Resource Assessment Tools: COMET-Farm and Planner

Soil Health Stewardship
Session #7
Resource Assessment Tools
September 9, 2021
9:45 to 10:30 pm Eastern

Speaker

Aaron Ristow

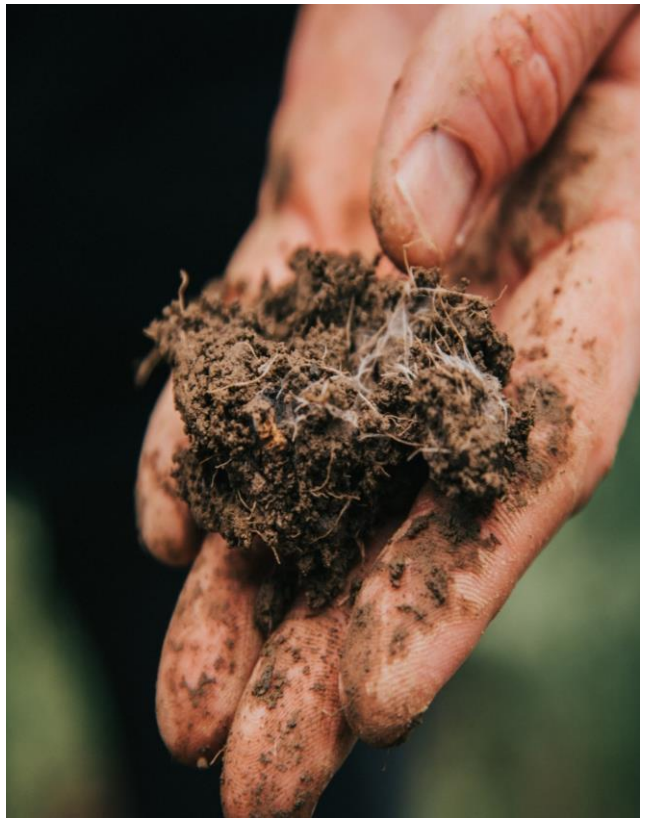
New York Agricultural Stewardship Program Manager

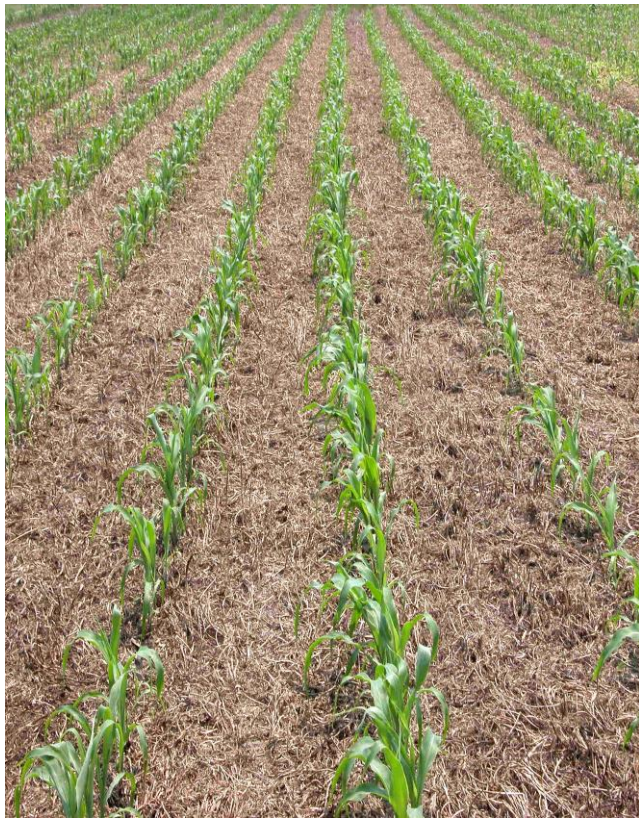
American Farmland Trust

Genesee River Watershed Demonstration Farm Network

LOCAL FARMS
HEALTHY SOIL
CLEAN WATER
Great Lakes
IN PARTNERSHIP WITH AMERICAN FARMLAND TRUST

- Learn from local farmers with successful soil health implementation
- Learn about changes in economic benefits and costs from their real-life experiences
- Learn about observed changes in soil quality like erosion or water runoff
- Learn how to integrate into current system
- Share technology, information and lessons learned with stakeholders





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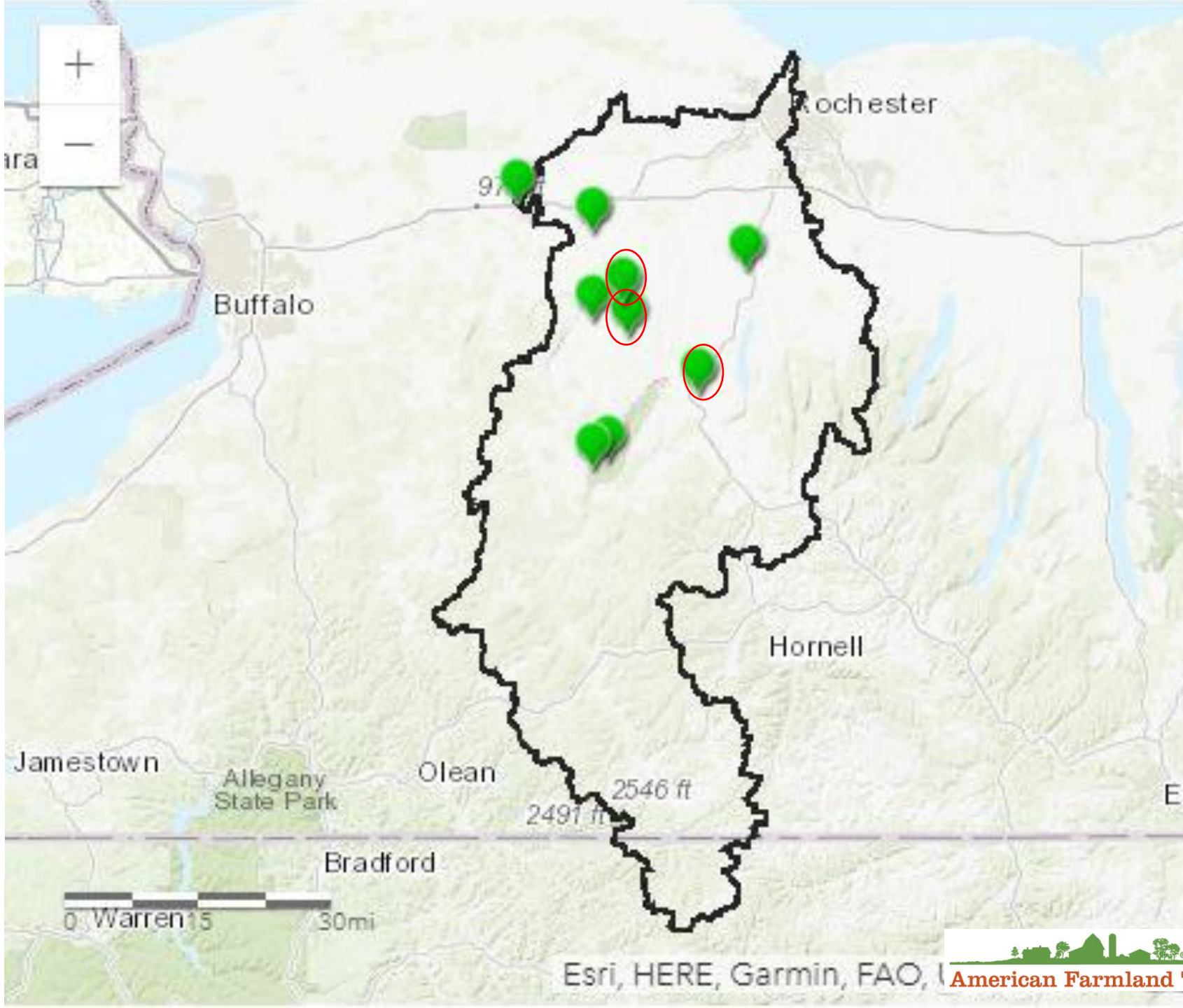
Genesee River Demo Farm Network



