ORGANIC AGRICULTURE: CLIMATE CHANGE CHAMPION

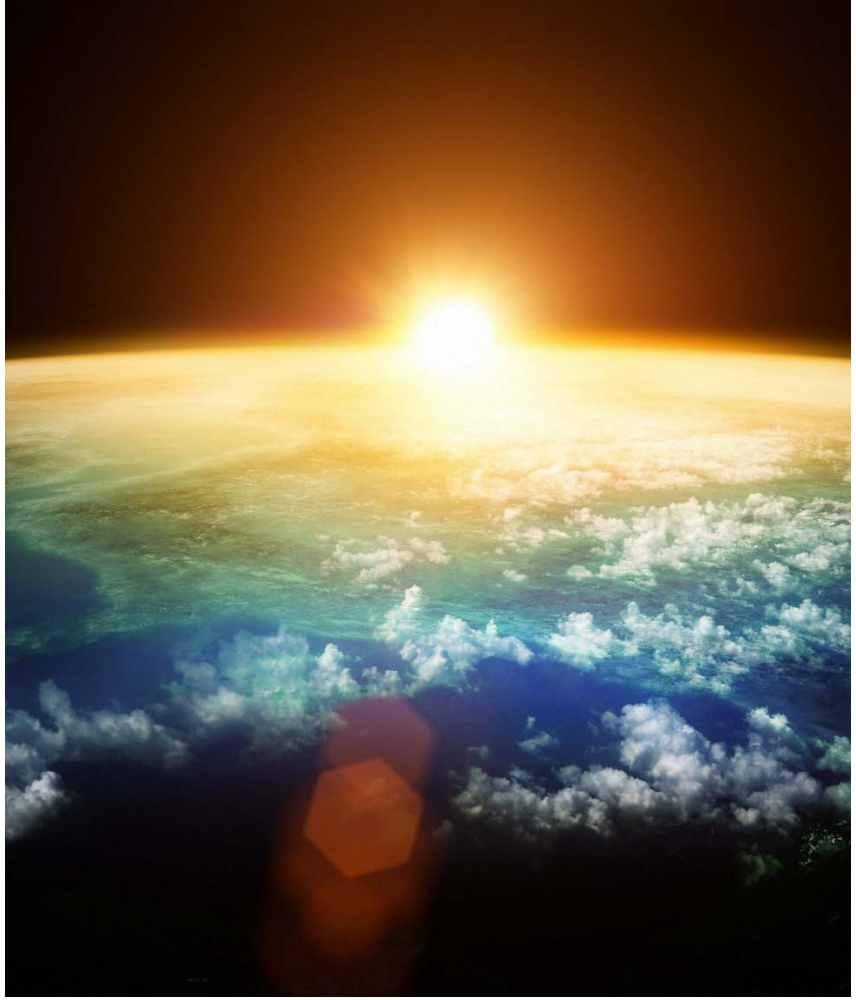
Friday, September 15. 2017
11:00-12:00 p.m.

SPEAKERS

Tracy Misiewicz, Associate Director Science Programs, The Organic Center
Elizabeth Reaves, Program Director, Sustainable Food Lab

MODERATOR

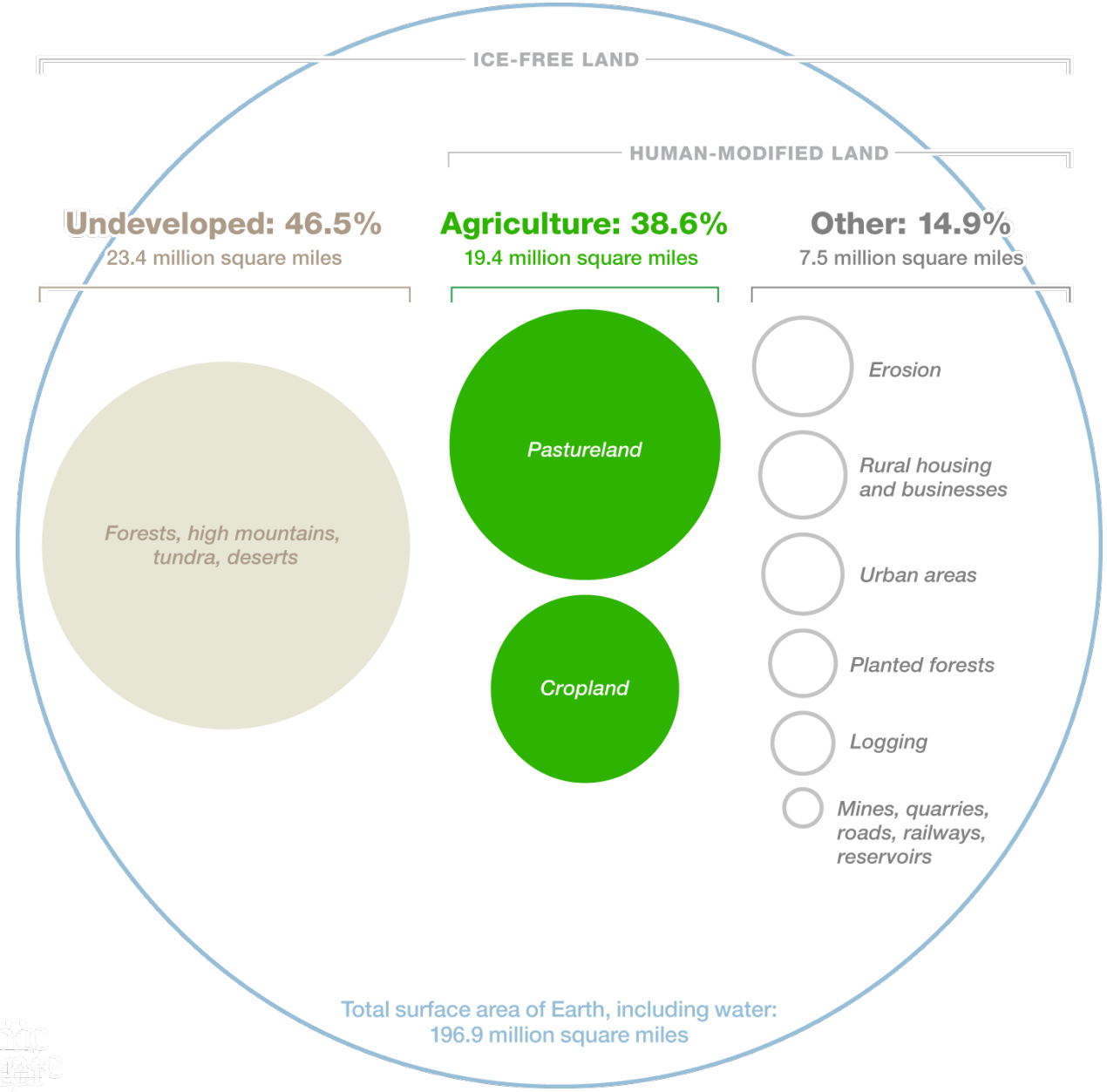
Shauna Sadowski, VP of Sustainability & Industry Relations, Annie's, Inc.



Organic Agriculture: Climate Change Champion
What does the science say?

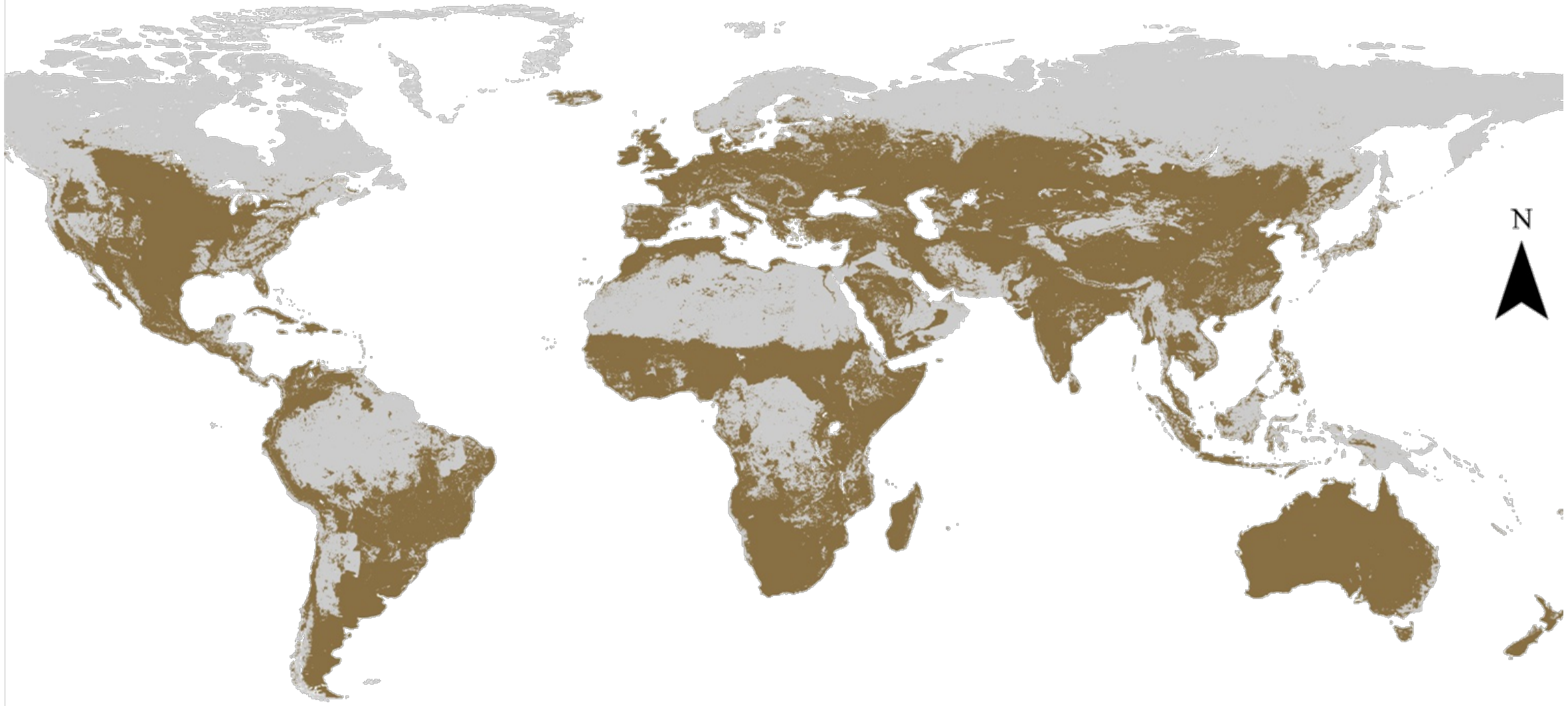
Tracy Misiewicz, PhD
Associate Director of Science Programs, The Organic Center

1. Why consider agriculture?
2. Organic farming and climate change mitigation
3. New research preview



- 40% of Earths ice-free surface is used for agricultural production
- 330 million acres in the U.S.

