

Environmental management systems in the viticulture industry

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Abstract

The Australian wine and grape industry is actively seeking to demonstrate its environmental credentials. This paper describes the process by which the industry is achieving this task by embracing the principles of environmental management systems (EMS) such as ISO 14001. The role of standards and the relevance of EMS to the industry are outlined. The activities that have been undertaken by the industry in environmental management and the procedure for implementation are described.

At a national level the industry has endorsed the establishment of a viticultural environmental management code and an environmental management framework designed to meet the varying requirements of industry participants. The tools and information packages to enable the adoption of good environmental practice are presented. These tools include the Viticare Environmental Risk Assessment (VERA) and information presented in the form of national environmental best management practice protocols. The key role of biodiversity in the implementation process is described.

Keywords

best management practice, biodiversity conservation, environmental management systems, environmental risk assessment, environmental standards, viticulture, wine and grape industry

Introduction

The Australian Wine and Grape Industry and its participants are increasingly recognising the value to them of good environmental management, primarily for production and marketing benefits. Like most industries it is also facing unprecedented scrutiny of its environmental management performance from external stakeholders. These stakeholders (including government, non-government organisations, consumers, and society in general), ultimately want goods produced in an environmentally sustainable manner with minimal adverse impact upon the environment. The Australian wine and grape industry, through its environment strategy 'Sustaining Success', is committed to the continual improvement of its environmental performance (WFA and SAWBIA 2002, www.wfa.org.au). The key objectives of the strategy are to:

- optimise business operations to ensure the use of resources and generation of unwanted by-products are managed in an efficient and ecologically sustainable manner
- anticipate and satisfy community and customer expectations on environmental performance
- measure and evaluate performance to demonstrate environmental stewardship.

The implications of this for the Australian wine and grape industry are as follows:

- It needs to have appropriate environmental management practices and performance.
- It needs to be able to demonstrate these appropriate environmental practices to external stakeholders, in a manner which has credibility with these stakeholders.
- It needs to plan in order to be able to respond to changes in stakeholder expectations and demands with respect to environmental management practices and performance.

In this paper we outline the issues related to environmental management for the wine and grape industry, with particular focus on environmental management systems (EMSs) using ISO 14004 principles, setting of environmental standards, and the role of EMS in the wine and grape industry. This background information is developed from a paper prepared for the 11th Australian Wine Industry Technical Conference, Adelaide, by Baker and Boland (2001a). We also outline the activity conducted to date, and examine how biodiversity issues can and will be included in the development of tools and protocols for the national EMS program.

Options for environmental management

When considering any formal arrangement for environmental management we are really looking at setting a standard.¹ This standard can range from a general set of broad guidelines and recommendations that a producer is not compelled to apply, to a very detailed specific set of prescriptive requirements that the producer *must* meet.

Most standards (and the various schemes that use them) are based primarily around performance, production or process (Mech and Young, 2001). There are usually elements of all three involved, but the emphasis is generally placed on only one of the three.

Performance

Standards that are performance-focused specify a certain level of environmental performance that should be targeted and / or have to be met (e.g. zero waste water to be released into streams or lakes; total water use to be no more than a certain amount per hectare; 10% of total land area to be set aside for native vegetation).

Production

Standards that are production-focused specify that certain production activities should and / or must be conducted in a certain way in order to minimise risk of adverse environmental impacts. They often take the form of a document such as a standard operating procedure or an environmental best management practice protocol (e.g. specific guidelines for pesticide storage and application, irrigation practices).

Process

Standards that are process-focused specify what is required for an enterprise to have a management process that enables it to identify and meet its environmental aims and requirements. These standards do not set either the environmental performance targets or the production standards. Instead they set the standard for the management structure in which to identify appropriate targets and standards, to determine appropriate action and monitor and review the outcomes of these actions. The most widely accepted process standard for environmental management is ISO 14001,² which provides the guidelines for the certification of an environmental management system.

Environmental management systems (EMS)

In simple terms, an environmental management system (EMS) is a *formal management process* for conducting all business activities in a manner which aims to ensure compliance with existing environmental laws and regulations. At the discretion of management the process can also be used as the vehicle for achieving other objectives, such as minimising negative impacts upon environmental quality and, where feasible, attempting to maximise any positive impacts. It is a process-based tool for building environmental considerations into the day-to-day conduct of business.

