

## **Helping Californians Irrigate Efficiently**

*by Kent Frame*

You may already know that applying the right amount of water at the right time saves water, energy, and money while increasing agricultural yield and landscape beauty. But, how do you determine the right amount of water before you turn your irrigation system on? How do you decide for how long to run it?

A highly diversified group of DWR scientists from the Office of Water Use Efficiency (OWUE) who administer a futuristic weather data-gathering program called the California Irrigation Management Information System (CIMIS) can help you answer these and many other questions regarding the data collected and its many uses.

In Sacramento headquarters, the CIMIS staff includes Senior Land and Water Use Analyst **Kent Frame** and Associate Land and Water Use Analysts **Mark Rivera**, and **Bekele Temesgen**. CIMIS District staff includes Associate Land and Water Use Analyst of Southern District **Sergio Fierro**, Land and Water Use Analyst of Northern District **Jamie Dubay**, Associate Land and Water Use Analysts of Central District **Kim Rosmaier** and **Marc Anderson**, Land and Water Use Analyst of San Joaquin District **Steve Ewert**, and Land and Water Use Analyst of Southern District **Robert Fastenau**.

Created in 1982 as a joint project between DWR and the University of California, Davis to encourage weather-based, water-budgeting irrigation methods, the CIMIS program has been managed, developed, and operated by DWR since 1985.

"CIMIS is an integrated network of 121 computerized weather stations located in many areas of California, like Davis, Fresno, and Red Bluff, including the South Coastal and Desert, and San Francisco Bay areas," said Kent, CIMIS Program Manager since 2001 and former employee of San Joaquin District and Central District. "By providing weather information needed for calculating water budgets, CIMIS can help growers and landscape managers improve irrigation efficiency."

Weather data is gathered from all over California to calculate reference evapotranspiration (ET<sub>0</sub>), the amount of water evaporated from soil and grass surfaces and transpired by grass surfaces at the weather station. From this information, growers and landscapers can establish a water budget irrigation schedule that will tell them when and how much to irrigate. This weather data is archived onto the CIMIS database and is available over the Web.

Bekele, who is originally from Ethiopia, has done extensive studies on evapotranspiration as a graduate research assistant at Utah State University before joining DWR's CIMIS program in 2001. He is currently exploring the potential for using remotely sensed satellite data to produce daily maps of ET<sub>0</sub> for California.

"In a June 2000 article of the California Agriculture magazine, it is stated that 370,000 acres of California farmland are managed using CIMIS information with yearly benefits of about \$65 million and a savings of more than 107,000 acre feet of water," said Bekele. "These figures are only beginning to illustrate the actual and potential savings CIMIS can produce."

The CIMIS stations, which collect the information for the program, sit on tripod legs and include a solar panel, wind vane, anemometer, lightning rod, telephone instrument, and various other pieces of computer and weather data equipment. "Sergio, Jamie, Kim, Steve, and myself from the Districts maintain the CIMIS weather stations in cooperation with our many partners," said Marc, who joined CIMIS in 2001 and worked as a biometeorologist for the Utah Climate Center and the National Weather Service. "In addition to visiting the stations monthly, I also assist in public outreach. And, I look forward to the possibility of one day forecasting ET<sub>0</sub> using the CIMIS network."

The District staff also performs CIMIS data user assistance, station quality control, selection of new station sites, and negotiation of land use agreements with cooperators for new sites.

"Thanks to District staff's assistance, the CIMIS stations have increased from 42 stations in 1985 to 121 active stations in 2002," says Kent.

All the weather stations are basically the same, which greatly simplifies maintenance and parts replacement and assists in maintaining the data standards that are required of CIMIS," said Mark, who has worked in all parts of the CIMIS program since 1992. When calibration and maintenance work is conducted, it is done at DWR's Bryte Lab in West Sacramento.

Rivera is currently involved with the weather station network management making certain that station integrity and data quality is maintained. "Managing the necessary resources to keep the station network functioning properly requires a lot of organization, skills which I enjoy employing," said Mark.

Originally intended for agricultural uses by farmers, farm advisors, irrigation consultants, and water agencies that, directly or indirectly, deal with irrigation scheduling, CIMIS has evolved over the last 20 years into a program that personifies the term "diversity." Clients today range from fire departments wanting to know "how hot" fuel will

burn at a given time of day to law enforcement agencies using CIMIS data in crime investigations. Windsurfers regularly call up the CIMIS Web site to check breeze conditions and golf course managers rely on CIMIS to help them realize the most efficient use of their irrigation systems. Pest control advisors use CIMIS data for pest management.

"Let's say someone wants to know what the water demand of a specific crop was in a particular area of California on a particular day, we can tell them quite accurately," said Marc.

While the user base continues to get more eclectic, so does the CIMIS program. "As we see the program and data evolving into more resource management, it's requiring that CIMIS adapt its weather stations to more nontraditional environments," said Kent. "We're looking to have a bigger presence in urban areas and will also begin looking at foothill areas, more remote mountainous areas and other regions where data gaps exist."

With over 4000 registered clients putting CIMIS data to a variety of uses, it is important that the users understand the CIMIS program. On April 25, 2002, CIMIS staff offered a tour of the CIMIS program to 21 representatives of DWR and other State and Federal agencies, including CALFED and the U.S. Bureau of Reclamation (one USBR attendee traveled from Boise, Idaho, for the orientation).

"Although the tour was the first of its kind offered by the CIMIS program, we plan to have similar tours for water resources agencies, farm managers, landscape managers, and other interested groups in the future," said Kent.

For information on future activities check the new CIMIS web page system news at [www.cimis.water.ca.gov](http://www.cimis.water.ca.gov).