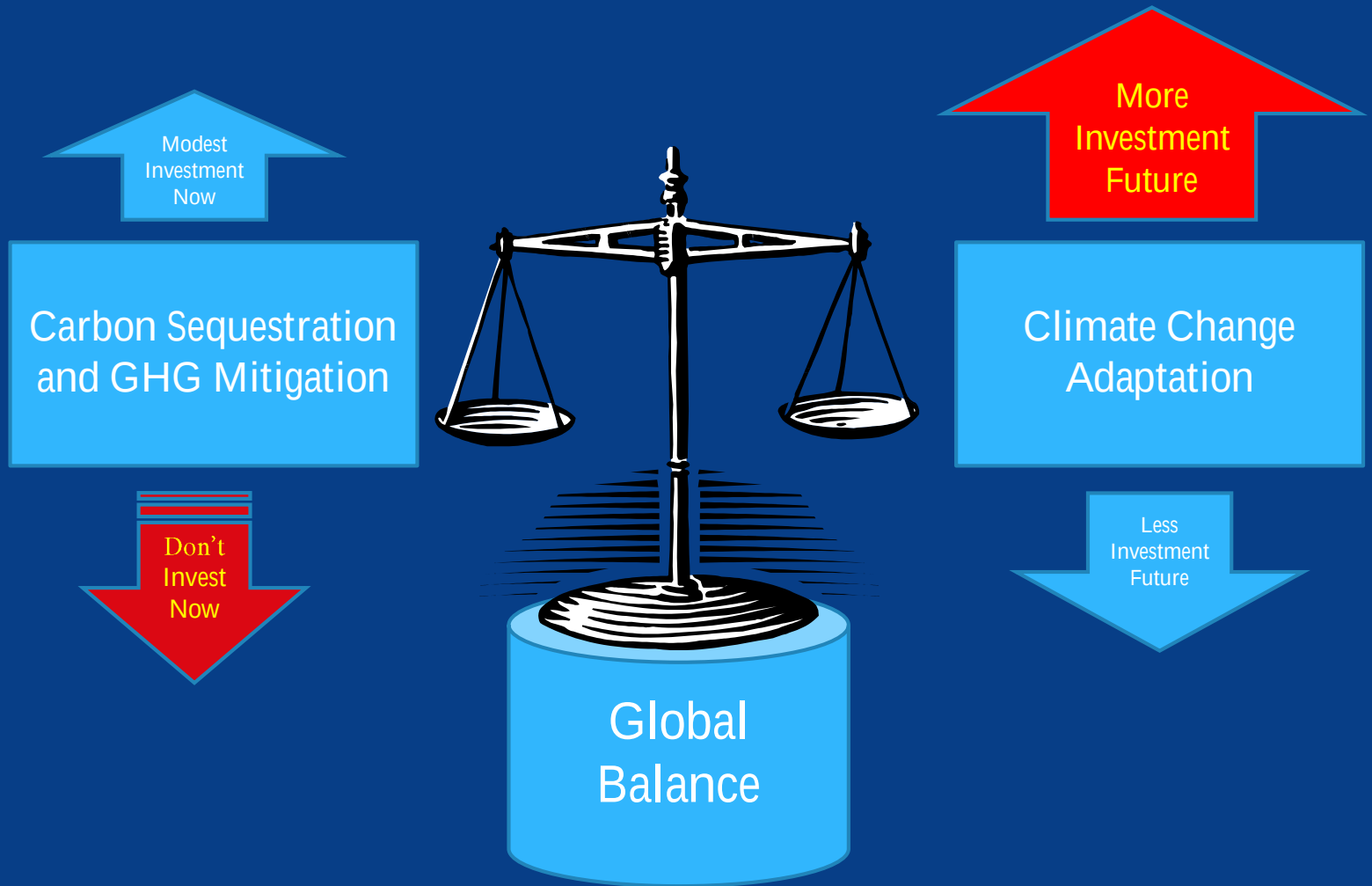
USDA United States Department of Agriculture

