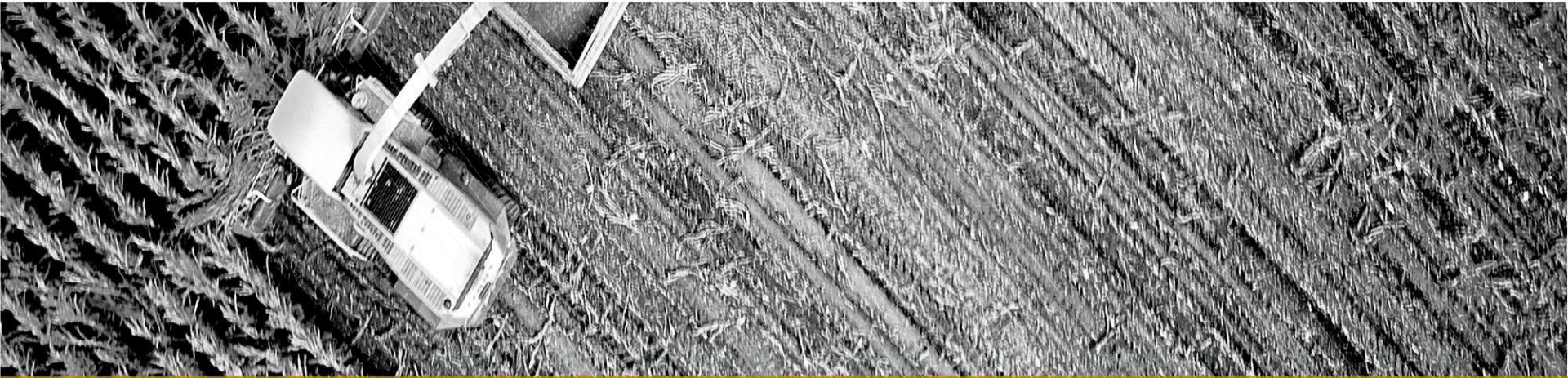


Sustainability in Conventional Farming



Matt Carstens - SVP
Land O' Lakes SUSTAIN





Helping Farmers Change the World

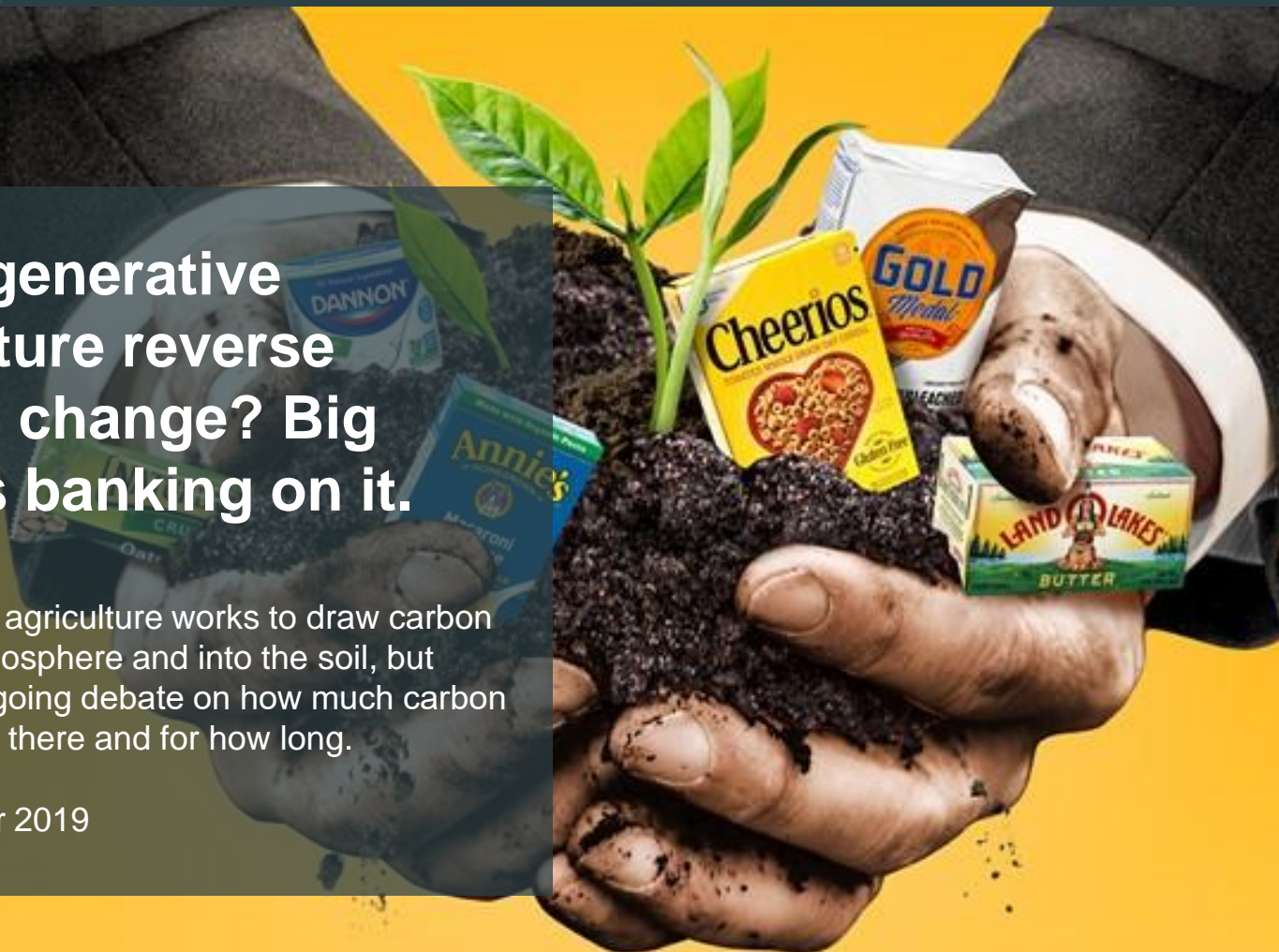
Driving Sustainable Agriculture Solutions at Scale