9 AFT-NRCS SOIL HEALTH ECONOMIC & ENVIRONMENTAL CASE STUDIES

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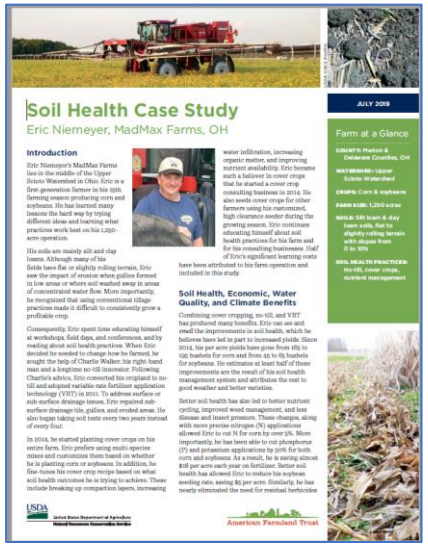
9 Soil Health Case Studies (front)

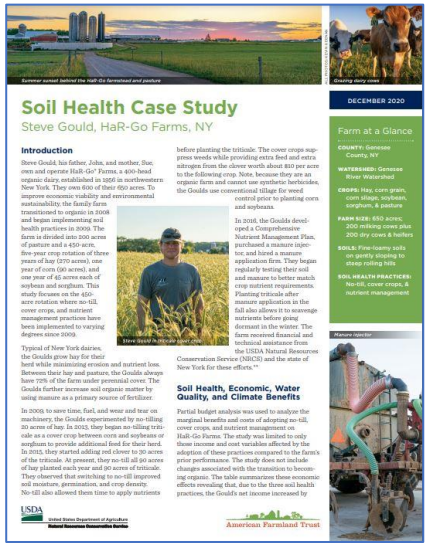
2 CA almond

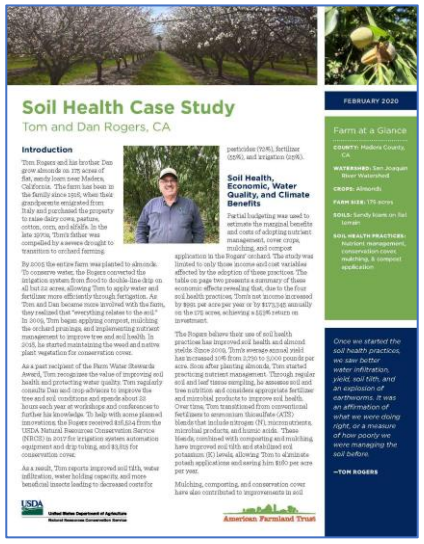
2 IL corn-soybeans

2 OH corn-soybeans



3 NY diversified row crop systems





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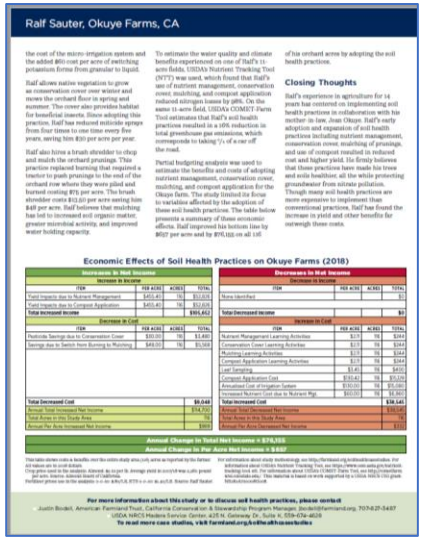
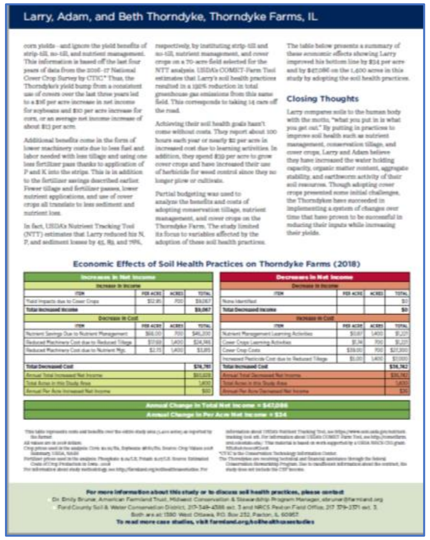
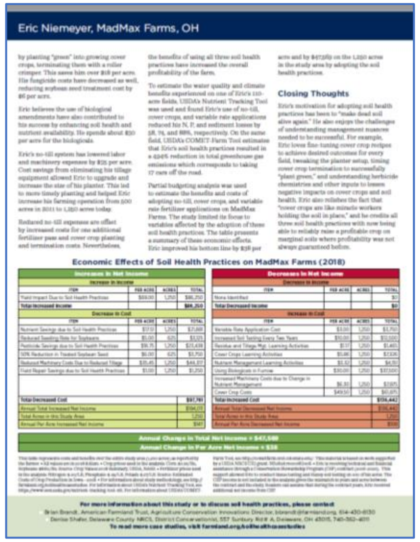
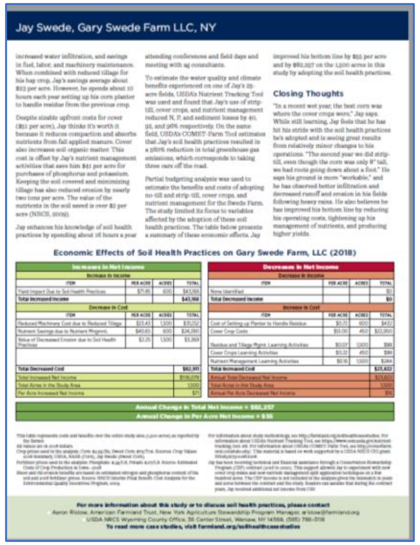
9 Soil Health Case Studies (back)

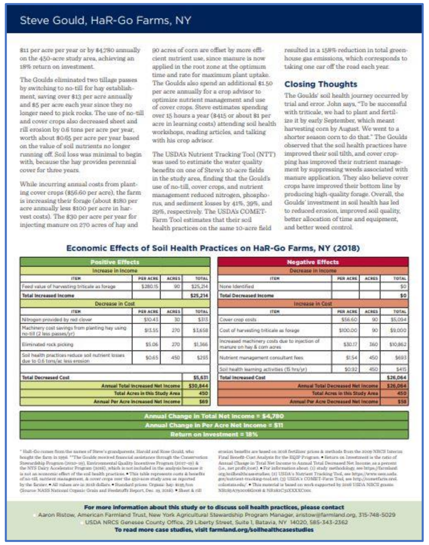
2 CA almond | 2 IL corn-soybeans | 2 OH corn-soybeans | 3 NY diversified row crop systems