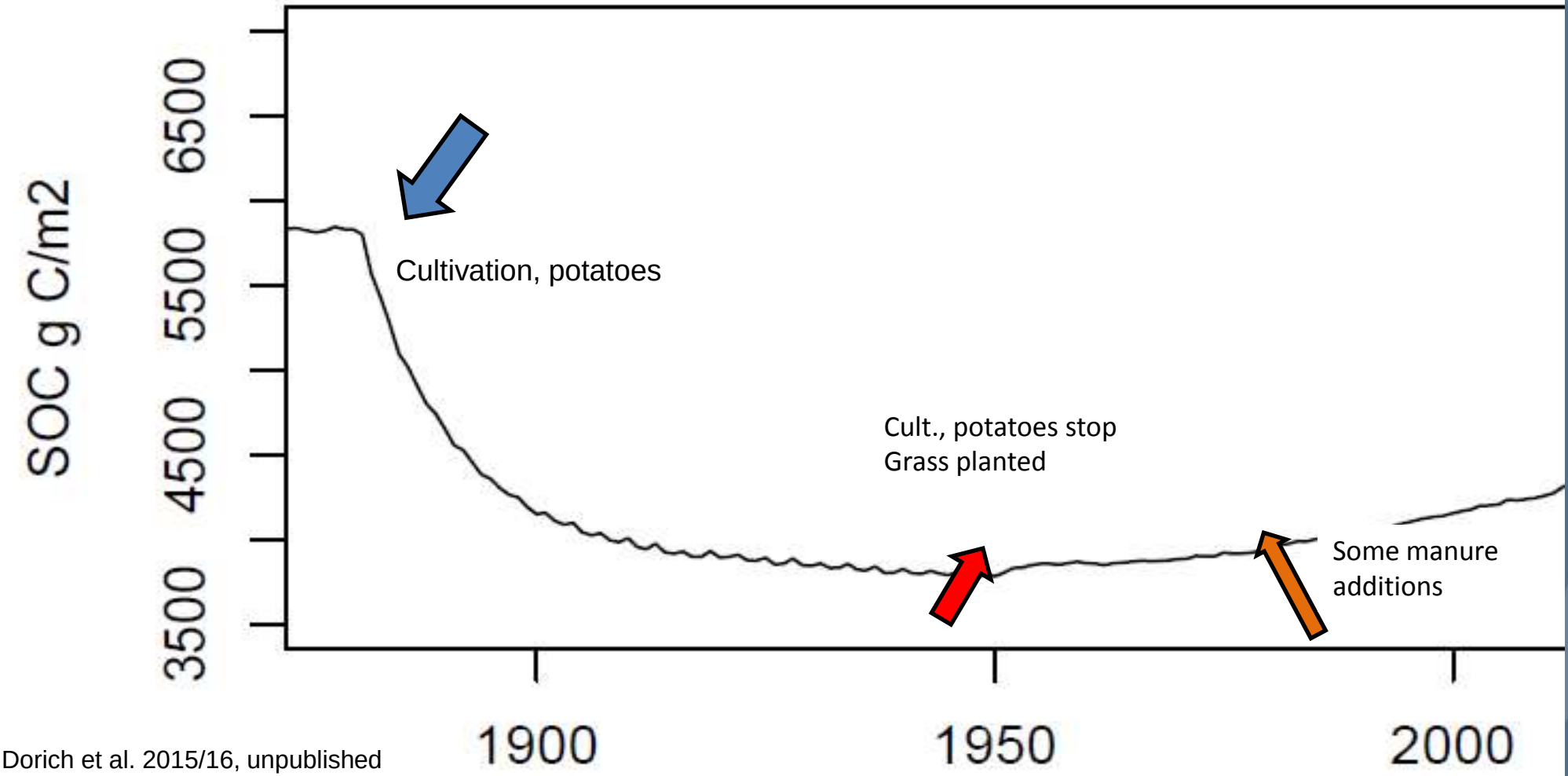
The Importance of Quantifying Greenhouse Gas Flows on Farms and Ranches

Kari Cohen
Leader, Conservation Innovations Team
USDA – Natural Resources Conservation Service (NRCS)
kari.cohen@wdc.usda.gov