¹ Accepted specification or codes of practice which define materials, methods, process and practices that, when effectively implemented ensure that consistent and acceptable levels of quality, performance, safety and reliability are achieved (Standards Australia 2001).

² ISO 14001 is the standard against which the EMS is audited. ISO 14004 is the standard for the guidelines for implementation and maintenance of an EMS (ISO is the International Organisation for Standardisation) (Standards Australia 1996a,b).

An EMS is *applied at the enterprise level*. It is a cyclical iterative process of 'Plan, Do, Check, Act' based upon the key principle of continuous improvement (Figure 1). This process is similar to that used in other management systems including those for quality assurance, occupational health and safety and food safety.

An effective environmental management system enables enterprises to make informed decisions with respect to environmental management. The EMS should facilitate the collection of data that is needed to make the right decision at the right time. The process should cover areas such as assessment of current performance, training, communication, knowledge of legal requirements, performance evaluation, and production process evaluation. A management system should be repeatable and consistent, and provide for the review of progress (Carruthers 2000).

Any formal process standards for EMS (including ISO 14001) are management standards, which focus upon managing the environmental impacts of enterprises; they are not environmental performance standards. This should not be interpreted as implying that there is no minimum target with respect to environmental performance. In their application of an EMS, enterprises should be aware of their legislative requirements along with other guidelines, which they are either compelled to comply with or have chosen to accept (e.g. codes of practice and Commonwealth, state and local government legislation) (Carruthers 2000).

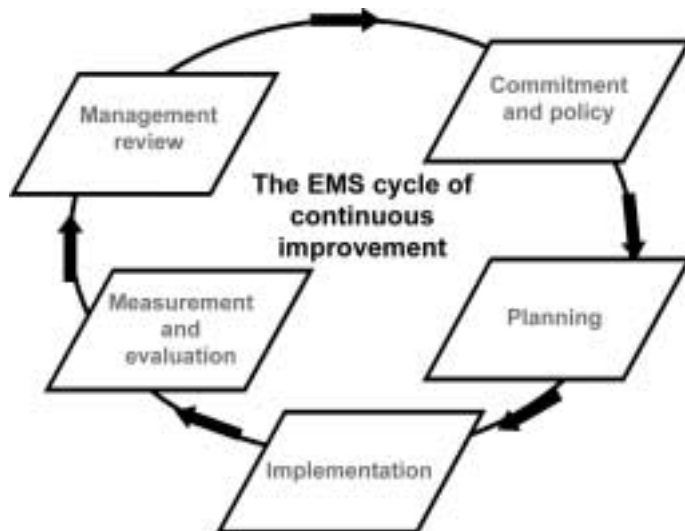


Figure 1 The environmental management system process (adapted from Standard Australia 1996b).

Setting the performance standards

The standards or requirements that an enterprise may have to meet, or chooses to meet, will originate primarily from the various stakeholders requirements. Ideally they will be prepared in consultation with the industry, but this may not always be the case. Some may be legal requirements, but others may allow growers and wineries the option of embracing them or at least consider elements of them.

The following six categories (legislation, market, catchment / region, industry, community, enterprise goals) represent the source of most, if not all, the objectives of the EMS that enterprises in the industry face. In the case of the first four categories it is likely that in the near future the requirements will take the form of performance standards. For the last two categories the requirements are more likely to be informal preferences. It should be noted that none of the categories are mutually exclusive.

Legislation

Historically, legislation has been the main source of environmental management requirements placed on the industry. Legislation and regulation relating to environmental issues seems likely to grow in the near future, and the nature of the requirements may change from a 'must not do' to a 'must do' approach.

Market

As awareness of environmental issues has grown, so have consumer expectations for 'environmentally friendly' products and production. Increasingly, particularly in Europe, retailers are looking for ways and means to provide guarantees to their customers in relation to the environmental management and performance associated with the products they sell. This is resulting in increased requirements being placed upon producers (who in turn place requirements upon their suppliers) to meet the standards either set by or subscribed to by the retailers. It is relatively early days for this type of standard, but indications are that they will become more commonplace and more comprehensive — for example, the Eurep-gap Protocol for fresh fruits and vegetables (EUREPGAP 2001).