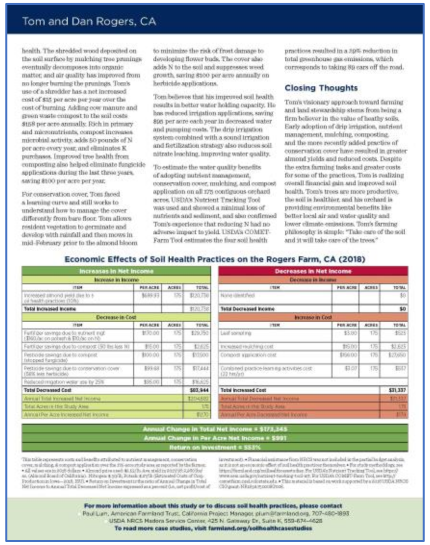

Ralf Sauter, Okuye Farms, CA

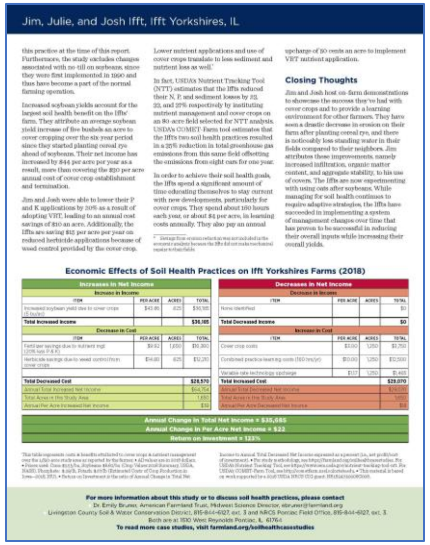

Larry, Adam, and Beth Thorndyke, Thorndyke Farms, IL

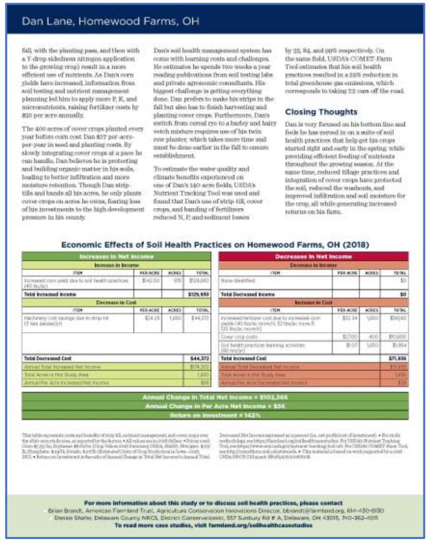

Eric Niemeyer, MadMax Farms, OH

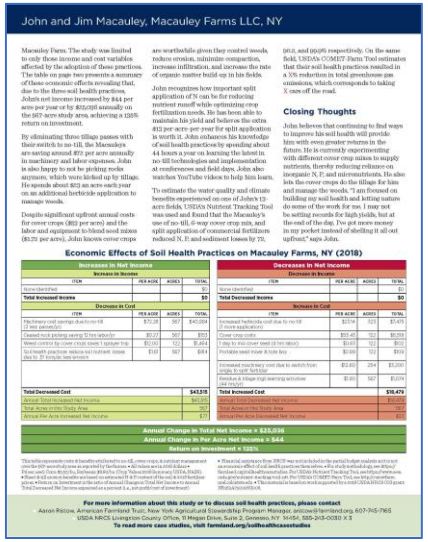

Jay Swede, Gary Swede Farm LLC, NY


Steve Gould, HaR-Go Farms, NY


Tom and Dan Rogers, CA


Jim, Julie, and Josh Ifft, Ifft Yorkshires, IL


Dan Lane, Homewood Farms, OH


John and Jim Macauley, Macauley Farms LLC, NY

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ENVIRONMENTAL ANALYSIS

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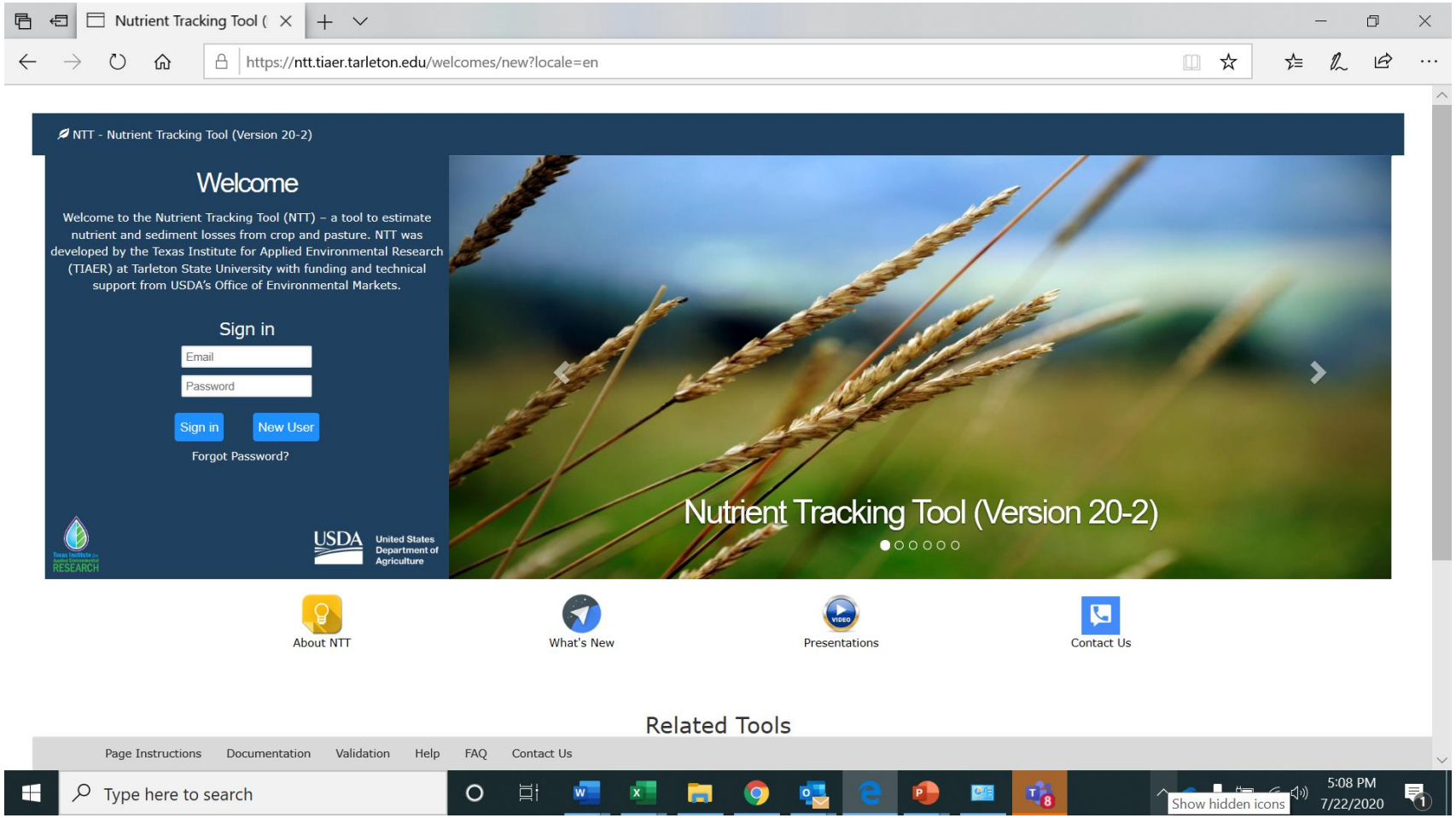
Nutrient Tracking Tool – Water Quality