Agriculture and Forestry – 2 x Exposed

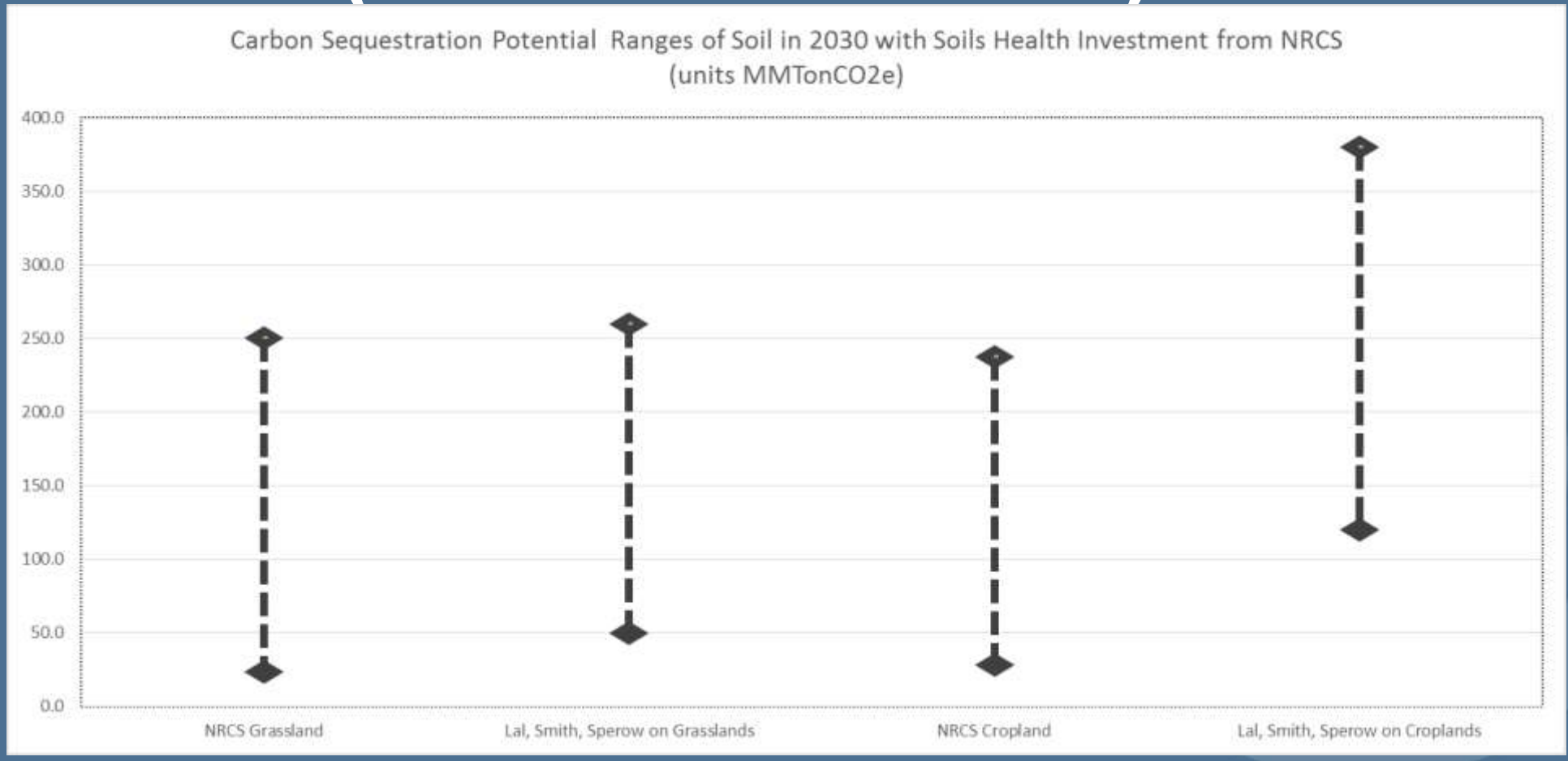


Historic Loss of Soil Carbon



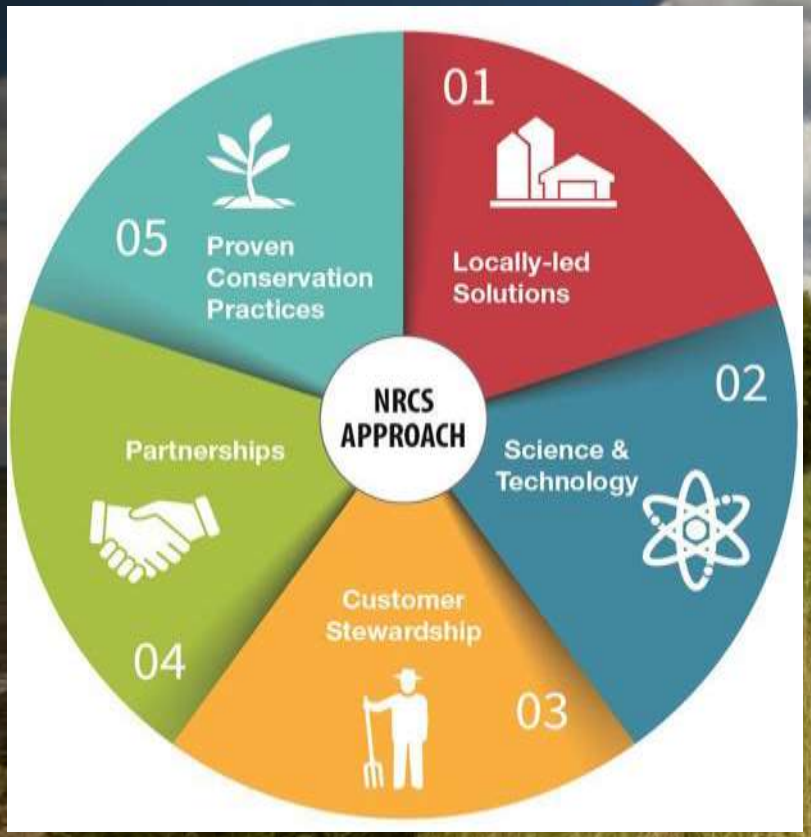
Dorich et al. 2015/16, unpublished

The Mitigation Potential of Soils Croplands and Grassland (~200-400 MMTCO2e)

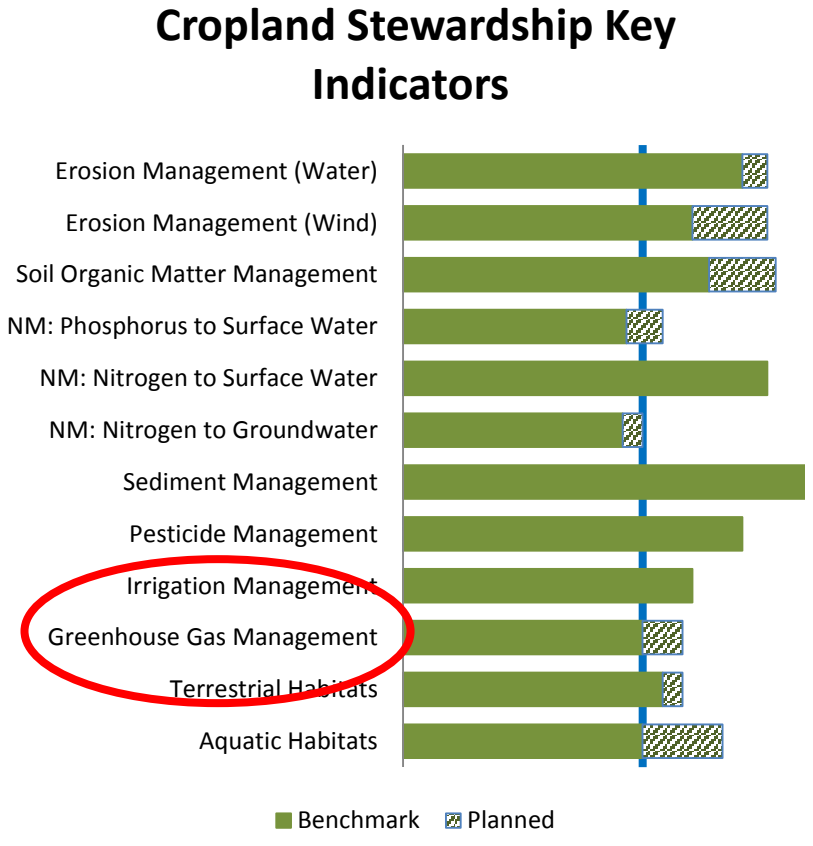


GHG Quantification

- Awareness building and conservation planning for producers
- Measuring outcomes of NRCS practices and programs
- Reporting for USDA's Building Blocks for Climate Smart Agriculture and beyond
- Supporting carbon markets, conservation finance approaches, and supply chain partnerships


01
Locally-led Solutions
02
Science & Technology
03
Customer Stewardship
04
Partnerships
05
Proven Conservation Practices
NRCS APPROACH