LAND O'LAKES
SUSTAIN

Can regenerative agriculture reverse climate change? Big Food is banking on it.

Regenerative agriculture works to draw carbon out of the atmosphere and into the soil, but there's an ongoing debate on how much carbon can be stored there and for how long.

NBC, October 2019





The Climate Crisis Leads 2020 Presidential Race

Minnesota farmers worried buffer law threaten property rights

By April Baumgarten on Apr 27, 2017 at 8:18 p.m.



HUFFPOST



Communities face contaminated
manure, nitrates, records

AdChoices

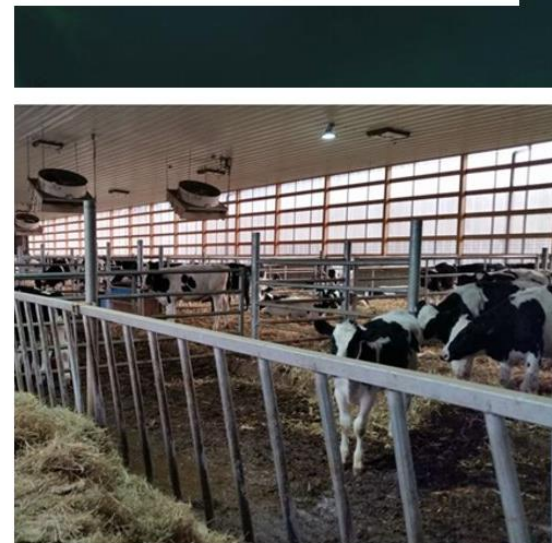


GREEN

This Lawsuit Has Put Big Ag On The Defensive In A Major Way

A pending Iowa case could set a new national precedent for water pollution stemming from farms.

Updated Aug 15, 2017



Yrde Farms, LLC in Waunakee. Chuck Quirnbach/WPR

City of Columbus issues nitrate

Jul 30, 2016 | Updated Aug 02, 2016

The best variety of
local craft beer in the area.

By Lori Kurtzman, The C
Posted Jun 30, 2016 at 12
Updated Jul 1, 2016 at 10:



Joseph Erbentraut Senior Reporter,
The Huffington Post

Operations Grow In Size And
rapples With Environmental Impact
ge Farms Raise Concern Over Water Quality
Dam

LAND O' LAKES
SUSTAIN™



Consumers are Changing



DEEP DIVE

Sustainability pledges are no longer a luxury for Big Food

Companies in the ultra-competitive industry will likely focus on renewable energy and water conservation in 2018 as they work to reduce their environmental footprint.

Walmart acted on warming. Here's how it made money, too
(E&E News 2019)

HSBC and Walmart launch green finance program to drive carbon cuts in retail supply chain
(Greenbiz 2019)

Big Food turning to regenerative agriculture to meet sustainability goals
(Food Dive 2019)

How Danone, Kashi and Land O'Lakes are backing sustainable farming
(Greenbiz 2019)

Consumers Want Sustainable Products

Almost **6 in 10 consumers** find sustainability important when **deciding what food to purchase.**

Half of CPG growth in the last five years came from **sustainability-marketed products.**

Products marketed as sustainable **grew 5.6 times faster** than those that were not.

