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Published on: 01 Dec 2001 - Eco-management and Auditing (John Wiley & Sons, Ltd.)

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Environmental Initiatives in South African Wineries: A Comparison Between Small and Large Wineries

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July 1999

A research paper submitted to the Department of Environmental and Geographical Science,
University of Cape Town, in partial fulfilment of the requirements for the Master of
Philosophy degree.

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ACKNOWLEDGEMENTS

I am indebted to my supervisor, Richard Hill, for his excellent suggestions, thorough editing and general support. I am very grateful to my mother, Diana Knowles, and my friend, Cathy Segar for the time and effort that they put into editing the paper. I would like to thank the wineries that I interviewed in this study for their co-operation and insights. This research was funded by the Centre for Science Development and the University of Cape Town.

Environmental Initiatives in South African Wineries: A Comparison Between Small and Large Wineries

Laura Knowles and Richard Hill*

ABSTRACT

This paper reports on an interview-based survey of small and large wineries, which considered the perceptions and experiences of both ISO 14001 and an industry specific initiative, called the Integrated Production of Wine Scheme (IPW). Large wineries have not yet implemented ISO 14001 but several intend to in future. Small wineries had a poor knowledge of ISO 14001 and believed that ISO management systems (i) are not required by the niche-markets they sell to, (ii) require resources that they do not have, and (iii) are unsuitable for their informal management style. Although wineries do face market-related environmental pressure, especially those that export to large supermarkets, there is as yet no pressure to introduce ISO 14001. The majority of wineries are members of the IPW scheme and are willing to make the changes required by it. IPW needs effective systems for monitoring and for removing non-complying wineries if the system is to improve environmental performance throughout the industry and achieve credibility amongst stakeholders.

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1. INTRODUCTION

The South African wine industry is large and diverse and includes both farmers who grow grapes and cellars that produce wine from the grapes. Wine makers may grow their own grapes, as in the case of small wine estates, or buy some of their grapes from commercial farmers. In South Africa, there are almost 5 000 grape farmers, cultivating over 288 million vines on 103 000 hectares of land (Muirhead, 1998). There are 295 wine cellars in South Africa and these range in size from very large companies with thousands of staff members to small, family owned and managed ventures with as few as five staff members (du Plessis, 1999). South Africa currently exports over 118 million litres of wine *per annum* - approximately 12% of total production (du Plessis, 1999). Principal overseas markets are the United Kingdom, Germany, Netherlands and Canada (Muirhead, 1998). The export market has become increasingly competitive (Erler, 1998).

Although taste and quality remain key factors for consumers of wine, environmental and social concerns are increasingly influencing customer behaviour (McBride, 1999). Wineries around the world have begun to realise the importance of addressing environmental issues. Some of the more serious environmental issues and incidents associated with the wine industry include the use of pesticides and fungicides in the production of grapes and the production of large quantities of acidic wastewater in cellars (Burger *et al.*, 1999). According to Steve Smith, a leading New Zealand viticulturist, "*Environmental integrity is no longer a discretionary practice when global consumers carry the expectation that wines will be produced in an environmentally responsible manner*" (Taylor, 1998:16). South African wineries need to take heed of this trend, given that countries in the European Union

(EU), South Africa's main wine export market, are considered to be the most environmentally aware and demanding in the world (Wall *et al.*, 1998).

The global wine industry has recently begun to investigate voluntary environmental initiatives, such as ISO 14001 Environmental Management Systems (EMSs) or industry-based guidelines. Eight wineries in New Zealand recently attained ISO 14001 certification (Roberts, pers. comm., 1999). The South African wine industry has recognised the potential importance of ISO 14001 and has formed a small committee to investigate the use of ISO 14001 (van Schoor, pers. comm., 1999). New Zealand has implemented an Integrated Wine Production Scheme, based on a points system, for the entire industry (Taylor, 1998). There are similar initiatives in several winemaking regions of the US (Anon, 1998a; Anon, 1998b; Howie, 1998; McBride, 1999). The South African wine industry has developed an industry-wide, voluntary environmental initiative called Integrated Production of Wine (IPW) that aims to improve the environmental performance of the entire industry. ISO 14001 environmental management systems can also be used by wineries to improve environmental performance and address stakeholder demands for environmental responsibility.

IPW and ISO 14001 are recent developments in an industry that has, hitherto, not placed an emphasis on environmental issues. This paper reports on the perceptions and experiences of managers of wineries in Stellenbosch, South Africa, towards both IPW and ISO 14001. It also evaluates the progress that has been made in these wineries with respect to implementing these environmental initiatives. The wine industry is particularly interesting to examine because it is characterised by enterprises of a wide variety of sizes. It has been established that small- and medium-sized enterprises may encounter difficulties when

implementing an EMS (Hillary, 1997; Ibbitson, 1997). This research investigated whether wineries of different sizes had different experiences with respect to ISO 14001 and IPW.

The following two sections provide background information on environmental issues in wineries and voluntary environmental initiatives. These sections are followed by an outline of methodology and a discussion of the results and conclusions.

2. ENVIRONMENTAL IMPACTS OF THE WINE INDUSTRY

Although the wine industry is generally perceived as being environmentally-sound (McBride, 1999), there are environmental issues associated with both viticulture and winemaking. Correct soil care is essential in viticulture, to prevent soil erosion and conserve fertility (Baum, 1999). There is the possibility of surface and groundwater contamination by fertilizers (Baum, 1999). The storage, use and disposal of pesticides, fungicides and herbicides can lead to environmental impacts such as the contamination of soil and groundwater, and can have health effects on both humans and animals (Burger *et al.*, 1999).

A key environmental issue for wineries is the disposal of wastewater from the cellar. Water is used in cellars for washing of vessels, equipment and floors, and for the cooling of fermentation cellars and vessels (Steffen, Robertson and Kirsten Ltd., 1993). Approximately five litres of water are used in the production of one litre of wine, although the scale of the operation and the range of activities carried out influence the specific water intake (McBride 1998a). On average, 70% of a winery's water intake becomes wastewater (SRK, 1993). Winery wastewater has a high organic content, contains both suspended and

settleable solids, is acidic, and has a pH ranging between 3 and 5 (McBride, 1998b). The wastewater is high in sulphide compounds which can lead to odour problems (Shepherd & Grismer, 1997). The three key methods of treating winery wastewater are as follows (McBride, 1998a):

- collection in underground storage tanks and transfer to fields for irrigation;
- separation of sludge in settling ponds for disposal on land; and
- connection to a local treatment facility.

