

# **Global warming could alter the US premium** wine industry in 30 years, says study

June 30 2011



Higher temperatures could hurt California and other premium wine-growing regions of the United States by 2040, according to a new study led by Noah Diffenbaugh of Stanford University. Credit: Sascha Zubryd, Woods Institute for the Environment

Higher temperatures could significantly impact California and other premium winegrowing regions of the United States in the next 30 years, according to a new study led by Stanford University climate scientists.

# Writing in the June 30 edition of *Environmental Research Letters*, the scientists

report that by 2040, the amount of land suitable for cultivating premium <u>wine grapes</u> in high-value areas of northern California could shrink by 50 percent because of global warming. However, some cooler parts of Oregon and Washington State could see an increase in premium grape-



growing acreage due to warming, according to the study.

These results come on the heels of the researchers' 2006 climate study, which projected that as much as 81 percent of premium wine grape acreage in the U.S. could become unsuitable for some varietals by the end of the century.

"Our new study looks at climate change during the next 30 years – a timeframe over which people are actually considering the costs and benefits of making decisions on the ground," said Noah Diffenbaugh, an assistant professor of environmental Earth system science and a center fellow at the Woods Institute for the Environment at Stanford, who co-authored both studies.

## Climate change, from global to local

Most U.S. wine comes from the West Coast. California alone produces on average more than 5 million gallons per year, accounting for about 90 percent of the nation's total wine production, according to the Wine Institute, a trade organization representing California winemakers. The institute estimated the retail value of the state's wine industry in 2010 at \$18.5 billion.

The new study focused on premium wines – the 25 percent most expensive wines on the market – and how global warming could affect growing conditions in four premium wine-producing counties by 2040: Napa and Santa Barbara counties in California, Yamhill County in Oregon's Willamette Valley and Walla Walla County in Washington's Columbia Valley.

"We focused on these counties because their mild climates have made them major sources of high-quality grapes, and because they represent both cool and warm growing conditions," Diffenbaugh said.



But that could change, and soon.

"There will likely be significant localized <u>temperature</u> changes over the next three decades," Diffenbaugh said. "One of our motivations for the study was to identify the potential impact of those changes, and also to identify the opportunities for growers to take action and adapt."

#### Climate change for lovers of fine wine

The study was based on the assumption that there will be a 23 percent increase in atmospheric greenhouse gases by 2040, which could raise the average global temperature by about 1.8 degrees Fahrenheit (1 degree Celsius) – a conservative scenario, according to Diffenbaugh. "World governments have said that to reduce the negative impacts of climate change, global warming should be limited to an increase of 1 degree Celsius," he added.

To predict how much land area will be suitable for premium wine grape cultivation in coming decades, Diffenbaugh and his colleagues used a very high-resolution computer model that incorporated local, regional and global conditions, including factors such as coastal wind speeds and ocean temperatures. The researchers compared their simulations to actual weather data collected between 1960 and 2010 to see if their model could accurately "predict" past temperatures.

Using the climate model and the historical weather data, the researchers predicted that by 2040, all four counties are likely to experience higher average temperatures during growing seasons, along with an increase in the number of very hot days when the thermometer reaches 95 F (35 C) or above.

In the experiment, the scientists divided premium grape varieties into separate categories based on their tolerance to different temperature



ranges. For example, Napa Valley – widely known for its pinot noir, cabernet sauvignon and other premium wines – has historically experienced growing seasons with an average temperature of less than 68 F (20 C) and fewer than 30 very hot days. Grapes that thrive in that climate have done well there.

According to the study, the average temperature in Napa Valley during the growing season could increase as much as 2 F (1.1 C), with the number of very hot days increasing by 10. As a result, the amount of land with historically hospitable growing conditions could shrink by half over the next three decades, the study found. In Santa Barbara County, the amount of suitable grape-growing acreage with similar climate conditions is projected to decline by more than 20 percent as temperatures rise.

"I was surprised that local temperature changes could have such a big impact on an important industry with only 1 degree Celsius of global warming." Diffenbaugh said.

The study also predicted higher temperatures in Oregon and Washington by 2040, but with potentially different outcomes for winegrowers. Oregon's Willamette Valley could see a slight increase in the amount of total suitable acreage and a large increase in area suitable for more valuable varieties, according to the study. But in Washington's Columbia Valley, varietals that are sensitive to severely hot days could see a 30 percent reduction in suitable land area, the results showed.

### **Risky business**

The researchers also looked at how much land could be available to growers who adapt to warmer conditions, such as by planting heattolerant vines or altering their cultivation practices. The study found that suitable acreage in Napa and Santa Barbara counties could actually be



increased if growers are able to produce quality grapes that can tolerate up to 45 very hot days and average temperatures of 71 F (22 C) in the growing season. However, varieties currently grown in those conditions tend to produce considerably lower wine quality and value, the authors noted.

Winegrowers, with their knowledge of which cultivation techniques are most appropriate in a given climate, could benefit from the study's forecasts of temperature conditions, Diffenbaugh said.

"Climate change over the next few decades is of particular relevance for the wine industry," he said. "It's a big investment to put plants in the ground. They're slow to mature, and once they mature they're productive for a long time."

Some decisions growers make now could affect their vineyards in 30 years, he added, whether they consider the potential effects of local climate change or not. Moving a vineyard to a cooler location or planting different varietals could be costly for winegrowers, the study said. But in areas where less drastic temperature change is likely, growers may be able to maintain the quality of their grapes by using existing cultivation and winemaking techniques, Diffenbaugh said. Possible strategies include special trellis systems that shade vines, using irrigation to cool plants and adjusting fermentation processes in the winery.

"It's risky for a grower to make decisions that consider <u>climate change</u>, because those decisions could be expensive and the climate may not change exactly as we expect," Diffenbaugh said. "But there's also risk in decisions that ignore global warming, because we're finding that there are likely to be significant localized changes in the near term."

"Humans are amazingly resilient, and individual growers will of course make decisions as they read the signs on the ground," he added. "We're



trying to understand how the climate that works so well for growing great wine grapes right now might be affected by even modest <u>global</u> <u>warming</u>. We can't know the future before it happens, but if we don't ask the question, we may be surprised when reality unfolds."

Provided by Stanford University

Citation: Global warming could alter the US premium wine industry in 30 years, says study (2011, June 30) retrieved 3 May 2024 from <u>https://phys.org/news/2011-06-global-premium-wine-industry-years.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.