

California drought: How water crisis is worse for almonds

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An almond tree is lifted into a wood chipper after farmer Barry Baker decided to sacrifice 1,000 acres of trees to save water in Firebaugh (Fresno County). Photo: Leah Millis, The Chronicle | [Buy this photo](#)

Atwater, Merced County -- A huge shift away from annual crops to nut trees has transformed the California farm belt over the past two decades and left farmers perilously vulnerable to the severe drought that is currently gripping the state.

California farmers have spent past years busily ripping out lettuce, tomatoes and other annual crops in an attempt to sate the nation's growing appetite for almonds, pistachios and other nuts.

The delicious perennials are lucrative, but the vast orchards that have been planted throughout the Central Valley require decades-long investments, year-round watering and a commitment from Mother Nature that she is evidently unwilling to make.

The crisis is a matter of crop flexibility. During droughts, farmers can fallow fields of lettuce and other crops, then replant them years later, picking up pretty much where they left off. That's not an option for nut trees, which need 10 years of growing and a steady supply of water before they yield enough to pay for themselves.

"These orchards are more profitable, which is why the farmers do it," said [Jay Lund](#), the director of the [Center for Watershed Sciences](#) at UC Davis. "It brings more money into California so there are a lot of good things about it, but the farmers have to be careful because a drought can be very tough on them."

The result is that about one-third of California's agricultural land is, Lund said, "very hard to fallow."

Farmers are scrounging for every drop of water they can find - digging wells, tapping aquifers and finding alternative sources. But some are coming to the stark realization that, no matter what they do, there won't be enough water to keep their trees alive.

Barry Baker has decided to sacrifice 1,000 acres of his Fresno County almond orchard so that he can keep the remaining 4,000 acres alive.

'Huge economic loss'

"It's a huge economic loss," said Baker, who looked on forlornly this past week as workers felled his beloved trees. "That's probably \$10 million in revenue I lost right there, but with the price of water today, up to \$2,500 per acre-foot, there is no way I could have found the water this year. A lot of guys are going to have to make that decision in the next couple of weeks."

Baker is actually one of the lucky ones. He has enough well water on his property to keep his remaining trees alive without having to break the bank buying overpriced water from irrigation districts. A great many farmers south of the delta don't have that luxury.

"I think we're going to see a lot of trees die," he said. "It's going to break a lot of farmers."

The switchover from annual crops to nuts has, by all accounts, been highly profitable. Nut production in California brings in \$7 billion in sales every year, with almonds by far the biggest money maker, at \$4.35 billion. Only grapes, which generated \$4.45 billion, sold more.

The growth is, at least in part, because of the popularity of the Mediterranean diet, which may also explain why U.S. consumption of olive oil has tripled over the past twenty years. The average American eats 1.8 pounds of almonds, according to the U.S. Department of Agriculture. That's a 36 percent increase since 2008. Consumption of walnuts, pistachios and pecans has also increased.

Extreme drought areas

Most of the orchards have been planted in areas suffering from what meteorologists call "extreme drought."

"An increase in the planting of permanent crops since California's last drought episode in 2009 is one reason we have concerns that this drought has the potential to be significantly worse," said [Steve Lyle](#), the spokesman for the [California Department](#) of Food and Agriculture.

About 3 million of the 9 million or so acres of irrigated agriculture in California are now orchards and vineyards, according to the experts. The Golden State is the nation's top producer of tree nuts, with almonds far outpacing everything else.

There are more than 800,000 acres of almonds in California compared with 418,000 acres in 1995. Production also doubled, from 912 million pounds in 2006 to 1.88 billion in 2013. California produces 82 percent of the world's almonds, which are neck and neck with grapes as the highest valued crop in the United States.

Meanwhile, most field crops have been cut back. There was, for instance, 1.5 million acres of cotton in California 25 or 30 years ago. Now there is only 300,000 to 400,000 acres, said Daniel Sumner, of the Agricultural Issues Center at the University of California at Davis.

Dairymen, ranchers hurt

The situation is also bad for dairy farmers and ranchers, according to Pete Craig, who owns a large cattle ranch near Lake Berryessa. He said the planting of almond orchards has taken thousands of acres of grazing land away from ranchers, many of whom are selling cattle because of a lack of feed.

"My company has lost over 8,000 acres of grasslands that I leased for cattle grazing to almonds in the last year alone," said Craig, who believes it is bad for the environment to replace California's diverse grassland ecosystem with a monoculture. "It is impossible to compete against a very realistic \$5,000 acre net return for a tree farmer, versus a \$15 acre return on native rangeland, and perhaps a \$100 acre return on irrigated ground to a cattle rancher. If you were a landowner, what would you do?"

Almonds have always been big in California. The Golden State, with its Mediterranean climate, is the world's top producer of the nut. Still, the recent expansion of the almond industry has been unprecedented, and there lies the problem.

An almond tree must get 3 to 4 acre-feet of water per year or nut production will decrease for an extended period of time. An acre-foot is enough water to cover an acre of land in a foot of water.

"When you cut back on water, it stresses the tree, and when an almond tree is under stress, it produces fewer nuts," said David Baker, the director of member relations for Blue Diamond Growers, an agricultural cooperative that specializes in marketing almonds. "The problem is, they will not recover for 3 or 4 years even if the drought breaks."

Replacing almonds with a different crop is not normally a viable option. It costs as much as \$6,000 an acre to plant an almond orchard and raise the trees until they are 5 years old, about the time it takes them to begin producing almonds. It takes about a decade before the orchard

produces enough almonds to pay for itself, according to farmers.

"Almonds are a huge investment," said Craig Arnold, who grows almonds on 800 acres of his 1,200-acre farm in Atwater (Merced County) that his great grandfather, Lawrence, built after leaving San Francisco following the earthquake in 1906.

The Merced Irrigation District, which gets its water from nearly empty Lake McClure, recently told Arnold he would be getting only about 6 inches of water per acre this year. Arnold said almonds and peaches require at least 30 inches of water per acre, which is the amount he received last year.

Can't afford to let trees die

"We have been trying to figure out what we are going to do," Arnold said recently as he stood near the family farmhouse, which he oversees with his father and uncle. "It's the almonds and the peaches that I worry about. I can choose not to plant everything else for a year, but I can't afford to let the trees die."

Arnold's plan right now is to leave fallow 250 acres of sweet potatoes and squash and use the water to keep his almonds and peaches alive. He has already converted 75 percent of his orchards to low volume drip or micro sprinkler irrigation and recently hired workers to refurbish an old well on his property that hasn't been used in decades.

Farmers are, in fact, sinking a large number of new wells across the state, but irrigating with well water can be problematic. Harmful salts and minerals from the aquifer can kill trees and damage crops. Wells can also cause the water table to drop, creating a whole new set of problems.

Nut prices to rise

It is a balancing act that thousands of farmers are now facing. One thing that is certain is that there will be huge economic losses and the price of almonds and other nuts will go up as production goes down.

"I have heard that between 200,000 and 250,000 acres will have significant reductions in production as a result of water shortages," said Dan Cummings, who grows 4,000 acres of almonds in Butte, Colusa and Glenn counties. "California produces almost 2 billion pounds of almonds. Think about it. If 200 million pounds of that is not produced, that's \$700 million that doesn't go to the farmer. It's huge."

And it could actually get worse before it gets better.

"Another year of this and you will see even the people who planned ahead getting hurt really bad," said Baker, the farmer who cut down 1,000 acres of orchard just so he could stay afloat another year. "It will really be a disaster next year."

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