Unfortunately all of these methods have their problems. It is necessary to remove solids from the wastewater and correct the pH of the effluent. Irrigation of the effluent and the disposal of sludge require large areas of land. Land irrigated with wastewater can be used for grazing, but not the growing of grapes (Steffen, Robertson and Kirsten Ltd., 1993). Irrigation can also be problematic if wastewater accumulates on the soil surface and causes unpleasant odours. Treatment at municipal treatment facilities is expensive (Steffen, Robertson and Kirsten, 1993).

In addition to the issue of water consumption and wastewater treatment, there is a range of other environmental issues associated with cellars. Organic waste, such as grape skins, pips and stalks, and inorganic waste, such as packaging materials, need to be disposed of in a responsible manner to prevent the contamination of soil and water (Burger *et al.*, 1999). The winemaking process is automated in large, modern wineries and requires a significant energy input. The environmental impact of this energy use has yet to be quantified (Baum, 1997).

3. VOLUNTARY ENVIRONMENTAL INITIATIVES: ISO 14001 AND IPW

In addition to complying with increasingly stringent environmental legislation, wineries can address the environmental issues through their own voluntary initiatives. Two such initiatives are discussed in this section. ISO 14001 provides general guidelines for an EMS and is applicable to any kind of industry, whereas IPW is specific to the South African wine industry.

3.1 ISO 14001: An Environmental Management System

ISO 14001 is an international standard for Environmental Management Systems (EMSs) which was developed by the International Organisation for Standardisation (ISO) (ISO, 1996). ISO 14001 aims to provide tools that enable an organisation to design, implement, and maintain an EMS (Sheldon, 1998). It allows managers to control progress towards the environmental objectives and targets set by the organisation itself (Sheldon, 1998). The management principles of ISO 14001 are broadly similar to ISO 9002, which is a quality management system (Hotensius & Barthel, 1997). A key difference between the two standards is that ISO 14001 requires organisations to continually improve their EMS (Sheldon, 1998). Once organisations have implemented an ISO 14001 EMS, they can have the EMS audited by an ISO 14001 accreditation body in their country.

According to proponents, there are several benefits associated with ISO 14001 adoption and certification (Cascio *et al.*, 1996; Jordan, 1995; Sunderland, 1997).

These benefits include:

- improving environmental performance of organisations;
- facilitating trade and removing trade barriers;
- instilling a culture of environmental responsibility in organisations and in the employees of these organisations;
- cost savings for organisations through more efficient resource use and reduction of waste disposal costs; and
- strategic business advantage in an increasingly competitive market.

Although ISO 14001 was designed to be applicable to all kinds of industries, it is still relatively uncommon outside of industries with a high environmental risk (Sunderland, 1997). A recent KPMG survey of uptake of EMS amongst South African enterprises showed that the sectors that place the most emphasis on EMS are Mining; Metals; Chemicals & Oils and Industrial Holdings (Alheit and Keogh, 1999). The high rate of uptake of EMS in these sectors was attributed to the fact that their operations have a high environmental impact, they are exposed to public pressure and regulation and are exposed to the market pressure of the export market (Alheit and Keogh, 1999). Other sectors, such as Agriculture, Food, Forestry, and Government Services have taken a 'wait and see' approach to certification (Alheit and Keogh, 1999). According to Wall *et al.* (1998), the US food industry is waiting to see whether the financial benefits of ISO 14001 will outweigh the costs, before adopting EMSs.

ISO 14001 certifications are still generally restricted to large enterprises (Hillary, 1997). Hillary (1997) showed that SMEs are confused about the relationship between ISO 9000, EMAS and ISO 14001.

Uptake of EMSs amongst SMEs may be hindered by the following factors (Hillary, 1997; Ibbitson, 1997):

- lack of qualified personnel within the organisation to develop and implement the system;
- lack of knowledge regarding environmental issues and environmental management;
- lack of time to develop and implement the EMS;
- lack of finance for the costs associated with the ISO 14001 certification process;
- lack of interest, in some cases, by management.

3.2 Integrated Production of Wine Scheme (IPW)

The Integrated Production of Wine scheme (IPW) is a voluntary environmental system, managed by the South African Wine and Spirit Board. A committee of researchers and industry members developed IPW and published the first guidelines in 1994. IPW aims to ensure that wines are produced in harmony with the environment, with the minimal addition of fertilizers and pesticides (Regulation R. 1413, 6 November 1998 of Liquor Products Act, Act 60 of 1989). IPW aims to improve environmental performance throughout the industry and 96% of wine producers have pledged their commitment to the scheme (Tromp, pers. comm., 1999). The 1998/1999 harvest was a trial run for IPW, and the 2000 production cycle will be the first year of implementation. The scheme is based on a system of continual improvement and will be updated every two years as technology and the needs of consumers change. It is thus based on a system of continual improvement (Tromp, pers. comm., 1999).

The IPW guidelines encompass aspects of both grape production and winemaking and include, for example, irrigation, nutrition, pesticides, harvesting, winemaking and packaging. A description of appropriate environmental management for each of these aspects is provided, and producers score their performance for each aspect between 0 and 5 (good to bad). Producers are encouraged to attend IPW courses for training on the scoring system (Tromp, pers. comm., 1999). Some of the aspects, such as pesticide use, are unambiguous, and the score is based entirely on which chemicals are applied and at what time of year. There are, however, other categories that are more subjective. For example, some phrases in the IPW scoring system, such as "*the use of chemical herbicides must be kept to a minimum*" (IPW, 1998: 2) are open to interpretation by producers.

The determination of the final score for both the vineyard and the cellar is based on the combined rating of all of the aspects, with some aspects being weighted more than others. The final score needs to be below a certain threshold score in order for the producer to be IPW compliant.

The system is based on self-monitoring by producers. IPW scorecards of grape-farmers need to be made available for inspection to the buyers of grapes, and cellars are required to send their scorecards to IPW for inspection. IPW personnel will randomly choose a small number of farms and cellars for inspection each year. It is envisaged that all producers will eventually commit to the IPW scheme and all South African wines will then be marketed as being IPW compliant, i.e. "*healthy, clean and environmentally friendly*" (Tromp, 1998:1). The manager of IPW envisions the system becoming a "*threshold for entry into and survival on the market*" (Tromp, 1998: 5).

4. RESEARCH METHODOLOGY

An interview-based survey of 16 wineries was undertaken, to identify and describe the attitudes and experiences of managers from selected South African wineries towards ISO 14001 and IPW. The survey was confined, for reasons of practicality, to 16 wineries in Stellenbosch, a wine-producing region 40 kilometres north-east of Cape Town. There are approximately 80 cellars in the Stellenbosch region, 70 of which are independent to each other. Managers from a sample of randomly chosen large and small wineries were interviewed to determine any differences in attitudes and experience between small and large wineries.

