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**Irrigation Scheduling:
Using CIMIS or
CIMIS-type weather
stations**

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Cooperative Extension

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Irrigation Scheduling: Using CIMIS or CIMIS-type weather stations

CIMIS means California Irrigation Management Information System. The California Department of Water Resources in cooperation with other agencies concerned about water conservation operates over 80 CIMIS stations in irrigated areas of the state. These are weather stations that calculate estimates of evapotranspiration (ET) for irrigated, mowed, vigorously growing grass. The calculated value comes from data provided by several instruments that measure atmospheric conditions which influence daily water requirements of crops. There are several manufacturers of instruments similar to those used by CIMIS.

ET is a combination of the amount of water evaporated from the surface of moist soil and foliage and water transpired from leaves. It is measured in inches, the same as rainfall. The weather stations calculate ET for grass daily and report it to a central station in Sacramento. This ET is called reference ET (ET_o) because it is the ET used in calculating ET for a crop (ET_c). ET_c for each crop is calculated by multiplying ET_o by a crop coefficient (kc). The kc corrects ET_o for plant size and the amount of ground cover shaded by plants intercepting sunlight. Appropriate kc's have been determined by research for several crops. The values are available through UC leaflets 21427 and 21428.

For deciding when to irrigate, a grower needs to estimate how much available water is stored in the root zone of the soil and how much of that can be extracted before it is time to irrigate. This volume of water is called allowable soil water depletion and when expressed in inches can be related to ET_c. When the total daily ET_c's since the last irrigation equals the allowable depletion, it is time to irrigate.

If water distribution uniformity (DU) by the irrigation system were perfect, it did not rain since the last irrigation, and no leaching to reduce soil salinity were needed, then the irrigation requirement (IR) for each irrigation would equal ET_c since the last irrigation. Because DU is never perfect, additional water is always needed to compensate for this defect. As long as the system is not modified and DU is not affected by variations in pressure, the compensating amount of water remains the same and is equivalent to the DU. The formula for calculating estimates of IR is:
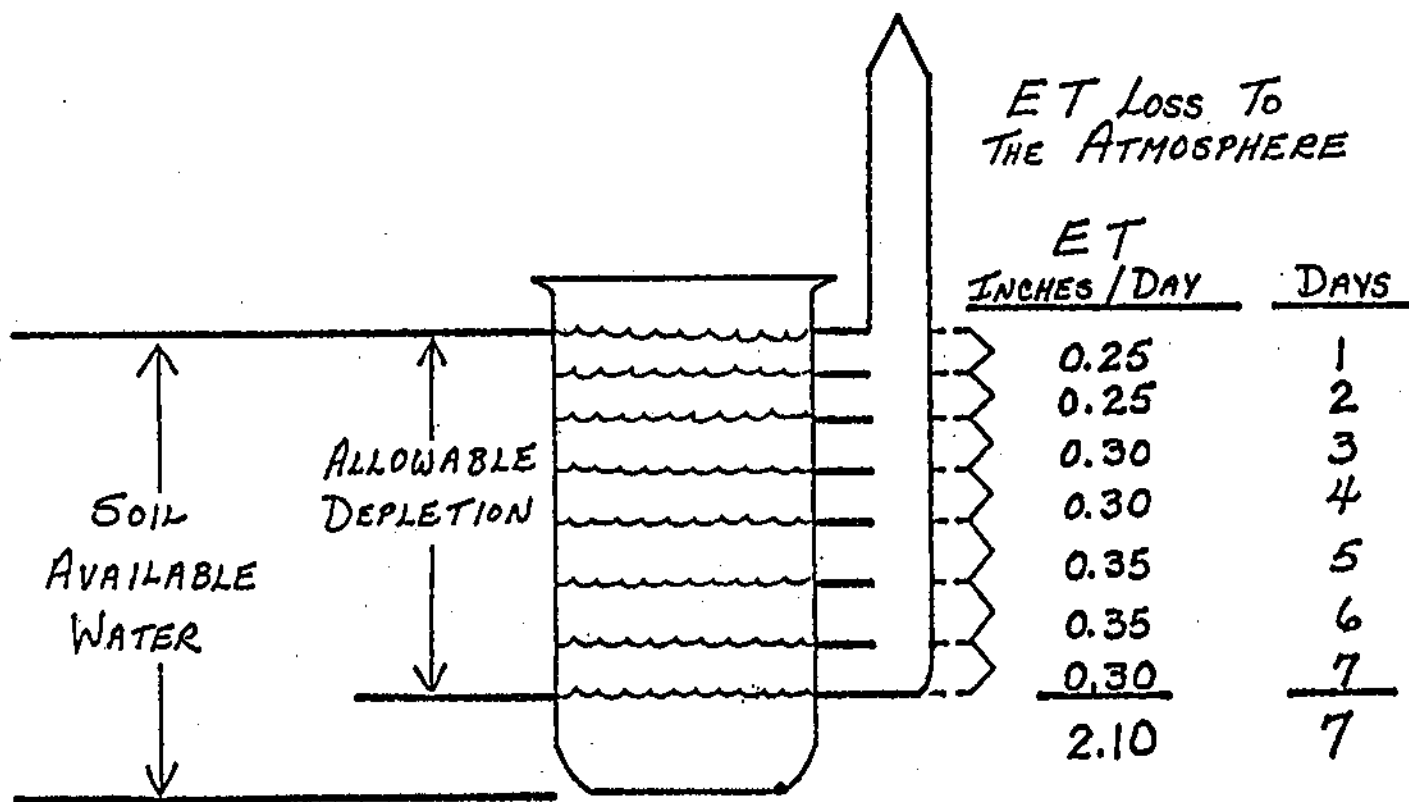
$$IR = ET_c/DU$$

Estimates of the amount of water to add to IR for salt leaching should be based on soil analysis. Rain and extra water applied to compensate for DU may accomplish some leaching.

If irrigation may be done at any time, the IR for each irrigation will be about the same. Adjustments for different rates of ET are made by varying intervals between irrigations. If irrigations are scheduled for uniform intervals between irrigations, adjustments for different rates of ET are made by variations in IR for each irrigation. With a fixed interval irrigation schedule, irrigations can be skipped as long as there is rain or adequate soil moisture.

A simple spread sheet can be used to accumulate daily ET_c. There are several commercially available spreadsheets that have been modified for irrigation scheduling, and with complicated cropping patterns, these may be helpful.

The Water Budget Method of Irrigation

ET Loss To The Atmosphere

ET Inches/Day	Days
0.25	1
0.25	2
0.30	3
0.30	4
0.35	5
0.35	6
0.30	7
2.10	7

Soil Available Water

Allowable Depletion

Irrigate

1. When? ------ After 7 Days

2. How Much? ---- Apply 2.10 Inches of Water + Losses (Efficiency consideration)