third-party audited, internationally recognised, applied along the entire supply chain, and result in a product label. They prescribe production practices that greatly reduce the risks of food contamination by chemical residues, and are widely understood and accepted in the market place. Organic standards do not specify intrinsic attributes of food, environmental sustainability issues, or food safety practices. However, adherence to stringent production practices and third-party auditing provide sufficient assurance that foods are free of chemical residues. This is highly valued by many consumers, to the extent where they pay premiums for certified products. While environmental sustainability and other criteria are being added to organic standards, it is unlikely that this will occur to any great extent. Organic standards are globally recognised for producing safe, healthy and relatively natural food, free of synthetic chemical residues. They are used by large numbers of producers, processors and manufacturers, and certified-organic produce is purchased by many consumers. Hence, organic standards are very highly regarded and successful, and this could be put at risk if these were changed to any significant extent.

Environmental labels are well suited to value-chain trading. These labelling standards are able to specify production practices, intrinsic product attributes and environmental performance targets for entire supply chains. Environmental labels are purposely designed for labelling products, and in effect take claims about production practices and product attributes right through to the consumer. There are a number of environmental labelling standards that can be considered for on-farm assurance.

Type II environmental labels are generally marketing claims of manufacturers, and are not based on a standard that can be applied along the supply chain. They also suffer from a lack of credibility due to their emphasis on single high-profile environmental issues instead of a more general life-cycle assessment, lack of third-party verification, and lack of conformance with an agreed standard. Type II environmental labels must also be promoted by the business that owns them, and this is beyond the financial means of most primary production enterprises.

National eco-labels, a form of Type I labelling based on the ISO 14024 standard, have a number of attributes that suit level-two assurance. They are internationally recognised, address the life cycle of products and thus operate across the entire supply chain, are third party audited, confer product labels, focus on issues of environmental impact, and also address some product function or intrinsic product qualities. However, they are very difficult to apply to the long, complex and highly variable food supply chains, and have been accused of contravening WTO rulings due to government involvement in setting product assessment criteria based on production practices. This combined with the high cost of multi-stakeholder eco-labelling programs makes them difficult to apply to food.

While full national eco-labels are very difficult to apply to primary production, it is possible to use a Type I label by restricting them to particular primary industries or regions, by abbreviating the life-cycle assessment, and by focusing more on production practices and less on environmental performance. This allows Type I environmental labels to be more easily applied to the production of food and fibre, and appear to be the model used in a number of environmental labelling programs for food in the US.

10.3 Environmental labelling and environmental performance

Australian primary producers generally desire to be good natural resource and land mangers. The additional stimulus provided by market benefits would motivate them to improve their environmental performance. However, the significant environmental outcomes required by markets and the wider community will require capacity building through training, provision of information and tools, and finance.

Premium prices for value-added food and fibre will motivate and help build capacity, but these will not be available to all producers. At this stage, consumers that are willing to pay a premium for environmentally preferable products are relatively few in number, constituting small market niches in developed countries. CEC (1999) observe that market support for 'environment-friendly' products has been very disappointing over the past decade and that, despite strong public concern for the environment, green markets have not grown.

An important role of the limited environmental labelling opportunities available for primary producers would be the development and customisation of an environmental assurance model for livestock industry sectors. This would create a fully operational environmental assurance model that would be available for use on a broader scale when conditions become favourable.

10.4 Recommendations

The main aim of this review was to describe and compare market-oriented on-farm standards that have potential to motivate and build the capacity of producers of food and fibre to improve their environmental performance. For this reason, the focus is on identifying on-farm assurance that adds value to food and fibre pre-farm-gate. The following recommendations are made for on-farm environmental assurance in accordance with this aim.

1. Markets for Australian food vary in their requirements for on-farm assurance. Consequently, on-farm assurance should be tailored to the needs of specific markets rather than taking a 'one size fits all' approach. At a minimum, markets should be divided into mainstream and niche.

2. Two levels of on-farm assurance are preferable, enabling producers to build on their initial investments. In this way the self-declared food safety assurance or chemical residue assurances for mainstream markets (first level of assurance) could be a stepping-stone to higher-value market segments (second level of assurance).

3. On-farm assurance for mainstream food markets that are sensitive to price should mainly concern practices and documentation associated with food safety, with assurances taking the form of self-declarations. This first level of on-farm assurance could be modelled on current National Vendor

Declarations, elements of quality assurance schemes, or on a simple environmental management system (EMS).

4. Similarly, the first level of on-farm assurance for wool production could provide assurances on minimum levels of chemical residues, which are emerging as a major issue in some markets. On-farm assurance could occur through chemical assay of wool samples by a credible testing laboratory.

5. The second level of on-farm assurance could be designed for particular market segments. It should provide credible assurances on food safety and chemical residues, and on a number of optional and negotiated intrinsic product qualities and extrinsic production practices. These on-farm standards should specify the production practices and performance criteria of particular market segments, and guarantee that producers have complied with all conditions of the standard.

6. Second level on-farm standards should have the capacity to label food as it passes along the entire value chain, with the label being an identifier of safe food that has specified intrinsic and extrinsic qualities.

7. Consideration should be given to the inclusion of specified production practices and intrinsic product qualities within current industry quality standards, their implementation along the entire supply chain, and for these standards to have an identifying logo or label.

8. Environmental labelling standards are also an appropriate model for on-farm assurance, as they specify production practices and intrinsic product qualities, and are well suited to value-chain trading. They are purposely designed for labelling products, and in effect take claims about production practices and product attributes right through to the consumer.

9. A form of Type I environmental label, based on the ISO 14024 standard, could be customised for particular primary industry sectors and regions. This type of environmental label is suitable for value-chain trading because it can specify production practices and intrinsic product qualities, is based on an international standard that is third-party audited, addresses the entire supply chain, and labels products.

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