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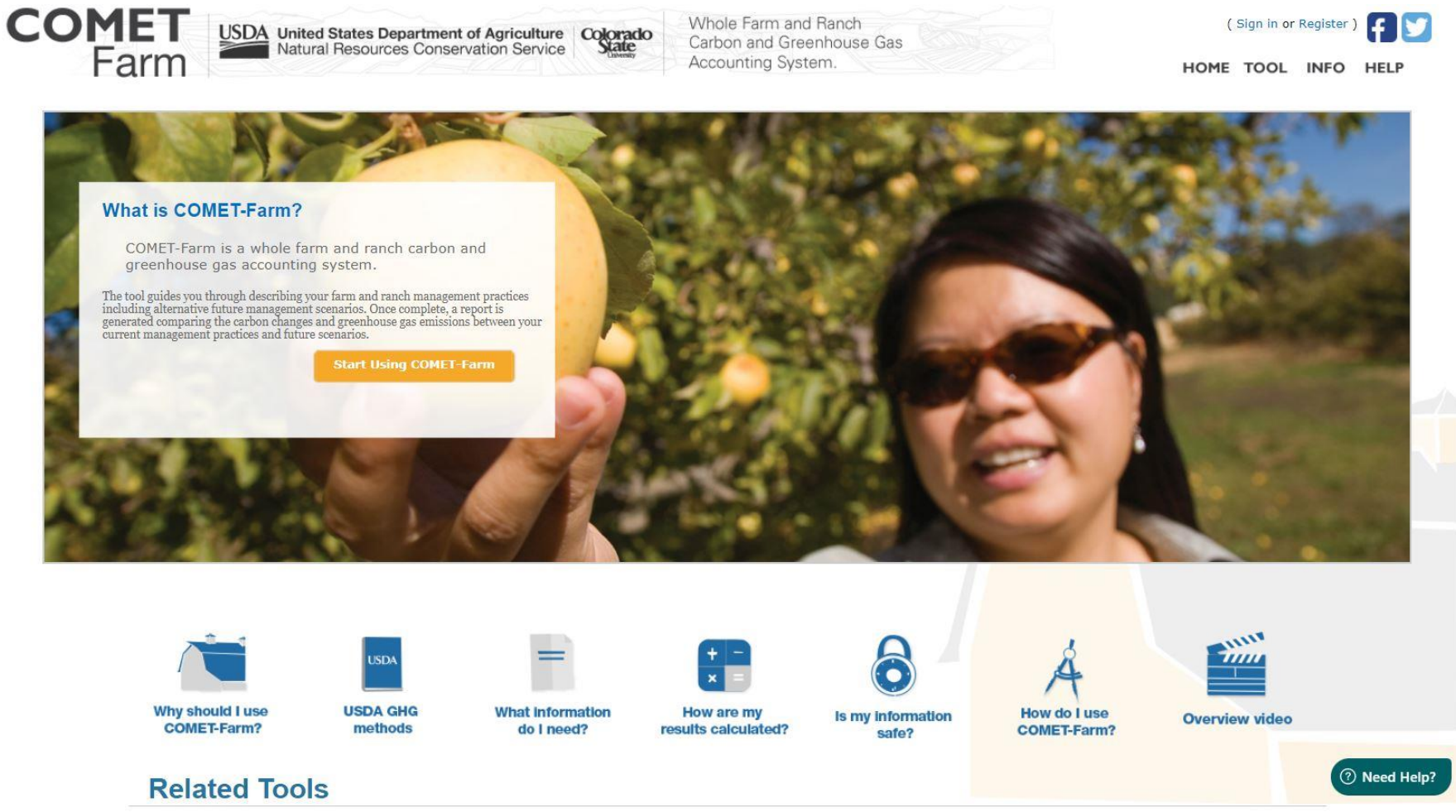
COMET-Farm Tool – GHGs



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Thank you to the External Reviewers of the Case Studies!

- NRCS Economists
  - **Lynn Knight**, Economist, East Region
  - **Bryon Kirwan**, Illinois State Economist
  - **Lakeitha Ruffin**, Oregon State Economist
  - **Richard Iovanna**, FPAC Economist
  - **Sophia Glenn**, FPAC Economist
  - **Sarah Cline**, FPAC Economist

- NRCS Soil Health Specialists
  - **Zahangir Kabir,** West Regional SH Specialist
  - **James Hoorman,** NE Regional SH Specialist
  - **Candy Thomas**, NRCS SH Specialist
  - **Justin Morris**, NRCS SH Specialist
  - **Barry Fisher**, NRCS SH Specialist

- University Economists
  - **John Hanchar,** Cornell Cooperative Extension
  - **Gary Schnitkey,** University of Illinois
  - **Brent Sohngen,** Ohio State University

- NTT Reviewer
  - **Mindy Selman**, USDA Office of Ecosystem Markets

- COMET-Farm Reviewers
  - **Matthew Stermer, Mark Easter, & Haley Nagle** Colorado State University

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Environmental Benefits of Soil Health Practices Across Three New York Farms

Water Quality Improvement

All 3 row crop farms observed reduced soil and water runoff

On selected field for the 3 NY farms, NTT estimated:

- Weighted average reduction in N losses were **49%** (range was 40 to 70)
- Weighted average reduction in P losses were **80%** (range was 39 to 92)
- Weighted average reduction in sediment losses were **83%** (range was 29 to 99)

