

## A Practical Partnership

### *Nebraska Water Balance Alliance – NCTA – Nebraska Extension*

For decades, irrigated acres in Nebraska have increased at the same time that competition for water from non-agriculture demands has also grown. Many agriculture producers now find themselves living and working in river basins that are just to one side or the other of the tipping point between sustainable and unsustainable use of the resource. For this reason, being able to identify, expand and better manage the available water supply is more important than ever.

In an effort to return all river basins to a sustainable condition, regulations have been instituted by the Department of Natural Resources (DNR) for stream diversions (surface water) and jointly by the DNR and the Natural Resources Districts (NRDs) for use of the aquifers (groundwater). These regulations include measures to prevent development of new irrigated acres, to limit the volume of water applied to a field in a single season or a block of consecutive seasons, and to take acres out of irrigated production.

Irrigated agriculture is a major driver of the Nebraska economy, contributing \$11 billion to the state economy and more than 31,000 jobs. Recognizing the importance of both water and agriculture to our future, the Nebraska Water Balance Alliance (NEWBA) was formed in 2010, with a mission to collaboratively promote sustainable water solutions that also safeguard our economy and quality of life.

A major initiative of this non-profit organization has been Water for Generation demonstration projects designed to identify promising technologies and strategies that, if adopted, could help to ensure a legacy of water. From 2011 to 2014, Project Coordinator Ted Tietjen has directed on-farm research projects with a dozen producers who together manage over 350 pivots of irrigated farm ground from the Panhandle to the center of the state. The purpose of the projects is to test and verify, in real life situations, the viability of a number of water saving ideas.

These projects have revealed that for promising water-saving technologies to be adopted they must meet at least 4 criteria:

- *Economically viable* – Costs to implement strategies must be offset by gains in profits, efficiency, production levels and/or ability to meet regulation requirements.
- *User friendly* – Technology must be understandable and easily adopted for use by the producer, without excessive time required.
- *Reliable* – Equipment must be installed on a timely basis and operate dependably. Vendors must be able to service equipment promptly and help producers understand how to use the technology to their best advantage.
- *Credible* – Ideally, technology is standardized to yield dependable, repeatable results that provide a level of assurance for effective use by producers and are trustworthy enough for regulators to base compliance expectations on.

Through the Water for Generations projects, NEWBA has brought together producers, vendors, regulators, crop consultants, power companies and lenders to better understand the options available and work jointly to improve the most promising strategies.

Soil Moisture Probes have proven to be one of the best new tools producers can use to both improve production and conserve water. However, widespread adoption requires better understanding of how the probes are installed and data used. Well informed installation, calibration and maintenance are critical if these probes are to provide the levels of performance and value that make wide spread

application viable and valuable. In addition, there is a need for more trained installers to meet the need for timely, accurate installation.

To that end, NEWBA has teamed up with the Nebraska College of Technical Agriculture (NCTA), to offer this hands-on training. NCTA will also be working with vendors through an internship program to train their students to become the technical support farmers need as they consider and adopt this technology on their farms. Nebraska Extension and UNL researchers have provided great assistance in providing unbiased research-based information on moisture monitoring and irrigation management in the manuals provided and in the NEWBA demonstration projects.

## **Workshop Overview**

This workshop includes a discussion of what soil moisture probes are, how to install them and how to read and interpret the data they provide. Probes are a great new tool to help producers decide how to put water to its best use in irrigated agriculture. The use of soil probes is increasing, along with other good water management tools discussed in this workshop including; the move away from gravity irrigation to sprinkler or sub-surface drip irrigation systems and tillage practices that reduce water evaporation from fields and increase water infiltration rates at the soil surface.

Dr. Ramsdale provides an in-depth look at the physical properties of our soil resource in the root zone and its interaction with water. Keep in mind that a single field may have many soils. Soil properties are heterogeneous between soil types and even within soil types. A soil probe provides measurements of water content in one cylindrical zone in a field. Installers must understand how to physically link and also calibrate the probe units to the soil so they transmit accurate data. They must also know how to select installation sites and adapt technology that best represent average field condition.

In a larger view, installers must understand what the agriculture producer is trying to accomplish with use of the probe and why. Each field or farm is unique but connected by water supply to other farm operations in the same river basin. Sustainability of each basin water resource depends on the collective efforts every producer to conserve irrigation water without impacting yield. Conserved water can remain in a reservoir or an aquifer or provide a water supply to surface water users, increase base flow to the river for environmental purposes and downstream states or be available for municipal and industrial needs. Agricultural water use, both irrigated and rain-fed, represents the largest percentage of Nebraska's water use and so it is within the agriculture sector that our greatest opportunity exists to substantially change the water balance in a river basin. Just an inch of water saved in a single season on each acre of the 6.7 million acres irrigated by center pivots in Nebraska represents a volume equal to more than a 10-year supply of water for the City of Lincoln! Solutions are not as easy as that water calculation, however, real savings and real solutions do result from the conservation of water by the irrigated agriculture community.

The purpose of this workshop is to help promote a better understanding, and potentially more widespread use, of soil moisture probes – a technological advance that shows great promise in helping producers conserve irrigation water and move closer to long term availability of our precious water resources for all the various purposes.