Global Warming and California Agriculture

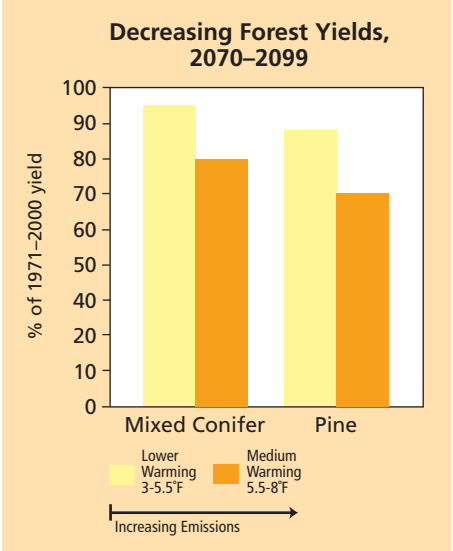
California Climate Choices

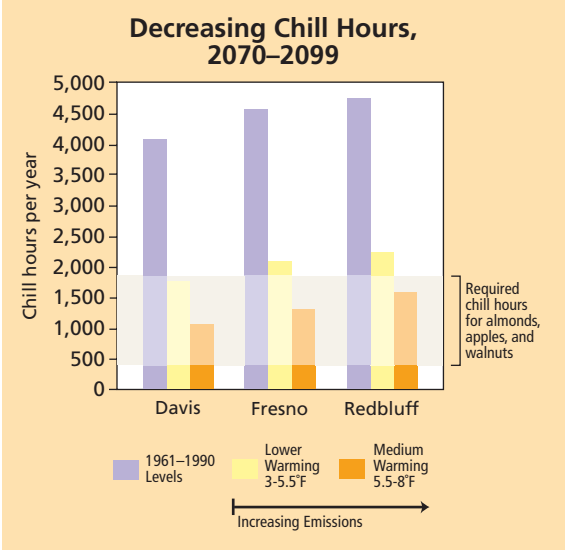
A Fact Sheet of the Union of Concerned Scientists

CALIFORNIA IS THE LARGEST and most diverse agricultural producer in the nation, growing half the country's fruits and vegetables, employing more than one million people, and covering a quarter of the state's total land area.

If global warming continues unchecked, rising temperatures and potential changes in precipitation patterns will pose serious challenges for California's agriculture and forestry industries. For example, higher temperatures will increase crop demand for water, while supply will become less reliable due to declining snowpack in the mountains. Higher temperatures will also alter the range of crop-damaging pests and microbial diseases. Finally, global climate change may enhance ozone pollution, which harms plant growth and makes them more susceptible to disease and pests.

The expected effects of continued temperature increases on a select set of agricultural and forestry products are presented below. These projections do not consider the effects of changes in water availability, the altered abundance and distribution of pests and diseases, or the varied effects of increased carbon dioxide levels, which could stimulate plant production and increase plant water-use efficiency but also promote the spread of weeds.





Rising temperatures have already significantly reduced the chill hours needed for fruit and nut tree development.

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Fruit Trees

A minimum number of chill hours (the hours per year where temperatures drop below 45°F) are necessary for proper bud setting for many fruit and nut trees. Chill hours are rapidly decreasing in many areas of the state and are approaching levels insufficient for proper plant growth.

If average statewide temperatures rise into the higher warming range (more than 8°F), the entire Central Valley is expected to approach, and in some cases surpass, critical thresholds for some fruit trees.

If these thresholds are reached, some high-value fruit crops such as almonds, cherries, and apricots may no longer be able to be produced in California.

Timber

Global warming is expected to have widespread effects on the productivity and health of California's forests. Forestlands cover 45 percent of the state, and commercial

Center for Forestry, Blodgett Forest Research Station

If temperatures rise to the medium warming range, pine plantations are expected to be 30 percent less productive.

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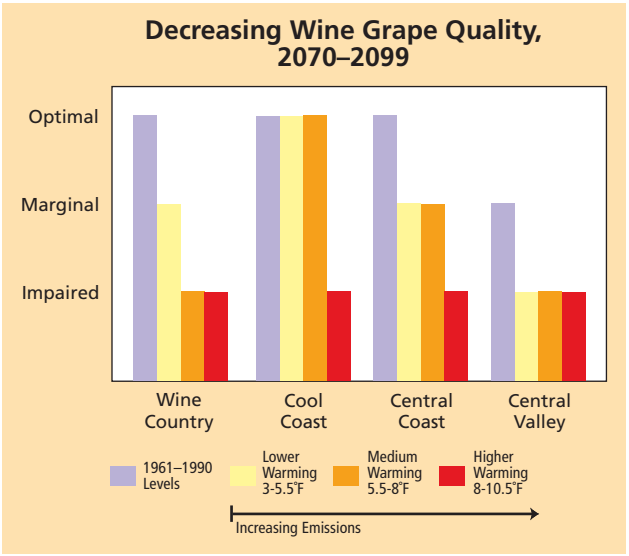


If global warming emissions are not reduced, wine grape quality is expected to be impaired throughout California.

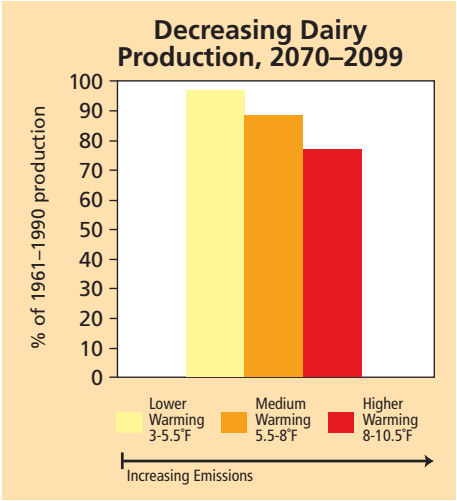
forests such as pine plantations cover 16 percent of the state. If average statewide temperatures rise between 5.5 and 8°F (the medium warming range), the produc-tivity of mixed conifer forests is expected to shrink about 20 percent by the end of the century. The reductions in yield from pine plantations are expected to be even more severe in this warming range, declining by as much as 30 percent by the end of the century.

Dairies

California's three-billion-dollar dairy industry supplies nearly one-fifth of the entire country's milk products. Heat stress in dairy cows can lead to poor feeding, weight loss, and reduced milk production, which begins to decline at temperatures at low as 77°F and can drop substantially as temperatures climb above 90°F. By mid-century, milk production is expected to drop two to four percent as a result of global warming. Toward the end of the century, a temperature increase into the higher warming range is expected to reduce milk production by up to 20 percent, more than twice the reduction expected if temperatures do not rise above the lower warming range.

Wine Grapes

California is renowned for its high-quality wines, produced throughout Napa and Sonoma Valleys, the Central Valley, and along the northern and central coasts. Temperature is one of the most important and controlling factors in wine grape development. Unchecked global warming is expected to impair wine-grape growing throughout the Central Valley by mid-century. By the end of the century, temperatures in the higher warming range are expected to cause wine grapes to ripen as much as one to two months earlier, impairing grape-growing conditions and reducing grape quality throughout the entire state.



Because most global warming emissions remain in the atmosphere for decades or centuries, the choices we make today greatly influence the climate our children and grandchildren inherit. We have the technology to increase energy efficiency and significantly reduce emissions from energy and land use. We must act now to avoid the dangerous consequences of global warming and help ensure a high quality of life for future generations. ■

SOURCES

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