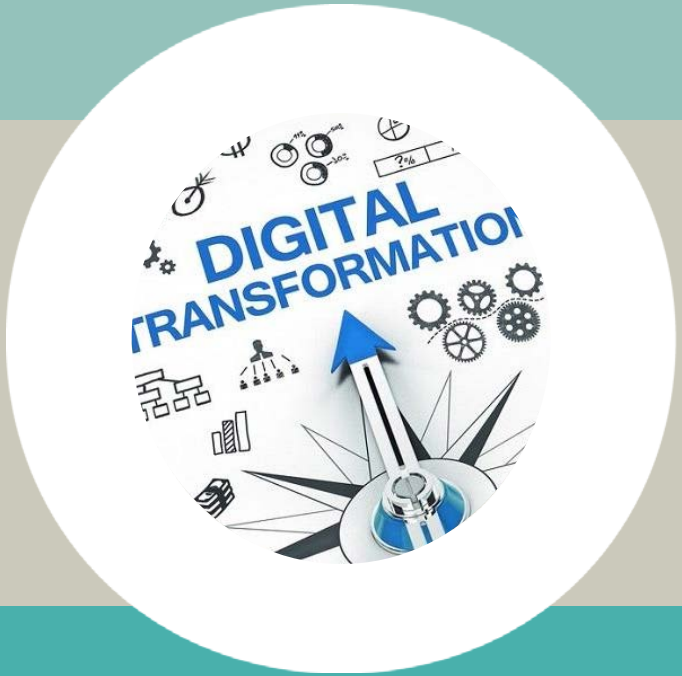

Digital Transformation

Amanda Neely

LAND O'LAKES, INC.

Technology & Agriculture

- Data Collection & Aggregation
- On farm productivity
- Digital Transformation
- Insights and Efficiencies
- E-business & Ease of business
- Partnerships & Integrations

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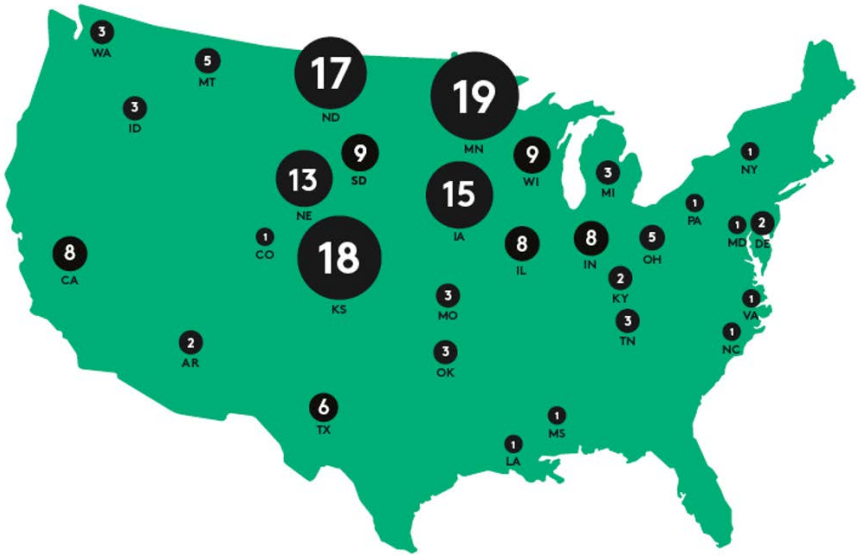
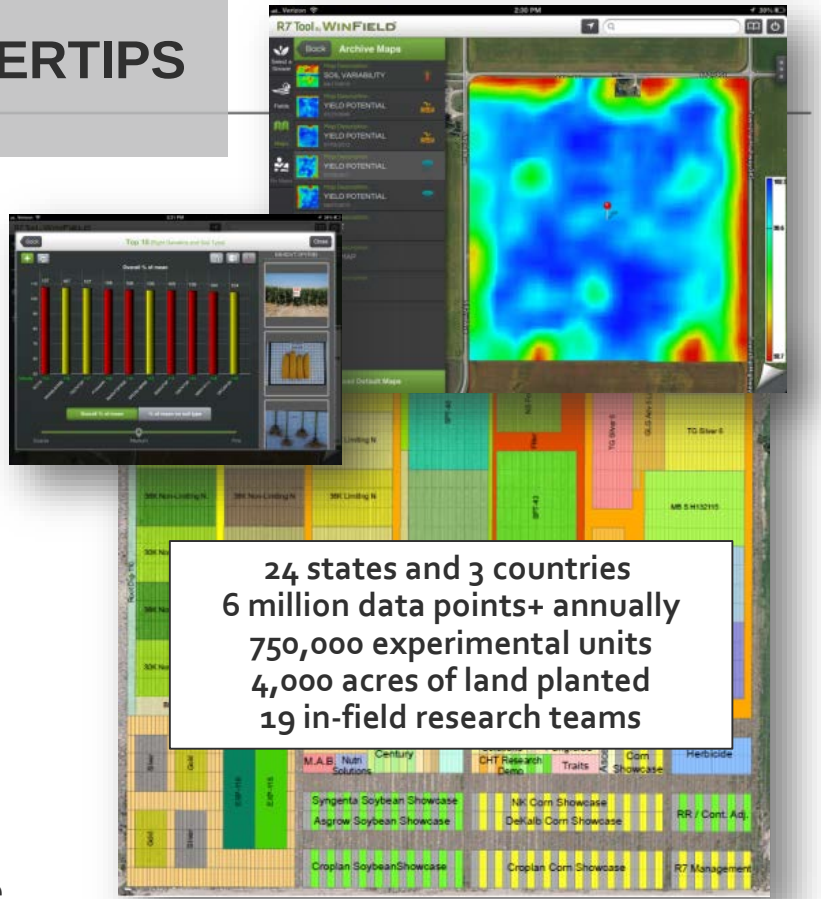
DELIVERING INSIGHTS TO YOUR FINGERTIPS