4.1. Sample selection

For the purpose of selecting a sample of small and large wineries for the study, the wineries in Stellenbosch were initially categorised as being small or large based on production figures in cases of wine *per annum*. A cut-off point of 500 000 cases (4,5 million litres) was used to distinguish between small and large wineries. Figure 1 shows the production and employment figures for the wineries, which were randomly selected for the study. As can be seen from Figure 1, one of the wineries that was categorised as small, based on production figures, is owned and controlled by a large multinational enterprise. This winery was reclassified as large because of its ownership structure. A combination of production, in cases, and ownership structure was thus used to classify wineries as large or small. In total, six wineries were chosen from the total of nine wineries in the 'large' category, and ten small/medium wineries were chosen out of a total of 61 wineries in this category.

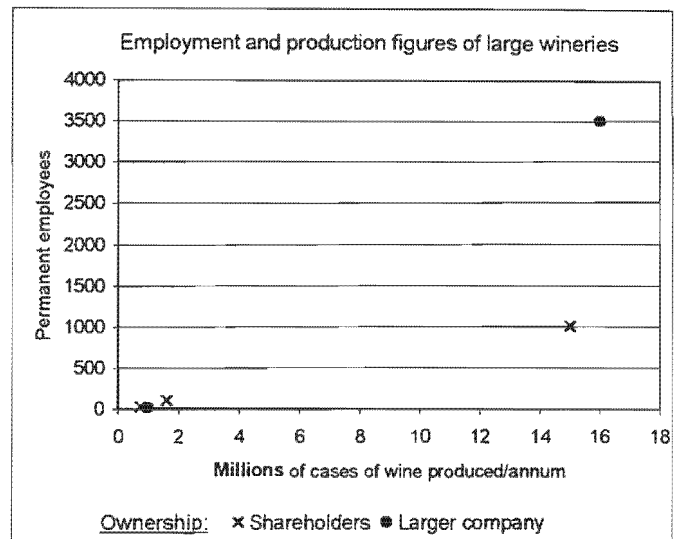
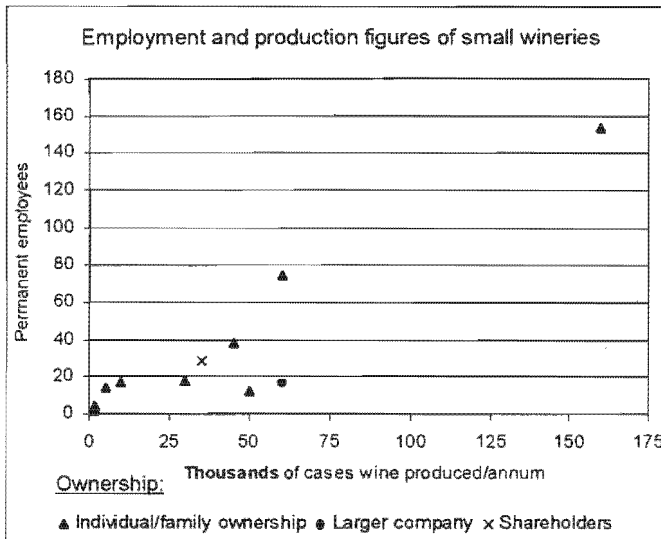


Figure 1. Size distribution of wineries in the study

In the small and medium wineries in the sample, the number of permanent employees is below the 200 threshold outlined in the National Small Business Act (Act No. 102 of 1996). Although some of the large wineries appear to have fewer than 200 employees, several of these wineries are also in direct control of the farms from which they obtain their grapes. The employment figures at these farms were unavailable and are thus not reflected in Figure 1.

4.2. Interview procedure and analysis of data

At least one senior manager was interviewed from each winery. These managers are all aware of strategic business issues and are in contact with buyers and clients. A questionnaire consisting of 40 questions, under four main headings, was used to structure the interviews. Although the interviewer ensured that all of the questions were answered during the interview, interviews took the form of discussions. Interviews lasted, on

average, one hour and were audiotaped with the permission of the interviewee. Interviews were later transcribed and analysed under the broad headings of the questionnaire.

5. RESULTS AND DISCUSSION

This section presents the results of the survey. The results are analysed in terms of the differing experiences that small and large wineries may have in relation to ISO 14001 and IPW. The experiences of the wineries with respect to ongoing environmental issues and emergency environmental incidents are discussed, to provide a background to environmental management in wineries. This is followed by a discussion of wineries' experiences with respect to environmental pressure from consumers and other interested parties.

5.1. Wineries' experiences of environmental issues and incidents

Wineries indicated that they had ongoing concerns about environmental issues. Several wineries have had environmental incidents or emergencies. Wastewater is the key environmental issue for wineries, with all but one winery listing this as an issue of concern. Many of the large wineries are concerned because their wastewater disposal systems are in contravention of the recently enacted National Water Act (No. 36 of 1998). Some of these wineries expressed fears about the possibility of having their operations closed by regulators. The larger wineries have investigated wastewater treatment plants but found the costs to be high. Given the high cost of treating wastewater, wineries could reduce

treatment costs by investing in water-saving programmes to decrease wastewater production (Steffen, Robertson and Kirsten, Ltd., 1993).

Solid waste is also a problem for wineries, with ten out of 16 wineries mentioning this as an environmental aspect of concern. Organic solid waste is usually composted but many wineries still burn or dump inorganic wastes. Some wineries stated that they burn pesticide and herbicide containers. Six wineries listed the use of hazardous sprays, such as fungicides, as another key environmental issue.

Over half of the wineries, nine in all, admitted to environmental incidents at the winery or wine farm. Figure 2 summarises the nature of these environmental incidents.

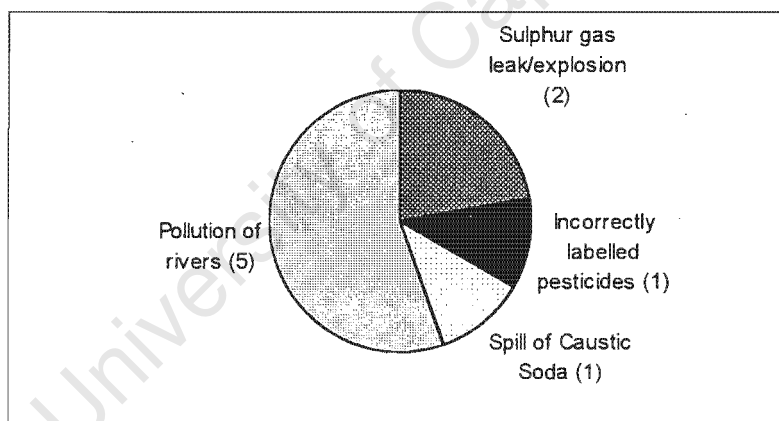


Figure 2: Nature of environmental incidents at wineries (n=9).