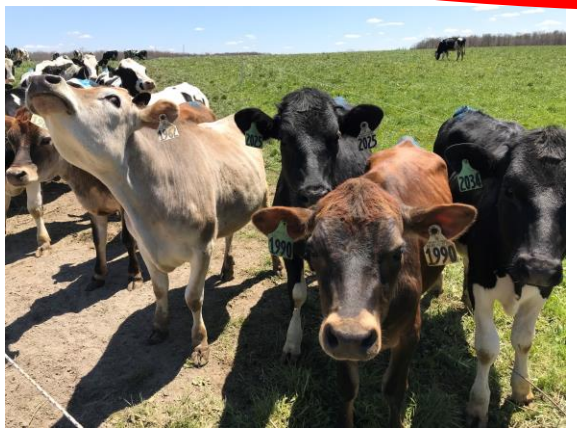
Average field size: 16 acres

Range: 10-25 acres

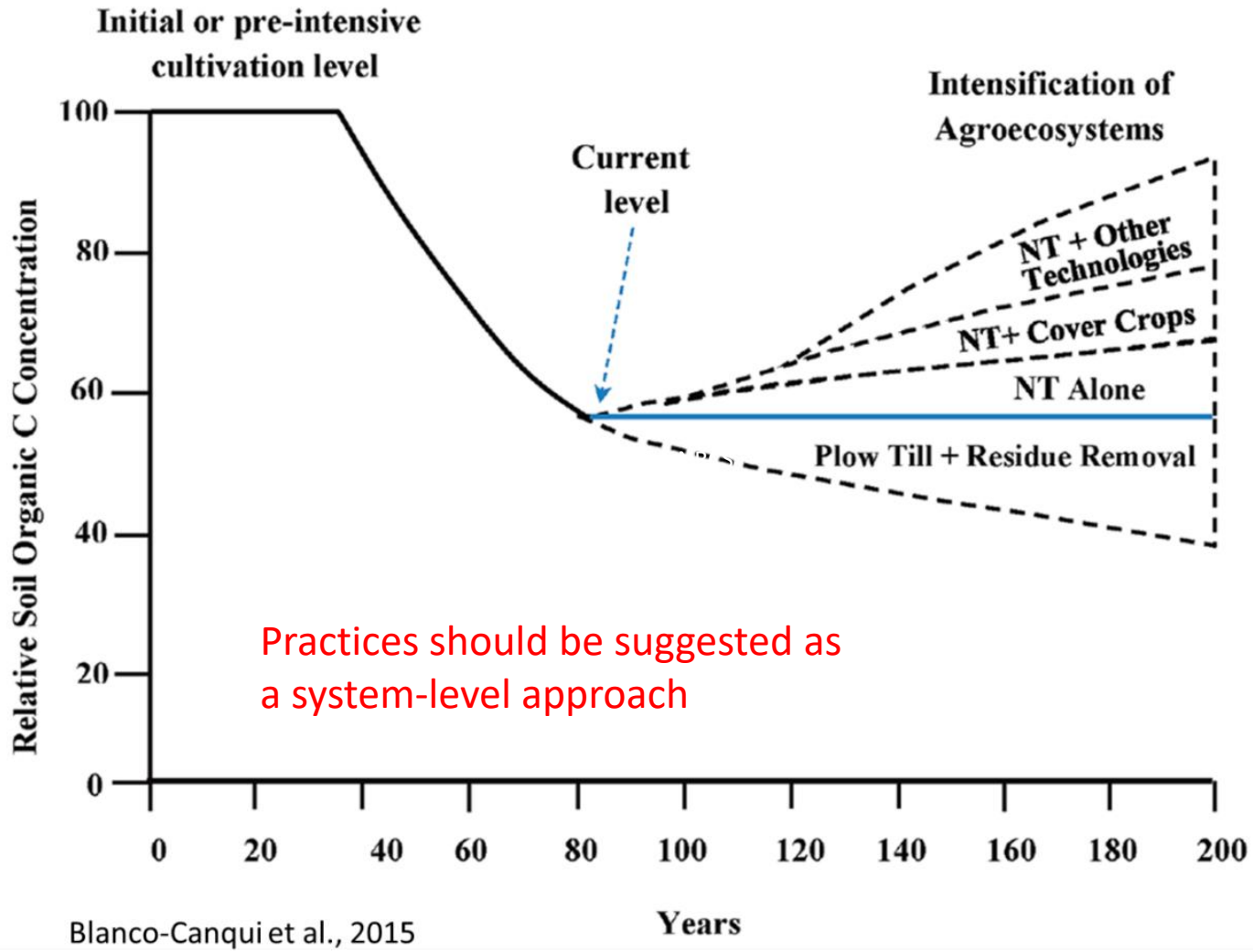
Climate Improvement

On same selected fields COMET-Farm estimated total GHG emissions

- Weighted average reduction of **366%** (range was 69 to 476
- Average reduction of **4 cars** off the road annually

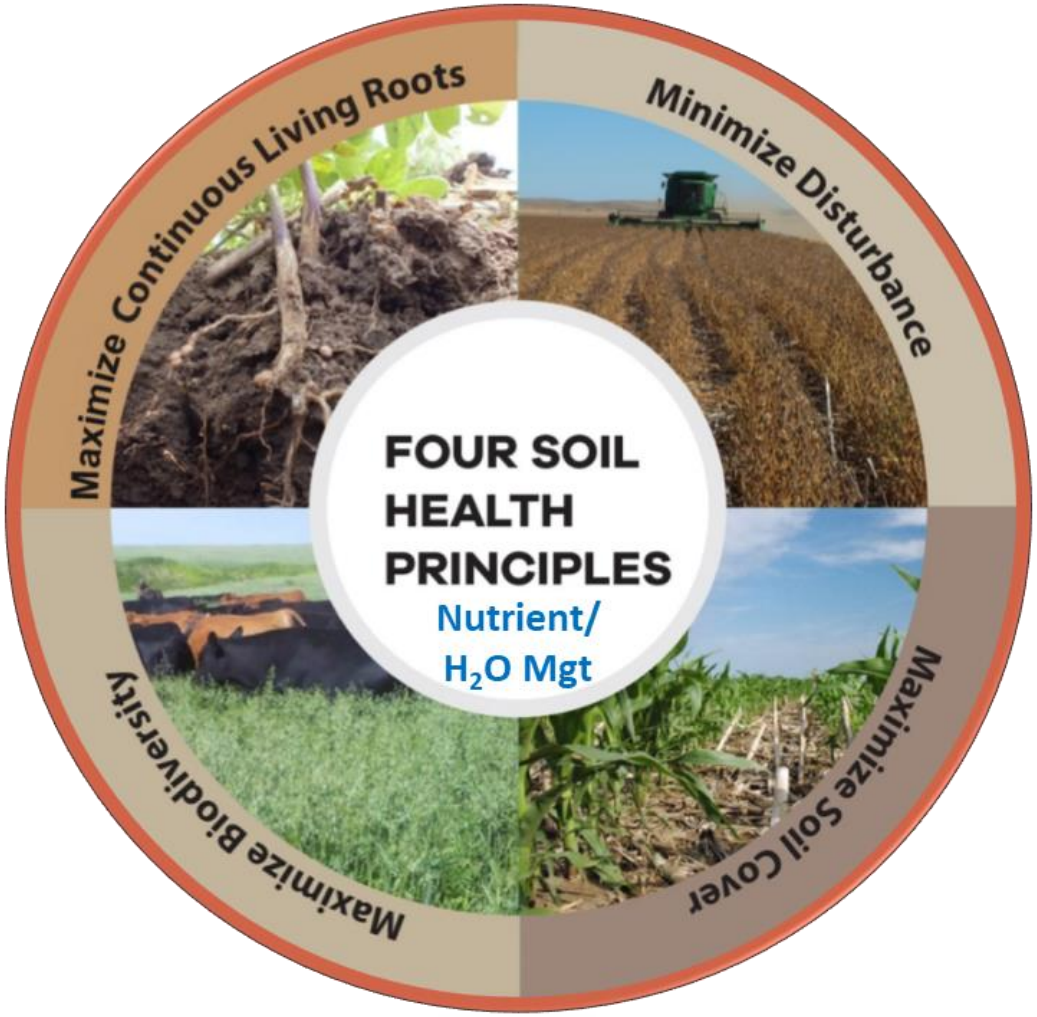


Managing for Climate Mitigation & Resiliency: System Synergies



Practices should be suggested as a system-level approach

Blanco-Canqui et al., 2015



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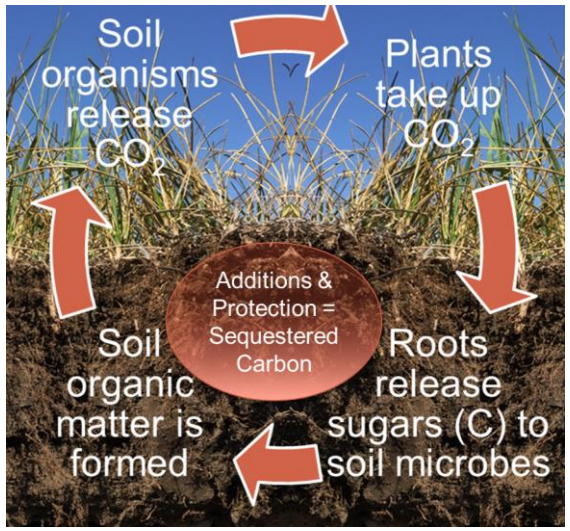