115 Answer Plot Locations – 20 Years of R&D





24 states and 3 countries
6 million data points+ annually
750,000 experimental units
4,000 acres of land planted
19 in-field research teams

Intelligently advancing agriculture to achieve predictable outcomes requires technology solutions that work for farmers

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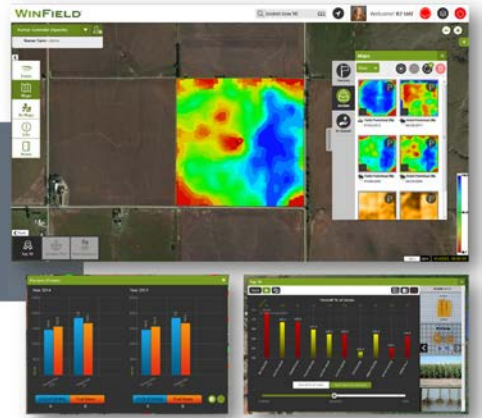
WINFIELD UNITED

R7® Tool

By WinField® United

- Best in class seed placement tool
- Easy-to-use Web & Mobile Solution
- Satellite Imagery to Detect Vegetation
- Field-Specific Variability Assessment
- Product-Specific Response Insights
- Enabling In-Season Management
- ROI Understanding for each Field

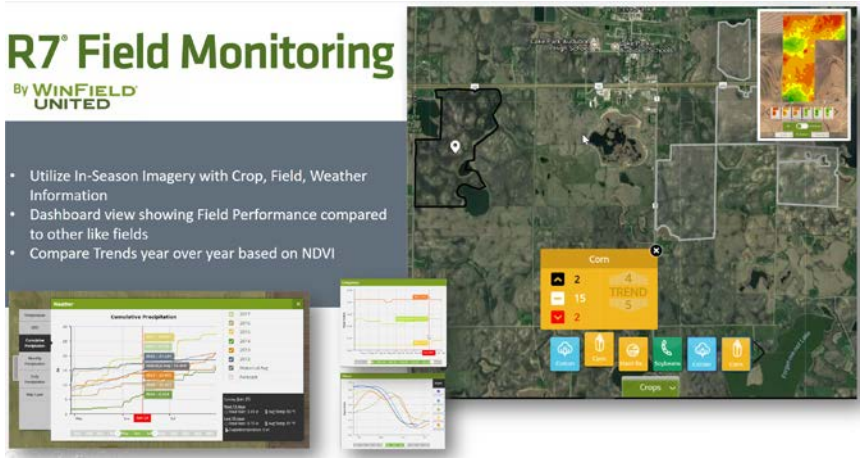
"Enable the growers that we serve to capture the optimal yield potential on every acre."