Catchment / region

There are several environmental issues of great regional significance (e.g. algal blooms) that individual producers only make a relatively minor contribution to, and which may appear to be insignificant to the enterprise. To ensure that these issues are taken into account at the enterprise level as well as the regional level, appropriate standards or guidelines need to be set at the catchment level.

Industry

While industries such as the Australian wine and grape industry are comprised of many individuals and enterprises, in the eyes of society they are often considered to be a single entity. The whole industry's environmental management record will come under increased scrutiny, and it will need to respond in a manner which provides evidence of its collective performance and practices. Some industries have chosen to respond by having a code of practice, such as the *Australian Minerals Industry Code for Environmental Management* (AMI 2000) or by providing BMP guidelines, such as the *Australian Cotton Industry Best Management Practices Manual* (CRDC 2000), or both. These can provide guidance on issues of concern to the industry, what practices are unacceptable, and what practices are required, and may outline how members of the industry can deal with particular issues. They also represent a statement of intent by the industry about how it perceives its role and how it intends to manage its interactions with the environment. In the case of the Australian wine and grape industry, this will be clarified by the National Environmental Strategy which has recently been prepared by the South Australian Wine and Brandy Industry Association and launched by the Winemakers Federation of Australia (WFA and SAWBIA 2002).

Community

Individuals and representative groups in the community expects producers to be environmentally responsible. These expectations are not usually communicated to producers in a formal manner, but this does not make them any less important than those discussed above. In some cases, the close proximity of the community to the producer's activities means that failure to address these expectations may have more immediate and significant negative impacts upon the business activities of the producer, for example, ignoring neighbours' complaints about spray drift or noise may result in legal action to restrict activities.

Enterprise goals

Last, but certainly not least, are the implicit requirements of the enterprise itself. While unlikely to be in the format of a Standard, enterprises have needs and wants of their own, with respect to how they impact upon the environment.

The Role of EMS

From the preceding discussion it appears that most, if not all, of the requirements of the various stakeholders will be either performance or production oriented. If that is so, then does a process based approach such as EMS have any relevance? The answer is definitely yes.

While the majority of requirements may be related to performance and production, the role of senior management is to ensure that an enterprise:

- identifies all its environmental requirements
- addresses them in an effective and efficient manner
- can demonstrate that it is addressing its environmental requirements in a manner that is acceptable and satisfies the relevant stakeholders
- regularly reviews the process to ensure it remains up-to-date and relevant.

Once senior management has decided that it needs to address these issues in a way that leads to continuous improvement, it can employ the EMS process standard as set out in ISO 14000 series to help it do this in a rational manner.

Without an EMS to 'process' the performance and production requirements of the various stakeholders (Figure 2) it is unlikely that an enterprise would be able to continue to meet all of these environmental requirements.