Resource Stewardship Evaluation Tool



Agriculture and Forestry: Part of the Climate Solution

Click on a case study to learn more

USDA Building Blocks for Climate Smart Agriculture and Forestry

NRCS has developed and posted a list of atmospheric-beneficial conservation practices online

GHG and Carbon Sequestration Ranking Tool

NRCS Practice Standards for Greenhouse Gas Emission Reduction and Carbon Sequestration

Qualitative Ranking N = Neutral	Practice Code	Practice Standard and Associated Information Sheet	Beneficial Attributes
 GHG Benefits of this Practice Standard	327	Conservation Cover	Establishing perennial vegetation on land retired from agriculture production increases soil carbon and increases biomass carbon stocks.
	329	Residue and Tillage Management, No-Till/Strip-Till/Direct Seed	Limiting soil-disturbing activities improves soil carbon retention and minimizes carbon emissions from soils.
	366	Anaerobic Digester	Biogas capture reduces CH_4 emissions to the atmosphere and provides a viable gas stream that is used for electricity generation or as a natural gas energy stream.
	367	Roofs and Covers	Capture of biogas from waste management facilities reduces CH_4 emissions to the atmosphere and captures biogas for energy production. CH_4 management reduces direct greenhouse gas emissions.
	372	Combustion System Improvement	Energy efficiency improvements reduce on-farm fossil fuel consumption and directly reduce CO2 emissions.
	379	Multi-Story Cropping	Establishing trees and shrubs that are managed as an overstory to crops increases net carbon storage in woody biomass and soils. Harvested biomass can serve as a renewable fuel and

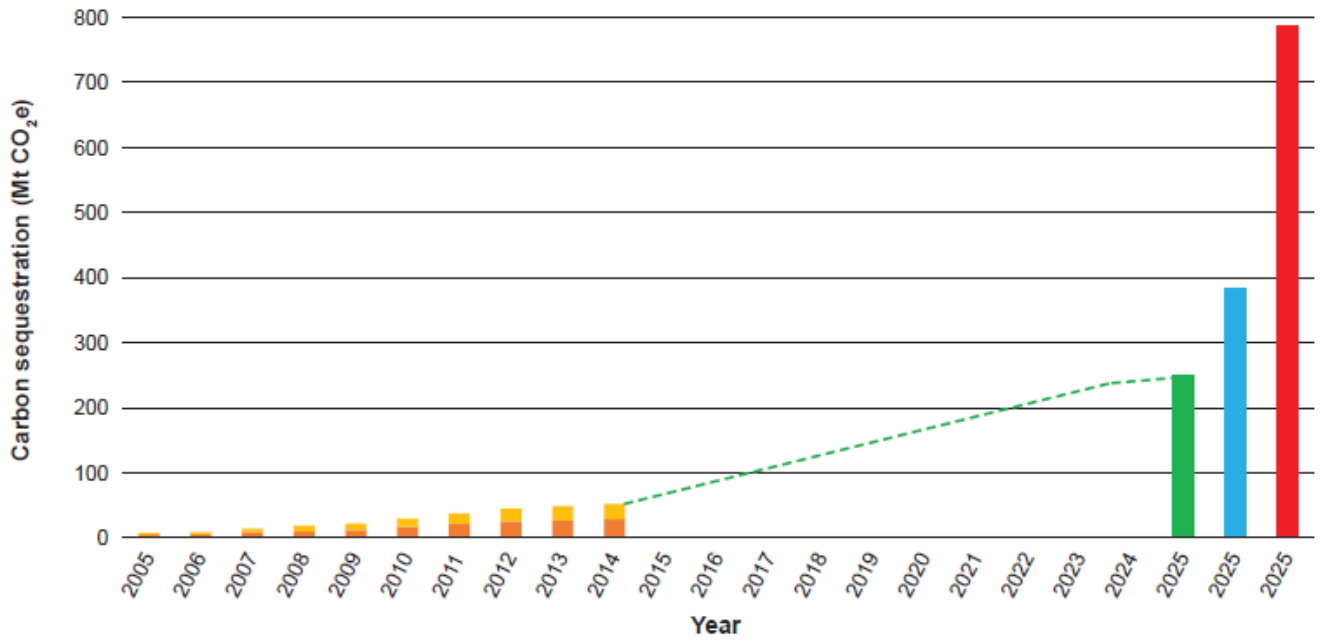
https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/air/?cid=stelprdb1044982

