

Viticulture, climate change and future scenarios

by
Sustainability and Circular Economy Lab
University of Gastronomic Sciences of Pollenzo



Photo by Markus Spiske on Unsplash
(https://unsplash.com/photos/1zYB6H7scJw?utm_source=unsplash&utm_medium=referral&utm_content=creditShareLink)

The climate crisis has become central to food production. This is because, on the one hand, agriculture and animal husbandry are among the sectors that contribute most to the emission of climate-changing gases into the atmosphere, significantly accelerating the rise in temperatures on a global scale, and on the other hand, agriculture is also itself a victim of the consequences of climate change. Extreme weather events, plant diseases, droughts, new pests and desertification are some of the aspects that will increasingly pose a challenge in terms of food production and agricultural yields.

These dramatic scenarios and progressive upheavals affect the whole of agriculture, with particular attention to the wine-growing sector. Here we see worrying repercussions on the productivity and quality of the grapes harvested. The individual climatic elements - such as temperature, light and precipitation - are strongly correlated to productivity, sugar content, acidity and aromaticity, in short, to all those

elements that characterise the typicality of a wine. As the temperatures on the earth's crust rise, the thermal conditions in the cultivated areas change accordingly. The 50th parallel north is the historical limit of viticulture (Fregoni, 2013), but global warming is pushing vine cultivation further north and further up. Vines can now also be planted in cold and snowy states such as Norway, with viticulture reaching extraordinarily far into the 59th parallel north (Eunews, 2018). It is not only Norway that is measuring itself against these new productions. In recent years, vineyards have also been planted in Belgium, Denmark, England and Sweden. Some of these vines are hybrids, i.e. bred specifically for colder climates, but the more classic European grapes such as Chardonnay, Nebbiolo and Pinot Noir are also easy to find (The New York Times, 2018). The southern hemisphere is also seeing producers pushing ever further south, with experimental plantings in places like Patagonia or Chile (Cubanfoodla, 2021).

The world geography of wine production is therefore changing. As a result, there is a progressive shift: areas not historically and politically linked to viticulture will see new vineyards planted. On the other hand, areas traditionally suited to wine production will gradually be transformed into sub-tropical areas, with scarce water resources, frequent scalding or burning of the grapes and over-rapid ripening, situations that can drastically increase the level of sugars contained in the grapes. When it is too hot, the grapes ripen faster, leading to an increase in sugars and, consequently, alcohol in the final product (Gaidos et al., 2014). These are all sensory alterations in the final product that will have to be increasingly controlled if we want to aim for a quality wine.

Moreover, on a global scale, the impacts of climate change on wine suitability are substantial and lead to possible conservation conflicts in land use and freshwater ecosystems. Some studies predict that the area suitable for viticulture will decrease from 25% to 73% in major wine producing regions by 2050 (Hannah et al., 2013). The resulting progressive establishment of vineyards at higher altitudes will lead to greater impacts on mountain ecosystems, with a conversion of the natural landscape into agricultural land. Attempts to maintain wine grape productivity and quality in the face of warming temperatures will undoubtedly lead to increased use of water for irrigation and/or to cool grapes - e.g. through spraying or sprinkling - creating

potential negative impacts on conservation and freshwater resources (Climatic Oasis, 2021).

Already today, unfortunately, as a result of climate change, harvests are often about a month earlier than 30 years ago. A situation that is also undermining the language of popular tradition, which is based on long-term observation: the proverb "in August you fill the kitchen and in September the cellar" (Il Punto Coldiretti, 2021) would now find it difficult to apply. For example, early harvests are being recorded with increasing frequency throughout Italy (La Repubblica, 2021). In fact, harvest dates are affected by the temperature that the grapes have received during the growing season, which starts around April until harvest time. If the spring and summer are warm, the grapes ripen faster and their sugar levels also increase, so they need to be picked earlier. If, on the other hand, temperatures are colder, there will be a delay in the start of the harvest. Unpredictable and extreme weather events are another factor that leads to earlier harvests, in some cases by weeks. This is the case with hailstorms and "water bombs" (i.e. very high clouds charged with water and energy, created by the considerable difference in temperature between the ground and the sky), which can destroy the work of an entire season in a few moments, releasing up to 200 millimetres of water in a few hours. Such events also risk damaging buildings and flooding warehouses. One example was the 2020 vintage, where in the Biella and Vercelli areas of Piedmont, some wine growers harvested a week early to avoid the catastrophic consequences of the hailstorms of those days (Coldiretti Piemonte, 2020). Unfortunately, it is wine producers who are mainly paying the price for a changing climate, with increasingly violent and devastating phenomena, but prices and quality will also change on the consumer front.

Bibliography and Sitography

Coldiretti Piemonte. (2020). *Grandine sui vigneti: anticipata la vendemmia per salvare il salvabile. Pioggia, grandine e vento tra Vercellese e Biellese*. - Retrieved 5 July 2021, from <https://vercelli-biella.coldiretti.it/news/grandine-sui-vigneti-anticipata-la-vendemmia-per-salvare-il-salvabile-pioggia-grandine-e-vento-a-cavallo-tra-vercellese-e-biellese/>

Condizioni estreme e clima in evoluzione sulla frontiera vinicola meridionale della Patagonia – Sud America. (2021). Retrieved from

<https://it.cubanfoodla.com/extreme-conditions-changing-climate-patagonia-s-southern-winemaking-frontier>

Eunews. (2018). *Il vino si può fare anche in Norvegia, e a produrlo è un italiano*, Retrieved 13 March 2018, from <https://www.eunews.it/2018/03/13/vino-si-puo-anche-norvegia-produrlo-un-italiano/102385>

Fregoni, M. (2013). *Viticultura di qualità*. Milano: Tecniche nuove.

Gaidos, S. (2014). *Grape expectations: Climate change is already transforming the wine industry*. *Science News*, 185(3), 20-24. doi: 10.1002/scin.5591850316

Hannah, L., Roehrdanz, P., Ikegami, M., Shepard, A., Shaw, M., & Tabor, G. et al. (2013). *Climate change, wine, and conservation*. *Proceedings Of The National Academy Of Sciences*, 110(17), 6907-6912. doi: 10.1073/pnas.1210127110

Il cambio clima porta i vigneti sulle vette e gli ulivi al Nord - Il punto Coldiretti. (2021). Retrieved from <https://www.ilpuncocoldiretti.it/attualita/il-cambio-clima-porta-i-vigneti-sulle-vette-e-gli-ulivi-al-nord/>

Il gran caldo anticipa la vendemmia (quasi ovunque). Gli esperti: "Sarà una buona annata in tutta Italia". (2021). Retrieved from https://www.repubblica.it/il-gusto/2021/08/17/news/il_gran_caldo_anticipa_la_vendemmia_gli_esperti_sara_una_buona_annata_in_tutta_italia_-314311151/

Oasi Climatica. (2021). *Viticultura stress calore*. Retrieved 5 July 2021, from <https://www.oasiclimatica.it/viticultura-stress-calore/>

The New York Times. (2018). *Great Bubbly From England, Believe It or Not*. Retrieved 5 July 2021, from <https://www.nytimes.com/2018/12/20/dining/drinks/english-sparkling-wine.html>