FEEDING THE WORLD



Legend Anthromes (v2), Ellis et al. 2010

Range and Cropland

Seminatural and Wild

Agriculture and Climate Change

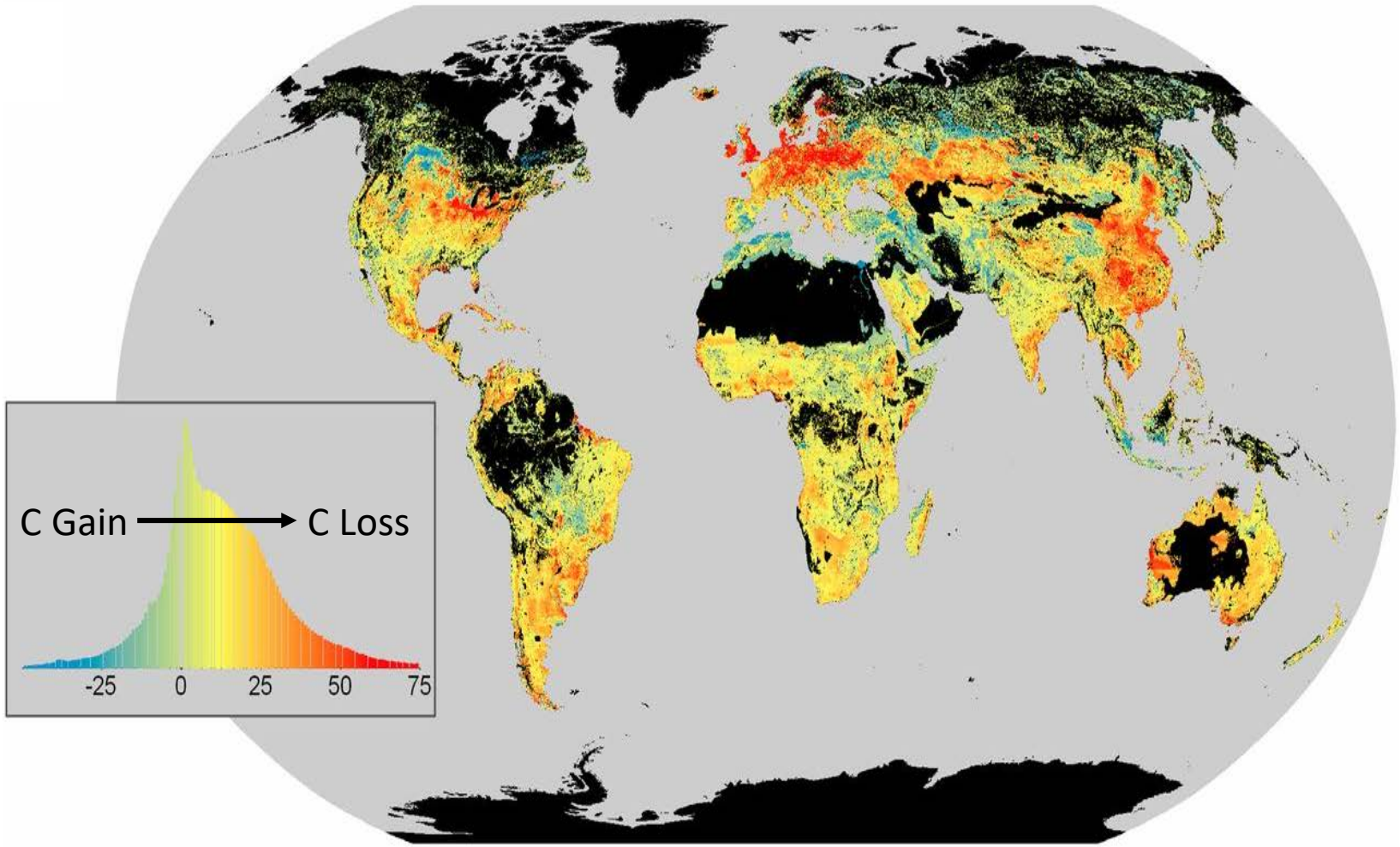
- Agriculture is a major contributor to total greenhouse gas emissions
- Projected increase in extreme weather events threatens food security

Conventional Agriculture

Depleting our soils

- Synthetic fertilizer
- Little recycled organic matter
- Pesticide use

Carbon Loss in the Top Two Meters of Soil



Jonathan Sanderman et al. PNAS
doi:10.1073/pnas.1706103114

PNAS

Conventional Agriculture

Global loss of soil carbon

- Article published in PNAS shows carbon debt
- 133 billion metric tonnes of carbon lost worldwide in the top 2 meters of soil
- Rate of loss increasing dramatically over the last 200 years

Organic Agriculture

Climate friendly practices

- Fallowing

Organic Agriculture

Climate friendly practices

- Fallowing
- Crop rotation

Organic Agriculture

Climate friendly practices

- Fallowing
- Crop rotation
- Manure and legume fertilizer

Organic Agriculture

Climate friendly practices

- Fallowing
- Crop rotation
- Manure and legume fertilizer
- No pesticides

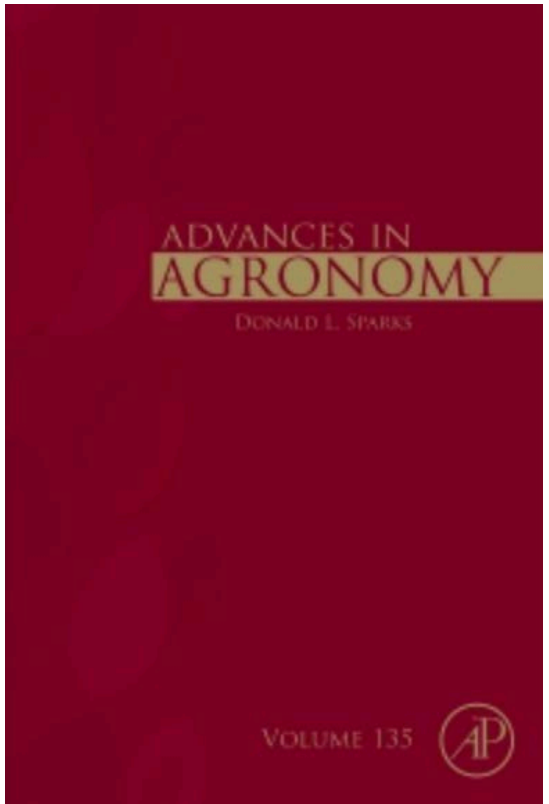
Organic Agriculture

- More soil organic carbon
- More energy efficient
- Reduced greenhouse gas emissions

National Comparison of the Total and Sequestered Organic Matter Contents of Conventional and Organic Farm Soils

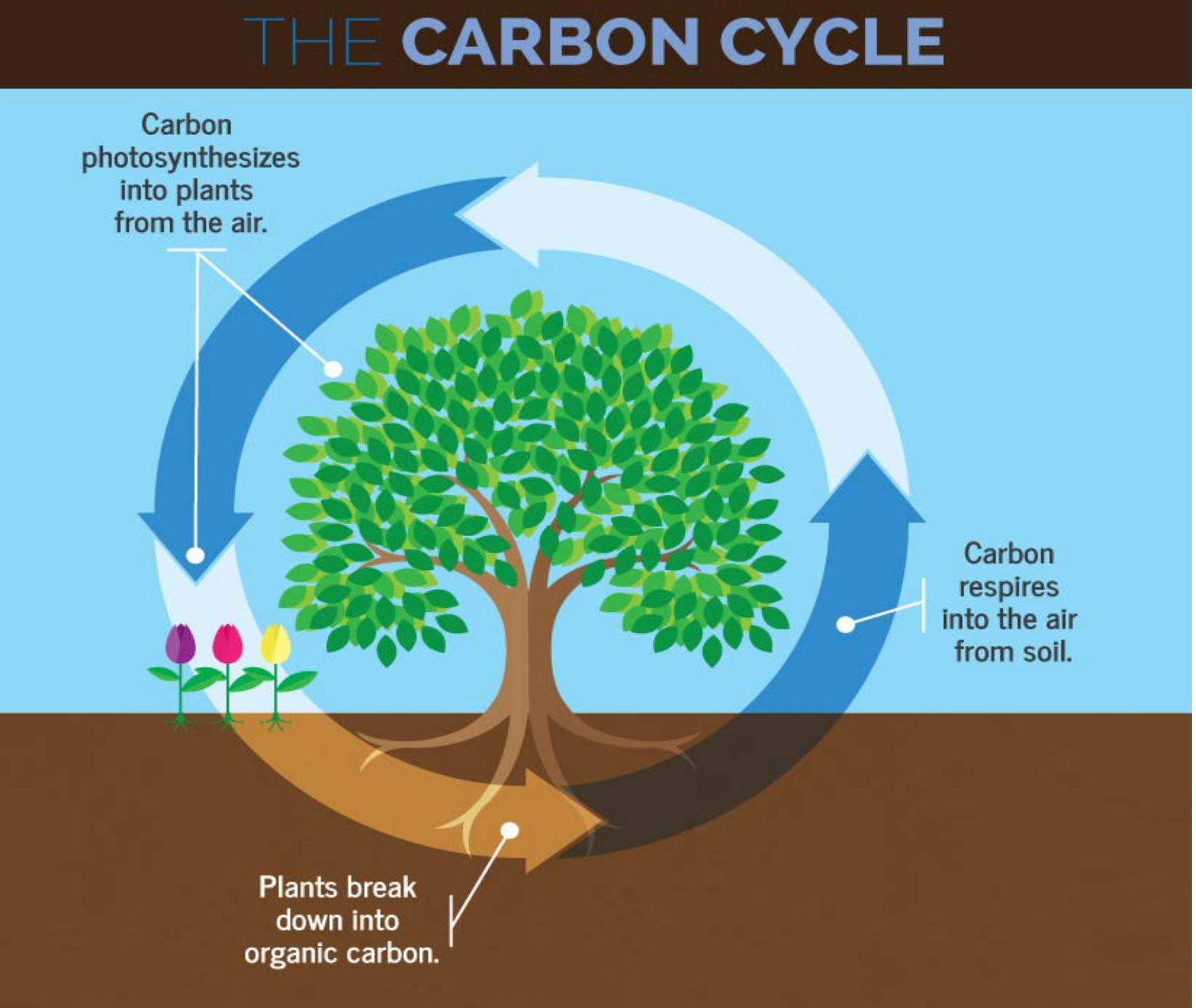
Elham A. Ghabbour, Geoffrey Davies, Tracy Misiewicz, Reem A. Alami, Erin M Askounis, Nicholas P. Cuozzo, Alexia J. Filice, Jennifer M. Haskell, Andy K. Moy, Alexandra C. Roach and Jessica Shade

Advances in Agronomy
Volume 146
Release date: October 1, 2017



New Research

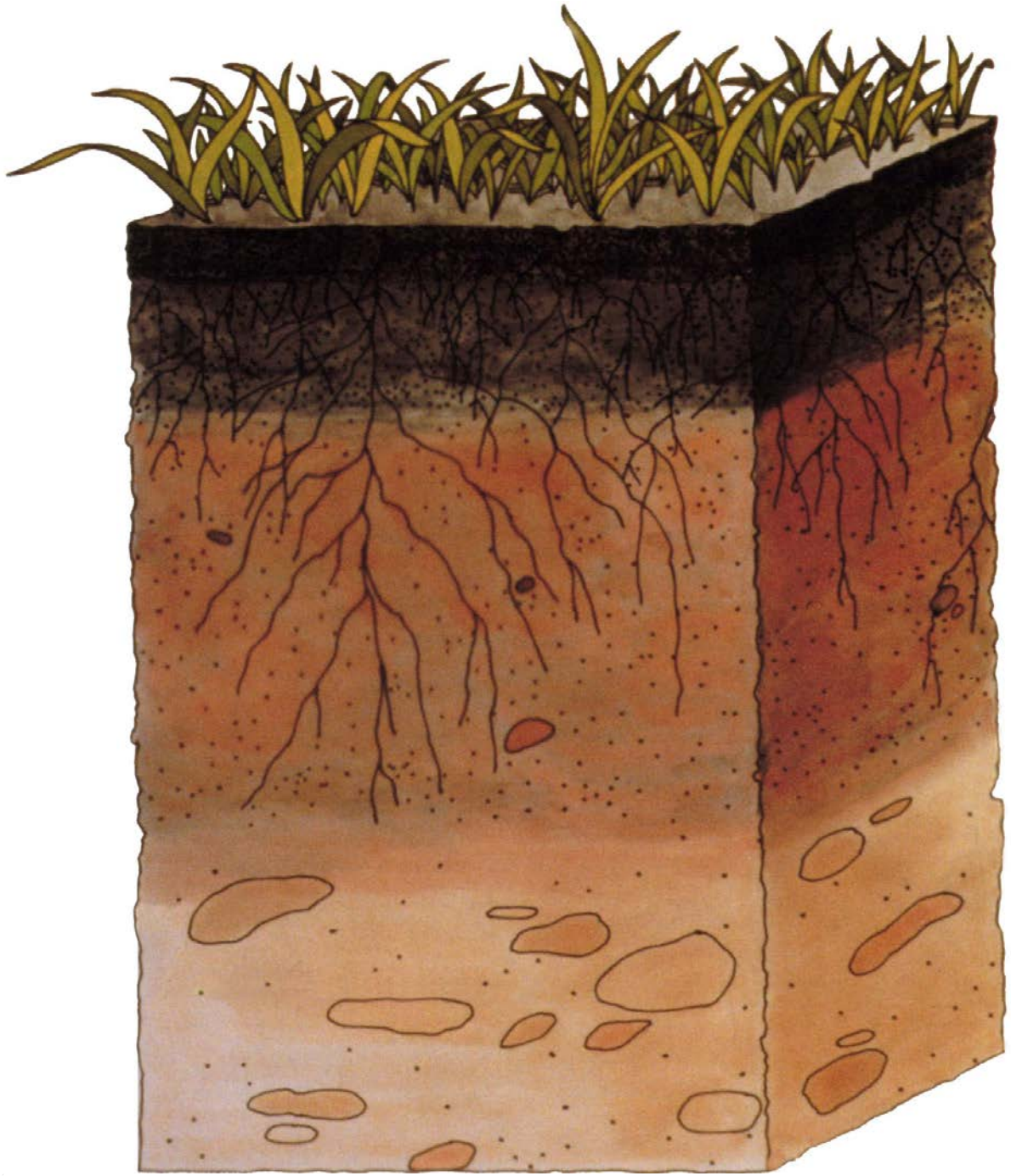
- Northeastern University National Soil Project
- Drs. Geoff Davies and Elham Ghabbour
- Comparison of long-term carbon storage in conventional and organically managed soils



Soil Organic Carbon

Why is it so important?