Climate Smart Mitigation Potential

Chambers, Lal, Paustian 2016

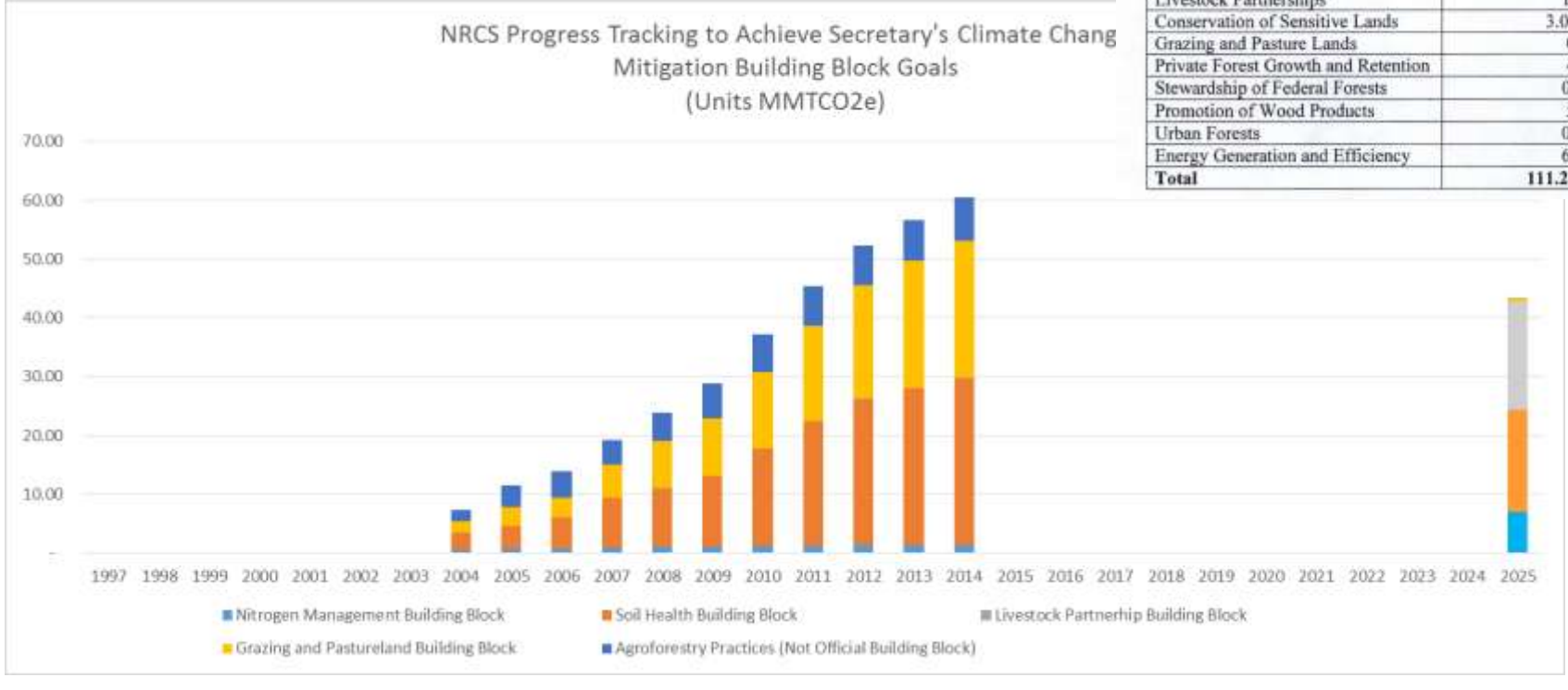
Figure 2

USDA Natural Resources Conservation Service (NRCS) atmospheric-beneficial conservation practices and bridging to 4 per Thousand on croplands and grasslands (0 to 20 cm).



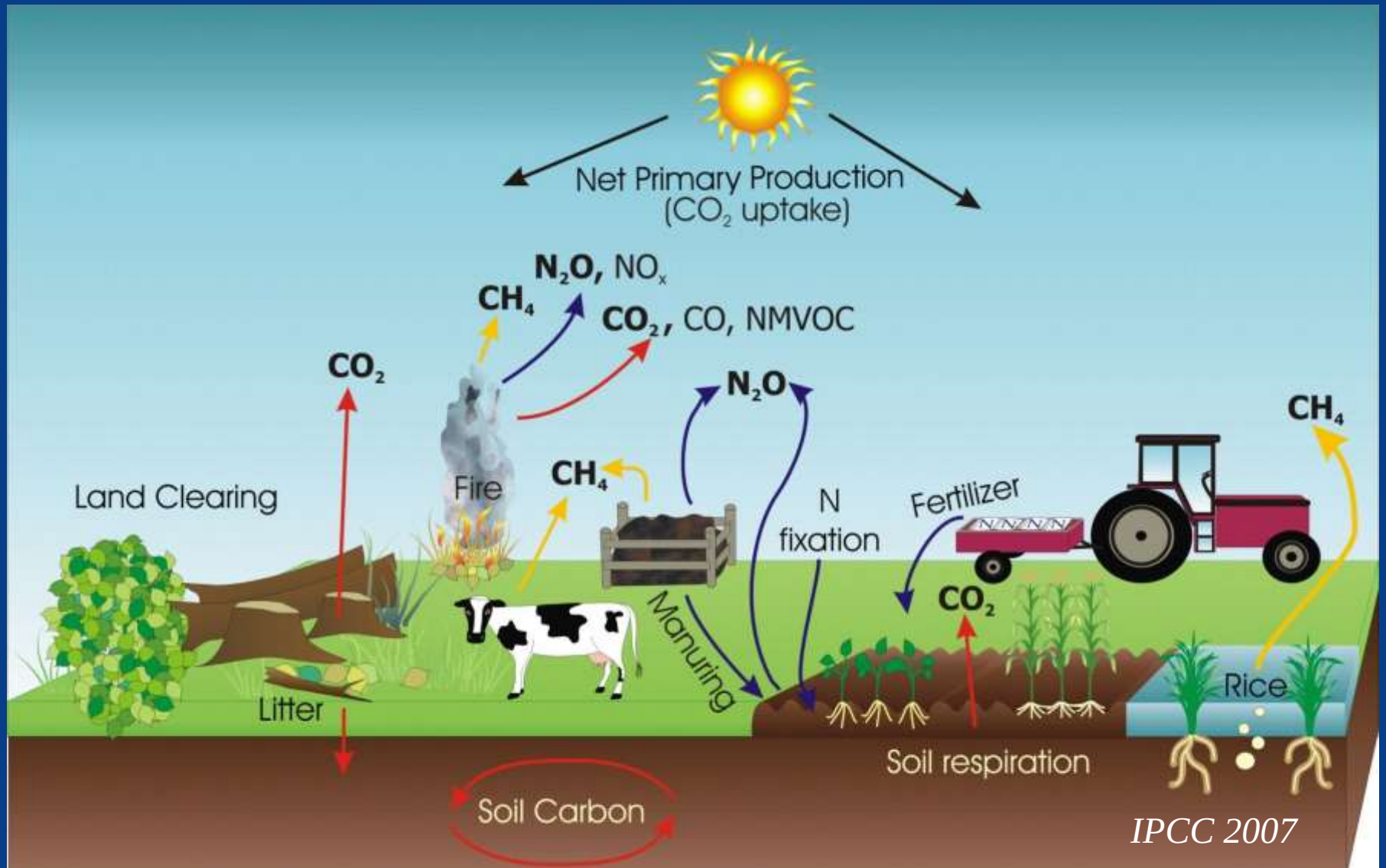
Creating an NRCS Inventory of GHG Emission Benefits and C Sinks from Conservation Database 2004-2014 (2015 coming soon)

