Metrics Committee

January 6, 2021

Happy New Year!

Name	Organization	Sector
Steve Linscombe	USA Rice Federation	Grower
Joe McMahan	Innovation Center for US Dairy	Grower
John Stewart	Soil Health Partnership	Grower
Jesse Daystar	Cotton Inc	Grower
Jeff Seale	Bayer	Agribusiness
Adam Herges	The Mosaic Company	Agribusiness
Lara Moody	The Fertilizer Institute	Agribusiness
Andy Greenlee	John Deere	Agribusiness
Jay Watson	General Mills	Brands & Retail
Ben Johnson	J.M. Smucker Company	Brands & Retail
Amy Hughes	Environmental Defense Fund	Civil Society
Michelle Perez	American Farmland Trust	Civil Society
Heidi Peterson	Sand County Foundation	Civil Society
Monica McBride	World Wildlife Fund	Civil Society
Eric Cummings	University of Arkansas	Affiliate
Sarah Sexton-Bowser	Kansas State University	Affiliate
Evelyn Steglich	USDA-NRCS	Affiliate
Nothabo Dube	Texas A&M Agrilife research	Affiliate
Amanda Raster	*ESMC*	*Affiliate-Observer*
Angela Pearson	*Fieldprint Canada*	*Affiliate-Observer*

Agenda

- Overview of carbon tool examples and responses from developers
- Soil Carbon Discussion
  - Potential to re-allocate 70k from our Walton Family Foundation grant.
  - They are amenable to using the funds on enhancing soil carbon in the Platform.

Metric Revision or Optional Feature?

- Funds would need to be allocated by mid-February
- Not sufficient time for a full revision process (member comment, public comment, Board approval)
- **Alternative**: Include either tool as an optional extra feature, similar to the full-farm Biodiversity or Irrigation Estimator functions
- While project is underway, Committee could explore whether to seek approval as a replacement for the SCI

Benefits to users of an optional tool

- Provide a way for farmers and project sponsors to estimate potential soil carbon change quickly
- Provide opportunities for exploring **“what if”** scenarios to see the potential impact of a change in practices on a given field
- Beneficial to projects working to quantify **soil health** improvements as well as projects focused on **climate impacts and resilience**
- Motivate and incentivize greater adoption of conservation practices including **cover crops, tillage and nutrient management**

Example: Benton County, IN – No till, non-legume cover crop , 25% N reduction

Emission Reduction Coefficients (ERC)
(tonnes CO_2 equivalent per unit per year)

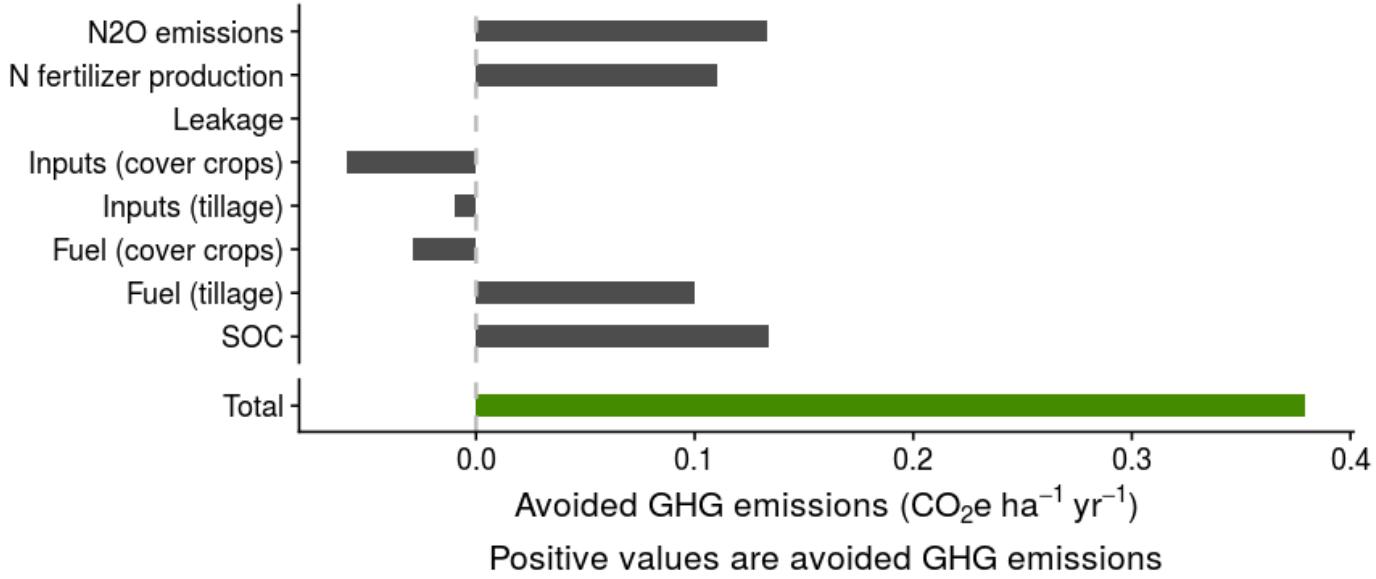
NRCS Conservation Practices	Soil Carbon	Biomass Carbon	Fossil CO_2	Biomass Burning CO_2	Biomass Burning N_2O	Biomass Burning CH_4	Liming	Direct Soil N_2O	Indirect Soil N_2O	Soil CH_4	Total Emission Reductions	Minimum Total Emission Reductions*	Maximum Total Emission Reductions*
Residue and Tillage Management - No-Till (CPS 329) - Reduced Till to No Till or Strip Till on Non-Irrigated Cropland	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.00	0.61	0.31	0.83
Cover Crop (CPS 340) - Add Non-Legume Seasonal Cover Crop (with 25% Fertilizer N Reduction) to Non-Irrigated Cropland	0.46	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.02	0.00	0.47	-0.07	0.70