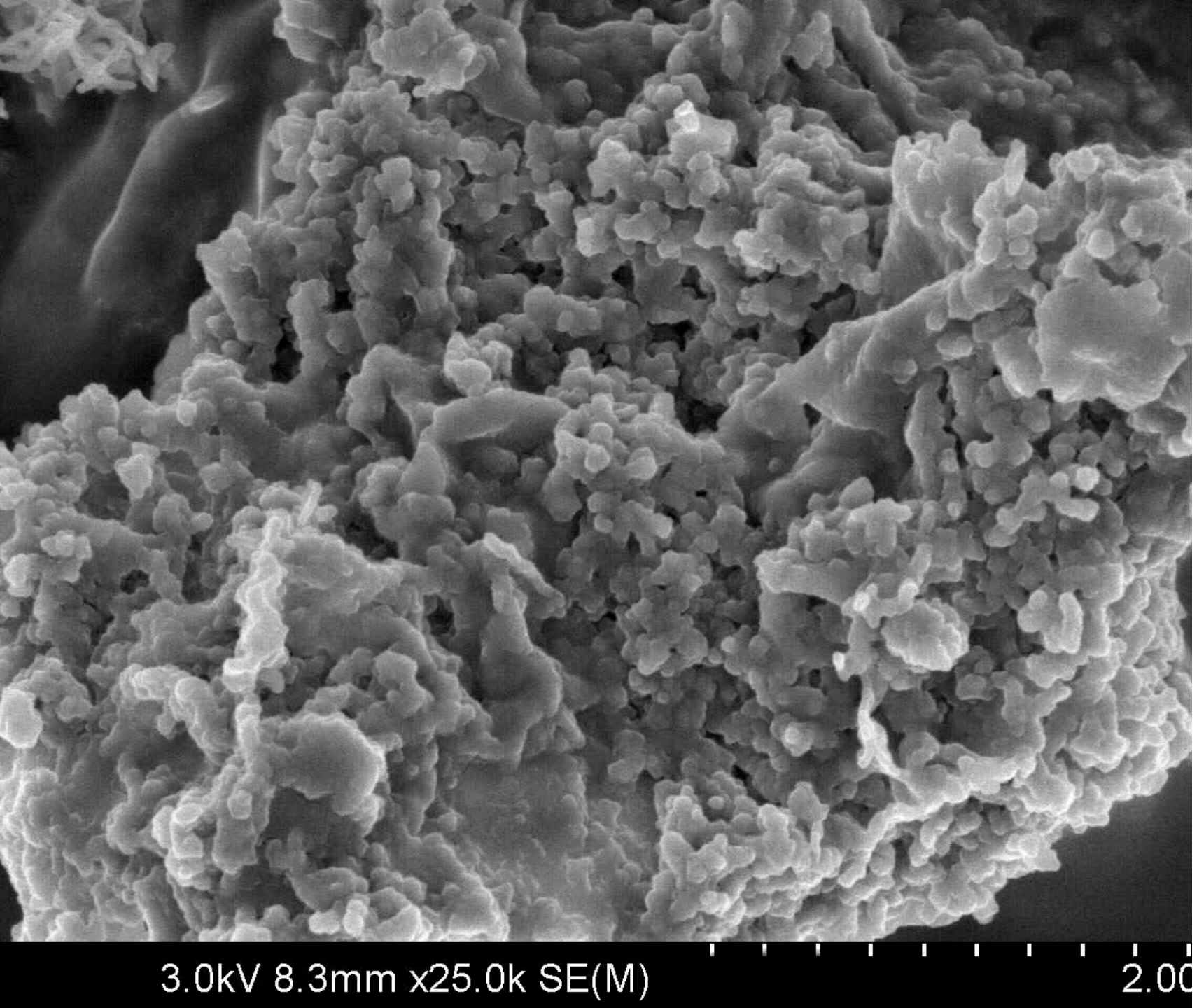
- Reduces erosion
- Protects against compaction
- Improves aeration, water filtration and water holding capacity
- Reserve for essential nutrients
- Supports soil organisms by providing a food source



Soil Organic Carbon

What are its components?

- Two main pools of soil organic carbon
- Labile carbon pool (high turnover)
- Stable carbon pool also known as humic substances (low turnover)
    - Humic acid
    - Fulvic acid



Humic Substances

What are they and why are they important?

- Major organic constituents of soil
- Contain carbon
- Long-lived and stable
- Linked with higher fertility, beneficial soil structure, etc.

Our Research

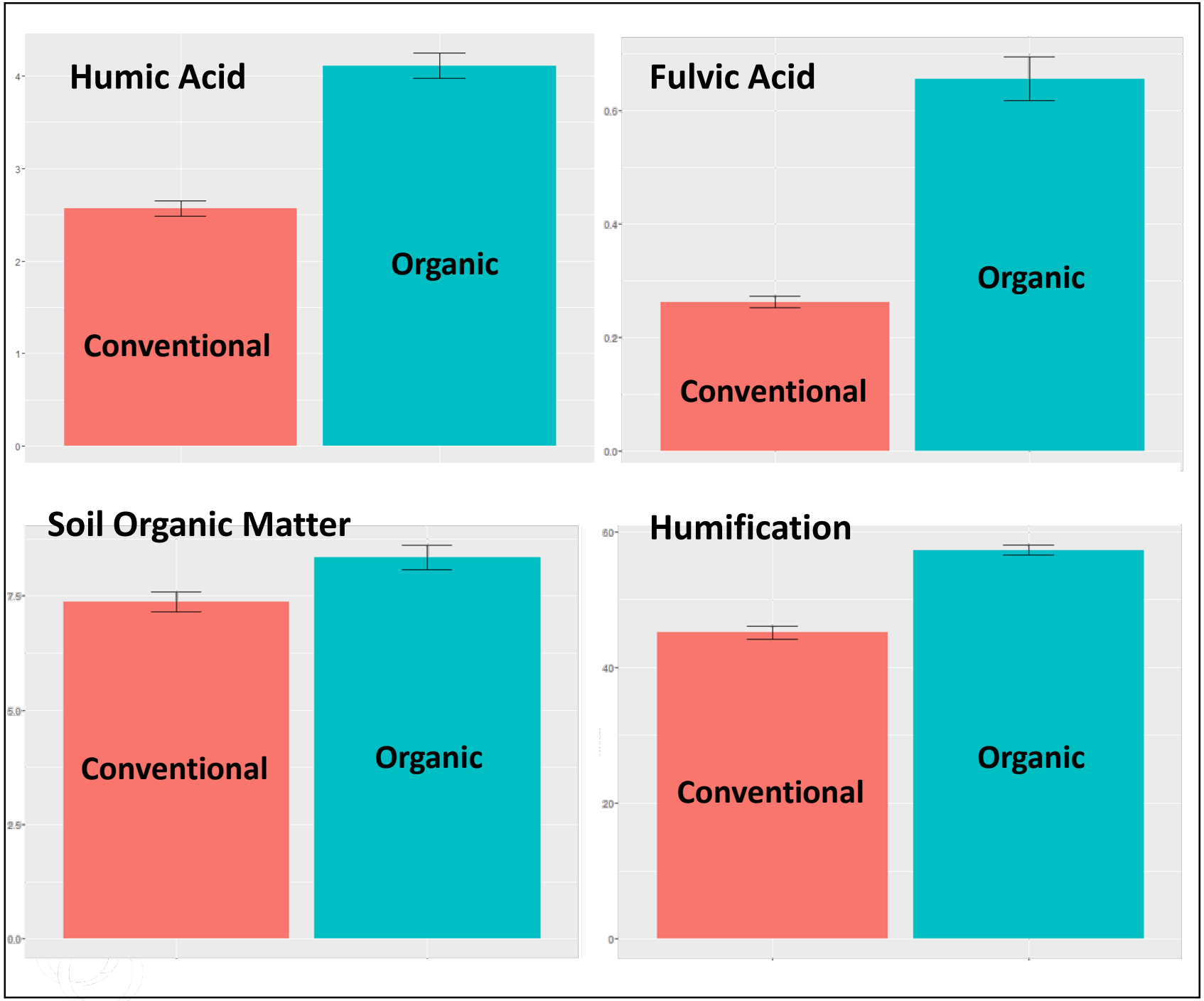
Do organic soils have higher levels of humic substances?

- Quantify the amount of humic substances in organic soils vs conventional soils
- Test the hypothesis that organic soils are better at long-term carbon sequestration

Our Research

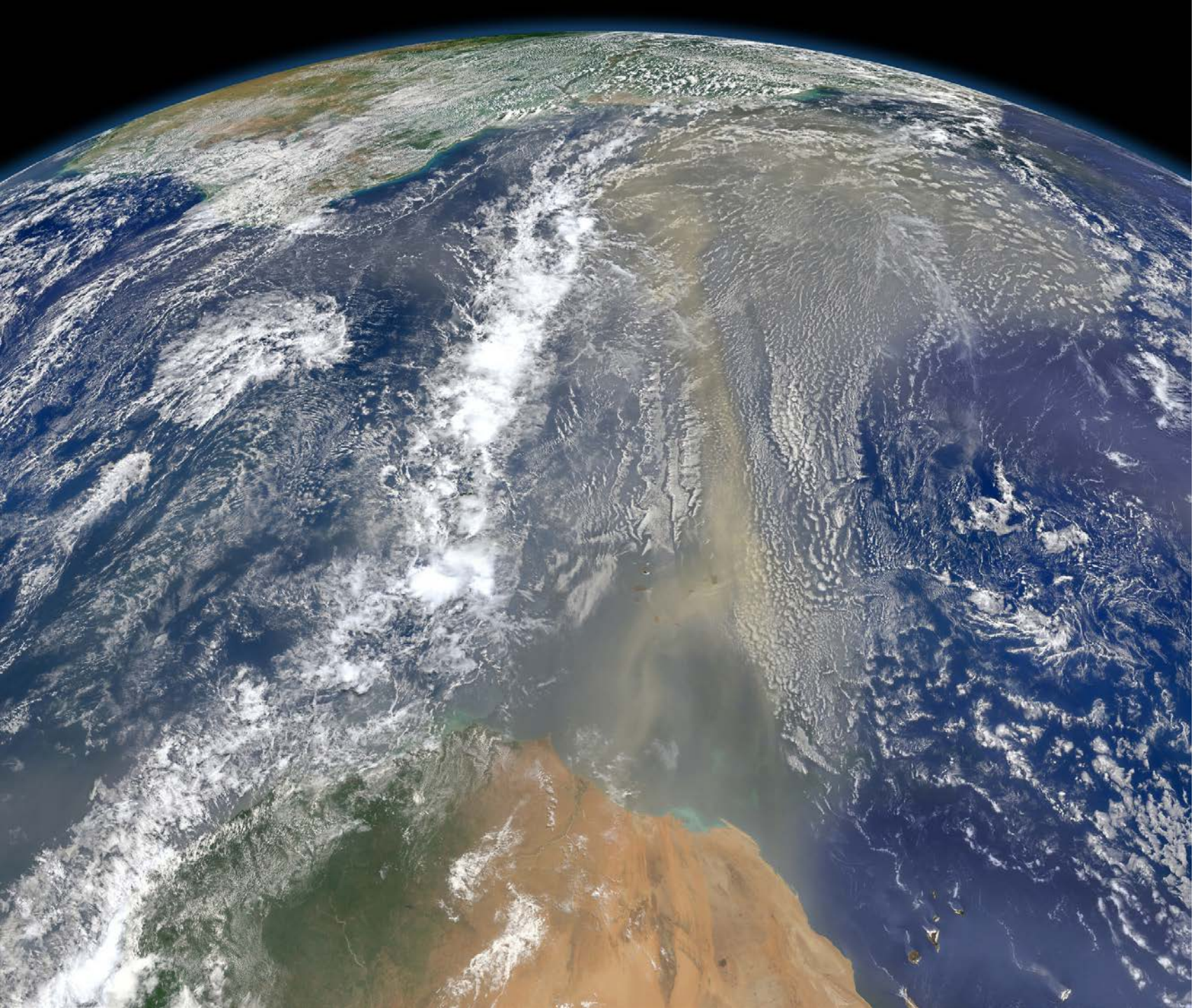
Research collaborators

- The Organic Center
- The National Soil Project at Northeastern University
- Over 1,000 farmers



Our Results

- On average, soils from organic farms had higher levels of:
  - 13% higher soil organic matter
  - 1 ½ times higher fulvic acid levels
  - 44% more humic acid
  - 26% more humification (i.e. long term carbon storage)



Importance

- First large-scale study comparing stable components of organic matter from organic and conventional farms
- Takes a broad view, and incorporates variation across management styles
- Shows that organic farming can build soil health and can contribute to climate change mitigation

