

TAMU and NMSU Scientists Help Irrigation Districts in Water Conservation

Dr. Zhuping Sheng, Texas A&M AgriLife Research
Dr. Phillip J. King, Department of Civil Engineering, NMSU

Support provided by: El Paso County Water Improvement District No. 1, Elephant Butte Irrigation District, Hudspeth County Conservation and Reclamation District No. 1, U.S. Bureau of Reclamation El Paso Field Office, USDA-NIFA, Rio Grande Basin Initiative, Texas AgriLife Research, New Mexico State University, and Texas Water Resources Institute

BACKGROUND

- Surface water from the Rio Grande is delivered for agricultural and urban use in our region by about 700 miles of canals and laterals maintained by two irrigation districts.
- An unknown quantity of the water delivered by these canals is lost through natural seepage and evaporation.
- Texas AgriLife Research and New Mexico State University scientists are working together to conduct studies to quantify canal seepage losses and opportunities for water conservation through lining canals in irrigation districts in Texas and New Mexico.

OBJECTIVES

- To determine water losses from canal seepage.
- To assess potential water savings by lining canals and delivery system improvements.
- To help irrigation districts prioritize canal lining and optimize the design of lined canals.
- To conserve water and increase available water supplies.



Canal seepage loss ponding test, Franklin Canal, El Paso, Texas



Water flow measurement in the Franklin Canal, El Paso, Texas

FINDINGS AND BENEFITS

- Research results from the canals tested show seepage losses ranging from 10% to 30% of the total amount of water delivered.
- Losses vary significantly from location to location due to different soil types and hydraulic conditions. The results show higher seepage loss rates in the upper valley than in the lower valley probably due to high permeability of soil.
- Two different methods are being used to measure seepage losses. Ponding test results show water seepage rates from 160 acre-feet to 362 acre-feet per mile along a portion of the Franklin Canal. Another method, current meter inflow-outflow measurements, show even higher seepage losses ranging from 884 acre-feet to 1,986 acre-feet per mile during the irrigation season.
- Average savings from lining 10 miles of canals could provide water for as much as 1,000 acres of crops or 8,000 households.
- Canal lining is expensive. The results from this study are assisting irrigation districts in targeting canals that will result in the highest water conservation.
- Substantial quantities of water can be saved by reducing canal seepage losses. This research is being used to increase water delivery efficiency and extend our limited water supplies.