

Ogallala Aquifer

2008

Federal Initiatives Accomplishments



Lead Agency:

U.S. Department of
Agriculture–Agricultural Research
Service

Partners:

Texas AgriLife Research–Texas Water
Resources Institute; Texas AgriLife
Extension Service; West Texas A&M
University; Texas Tech University;
Kansas State University

Federal Funding:

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Service

<http://ogallala.tamu.edu>

AgriLIFE RESEARCH
Texas A&M System

AgriLIFE EXTENSION
Texas A&M System

Purpose/Objectives

The Ogallala Aquifer region produces about 4% of the nation's corn, 25% of its hard red winter wheat, 23% of its grain sorghum, and 42% of its fed beef. Agricultural irrigation accounts for 90% of the groundwater withdrawals in many parts of the region. Because the economy and viability of the agricultural industries and rural communities are so dependent on the aquifer, scientists joined forces, beginning in 2003, to develop water conservation technologies and policies to sustain the aquifer.

Accomplishments/Impacts

- Successfully applied crop evapotranspiration (ET) values to the Recursive calculation method, an innovative method for ET measurements that eliminates assumptions regarding temperature and humidity of evaporating surface water and can be easily implemented using commercial software.
- Determined the relationship between cotton development and heat unit accumulation in the Texas High Plains and applied long-term air temperature data to estimate potential cotton yields for counties over the Ogallala Aquifer in Texas, Kansas, and Oklahoma. Results conclude that cotton is a suitable alternative crop in 91 of 131 counties with viable yields (more than 500 pounds per acre).
- Developed drought- and high-temperature-tolerant corn germplasm that required less water to produce equal yields and developed value-added germplasm; both genetic approaches promote water conservation through development of drought-resistant crops.
- Showed that plant disease and insect infestations must be considered when developing irrigation management programs. Research data verified that infestation of wheat streak mosaic virus reduces crop water-use efficiency in hard red winter wheat.
- Concluded that preseason irrigation may be a viable practice when in-season well capacity cannot fully meet crop needs. A field study on irrigated corn proved that preseason irrigation increased grain yields an average of 16 bushels per acre.
- Launched Internet data resources for the public (www.gis.ksu.edu/ogallala) and created an information catalog of stored and Web resources (www.gis.ksu.edu/portal). Data includes hydrology, climatology, and agricultural information.
- Projected ways the decline of the aquifer could affect the regional economy. Baseline regional economic impacts with respect to industry output over 60 years for three subregions of the southern Ogallala region are \$2 billion for the northern region, \$1 billion for the central region, and \$3 billion for the southern region.
- Presented information on best management practices for soil water conservation and irrigation to 125 consultants and producers, 500 Master Gardeners, lawn and tree care professionals, homeowners, 5,400 K–12 students, and 200 K–12 teachers.
- Developed a Web site called Dr. Dirt's K–12 Teacher Activities to assist teachers with instructional material for soil and water management concepts.