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University of California
Agriculture and Natural Resources
Making a Difference for California

UCCE Kern Soil & Water

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Maximum Water Use Efficiency in a Drought Year

The Federal project water allocation and State water supplies from the California Aqueduct were reduced to 0% a month ago. Snowpack and reservoir storage across the state is at record lows. In many areas of Kern County, groundwater pumping levels have dropped 50 to 200 (or more) feet compared to 4 years ago. Pump and well drilling companies have schedules booked solid for the next 6 months.

Okay, we know it's bad, now what can we do about it? Following is a list of practices and resources to help you get the most out of every drop of water. The following topics are too extensive to explain in one newsletter, so they are only introduced here as a general category (with a couple exceptions) with links to other newsletters or tables posted on our Kern Cooperative Extension Website http://cekern.ucanr.edu (and a few others) so you can get more info on the topic of your choice.

NORMAL YEAR CROP WATER USE, EVAPOTRANSPIRATION (ET) and CIMIS

From May through August we are blessed with very predictable weather in the San Joaquin Valley, where the "reference crop potential evapotranspiration" (basically unstressed pasture grass water use, ETo) varies no more than 5% from one year to the next. This makes it possible to estimate average crop ET for a given week based on the "normal year" ETo multiplied by a crop coefficient (Kc) for that stage of crop development. These average SSJV ET values and Crop Coefficients can be found at:

http://cekern.ucanr.edu/Irrigation_Management/Average_SSJV_ET_and_Crop_Coefficients/

These are a combination of published values and my personal observation from Kern County trials. Additional references are also listed. More detailed Excel tables can be downloaded for the below crops:

- Almonds:http://cekern.ucanr.edu/Irrigation_Management/Almond_Drip_-_Microsprinkler_-_Flood_Weekly_ET/
- Citrus: http://cekern.ucanr.edu/Irrigation_Management/Citrus_ET_by_age/
- Forage: http://cekern.ucanr.edu/Irrigation_Management/Forage_ET/
- Table Grapes: http://cekern.ucanr.edu/Irrigation_Management/Grape_ET/
  http://cekern.ucanr.edu/Irrigation_Management/Estimating_vineyard_crop_coefficients/
- Pistachios : http://cekern.ucanr.edu/Irrigation_Management/Pistachio_ET_by_age/
- Almond-Pistachio-Citrus Regulated Deficit Irrigation: http://cekern.ucanr.edu/Irrigation_Management/Almond-Pistachio-Citrus_Regulated_Deficit_Irrigation/

The data given in these tables is my best estimate for the southern San Joaquin Valley. You can update these tables with the current year's ETo by accessing the CIMIS website and following these steps:

Website Address:
http://www.cimis.water.ca.gov/

Non-Members – last 7 days only:

1. Select Data tab on header
2. Sample Daily or Monthly report
3. Select County
3. Submit – gives last 7 days for all stations in county

KERN COUNTY CIMIS STATIONS

5	Shafter/USDA
54	Blackwell's Corner
125	Arvin-Edison
138	Famoso
146	Belridge

Signing up for membership is free, can be done on the website and allows many more options for data access.

A new feature was added this last year called "Spatial Cimis" that can triangulate an ETo estimate for your exact farm location.

There are many other publications available with suggested crop water use tables (brose UC irrigation publications: http://anrcatalog.ucanr.edu/Search/irrigation.aspx and our current UC Drought Management Website: http://ciwr.ucanr.edu/California_Drought_Expertise); not all of them agree. My numbers for almonds are higher than nearly any other reference, but are the result of 12 years of various trials and observations in more than 40 almond blocks across Kern County and they also reflect a higher estimate of San Joaquin Valley ETo than the one we used 10 years ago. Remember, these tables are just guidelines to get you started. Depending on salinity impacts, crop load, the overall vigor of your field and irrigation uniformity your actual crop water requirement (ET + non-uniformity + leaching) may be less or as much as 10 to 20% greater than the table values. Checking field soil moisture (next section) and actual crop stress will tell you whether you are on target or not.

Blake Sanden/Farm Advisor/Irrigation and Agronomy
blsanden@ucdavis.edu or 661-868-6218