The Three Hot Topics in Agriculture Consumers Care About According to Mintel

- **Soil Health**
- **Regenerative Agriculture**
- **Farmer Welfare**





**Farmers can help.
You can too.**

So How Do We Get There? Start at the Beginning – On the Farm.

There are **900+ million** acres of U.S. land managed by farmers, to sequester carbon, improve water quality, boost biodiversity and reduce overall environmental and *climate impact*.



At Land O'Lakes SUSTAIN ...

Sustainability means:

- Supporting profitability and resiliency for farmers
- Protecting natural resources

Everything we do
comes down to
this.





**We are the bridge between
farm and consumer;
working across the supply
chain to create impact.**

BY CREATING A
SYSTEM OF CHANGE



Ag Retailers Support Farmers Efforts to Drive On-Farm Improvements



AIR

Reducing GHG emissions



SOIL

Improve soil health and utilize more efficient nutrient management practices



WATER

Increase water use efficiency and improve quality

Here's What We'll Do



We match you with U.S. acres in your supply chain.

**Farmer
s**



Our proprietary ag tech tool measures the impact of conservation practices on those acres.

**Technolog
y**



Farmers use recommendations from the tool to make changes that improve farm profitability and reduce impact.

Ag Retail



We generate acre-by-acre metrics detailing soil health, GHG emissions, water quality and conservation activity for you.

Data



You use those metrics to demonstrate impact to key stakeholders and customers.

Impact



LAND O'LAKES
SUSTAIN™

Land O'Lakes Inc.

The Land O'Lakes network touches:

50% of the harvested acres in the US

25% of all row crop farmers

30% of all animal protein

90% of grocery store shelves

Who We Work With

Major Companies



NGOs



Venture Capital



Government



FARMS



SUSTAINABLE
MANAGEMENT

TRUTERRA

REALTIME INPUTS & ANALYSIS
OF MILLIONS OF ACRES



SUSTAINABILITY
DATA

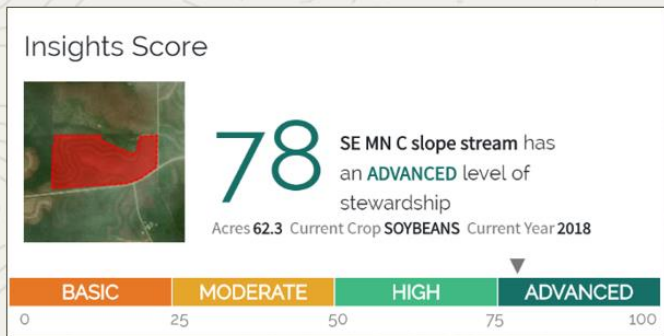
PRODUCTS



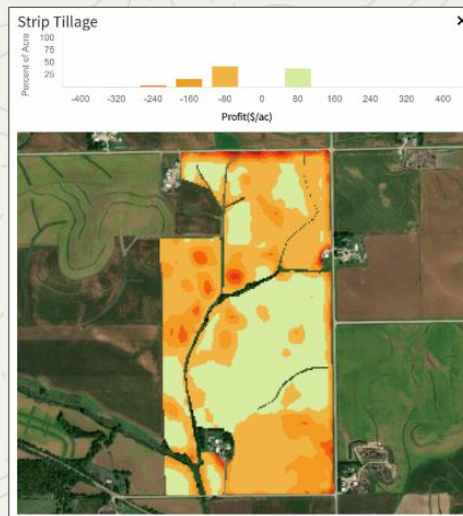
Today

Truterra™ Insights Engine is the industry-leading precision stewardship platform – generating field-by-field insights and opportunities to advance economic and environmental performance