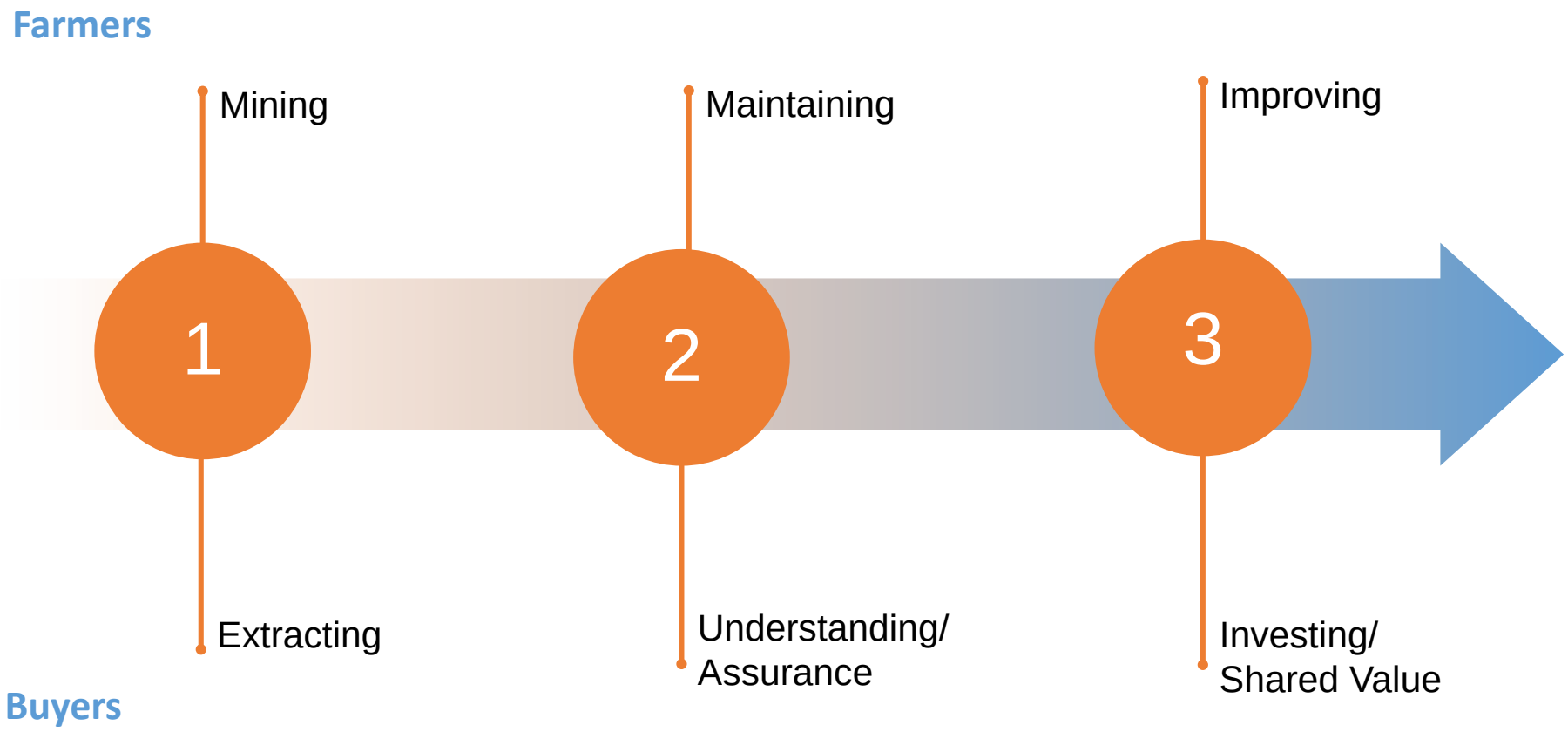
The Organic Center

Decision support tools

Measuring carbon in agricultural supply chains

Sustainable Food Lab

Progression of Change



Progression of Change

Action areas

Global Potential

1

Fertilizer

Type, rate, optimizations

Big acres
Big issues (water)
Big source of GHG

2

Soil

Till, cover, rotations
perennials

Big acres
Bigger change
Lots of ancillary benefits
(water, productivity biodiversity)

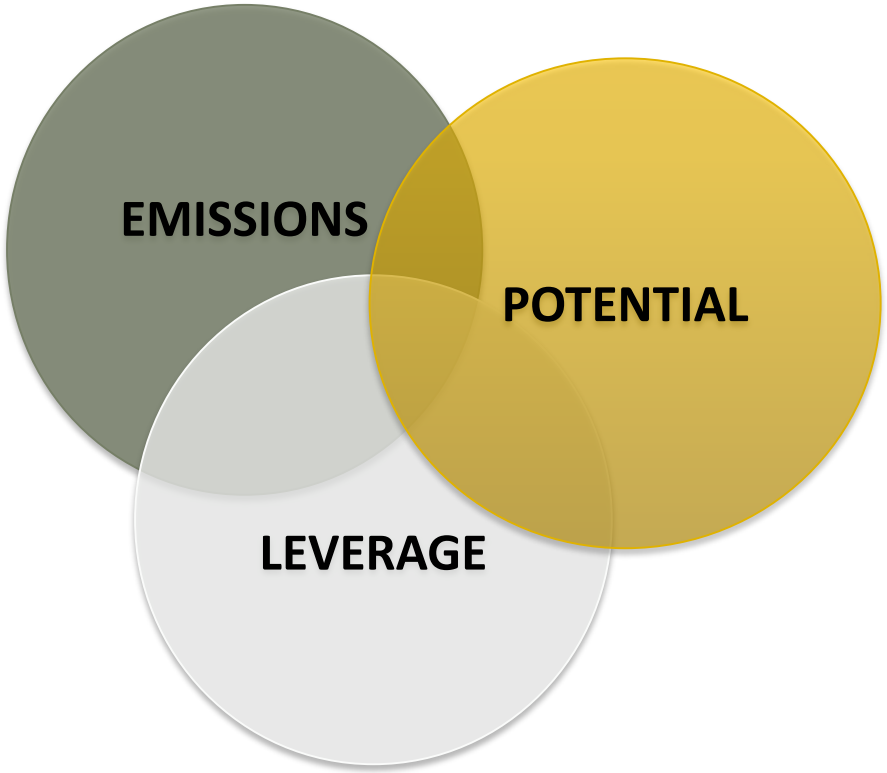
3

Agroforestry

Pruning
Residue management

Small acres
Biggest change

Taking Action



Mt CO_2-eq

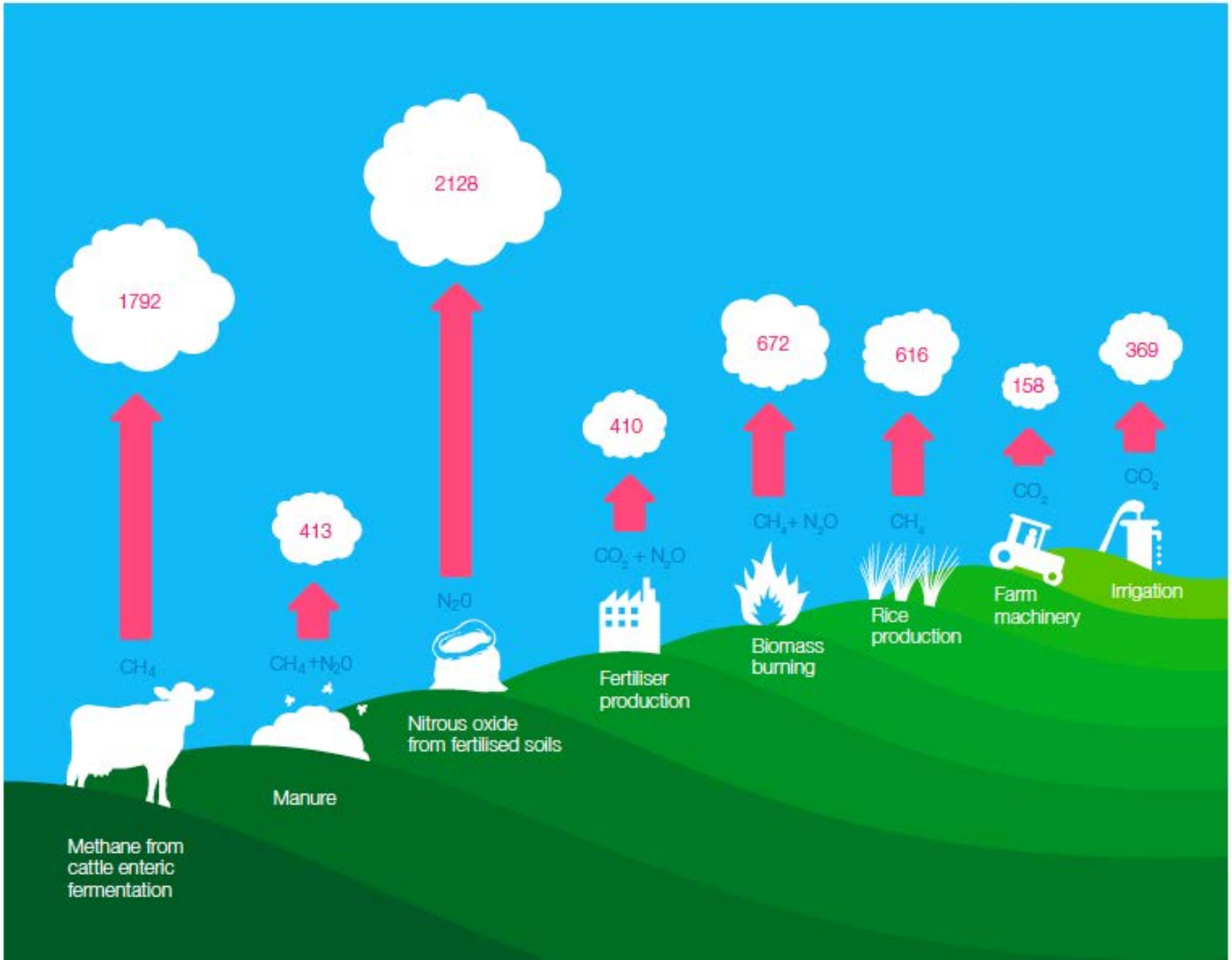
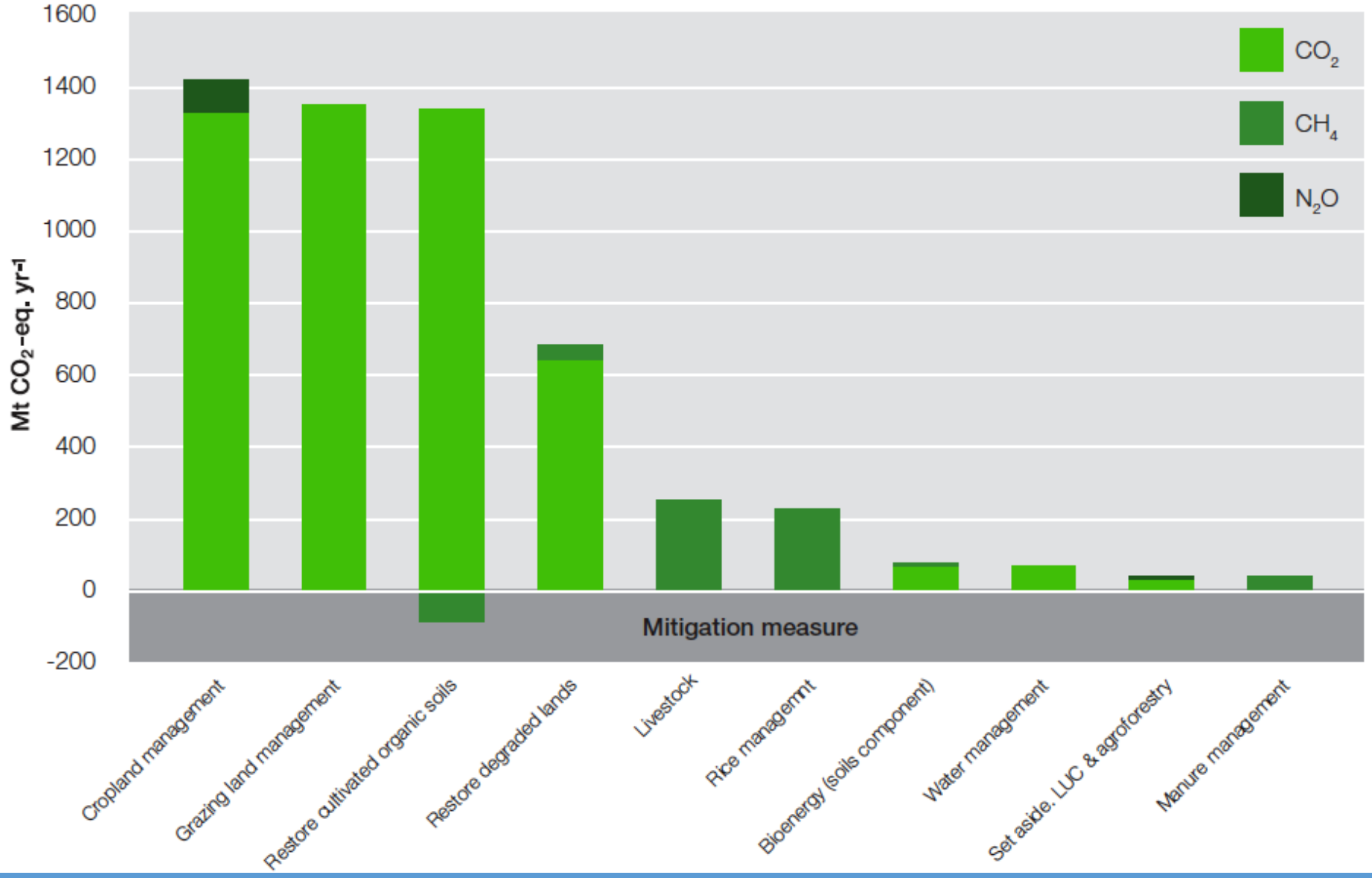

1792
CH_4
Methane from cattle enteric fermentation
413
$CH_4 + N_2O$
Manure
2128
N_2O
Nitrous oxide from fertilised soils
410
$CO_2 + N_2O$
Fertiliser production
672
$CH_4 + N_2O$
Biomass burning
616
CH_4
Rice production
158
CO_2
Farm machinery
369
CO_2
Irrigation

Figure 8. Global technical mitigation potential by 2030 of each agricultural management practice showing the impacts of each practice on each GHG.