R7® Field Monitoring

By WinField® United

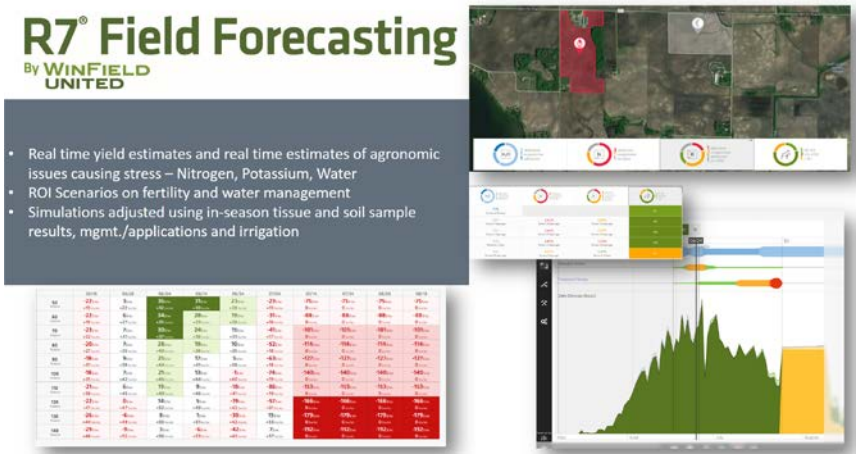
- Utilize In-Season Imagery with Crop, Field, Weather Information
- Dashboard view showing Field Performance compared to other like fields
- Compare Trends year over year based on NDVI



R7® Field Forecasting

By WinField® United

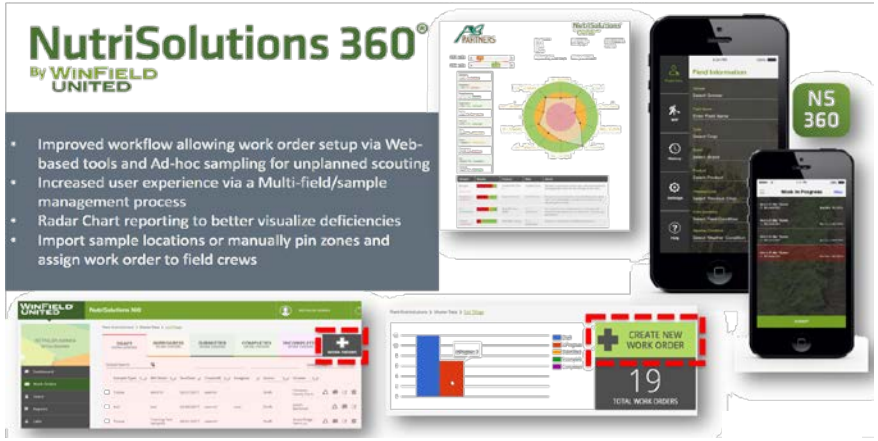
- Real time yield estimates and real time estimates of agronomic issues causing stress – Nitrogen, Potassium, Water
- ROI Scenarios on fertility and water management
- Simulations adjusted using in-season tissue and soil sample results, mgmt./applications and irrigation



NutriSolutions 360®

By WinField® United

- Improved workflow allowing work order setup via Web-based tools and Ad-hoc sampling for unplanned scouting
- Increased user experience via a Multi-field/sample management process
- Radar Chart reporting to better visualize deficiencies
- Import sample locations or manually pin zones and assign work order to field crews



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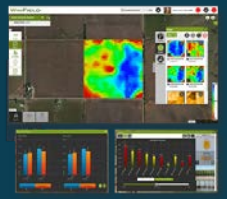
WINFIELD UNITED ATLAS OMNI-CHANNEL SOLUTION



