The Science of Irrigation Management

July 2014 Snapshots

If you've spent any time driving through Minnesota's farmland, you've likely seen long booms inching across fields, showering the crops below. At first glance, these irrigation systems look like the sprinklers that keep our lawns green through the hot summer. However, these center pivot irrigation systems are part of a complex equation that balances the needs of the crop with the local soil and weather conditions. If that equation falls out of balance, a farmer will apply either too much water - wasting a valuable resource - or too little water - depriving his or her crops the water needed for optimal production. The Benton Soil and Water Conservation District (SWCD) has established an irrigation assistance program that provides farmers with the information they need to help keep that water resource equation in balance, saving farmers money and protecting the state's water resources.

Pictured above, irrigation "catch cans" are used to test whether nozzles are functioning properly.

There are two parts to the Benton SWCD's irrigation assistance program. The first is a scheduling tool that allows farmers to better understand local environmental conditions so they can water their crops at the right time. The scheduling tool is a software program used by the SWCD that combines data on the type and age of the crop in a particular field, local soil conditions, and recent local weather to provide the farmer with the water conditions within that specific field. When the soil moisture conditions approach a threshold that will reduce crop production, the farmer knows it is time to turn on the irrigation system and 'refill' the soil with moisture. The conservation district does not rely solely on the computer's output and also does field inspections to check soil moisture. If the computer information does not match the field information, the computer is updated to reflect real world conditions.

The second part of the irrigation management program involves checking the entire irrigation system to verify that each nozzle is operating as designed. These center pivot systems are designed to discharge water within certain established limits. If the nozzles are not working properly, some parts of the field may get too much water and other parts of the field may get too little water. To ensure the system is functioning correctly, district personnel work with the farmer to place 'catch cans' along the length of the field. As the irrigation boom moves over the catch cans, the amount of water released by each nozzle is recorded and compared with the designed output of the system. Farmers can then verify their systems are working

properly and make necessary adjustments to specific nozzles.

The Benton SWCD established the program using a BWSR Clean Water Fund grant. Participating farmers have reported benefits from the program and many said they would seek additional help in their irrigation management in the future, a sure sign of the program's success. This partnership between the Benton SWCD and local farmers using center pivot irrigation systems demonstrates the value of local governments in providing high quality technical assistance to the state's farmers. The Benton SWCD irrigation management program shows that while the system may appear simple, managing the state's agricultural lands isn't as simple as turning the water on or off. Paying attention to how and when we use the state's water resources is a lesson we can all learn from, even if we're just watering our home lawns.