How much water has your crop used since your last irrigation?

California Irrigation Management Information System (CIMIS) reference evapotranspiration (ETo) information is an estimation of the ET of a healthy pasture. How can you use this data to determine how much water your crop has used since your last irrigation? The answer is crop co-efficients.

What are crop coefficients?

Crop coefficients are conversion numbers multiplied by the evapotranspiration of the reference crop (healthy pasture) to estimate the evapotranspiration of other crops. Crop coefficients vary by crop, by time of year, and by specific cultural or management practices. The range of crop coefficients varies from very small (around 0.15 for early season row crops) to very large (around 1.3 for walnuts in mid-season). For the majority of annual crops, early-season crop coefficients are small, mid-season values are high, and late-season values are in between. Crop coefficients have been developed for use with other evapotranspiration-based irrigation scheduling programs. Crop coefficients developed specifically for CIMIS ETo information must be used to make the best use of CIMIS data. ETo can be obtained by calling the Department of Water Resources' CIMIS computer. Some water agencies can also furnish this information, and it is published in some newspapers. See the DWR publication *How You Can Get CIMIS Information* for more information.

How were crop coefficients developed?

Crop coefficients were established through a series of actual field measurements. Work by the United States Department of Agriculture, University of California, Bureau of Reclamation, and DWR resulted in the majority of crop coefficients in existence today. Research is still continuing to develop crop coefficients for crops not studied before and to refine crop coefficient estimates in both early and late seasons of various crops.

How are crop coefficients used to estimate crop ET?

Estimating the daily ET rate of your crop is very simple. Multiply the ETo for that day by the crop coefficient for that day.

> **EXAMPLE:** Your corn crop has a crop coefficient of 1.1 for June 15. The CIMIS ETo value for the closest weather station for June 15 is 0.26 inches.
>
> ET = ETo x crop coefficient
> ET = 0.26 inches x 1.1
> ET = 0.286 inches

Continually monitoring the ET of your crop throughout the growing season and using a water budget can help improve the management of your irrigations. Using the water budget method is similar to balancing your checkbook. ET represents withdrawals, and irrigations represent deposits.

After your last irrigation, you would monitor the ET of your crop. When the accumulated crop ET is equal to the amount of water you decided can be safely extracted from the soil, an irrigation is done. Also, you know you have to irrigate enough to replenish the amount of water extracted (the accumulated ET). Using ET as a management tool can reduce the possibility of irrigating too soon and applying too much water or irrigating too late which can result in crop stress.

Where do I get crop coefficients?

The University of California has developed two booklets on crop coefficients. Copies of these booklets can be obtained by visiting **www.cimis.water.ca.gov**.

Using Reference Evapotranspiration (ET) and Crop Coefficients to Estimate Crop Evapotranspiration (ETo) for Agronomic Crops, Grasses, and Vegetable Crops

Using Reference Evapotranspiration (ETo) and Crop Coefficients to Estimate Crop Evapotranspiration (ETc) for Trees and Vines

What if I am irrigating a landscape?

Because landscape plantings often have more than one species, variable density, and a range of microclimates, a different coefficient, known as a landscape coefficient (KL), has to be used. Detailed information on landscape irrigation and KL can be obtained from *A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California, The Landscape Coefficient Method and WUCOLS III (August 2000)*. This publication is available from:

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http://www.owue.water.ca.gov/docs/wucols00.pdf

For more information

http://wwwcimis.water.ca.gov/cimis/info.jsp

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