The pollution of water sources is a key problem, and two of the large wineries have been involved in significant water pollution incidents. In one case, a broken pump led to wastewater polluting a nearby river. The winery stated that the incident was due to bad management and that they had no system in place to deal with the incident. As a consequence of this incident, regulators have insisted on the winery providing detailed

wastewater disposal plans before approving building expansions. Another large winery reported an even more serious incident in which a leaking valve in a cellar pipeline caused alcohol to run into stormwater channels and into a nearby river. The river was polluted by a total of 100 000 litres of alcohol. Once again, the winery had no systems in place to deal with such incidents. As a consequence of this spill, the winery was exposed to negative publicity and was forced to address environmental issues. As a result of the incident, the winery appointed a Risk Manager, who developed and implemented a health and safety programme. This programme has been recently extended to include environmental aspects.

Other environmental incidents at wineries included sulphur gas cylinders exploding or leaking. One winery expressed concern over the way in which agricultural chemicals, such as pesticides, are handled, because the current methods occasionally lead to pesticides running into a nearby water source. This winery suggested that it needed to develop procedures for the safe handling of such chemicals.

The survey has shown that there are ongoing environmental problems associated with wineries, and that the activities in wineries can lead to serious environmental incidents. In some cases, wineries are contravening legislation through poor environmental management, which may lead to fines or the threat of closure. Environmental incidents may also damage the wineries' relationship with the public. Despite the risks associated with mismanaging environmental issues, the wineries surveyed did not have systematic procedures in place prior to environmental incidents occurring. The potential of ISO 14001 or IPW to improve the environmental performance of these wineries is discussed in sections 5.3 and 5.4.

5.2. Pressure to improve environmental performance

Table 1 lists the enquiries that wineries have received with respect to environmental issues from buyers, agents or other interested parties. All of the large wineries have received environmental queries, whereas only four of the ten small wineries have received such queries. The six small wineries that have not received environmental queries did acknowledge that the export market is environmentally aware and that the demand for environmentally friendly wine is growing.

Table 1: Summary of environmental enquiries addressed to individual wineries.

SOURCE OF ENVIRONMENTAL ENQUIRY	ISSUE
Small wineries	
Consumers (Germany)	Packaging: concern that an ornament on the bottle may be made of lead.
Agent (UK)	Vegetarian wines
Buyer (UK)	Membership of IPW
Visiting growers (USA)	Pesticides
Agent (Nordic country)	Existence of an environmental policy
Buyer (EU)	Pesticides
Large wineries	
Buyers of bulk wine (South Africa)	Pesticides
Supermarkets and other buyers (UK, USA)	Cleanliness of factory; general environmental issues such as air & water pollution
Buyers (EU)	Working conditions of labourers
Supermarkets and other buyers (UK)	General
Supermarkets (UK)	Working conditions of labourers; pesticides
Supermarkets (UK)	Working conditions of labourers; ecological issues - endangered plants on wine farm area

The majority of environmental enquiries was from interested parties in EU countries, which is the key export market for South African wineries. The EU market is renowned for being environmentally aware and demanding (Gerber *et al.*, 1997; Wall *et al.*, 1998). The environmental pressures that wineries face may be heightened by the link between environmental issues and food safety issues. Recent outbreaks of disease, associated with contaminated food, have led to an unprecedented concern, amongst consumers, about food safety (Wall *et al.* 1998, citing Powell and Leiss, 1997). The ongoing controversy regarding genetically modified food is another example of the concern that many consumers have about food safety issues (King, 1999). It is thus not surprising that wineries have been questioned about their use of pesticides. Wineries are not alone in this regard. South African fruit exporters have also been exposed to pressure from export markets to manage or reduce the use of pesticides (Bethlehem, 1997). In some cases, buyers were concerned about the living and working conditions of staff employed on grape farms and in wineries.

Agents and large supermarket groups in the UK were responsible for the majority of environmental enquiries. Many large retail groups are giving increasing attention to reducing their environmental impact and that of the supply chain. The UK supermarket group, Sainsbury's, buys wine from many of the large wineries in the study group. Sainsbury's has a policy of working with its 6 500 suppliers to help them improve their environmental performance, and launched its first environmental report in 1996 (Austin, 1996). Sainsbury's was motivated to adopt this policy by its desire to meet the needs of customers regarding, *inter alia*, value, quality, variety and environmental issues (Austin, 1996).

One of the managers from a large winery noted in the interview:

"We are going to be pressurised by the overseas people that we export to - places like Sainsbury's and Tesco. They don't want to hear that you are contaminating rivers and so on. They are concerned about the chemicals you use and the conditions amongst workers. They even asked questions about the packaging material that we use."

The experience of wineries is testament to the demands exerted through the supply chain on producers regarding their environmental performance. It is often argued that the market is the most effective mechanism in demanding higher environmental standards and improving environmental performance of producers in the supply chain (O'Laoire, 1997). Market pressure on wineries has not been evenly applied. Although all but one of the wineries in this study export wine to the EU, market pressure has been predominantly felt by large wineries exporting to supermarket chains.

5.3. Managers' perceptions and experiences of ISO management systems

Wineries need to manage their environmental performance to reduce the frequency and impact of environmental incidents and to meet stakeholder demands. ISO 14001 is promoted as being an appropriate tool for organisations to improve environmental performance and demonstrate to shareholders and consumers that they are environmentally responsible (Cascio, *et al.*, 1996, Sunderland, 1997). The following sections examine the wineries' experiences and perceptions of ISO 14001. Because of the strong similarities

between ISO 9002 and ISO 14001 with respect to management principles, the direct experiences of wineries with ISO 9002 is also be discussed in this section.

5.3.1. Managers' experiences of ISO 9002

Figure 3 outlines the understanding of ISO 9002 and the progress that small and large wineries have made towards implementing this management system.

