

The Future of Wine

Grace Forsyth, 3rd April 2014, BSC Environmental Economics and Environmental Management

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Climate change: these words generally evoke images of greenhouse gases and natural disasters, but have you ever thought about the affect it may have upon the quality of our favourite Merlot¹⁵? Wine quality is particularly vulnerable to the effects of climate change due to its reliance on weather conditions¹⁸. These changes could dramatically alter the quality and economics of the wine industry, which is a \$16 billion business in California alone¹⁰.

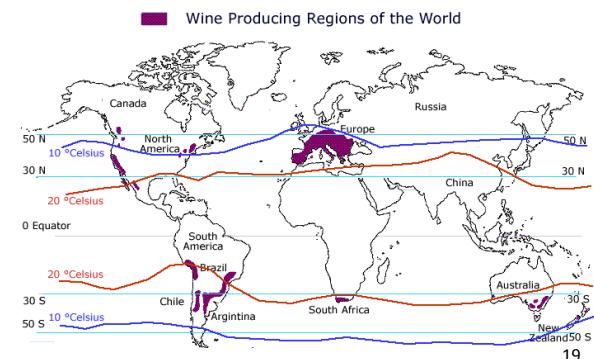
Wine is characterised by the adaptation of the grape cultivation to the region in which it is grown, whilst the climate determines grape variety and size⁵. With the changing nature of global weather conditions certain regions are likely to suffer, which will require mitigation and adaption techniques to save the deterioration of one the

world's favourite alcoholic drinks⁸.

The Science

So how will climate change cause vineyards to change? Temperature is likely to be most disruptive to grape growing as global temperatures increase it could cause the northern boundary for grape growing to shift by 10-30km per decade¹³. Heat can initiate earlier harvests, creating management problems such as harvester and workforce availability¹⁶. Already, the harvest date in Johannesburg is 2-3 weeks earlier than it was between late 18th-early 20th century³.

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In presently cooler climates, this warming temperature can mean the beginning of wine production¹⁷. In the future we can expect our wines to come from as far North as England and as far East as Ukraine and Southern Russia⁹. Many of these countries do not have established wine growing regions such as in Spain or France, which is indicated on the world wine producing regions map above⁹. Already however, there are around 400 wineries in England and Wales, with this number set to rise significantly over the next 100 years¹³. Germany, being the most northern and coolest of Europe's commercial wine producing

countries, may gain the most, shifting the market from France¹³. It isn't all bad news for France. The quality of Champagne and Bordeaux wine is likely to benefit from increased temperatures-we may have to start drinking more champagne, what a shame⁶!

Spain could be the first wine-growing region where grape growing becomes impossible¹. Wines are likely to become 'flabby', with high alcohol contents and little acidity for freshness⁸. This will require extra methods to decrease alcohol and increase acidity, presenting an extra cost to an already struggling economy⁸.

Pests and diseases are likely to threaten more wine growing crops, spurred by increased temperatures². Black Rot and Esca are two diseases that are now readily seen around Germany, yet were unable to breed 20 years ago due to the cold¹³. This is likely to further damage biodiversity in the area, with pests causing disruption to many other crops besides the grape plant.

Forest and bushfires are likely to become more common, tainting the taste of the grape through the smoke³. Furthermore, areas

like Bordeaux are likely to suffer from sea level rise. Despite the warmer temperatures benefitting the grape production, flooding could destroy the future of Bordeaux wine. Additional natural disasters such as earthquakes pose a threat to the grape crop in regions such as Washington State, USA¹⁵.

The Critics

Despite IPCC predictions of increasing global temperatures there are a large number of people that do not believe climate change to be a major world problem¹⁵. This doubt is well documented and supported throughout the wine industry as well. Stuart Smith, a UK vineyard owner, offers an insight into the issue of climate change in the wine industry.

An interview with one of the UK's top wine makers, Stuart Smith:

Stuart Smith owns Ryedale Vineyards, the most northerly commercial vineyard in the United Kingdom. He provides insight into the effect climate change has had on the wine growing industry¹¹.

Q: Have you noticed any significant changes in your vineyard over the past years that you believe to be specifically related to changes in weather conditions?

A: Every year is different. We only planted the vineyards 8 years ago, so there are no consistent trends. There have been hot years, wet years, cold years.

Q: Is there a general consensus within the wine industry that climate change will be a factor to consider for wine production in the coming years?

A: No, there is much disagreement, including climate change denials. I don't deny climate change, but don't think it's an important factor in vineyard success or failure.¹⁴

Adaption and Mitigation

At this stage you may be thinking, 'what can I do to ensure the longevity of my favourite wine?' All hope is not lost. The more we look after our planet, the more we will be able to limit the risk of climate change to our agricultural systems⁷. However, adaptive measures are needed to deal with the effects that are already inevitable⁷. Without adaption techniques it is predicted that grape quality in Australia may be reduced by 7-39% by 2030¹⁸.

Adaptive measures include shifting vineyards to areas with similar climate conditions as the grape had previously¹⁸. If moving areas is not a possibility then the grape variety could be altered to favour new conditions¹⁸.

worldwide; it is time for us to make changes to protect our planet.■



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Genetic modification offers another tool for adapting to new climate conditions. Altering the expression of the grape gene to increase tartaric content would allow for maintenance of the acid and sugar balance, preventing the wines from becoming too 'flabby'².

Moreover, new yeasts can be used to adapt to higher alcohol concentrations, which will ferment the wine without creating excessive alcohol levels².

All of these changes will come at a large cost. One which will be particularly difficult to deal with considering the economic hardships faced by many of the wine growing regions such as Spain.

Although climate change is an issue that the wine industry have already and will continue to have to deal with there is still great uncertainty². Climate change not only threatens the wine industry but many aspects of biodiversity