## What is COMET-VR?

COMET-VR is an online management tool that provides a simple and reliable method for estimating changes in soil carbon sequestration, fuel, and fertilizer use resulting from changes in land management.

## What is Carbon Sequestration?

Storing, or "sequestering," carbon involves increasing the organic matter in soils ("humus") and in vegetation. Sequestering carbon helps reduce the amount of carbon dioxide ($CO_2$) in the atmosphere.

## Why is Carbon Sequestration Important?

Carbon, in the form of $CO_2$, when released to the atmosphere, traps heat within the atmosphere. It raises the temperature of the air and contributes to what is known as the "greenhouse effect."

## What Benefits Can I Get from Sequestering Carbon?

Sequestering carbon improves both soil and air quality and can help mitigate atmospheric change. Stored soil carbon could become a valuable traded commodity as we move toward an environmentally conscientious, market-based economy.

## How do I use COMET-VR?

1. Go to the Web site:
   http://www.cometvr.colostate.edu/

2. Select the "COMET-VR Tool" from the tab on the right.

3. Answer six step-by-step questions about your site:
   - State
   - County
   - Parcel Size
   - Soil
   - Rotation
   - Tillage

4. Select: Get Carbon

## How does COMET-VR work?

COMET-VR uses the Century soil carbon model to provide estimated soil carbon differences resulting from changes in land management. Century is a generalized ecosystem model which simulates carbon (e.g., biomass), nitrogen, and other nutrient dynamics. The model simulates management impacts on soil carbon, as well as the effects of land use changes between cropland, grassland, and forest.

Producers using no-till, conservation tillage, improved grazing management, or other conservation practices, provide storage for carbon benefiting their farms, ranches, and the environment. COMET-VR allows them to document their carbon changes and evaluate the impact of their management activities on soil carbon.

Once farmers or ranchers have run COMET-VR and obtained a soil carbon sequestration value, they can register those values as carbon credits under the Voluntary Emission Reduction Registration Program (Section 1605(b) of the 1992 Energy Policy Act, http://www.usda.gov/oce/global_change/gg_reporting.htm). Through this program, carbon credits may become a traded commodity.

## Conservation Activities

Many conservation activities can directly or indirectly address atmospheric change and greenhouse gas issues related to agricultural operations. Some may be eligible for payments under USDA conservation programs such as the Environmental Quality Incentives Program, or the Conservation Security Program.

## Resource Benefits

Conservation practices and management activities can:

- Reduce emissions of greenhouse gases (carbon dioxide, methane, and nitrous oxide) from agricultural operations, feedlots, and equipment;
- Increase soil carbon in cropland and grazing land;
- Increase forest carbon stocks; and
- Provide greenhouse gas offsets through the use of agriculture residues and manure management.

*Well-managed rangeland can help sequester carbon in the soil.*

## Conservation Activities that Sequester Carbon and Reduce Greenhouse Gases

- Tillage programs, such as no-till, and machinery that combine operations and reduce the number of trips across a field
- Use of bio-based fuel
- Nutrient management to reduce nitrous oxide emissions from agricultural fields
- Feed management to reduce methane generation in ruminant animals
- Grazing management to sequester carbon in range and pasture soils
- Manure management and/or anaerobic digester technology to capture methane for use as an energy supply
- Participation in carbon trading and/or voluntary reporting of greenhouse gas programs
- Agricultural residues to produce bio-based products
- Residue management, cover crops, and reduced fallow periods to sequester carbon in soils

NRCS Natural Resources Conservation Service

Natural Resource Ecology Laboratory

COMET-VR was developed in cooperation with Colorado State University, NREL.

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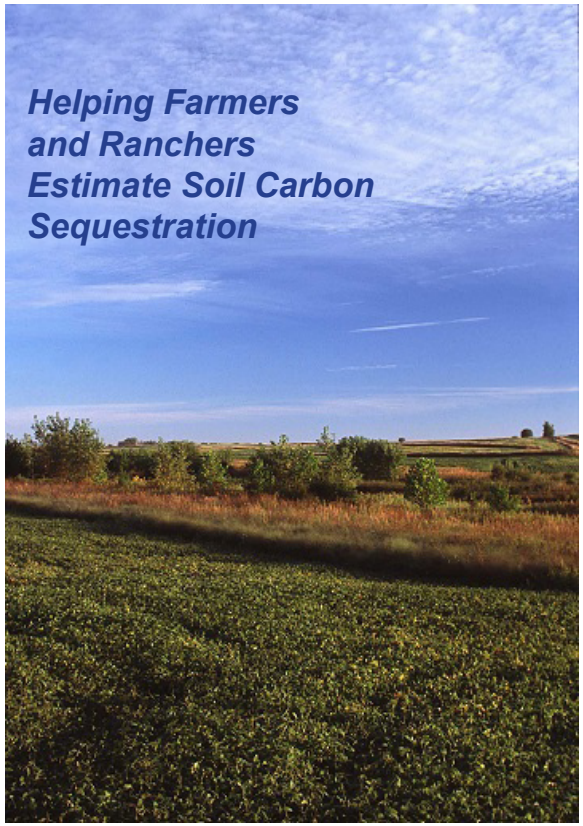
# COMET-VR

## The CarbOn Management Evaluation Tool – Voluntary Reporting (COMET-VR)




Learn more about air quality and atmospheric change by visiting the following NRCS Web site:

www.airquality.nrcs.usda.gov/

*Helping People Help the Land*