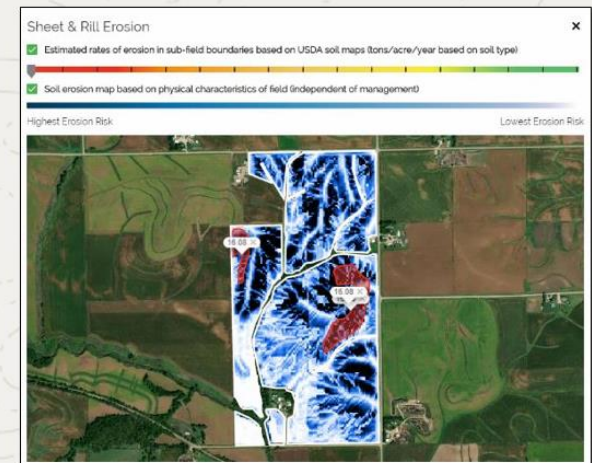
Stewardship Score

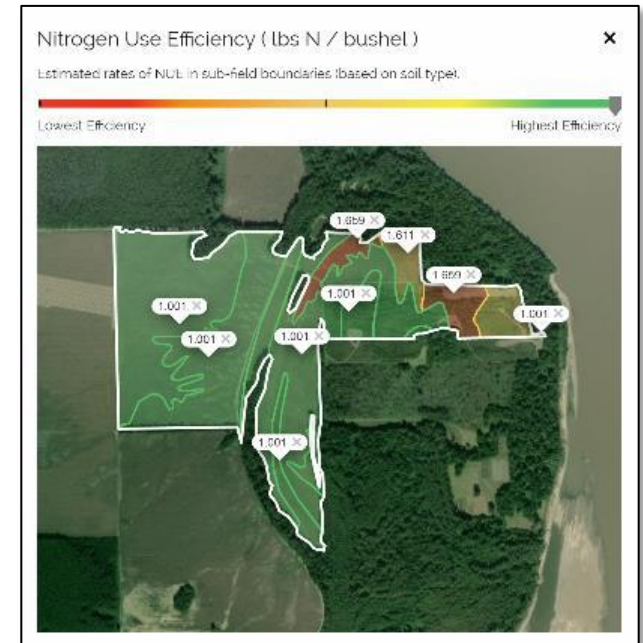


Profit Insights



Precision Soil Insights

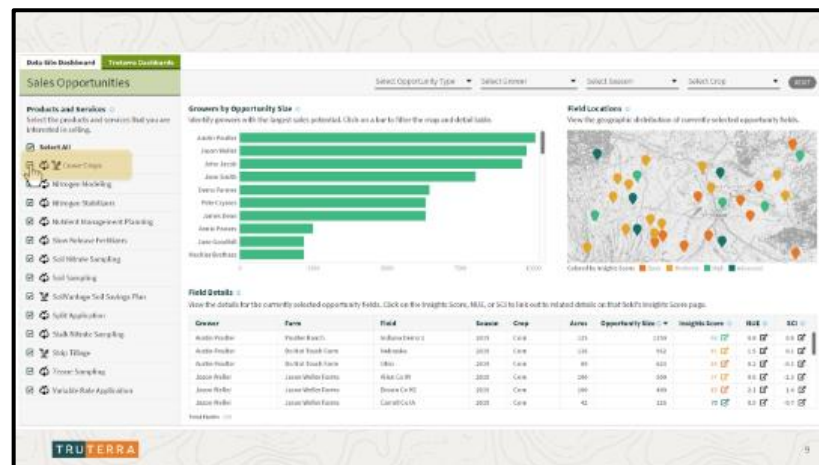




Value to Ag Retailers

Supporting environmental and economic impact in rural America

- Value-differentiated service offering
- Agronomic and profitability insights
- Ability to support ROI-focused conservation solutions
- Access to Land O'Lakes SUSTAIN retailer incentive offerings
- Supported growth of ag retailer offerings and operation



Value to Downstream

Defining and Quantifying sustainable impact from farm-to-fork

We can help quantify claims on the following, baseline and YOY change:

- Acres
- Aggregated Insight Scores
- Greenhouse Gas Emissions
- Nitrogen Use Efficiency
- Soil Health
- Water Quality
- Climate Resiliency Risks
- Economic Insights
- Economic impact by county

Details on specific conservation practice adoption including but not limited to:

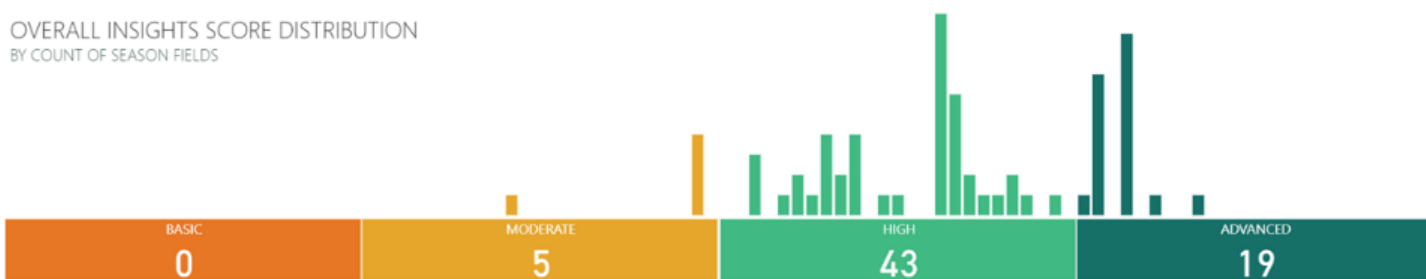
- Tillage Practices
- Nutrient Management
- Fertilizer and Pest Management
- Stabilizer Use
- Nutrient Application Timing
- Precision Soil Management
- Cover Crops
- Prevent Plant