Building Block	Estimated Annual GHG Reduction by 2025 ($MMTCO_2e$)
Soil Health	4.3 – 17.3
Nitrogen Stewardship	7.0
Livestock Partnerships	18.7
Conservation of Sensitive Lands	3.0 – 3.2
Grazing and Pasture Lands	0.4
Private Forest Growth and Retention	4.8
Stewardship of Federal Forests	0.03
Promotion of Wood Products	5.9
Urban Forests	0.02
Energy Generation and Efficiency	67.0
Total	**111.2 – 124.4**



Ecosystem Services Quantification Tools

Agricultural sources and sinks of greenhouse gases

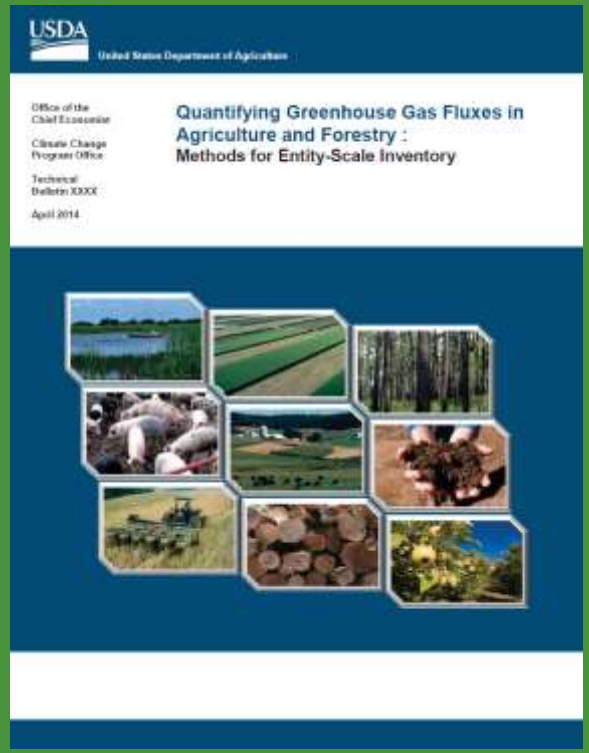


COMET-Farm™

Calculation Methods – all transparently documented

Implements the peer-reviewed, USDA-sanctioned entity-level inventory methods.

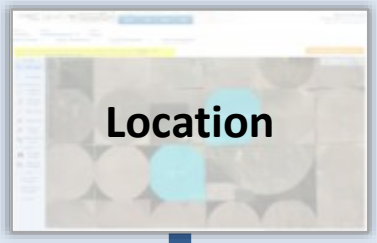
- Soil-related GHG emissions: "Blue Book" Methods Document
- Livestock-related GHG emissions: "Blue Book" Methods Document
- Energy-related GHG emissions: USDA/NRCS Energy Tool, EPA Emission Factors



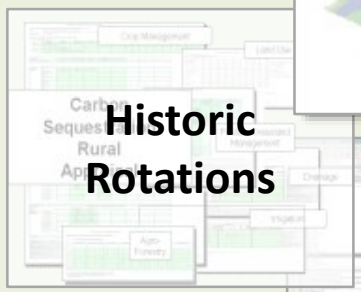
COMET-Farm

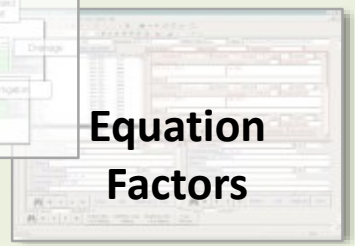
How it works

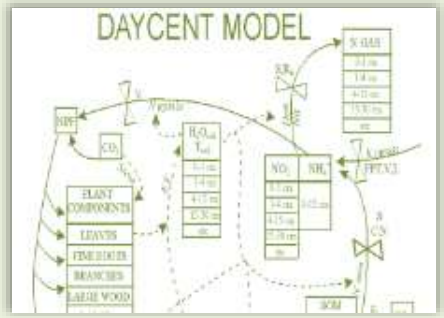
Web Interface



CSU Server







Empirical Models

Outputs

COMET™ FARM | USDA NRCS Colorado State University | whole farm and ranch carbon and greenhouse gas accounting and reporting

COMET-PLANNER

NRCS USDA Colorado State University

Carbon and greenhouse gas evaluation for NRCS conservation practice planning

This tool was developed with the generous support of the Rathmann Family Foundation and the Marin Carbon Project

Evaluate potential carbon sequestration and greenhouse gas reductions from adopting NRCS conservation practices

Click to View Introduction Video

NRCS Conservation Practices included in COMET-Planner are only those that have been identified as having greenhouse gas mitigation and/or carbon sequestration benefits on farms and ranches. This list of conservation practices is based on the qualitative greenhouse benefits ranking of practices prepared by NRCS.