*Minimum and maximum emission reductions represent the minimum and maximum total emissions over a range of soil, climate and management conditions within multi-county regions. Min/Max emissions are not estimated for all practices, due to limitations in quantification methods

**Values were not estimated due to limited data on reductions of greenhouse gas emissions from this practice

COMET-Planner Interpretation: These practice changes combined would result in 1.01 tons CO2e/ac/yr for **a total of 2.75 tons C/acre over 10 years**

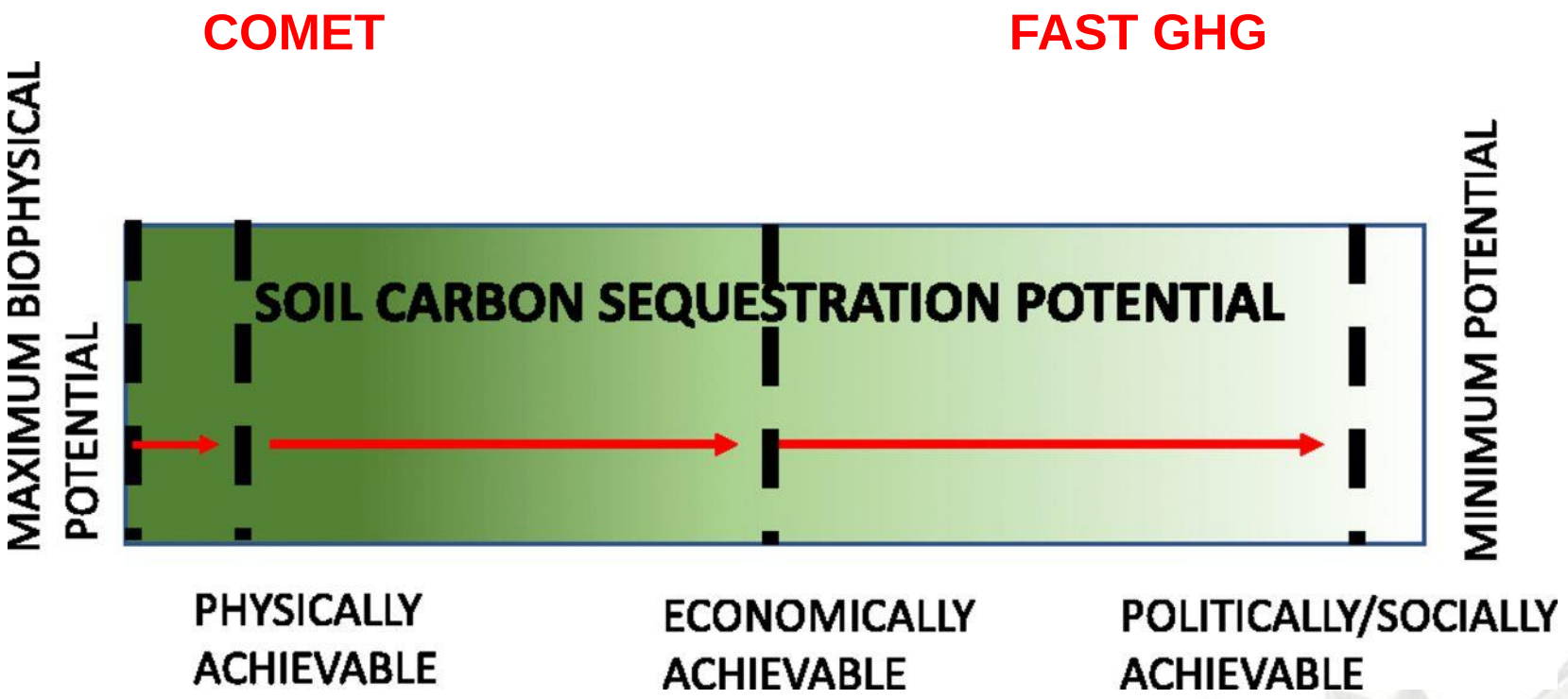
Results | Calculations | About | FAQs



FAST GHG Interpretation: Practices used will result in an SOC change of 0.12 tons CO2e/ha/yr for **a total of 1.32 tons C/acre over 100 years**

Why lower? Accounts for risk of practice reversal over the century.

Understanding the difference in calculations



Ronald Amundson, and Léopold Biardeau PNAS 2018;115:46:11652-11656

Responses: Uncertainty Characterization

FAST GHG: We are developing uncertainty analysis now, it will be completed during the coming months as part of a manuscript for submission to a peer reviewed journal.

COMET Planner: We have worked on SOC uncertainty for three years with numerous statisticians and a robust understanding of uncertainty calculations for SOC and N2O within the National GHG Inventory. The N2O structural uncertainty is "down-scaleable" from the national inventory. The SOC is not – due to small sample size of fields and the difficulty of downscaling the methodology. The COMET-Planner results consistently receive critique as being fairly conservative, I try to take comfort in the conservativeness of the benefits calculations while we continue to attempt to quantify SOC uncertainty properly at the field level.

Responses: Validation to field data

FAST-GHG: The tool was calibrated using available published field data, and is therefore known to be well calibrated to currently available field data. We look forward to being able to continue validation of the model as more data become available.

