



Carbon and greenhouse gas evaluation of conservation practices

COMET-Farm™ and COMET-Planner™

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CA-Dutch Climate Smart Agriculture
Webinar

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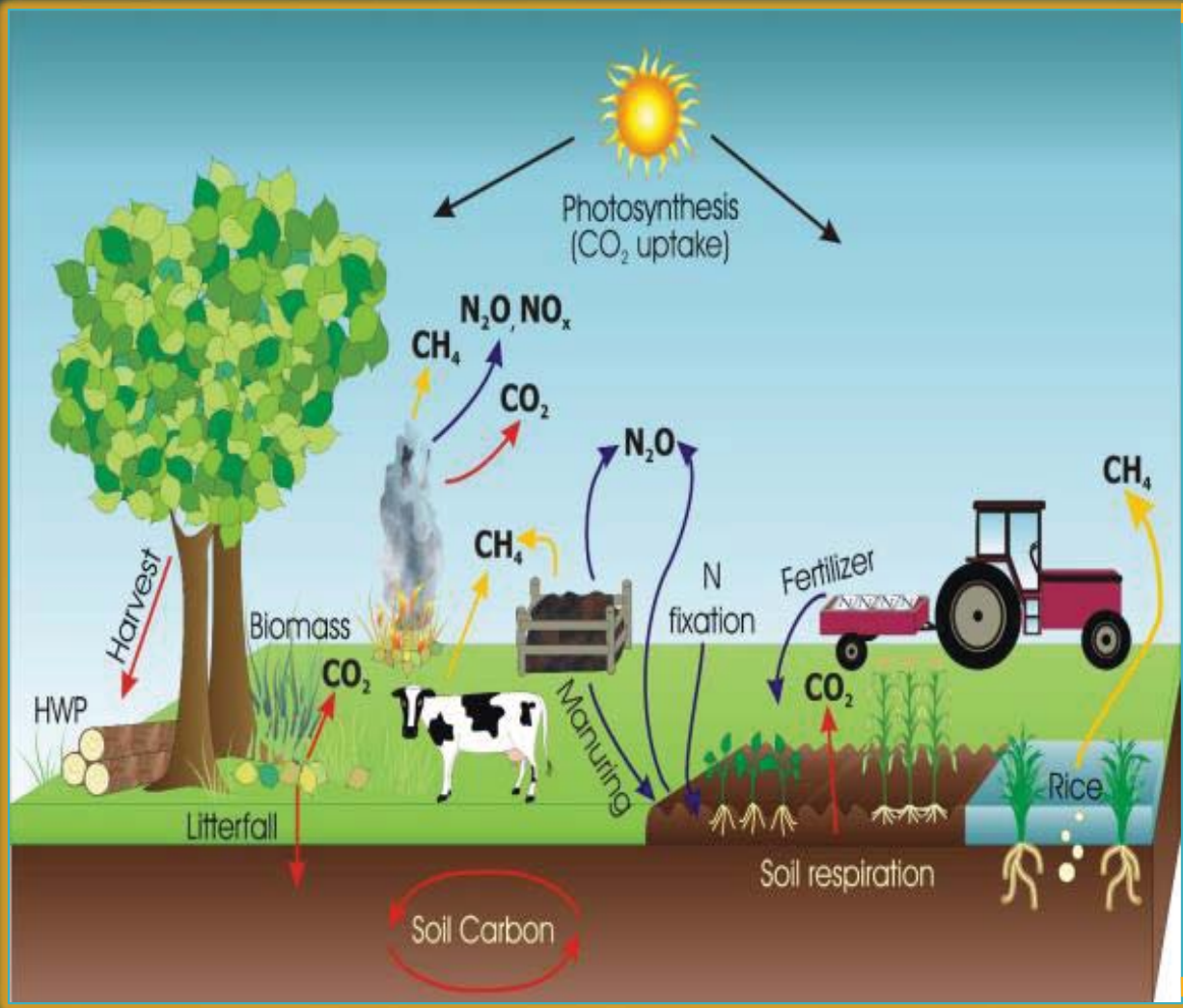
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COMET-Farm™ & COMET-Planner™