R7® Tool

Nutrisolutions®

R7® Field Forecasting

Truterra™

INSIGHTS

Data / Insights for Decision Making

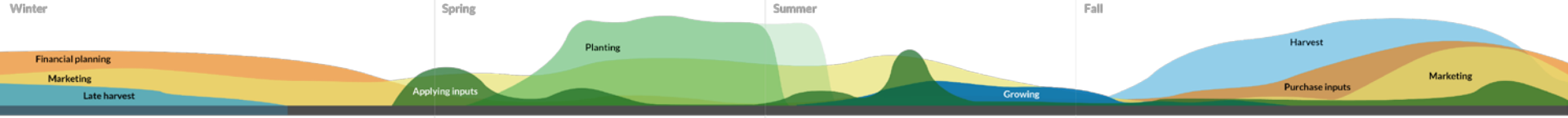
PURCHASE

Website / Digital Marketing
Personalized Experience
Commerce

FULFILLMENT

Inventory Transparency
On-Time Delivery
Operational Efficiency

Understanding the Growers Journey



Financial planning

Project the earnings, and strategize the spending for the new year, with financial advisors and crop consultants. Secure line of credit and purchases crop insurance.

Activities: review prior year, budget and forecast new year, secure line of credit, purchase crop insurance, prepare tax.

Networking and community

Attend grower meetings to learn about best practices and the latest in farming. This maintains a sense of community which is diminishing in farming business.

Late harvest

Activities: tractor shows, volunteering

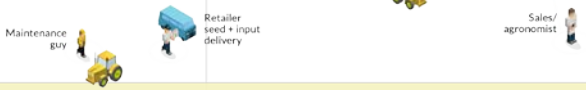
Applying inputs

Planting

With help from agronomists, load the USB drive that contains the Rx and import new files into the John Deere planter (uses auto-steering for planting. **Activities**: load Rx to equipment, plant seeds (replant if needed).

Preparing pre-season

Make sure everything is good to go, equipment is tuned up and seeds are received. **Activities**: repair machinery during "fix-it months", seed and input delivery, create Rx.



Vacation

Vacation with the family. Text with agronomist to receive images of the fields in case anything abnormal comes up.

Growing

Trust in the agronomist to monitor the fields and make in-season applications depending on diseases, pests or deficiencies. **Activities**: crop scouting, diagnose and treat, soil and tissue sampling.

Selecting and purchasing inputs

With insights learned during harvest, discuss hybrids, chemical and fertilizers for next year with agronomist. Choose the inputs from the local co-op's product brochures. Place orders and prepay. **Activities**: select inputs, negotiate price, lock down and prepay.

Harvest

With the seasonal staff operate the combine to harvest crops. The grower sits in front of the monitors with real time imagery of the yield map—at the same time, looking at the combine and watching the field condition. **Activities**: prepare bins, harvest, evaluate and analyze, haul and store grains.

Marketing and selling crops

Staying on top of the trends, while relying closely on marketing advisors to determine when to sell. **Activities**: monitor market, sell crop, haul grain.

Record keeping

With help from marketing, financial advisors and agronomist, the grower tracks the financial and operational activities related to his farm. **Activities**: bookkeeping, submit record to FSA.

Monitoring grain elevator

The agronomist had suggested to use temperature sensor and remote management program to monitor the grain conditions in the elevators. Makes sure grains are in a low temperature and dry environment—warmth and humidity will cause sprouting.

Providing connected solutions and an integrated farming experience

Connectivity through combined data provides growers with a **complete, cross-dimensional view into their farm, fields, activities, purchases, collaborators and finances**.

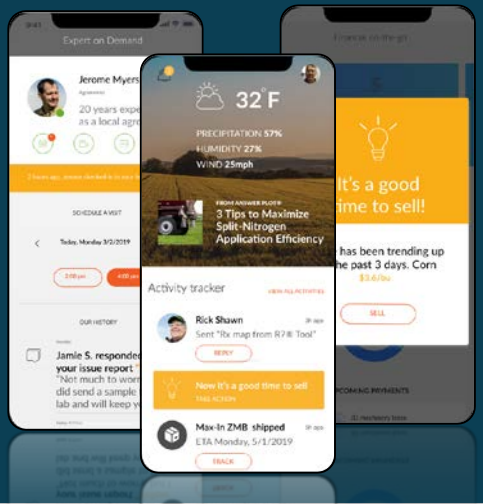
Completeness of data guarantees more accurate insights and forecasting—growers are motivated to keep their field and farm data up to date and understand the benefits of a data input service.