Leverage

It makes sense for farmers they just need inspiration

Or,

There are serious cost barriers to making change feasible and co-investment is needed

How can measurement tools help?

Baseline

Opportunity for change

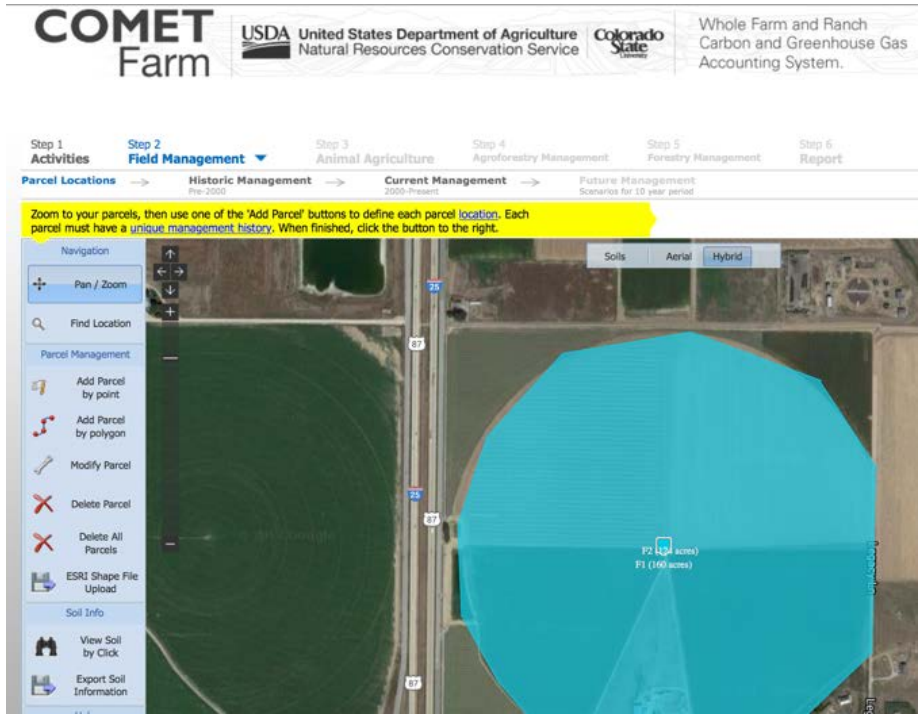
Decision Support

Reporting and story telling

COMET-Farm™

Web-based Greenhouse Gas Inventory Tool for Land Use Designed for Conservation Scenario Analysis

- Estimates the carbon footprint for all or part of a farm/ranch operation
- Allows users to evaluate different options for reducing GHG emissions
- Provides an accurate estimate tailored to specific user

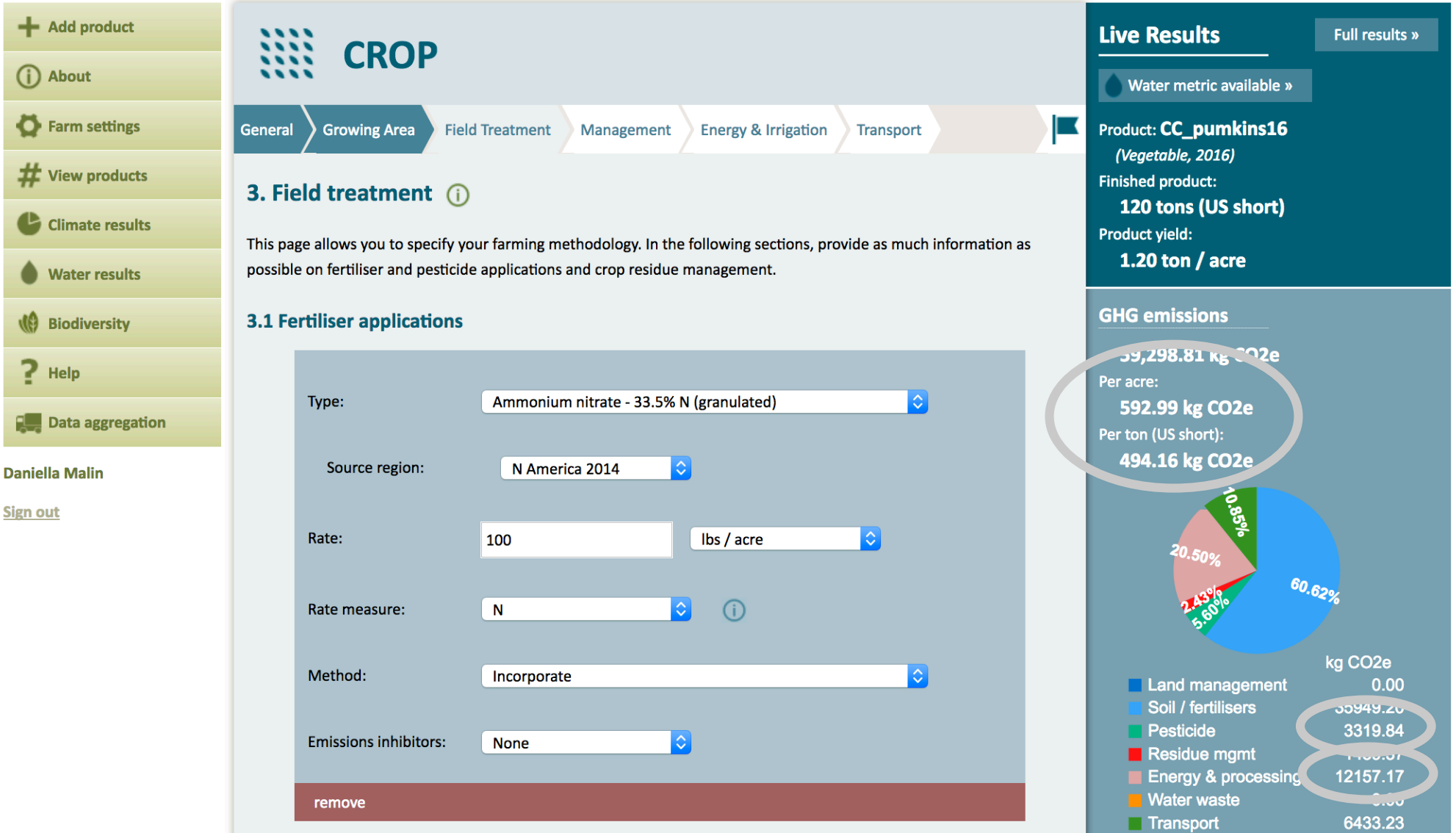


Cool Farm Tool

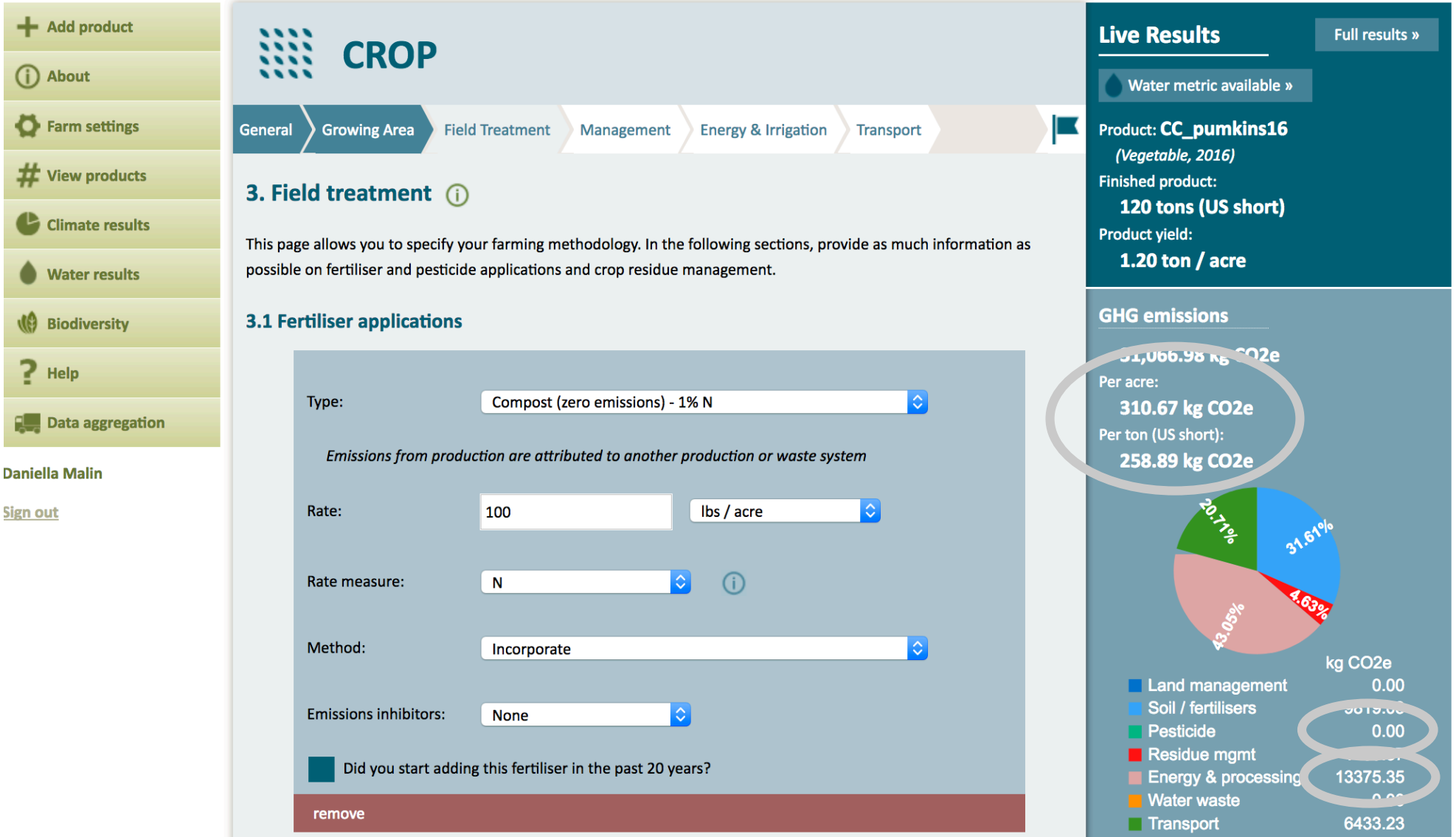
On-line tool for calculating on-farm environmental impacts for GHG, water use, and biodiversity:

- Globally relevant
- All crops and livestock
- Easy to use
- Allows for “what-if” scenarios