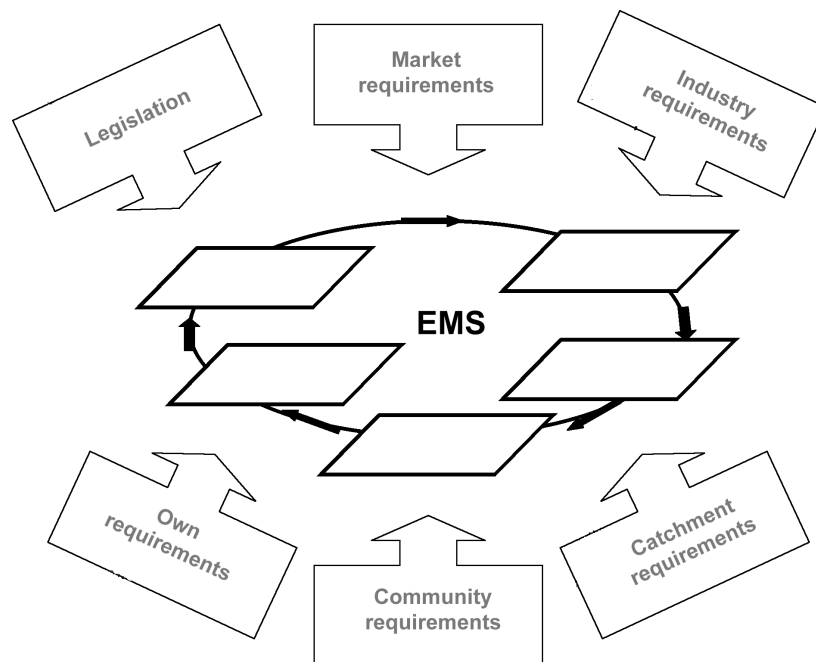


Figure 2 The role of EMS in addressing requirements.

How does it work for an industry?

As part of the strategy to address its environmental management needs, the Australian Wine & Grape Industry has recognised the value of environmental management systems by the inclusion of a component in the Viticare program of the Cooperative Research Centre for Viticulture (CRCV), that is dedicated specifically to EMS (*Project 5.2 Environmental Management Systems*) (www.crcv.com.au).

This project aims to ensure that the adoption and maintenance of EMS in viticulture will meet the environmental management and business needs of the industry and its participants in a practical and effective manner.

The industry situation

During the initial stages of the project, significant effort was invested in three areas: liaison, consultation and review (Baker et al. 2001). In Australia a number of projects of varying scales and complexities are under way to trial EMS or environmental management tools for agriculture, or both. The project team has established links with these projects to achieve a high level of coordination and avoid duplication of effort.

Extensive consultation has been undertaken with growers, winemakers, managers and researchers to identify what outcomes they believe they need with respect to environmental management and environmental management systems, in both the short and long term. This consultation has been undertaken within this project and other projects (e.g. Fisher et al. 2000).

Several environmental management schemes and tools have been developed overseas to address environmental management needs in agriculture and viticulture, including Low Input Viticulture and Enology (LIVE), Linking Environment and Farming (LEAF), Farm*A*Syst, Vitiswiss, and the Lodi-Woodbidge Winegrape Commission Integrated Pest Management Program (see Carruthers and Tinning 2000). These have been reviewed and their applicability to the industry and the Australian environment has been considered (Baker and Boland 2001b). Many of these are portrayed as, or perceived to be, environmental management systems. In most cases this is inaccurate, because they are in fact tools that can assist in the implementation and maintenance of environmental management systems. It has been recognised that there are aspects of these that could be adapted and incorporated into useful tools for the industry.

This initial work provided the basis for a discussion paper (Baker and Boland 2001b), which was distributed to industry leaders with an accompanying survey. Feedback confirmed that, with respect to environmental management, there is a considerable variation in both the needs and expectations of the individuals and companies that comprise the Australian wine and grape industry. The overwhelming response from survey respondents was agreement that the industry needs should act in order to improve its environmental performance and demonstrate this to all interested parties. Most agreed that any approach adopted should be industry-owned, voluntary, practical, and relevant both to Australian conditions and to grape growing and winemaking. Many expressed a desire for a simple system that would readily enable them to identify and address their environmental management needs and responsibilities, including legal requirements. Others recognised either an opportunity to market or a need to be able to demonstrate their environmental management performance domestically and internationally. In order to do this the industry will require formal environmental management as well as environmental management systems, which includes the option (but not necessarily the requirement) of independent auditing and external certification (e.g. ISO 14001).

National implementation

The conclusion reached following the initial period of liaison, consultation and review was that the Environmental Management Systems project team could best contribute to the Industry through the development of a national wine and grape industry approach to environmental management (Baker and Boland, 2000 and 2001b). This approach provides guidance to growers and wineries about what their environmental management options are, and about how *their* business needs may be addressed through participation in the process. Considerable work has been undertaken to put in place the component parts of this approach, including the development of both the process and the information.

The key elements are set out in the following subsections.

Environmental Strategy

A Wine Industry Environmental Strategy has been developed to provide a whole-of-industry direction (WFA and SAWBIA 2002). The strategy presents a vision for the whole of the wine and grape industry.

