

Title: North Plains Research Field Drip Irrigation System

Contact and PI(s): Thomas Marek, Research Engineer and Superintendent, NPRF, and John Sweeten, Professor and Resident Director, Amarillo

Amount of Funding: \$ 8,000 for drip irrigation system (partial support).

Grant Duration: March 1 -August 31, 2004.

Need and Rationale: Water management personnel of The Texas A&M University System- Texas Agricultural Experiment Station (TAES) at Amarillo, TX have been heavily involved in the development and evaluation of irrigation systems, irrigation technologies, irrigation water use efficiencies, cropping systems, and crop production economics since the 1960s. The principal facility used in these northern Panhandle efforts has been the North Plains Research Field (NPRF) located approximately 62 miles north of Amarillo, TX near Etter, TX. The NPRF lies over the Ogallala aquifer in one of the most heavily irrigated and agricultural productive regions of Texas. Irrigation water management data and economic information based on applied research and demonstration output from the NPRF has been disseminated to area producers by individual and group technology transfer functions throughout the years. In the last two years, the NPRF facility has conducted or hosted an average of 20 experiments per year led by 19 engineers and scientists, respectively. These research and demonstration efforts involved and accommodated personnel from six different agencies (TAES, TCEQ, USDA-NRCS, USDA-ARS, WTAMU, and the NPGCD) and from 12 affiliated locations including the Agricultural Research and Extension Centers at Amarillo, Lubbock, and Vernon.

The NPRF is a leased, 326-acre irrigated research field owned and supported by the North Plains Underground Water Conservation District in Dumas, TX. However, the NPRF facility has been and currently continues to be predominantly surface irrigated (62%). Planned changes are to virtually eliminate surface irrigation in the near future to bring the facility "up to date" with regards to using advancing irrigation systems. These upgrades are required towards increasing irrigation water utilization, water conservation, and enhanced management capability. One of the critical needs involves that a modern drip irrigation system whereby northern Texas High Plains producers can obtain updated, representative irrigation related water use data for their area. It is viewed by many producers within the area that drip irrigation can be used to reduce the current level of Ogallala groundwater pumping needed to meet future irrigation water needs within Region A. The drip system will also allow researchers the ability to utilize and manage irrigation scheduling in a more controlled, frequent and variant manner. Many investigators conducting scientific work at the NPRF prefer irrigation by methods other than surface flow since a) it most adequately represents emerging irrigation trends within the region, and b) allows more flexibility in timing and quantity per irrigation applied to accommodate research project protocols and representative demonstration activities. For instance, corn and wheat breeding variety trials at the NPRF prefer alternate irrigation systems for water use efficiency evaluations. Crops tentatively proposed for evaluation

under the drip system are cotton, corn, sorghum, and wheat. Specialty crops may be investigated in the future.

Description: The complete drip system designed for the NPRF consists of implementing the center pivot corners as well as the rectangular areas of land not currently in use or planned for use by center pivot systems. A sketch of the NPRF and the proposed, numbered areas, when completed (in the future), is illustrated in the attached figure. A properly designed and fully implemented modern, drip system developed for the NPRF will significantly exceed the level of funding available within the allocated limits of this TWRI grants program. Total estimates range up to \$100,000. Nonetheless, significant progress can be accomplished with these initial TWRI grant funds and matching funds to be formally requested (tentatively committed for matching) from the North Plains Groundwater District of Dumas, Texas. Since much of the initial efforts will involve the electrical supply and control lines plus the pump, pressurization tank(s), valving, automated controls, filtering equipment, reservoir inflow pipeline, and distribution pipelines, only section 11 can be outfitted in this first stage implementation. Additionally, the West Texas A&M University Environmental Sciences Program (Parker and Rogers) has agreed to tentatively supply a heavy, butyl rubber reservoir liner for the NPRF. In addition, design of the facility will be reviewed in cooperation with Dr. Terry Howell (USDA-ARS, Bushland, TX) a recognized, national leader in drip irrigation systems design, along with Leon New of the TCE, Amarillo, TX to ensure the latest state-of-the-art configuration.

Outcome (Initial): Research experimentation regarding comparison of crop production is anticipated in the first year of operation (2005 season). Subsequent assessments are to potentially involve the pulsing of irrigation water to evaluate the potential advantage of drip line capillary action with time to promote upwards movement of the irrigated wetting front, critical for germination purposes.

Cost sharing and matching funding:

An ancillary request is to be submitted to the North Plains Groundwater Conservation District of Dumas, Texas for matching of these requested funds to initiate design and implementation of a modern, research drip system at the NPRF.

Technology Transfer Outcomes:

Information derived from the research and demonstration activities conducted with the drip irrigation system will be relayed to producers through ongoing scientific venues, educational and technology transfer programs of the TAES, TCE, WTAMU, USDA-ARS, USDA-NRCS, and the NPGCD. These will include, but are not limited to, unit reports and publications, agency reports and publications, NPRF reports, scientific journals, associated irrigation presentations, and tour and field day activities. Credit to supporting sponsors will be acknowledged in the respective publications.

Budget:

Expenditure Description	Amount Requested	Other Sources	Total
Supplies and Materials	\$8,000	\$10,4000	\$18,400
Total Project Costs	\$8,000	\$10,400	\$18,400

List of acronyms:

TAES - Texas Agricultural Experiment Station

TCE - Texas Cooperative Extension

WTAMU - West Texas A&M University - (Agriculture Program)

USDA-ARS - United States Department of Agriculture - Agricultural Research Service

USDA-NRCS - United States Department of Agriculture - National Resource Conservation Service

NPGCD - North Plains Groundwater Conservation District

NPRF - North Plains Research Field

Texas Agricultural Experiment Station's
North Plains Research Field

