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**Website:**  
[http://www.ars.usda.gov/research/projects/projects.htm?NP\\_CODE=202](http://www.ars.usda.gov/research/projects/projects.htm?NP_CODE=202)

## ARS National Program

[www.ars.usda.gov/research/programs.htm](http://www.ars.usda.gov/research/programs.htm)

REAP contributes to the goals and objectives of ARS National Program Soil Resource Management (NP 202), Global Change (NP 204) Agricultural System Competitiveness and Sustainability (NP 216), and Bioenergy and Energy Alternative (NP 307).

## 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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United States Department of Agriculture  
 Agricultural Research Service

# Renewable Energy Assessment Project

# REAP

*A multi-location research project to ensure the soil resource indefinitely meets the demands for food, feed, fiber and fuel.*



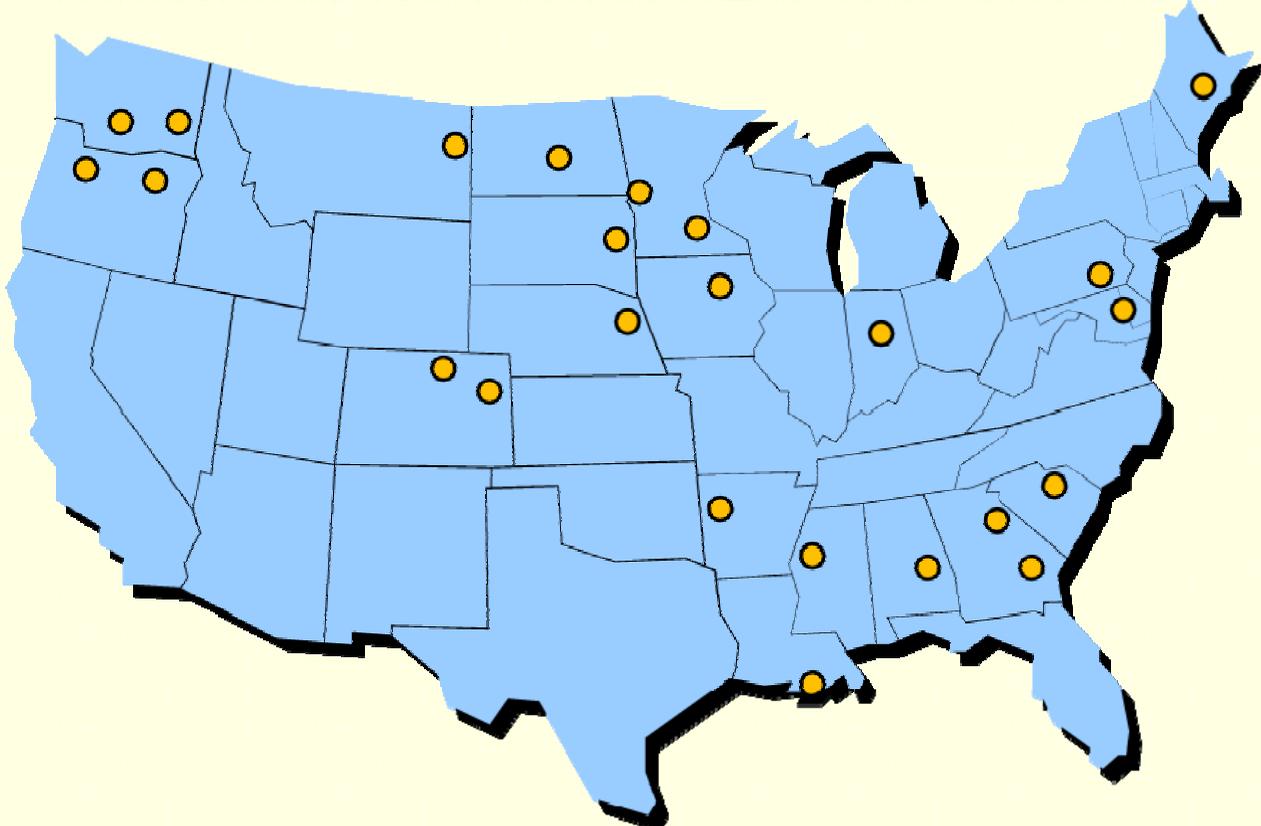
How do we maintain a sustainable balance? Maintain our soil, water and air resources!

A sustainable biofuel and bio-product industry must be based on management practices that maintain soil cover, reduce the risk of erosion and that maintain soil organic matter; thereby sustaining soil productivity.

