

Study explores climate change response

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Introduction

Projections suggest that future climate change will affect wine-producing regions around the world to varying degrees.

For example, increases in temperature are expected at a greater level in eastern and southern wine regions in Australia than regions such as southwest Western Australia (e.g. Margaret River). At the same time, southwest Western Australia is expected to see continued declines in annual rainfall as a result of climate change. Among all the premium wine-producing regions in Australia, the highest declines in annual rainfall are predicted for the Margaret River wine region over the next several decades (Webb, 2010).

However, the question remains as to what extent climate change will actually affect wine production.

Reports among economists (Stern, 2006) and research bodies (IPCC, 2007) tend to paint a distressing picture of the effects climate change will have on economies and societies. From a business perspective, not all industries are predicted to be effected equally (Dovers and Hezri, 2010; Winn et al., 2010).

As for the wine industry, there is evidence to suggest that climate change, in the form of increasing temperatures, has actually been a benefit. For example, Jones et al. (2005) find that in a study of the world's top wine-producing regions, rising temperatures since 1950 have resulted in improvements in quality. Others confirm Jones and colleagues' findings in regions such as the Mosel Valley and Rhineland (Germany) and Bordeaux (France), which have demonstrated a concomitant rise in quality as temperatures have risen (Storchmann, 2005; Colman and

Päster, 2009; Ashenfelter and Storchmann, 2010).

In what appears to be almost a case for climate change, Jones et al. (2005) note that many regions have reached an optimal growing season temperature threshold above which vintage quality – and potentially pricing – tends to decline.

There is, however, a qualifier. Changes are likely to be heterogeneous across regions, suggesting that a common rule of thumb in the industry of "the warmer the better" does not apply.

Given wine grapes are amongst the most sensitive of agriculture products to changes in climatic conditions, response to climate change is, therefore, of growing interest in the Australian wine industry.

The method

In an effort to assess various responses to climate change, this article highlights a study that was conducted between November 2009 and March 2010 in the Margaret River wine region. The sample included 12 of Margaret River's most respected wine companies, and these companies ranged in grape tonne crush and cases sold.

Semi-structured interviews were conducted with representatives from each firm, including managing directors, general managers, vineyard managers, viticulturalists, and winemakers. All interviews were conducted on-site and interviewees demonstrated a high level of professionalism in their understanding of the broader implications of climate change on society, specific impacts on the wine industry, and their individual company's responses to the issue.

Interviews were digitally recorded (one company declined having the interview recorded) and transcribed verbatim. Through the use of NVivo, a quantitative analysis software package, interview transcripts were analysed and units of meaning were developed through careful examination and re-examination of the raw data.

Themes that emerged from the units of meaning were pieced together to sort data into conceptual clusters, which were the basis of the interpretation of the findings.

The study was interested in interviewee response to three broad questions:

- 1 Is climate change a concern and, if so, why?;
- 2 What are some the key issues to be faced with respect to responding or adapting to climate change?; and
- 3 Has any action been taken to address climate change?

The results

As for question 1, the general consensus is that climate change is an issue for wineries in Margaret River, although the extent of its impact is unclear. For example, one company stated that climate change is a "threat", while another company expressed concerns about increases in the frequency of hot days, particularly in peak growing season.

As for the impacts of climate change, the biggest concern related to wine styles, and decisions over getting the mix of varieties right. For example, one company suggested that if the region gets too hot, then Chardonnay may no longer be suitable as a variety. Note, however, that not all companies were convinced that climate change was actually a threat.

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Several companies stated that while increases in temperature are predicted in Margaret River, they are not of a magnitude that will negatively impact wine production. In fact, if temperatures increase by .2 to 1°C over this century as predicted, one company sees this as mainly a positive because some varieties in Margaret River, like Cabernet Sauvignon, should increase in quality.

Another company agreed, stating that increases in temperature (as long as they are not extreme) actually make "viticulture and wine-making easier". Similar sentiments were expressed regarding increased weather variability, less rainfall, and increases in CO₂, namely some companies are not concerned over these three factors at all, at least based on current projections.

As for question 2, the most often-discussed challenge in responding to climate change was, not surprisingly, economics-related. Economics directly and indirectly impacts many other expressed challenges (Figure 1).

Given the current economic conditions facing the global wine industry, most companies suggest that climate change must be addressed with an eye to cost-benefit. For example, concern was expressed over planting hot climate varieties as a means to adapt to climate change because planting a new variety is at a minimum a 10 to 15-year experiment.

Unless there is clear indication that the market will accept a new, hotter climate variety from the Margaret River wine region, companies were generally sceptical about going down this path. Other major challenges include canopy management and uncertainty about when to implement mitigative or adaptive strategies and which response actions will be most appropriate.

		Type of action		
Type of wine firm	Type of response	Market-based	Regulatory/Standards-based	Operational-based
Grapegrower	Mitigation		- - - -	
	Adaptation		- - - -	
Wine producer	Mitigation		- - - -	
	Adaptation		- - - -	

Figure 2. Generic response framework to climate change

Our last question assessed types of response to climate change. These responses are conceptualised in the generic framework presented in Figure 2. This section only highlights the key observed responses.

