



# United States Department of Agriculture Agricultural Research Service

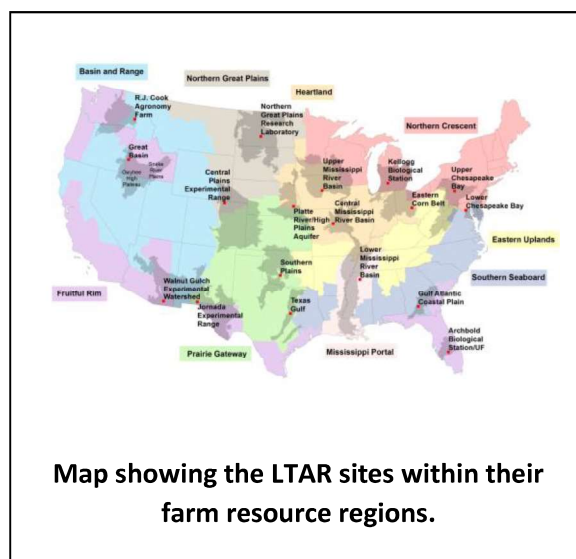
## Long-Term Agroecosystem Research (LTAR)

Grazinglands Research Laboratory, El Reno, Oklahoma

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**Rationale:** Agriculture faces tremendous challenges in providing a stable and affordable food supply; bioenergy production; protection of water, air, soil, and biological resources; and maintenance of rural economic vitality in the face of growing world population variable and changing climate, and competition for limited natural resources. Meeting the needs of future populations will require production of more food, fiber, and fuel from agricultural lands while protecting and sustaining environmental quality. The ability of US agriculture to adapt to changing demographic, economic, environmental, and climatic conditions while sustaining agricultural production and ecosystem services into the future is the focus of the Long Term Agro-Ecosystem Research (LTAR) network.

**Objective:** The LTAR network conducts long-term, trans-disciplinary research across major regions of the US to enhance sustainable intensification of agro-ecosystems and elucidate potential tradeoffs in alternative production strategies. The Southern Plains LTAR will focus primarily on forage-based beef production that links dual-purpose wheat, native prairie systems, and a variety of other pasture and forage crops. Such mixed land-use systems dominate the Southern Plains landscape and provide the largest farm-gate returns in the region. The grazing phases of the beef cattle life cycle - cow-calf, stocker, heifer replacement – will be the primary focus of the research.



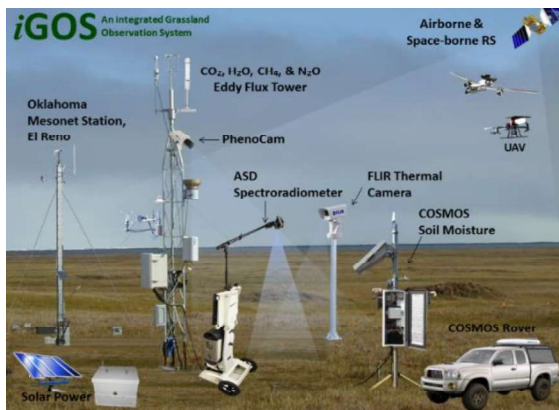
Map showing the LTAR sites within their farm resource regions.

**What we are doing:** The LTAR network will draw upon historical long-term data and rely upon cross-site research and common geographically-scalable databases to deliver knowledge and applications to address challenges related to productivity, climate variability and change, agricultural conservation and environmental quality, and socioeconomic ties to productivity, climate, and environment. The LTAR network strategy includes site based research, a Common Experiment that contrasts a “business as usual” versus an aspirational system that enhances productivity and ecosystem services that are relevant to each specific site. Delivery of long-term, standardized publicly-available data is a core element of the LTAR network. The Southern Plains common experiment will contrast conventionally-tilled graze-out wheat with no-till wheat-canola rotations (see p. 75 for further information). Two fields will have integrated cropland observation systems (iCOS) as illustrated below.



In addition, we will conduct research at two iGOS fields, one a native prairie pasture and one an Old World Bluestem pasture.

A variety of associated studies will address management of native prairie grazing, tillage-cover crop-fertilizer dynamics, soil microbiological processes, and nutrient use efficiency of beef cattle. Field and modeling assessment of climate variability and change, hydrologic processes, and soil moisture dynamics will span across the agroecosystems being assessed.



**Summary:** The Grazinglands Research Laboratory leads the Southern Plains site of the LTAR network. A goal of the LTAR network is to apply research results to solve critical challenges facing agriculture. The LTAR scientific foundation builds from a mixture of data from on-going networked science, new cross-site experiments, and long-term historical measurements. This foundational science approach is expected to lead to: 1) new technologies and management practices that address key problems facing agricultural production and natural resource conservation; 2) new knowledge of processes and systems central to US agriculture; 3) improved models that apply data, technologies and/or knowledge to characterize how agriculture meets multiple goals at regional, national and global scales; and 4) data sets that are globally accessible for scientific analyses.

**Partners:** University of Oklahoma, Oklahoma State University, Kansas State University, Texas AgriLife at Overton, and others.

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