Greenhouse Gases in Agriculture



The
COMET
Tools
Provide a
Systems
Approach
to
full GHG
Inventories
and
Conservatio

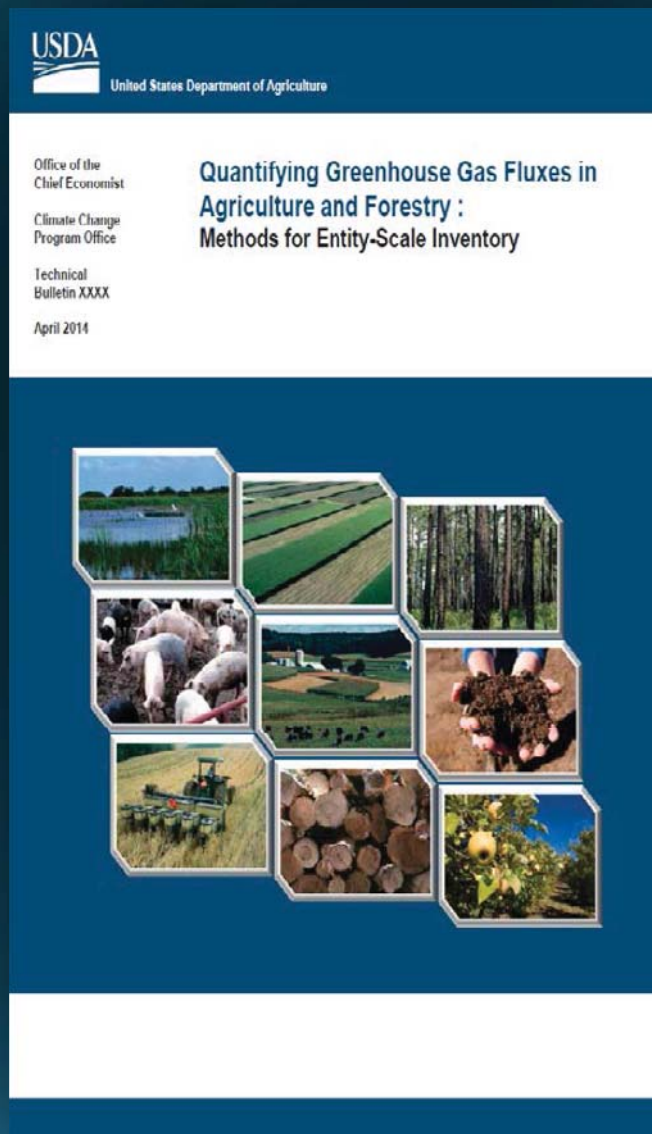
Image courtesy of Amy Swan of the NREL at Colorado State University

COMET-Farm™ & COMET-Planner™

Calculation Methods



- Implements the peer-reviewed, USDA-sanctioned entity-level inventory methods.
 - **Soil-related GHG emissions:** DayCent dynamic model, also used in the U.S. National Greenhouse Gas Inventory + additional empirical models.
 - **Livestock-related GHG emissions:** statistical models based on USDA and university research, largely consistent with models used in the U.S. National Inventory.
 - **Energy-related GHG emissions:** based on the models used in the USDA/NRCS Energy Tool along with supplemental peer-reviewed research results.