Project Name:

State:

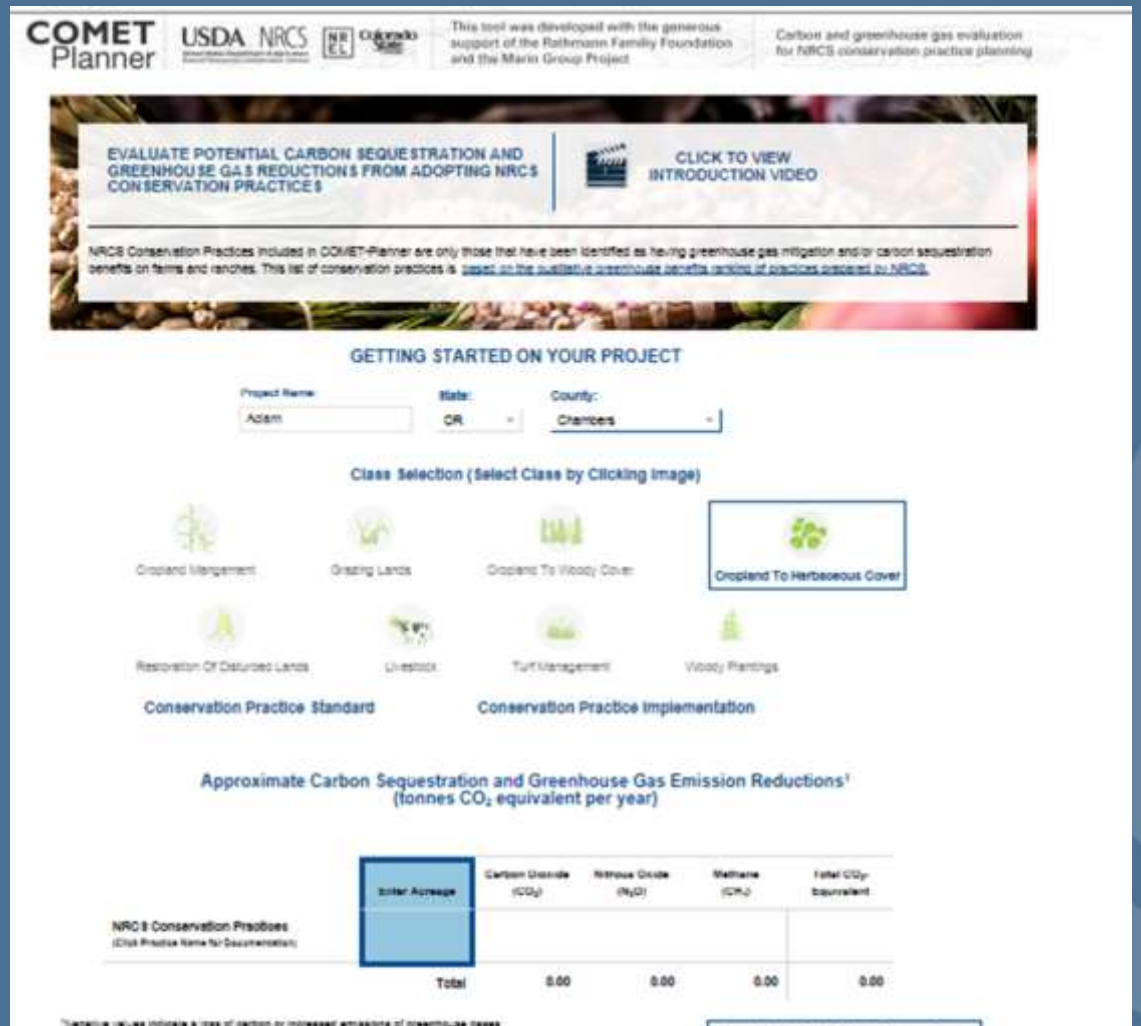
County:

NRCS Conservation Practices - Select Your Practice(s)

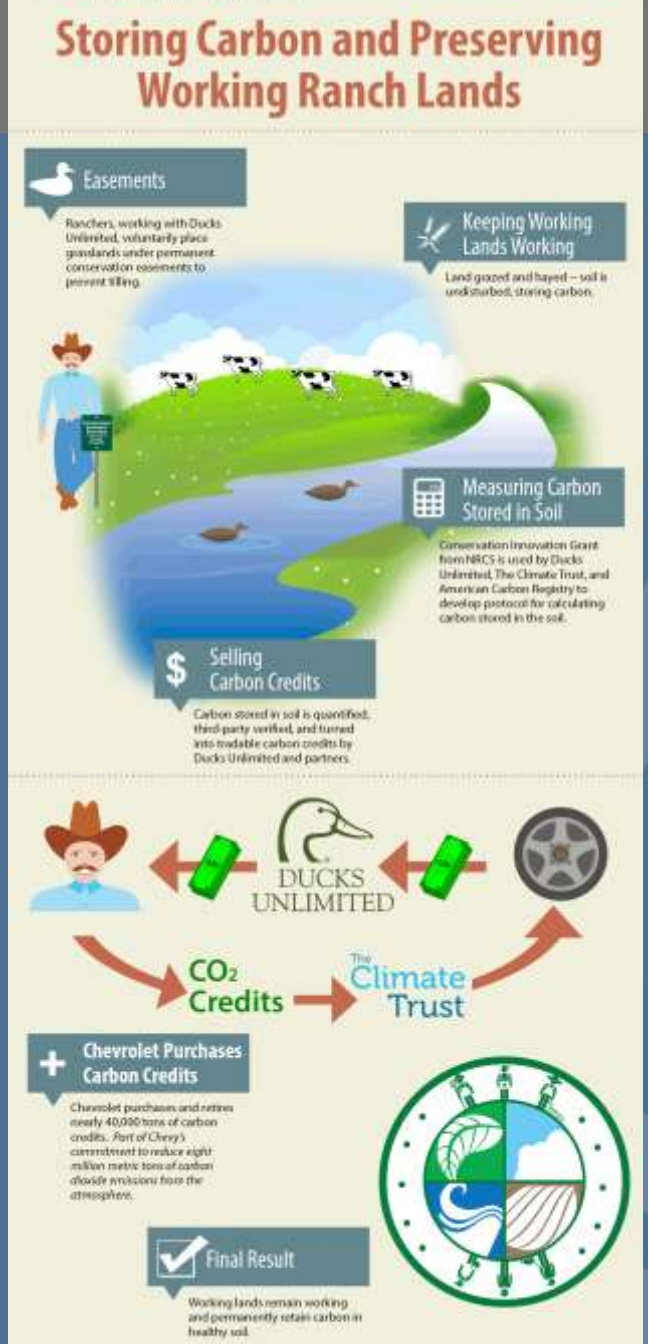
Name CPS (Conservation Practice Standard Number)