As for market-based actions, little appears to be happening. A few companies expressed that they were moving towards lightweight glass in packaging (which reduces greenhouse gas emissions in bottle production and transport of wine to market), although others were concerned about wine quality with such packaging. One company has planted hotter climate varieties on a very small scale.

The consensus is that the planting of hotter climate varieties on a large scale is not immediately viable because there is no real indication of market demand.

With respect to regulatory/standards-based actions, virtually all of the companies in the

sample are pursuing EntWine certification. Because EntWine addresses carbon emissions, firms gaining certification have a means of engaging in mitigative actions towards climate change, i.e. decreasing their carbon footprint. No company reported having ISO 14001 certification, although one company reported that it was certified biodynamic and carbon neutral.

Finally, operational-based actions appear to be receiving the most attention. Some companies reported actions that were not necessarily employed to address climate change, but rather to be good environmental stewards or because it is part of the company's values and philosophy.

As for mitigative actions, most companies have carbon sequestering in place, in the form of planted trees and shrubs.

Most companies also reported minimised use of agri-chemicals through petiole analysis and other analysis techniques that help reduce application load (minimised use of agri-chemicals reduces greenhouse gas emissions).

Companies are also demonstrating adaptive responses. For example, the use of UV spray protectants was cited by one company, which perceived more extreme heat days to be a growing problem in the region. Most companies are also engaged in water-saving efforts in the vineyard, including a variety of canopy management techniques and the use of drip irrigation.

As for operational-based actions in the winery, several companies discussed the use of alternative energy sources (as means to cut costs and reduce greenhouse gas emissions) such as solar and wind, but, perhaps surprisingly, none have implemented any energy-production sources.

Two companies did discuss purchase of green energy from a local energy provider, although at a higher price than normal energy costs. In terms of *decreasing* energy use in the winery, several technologies are being used,

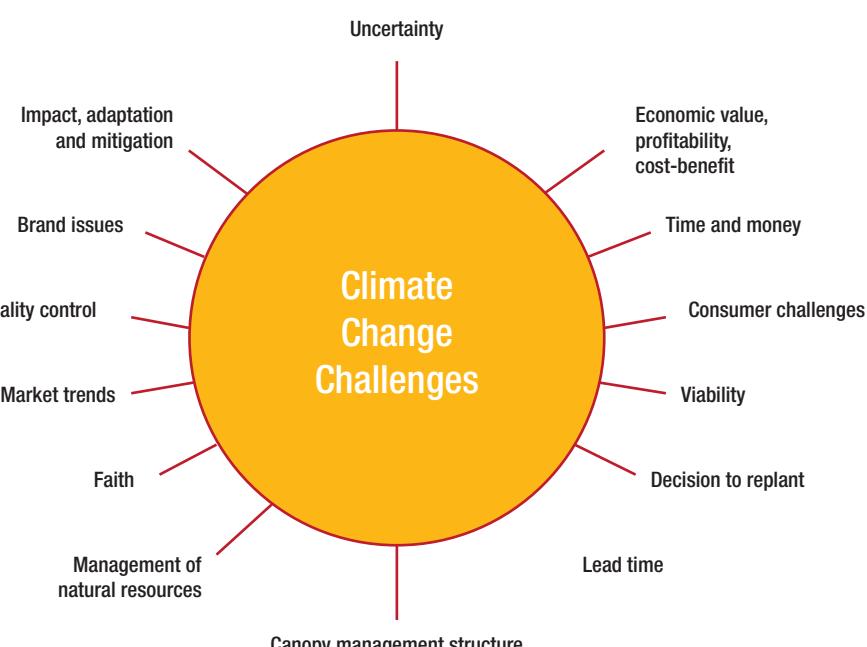


Figure 1. Challenges of climate change response.

winemaking

including computer-controlled temperature regulation on tanks, tank insulation, timing of loads, metres to monitor energy use, variable speed devices, energy-rated appliances, and florescent lighting.

All of these actions not only cut energy use, but also greenhouse gas emissions. As in the vineyards, several companies are conserving water use in the winery (an adaptive action), for example, through anaerobic treatment of waste water and water reuse. Such actions are particularly important as Margaret River's annual rainfall continues to decline.

Conclusion

Climate change appears to be inevitable in Australia. However, projections suggest that not every wine-producing region will be affected equally. In an effort to study the issue, this exploratory study of Margaret River suggests sample firms are taking some action to address climate change. Still more opportunities remain.

The level and breadth of response will be driven by strategy, market demand for wine styles and varieties, cost-benefit analysis, availability of resources, and company values and philosophy.

However, we also suggest that microclimates will be a critical consideration for response to climate change. For example, recent calculations in Overberg, Stellenbosch, and Paarl wine of origin districts in South Africa confirms microclimate effects, with differences of up to 6°C over a 40km distance.

This suggests caution with respect to broad generalisations about climate change effects and that the science behind the study of climate change needs to expand to a higher level of precision, particularly in wine producing regions.

For more information and the full version of the study described in this paper, visit http://www.winewa.asn.au/Documents/MR_report.pdf

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