## Products

- Documentation of management system effects
- Algorithm-based guidelines to sustainable biomass harvest rates
- Location-based support tools to estimate residue harvest and quantify economics and ecosystem service benefits

# Nationwide Network of REAP ARS Scientists



- |                    |                  |                     |               |
|--------------------|------------------|---------------------|---------------|
| Auburn, AL         | Dawson, GA       | St. Paul, MN        | Florence, SC  |
| Booneville, AR     | Watkinsville, GA | Stoneville, MS      | Brookings, SD |
| Akron, CO          | Houma, LA        | Sidney, MT          | Corvallis, OR |
| Fort Collins, CO   | Beltsville, MD   | Mandan, ND          | Pendleton, OR |
| Ames, IA           | Orono, ME        | Lincoln, NE         | Prosser, WA   |
| West Lafayette, IN | Morris, MN       | University Park, PA | Pullman, WA   |

## Challenge

How to harvest corn and other residue without deleting soil organic carbon or increasing risk of erosion, and risking loss of soil productivity.

## Management Strategies

1. Inclusion of perennials
2. Cover crops
3. Living mulch
4. Reducing tillage
5. Limiting harvest rates

## Opportunities

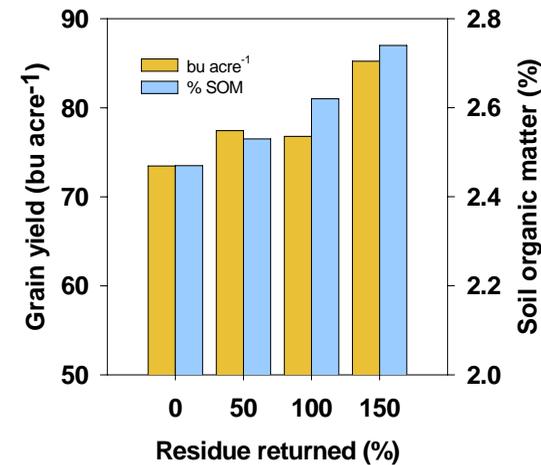
Successful biomass feedstock systems:

1. Produces food, feed and fiber for an increasing world population
2. Provides ecosystem services: erosion control, carbon sequestration, wildlife habitat and protects water quality
3. Replenishes soil organic carbon and cycles plant nutrients
4. Produces feedstock for biofuels

## Objective

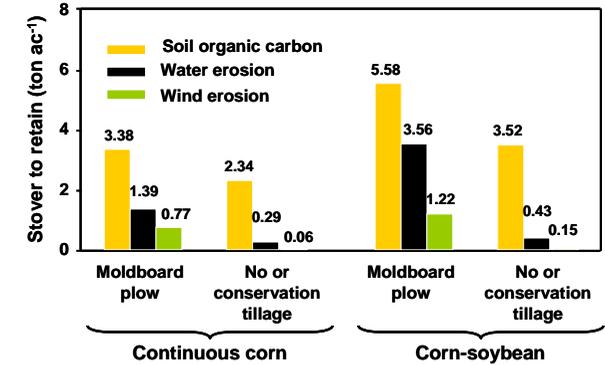
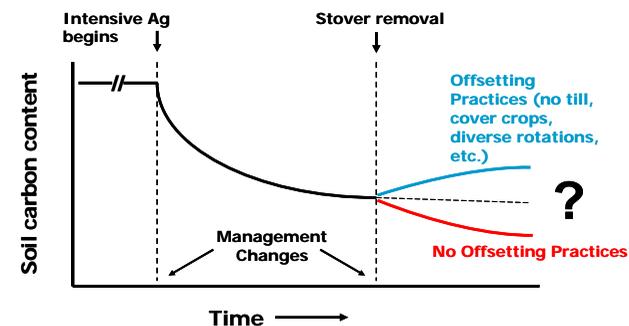
Develop biomass feedstock harvest rates and management strategies that safeguard the soil so it can meet the demand for food, feed, fiber, and fuel.

### Residue removal impact on grain yield and soil organic matter

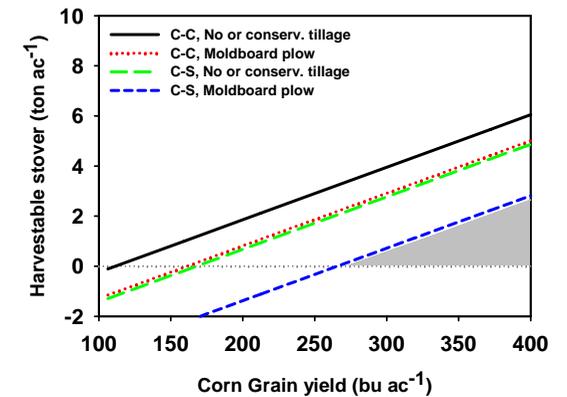


Returning crop residue to the field has a positive impact on yield and soil organic matter.

### Soil C change with management



Generally, it takes more stover to manage for soil organic carbon than for water or wind erosion. Stover should not be harvested from highly erodible lands.



The amount of stover that can be sustainably harvested will vary by management. In this example, stover in the shaded area would be sustainably harvestable under moldboard plow tillage in a corn-soybean rotation (blue dashed line).

Harvestable amounts will vary by crop and region.