

ET Tower Provides Information for Water Conservation

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Support Provided by: USDA NIFA, Texas A&M AgriLife Research, Texas Water Resources Institute, and 5R Enterprises, Inc.

BACKGROUND

Prolonged drought conditions in the Paso Del Norte region have increased the need to find ways to conserve limited water resources. In order to develop effective water conservation measures in agricultural irrigation, a better understanding of and accurate measurements of the field level hydrologic cycle and interaction among atmospheric water, surface water (irrigation) and groundwater is required. With USDA NIFA support from the Rio Grande Basin Irrigation Water Conservation Program and Five R Enterprises Inc., we established an Evapotranspiration (ET) Monitoring Tower and a weather station at Five R Enterprises pecan farm in El Paso County in July 2010.

EQUIPMENT AND OUTCOMES

An 18-meter high ET tower with an Open Path Eddy Covariance (OPEC) system manufactured by Campbell Scientific, Inc. has been in operation in this field over thousand acres since July 2010.

This OPEC system measures carbon dioxide flux, latent heat flux, sonic sensible heat flux, momentum flux, a computed sensible heat flux, temperature, humidity, horizontal wind speed, and wind direction, net radiation, soil heat flux, soil temperature and soil water content. The data is collected at a preset time intervals for example, hourly. The data is then sent to the Research Center through radio modems and internet connection at the farm. Special software is used to communicate with and monitor dataloggers and analyze the data. In addition, a weather station collects temperature, humidity, horizontal wind speed and wind direction, net radiation, precipitation and groundwater level.

Users can view data and graphs on the internet. Specially, farmers can obtain real-time weather and hydrologic information. These accurate local measurements are providing the information needed to increase irrigation system efficiency, conserve water and improve other farm operations.



Researchers are maintaining the ET tower



Collecting data from weather station

PROGRAM RESULTS AND BENEFITS

- The ET monitoring data enables a better understanding of water movement within the atmosphere, soil and plants as well as consumptive use of water by pecans.
- Provides the real time ET and weather data and information needed for farmers to make timely decisions in irrigation scheduling to conserve water and improve crop yield.
- These stations can be incorporated into the statewide ET network, developed by Texas AgriLife Research and Extension for the State of Texas, to fill data gap in Far West Texas.
- Through collaboration and data sharing with NMSU and USBR scientists, work is under way to develop a regional database.
- Continued data collection can help us gain a better understanding of hydrologic impacts of climate changes in arid regions.