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Accounting for Evapotranspiration Differences due to Microclimate in the Coachella Valley, California

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Abstract Text:

Urban irrigation managers in the Coachella Valley of California have been using the State irrigation management information system (CIMIS) since the mid 1980's to help determine the irrigation run-times on golf courses and other large turfgrass and landscape sites. The State has located four CIMIS weather stations in the Valley for use by farmers and landscape water managers. Since this desert region has one of the highest water use rates in the State, it can benefit from efficient and accurate irrigation management.

The Coachella Valley Water District and other water retailers in the Valley noticed that some large properties (golf courses) were using considerably less water than the predicted need based on CIMIS stations used by the urban water managers. Many of the golf courses were already using proprietary weather stations connected to their irrigation systems to provide location specific ET estimates for their properties.

This study was started to determine the differences in water use as predicted by weather station sensors (air temperature, humidity / dew point, wind speed and solar radiation) located in eleven different locations throughout the Valley between 2000 and 2007. These data were used to calculate hourly ETo using the modified Penman-Monteith equation (Allen et al., 2005) and were compared with the State CIMIS station ETo calculations at the Indio, CA site [stn. # 162 and later # 200].

Correlations between the CIMIS and eleven Valley locations studied were calculated and isolines developed to show varying ETo by location in the Valley to help water managers better use the CIMIS information for their particular location. Findings showed up to a 40 % decrease in predicted water use in some locations in the Valley compared to the Indio CIMIS station ETo estimates.

REFERENCE

Allen, R. G., Walter, I. A., Elliott, R. L., Howell, T. A., Itenfisu, D., Jensen, M. E. and Snyder, R. L. (2005). "The ASCE Standardized Reference Evapotranspiration Equation." Amer. Soc. of Civil Eng. Reston, Virginia, 192 p.

Impact Statement:

By using the CIMIS information developed from newly located weather stations, turfgrass managers can very accurately apply as much irrigation water as the plants need without wasting this finite and expensive resource. With 2,800 acres in golf turf and other turf in the wind-protected areas of the valley, there is the potential of saving up to 40 percent of the yearly total predicted water use for Indio (85.4 inches). This would reduce total use in the wind-protected areas by 34 inches, saving 2.5 billion gallons of water.

