



January 17, 2006

A research consortium between USDA-Agricultural Research Service, Kansas State University, Texas Agricultural Experiment Station, Texas Cooperative Extension, Texas Tech University, and West Texas A&M University

## Preserving for Tomorrow

### *Ogallala Aquifer's Economic Impact on Rural Communities*

story & photos by Shelby Axtell

Economies of rural communities in the Ogallala Aquifer region depend on the irrigation water it produces. If the Ogallala dries up, many of these communities might too. However, Kansas State University, Texas Tech University, West Texas A&M University and the Texas A&M Cooperative Extension in Amarillo, Texas, have joined together to research possible economic policies which could sustain the aquifer and its communities.

Alternative scenarios including changes in economic activity, employment and infrastructure of the communities in the Ogallala Aquifer region are being studied in Kansas, Colorado, Oklahoma, Texas, and New Mexico. These scenarios are being evaluated over a 60-year period to determine the economic impact it would have on each community.

Researchers have divided the southern portion of the aquifer into three sections: the southern part of the Texas Panhandle plus Roosevelt and Lea counties in eastern New Mexico, the Oklahoma Panhandle, northern part of the Texas Panhandle and Curry County, New Mexico, and finally western Kansas and eastern Colorado.

#### **Southern Texas Panhandle and Eastern New Mexico**

Erin Wheeler, former master's student in Texas Tech's Department of Agriculture and Applied Economics, and her advisors Dr. Jeff Johnson, assistant professor and Dr. Eduardo Segarra, professor, researched the southern part of the Texas Panhandle plus eastern New Mexico.

"Erin's thesis looked at selected water conservation policy alternatives over a 60-year period to determine which policy would conserve the aquifer, but still keep the agricultural economy of these communities

viable," Johnson said. "Most of these communities are dependant on the agriculture in their area."

Long term, Johnson said, his department is trying to determine different policy options that would be the most beneficial to these communities' economies, individual producers and the aquifer.

In the course of her research, significant differences were found in hydrologic characteristics and current irrigation levels across the southern regions. In short, policies should not be made for entire geographic areas; instead water conservation policies should be created on hydrologic boundaries.

Johnson explained how some of the counties in Wheeler's study do not deplete water levels as rapidly as others. Of the 24 counties in the study, results showed only nine are heavily irrigated, and Wheeler suggested policy makers focus on policies for these counties individually instead of as a whole region, Johnson said.

"We discovered that the aquifer is not homogenous," Johnson continued. "Depletion levels differ from county to county, so a blanket water conservation policy for the area would be inefficient."

***"We discovered that the aquifer is not homogenous. Depletion levels differ from county to county, so a blanket water conservation policy for the area would be inefficient."***

**- Dr. Jeff Johnson, Texas Tech University**

Wheeler's economic study is just one of a few being conducted. Johnson said they are studying several alternative conservation policies that policy makers can review and compare. Other ideas have included incorporating livestock into crop rotations and forming a program

similar to the Conservation Reserve Program (CRP), where farmers would be compensated for not pumping water for a season.

## Oklahoma Panhandle and Northern Texas Panhandle

Dr. Lal K. Almas, West Texas A&M University Assistant Professor of Agricultural Business and Economics in Canyon, Texas, is the principle investigator for the economic impact of the aquifer in the Oklahoma Panhandle, the northern Texas Panhandle and Curry County, New Mexico. Almas said their results are similar to those at Texas Tech, with each county having a different aquifer water level; therefore policies would need to be area specific.

“We have found that saturated thickness varies for each county, and crop compositions are also different for each county,” Almas said. “Both of these factors have to be taken into account when developing possible policy scenarios.”

The southern portion of the Texas Panhandle is mainly cotton, whereas in the northern region, grains are the primary crop, Almas said. Grains, particularly corn, require a greater amount of water than cotton. Almas said not only does the aquifer’s water level have to be taken into account, but the crops produced in each county, irrigation technology being used, and pumping lift also have to be considered when developing possible policies. A uniform policy across the board may not produce desired results.

West Texas also found that of the 26 Texas counties included in their region, three don’t have access to aquifer water. Three counties in the Oklahoma Panhandle and Curry County, New Mexico, are also included in the study.

This year, Almas said, they plan to analyze three to four alternative policy scenarios to determine the expected

changes in crop production pattern and estimate economic incentives to be offered to the producers to entice them to conserve water. The economic impacts of these policies on the regional economy will also be assessed.

“Ultimately, it is the socioeconomic impact that matters,” Almas said. “We must consider what will happen to the population in these areas when developing possible scenarios.”

little as 20 years. Ding also discovered the 44 counties studied in Kansas and Colorado all have varying aquifer water levels, and some counties irrigate heavier than others.

K-State’s next step in their study is to start implementing different policy options. Peterson said policy options will be similar to those at Tech, such as a program similar to CRP and providing governmental incentives for farmers who switch from crops to livestock.

*Agriculture is the backbone for most rural communities in the Ogallala Aquifer region. If the aquifer dried up, producers would not be able to irrigate their crops or water their livestock.*



## Preserving for Tomorrow

These university’s studies are being conducted in order to make economic analysis of potential policies readily available to governmental policy makers in the event the time comes to legislate the use of Ogallala water. The goal is to increase the longevity of the Ogallala Aquifer as well as the rural economies it supports.

## Western Kansas and Eastern Colorado

Studies conducted at Kansas State University have found similar results to Texas Tech and West Texas. Dr. Jeffrey Peterson, assistant professor in the department of agricultural economics at K-State, is researching the economic impact of the aquifer in western Kansas and eastern Colorado.

“Our results have shown that one size does not fit all,” Peterson said.

Ya Ding, Peterson’s former doctoral student, researched what would happen over the 60-year period if current trends were continued. Peterson said results showed if producers were to continue irrigating like they are today, some counties could run out of water in as

*For additional information contact one of the following: Dr. Jeff Johnson, assistant professor, Texas Tech University Department of Agricultural and Applied Economics, Box 42132, Lubbock, Texas, 79409, phone (806) 742-2821, fax (806) 742-1099; Dr. Lal K. Almas, assistant professor, West Texas A&M University Agricultural Business and Economics, 213F ANS Building, Canyon, Texas, 79016, phone (806) 651-2552, fax (806) 651-2938; or Dr. Jeffrey Peterson, assistant professor, Kansas State University Department of Agricultural Economics, 216 Waters Hall, Manhattan, Kansas, 66506, phone (785) 532-4487, fax (785)-532-6925. The writer, Shelby Axtell, may also be contacted at (806) 742-2816. †*