

Science for Environment Policy

How policies could help winegrowers adapt to climate change

Grapes are sensitive to small changes in temperature, rain and sunlight, meaning climate change will have implications for wine producers worldwide. This study assessed local vulnerabilities and adaptation strategies in two wine-producing areas in France. The findings may help growers to develop suitable methods of adapting to long-term climate change.

Changes to climate are already having visible effects on natural systems. These trends, including warming and changing patterns in rainfall and extreme weather, will only become more apparent and more severe in the future. Such changes will have profound effects on [agriculture](#), and particularly on wine production (viticulture). This is because grapevines are extremely sensitive to their surrounding environment, with seasonal variations in yield much higher than other common crops, such as cereals¹.

Indeed, viticulture is one of the most sensitive sectors to climate change, as the local climate of a wine-growing region is tightly linked to its grape-growing potential. Climate influences not only the quantity of grapes produced but also the quality of wine (via changes to sugar and alcohol content). In the long term, climate change is likely to cause major geographical shifts in suitable production areas, bringing opportunities to currently cooler regions of the world and threatening traditional wine-growing strongholds such as France and Italy.

This study assessed climate vulnerability in two wine-producing areas in Anjou-Saumur in France, famous for the Chenin and Cabernet Franc grape varieties. The researchers — funded by the EU LIFE programme² — interviewed 30 winegrowers from the region in 2012 and 2013. The winegrowers discussed wine quality in the context of past and current climatic conditions, and identified heat, seasonal amount and timing of rainfall and the incidence of late spring frosts as the most important variables. Interviewees also mentioned a change in vine pests and diseases and researchers acknowledged that warmer and wetter weather conditions could bring an increased risk of pests and diseases.

The researchers next asked winegrowers about changes in wine production practices over recent decades. Winegrowers identified the 1990s as a 'turning point' for practices due to the high quality seasons of 1989 and 1990, followed by the very poor seasons of 1991 and 1992. According to the winegrowers, they realised they had to alter their practices to better manage climate-related risks and opportunities. In particular, they discussed:

- Practices to improve vine growth and grape yield, such as soil amendments and the introduction of cover cropping;
- Understanding the influence of soil on grape development, including using high-resolution soil data to select the best vineyards for wine production; and
- Changes to grape ripening and harvest dates, including implementing inter-row management practices (i.e. how the soil between rows of vines was treated and what was grown between them) to produce higher-quality grapes.

Adaptive responses to climate mostly occur during harvest, such as harvesting at night by machine, or during winemaking, such as blending wines from different vineyards to maintain quality.

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1. Chloupek, O., Hrstkova, P. & Schweigert, P. (2004). Yield and its stability, crop diversity, adaptability and response to climate change, weather and fertilisation over 75 years in the Czech Republic in comparison to some European countries. *Field Crops Research*, 85(2-3): 167-190.

2. ADVICLIM is supported by the European Commission under the LIFE programme. See: <http://www.adviclim.eu> and LIFE13 ENV/FR/001512 ADVICLIM: ADapataation of VIticulture to CLIMate change

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3. Regulation (EU) No 1306/2013: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0549:0607:EN:PDF>

The interviewers finally discussed future changes to climate and asked the winegrowers to organise a list of practices from urgent to low priority. The winegrowers placed the highest priority on short-term adaptation measures such as changes in harvesting techniques, while long-term measures such as changing varieties of grapes and using irrigation for vine water supply received the lowest priority. (Historically, irrigation was banned in some European wine-growing regions, as it was thought to compromise the quality of wine and is associated with some environmental concerns – although policy is changing³.) All winegrowers described great uncertainty about future climate change.

The findings emphasise the importance of local knowledge in understanding the vulnerability of wine-growing regions. In addition to climate, local environmental features and socio-economic factors were also shown to influence wine quality. Understanding these factors is important for developing the most appropriate adaptation strategies to climate change.

The researchers say policy changes could help winegrowers adapt to uncertain long-term climate changes. For example, producing wines from different varieties of grapes that are better suited to warm and dry conditions is not permitted under current appellation regulations. They also say high-resolution climate change projections could help winegrowers to understand the possible future changes better and to develop appropriate adaptation strategies for them.

