

2020 annual theme: climate change

When we invited our readers to take part in a readership survey recently, we asked them to nominate topics they would like to see more coverage of in future issues of the *Grapegrower & Winemaker*. Managing climate change was mentioned more than any other, so we decided to respond by introducing an annual theme on the subject for 2020. This means that in every issue this year there will be at least one article on climate change.

To introduce 2020's annual theme of climate change, we sought some industry opinions on the subject from somewhat opposite ends of the spectrum.

First, we have Australian viticultural consultant Richard Smart, who recently returned to reside in Australia after living in the UK for a few years. As well as a keen interest in the management of grapevine trunk diseases, Richard says he has a renewed enthusiasm to work with the wine sector to help mitigate climate change.

We then have Erland Happ (page 19), proprietor of Happs, in Margaret River, who believes the theory of global warming doesn't match what's happening in the atmosphere. He recently joined 500 scientists in signing a letter addressed to UN secretary-general António Guterres and executive secretary Patricia Espinosa Cantellano, entitled: 'There is no climate emergency'.

Towards a sustainable future

How the Australian wine sector could and should help mitigate against climate change



Richard Smart
Photo: Milton Wordley

Weather and climate change dominate the news now, perhaps more than at any previous time. Individuals, communities and governments are struggling to come to terms with recent events and discussion as to causes. No doubt members and employees of the Australian wine industry are also involved. Because of my professional interest in climate, grapevines and wine, I have been aware earlier of this issue — earlier than most.

My personal climate change reaction can be divided into three distinct stages: first, awareness, secondly adaptation, and the thirdly mitigation. I first became aware of the link between atmospheric CO₂ levels and global temperatures in the 1970s, as a PhD student at Cornell University in the USA. One of my professors, Ed Lemon, warned that fossil fuel combustion causes increasing atmospheric CO₂ which would lead eventually to global warming and climate change.

I wrote and lectured about the impact on the Australian wine industry, and subsequently how it might adapt to increasing temperatures. Peter Dry and I published a climate index of Australian wine regions in 1980 which allowed subsequent predictions of warming impact (see, for example, Smart 2009). Many Australian wine regions are already warm to hot, so any temperature increase will be associated with a likely decrease

in wine quality for present varieties. Of all the adaptation strategies considered, relocating vineyards to cooler climates will be the most rewarding.

In this regard, Australia is lucky. There are considerable suitable land resources with potential to the south, especially in Tasmania, and at elevation on the Great Dividing Range (see Smart 2009). Even some traditional irrigated areas may be relocated! However, some more traditional regions established over 150 years ago may be found wanting in a hotter future, one example being the Barossa Valley (see Smart 2019). Is it possible to lower present and future temperatures to maintain the style and quality that have led to the region's fame?

One strategy that can help is to ensure vines are well supplied with irrigation water; misting can cool vines and the soil but is wasteful of water. Placing shade cloth over vines can help, but is expensive and can interrupt other operations like spraying and harvesting. Covering foliage and fruit with reflective products like 'Surround' is useful to protect vines from high temperatures. Planting more heat-tolerant vines will be effective, but these may not be well known in the market nor presently associated with the region's reputation.

The third stage of action is mitigation, which is now my present level of

involvement. There are unfortunately only limited examples of this in the Australian wine industry at present. To action mitigation, vineyards and wineries need to be aware of their carbon footprint, as indicated by life cycle analysis (LCA). One of the earlier LCA studies was the carbon impact of Australian wine consumption in the UK, involving Cecil Camilleri of Yalumba (Amienyo *et al.* 2014). Comprehensive LCA studies have also been developed by the AWRI for the Australian wine sector (Abbott *et al.* 2016) which align with overseas studies. There remains questions about appropriate carbon accounting methods, discussed by Smart (2019). At the time of writing (1 December 2019) there is no access to carbon accounting available on the AWRI website; let us hope that staff receive support necessary to remedy this situation.

What have we learned from published LCA analyses? The AWRI report for the average Australian situation identifies glass bottle packaging and transport as 'hot spots', representing a whopping 68% of total CO₂ emissions. Grapegrowing, at 15% of the total, and winemaking, at 17% of the total, are minor components; electricity (generated from fossil fuels) was, however, 82% of winemaking CO₂ emissions, although fermentation emissions of CO₂ were not accounted for. ▶

How can the wine sector mitigate climate change?

