



## WATER RESOURCES RESEARCH GRANT PROPOSAL

**Project ID:** 2002TX50B

**Title:** Increase Water Use Efficiency: Implementation of Limited Irrigation for Crop Biotic and Abiotic Stress Management

**Project Type:** Research

**Focus Categories:** Agriculture, Irrigation, Water Use

**Keywords:** irrigation, water use, water management, evapotranspiration, cotton

**Start Date:** 03/01/2002

**End Date:** 02/01/2003

**Federal Funds:** \$5,000

**Non-Federal Matching Funds:** \$15,000

**Congressional District:** 23rd

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**Abstract**

The goal of this project is to improve irrigation efficiency of cotton in environments where abiotic and biotic stresses are likely to occur. The study will identify irrigation thresholds and optimal irrigation strategies that will conserve water when cotton is grown in environments where drought and disease and insect stresses occur. The project will also determine the optimum times of year to apply fungicides to control cotton root rot, and will evaluate how well remote sensing techniques can detect whether cotton plants are infected with root rot, or plagued by insects or drought.

To accomplish these objectives, field studies will be carried out at the TAMU Ag Research Center at Uvalde. These experiments will employ low-energy precision application [LEPA] sprinkler systems to irrigate the cotton, based on measurements of potential evapotranspiration. Multiple infrared thermometers will be directly attached to the center pivot to record stress conditions in real time, while the pivot is moving. Crops will be scanned during different stages of development and, if a specific stress is found, a site-specific chemical application will be used to combat the source of the stress. Data from the infrared thermometers [IRT] will be ground-truthed and correlated with other measurements of plant growth. Ultimately, water savings will be derived by identifying the crop management strategy that produces maximum cotton yields while best limiting cotton stresses.

This project will help answer whether limited irrigation and site-specific crop management can improve water use efficiency, limit root rot, and lessen the cost of cotton production. It will also assess whether the use of high tech methods like IRT can be linked to a geographic information system to best grow cotton while optimally using limited water resources.