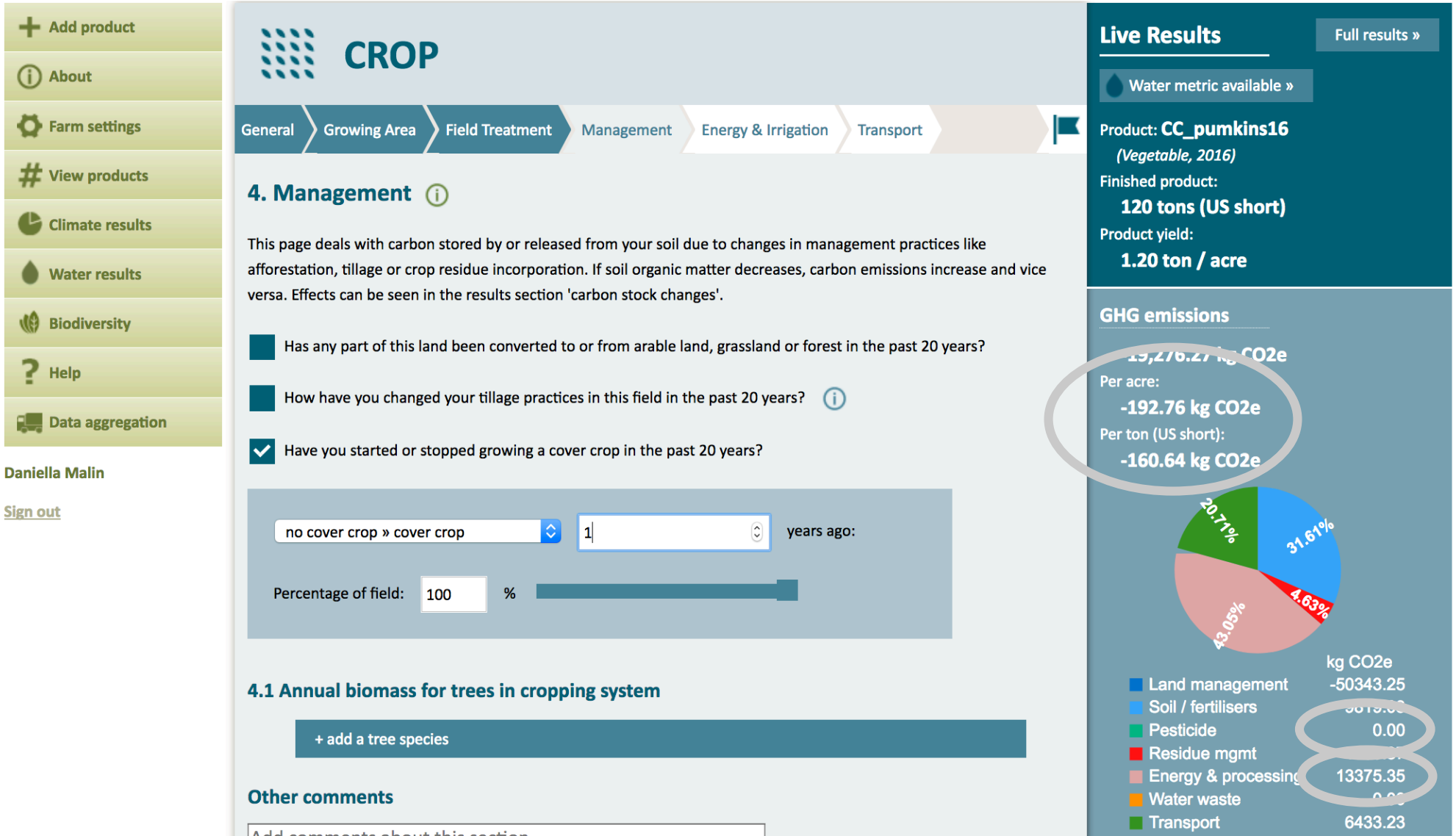
Quantification - baseline



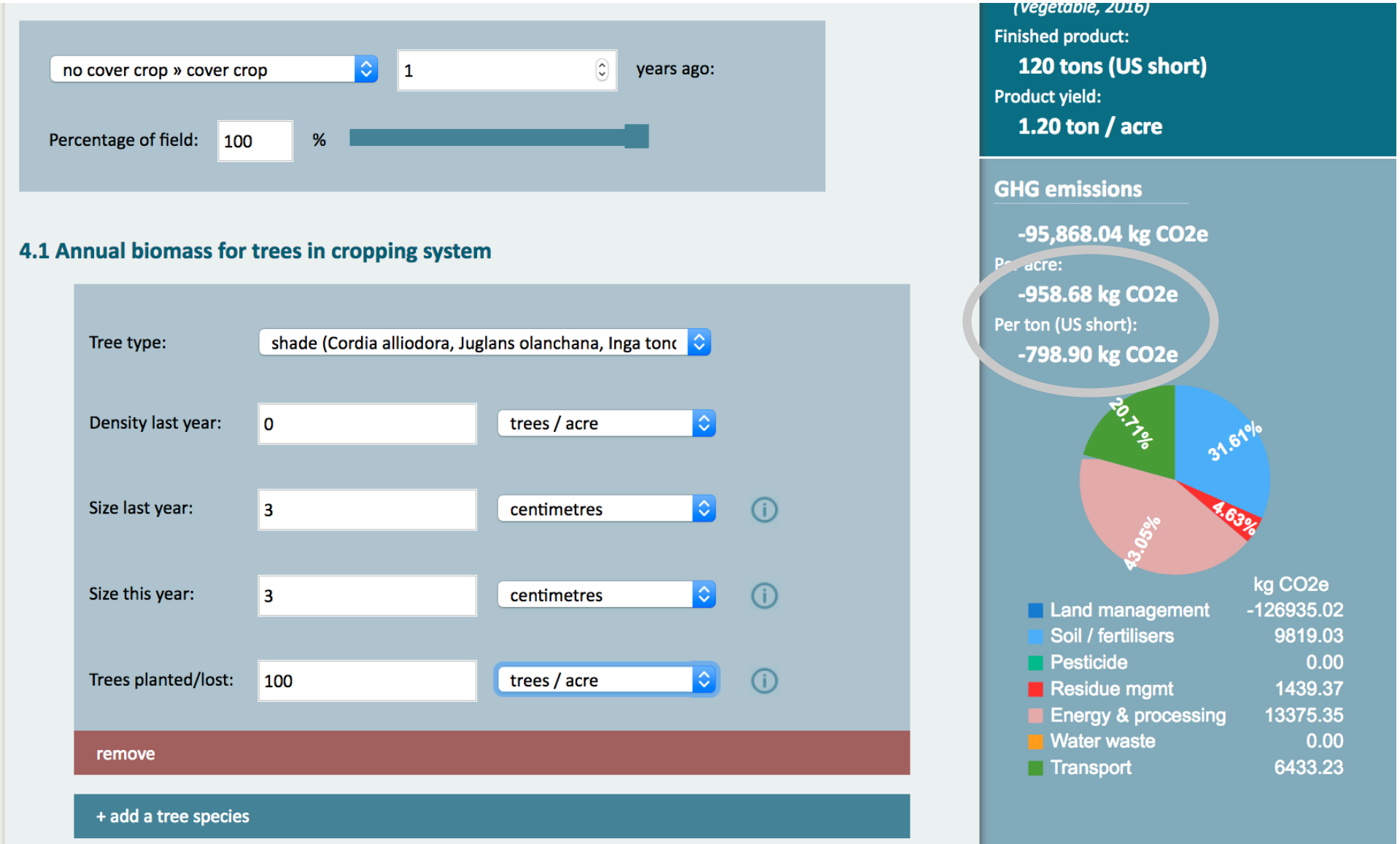
Quantification – fertilizer changes



Quantification – soil changes



Quantification – agroforestry



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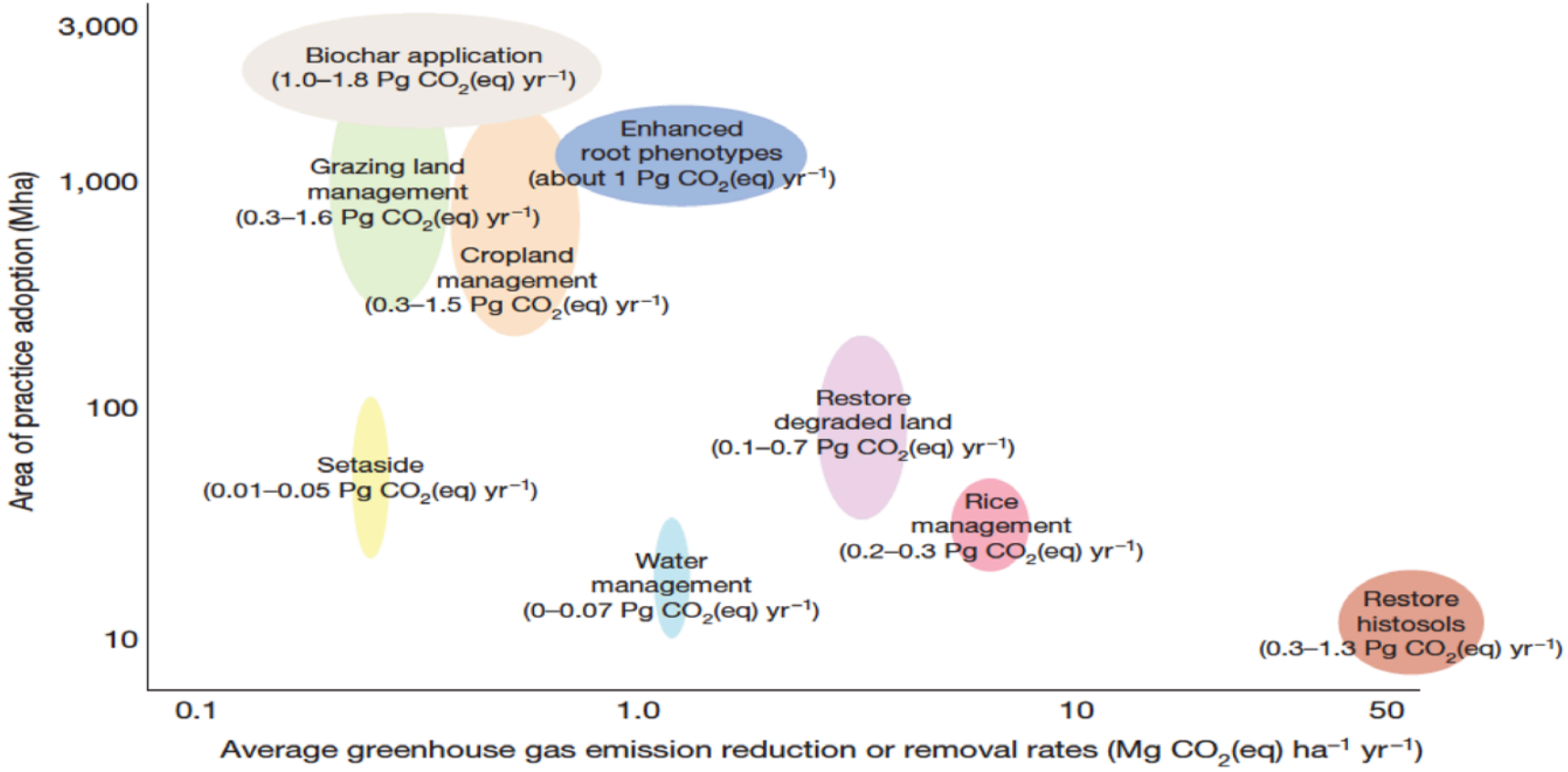
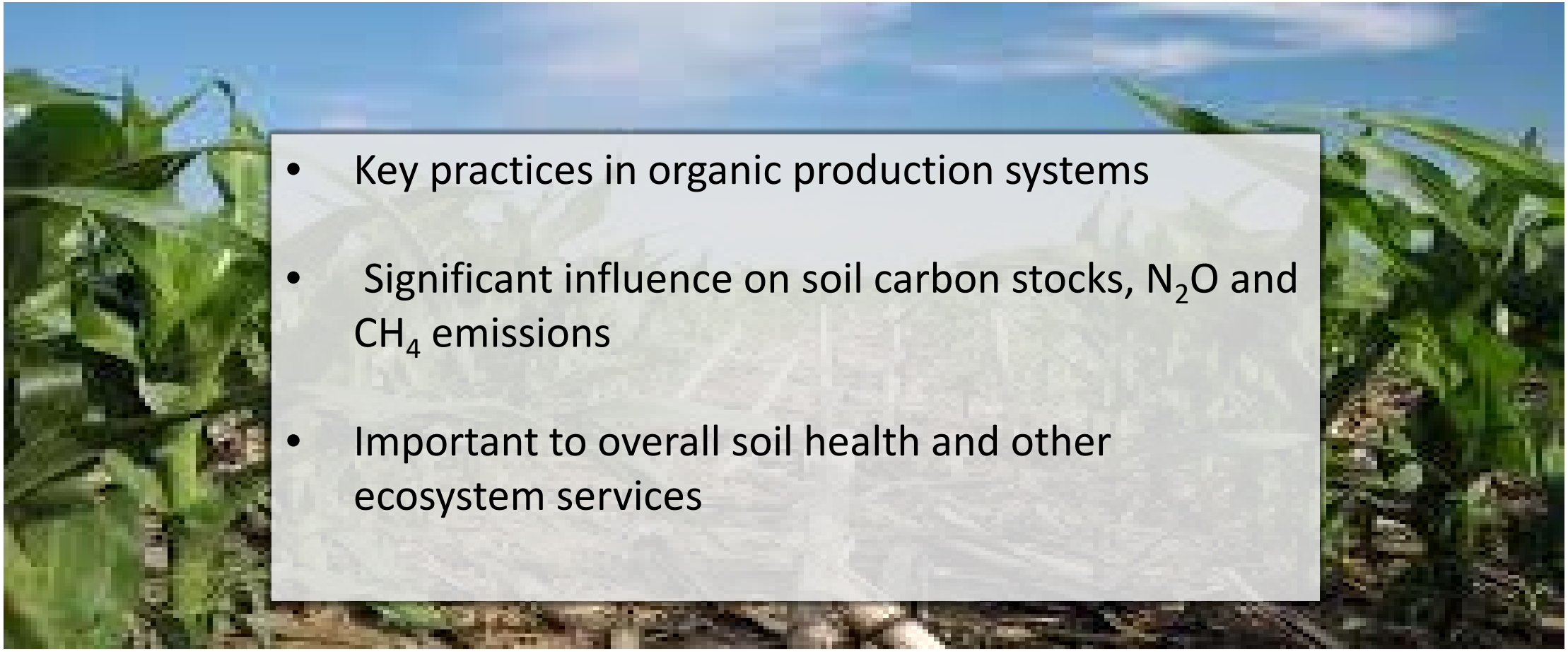
Biggest change