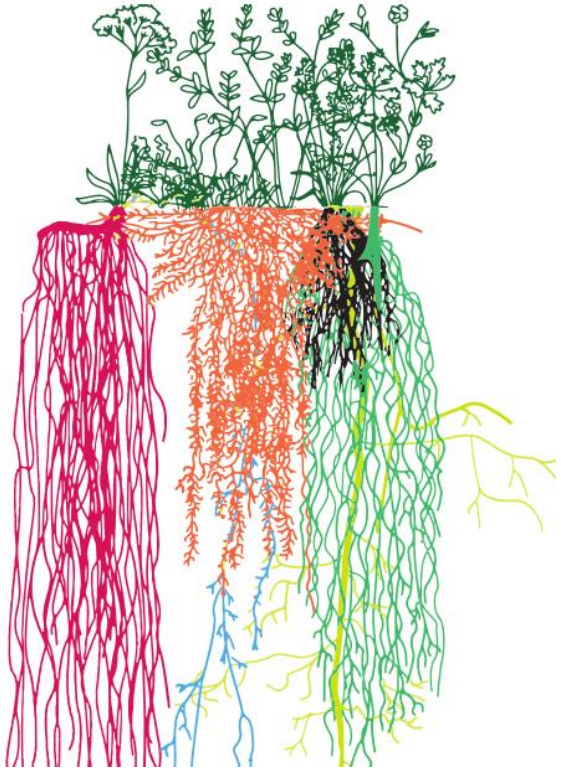

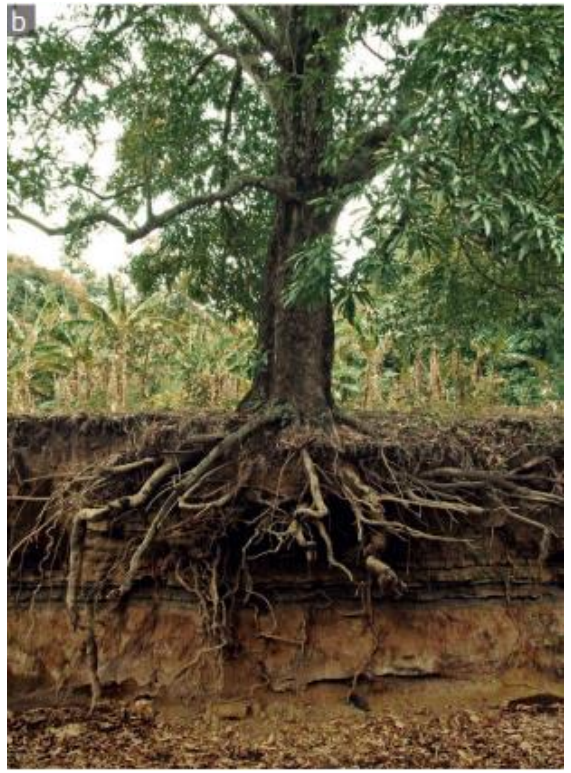

Soil Stores 2-3x More CO_2 than the Atmosphere
2-5x More than Vegetation

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Potential Target Areas for GHG Capture

US Adoption of 4 Soil Health Practices

(*29 recognized & funded by USDA-NRCS for reducing C emissions*)

Practice	Capacity (M ac)	Current Adoption (M ac)	Current Adoption (%)
Prescribed Grazing	655	7	1
Cover Crops	396	15	4
No Till	396	104	26
Nitrogen Management	396	138	35

Source: US Ag. Census (NASS, 2019); ERS (2017) and the Soil Health Institute

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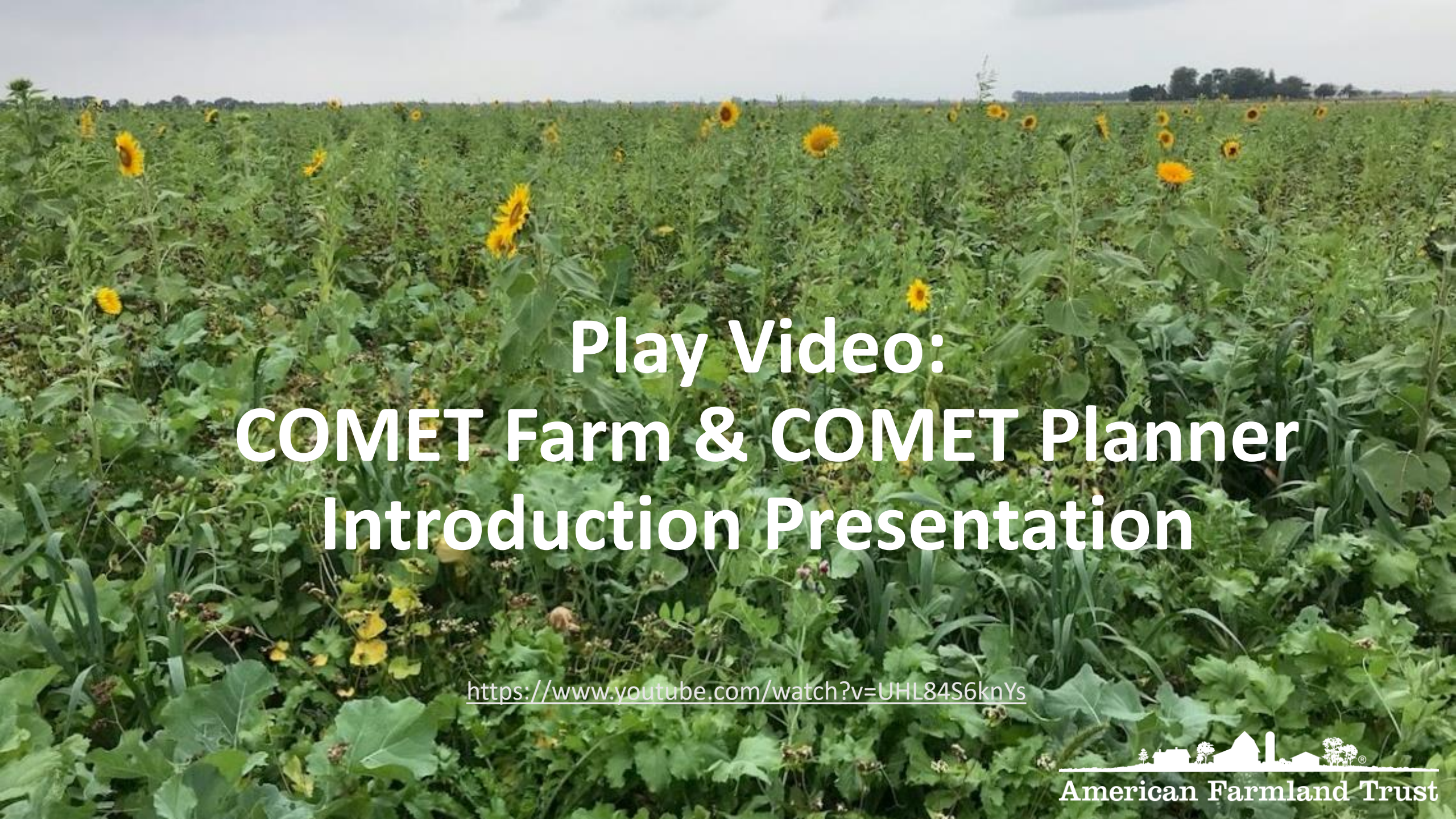

