2019 USAFRI Research Project Objectives

Comparison of Cropland Emissions, Carbon Sequestration, and Soil Health Outcomes in Alfalfa (*Medicago sativa*) and Corn (*Zea mays* L.) Production Fields in an Integrated Crop-Livestock Dairy System
USDA-ARS U.S. Dairy Forage Research Center - Riday

Project Award: $60,000

Justification:

- Integrating perennials into the cropping system is an important practice for agricultural producers interested in improving farm environmental outcomes and promoting soil health. Among livestock producers, and dairy producers in particular, alfalfa is the most commonly selected perennial for inclusion in their crop rotations.

  There is increasing concern among farm groups and the general public about extreme weather events and warming trends associated with climate change. In light of serious economic instability in the dairy sector, carbon-neutral farming and access to carbon markets may emerge as important farm income streams. Alfalfa, like other perennials, may serve as a farm carbon sink, as well as protect soil health (i.e., microbial diversity, soil nitrogen, reduced runoff etc.) due to the continuous ground cover, qualifying producers for credits in a carbon marketplace. Evaluating the carbon storage and soil health potential of alfalfa and other crops in the dairy rotation is an area in urgent need of research and development.

Objectives:

- The objectives of this project are to 1) evaluate and compare the performance of alfalfa (*Medicago sativa*) and corn (*Zea maps* L.) with respect to a) field greenhouse gas emissions; b) gross and net primary productivity; c) metrics of soil health; and d) soil carbon sequestration; and 2) use these data to evaluate whether alfalfa, when included within the dairy cropping rotation, produces ecosystem services that could translate to economic benefits.