Viticultural Environmental Management Code

In order to facilitate the adoption of a consistent industry-wide approach to environmental management, an environmental management code was identified as a means of providing a valuable common reference upon which industry members could base their actions. It will provide a basis for formal environmental management within the industry and could be the forum for establishing and promoting recommended minimum standards of practice and performance for the industry.

A draft Australian Viticultural Environmental Management Code has therefore been prepared under the EMS project. It is intended to act as a statement of principles and intent by the industry about how it perceives its role and how it intends to manage its interactions with the environment. The code is designed for an individual business within the wine and grape industry.

The draft is based upon the Australian Wine Industry Environment Strategy and the general environmental management principles of the viticulture industry that have been identified during the course of the Environmental Management Systems project. The format of the draft is based upon the Australian Minerals Industry Code for Environmental Management (AMI 2000) which after a review of options, was identified as having a structure that suited the aim of providing a relatively short but comprehensive statement of intent.

The code upholds issues and practices identified in the environmental risk assessment and the environmental best management practice protocols (see below).

Environmental management framework

A national environmental management framework for the Industry has been developed (Baker and Boland 2001b). The proposed framework is built upon a seven-tiered model which ranges from the most simple environmental management approach at Level 1, up to independently audited and certified EMS at Levels six and seven (Figure 3).

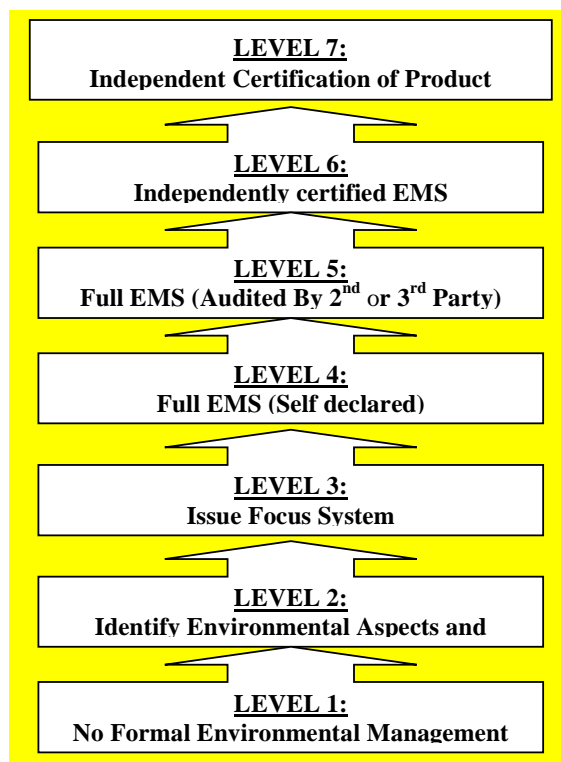


Figure 3 The environmental management framework model.

The framework provides a pathway by which growers and winemakers can enter at the level *they* feel most comfortable, and have the option to progress to a higher level should *they* feel they need to. The framework should not be interpreted as a recommendation that growers and / or wineries must move toward the external certification options either now or in the future. For the majority in the industry, undertaking an environmental risk assessment and considering environmental management issues in a more formal manner than at present may be sufficient. But some in the industry will wish to progress further, and we need to ensure that the path that they take will be consistent with the direction set by the industry. This framework has been suggested as a model to be adopted by other agriculture industries (AFFA 2001).

Viticare Environmental Risk Assessment (VERA)

The Viticare Environmental Risk Assessment (VERA) tool has been developed by the Cooperative Research Centre for Viticulture as a starting point for growers to begin building environmental management into their vineyard management. The tool guides growers through a list of questions about vineyard management practices, helps them prioritise and assess the impact of issues, and encourages them to think about how existing or potential problems can be addressed. It has been designed primarily as a stand-alone planning tool that will also meet a key requirement of the international standard for environmental management systems (ISO 14001). This will enable growers to build upon the output of VERA should they wish to implement an EMS at some time in the future.