*Aggregated insights at the county level

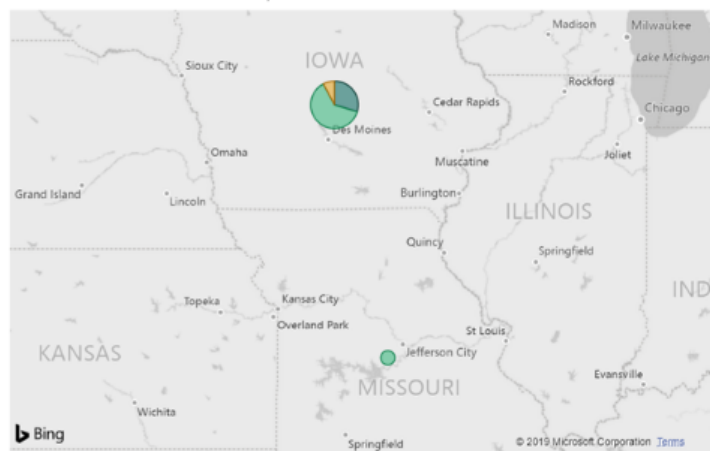
Truterra Insights Engine Dashboards

Insights Score Distribution

OVERALL INSIGHTS SCORE DISTRIBUTION
BY COUNT OF SEASON FIELDS



INSIGHTS SCORE BY STATE, COUNTY



INSIGHTS SCORE FACTOR DISTRIBUTIONS

MANAGEMENT STEWARDSHIP



SOIL & NUTRIENT LOSS MITIGATION



CONSERVATION ADOPTION



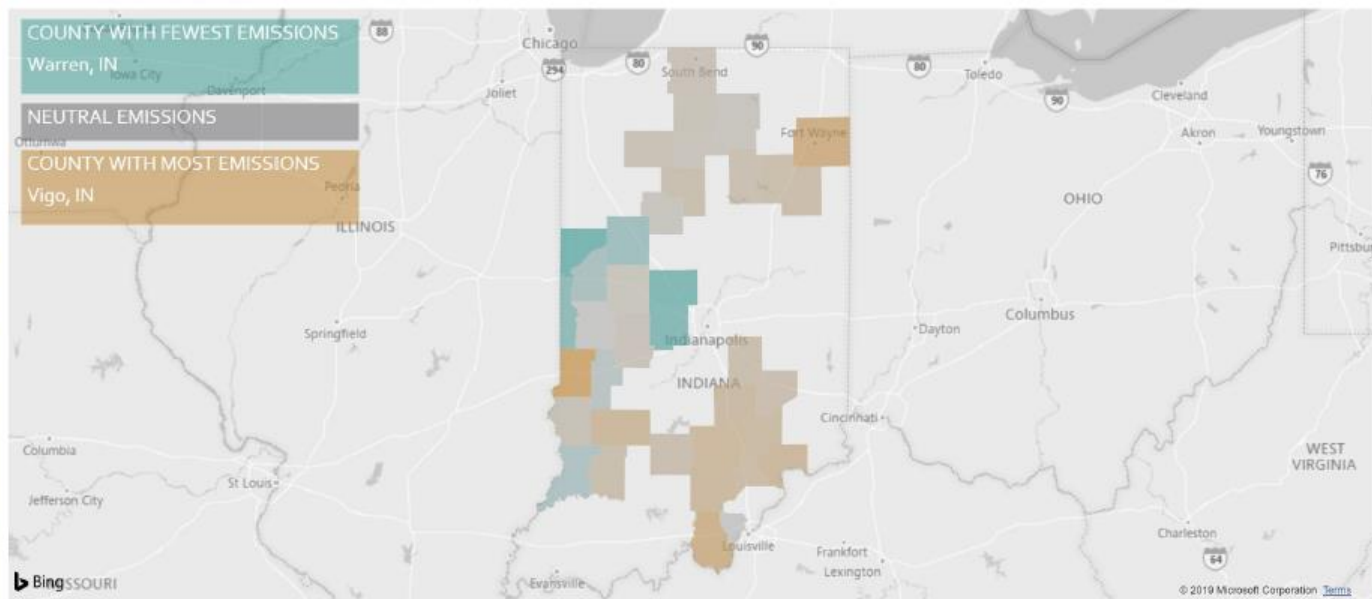
The Truterra Insights Score demonstrates the level of stewardship on a given field. Aggregated, company partners can see the overall level of stewardship on their acres.