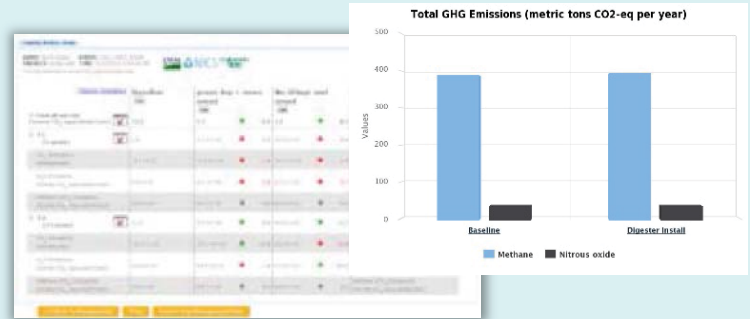
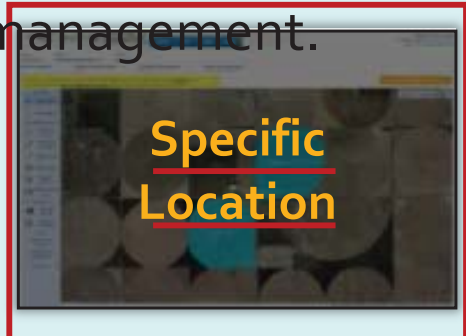
COMET-Farm™

How it works



Web Interface

User inputs their unique Farm or Ranch management.



Results

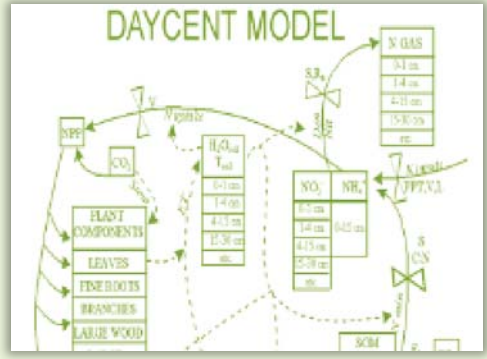


Historic Rotations
NRI, Cropping Practices Survey, CSRA

Climate & Soil
PRISM & SSURGO

Equation Factors, USDA Methods, IPCC

CSU Server



Empirical Models

Outputs



COMET-Farm Work Flow



The workflow consists of the following steps:

- Homepage:** Introduction to COMET-Farm, including a 'What is COMET-Farm?' section and 'Related Tools' like COMET Energy Tool and COMET Planner Tool.
- Parcel Location:** A satellite map interface where users select a specific parcel on their farm.
- Current Management:** A screen for entering current farm management data, including crop type and planting dates.
- Future Management:** A screen for entering future farm management data, including crop type and planting dates.
- Results and Report:** A dashboard displaying 'Total GHG Emissions (metric tons CO₂-eq per year)' in a bar chart, comparing 'Baseline' and 'No-till' scenarios. The chart shows emissions for C, CO₂, CO, N₂O, and CH₄.



Future Management

Step 1: Activity | Step 2: Field Management | Step 3: Report

Parcel Location: [Map]

For Parcel F1 in 2016, what crop will you plant, when will you plant, and when will you harvest?

What type of crop? Corn Soybean

Planting Date: 05/21/2016

| Harvest Date | Start | End (Date) | Harvest (%) | Status |
|--------------|-------|------------|-------------|--------|
| 05/21/2016 | Yes | 0% | 0 | X |

| Plant Date | End Date | Planting (%) | Status |
|------------|----------|--------------|--------|
| | | | |

Parcel Management Summary:

- 2016: Corn
- 2017: Sugar Beets
- 2018: Dry Field Beets
- 2019: Corn
- 2020: Sugar Beets
- 2021: Dry Field Beets
- 2022: Corn
- 2023: Sugar Beets
- 2024: Dry Field Beets
- 2025: Corn
- 2026: Sugar Beets
- 2027: Dry Field Beets
- 2028: Corn
- 2029: Sugar Beets
- 2030: Dry Field Beets

Current Management

Step 1: Activity | Step 2: Field Management | Step 3: Report

Parcel Location: [Map]

For Parcel F1 in 2015, what crop did you plant, when did you plant, and when did you harvest?

