MISSION STATEMENT
To deliver solutions to great agricultural challenges
AGRICULTURE IS...
A Service Provider
WHAT IF I TOLD YOU

THE SOLUTION WAS ALREADY THERE?
Healthy soil has amazing water-retention capacity. Every 1% increase in organic matter results in as much as 25,000 gal of available soil water per acre.

One teaspoon of healthy soil contains 100 million - 1 billion individual bacteria.

All of the soil microbes in 1 ac/ft of soil weigh more than 2 cows.

Earthworm populations consume 2 tons of dry matter per acre per year, partly digesting and mixing it with soil.
soil health practices, such as crop rotation and nutrient management, also play key roles for protecting and enhancing water quality through soil health.

In fact, reduction in nitrate loss to groundwater is generally due to IMPROVING WATER QUALITY THROUGH SOIL HEALTH plant uptake of that nitrate by the cover crop.
Healthy soil is key to feeding **9 billion** by **2050**

Sources:
- Water holding capacity: Kansas State Extension Agromony e-Updates, Number 357, July 6, 2012
- Bacteria in a teaspoon: *Soil Biology Primer* page c-1 (Elaine Ingham, Andrew R. Moldenke, Clive Edwards)
- Earthworm population consumption: *Earthworms: a Penn State publication* by Sjoerd Duker, Assoc. Prof. of Soil Management and Richard Stehouwer, Assoc. Prof. Environmental Soil Science
- Feeding people: *The United Nations*
77,200 Farms/Ranches

34,000,000 acres
850,000,000,000 available gallons today
ADD additional 8,500,000,000
1.7 billion tons of topsoil lost to erosion each year in America.

6 billion beneficial microorganisms in a teaspoon of soil.

1/5 of greenhouse gas emissions could be offset by global changes in farming practices.

295 million tons of soil saved thanks to conservation programs in the Farm Bill.
Strategies to address these opportunities:

- Increase drought resilience
- Increase temperature resilience
- Increase resistance to pests & pathogens
- Halt invasive species
- Develop more resilient soil/plant/animal Systems
Roots are responsible for anchoring the plant and uptake of nutrients and water.

- They promote soil health by preventing erosion and creating beneficial microbial communities. Dead roots increase water retention and storage.
- Shallow roots can access bands of fertilizer like nitrogen and phosphorus.
- Microbes promote nutrient and carbon cycling, and they form relationships with the plant.
- Channels made through the soil by roots act as pathways for water to infiltrate deep down.
- Deep roots can forage for water during times of drought in the subsoil.
- Vertical roots, especially grass roots, can punch through hardpans that limit growth.

Larry York, Ph.D.
Assistant Professor
Mike Trammell
Senior Plant Breeder
Elison Blancaflor, Ph.D.
Professor
Cell Biology and Plant Development
Studies seek to learn more about the mechanisms that control root and shoot growth, seedling emergence, and light absorption for photosynthesis.

Learn more ➔

Genomics
Programs encompass both the creation and use of a variety of research tools to explore and decipher the complexities of plant and microbe growth, development and function.

Learn more ➔

Plant Breeding
A broad range of practices are used to create new varieties of plants with increased productivity or traits that provide value to agricultural production systems in the Southern Great Plains.

Learn more ➔

Plant-Microbe Interactions
Researchers study viruses, fungal pathogens, endophytes and mycorrhizae, and how these microbes affect plant productivity, stress tolerance and disease resistance.

Learn more ➔

Plant Nutrition
Studies seek a better understanding of the molecular and physiological mechanisms underlying how plants take up nutrients from the soil and use them to grow.

Learn more ➔

Plant Physiology
Studies investigate the organism-scale biological processes crucial to plant growth and environmental response, a key to plant improvement.

Learn more ➔
System Optimization
Strategies to address these opportunities:

- Improve management
- Enhance production efficiency
- Targeted livestock/forage systems
- Introduce technologies
- Diversify enterprises
- Test system components
- Combine components into systems
- Modeling for decision support
- Turn data into solutions