Play Video:
COMET Farm & COMET Planner Introduction Presentation

https://www.youtube.com/watch?v=UHL84S6knYs

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COMET Planner Demonstration

Available at: https://www.youtube.com/watch?v=sC63SJJ3LRM

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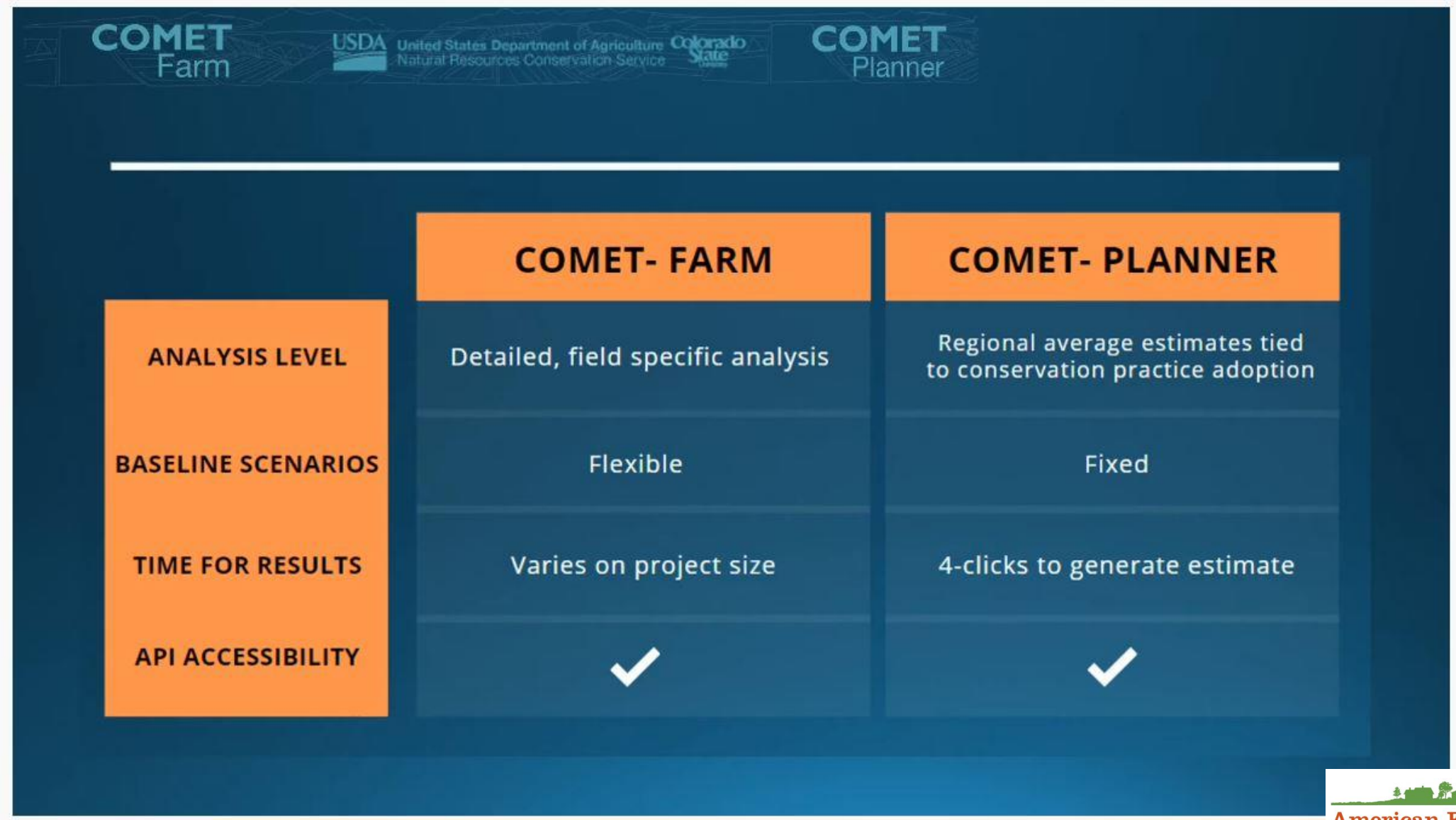
COMET-Farm vs. COMET-Planner



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COMET-Planner Key Information

Step 1: Project Name and Location

- Project name, state, county

Step 2: Farming System and associated Conservation Practices

- Cropland Management
- Grazing Lands
- Wood Plantings
- Cropland to Herbaceous Cover
- Restoration of Disturbed Lands

Step 3: Select NRCS Practices and Implementation

- Several Practice Standards, depending on system
- Several Implementation levels of practices, depending on system

Step 4: Acreage Associated with Each Conservation Practice

Results are instant and displayed at bottom of page

COMET-Planner Results

- All estimates are presented as emission reductions relative to baseline management
- Positive values denote a decrease in GHG emissions and negative values denote an increase in GHG emissions
- Soil and biomass carbon stock increases in response to conservation practices are limited in duration
- The carbon dioxide reductions reported should be viewed as average values over a 20-year duration

The greenhouse gas equivalencies calculator can help you understand what reducing carbon dioxide (CO_2) emissions means in everyday terms: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

COMET-Planner Carbon Sequestration and Greenhouse Gas Estimation Report

Project Name: Swede Farm

State: New York

County: Livingston

Date Created: 09/08/2021 14:35:06

Approximate Carbon Sequestration and Greenhouse Gas Emission Reductions*
(tonnes CO_2 equivalent per year)

NRCS Conservation Practices	Acres	Carbon Dioxide	Nitrous Oxide	Methane	Total CO_2-Equivalent
Residue and Tillage Management - No-Till (CPS 329) - Intensive Till to No Till or Strip Till on Non-Irrigated Cropland	25	9	1	0	10
Cover Crop (CPS 340) - Add Non-Legume Seasonal Cover Crop (with 25% Fertilizer N Reduction) to Non-Irrigated Cropland	25	3	0	0	3
Nutrient Management (CPS 590) - Improved N Fertilizer Management on Non-Irrigated Croplands - Reduce Fertilizer Application Rate by 15%	25	0	0	0	0
Totals:	75	12	1	0	13

*Negative values indicate a loss of carbon or increased emissions of greenhouse gases
**Values were not estimated due to limited data on reductions of greenhouse gas emissions from this practice

For more information on how these estimates were generated, please visit www.comet-planner.com.

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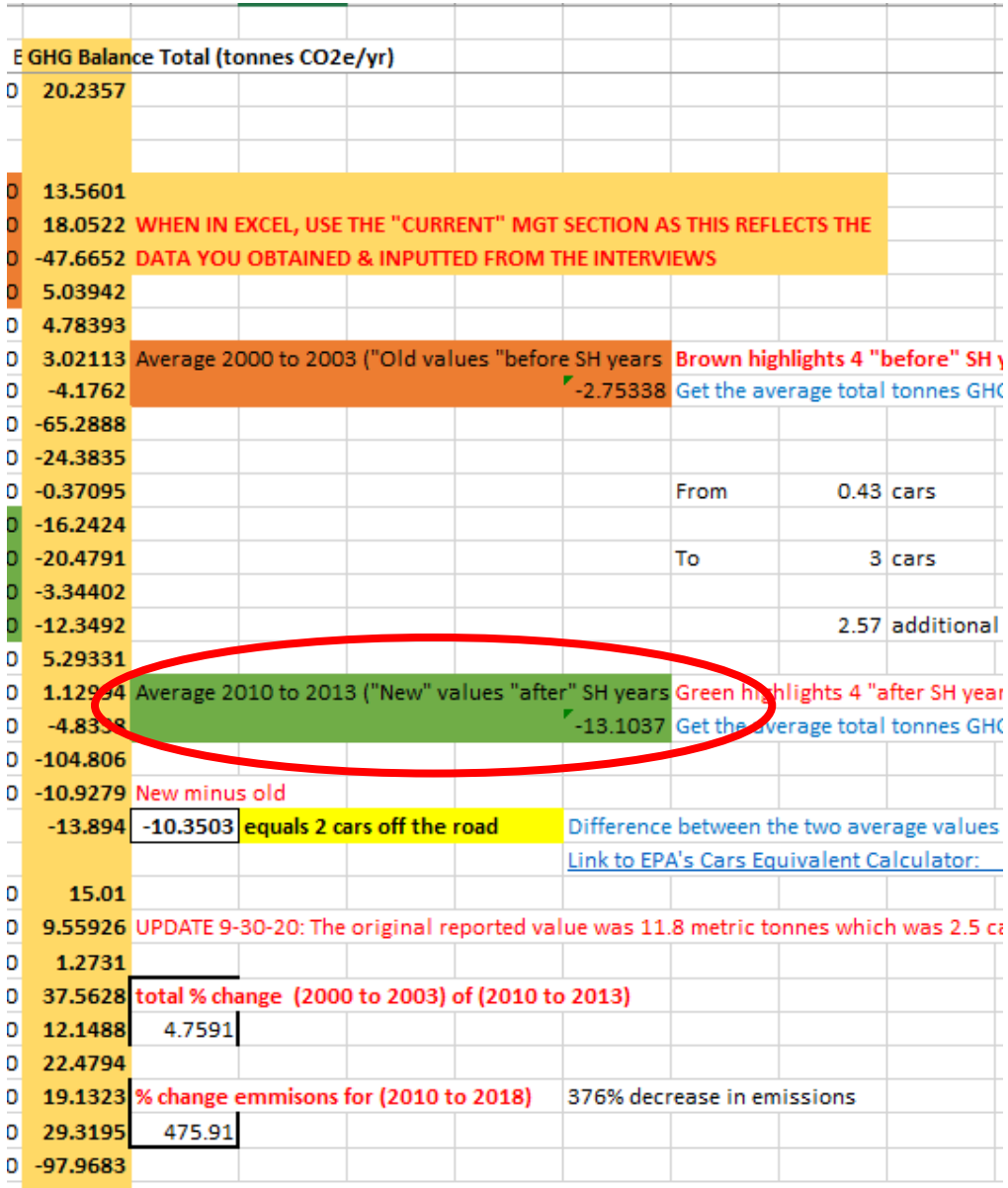
COMET-Farm vs COMET-Planner Results

