California Drought Spurs Technology on the Farm

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It has been two decades since Willie Hartman started making farm equipment that helps growers conserve water, but sales didn't take off until the past four years. Credit goes, in part, to California's worst drought in at least half a century.

Farmers in the Golden State's $45 billion agricultural economy are increasingly thirsty for ways to save water, prompting a burst in demand for tools and processes like Mr. Hartman's On Target Sprayer.

At a cost of $20,000 to $50,000 each, Mr. Hartman's machines electrically charge mists of pesticides and plant nutrients in a way that causes them to stick to leaves more evenly, using about 80% less water than conventional chemical-spray rigs. Sales at his Progressive Grower Technologies Inc. are rising 30% a year, more than triple the rate four years ago, he said.

"Everybody's aware of water now," Mr. Hartman said. "Everybody's watching it."

Farmers in the arid West long have sought to lower their costs, including for water. But it often has taken a back seat to pressing concerns about labor, energy and other expenses. Now a drought that has stretched for four years is heightening attention to water efficiency by California growers of crops, whether almonds, olives or peaches—and opening a new market opportunity for those peddling novel solutions and others whose products received little notice until now.

New technologies range from a nontoxic gel made by Moasis Inc. that, mixed into soil, stores and slowly releases water near roots, to companies using satellite and aerial imagery to help farmers better plan how to irrigate crops based on how sections of their fields are faring. A water-pump monitor made by PowWow Energy Inc. alerts farmers to leaks in irrigation equipment.

Their emergence underscores the resilience of a U.S. agricultural sector long accustomed to the vagaries of weather but under increasing pressure in recent years from foreign growers that sell to American supermarkets as well as rising costs and regulatory mandates. Along with leaving fields unplanted and diverting water to higher-value crops like berries or nuts, farmers in California—the nation's biggest agricultural producer and exporter—are implementing robotics and other techniques for boosting productivity.

It isn't clear whether the nascent water technologies can significantly dent water use and soothe concerns about availability in the near term. But some farmers and water-efficiency advocates say adopting new processes and technologies could cut agricultural water use by 10% to 25%.

A preliminary study in June by the Center for Watershed Sciences at the University of California, Davis, estimated the drought would cause $2.7 billion in statewide economic losses this year from farmers fallowing more than a half-million acres of land and 18,600 agriculture-related job losses. California recently ordered holders of some of the oldest and most significant water-rights claims in the state, many of whom are farmers, to stop drawing water.

ENLARGE
Thistles grow in an abandoned vineyard near Terra Bella, Calif., where drought is in its fourth year. Photo: DAVID MCNEW FOR THE WALL STREET JOURNAl

Daniel Sumner, an agricultural economist at UC Davis, said that people focused simply on cutting absolute water use are looking at it the wrong way. Growers who find new ways to produce more food per unit of water may generate bigger

gains in water efficiency, he said. “If we can grow more food with our water, that’s presumably what we would like to do,” he said.

One of the biggest ways that is happening is through the reams of agricultural data seeping into water technology.

Growers say they are regularly receiving sales pitches for new tools that measure everything from soil temperature to air pressure to help better understand how much water their crops need.

In late 2013, Terlato Wine Group, a large producer of California wines, began testing one new system from Tule Technologies Inc. on 130 of its 600 wine-grape acres, said Vice Chairman John Terlato. Through its wire sensors, Tule quantifies how much water the plants actually use day to day by measuring the water they release as vapor. It has allowed Terlato to irrigate its vines with the amount they need when they need it, yielding higher-quality grapes and reducing water usage by 20% on those acres, he said. This year, Terlato is nearly tripling its Tule acreage.

Mr. Terlato’s company has scrutinized its water use for years. Yet Mr. Terlato, like many growers, is irked by a generalized perception in California that farmers are taking more than their share of water.

The “big, wide brush that everybody is using too much water is a generalization, and I know there are a lot of people working hard out there to be thoughtful about this,” he said.

San Francisco-based Tule, founded in December 2013, has sold more than 320 systems so far, many to wine vineyards. Its sensors, which each cover about 10 acres of land, cost $1,500 apiece.

For some growers, water-conservation investments also are a strategic calculation. Publicly traded Limoneira (http://quotes.wsj.com/LMNR) Co. LMNR 0.77 % (http://quotes.wsj.com/LMNR), with about 7,300 acres of citrus and avocados, is preparing now for long-term water limits it expects will eventually be based on historical usage rates.

For about seven years, it has carpeted its groves with mulch made from yard waste and construction debris to stem soil-moisture evaporation, cutting water use by between 15% and 25%, said Chief Operating Officer Alex Teague. But last year, the Santa Paula, Calif., company installed plastic tubes that collect water samples as far as two feet below the ground on 400 of its acres in a pilot project to better monitor nutrient and moisture levels. Limoneira also this spring began testing a new irrigation system by Netafim Irrigation Inc. Instead of the fan jets Limoneira currently uses, which sit 12 to 24 inches from the ground and lose about 15% of their water to evaporation, it is a system of tubes, dotted with holes, that lies on the ground. It can pump a higher volume of water during the hottest parts of the day directly to trees and lose less water to evaporation because it is closer to the ground.

Mr. Teague estimates the combination of better monitoring and new irrigation could save an additional 25% of water use when deployed throughout the company, and come in handy soon. By lowering water needs now, "you're giving yourself a cushion" for future dry spells, he said.

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