COMET-Planner: This is where the field sampling and verification of the DayCent model and the COMET-Farm tool really come into focus. We utilize the COMET-Farm tool, in a meta modeling approach, to generate the COMET-Planner results. The science and methods behind COMET-Farm then 'shine through' with the COMET-Planner results. We run replicability tests through an auto-tester every night and have a number of "validation sites". We enforce a strict version control methodology on both tools. This allows users to have awareness of the version of the results that they are using. We keep a ledger of the version updates in order to avoid the "black box" and "model tuning" criticisms.

FAST GHG

Can we add new crops? Depends on available data and would require a few months FTE per crop to add.

COMET Planner:

Can we show just SOC results alone? The carbon and nitrogen cycles are so interconnected that I would be cautious about focusing purely on SOC. I suppose you could focus on the transition to conservation scenarios and only present SOC. Maybe there is a way to provide a simple indicator of the corresponding results for nitrogen.

Is there a model service from NRCS with COMET-Planner? Yes, this is available and could be used by the Fieldprint Platform

Soil C recommendation

- Build in COMET-planner as an optional scenario function for farmers/project admins to explore the potential soil C benefit of conservation practice adoption.
  - Could include an N2O scenario feature as well to make sure trade-offs are considered.

Field to Market®

Why COMET-Planner?

- Of available options, it is the most ready-to-use
- USDA commitment to ongoing development and support of COMET Farm and Planner to keep up-to-date with scientific advances
- Provides consistency with other FTM metrics (GHG Emissions)
- Most appropriate as a scenario “what-if” tool
- Clearer path to more complex tools proposed for use in carbon markets

Why not Cornell approach?

- **Technical aspects** – Provides an annual rate of sequestration amortized over 100 years, so includes assumptions about practice reversal and leakage
  - More suited to long-term accounting than a farmer-facing tool
- **Institutional aspects** – No long-term support/funding, so further development (new crops, additional practices, revisions to update scientific assumptions) dependent on private sector fundraising.

Group Discussion