

Grapes may take in less water than you think, even in California.

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California Winegrowers Turn to Tech to Save at the Tap

by Marguerite Richards



It's a hot October day in Northern California, and I'm roving a sea of endless green vineyards, which I'm sure haven't felt much rain this summer. That's when I notice the irrigation lines for the first time, then begin to see them everywhere. I imagine the wine industry to be a serious drain on California water resources, and wonder how they are navigating the drought.

It turns out they use less water than you might think. In fact, vines actually thrive in a water-stressed environment, and winemakers have been turning to technology to help them determine the perfect wine climate.

According to reports by [UC Davis](#) and the [Pacific Institute](#), grapevines use less applied water than many crops including alfalfa, almonds, pistachios, rice, and corn. But irrigation is not the only calculation when it comes to water consumption: to properly compare water use from one crop to another is difficult. Variables are heavily influenced by the precise location's climate and soil characteristics. And if you get into calculating the value of each crop, there are jobs, taxes, and nutrition to consider. It's a challenging debate. (See [Which California Crops Are Worth the Water? Check for Yourself.](#))



A soil moisture probe at work in a California vineyard. Photograph by Eric Pooler

While some vineyards in the driest areas have indeed been affected, overall, California is an ideal climate for viticulture—precisely because it is so dry. Winemakers work hard to be as precise about irrigation as possible. According to Napa Valley growers, this is especially true for making high-quality wines.

“The ideal is to have an early season water deficit to help make sure the berry is not a large berry, but small and concentrated,” says Jim Duane, Winemaker at [Seavey Vineyard](#). Experts actually aim to make the vine drought tolerant, knowing that the quicker this happens, the less water it will use over the season. “If we can get away without irrigating, we will,” says Eric Pooler, Director of Winegrowing at [Boisset Family Estates](#).

And while the demands for good winemaking may not have changed with the climate, the tools to get grapevines just the right amount of water have evolved. Since the seventies, tech tools have been used in research to measure water stress, and to manage water resources more efficiently, as Garrett Buckland of [Premiere Viticultural Services](#) explains. “Part of building a sustainable business is getting the tech to match so that we’re not wasting resources. No one cares more than the guy who puts 30 to 40 million down on a property. He needs the water to still be there for years to come.” says Buckland.



A close up of the ET monitor in a vineyard. Photograph by Eric Pooler

The first revolutionary piece of technology was the [CIMIS, a network of automated weather stations developed by DWR and UC Davis in 1982 to assist irrigators](#) in measuring evapotranspiration (ET), or how much water is vaporized into the atmosphere. The farmer could gather that information from the nearest station, and with the crop coefficient, would have an estimation of how much water to add. “It was a rough idea, but it was a starting point,” says Roger Boulton, [Professor of Enology at UC Davis](#).

Since the mid-90s, many new tech tools have been honed for use in winegrowing to measure water stress on the plant itself—each telling a different part of the story. The Pressure Bomb, which tests leaf water potential, has been used in research for decades, but became widespread for viticulture in 1995. The same year, the soil moisture probe came into use for measuring water penetration, location, and retention. The Dendrometer came about in 2004, gauging the dimensions of the plant. Shortly after, in 2005, the Porometer was developed to measure water vapor exiting plant leaf. In 2010, the Sap Flow Sensor was designed, a device revealing the turgor pressure of sap in plant tissue, or basically, how much water is going through the vine and at what rate.

The newest tech, the ET Censor, came to market in 2012. This tool, developed by UC Davis, functions similarly to the original CIMIS stations, but it's far more accurate. It shows daily readings of a vineyard, as opposed to estimations from the closest station. "It's a refinement, better at onsite estimates," says Boulton.

But humans still play an important role in the health of wine vines. "We're still looking for the holy grail in technology. If I could get a vine to talk to me every 15 minutes, I'd want to know what it would say in real time," says Buckland. "The best technology is still our brains."

And according to Boulton, without federal grant programs to study new water conservation systems for agriculture, UC Davis won't be researching the development of a comprehensive tool anytime soon.

But the winemaker has a less fatalist prediction vis-à-vis the drought. "Tech spawns in areas of need, so I think we're going to see more and more [tools] continue to improve our irrigation practices. We want to farm holistically but [we] can do it better by paying attention to technology," assures Pooler.

With their watchful eye on one of the world's most precious resources, it seems that California is not turning much of its water into wine after all.