+ Cropland Management (9 Items)
+ Cropland to Herbaceous Cover (10 Items)
+ Cropland to Woody Cover (7 Items)
+ Grazing Lands (3 Items)
+ Restoration of Disturbed Lands (5 Items)

The new COMET-Planner



Greenhouse Gas Markets



USDA
United States Department of Agriculture

First ever purchase of carbon credits from nitrogen stewardship practices implemented on corn fields

USDA
United States Department of Agriculture

Methane reductions from rice production—Arkansas & California

Methane Reductions from Rice Production

Corporate Supply Chain Partnership--Vermont

CARING DAIRY
A Ben & Jerry's Initiative

+

= private sector dollars for dairy farmers

Newsroom

Newsroom Home

Spotlight

News Releases

Social Media

Viewpoints

Multimedia

Recognition

Monsanto Announces $1.6 Million Investment in Developing System to Help Agriculture Quantify Greenhouse Gas Reductions

USDA-NRCS Also Commits $1 Million Through Conservation Innovation Grant To Farmer-Focused Project

Friday September 23, 2016

Dateline:
ST. LOUIS

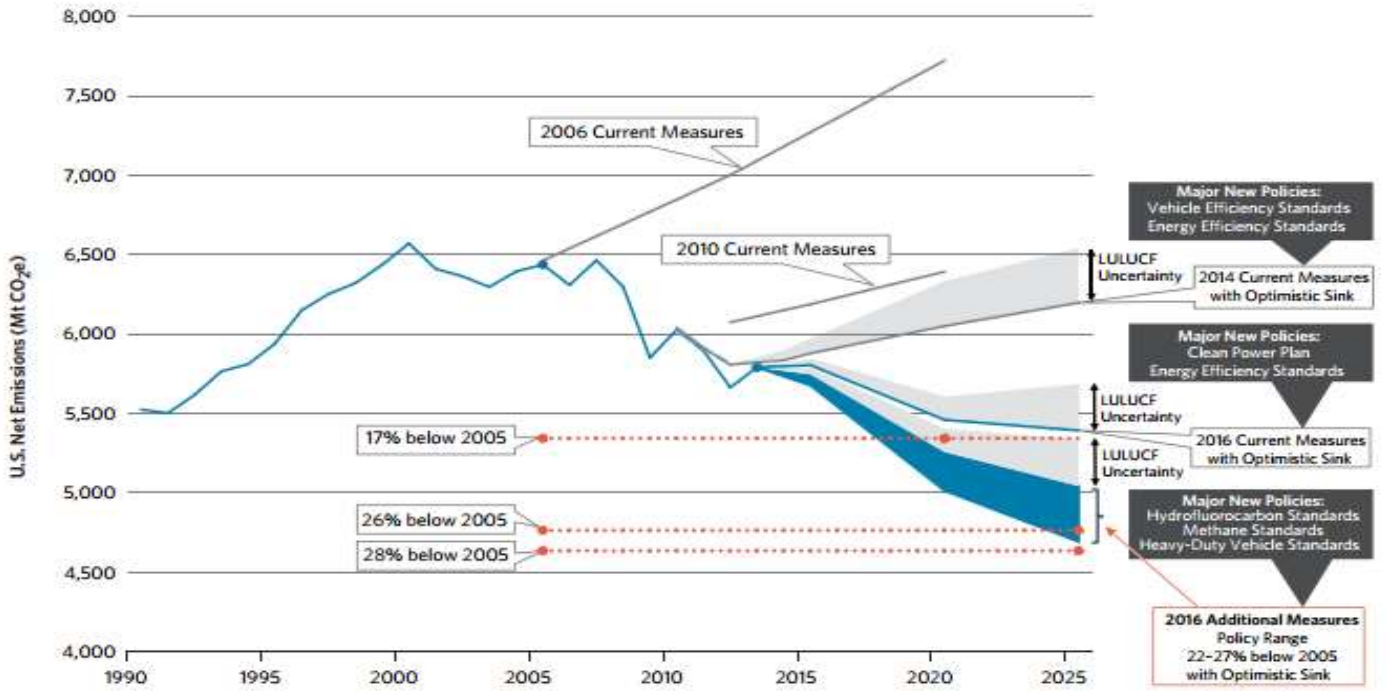
ST. LOUIS--(BUSINESS WIRE)--The U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) recently awarded the National Corn Growers Association

"The system being developed

Role of the land carbon sink

Figure 6 **U.S. Emissions Projections—2016 *Current Measures* Compared with Potential Reductions from *Additional Measures* Consistent with the *Climate Action Plan***

Also shown are previous projections from the 2006, 2010, and 2014 U.S. Climate Action Reports, which demonstrate the dramatic ratcheting down of projected U.S. emissions over the past decade.



"…We will need to bolster the forests, agricultural lands, and urban areas that are likely to remain our most effective carbon capture and sequestration mechanism." – Brian Deese