The Amarillo Center, which opened in 1977, is located in the Texas Panhandle, on the High Plains portion of the Southern Great Plains, one of the world's foremost farming regions. Agriculture here generates some $5 billion in income annually. The region is dotted with cattle feedlots, and farms also produce sheep, goats, hogs, forage, wheat, corn, sorghum, and cotton. Because the High Plains Region has limited rainfall and a depleting underground water supply in the Ogallala Aquifer, irrigation efficiency and the development of drought-resistant crops are important issues in the region. The cumulative impacts of intensive cattle feeding on air quality, water quality, and water use are also of public concern. Research scientists at the Amarillo Center are achieving preeminence in Texas and nearby states in these and other issues, including feedlot cattle nutrition, wheat breeding and genetics, crop stress physiology, plant pathology, integrated pest management for grain crops, biological control of insects and weeds, and bioenergy feedstocks from crops and animal residues.

**Current Research**

**Evaluating wet distillers grains as a supplemental fat replacement in cattle feed**

One-third of all U.S. beef cattle are finished within a 150-mile radius of Amarillo. The goal of the Texas A&M AgriLife Research Beef Cattle Nutrition Program at the Amarillo Center is to improve beef production efficiency and animal health while reducing nutrient losses to the environment, conserving natural resources, and improving the quality of beef delivered to the consumer. Use of distillers grains in finishing systems is a major focus of the program. Including distillers grains at 20% of dietary dry matter increases the crude protein and phosphorus content of feed. Agricultural engineers at Amarillo have also found that adding distillers grains to feed can increase the biofuel value of cattle manure by up to 5%.

**Breeding new wheat varieties with drought tolerance and leaf rust resistance**

The goal of the Texas A&M AgriLife Research wheat-breeding program at the Amarillo Center is to design varieties that are best adapted to Texas. Modern cultivars generally have a higher yield and more efficiently use available natural resources. They also have greater resistance to insects and to pathogens such as wheat streak mosaic virus, thus reducing the need for chemical applications. During 2011, drought stress resulted in the loss of about 240 million bushels of winter wheat in the Southern Great Plains, resulting in an approximately $500 million loss to the Texas economy at today's wheat prices. A major project is under way at Amarillo to develop superior wheat germplasm lines with tolerances to multiple stresses, using conventional and molecular breeding. One strategy is to unlock the drought tolerance mechanism using molecular genomics.

**Developing techniques for irrigation management to help conserve water**

The Texas High Plains is the state’s most intensively irrigated region, accounting for nearly 90 percent of all water use. In the Texas Panhandle alone, the adoption of irrigation schedules based on evapotranspiration (ET) across 50% of the 1.38 million irrigated acres would yield 57,500 acre-feet of water savings per year, or 50% of the Panhandle’s irrigation conservation needs over the next decade. At a cost of approximately $9 per acre-foot, the use of ET-based irrigation scheduling could represent the most cost-effective means for immediate water conservation in the region. A research team at the Amarillo and Lubbock Centers developed new
software to accurately and easily compute ET for use in irrigation scheduling and water management, saving over 50,000 acre-feet (16.2 billion gallons) of groundwater in 2011 for the northern Texas High Plains. The researchers also developed new data on limited-irrigation corn production that is being used to shape groundwater conservation regulations and determine the feasibility and sustainability of growing corn with less water.

**Conducting air quality research to help feedlots comply with EPA requirements**

Through the Air Quality: Reducing Feedlot Emissions federal initiative, the Amarillo Center has developed a sound scientific basis for cost-effective air quality emissions abatement measures for open-lot cattle feedlots and dairies in the Southern Great Plains of Texas and Kansas. Researchers measure particulate matter, ammonia, hydrogen sulfide, odor, volatile organic compounds, and greenhouse gases to help with emissions control. Results from this project were adopted by the National Cattlemen’s Beef Association and the EPA to satisfy federal reporting requirements. In addition to impacts on air quality for humans, more than a million cattle die from respiratory illness in the United States each year. Amarillo researchers estimated that a Panhandle feedlot with a capacity over 32,000 head could save about $40,000 per year by adopting dust abatement practices.

**Research Impacts**

- AgriLife scientists have saved feedlots more than $30 million per year with research focused on feeding distillers grains to cattle.
- The Amarillo Center is leading irrigation efforts that could result in conserving nearly 130 billion gallons of water per year.
- Growers saw a $4.8 million annual increase in yields when planting new wheat varieties developed at the Amarillo Center.

**Amarillo Center Facilities**

- Amarillo — 25,300-square-foot urban complex of offices, laboratories, and educational amenities on 21 acres
- Bushland — 164 acres of pasture and croplands, co-located within 1,600 acres of the USDA Agricultural Research Service laboratory complex, established in 1938, with shared facilities, including a 384-head experimental cattle feedlot; wheat improvement and greenhouse complex; research facilities for agronomy, entomology, and irrigation management; and the 640-acre James Bush Research Farm
- Etter — 326-acre North Plains Research Field, including irrigated cropland for water-use efficiency evaluations

**About Texas A&M AgriLife Research**

*A member of The Texas A&M University System*

Established in 1888, Texas A&M AgriLife Research is the state’s premier research and technology development agency in agriculture, natural resources, and the life sciences. Headquartered in College Station, AgriLife Research has a statewide presence, with scientists and research staff on other Texas A&M University System campuses and at the 13 regional Texas A&M AgriLife Research and Extension Centers. The agency conducts basic and applied research to improve the productivity, efficiency, and profitability of agriculture, with a parallel focus on conserving natural resources and protecting the environment. AgriLife Research has 550 doctoral-level scientists, many of whom are internationally recognized for their work. They conduct hundreds of projects spanning many scientific disciplines, from genetics and genomics to air and water quality. The annual economic gains from investments in Texas’s public agricultural research are estimated at more than $1 billion. Through collaborations with other institutions and agencies, commodity groups, and private industry, AgriLife Research is helping to strengthen the state’s position in the global marketplace by meeting modern challenges through innovative solutions.