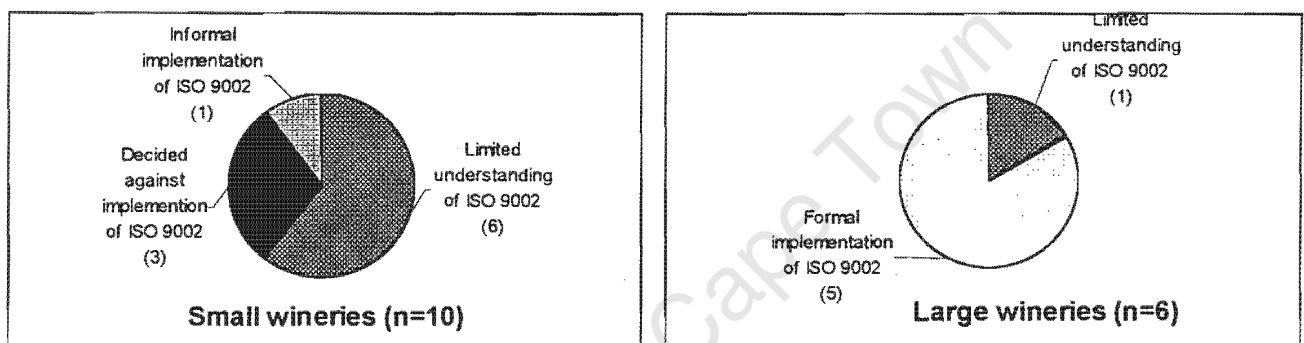


Figure 3. ISO 9002 in small and large wineries

There is a clear difference between small and large wineries. Almost two thirds of the small wineries have a limited understanding of ISO 9002, and talked of 'ISO management systems' without distinguishing between ISO 9002 and ISO 14001. One third of small wineries had decided that ISO 9002 was unsuitable for their business. One small winery is implementing ISO 9002 in an informal manner, although this winemaker has previously worked at a large winery with ISO 9002. In contrast, all but one of the large wineries have an audited ISO 9002 system in place. The one large winery without ISO 9002 sells bulk wine to South African wineries and is the only winery in the study group to not be directly involved in the export market. This lack of contact with the pressures of the export market may have contributed to this winery's lack of understanding and awareness of ISO 9002.

The large wineries that have experience with ISO 9002 are generally positive towards it. Most of them were motivated to implement ISO 9002 to increase their efficiency and to gain marketing advantage. These wineries felt that ISO 9002 had been effective in improving the efficiency of their operations and they believed that it had assisted them in producing goods of a consistently high standard. One winery was able, because of ISO 9002, to trace complaints about 'corked' wine to the cork supplier for a particular batch of wine and has implemented a system of fining cork suppliers for each complaint. Another winery, which had complaints about glass in its wine, was only able to find the source of the problem when it implemented a quality management system on the bottling line.

Wineries had mixed feelings about the effectiveness of ISO 9002 as a marketing tool. ISO 9002 would appear, at this stage, to be an added marketing advantage for wineries rather than a necessity to gain entrance to the market. Wineries did believe that large buyers were beginning to demand quality management systems and that ISO 9002 would help them to satisfy this demand.

5.3.2. Limited use of formal management systems in wineries

Figure 4 outlines the awareness that small and large wineries have of ISO 14001. Wineries are generally less aware of ISO 14001 than of ISO 9002. This is to be expected, given that ISO 14001 is a relatively recent innovation. The five large wineries that have formally implemented ISO 9002 are the only ones to have an understanding of ISO 14001 (see Figure 4). Only one third of the small wineries were even aware of ISO 14001, although many had (mostly negative) opinions about ISO management systems in general.

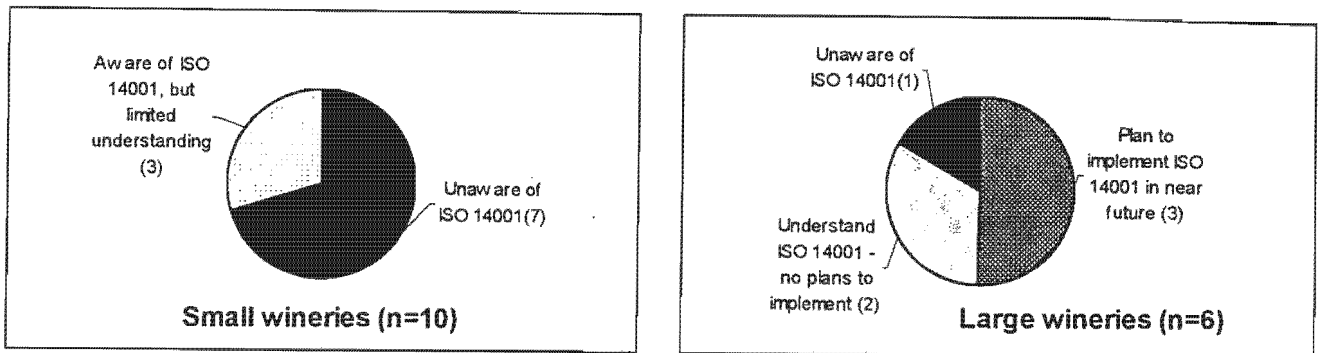


Figure 4. ISO 14001 in small and large wineries

None of the small wineries had an EMS and only two of the large wineries managed environmental issues in a systematic way. The approach to environmental management in these two large wineries is different. The first winery manages its environmental risks by making use of an environmental committee that publishes an environmental report for its holding company. The second large winery has adopted an integrated Safety, Health and Environmental (SHE) Programme. The activities of the former are influenced by the policy of its multinational holding company, whereas the latter was prompted to initiate the SHE programme as a result of being responsible for a serious environmental incident. Only one winery has an environmental policy.

This lack of awareness and progress towards implementing an EMS for managing environmental performance is not uncommon in the agricultural sector. In a survey of wineries in California, Baum (1999) found that although aspects of an EMS existed at some wineries, no winery had developed a complete, integrated EMS. The views of both small and large wineries toward ISO management systems, in general, and ISO 14001 in particular, are examined in the following section to understand the lack of uptake of EMS in this sector.

- **Large wineries' perceptions of ISO 14001**

Of the five large wineries with an understanding of ISO 14001, three intend to implement ISO 14001 in the near future. The two wineries with ISO 9002 systems that do not intend to implement an ISO 14001 felt that ISO 14001 would be costly in terms of both time and money to implement and would not necessarily bring concomitant rewards. They did not perceive it as being a marketing necessity at this stage but stated that they would reconsider their decision should it become important in the export market. This 'wait and see' approach is common in industries that do not yet have a clear understanding of the role that ISO 14001 can play in their business. According to Wall *et al.* (1998), there is currently a great deal of uncertainty with respect to whether ISO 14001 will become a significant management tool in the agri-food industry world-wide.

