

Adapt

On-farm changes in the face of climate change

Top Six Crops to Watch

Almonds & Walnuts

Strawberries

Cole Crop

Wine Grapes

Lettuce

USDA California Climate Hub
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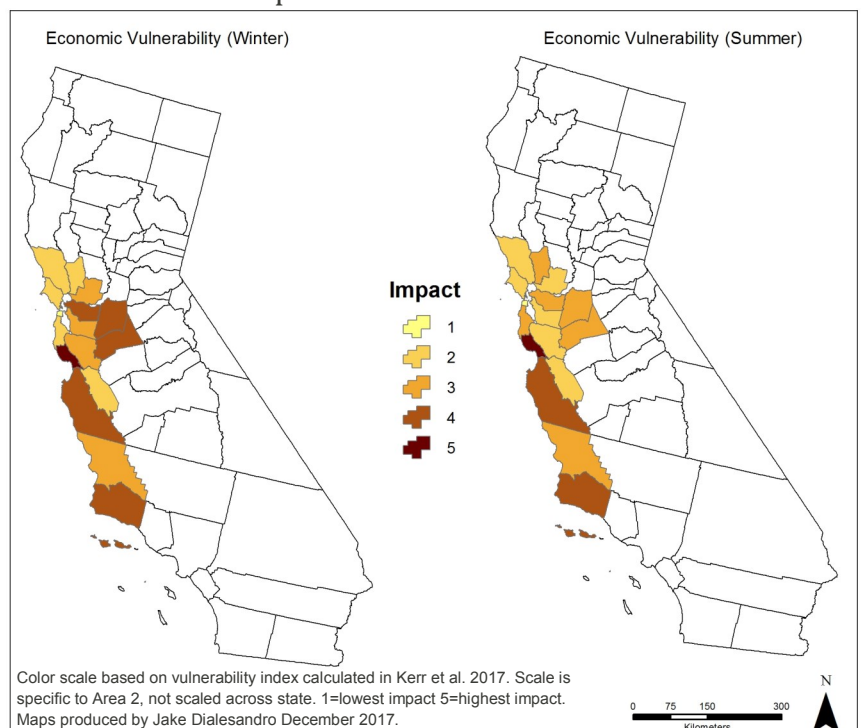
Kerr et al., "Vulnerability of California specialty crops to projected mid-century temperature changes". 2017.

More Heatwaves and Less Chill for California

The agricultural economy of certain counties in California are more vulnerable to projected changes in climate than others; this flyer details on-farm adaptation strategies to mitigate some of the effects of increased winter temperatures and frequency of summer heatwaves.

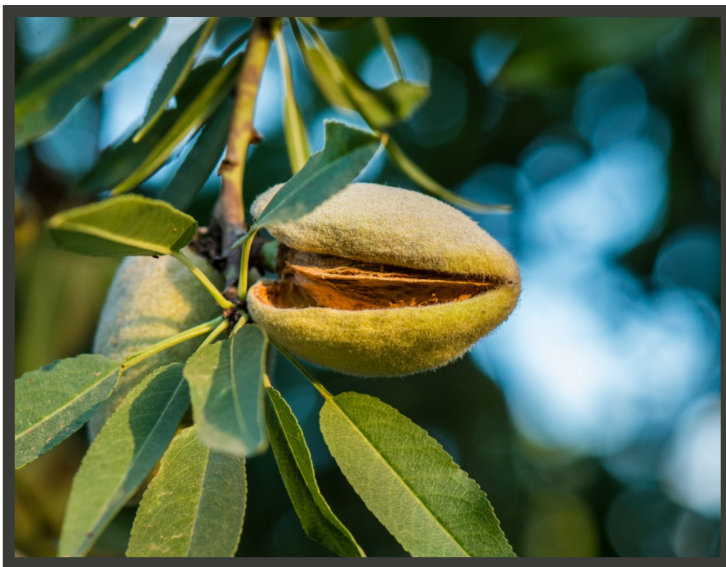
Projected conditions put the most strain on heat intolerant crops and crops with high chill requirements. Crops with these characteristics that also have a high market value or are grown in large acreage, make a county vulnerable to economic declines. Information on this flyer highlights the most vulnerable counties in California Area 2 and crops which are causing this.

For more detailed advice, please reach out to the UC Cooperative Extension Specialists listed to the left.



Almonds orchards will likely cause declines in the agricultural economy of San Joaquin and Stanislaus. Almonds' summer heat vulnerability, chill-portion requirements, dependency on bee pollination, and increased pest pressure with warmer weather coupled with their high value make them an economic driving force. Adaptation strategies include frost avoidance through heat reflection products to delay bloom, changes in harvest timeframe to avoid pest pressures, and deficit irrigation strategies to adapt to statewide drought conditions. Planting natural pollinator habitat could alleviate honey bee population decline and breeding programs to develop low-chill, self-pollinating, insect resistant, and earlier yielding varieties will be essential to the longevity of almond orchards in California.

Cole crops do not fare well under projected spring and summer temperature increases, specifically in Monterey and Santa Barbara. Cauliflower, broccoli, and head cabbage are the U.S.'s top-produced cole crops and all three have narrow optimal temperature ranges below 68°F. All cole crops are sensitivity to spring heat waves. Temperatures above 80°F cause bolting in cabbage and cause cauliflower to become small and yellow. Adjusting planting and harvest dates can help avoid heat stress. Across California, a northward shift in geographic spread would benefit cole production.



Wine Grapes are likely to create economic losses in Monterey, Napa, San Joaquin, San Luis Obispo, and Sonoma because of moderate yield sensitivity and high flavor sensitivity to temperature increases coupled with high value. These counties are also sensitive increases in winter temperatures. On-farm techniques that may help avoid economic loss include transitioning to varieties with greater heat tolerance, canopy misting, irrigation tactics, trellising type, canopy management, partial shading, reflective material spray, and taller vine training height. Changing varieties may not be feasible due to market demand.

Walnuts are extremely vulnerable to the projected increases in winter temperatures because of high chill requirements and moderately vulnerable to extreme summer heat. The counties likely to experience economic losses due to climate are San Joaquin and Stanislaus. To reduce effects of summer heat waves, irrigation can be carefully monitored to avoid water stress and trees can be treated with sunburn spray. However, there are no government-approved products available for combating warmer winters, but producers can advocate for more breeding of heat-tolerant and low chill varieties.

Strawberries cause economic vulnerability in Monterey, Santa Barbara, and Santa Cruz because of their high value, acreage, and extreme climate sensitivity. Warmer temperatures may shorten growth cycle, promote pest and disease pressure, and reduce pollination. Using ventilated protective structures to provide shade and syncing irrigation frequency and amount with evaporative demand are currently the best on-farm methods for mitigating heat stress. Strawberry production would benefit from a move to cooler zones.

Lettuce is economically vulnerable crops because of its sensitivity to warm temperatures. Ideal growing temperatures are around 73°F (daytime) and 45°F (nighttime). Warmer spring and summer temperatures cause bolting, while temperatures above 90°F cause bitterness. The most vulnerable counties to economic losses from lettuce are Monterey, Santa Barbara, and Santa Cruz. Planting and harvesting earlier may avoid heat stress. Changing to heat tolerant and bolt-resistant varieties may also mitigate climate risks.