What type of crop? Corn Soybean

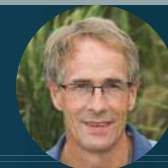
Planting Date: 05/21/2015

| Harvest Date | Start | End (Date) | Harvest (%) | Status |
|--------------|-------|------------|-------------|--------|
| 05/21/2015 | Yes | 0% | 0 | X |

| Plant Date | End Date | Planting (%) | Status |
|------------|----------|--------------|--------|
| | | | |

Parcel Management Summary:

- 2015: Corn
- 2016: Sugar Beets
- 2017: Dry Field Beets
- 2018: Corn
- 2019: Sugar Beets
- 2020: Dry Field Beets
- 2021: Corn
- 2022: Sugar Beets
- 2023: Dry Field Beets
- 2024: Corn
- 2025: Sugar Beets
- 2026: Dry Field Beets
- 2027: Corn
- 2028: Sugar Beets
- 2029: Dry Field Beets
- 2030: Corn
- 2031: Sugar Beets
- 2032: Dry Field Beets



COMET-Planner 2.0

- 1) Aligns GHG reduction estimates with **COMET-Farm** and the **USDA entity-scale GHG inventory methods**.
- 2) Improving the spatial resolution of estimates from the sub-national scale to multi-county regions.
- 3) Adding options for implementing various

COMET-Planner 2.0

Step 1 Begin by naming your project and selecting your state and county

Project Name: State: CA County: Kern

Step 2 Select the class of conservation practices that best describes the practice you would like to evaluate

Cropland Management
 Grazing Lands
 Woody Plantings
 Cropland to Herbaceous Cover
 Restoration of Disturbed Lands

Step 3 Select an NRCS Conservation Practice Standard and a Practice Implementation that best describes your system. You may add multiple practices if you would like to add a practice under a different class of practices, return to Step 2.

Conservation Practice Standard:
 Conservation System Improvement (CPS 112)
 Conservation Crop Rotation (CPS 122)
 Cover Crop (CPS 342)
 Mulching (CPS 424)
 Multiple Conservation Practices
 Nutrient Management (CPS 592)
 Residue and Tillage Management - No-Till (CPS 122)

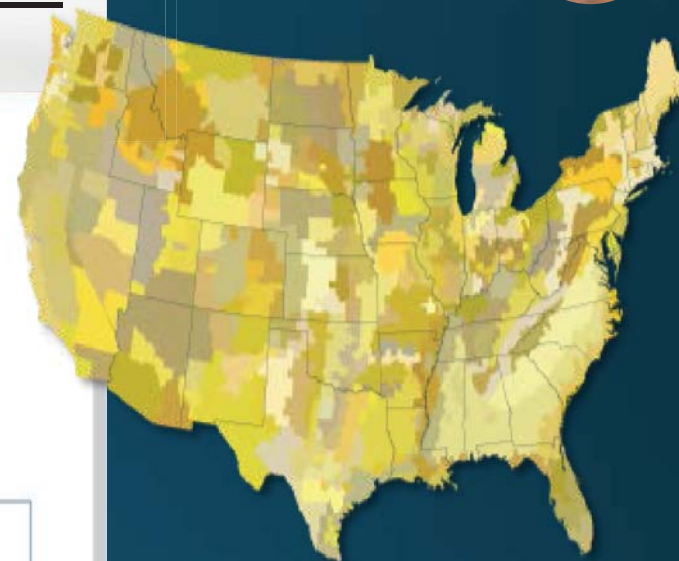
Conservation Practice Implementation:

Step 4 Enter the acreage associated with each conservation practice you selected

Approximate Carbon Sequestration and Greenhouse Gas Emission Reductions¹ (tonnes CO₂ equivalent per year)

| Enter Acreage | Carbon Sequestration | Greenhouse Gas Emission Reductions | Total CO ₂ -Equivalent |
|---------------|----------------------|------------------------------------|-----------------------------------|
| | | | |

NRCS Conservation Practices (Click Practice Name for Documentation)



Estimates resolved at the MRLA-scale