Although some wineries are adopting a 'wait and see' approach, three of the large wineries claimed that they intend to implement an ISO 14001 EMS within the near future. These wineries are primarily interested in ISO 14001 as a tool to manage their environmental risks in order to avoid being the target of public pressure. The winery that had polluted a nearby river with large quantities of alcohol felt particularly strongly that it needed a system to manage its environmental risks. It had received a great deal of negative publicity from the incident and wanted to ensure that it was taking all responsible steps to prevent another such incident. This winery implemented a SHE programme as a result of the incident and will gradually adopt components of ISO 14001 to strengthen the environmental side of the programme.

These findings are consistent with the attitudes of the broader South African business community towards EMS. A recent KPMG study (Alheit & Keogh, 1999) found that the most commonly perceived advantages of EMSs are risk-based advantages such as compliance with legislation, improving environmental risk management, and demonstrating due diligence. Improving the company's image and relationships with the public were also cited as significant advantages (Alheit & Keogh, 1999). South African companies report they are more motivated to invest in EMS by stakeholder pressure, public perceptions and regulatory compliance than by internal factors such as the desire to increase efficiency of resource use or achieve cost savings (Alheit & Keogh, 1999). None of the wineries that were interviewed mentioned cost savings as a motivation for developing an EMS.

Wineries did not mention the potential marketing advantage of ISO 14001 as being a reason for implementing an EMS. This was despite the fact that all of these wineries had received environmental pressure from buyers. This is consistent with the finding that managers in the Ontario food industry have not experienced any demand that goods be produced under an ISO 14001 management systems (Wall *et al.*, 1998). Although, at this stage, ISO 14001 does not appear to be of strategic importance for South African wineries, it may become a significant factor for wine exporters in future. The South African wine industry should monitor the uptake of ISO 14001 in world markets to ensure that it is prepared, should ISO 14001 become a requirement for competing in the international wine market.

- **Small wineries perceptions towards 'ISO management systems'**

Eight of the ten small wineries stated that they would not consider implementing ISO 9002 or 14001 until they were forced to do so by market pressures. Many of the wineries

regarded this pressure as being unlikely. This is in contrast to the three large wineries that are interested in implementing ISO 14001 for non-market reasons. The approach of being forced to adopt such systems, rather than viewing them as an opportunity, is not uncommon in South African businesses of all sizes. A recent survey concluded that, in the South African context, organisations are more motivated to implement EMS to avoid negative effects than to take advantage of opportunities (Alheit & Keogh, 1999).

Although small wineries have not had direct experience with ISO 9002 or 14001, they do have a range of reservations about ISO management systems that are interesting to examine. The reason that small wineries are reluctant to implement ISO 14001 may be partly related to their lack of information and understanding of the system, as well as to genuine concerns about its suitability to their scale of operations. More specific reasons for not implementing ISO 14001 (or ISO 9002) include the following:

1. Small wineries export to niche-markets which do not demand ISO 14001

Small wineries tend to sell to niche-markets that do not demand systems such as ISO 14001 or ISO 9002. Their wine, because it is made in small quantities, may be highly priced and bought by collectors, small wine-shops or restaurants rather than large supermarkets. It is often the large supermarkets that require their producers to have systems such as ISO 9002 or 14001. According to Sheldon (1997), supply chain pressure may eventually result in ISO 14001 effectively replacing national environmental legislation. This concept may be unrealistic because market pressure is not evenly applied throughout the wine industry. Small wineries with niche-markets are not exposed to the same kind of pressure as large

wineries, and are therefore unlikely to be pressured by their markets to implement ISO 14001.

2. *Negative perceptions of management systems*

Many small wineries have a negative view of management systems. They are not opposed to the concept of managing their environmental impacts, but are opposed to the concept of introducing formal systems, of any kind, into their small wineries. There are several reasons contributing to this negative perception of formal management systems.

Several small wineries in the study have informal management systems and believe that their management style is not consistent with the formal procedures of an ISO management system. It was felt that working through formal, set procedures for all of the diverse tasks that a manager in a small winery performs, would be an unnecessary burden. Problem solving is based on intuition and past experiences rather than carried out by formal procedures. This is consistent with the finding that many SMEs perceive ISO 14001 as being "*ill-adapted to the informal management style that prevails in SMEs*" (Aprodi, 1996: 247).

Several small wineries are family owned and managed. These wineries do not see the need for structured management systems, because they state that management staff operates according to a common family code or ethic. Although this ethic may be upheld by management staff, there would be several dozen non-management staff who would not necessarily operate according to the same code. The non-management staff may undertake

environmentally sensitive work, such as handling pesticides and could benefit from the adoption of formal procedures for dealing with such tasks.

Some wineries were concerned that formal management systems may take away creativity and flexibility. This was a particular concern for winemakers because of the creative nature of winemaking. The experience of the large wineries with ISO 9002 is encouraging in this regard. A winemaker from one of the large wineries noted:

"There was a lot of resistance at the beginning, especially amongst winemakers. They originally thought that they would have to give away their secrets. It doesn't do that".

Although these concerns about management systems may be unfounded, negative perceptions do represent a barrier to the implementation of ISO 14001 in small wineries. ISO 14001, unlike an industry-wide system such as IPW, needs to be voluntarily initiated by an individual winery. Negative perceptions about management systems tend to militate against their adoption.

3. Small wineries may lack the resources required to implement ISO management systems

Research amongst SMEs has established that the costs associated with an ISO 14001 EMS are likely to be relatively high, particularly for companies without a well-defined business management system (Davy, 1997). The costs include fees for consultants assisting with establishment of the system or the cost of employing an environmental manager. In the case of wineries, there are also likely to be marketing costs because consumers are largely

unaware of the relationship between agricultural practices and environmental quality (Wall *et al.*, 1998). This means that there might be costs associated with creating customer awareness about the benefits of ISO 14001 produced goods. In addition, the cost of external audits is a key obstacle for small businesses (Wall *et al.*, 1998). The one small winery implementing ISO 9002 is doing so in an informal way because of the prohibitive costs of auditing.

Many small wineries noted that a key problem for them was that they lacked a 'driver' - a trained person to initiate and implement the system. The importance of environmental training and awareness amongst staff members cannot be underestimated. Petts (1998) found that many of the SMEs that are proactive in environmental matters are characterised by the presence of an individual who 'champions' the environmental cause. According to Hillary (1997), one of the factors inhibiting implementation of an EMS in SMEs is that implementors often lack training and techniques to implement EMSs. It is likely that wineries will have to invest in the training of staff members in order for them to initiate and implement an EMS and this will lead to additional costs.

