United States
Department of
Agriculture

Natural
Resources
Conservation
Service

NRCS

Opportunities for Managing Carbon Sequestration and Greenhouse Gas Emissions in Agricultural Systems

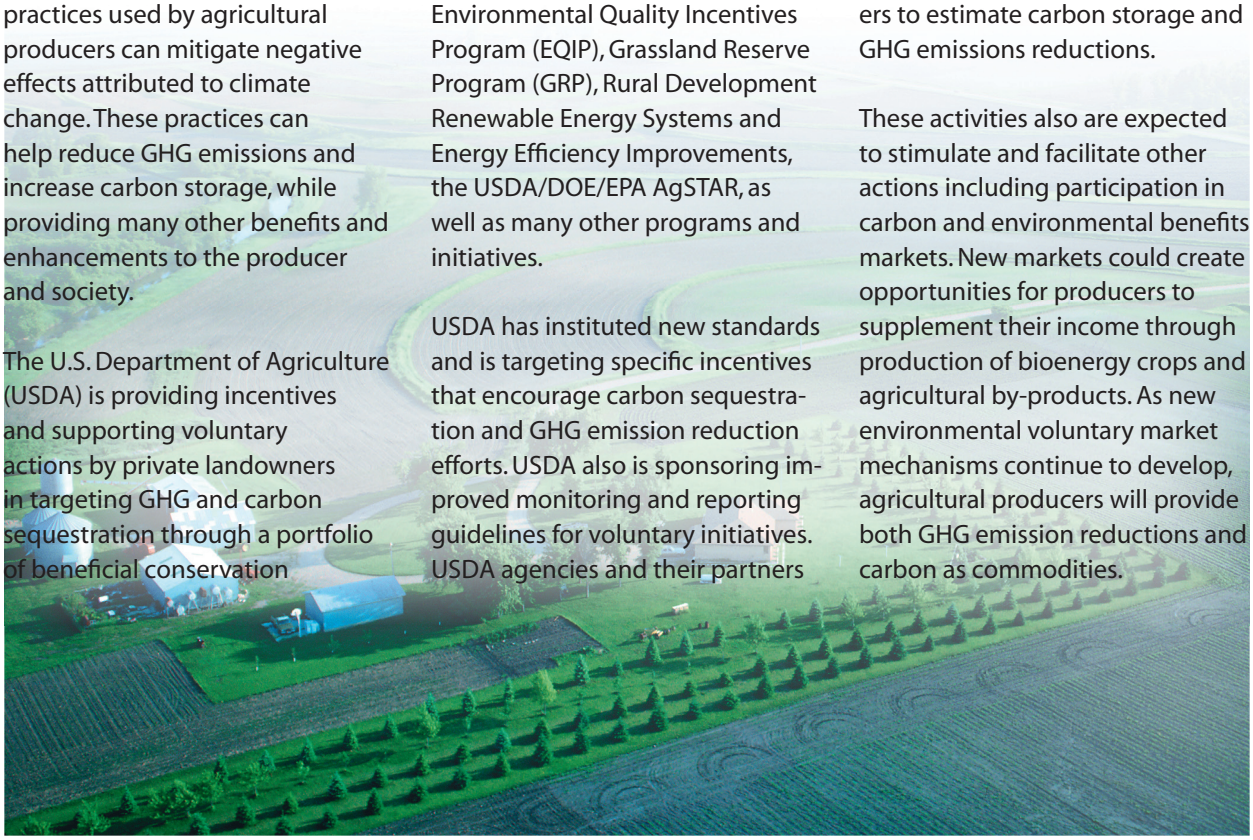
Producers have opportunities to employ conservation practices that save money and time while reducing greenhouse gas emissions and growing a new crop, carbon.

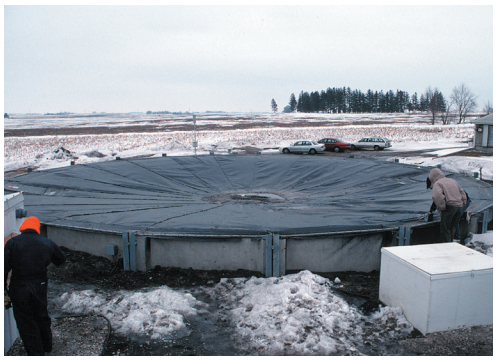
Agricultural and forestry production systems offer a wide variety of opportunities to reduce greenhouse gas (GHG) emissions and increase carbon storage, called sequestration, in soils and vegetation. Many conservation practices used by agricultural producers can mitigate negative effects attributed to climate change. These practices can help reduce GHG emissions and increase carbon storage, while providing many other benefits and enhancements to the producer and society.