Net GHG Emissions

TRUTERRA 2018 NET GHG EMISSIONS lbs / acre / year



AVERAGE GHG EMISSIONS BY COUNTY

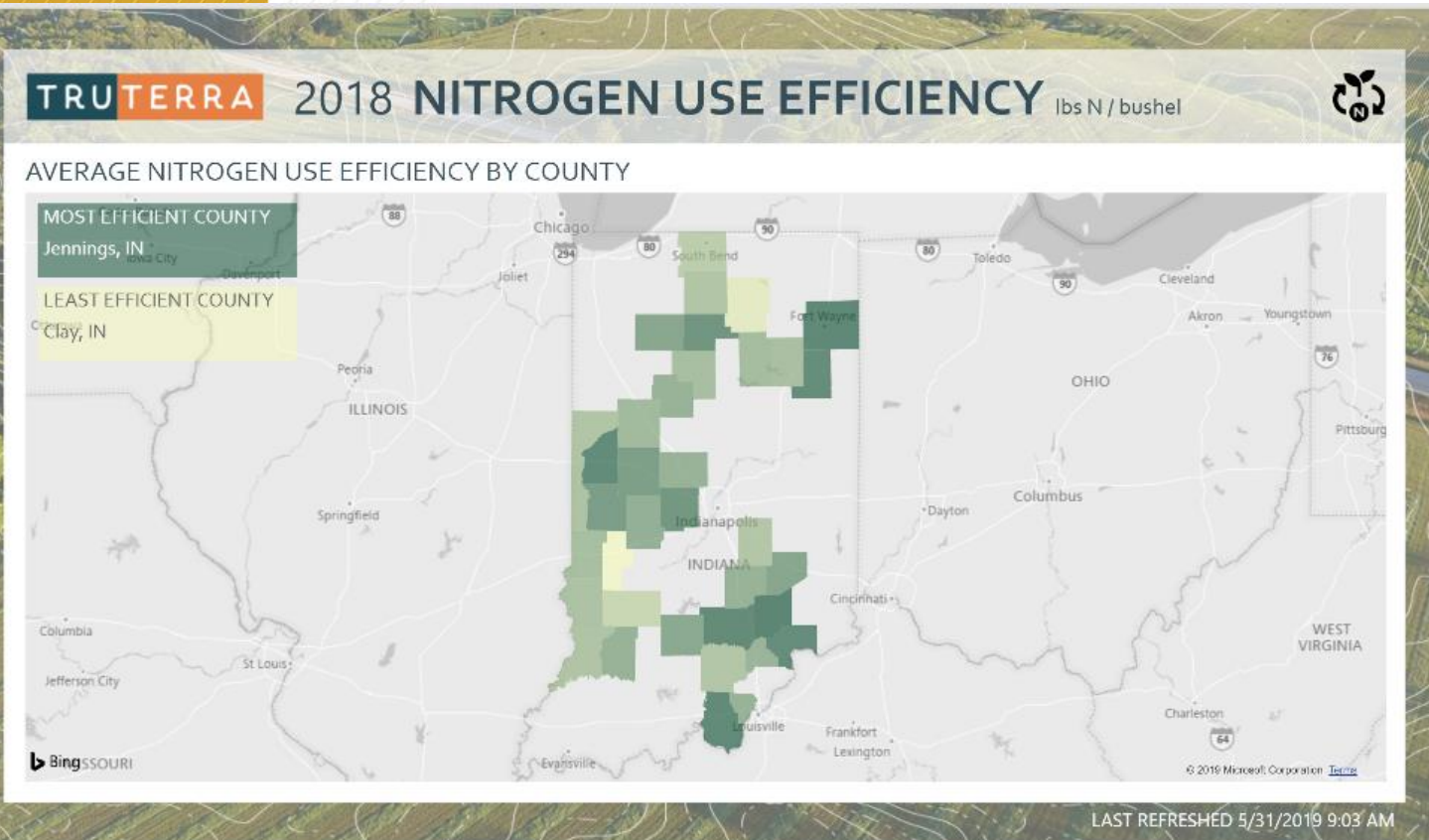


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An estimate at the field level of the total release of CO₂ equivalent into the atmosphere.