It is clear that many small wineries, in addition to having negative perceptions of ISO management systems, also face very real practical problems in initiating and implementing such systems. The following section summarises available research and experience that can assist small wineries in establishing ISO 14001 EMSs.

- **Sector-specific guidelines for EMS**

It is possible for organisations, within the same sector, to develop components of a generic EMS that can be adapted to the needs of individual organisations. Such development may lower the total cost of EMS implementation and provide a support structure for small organisations. Initiatives in New Zealand and Singapore provide examples of sector-specific EMSs.

Four small New Zealand wineries, all competitors operating in separate regions, acted co-operatively to implement a group environmental management system and attain ISO 14001 certification (Kavanagh, 1998). These wineries formed a network called 'Living Wine', and were able to source a grant from the Business Development Board to help finance an environmental consultant. The consultant developed a generic environmental management manual as a reference for all the wineries. Each winery has an EMS, adapted from this generic environmental manual, specific to its own operation (Kavanagh, 1998). Through working together, the wineries were able to reduce consulting fees and certification costs. The key benefit of this co-operation is a sharing of information regarding different vineyard and winery practices, which reduced the amount of time needed to develop and implement ISO 14001 (Riddiford, 1999). In addition, wineries review each other's procedures and share information about any corrective action that may be required (Kavanagh, 1998). An additional advantage is the peer pressure that wineries experience - being part of a group motivates them to continue operating in an environmentally responsible manner (Riddiford, 1999). Since the success of the 'Living Wine' group, four other New Zealand wineries have made use of the generic manual and have recently attained ISO 14001 certification.

Singapore encourages similar systems amongst SMEs. A statutory body is involved in specific schemes to provide financial assistance to SMEs. It awards SMEs up to 70% of the cost of environmental consulting services and another 50% for assistance with ISO 14001 certification (Tanner *et al.*, 1997). In addition, the statutory body runs a scheme to assist groups of three-to-five SMEs, preferably from the same industrial sector, to pool their resources and save up to one-third of the cost of EMS implementation and certification to ISO 14001 (Tanner *et al.*, 1997).

Sector-specific EMSs enable companies to combine resources and lower the costs of ISO 14001 implementation. The experience of the New Zealand wineries shows that many wineries have similar environmental aspects and a generic wine industry EMS can be easily adapted to meet the needs of individual wineries. Small wineries, in particular, will benefit from the lowered costs and shared skills and knowledge associated with a sector-specific EMS. The South African wine industry should consider the possibility of facilitating ISO 14001 adoption through the development of a generic wine industry EMS.

5.3.3. Conclusion: ISO 14001 in the South African wine industry

ISO 14001 is not yet perceived to be a strategic requirement for South African wineries. A few large wineries are considering implementing ISO 14001 EMSs in order to manage their environmental risks more effectively. They appear to be motivated, in this regard, by past experiences of serious environmental incidents. In contrast, none of the small wineries has any intention of implementing an ISO 14001 EMS at this stage. Many intend to wait until forced to implement EMS by markets. A lack of understanding of ISO 14001, as well as a range of concerns about ISO management systems, is proffered as the reason for this

reluctance. Small wineries may find implementing an ISO 14001 EMS problematic because of the financial cost and the skilled personnel that are required (Hillary, 1997). The New Zealand wineries that approached ISO 14001 implementation as a group, demonstrate that there are ways to effectively address the resource problems of SMEs, if there is a will to do so. Small South African wineries do not, however, appear to have the will to implement ISO 14001 EMSs. Firstly, they do not perceive a need for such a system, partly because their small niche-markets do not require it. Secondly, they have a range of concerns about the concept of formal management systems. Although some of these concerns may be unfounded, this negative perception of ISO management systems, remains a key obstacle to small wineries implementing ISO 14001 management systems. Sectoral implementation of EMSs may assist small wineries in implementing ISO 14001, but wineries will still require the will and commitment to initiate such programmes.

5.4. Integrated Production of Wine (IPW)

The Integrated Production of Wine (IPW) scheme is, like ISO 14001, a voluntary environmental initiative which wineries may choose to adopt to improve their environmental performance. Unlike ISO 14001, IPW was developed specifically for wineries and is administered by the wine industry. The following sections examine the response of wineries, both small and large, to IPW. The relationship between ISO 14001 and IPW is discussed.

5.4.1. Level of commitment of wineries and motivation for joining IPW

IPW has met with a positive response from wineries. All but one of the wineries in the study group are members of the scheme. Wineries expressed a willingness to make the changes required by IPW, probably because the IPW initial requirements are lenient. Five wineries already claim compliance with the system, and seven need to make only minor changes. Wineries are generally positive towards these changes, which relate primarily to the use of certain agricultural chemicals, such as pesticides, and to record-keeping. Establishing lenient requirements initially has encouraged widespread participation in the scheme, which has the potential benefit of improving environmental performance throughout the wine industry. The intention is to strive for continuous improvement by raising the requirements of the scheme as the environmental performance of the industry improves and as new technology and research becomes available.

The high membership rate and the general willingness of wineries to make changes demonstrate that many wineries are not adverse to environmental initiatives - even initiatives that may involve paperwork. Wineries see the need for improving environmental performance through initiatives such as IPW. The reluctance of wineries to initiate ISO 14001 is probably due to negative perceptions, rather than a lack of will to improve environmental performance.

The two key reasons cited for joining the IPW scheme are a personal interest in environmental issues and a belief that IPW may be important in marketing wine. Table 2 shows the multiple reasons stated by wineries for joining IPW.

Table 2: Wineries' reasons for joining the IPW scheme.

REASON	Personal interest in environmental issues	Important to participate in an industry initiative	Important for export markets	Easy to comply with
SMALL				
1	✓		✓	
2		✓	✓	✓
3	✓	✓		
4	✓		✓	
5		✓		
6	✓			
7			✓	
8*		✓	✓	
LARGE				
1		✓		
2	✓	✓	✓	
3	✓			✓
4	✓	✓	✓	
5	✓		✓	
6	✓		✓	
TOTAL	9	7	9	2

* Of the ten small wineries, only eight are listed because one was not a member and one was unaware of its reasons for joining IPW.

None of the managers of small wineries who have a personal interest in environmental issues is contemplating ISO 14001. This suggests that small wineries do not perceive ISO 14001 as the best option for improving environmental performance. Many small wineries see IPW as a more appropriate tool than ISO 14001 for improving environmental performance.