LCA results allow us to nominate an approach, in a priority order:

- replace glass bottles as packaging, at least for cheaper wines, and generally reduce bottle weight.
- reduce transport costs, especially using bulk transport where possible for export
- reduce fossil-based electricity use, with alternate generation
- avoid winery emissions of CO₂
- reduce fuel use for vineyards and winery machinery and vehicles.

Alternatives to glass packaging

The present wine glass bottle being round and tapered is a bad shape and weight for efficient transport. Little wonder, it was originally developed in England in the mid-1600s; surely it is time the wine sector upgraded!

There are several alternative packages being evaluated using cardboard, paper, plastic, and aluminium, in a variety of formats. Australia has a fine record at innovative packaging with the bag-in-box invention, and being very early adopters of screwcaps. Will this record be further enhanced, perhaps by initiation and widespread adoption of a suitable new appropriate packaging format? Will the suitability be assessed, as was so well done by AWRI for screwcaps? Will consumer acceptance be studied, for example, by wine marketing professionals at the University of South Australia?

It is worth noting the proportion of cheaper Australian wine by volume; Euromonitor International for July 2019 shows 39% of red wine selling for \$9.50 or less; for white wine the figure is 55%. A similar situation exists in export markets. For example, in the UK, for red wines, 86% sells for £5.50 or less, and for whites the figure is 88%. In the USA, the corresponding figures are for red wines 48% and white wines 53% less than USD9.50. These are all substantial volumes, so replacement of glass would make a significant carbon footprint contribution.

Reduce transport costs

Glass bottles can weigh around the same as their contents, but lower weight 330g bottles are now available. Any replacement packaging should, of course, be much lighter.

Reduce grid electricity use

Australia is the lucky country, with abundant solar and wind energy resources (see Garnaut 2019). Several Australian wineries are investing in solar energy: David Bruer, of Temple Bruer, is using solar panels to pump irrigation water at Eden Valley. An English company, Greencroft (www.greencroftbottling.com), uses wind and solar for a contract bottling business.

Further, vineyard biomass is currently a cost to vineyard and wineries for disposal. Existing European technology allows prunings to be baled in the field, then to be air dried, then shredded, then combusted in ovens attached to wineries, to generate heat or cooling or electricity. Similarly pomace may be dried and combusted. Both prunings and pomace can be made into biochar, and sequestered as a soil amendment.

Avoid winery emissions of CO₂

Is it not incongruous that most Australian wineries purchase CO₂ for sparging tanks etc, and yet release fermentation CO₂ to the atmosphere? Fermentation CO₂ is one of the purest sources of CO₂ known. Technology exists in Europe to harvest fermentation CO₂, to clean, purify and compress it. CO₂ can be used to fertilise algal photosynthesis to eventually produce biofuels, a developing technology. In a few words, why do wineries not treat CO₂ the same as waste water? Hopefully soon it too may be subject to regulation, as for waste water.

Electric powered vehicles

John Deere has just built its first electric powered tractor. The future is here.

Conclusion

When I have discussed these issues with a few industry members their first question has been, 'How much will it cost?' My standard answer is, 'How much will it cost if the rise in atmospheric CO₂ and other problem gases is not halted? How much will our continuing dependence on fossil fuels cost future generations?'

It is frankly naïve to believe that life as we know it will continue into the future. If you are unaware of the projections then reading 'The Uninhabitable Earth' by David Wallace-Wells will be enlightening, perhaps frightening.

The question facing the Australian wine industry is, will it act as a body to action the procedures outlined above, or will it be only a few companies that will make the transition? Whichever way, early adopters will have the public relations benefit in a society where climate change and its mitigation becomes a dominating issue, as has already begun. Consumers, especially millennials, will likely become more environmentally conscious.

I heard the following comments from the retiring governor of the Bank of England when asked about the cost of moving to a low carbon economy: "...it will not be a cost, it will be a new opportunity for economic growth". I hope that this sentiment will be appreciated by Australian manufacturers of vineyard and winery equipment, and vineyard and winery managers and owners.

Familia Torres, of Spain, and Jackson Family Wines, of California, are presently world leaders in environmental awareness and mitigation. They have formed International Wineries for Climate Action (IWCA), a working group aiming to use science-based targets for carbon emission reductions aimed at decarbonising the wine industry. Are there any Australian signups at present?



An example of a logo that could be used on wine packaging to indicate that no CO₂ was released during fermentation. Source: Richard Smart and Rachel Cooper

Finally, I look forward to the day when I can buy Australian wine in an environmentally-friendly package, bearing a logo like the one on this page indicating that no CO₂ was released to the atmosphere during production of this wine.

References

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