COMET-Farm Analysis



E	GHG Balance Total (tonnes CO2e/yr)				
0	20.2357				
0	13.5601				
0	18.0522	WHEN IN EXCEL, USE THE "CURRENT" MGT SECTION AS THIS REFLECTS THE			
0	-47.6652	DATA YOU OBTAINED & INPUTTED FROM THE INTERVIEWS			
0	5.03942				
0	4.78393				
0	3.02113	Average 2000 to 2003 ("Old values "before SH years	Brown highlights 4 "before" SH y		
0	-4.1762	-2.75338	Get the average total tonnes GHG		
0	-65.2888				
0	-24.3835				
0	-0.37095		From	0.43	cars
0	-16.2424				
0	-20.4791		To	3	cars
0	-3.34402				
0	-12.3492			2.57	additional
0	5.29331				
0	1.12994	Average 2010 to 2013 ("New" values "after" SH years	Green highlights 4 "after SH year		
0	-4.8338	-13.1037	Get the average total tonnes GHG		
0	-104.806				
0	-10.9279	New minus old			
	-13.894	-10.3503 equals 2 cars off the road	Difference between the two average values		
			Link to EPA's Cars Equivalent Calculator:		
0	15.01				
0	9.55926	UPDATE 9-30-20: The original reported value was 11.8 metric tonnes which was 2.5 ca			
0	1.2731				
0	37.5628	total % change (2000 to 2003) of (2010 to 2013)			
0	12.1488	4.7591			
0	22.4794				
0	19.1323	% change emmisons for (2010 to 2018)	376% decrease in emissions		
0	29.3195	475.91			
0	-97.9683				

COMET-Planner Report

COMET-Planner Carbon Sequestration and Greenhouse Gas Estimation Report

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State: New York

County: Livingston

Date Created: 09/08/2021 14:35:06

Approximate Carbon Sequestration and Greenhouse Gas Emission Reductions*
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COMET TIPS

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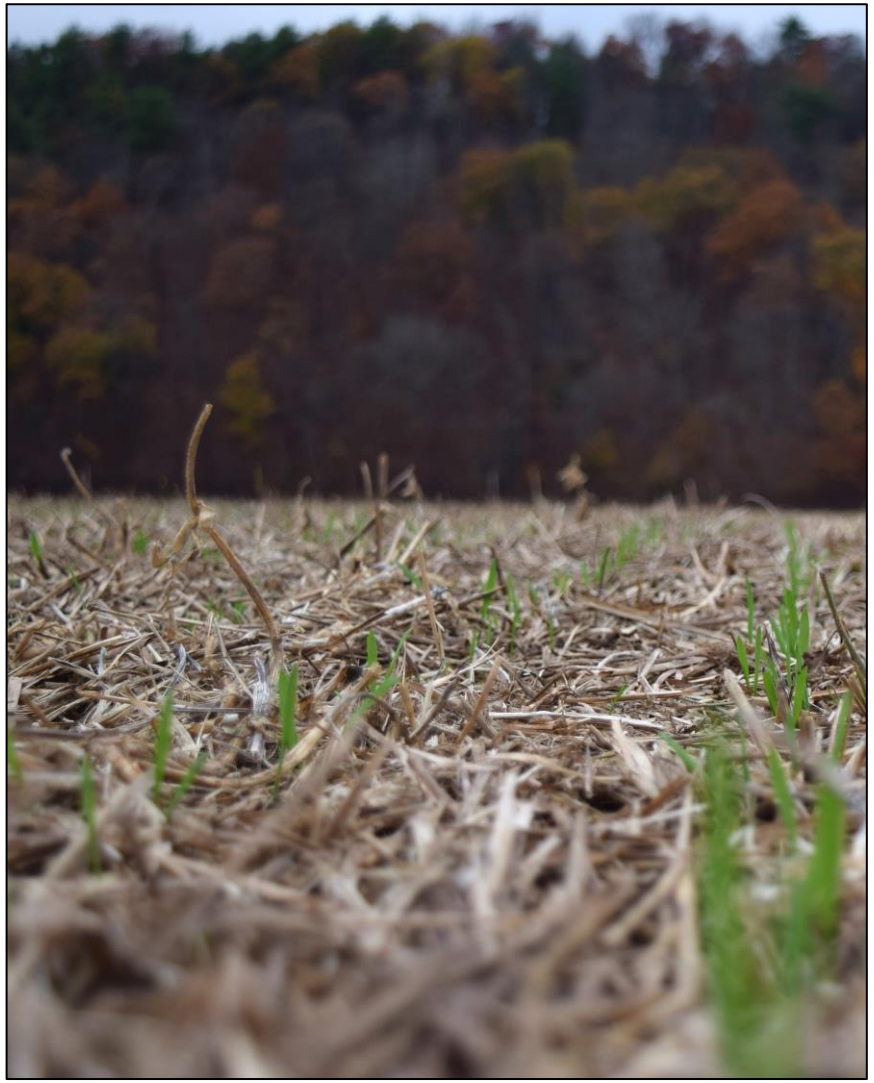
TIPS FOR CONDUCTING COMET ANALYSIS

Identifying farmers

- Farmers who have expressed an interest in environmental benefits
- Farmers with a good story/large contrasts between before and after
- Farmers with a history of practice
- Farmers with good records
- Farmer who have other conservation practices in place
- Farmers willing to put their business out there
- Farmers willing to travel and speak about their journey in front of peers
- Farmers respected in their community



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TIPS FOR COMET ANALYSIS

Interviewing Farmers

- Schedule visits
- Timing the interview is important; likely only done during winter
- Show interest/be curious
- Identify farm type, practices
- Record interview
- Set aside up to an hour
- Give them an idea of the questions that will be asked before the interview

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TIPS FOR CONDUCTING COMET ANALYSIS

Sharing results

- Have a compelling story, seek contrasts
- Must record interview
- Pick out great quotes from your interview
- Make stories as simple as possible
- Have a talented, expert team in place

Contact Info

Aaron Ristow
NYS Ag Stewardship Manager
aristow@farmland.org
315.748.5029

Download the case studies at:
farmland.org/soilhealthcasestudies

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