

IMPACT

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IMPACT is a series of publications highlighting how UC Davis' College of Agricultural and Environmental Sciences makes a difference in the lives of Californians. Through research, teaching, and outreach programs, UC Davis research touches almost all aspects of Californian life. Today, millions of people eat safer foods, breathe cleaner air, and drink healthier water with the help of our researchers. We're making discovery work – for California and the world.

IRRIGATION ADVANCES CONSERVE WATER

THE ISSUE

California agriculture is a central pillar of the state's economy, producing \$37 billion worth of fruits, nuts, vegetables, field crops, livestock, and greenhouse, nursery, and floriculture products in 2007. Water is key to this agricultural bounty.

In a normal year, California agriculture uses about 34.2 million acre-feet of water for irrigation, according to a 2009 report by the UC Davis Agricultural Issues Center. About 8.9 million acre-feet is devoted to urban and industrial uses. The remainder of the state's "developed" water—36.9 million acre-feet—is distributed for environmental uses or is stored in surface and groundwater reservoirs.

UC Davis has a long history of working with farmers to find new ways to irrigate crops that maximize production and reduce water use.

WHAT WE'RE DOING

Some of the earliest work at the university laid the foundation for orchard and vineyard irrigation practices throughout California. Today our scientists are experimenting with innovative research projects and new information technology to make the most of our water resources.

Tapping web tools: A quarter century ago, scientists from the state of California and UC Davis created the California Irrigation Management Information



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System (CIMIS). A statewide network of CIMIS weather stations generates regional plant water need predictors (called evapotranspiration rates) that help growers and farm managers determine irrigation requirements. This water-management tool has saved millions of dollars in water and energy costs.

With new information technology, even greater water efficiencies are in the making. UC Davis biometeorology specialist Richard Snyder, in cooperation with Oregon State University and UC Cooperative Extension farm advisors, is leading an "optimum irrigation scheduling" project that incorporates other factors affecting crop water use—soils and salinity, field configurations, and farm management preferences—into a web-based advisory tool.

"This gives California growers more precise and more flexible irrigation scheduling abilities," Snyder says.

See additional IMPACT sheets at <http://impact.ucdavis.edu>

Soaring to new heights: “Regulated deficit irrigation” is a technique that reduces the seasonal amount of water applied to less than what a crop is capable of using. In winegrapes and some tree crops, this practice can actually improve crop quality. One winegrape study produced better quality fruit and wine with 30 percent less water.

David Goldhamer, a UC Davis water management specialist based at the university’s Kearney Agricultural Center in the San Joaquin Valley, was an early pioneer of regulated deficit irrigation and has been exploring new ways to maintain grower profitability with less water. In 2009 he and a team of Spanish researchers flew robotic aircraft equipped with specialized cameras over pistachio and almond orchards, and table-grape vineyards, to record information on water stress, nutrition status, and insect and disease damage. The test demonstrated the potential to save 20 percent in pistachio water use.

“This technology is the future of farm-water management for trees and vines,” Goldhamer says.

Coping with drought: UC Davis irrigation specialists Terry Prichard and Larry Schwankl have compiled information about managing limited water supplies in a “UC Drought Management” website. This site (<http://ucmanagedrought.ucdavis.edu>) contains information on crop irrigation strategies for almonds, pistachios, stone fruits, walnuts, and alfalfa, with new information coming online as available.

Almonds alive: Almonds are one of California’s most important crops. In 2007, growers produced 1.7 billion pounds of shelled almonds worth more than \$2.1 billion (California Department of Food and Agriculture data). In 2009, many almond growers were faced with severe cutbacks in water availability.

Ken Shackel is a UC Davis plant scientist leading an experiment in the Sacramento Valley to determine just how much water almond trees need to survive. With subterranean probes and plant sensors, he and fellow scientists are creating soil- and plant-based measures to be used as benchmarks for judging the severity of orchard water stress. This information will help farm managers make irrigation decisions when faced with a severe drought scenario.

“The effects of drought on an almond tree can last two or three years,” Shackel says. “We also study how different management practices during drought will affect future tree health and production.”

A SHARED VISION

Many other UC Davis scientists are contributing knowledge and advice on how the agricultural community can adjust to limited water availability. Working in tandem with UC’s statewide network of UC Cooperative Extension farm advisors and other experts in government agencies, the university is digging deep to access the tools Californians need to best manage our water resources.

That’s impact—teamwork to keep California agriculture thriving.

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