The Vernon Center serves the agricultural producers and communities of Texas’s Rolling Plains. The center was founded in 1905 with the location of a jointly operated USDA and Texas Agricultural Experiment Station facility in Chillicothe. The center at Vernon opened in 1971, and the Chillicothe station became a substation. The Vernon Center operates 2,531 acres, including 2,196 acres in rangeland and pastureland (leased) and 335 acres (owned) in research and demonstration farmland at Lockett and Chillicothe.

The region’s economy is based on cattle, wheat, cotton, and pasture and rangeland, supplemented by poultry, peanuts, and grain sorghum. The Vernon Center’s mission is to assist producers, families, and communities through research and education in land stewardship, rangeland restoration, forage and grazing system improvement, dryland crop production, and efficient use of limited water resources. Center researchers focus on efficient crop and tillage systems, hydrology, water quality, watershed management, and agricultural resource economics. They are investigating canola as a viable and profitable crop for the region, as well as triticale, a man-made cereal crop with a high livestock-feed value.

Vernon research scientists have developed nationally and internationally recognized, science-based knowledge documenting natural resource management as a requirement for healthy, functional ecosystems; integrated crop and livestock production systems; and sustainable use of natural resources in semiarid environments. As we move into the future, our program directions are shifting to include research on climate change or extreme weather patterns as they relate to crops, pastures, and water use or availability.

CURRENT RESEARCH

USING COVER CROPS TO IMPROVE YIELDS AND SOIL PROPERTIES

There are 2–3 million acres of cover crops planted in the United States, with a goal to increase that acreage to 20 million by 2020. Planting cover crops is more successful in humid regions of the country. Researchers at Vernon are working to develop management practices for growing cover crops in the drier regions. The research has shown that although cover crops can significantly lower stored soil moisture during peak growth periods, the deficit is made up between termination of cover crops and planting of cash crops due to enhanced infiltration of cover crop systems. Yields have been maintained in both dryland and irrigated systems.

RESEARCHING ROTATIONAL GRAZING FOR BEEF PRODUCTION AND ECOSYSTEM HEALTH

Managing grazing on semi-arid savanna rangeland stocked with livestock involves maintaining current ecosystem health, maximizing profit, and restoring depleted rangelands. Vernon research shows that managing grazing for best ecosystem health results in earning capacity four times higher than grazing on rangelands with poor ecosystem health. The research has also shown that grazing practices build soil organic carbon levels, soil microbial communities, and functions that minimize soil erosion. This can result in soils being a net sink for greenhouse gases (GHG). Using life cycle assessment, researchers estimated GHG emissions for cow-calf farms under various management strategies. They found that cow-calf farms converting from continuous grazing to multi-paddock or rotational grazing could be either net carbon sinks or low carbon sources for decades. Multi-paddock grazing also increased grass quality and digestibility, which could potentially reduce GHG emissions by 30%.
Using rotational crops to improve production

Cropping systems within the Rolling Plains are predominantly monoculture cotton and wheat. There are several warm-season crops for rotation with cotton, but cool-season alternatives for rotation with wheat have been less viable — over the past few years, winter canola has proved the best. In 2013, an estimated 40,000 acres were planted in North Texas, where farmland is similar to that of Kansas and Oklahoma. Wheat yields have increased by as much as 30% following rotation with canola. However, canola production has been challenging for no-till producers. The Vernon Center is leading research to develop optimum management strategies to maintain the expansion of canola acres in Texas. Research areas include winter canola variety trials, planting dates, tillage systems, seeding rate, row spacing, and grazing. This work has become a valuable resource for Texas and southwestern Oklahoma canola producers.

Research impacts

• Vernon researchers are developing a behavioral-based monitoring system using radio frequency identification (RFID) technology for preclinical detection and mitigation of bovine respiratory disease, which costs the cattle industry $1 billion annually in morbidity and mortality.

• Research at the Vernon Center shows that using no-till cropping systems and irrigating crops below full demand results in erosion control and improved soil and water quality.

• The Vernon Center has provided the most complete published data set in the world related to summer prescribed burning for mesquite and prickly pear cactus control.

• Evaluating the Seymour Aquifer for nitrate-nitrogen concentration could save cotton producers in the Rolling Plains about $2 million annually in nitrogen fertilization by accounting for well water nitrates and crediting them toward crop nitrogen requirements.

Vernon center facilities

Vernon and Chillicothe — 16,000 square feet of office and laboratory space; 20,000 square feet of shop, storage, and work areas; 7,500 square feet of greenhouses; 875 acres of cropland; and 1,690 acres of rangeland/pastures. The Texas Foundation Seed Service, also operated by AgriLife Research, is adjacent.

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.