The U.S. Department of Agriculture (USDA) is providing incentives and supporting voluntary actions by private landowners in targeting GHG and carbon sequestration through a portfolio of beneficial conservation programs: Conservation Reserve Program (CRP), Conservation Security Program (CSP), Wetlands Reserve Program (WRP), Wildlife Habitat Incentives Program (WHIP), Conservation Reserve Enhancement Program (CREP), Environmental Quality Incentives Program (EQIP), Grassland Reserve Program (GRP), Rural Development Renewable Energy Systems and Energy Efficiency Improvements, the USDA/DOE/EPA AgSTAR, as well as many other programs and initiatives.

USDA has instituted new standards and is targeting specific incentives that encourage carbon sequestration and GHG emission reduction efforts. USDA also is sponsoring improved monitoring and reporting guidelines for voluntary initiatives. USDA agencies and their partners are developing tools to estimate the amount of carbon stored and GHG emissions reduced at the field and producer level. COMET-VR (CarbOn Management Evaluation Tool - Voluntary Reporting), a web-based, interactive tool for estimating carbon sequestration and GHG reductions under the Department of Energy's Voluntary Greenhouse Gas Reporting Registry, at http://cometvr.colostate.edu, is an example of one of these cooperative efforts. Such tools will make it easier for producers to estimate carbon storage and GHG emissions reductions.

These activities also are expected to stimulate and facilitate other actions including participation in carbon and environmental benefits markets. New markets could create opportunities for producers to supplement their income through production of bioenergy crops and agricultural by-products. As new environmental voluntary market mechanisms continue to develop, agricultural producers will provide both GHG emission reductions and carbon as commodities.





A Wide Range of Agricultural Activities with Technical Assistance...

can be used to manage GHG levels through sequestration of carbon in soils and woody biomass, reduction in GHG emissions, or fossil fuel substitutions. These activities are most often adopted for the other ecosystem services they provide, such as improved air, soil, and water quality; wildlife habitat; and alternative sources of income. Here are just a few of the practices that producers may want to consider in their management plans:

Conservation Practice	GHG Objectives	Additional Benefits
CROPS		
Conservation tillage and reduced field pass intensity	Sequestration, emission reduction	Improves soil, water, and air quality. Reduces soil erosion and fuel use.
Efficient nutrient management	Sequestration, emission reduction	Improves water quality. Saves expenses, time, and labor.
Crop diversity through rotations and cover crops	Sequestration	Reduces erosion and water requirements. Improves soil and water quality.
ANIMALS		
Manure management	Emission reduction	On-farm sources of biogas fuel and possibly electricity for large operations provides nutrients for crops.
Rotational grazing and improved forage	Sequestration, emission reduction	Reduces water requirements. Helps withstand drought. Increases long-term grassland productivity.
Feed management	Emission reduction	Reduces quantity of nutrients. Improves water quality. More efficient use of feed.
AGROFORESTRY		
Windbreaks for crops and livestock	Sequestration, emission reduction	Improves crop and livestock protection and wildlife habitat. Provides alternative income source (specialty crops, hunting fees).
Silvopasture with rotational grazing and improved forage	Sequestration, emission reduction	Provides annual income from grazing; long-term income from wood products.
Riparian forest buffer	Sequestration	Improves water quality and wildlife habitat. Provides alternative income source (specialty crops, hunting fees).

To Learn More About ...

climate change, greenhouse gases, implications for agricultural production, and opportunities for producers, contact your local USDA Service Center or Resource Conservation & Development Area office. Information can also be found at:

- USDA Natural Resources Conservation Service: *http://www.nrcs.usda.gov*
- USDA Farm Service Agency: *http://www.fsa.usda.gov*
- USDA FS/NRCS National Agroforestry Center: *http://www.unl.edu/nac*
- USDA Global Change Program Office: *http://usda.gov/agency/oce/gcpo/index.htm*

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