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ARS National Programs

- Soil and Air
- Agricultural System Competitiveness and Sustainability

Website: www.ars.usda.gov/research/programs.htm

ARS MISSION

The Agricultural Research Service conducts research to develop and transfer solutions to agricultural problems of high national priority and provides information access and dissemination to
- ensure high-quality, safe food and other agricultural products,
- assess the nutritional needs of Americans,
- sustain a competitive agricultural economy,
- enhance the natural resource base and the environment, and
- provide economic opportunities for rural citizens, communities, and society as a whole.

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GOAL

To identify and develop agricultural strategies to enhance soil carbon sequestration and reduce greenhouse gas emissions and to provide a scientific basis for carbon credit programs, to reduce net emission of greenhouse gas and improve environmental quality.

Current GRACEnet/REAP Locations

NLCD Classifications
- Orchards/Vineyards/Other
- Pastures/Hay
- Row Crops
- Small Grains
- Fellow

National Land Cover Dataset
http://landcover.usgs.gov

15 Public Data Contributors
- Ames, IA
- Auburn, AL
- Bowling Green, KY
- Florence, SC
- Fort Collins, CO
- Lincoln, NE
- Lubbock, TX
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- Pendleton, OR
- Sidney, MT
- Starkville, MS
- St. Paul, MN
- Tucson, AZ
- University Park, PA
- Urbana, IL
- Watkinsville, GA
- West Lafayette, IN

APPROACH

Consistent protocols for soil, trace gas and plant sampling are used across the network.

Assessment within GRACEnet follows four location-specific scenarios:

1. Business as usual in production agriculture for various areas of the country.
   - What is the carbon accumulation/loss rate under typical agricultural management?

2. Maximizing carbon sequestration rate.
   - What can be done to reach the highest carbon sequestration rate?

   - Agriculture is the main source of nitrous oxide and methane to the atmosphere. Practices will be developed to reduce the emission of these gases. What can be done to reach the highest carbon sequestration rate?

4. Maximizing environmental benefits by improving water, air, and soil quality.
   - This scenario investigates management systems to optimize both agricultural and environmental benefits, by sequestering soil carbon and decreasing greenhouse gas emissions.

OBJECTIVES

1. Evaluate status and direction of change in soil carbon for typical and alternative agricultural systems.

2. Determine net greenhouse gas emission (carbon dioxide, methane and nitrous oxide) of current agricultural systems for typical and alternative agricultural systems.

3. Determine the environmental effects (water, air and soil quality) of agricultural systems developed to reduce greenhouse gas emission and increase soil carbon storage.