National Environmental Best Management Practice protocols

These are generic documents that have a national whole-of-industry focus, but are structured to facilitate the application of the principles at a regional level. The protocols are designed to address environmental risks associated with production-related activities, and relate directly to issues identified in VERA. They provide guidance and recommendations on how to identify and adopt the practices and processes. Adherence to these protocols should lead to improved environmental management performance, in line with whole-of-industry standards.

Four draft protocols have been produced and are currently being validated:

- water management
- pests and chemical management
- soil and fertiliser management
- equipment, machinery and vehicle management.

Another five protocols will be developed over the next six months:

- waste management
- vineyard establishment
- general / other
- biodiversity
- greenhouse.

Environmental management systems (and Industry) guidelines

These guidelines will provide instruction and guidance on how to implement and maintain the components of a full EMS that complies with the relevant international standards (ISO 14001 and ISO 14004) in a viticultural enterprise. They will be designed to enable growers to either adopt a full EMS or just implement those discrete components that meet their current needs. The guidelines will be based upon the draft national environmental management framework for the industry (Baker and Boland 2001b).

Regionalisation

The national information has been designed to help regions implement of good environmental management practice. The Viticare team have worked extensively with regional groups, either directly or in collaboration with existing project personnel. These pilot groups have included Margaret River, Currency Creek, Mornington Peninsula, Clare / Eden Valley, Goulburn Valley,

Yarra Valley, Langhorne Creek, Coonawarra and Mount Gambier. The national information provides guidance about how to implement an EMS and supplies the national protocols for best environmental practices. These national protocols are generic and must be modified to include regional information and relevant targets. Alternatively, regions may develop their own regional protocols, which may be more targeted and appropriate for local implementation. An example is a project in the Yarra Valley which is developing regional environmental best management practices for vineyards. This project aims to improve natural resource outcomes, focusing on catchment-based environmental management systems (Fisher et al. 2002).

Biodiversity : a key issue

The Australian wine industry has identified biodiversity as one of its key environmental issues in the 'Sustaining Success' strategy (WFA and SAWBIA 2002). In addition, individual landholders are aware of the significance of biodiversity values for the economic and environmental sustainability of their business.

The Viticare Environmental Risk Assessment (VERA) tool focuses on the impact of viticulture management practices on the environment. The current version of VERA (Version 8) considers the aspects and impacts associated with: water management, pests and chemical management, soil and fertiliser management, equipment, machinery and vehicle management, waste management, vineyard establishment, and general / other. The impacts of practices on flora and fauna are currently scattered throughout VERA, rather than being focused specifically on the issue of biodiversity. For example:

- the issue of **water management** considers the aspect of extraction of water and the potential impact on the local ecosystem (habitats, breeding) and flora and fauna
- the issue of **pests and chemical management** considers the aspect of application of pesticides and the potential impact on flora and fauna on-site and off-site
- the issue of **pests and chemical management** considers the aspect of storage, transport and handling of pesticides and potential leakages/spills leading to a potential impact on flora and fauna.

Additional issues related to biodiversity are currently included in the general / other issue. For example, the aspect of land clearing for the establishment of vines has a potential impact on the removal of trees and native vegetation and could affect native flora and fauna.

In the process of validating VERA it has become apparent that the issue of biodiversity interacts with other management issues, as the examples above show. However, following consultation with industry groups it has been agreed that biodiversity is sufficiently important to warrant a specific focus. As a consequence, VERA is currently being modified to incorporate these changes. In addition, an 'environmental best management practice protocol' focusing on biodiversity will be produced. This protocol will build on consultation conducted with the wine and grape industry during the development of the VERA tool and also the DSE / DPI experience with incorporating biodiversity into environmental management systems (Anderson et al. 2001).

Summary

Considerable effort and resources have been devoted to establishing a framework to meet the environmental requirements of the wine and grape industry. As a consequence, a framework has been promoted which used the ISO 4004 principles and enables participants to select the level of environmental reporting appropriate to their needs. This ranges from developing a simple action plan through to audit and certification. Numerous tools have been developed to assist in the implementation of the environmental management system (e.g. action plans, VERA).

In addition, an information package has been developed to assist in the achievement of good environmental practice. These protocols focus on key issues such as water and pests and chemical management. The development of a biodiversity protocol is planned over the next six month period.

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