In this calculation, the Truterra Insights Engine includes estimates of carbon dioxide from soil respirations and aeration, the amount of CO₂ released from equipment usage and the nitrous oxides emissions from nitrogen fertilizer as it oxidizes and releases into a powerful greenhouse gas.

Nitrogen Use Efficiency



Nitrogen Use Efficiency indicates a balance between pounds of nitrogen used per bushel of corn or wheat. The goal is to be in the appropriate range based on crop and geography. Nitrogen Use Efficiency is a key indicator as to overall management and water quality.

TRUTERRA 2018 STABILIZERS

STABILIZERS

10%

OF PASSES USE STABILIZERS

STABILIZERS BY PASS & FERTILIZER TYPE

False True



STABILIZER USE BY FERTILIZER TYPE

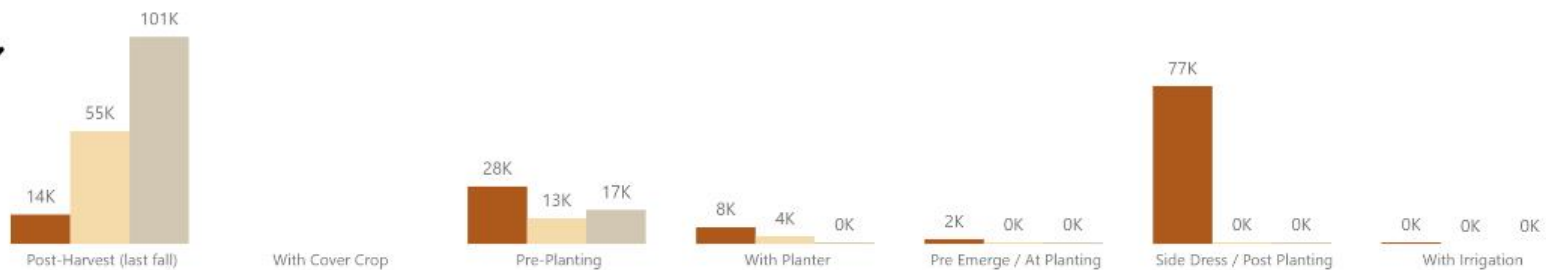
Fertilizer Type Stabilizer	Commercial		Manure	
	Passes	Acres	Passes	Acres
	3147	62,654	22	1,747
Nitrification Inhibitor	271	10,741		
Urease Inhibitors	80	3,815		
Total	3498	62,760	22	1,747

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TOTAL NUTRIENTS APPLIED BY TIMING

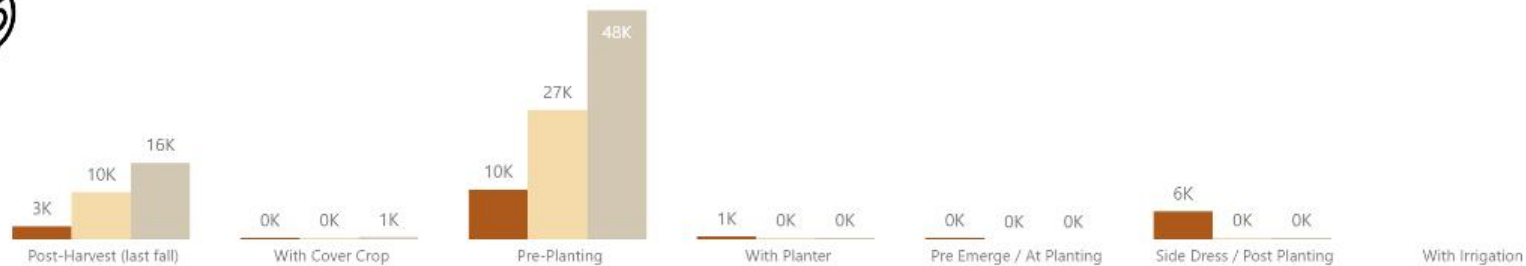
CORN

● N ● P ● K



SOYBEANS

● N ● P ● K



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Farmer/Ag Retailer Facing Dashboards

Season Field

Truterra

Profit Insights

Current Field Information

Field Name Dunkin co MO

Field Size 225.87

Current Crop Corn

Crop Year 2018

Select Comparison Scenario:

Compare Conventional Practices with:

- ☐ Current Practices ⓘ
- ☐ Enhanced Nitrogen Practices ⓘ
- ☐ Improved Residue Cover ⓘ
- ☐ Strip Tillage ⓘ
- ☐ Interseeded Winter Cover ⓘ
- ☒ Post Harvest Winter Cover ⓘ
- ☐ Contour Conservation Management ⓘ
- ☐ Terrace Conservation Management ⓘ

