

**Water Quantity Enhancement Activity – WQT07 – Regional weather networks for irrigation scheduling**



**Enhancement Description**

Crop evapotranspiration (crop ET) information from a regional weather network is utilized as a part of the irrigation water management plan for irrigation scheduling. Water use is planned and adjustments in application rates and timing are made using the regional weather network data.

**Land Use Applicability**

Cropland, Pastureland

**Benefits**

The use of data from regional weather networks can improve a farmer’s estimate of evapotranspiration from irrigated crops. This information combined with local rainfall data and monitoring of soil moisture can significantly improve the accuracy of irrigation timing and application rates. Benefits include reduced aquifer depletion, and reduced runoff and deep percolation, both of which reduce movement of agrichemicals from farm fields to aquifers, lakes, and streams.

**Conditions Where Enhancement Applies**

This enhancement applies to irrigated cropland or pastureland where regional weather data is not currently used to schedule irrigation events.

**Criteria**

This enhancement requires:

1. A subscription to a regional weather network that supplies crop ET values for irrigation scheduling.
2. The crop ET information from the network must be used as part of the irrigation water management plan to match water application rates and timing to the needs of the crops and soils.

**Adoption Requirements**

This enhancement is considered adopted when the applicant has a valid subscription to a regional weather service, has developed an irrigation water management plan based on the ET data from the regional weather network and has a record of irrigation events based on the ET data from the regional weather network.

**Documentation Requirements**

1. Documentation of subscription to a regional weather network.



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2. An irrigation water management plan showing the use of the crop ET data from a weather network in irrigation scheduling.
3. A record of actual irrigation events based on the ET data from the weather network.

### **References**

Elliott, R.L., K.G. Hubbard, M.D. Brusberg, M.J. Hattendorff, T.A. Howell, T.H. Marek, R.L. Snyder. 2000. The Role of Automated Weather Networks in Providing Evapotranspiration Estimates. Proceedings of the 4<sup>th</sup> Decennial National Irrigation Symposium. November 2000. pp 243-250.

<http://www.cprl.ars.usda.gov/wmru/pdfs/The%20role%20of%20automated%20weather%20networks%20in%20providing%20evapotr.pdf>

Pierce, F.J. and T.V. Elliott. 2008. Regional and on-farm wireless sensor networks for agricultural systems in Eastern Washington. <http://www.sciencedirect.com/science/article/pii/S0168169907001664>

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**Reference:**

- **449 – Irrigation Water Management**
- **Plan Your Irrigation Scheduling with Daily Crop "ET".** University of Minnesota Extension Service. *Minnesota Crop eNews*.  
<http://www.extension.umn.edu/cropEnews/2006/pdfs/06MNCN27.pdf>

Irrigation scheduling is the process of maintaining optimum water balance in the soil profile for crop growth and production. Irrigation decisions are based on an accounting method on the water content in the soil. Components of irrigation scheduling include the plant growth stage and water use, soil water holding capacity, evaporative demand and rainfall or irrigation additions. To estimate plant water use and evaporative demand factors such as temperature, solar radiation, humidity, wind and rainfall are monitored. The crop water use is known as crop evapotranspiration (ET). A potential reference evapotranspiration can be calculated based on weather conditions.

**Crop ET data can be found at:**

Minnesota & Wisconsin (reference) Crop ETs

[http://www.soils.wisc.edu/uwex\\_agwx/sun\\_water](http://www.soils.wisc.edu/uwex_agwx/sun_water)

North Dakota Ag Weather & Crop ET

<http://www.ndawn.ndsu.nodak.edu/>

**Weather information and/or ET information can be found at:**

University of Minnesota Research and Outreach Center Websites.