The Amarillo Center opened in 1977 and 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, dairies, and swine operations. Farms also produce forage, wheat, corn, sorghum, and cotton. Because the 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 scientific opportunities. The impacts of intensive cattle feeding, dairies, and swine production on air and water quality and water use are also of public concern. Research scientists at Amarillo are achieving preeminence in feedlot cattle nutrition, wheat breeding and genetics, crop stress physiology, plant pathology, integrated pest management for grain crops, biological control of insects and weeds, managing environmental quality and natural resources, and bioenergy feedstocks from crops and animal residues.

CURRENT RESEARCH

EVALUATING NEW TECHNOLOGIES AND FEED SUPPLEMENTS FOR THE BEEF INDUSTRY

Amarillo’s Beef Cattle Nutrition Program provides research-proven, relevant, and unbiased information to beef cattle producers in the Texas High Plains. The program is designed to mimic beef production systems (primarily post-weaning systems) and encompass newly received calves, stocker operations, and finishing/feedlot systems. As the beef industry changes relative to markets, weather, and consumer perception, the center maintains an innovative approach to research. Goals include developing new technologies for cattle feeding; better understanding the genetic potential of animals; incorporating all sectors of the industry, since each stage of production affects the next; and analyzing and improving the environmental sustainability of the beef industry.

BREEDING NEW WHEAT VARIETIES WITH DROUGHT TOLERANCE AND STRESS RESISTANCE

Amarillo’s wheat improvement team focuses on the molecular mechanisms of biotic stresses (greenbug, wheat curl mite, wheat streak mosaic virus, and Hessian fly) and abiotic stresses (drought and heat). Their research includes mapping genes and loci controlling resistance and tolerance, developing high-throughput molecular markers, and applying marker-assisted breeding. They seek to understand the physiological mechanisms of stresses by evaluating their effects on plant biomass at critical growth stages and on grain yield and yield components. They also evaluate the development of germplasm lines and cultivars adapted to many of these stresses. The most popular TAM wheat varieties developed for the High Plains are TAM 111, TAM 112, and TAM 113. The center’s breeding legacy continues with the newest varieties, TAM 114 and TAM 204.
MANAGING IRRIGATION IN CROP PRODUCTION

The Texas High Plains is the state’s most intensively irrigated region, accounting for nearly 90% of all water use. Amarillo’s water management team develops tools and technologies to manage irrigation, especially to enhance precision application. This includes assessing water-use efficiencies associated with crop selection and improving soil management through conservation tillage. Integrating water management and crop production strategies will help to extend the life of irrigated agriculture by maximizing net economic returns, even as the Ogallala Aquifer declines. This research supports the development of the regional and state water plan.

CONDUCTING AIR QUALITY RESEARCH IN FEEDLOTS

Amarillo’s environmental quality research team measures and models the atmospheric emissions from intensive agricultural, cattle feedlot, dairy, and swine production that may be contributing to climate change. These emissions include carbon dioxide, methane, nitrous oxide, ammonia, and fine particles. The team uses innovative and emerging technologies, including remote-sensing platforms, open-path optical sensors, and low-cost, community-based monitoring approaches to yield the highest data coverage. Their goal is to guide producers and better inform regulatory agencies and policy makers.

RESEARCH IMPACTS

- Advanced studies on molecular markers in wheat can improve yield, yield components, and resistance to insects and diseases.
- Wheat cultivar TAM 111 is the most planted hard red winter wheat in the United States.
- TAM 112, which is rust resistant and drought tolerant, and TAM 114, which has superior bread-making qualities, are among the many successful wheat germplasm lines developed at Amarillo.
- Researchers found that supplementing protein to cattle consuming low-quality forage alters their gut microbial structure and decreases greenhouse gas emissions.
- Researchers determined that the potato psyllid transmits zebra chip disease and discovered ways to mitigate the disease, allowing a 50% increase in potato acreage in Texas.
- Texas A&M AgriLife Research and Texas A&M University signed a multi-year agreement with Bayer CropScience to support our development of advanced wheat varieties for Texas and worldwide.

AMARILLO CENTER FACILITIES

Amarillo — 25,300-square-foot urban complex of offices, laboratories, and educational amenities on 21 acres

Bushland — 804 acres of owned and leased pasture and croplands, some of which are alongside 1,600 acres of the USDA Agricultural Research Service laboratory complex, established in 1938. Shared facilities include a 400-head experimental cattle feedlot and metabolism barn for individual cattle greenhouse gas emission studies. They also include facilities for research in cattle health, air quality, small grains genetics, crop stress physiology, plant pathology, biological pest control, irrigation management, and alternative crop production.

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.