Customize Current Practices with:

- ☐ Profit Focused Conservation Cover ⓘ
- ☐ Reduced Tillage ⓘ
- ☐ Strip Tillage ⓘ

Your Field with:



Conventional Practices

Profit Performance Estimate

[\(Show budget\)](#)

Acres	225.88	
Yield ⓘ	185	bu/ac
Profit ⓘ	82.17	\$/ac
Total Profit ⓘ	18,560.64	\$
ROI ⓘ	14.29	%

Stewardship Performance Estimate

Insights Score ⓘ 11

Soil Erosion ⓘ 76.12 ⓘ

Soil Quality ⓘ -0.36 ⓘ

Emissions ⓘ 102.2 ⓘ

Conventional Practices Compared with:



Post Harvest Winter Cover

Profit Performance Estimate

[\(Show budget\)](#)

Acres	225.88	
Yield ⓘ	185	bu/ac
Profit ⓘ	80.39	\$/ac
Total Profit ⓘ	18,158.58	\$
ROI ⓘ	13.93	%

Stewardship Performance Estimate

Insights Score ⓘ 74

Soil Erosion ⓘ 9.04 ⓘ

Soil Quality ⓘ 0.50 ⓘ

Emissions ⓘ -19.25 ⓘ

Nitrogen Use Efficiency (lbs N / bushel)



Estimated rates of NUE in sub-field boundaries (based on soil type).



Sheet & Rill Erosion



Estimated rates of erosion in sub-field boundaries based on USDA soil maps (tons/acre/year based on soil type)



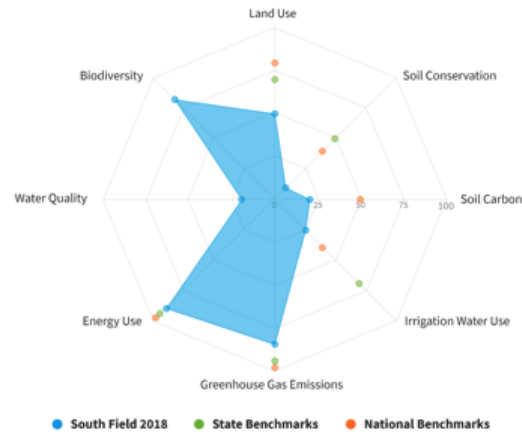
Truterra™ Insights Engine

Fieldprint® Platform Report

TRUTERRA

Prepared For Pete Crymes Farm Behind Joe's Retailer Greenpoint Ag

Fieldprint® Analysis



RESOURCE AREA	YOUR FIELD	STATE	NATIONAL
Land Use (ac / bushel)	0.0714	0.0180	0.0200
Soil Conservation (t / ac / yr)	3.3	3.4	4.2
Soil Carbon	0.34	N/A	N/A
Irrigation Water Use (ac in / bushel)	1.2222	0.9160	0.6804
Greenhouse Gas Emissions (lbs CO ₂ e / bushel)	549.82	19.15	24.56
Energy Use (btu / bushel)	681,079	35,955	68,621
Water Quality	8.19	N/A	N/A
Biodiversity	0.50	N/A	N/A

Interpreting Your Results

The tighter your Fieldprint® Analysis is to the center of the spider diagram, the greater your sustainability performance or resource use efficiency. Generally, if you can see blue areas beyond the state or national benchmarks, this is an opportunity for improvement and an important area to consider in the next growing season. Over time, comparing the results of multiple analyses can help you evaluate sustainability progress and consider trade-offs between different management approaches for your field.



Field to Market's sustainability metrics allow you to compare your sustainability performance against the Field to Market state and national benchmarks. The metrics incorporated from Field to Market's Fieldprint® Platform enable you to document and demonstrate your sustainability performance and resource use efficiency, while also helping you identify opportunities for continuous improvement.

Benchmarks represent an average based on USDA statistical data for the period 2008-2012 and provide context for how your scores relate to this known point. Benchmarks should not be interpreted as a specific level of sustainability, or a performance target.

Field to Market, the Field to Market logo and Fieldprint are registered trademarks of Field to Market: The Alliance for Sustainable Agriculture.

LAND O' LAKES
SUSTAIN

Prepared By
Agronomist Name

Printed On
August 15, 2018

Page
1 of 1

Agriculture Drives Impact

- Precompetitive space
- Consistent messaging
- Reduce the number of systems/tools



**Only by
working
together can
we build the
future of the
industry.**





Thank You

——— Matt Carstens ———

Senior Vice President, Land O'Lakes , Inc.

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Twitter is @MattCars1