

HPWD Water Conservation Research, Demonstration & Education Funding

Progress Report – June 30, 2016

Title: Enhancing Irrigation Research Facilities in the Texas High Plains

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Executive Summary - Irrigated crop production is extremely important in the Texas High Plains, with corn irrigation using 53% of the entire water budget annually (1.43 million ac-ft.) in the northern Texas region. However, the declining water table along with irrigation pumping restrictions being implemented by water districts will challenge sustained corn production in the future. Limited irrigation, or the application of less irrigation water than the crop requires for full evapotranspiration (ET_c), will be the primarily practiced in the future. In last few years, we conducted numerous field studies at Texas A&M AgriLife's North Plains Research Field near Etter, TX to evaluate major crops such as corn, wheat and grain sorghum under reduced irrigation scenarios. Multi-year field studies indicated that it is possible to maintain relatively high yield (e.g., 200 bu/ac of corn) at an irrigation level of 75% crop ET requirement with new selected hybrids and nominal rainfall. This reduced irrigation level promotes irrigation groundwater conservation of over 20% or approximately 5 inches. Also, water use efficiency is generally increased as well. Due to the closure of the Texas A&M AgriLife Research Station at Etter, TX, our new and on-going corn and other crops limited irrigation research was relocated to Bushland, TX and we have experienced some gains in terms of daily travel. However, we faced relocation challenges with the installation of the relocated irrigation systems, particularly the center pivot system(s) for continuing and advancing our field research efforts. The funding from the HPWD Water Conservation Research, Demonstration & Education Program has helped us to install infrastructure power for an advanced center pivot irrigation system at the Bushland Station. The system is expected to be available for research projects under multi-irrigation levels and an advanced control systems for the 2017 crop season. The impact of irrigation management research on crop production within the Texas High Plains region is very significant. In the northern Texas Panhandle, saving just 1 inch/ac/year of irrigation on all the regional corn acreage results in a total water savings of nearly 40,000 ac-ft or 13 billion gallons. The overall economic return can also be easily estimated considering the savings in pumping and other production costs. In the future, better irrigation management leads to improved and increased irrigation water conservation within the Texas High Plains.

Progress made to date with the project – The funding from this HPWD program was used for the installation of a electrical power and meter pole, the setting of 3 phase power transformers from Excel Energy and the meter and service disconnect box for operation of the center pivot irrigation system relocated from the Etter Research Station in 2014 and the newly designed booster pumping facility to supply the pivot.

Successes or setbacks observed with the project - Although there are many management factors that affect crop production, irrigation management remains the most important in the Texas High Plains. With the declining water table in Ogallala Aquifer, irrigation water will become limited in the future. As such, research on limited irrigation becomes crucial to address production issues under reduced water resources. In particular, the research under different irrigation levels will allow us to identify best management practice with accompanying new genetics under limited irrigation scenarios. Toward to this end, the **HPWD** played an important role in supporting our on-going research projects. There is no doubt that the continuous investment of research and development will have long-term benefits to agricultural production improvement.

Conservation impacts to the district – One of the goals in the 2015 fiscal year for the HPWD is to provide the most efficient use of groundwater resources. As such, the impact of irrigation management research on crop production is very significant and cannot be overstated. Improved and advanced irrigation management will lead to (1) sustainable crop yields; (2) maximized water-use efficiency; (3) reduced production input costs; and (4) irrigation water savings.

A budget expense report – The funds were used to pay two bills. One from Patrick electric to drill pole hole and supply and install the power pole and the other from Excel Energy for the 3 transformers on the high line pole and connection to the power pole and meter loop. See attached expenditure report.



Fig. 1. The center pivot system removed from Etter is currently stalled in Bushland, TX.

Texas A&M AgriLife Research - Amarillo

Project: Enhancing Irrigation Research

Sponsor: High Plains Underground Water Conservation District

Principal Investigator: Dr. Qingwu Xue

Project Dates: 10/1/15 to 9/30/16

	<u>Award</u>	<u>Expenditures</u>
Awarded Amount	\$10,000.00	
Expenditures		
Patrick Electric Service Inc. Electrical Pole set for Emeny Land Center Pivot, North Section, Bushland Research Farm		\$2,650.00
Xcel Energy To establish electrical service to new pole set by Patrick Electric to provide power to operate Emeny Land Center Pivot, North Section, Bushland Research Farm (Total cost \$8,132.40)		\$7,350.00
Total	\$10,000.00	\$10,000.00