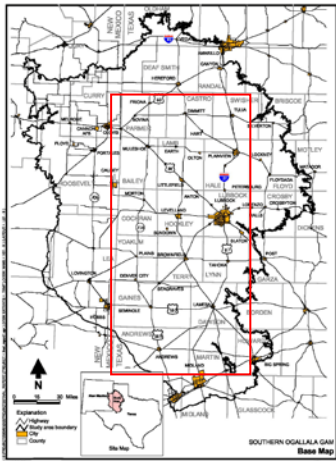


## A Hydro-Econometric Analysis of Producer Water Use and Aquifer Hydrology in the Texas High Plains

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Southern Ogallala aquifer  
(TWDB 2003)

### BACKGROUND

Conservation of ground water resources is vital to the agricultural economy of the Texas High Plains. The Ogallala aquifer provides 6.9 million acres of irrigated cropland in Texas, which accounts for almost 15 percent of the total irrigated acreage in the United States. The southernmost portion of the Ogallala Aquifer underlies this region and constitutes the only reliable water source for irrigated agriculture in the Texas High Plains. The critical importance of conserving ground water has been well recognized by local water authorities. Irrigation efficiency improvements are generally considered to be promising groundwater conservation measures. However, they may or may not slow down aquifer depletion, depending on a variety of economic and hydrologic factors such as irrigated acreage, irrigation technology, crop choice, and return flow. Further, producer's water use decisions and the underlying aquifer's movement are interlinked and therefore must be examined in a unified framework in order to anticipate policy impacts on aquifer depletion.

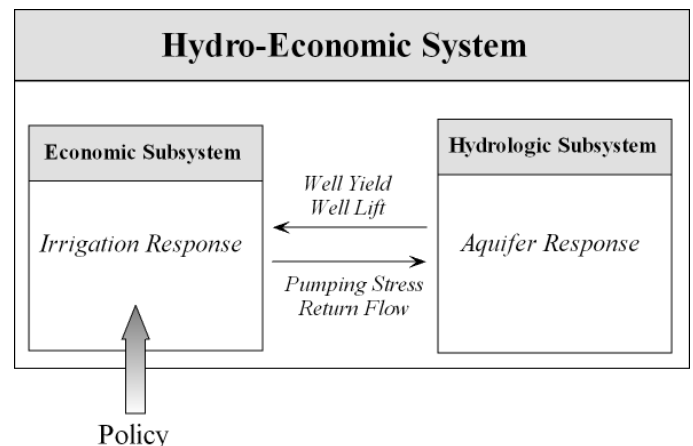
### OBJECTIVES

The primary objectives of this research is to develop a policy assessment tool for the Texas High Plains, to enable the impacts of water conservation policies to be soundly evaluated and better strategies developed to manage the ground water resources. The specific objectives are to:

- Develop and estimate a hydro-econometric model, taking full account of producers' economic behavior and the underlying aquifer's hydrologic behavior.
- Test the hypothesis that improved irrigation efficiency slows down aquifer depletion.
- Simulate the short- and long-term impacts on the aquifer of a set of policy measures identified by stakeholders.
- Disseminate findings through targeted presentations and publications and
- Make publicly accessible the dataset and information in the hydro-econometric analysis.

### ANTICIPATED RESULTS AND BENEFITS

- The hydro-econometric analysis eliminates arbitrary behavioral assumptions in mathematical programming-based policy evaluation models and enhances the Groundwater Availability Model with better estimates of pumping stress and return flow to conserve water and improve water management.
- The expected outcomes of this project include: (1) a dataset, available for public use, integrating county acreage data with hydrologic, economic, institutional, technology, and policy information; (2) a hydro-econometric model by which researchers can simulate policy impacts on the aquifer system; (3) evaluation of a set of water-conserving policy measures, including incentive-based programs for improving irrigation efficiency and reduce costs; and (4) dissemination of research results through targeted publications and presentations.



Representation of hydro-econometric modeling system