Another important reason for wineries joining IPW is that it was seen as important to be involved in an industry-wide initiative. A problem with many voluntary initiatives is that companies lack the incentive to join and comply (Barber, 1998). The peer pressure to be a part of the IPW initiative is a factor behind the high membership rate and may also ensure

that the wineries comply with the conditions of the scheme. Although IPW clearly has widespread support within the wine industry, there are potential problems associated with industry-specific-voluntary initiatives such as IPW. These problems are outlined in the following section.

5.4.2. Potential problems associated with IPW

Although industry-specific, voluntary initiatives have the potential to improve environmental performance within a sector, many have been criticised for lacking transparency and public accountability and for failing to demonstrate that they are environmentally effective (UNEP, 1998; Barber, 1998; Hanks, 1998). It is essential, for the sake of public accountability, that such systems have a well-defined procedure for monitoring and evaluating performance (Hanks, 1998). Barber (1998) argues that, for the sake of credibility, such systems should be independently monitored and verified.

Many wineries expressed concern about the way in which the IPW system would be monitored. Although wineries have to supply copies of their scorecards to IPW administration or buyers, it is essentially a self-monitoring system, although the IPW administration will undertake a small number of audits each year. Self-monitoring systems, such as IPW, may find it problematic to establish credibility amongst stakeholders.

Barber (1998:21) explains that voluntary systems "*need to be substantive and the ideas and language need to be unambiguous, undiluted and meaningful*". IPW is problematic in this regard. The scoring system has a number of weaknesses, which make it difficult to accurately complete the scorecard. For example, in the 'Soil and Terrain' category, seven

criteria for good environmental management are listed. Producers are given no indication of how to weigh these criteria against each other to get a single score for the category. Some phrases in the IPW scoring system, such as "the use of chemical herbicides must be kept to a minimum" (IPW, 1998: 2) are open to interpretation. The scoring system needs to be clarified to ensure that final scores provide a reliable indication of environmental performance.

Another important requirement for voluntary initiatives is that there needs to be meaningful sanction, in addition to peer pressure, for those companies that are not performing (Hanks, 1998). Even though IPW does make it clear that participants may not exceed a certain threshold score, no system is in place to remove poorly performing producers from the scheme, and some wineries expressed concern in this regard. For example, the IPW administration has not yet determined how many chances participants will be given to improve their scores before being removed from the system (Tromp, pers. comm., 1999). This weakness of IPW has the potential to undermine the credibility of the system, and needs to be addressed in the further development of the system.

5.4.3. Conclusion: The relationship between IPW and ISO 14001

Although there are clearly problems associated with IPW, such industry-specific voluntary initiatives do have a role to play in improving environmental performance. Unlike ISO 14001, IPW provides wineries with specific standards for environmental performance. Many wineries lack the skills and resources to determine their environmental impacts, and the IPW standards can be used by wineries as a starting point to assist in determining their environmental aspects.

Although an ISO 14001 EMS may be advantageous because it is developed to conform with the specific organisational structure of a winery and because it addresses any unique environmental aspects that a winery may have, establishing such a system requires a great deal of time, knowledge and effort. IPW may assist small wineries, which do not have the skills and time to develop an EMS, to improve their environmental performance. IPW may also assist wineries in developing an EMS through providing standards that offer a starting point for the development of an EMS.

An advantage of IPW is that its requirements can be met within the current management structure of the winery. Many small wineries are reluctant to change their informal management system and may reject ISO 14001 for this reason. A standards-based system such as IPW may thus be more appropriate for such wineries. IPW clearly has an important role to play in improving environmental performance throughout the wine industry. It will not, however, reach its full potential unless the possible problems regarding monitoring and the removal of non-conforming wineries are addressed.

6. CONCLUSIONS

There is a need for environmental management within the wine industry because of the environmental consequences of routine operations, as well as the potential for occasional environmental incidents. Effective environmental management is an important part of effective business management. Wineries that have a poor record of environmental management may be exposed to public pressure, increased attention from regulators and supply chain demands. ISO 14001 and IPW are two initiatives which wineries may use to assist them in improving environmental management.

Several large wineries have plans to implement ISO 14001 in the future. Their intention is motivated, in part, by the fact that some large wineries have been involved in environmental incidents, which adversely affected their relationship with stakeholders. Others, because of their high public profile, cannot afford to be responsible for such incidents. Large wineries thus perceive a need for environmental risk management. Small wineries, in contrast, are largely unaware of ISO 14001. Although many small wineries expressed a personal interest in environmental issues, ISO 14001 was not their technique of choice for managing environmental issues. In some cases this may be due to lack of awareness about the system, whereas, in others, it is because ISO management systems are perceived as unsuitable for the informal management style in small wineries, and unattainable because of a lack of resources. In addition, small wineries do not have a marketing need for ISO 14001 because they export to small niche-markets that do not require such systems. Small wineries can be assisted in the implementation of an ISO 14001 EMS, notably in the innovative group approach taken by a group of small wineries in New Zealand. At present, such initiatives are unlikely to be implemented in small South African wineries because of negative perceptions of ISO 14001 and inadequate motivation to initiate such a system. At this stage, changing wineries' perceptions of ISO 14001 would appear to be a more effective way of enabling wineries to implement ISO 14001 EMSs than financial or technical assistance.

IPW is another tool that wineries can use to improve their environmental performance. This industry-specific, voluntary initiative has been widely adopted by wineries. The initial leniency of the system may be an important factor in enabling the entire industry to participate in the scheme. The environmental performance of the industry can be gradually improved by continual improvement of the IPW standards as the industry becomes more

environmentally aware and as technology changes. Elements of ambiguity in the IPW scoring system need to be removed so that wineries can reliably rate themselves. In addition, a procedure for removing wineries that are not complying with the conditions of the scheme needs to be articulated to ensure that the system is credible to stakeholders.

IPW and ISO 14001 have a complementary role to play in improving environmental performance within the wine industry. IPW is a system accessible to wineries, of all sizes, throughout the South African wine industry. This will enable it to gradually raise the environmental performance of the entire industry. At this stage in South Africa, ISO 14001 is a tool that only a select number of wineries are likely to use. These are likely to be large wineries with a high environmental risk or high public profile. Although ISO 14001 is not yet a force in international wine markets, the wine industry cannot afford to ignore the possibility of its becoming a significant factor in future. The wine industry should follow the progress of ISO 14001 and keep its members informed of international trends so that they can position themselves effectively for future trends.

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