Potential/acres



PRACTICE REVIEW

cover crops, organic amendments, management intensive grazing



- Key practices in organic production systems
- Significant influence on soil carbon stocks, N_2O and CH_4 emissions
- Important to overall soil health and other ecosystem services

Join us for an interactive session

Decision-support tools to assess farm-scale greenhouse gas (GHG) emissions

1-2 pm

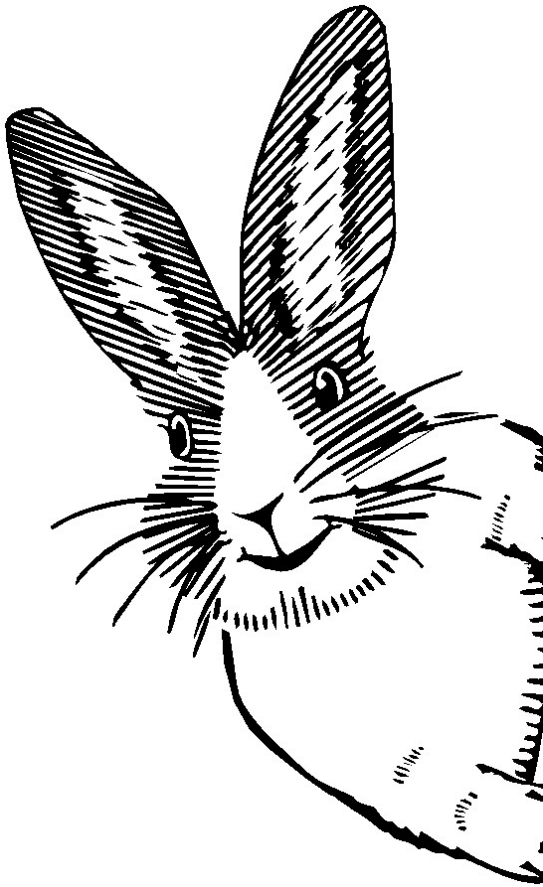
Room #318
Baltimore Convention Center

Natural Products EXPO EAST®

September 15, 2017

Annie's HOMEGROWN™

RABBIT OF APPROVAL™



Organic Agriculture: Climate Change Champion

Shauna Sadowski, Senior Sustainability Manager

Founded with a Purpose

Annie's was co-founded by Annie Withey in 1989

- Real and authentic roots
- Great tasting products with broad appeal
- Natural and organic ingredients
- Socially and environmentally responsible

Our Mission: To cultivate a **healthier**, **happier** world by spreading **goodness** through **nourishing** foods, honest words and conduct that is **considerate** and forever **kind** to the planet.

Annie's Approach to Sustainability

Farm To Yum

What we stand for:

At Annie's, we strive to understand our decisions in context of the larger food system. We seek to make decisions based on our impacts on the planet, on people, and on profits. We measure and manage our performance through this triple bottom line lens.

What we care about:

How we go about our work:

Design better food – Our biggest opportunity to make a difference is through the products we make. We strive to source from more sustainable ingredient, packaging, and manufacturing partners who align with our values.

Inspire change and educate – We aspire to be a force for good, learning from and collaborating with others to achieve positive change in the food system.

Lead by example – We seek to create a workplace that reflects our company values to ensure that we walk the talk at home.

Our Longstanding Commitment to the Climate

1998

Annie's 1st certified organic mac & cheese in 1998 marked our early commitment to healthy soil and climate change

2006

Partnership with NativeEnergy to support renewable energy projects (2006-15)

2009

Joined the Sustainable Food Trade Association and committed to tracking progress

2011

Published our first public sustainability report

Awarded our first Green Bernie to supplier

2012

New office certified LEED Gold

Conducted our first LCA

Funded the Climate and Sustainable Corn-Based Crop Systems Project (CSCAP)

Joined BICEP (Business for Innovative Climate and Energy Policy)

2013

Signed onto the @BICEP Climate Declaration

Certified as a Bay Area Green Business

2014

Conducted a waste characterization study for the Berkeley office

2015

Won the Bay Area Acterra Award

2016

Received the "Climate Disruptor" award for our efforts to reduce our environmental footprint

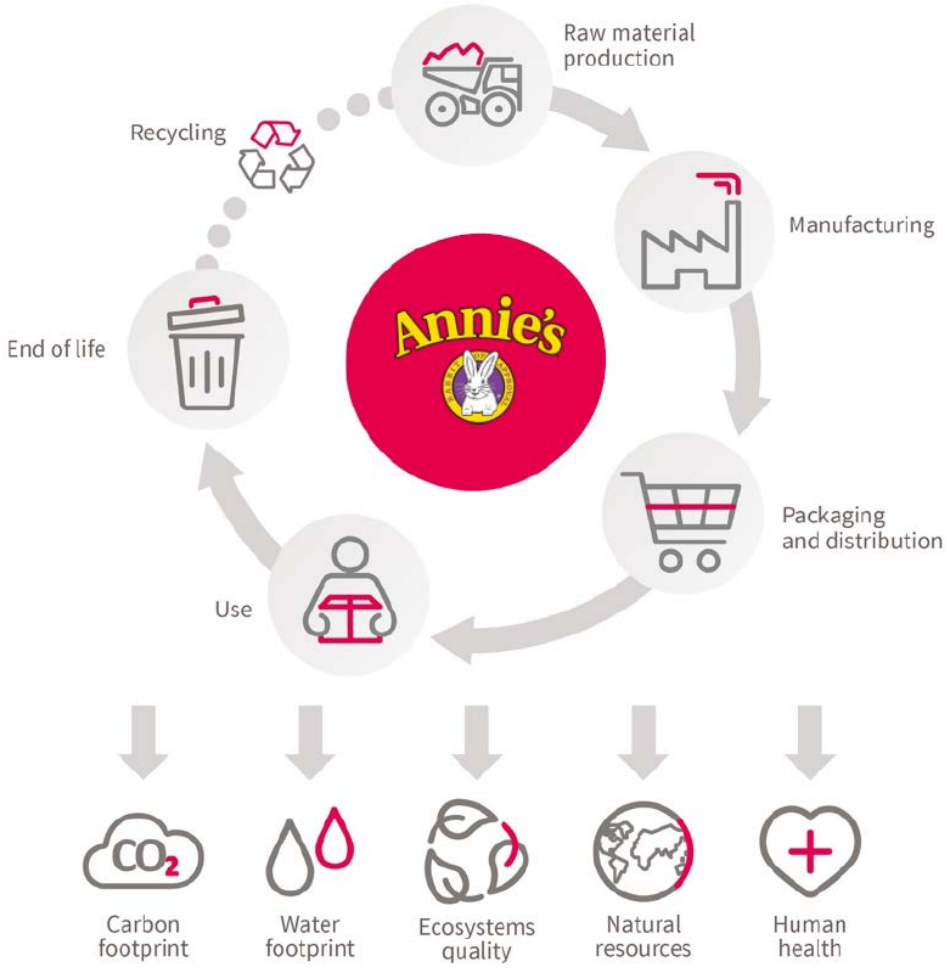
Partnered with BICEP to advocate for 40% fuel use reductions for trucks

2017

Declared 5 climate change commitments through Climate Collaborative

Signed the "We Are Still In" letter in support of the Paris Climate Accord

2017 Life Cycle Assessment



Where are our greatest environmental impacts?

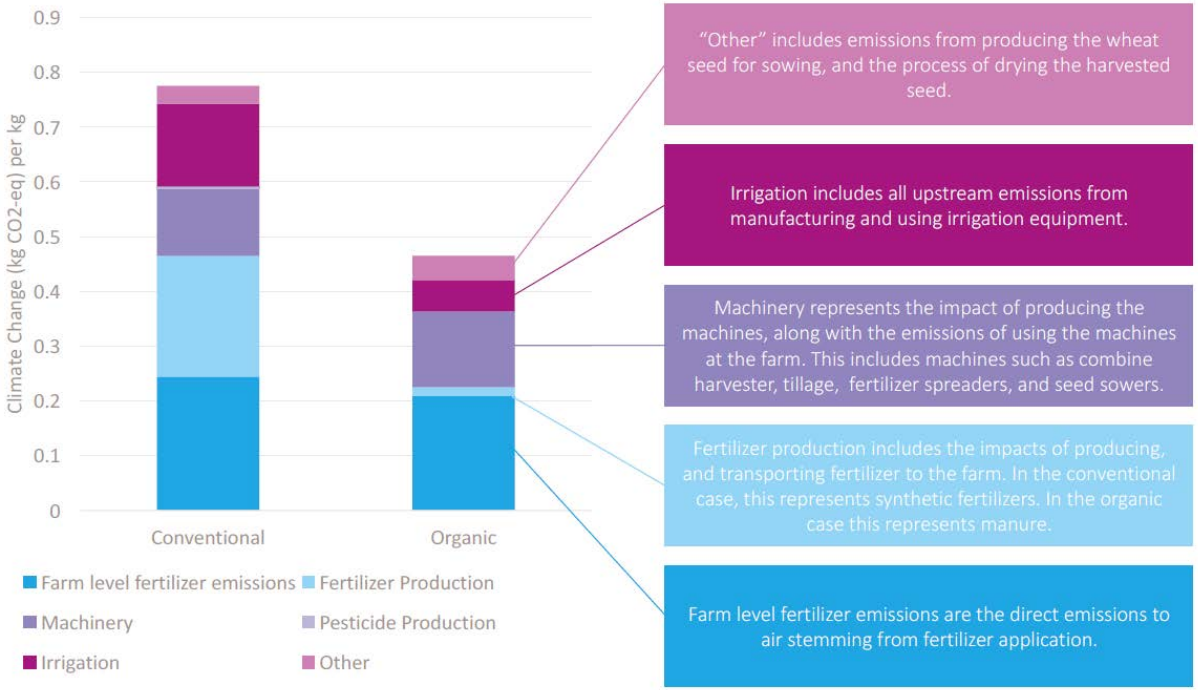
Based on an environmental life cycle assessment of 12 Annie's products

	Agriculture	Manufacturing	Packaging	Distribution	Consumption	End-of-Life
Climate change	44%	6%	13%	20%	17%	0%
Water Consumption	95%	0%	1%	0%	4%	0%
Impacts on Biodiversity	77%	1%	11%	7%	4%	0%
Toxic Chemicals	72%	3%	8%	5%	11%	-1%

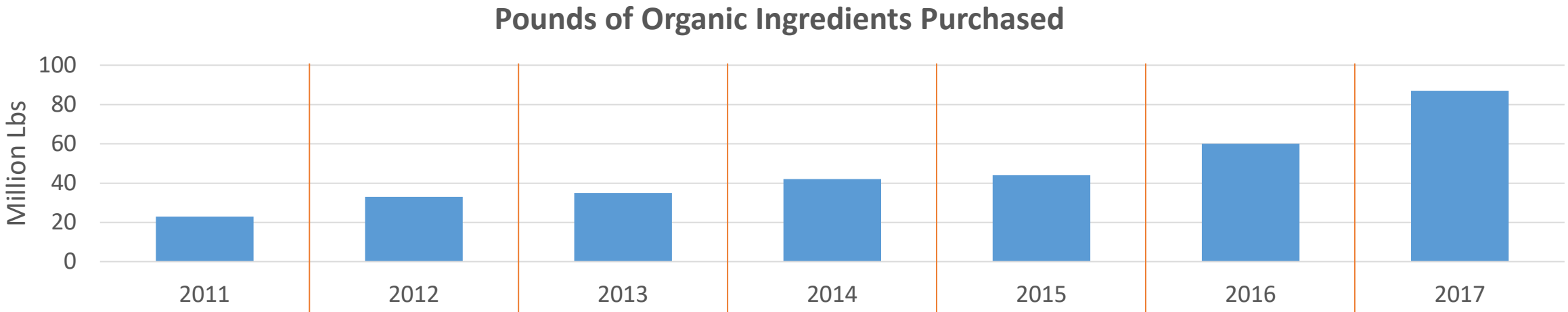
LCAs and Organic

- There were some important limitations to the LCA with regard to organic:
  - Lack of comparable data for organic ingredients. Conventional data is used in the LCA.
  - Availability of data on specific crops is better, but gaps remain for lower volume ingredients.
  - LCA only takes into account emissions data, and does not include sequestration potential.
  - Impacts based on farm specific attributes (e.g. crop rotation, no-till, cover crops, etc.)

Organic wheat shows a lesser carbon primarily due to lesser fertilizer production impact and lesser irrigation



Building our Commitments to Organic



2011	2012	2013	2014	2015	2016	2017
71% of Annie's sales are from organic products	Developed Sustainable Ingredient Sourcing strategy	Through CSCAP, funded 5-year research study on soil carbon sequestration	85% of Annie's sales are from organic products	85% of Annie's sales are from organic products	88% of Annie's sales are from organic products	92% of Annie's sales are from organic products
Formalized our sustainability reporting with the SFTA framework			Founding member of the U.S. Organic Grains Collaboration to expand organic acreage		Funding for The Organic Center and SHINE project to conduct LCA on organic	Signed onto Carbon Underground's definition of Regenerative Agriculture

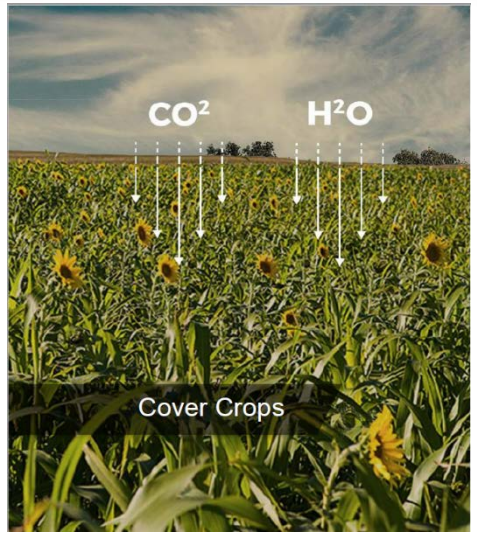
Regenerative Agriculture

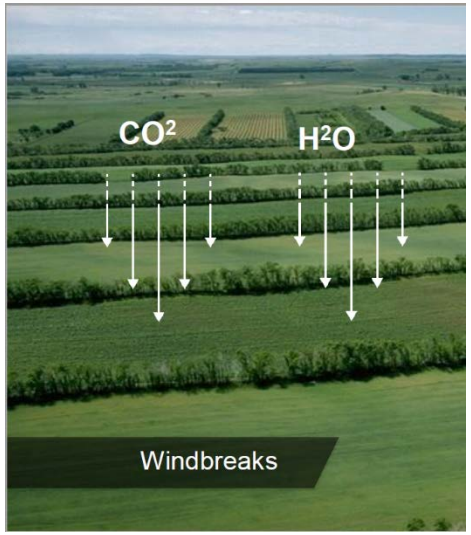
Regenerative agriculture works ***with nature*** to build resilience and diversity.

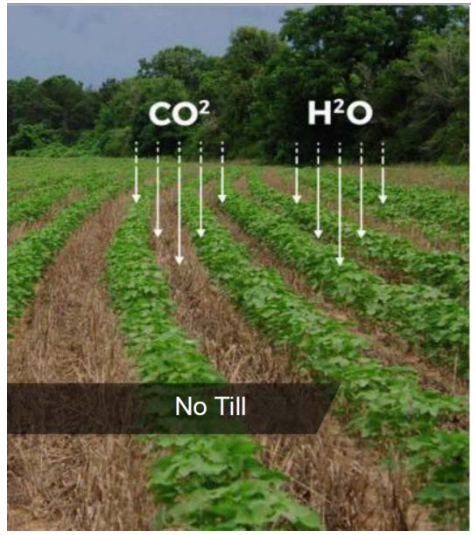
- Regenerative agricultural practices work with nature to **<u>pull carbon from the air and store it in the soil</u>**, where it nourishes a network of life. By sequestering carbon underground, regenerative practices **can reduce the greenhouse gases in our atmosphere.**

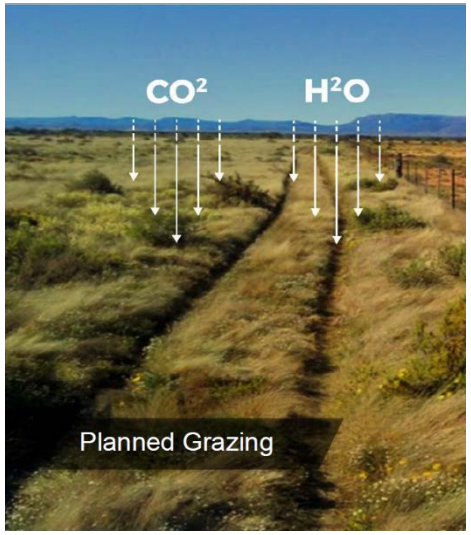
- Regenerative practices include: composting, cover crops, extended crop rotations, no- or low-till, and perennial crops, among others. *These practices are not new – many organic farmers employ them to varying degrees.*

- We see strong potential to build healthy soils and to strengthen our own supply chains. Healthy soil creates greater resilience for farmers and their crops, which become our ingredients and ultimately our products.

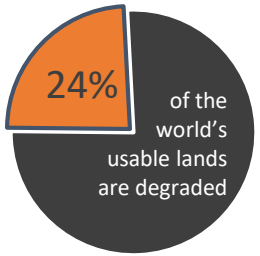




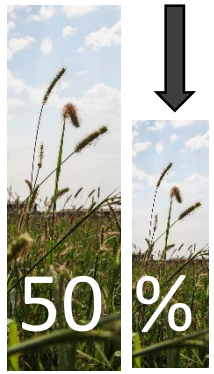




Impacts of Regenerative Ag on Climate Change



Soil degradation can reduce yields by up to



- Regenerative agricultural practices can help **reduce greenhouse gas emissions and sequester carbon, both of which are needed to mitigate the effects of climate change.**
- According to Drawdown, food and agriculture account for 8 of the top 20 solutions to address climate change (from both sequestration and reduced emissions).
- According to Dr. David Johnson of New Mexico State University, **if we converted 22% of arable land to regenerative agriculture we could capture all anthropogenic carbon emissions** and return atmospheric carbon levels to pre-industrial levels **in about a decade.**
- More data is needed, but available evidence suggests that regenerative agriculture and better soil management can play a significant role in mitigating climate change.

Our Commitments to Soil Health

- We're on a journey …
  - Learning from scientists, farmers, and non-profits to better understand the science of regenerative agriculture
  - Publicly supported Carbon Underground's definition of Regenerative Agriculture
  - Made a commitment through the Climate Collaborative to pursue carbon farming
  - Developed an internal Regenerative Agriculture Framework to guide decisions for product innovation, sourcing, and marketing
  - Exploring ingredient sourcing opportunities that incentivize regenerative agriculture

General Mills + Annie's | Better Together

MAKING FOOD PEOPLE LOVE

General Mills has committed to reducing absolute GHG emissions by 28% by 2025, compared to 2010, across our full value chain – from farm to fork to landfill

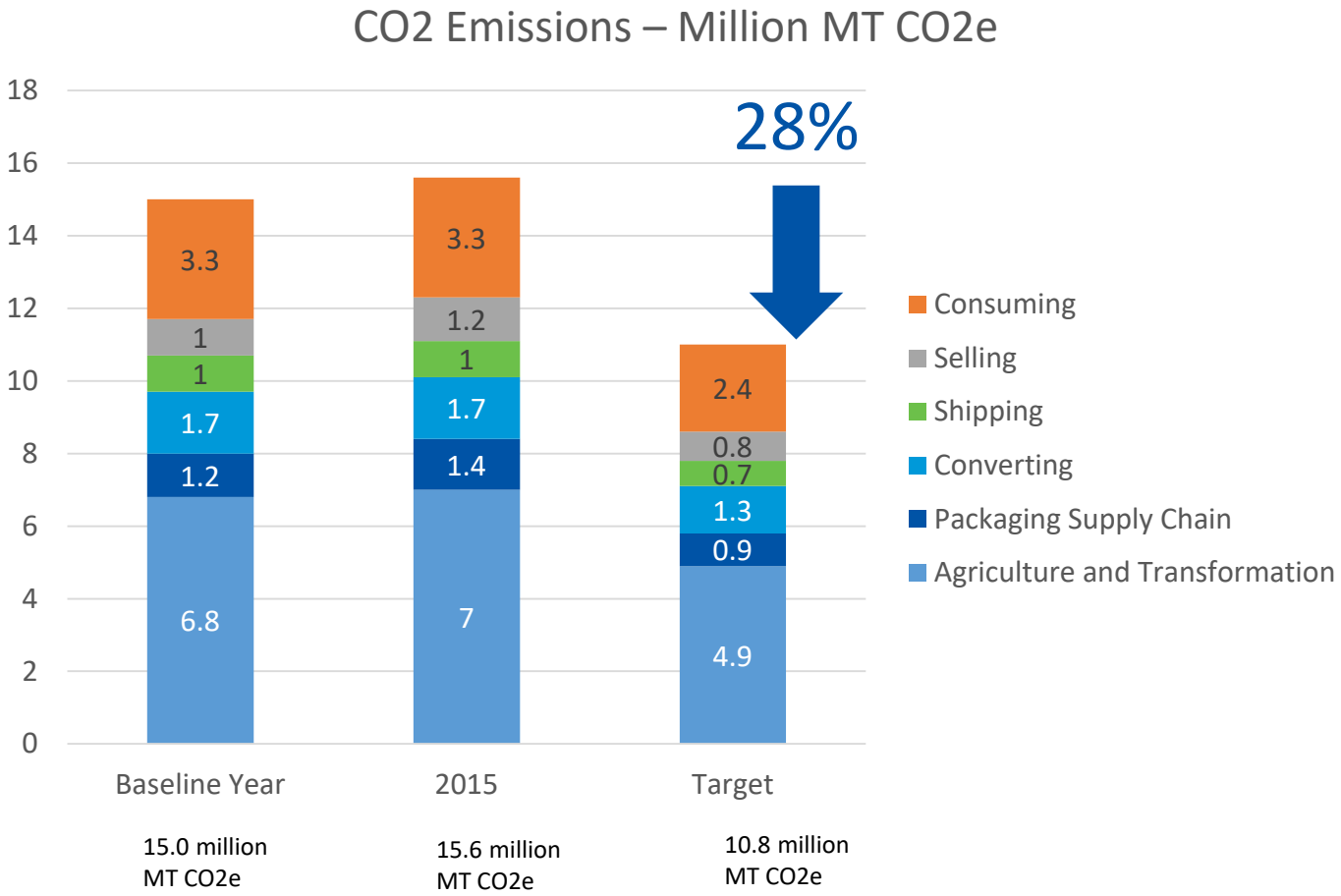
28%

2025 goal*: Reduce absolute GHG emissions across our full value chain by 28 percent

41-72%

2050 goal*: Reduce absolute GHG emissions across our full value chain to sustainable levels in line with scientific consensus

General Mills natural and organic brands



General Mills Climate Initiatives in Agriculture

- Based on General Mills' LCA, 48% of value chain GHG emissions comes from agriculture and transformation into food ingredients
- Some initiatives underway include:
  - Member of Business for Innovative Climate and Energy Policy (BICEP) to work with other businesses and policymakers to advocate for innovative and impactful climate and clean energy policies.
  - Partnered with The Nature Conservancy in 2016 to create ReThink Soil: A Roadmap to Soil Health
  - Committed $2 million over the next 3 years to fund work of The Nature Conservancy, the Soil Health Initiative and the Soil Health Partnership
  - Committed to doubling organic acreage to 250,000 between 2015 and 2019
    - Contributed to the Prairie Organic Grain Initiative – addressing the shortage of organic grain growers by helping conventional growers make the transition
    - Strategic partnership with Organic Valley to help 20 dairy farms add 3,000 acres to organic dairy production over 3 years

Visit us @ Expo East #1739
#soilmatters

Join the conversation.

ORGANIC AGRICULTURE: CLIMATE CHANGE CHAMPION

QUESTIONS?

SPEAKERS

Tracy Misiewicz, Associate Director Science Programs, The Organic Center
Elizabeth Reaves, Program Director, Sustainable Food Lab

MODERATOR

Shauna Sadowski, VP of Sustainability & Industry Relations, Annie's, Inc.