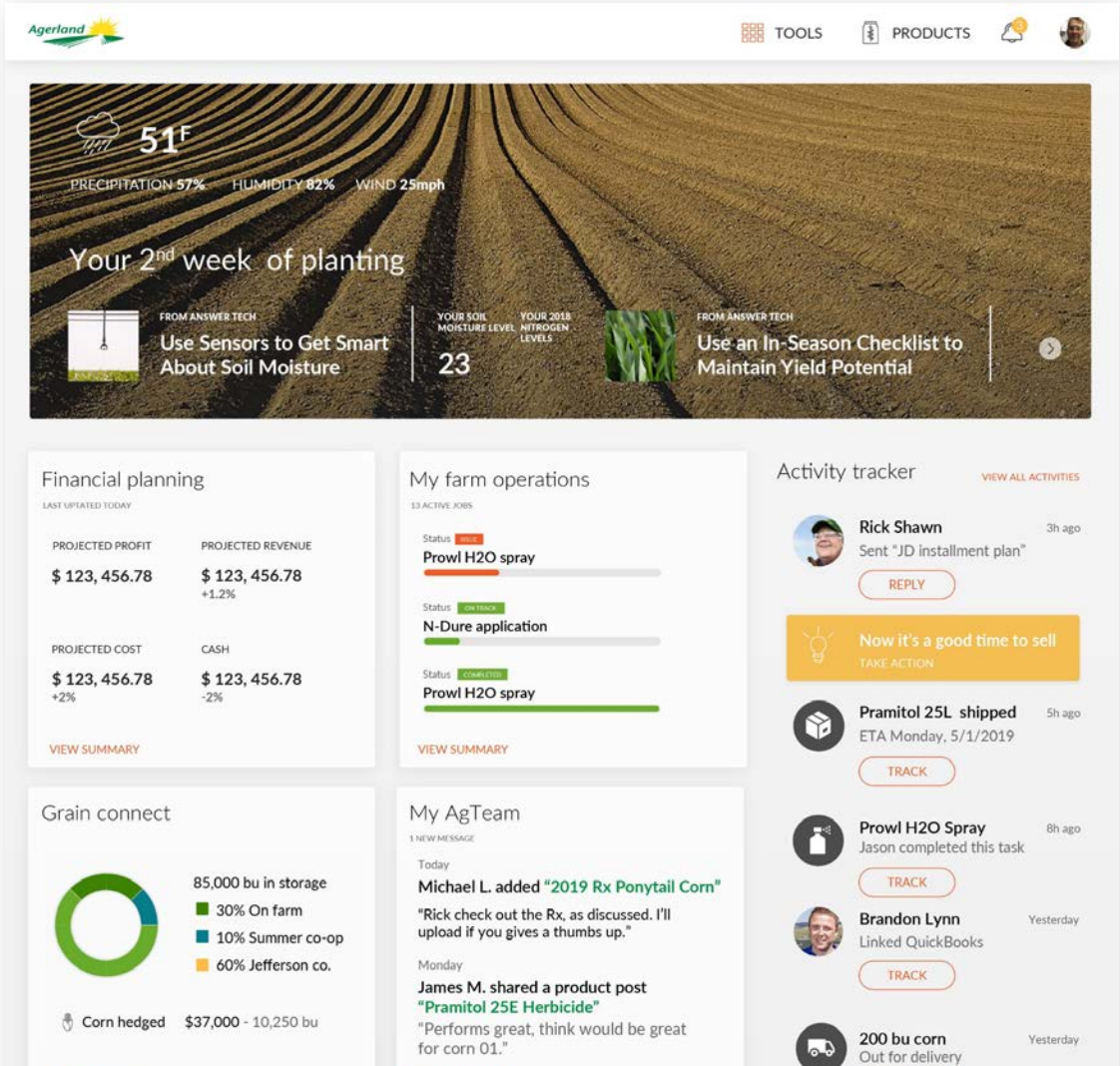
WINFIELD UNITED ATLAS

Example concept: Grower's dashboard

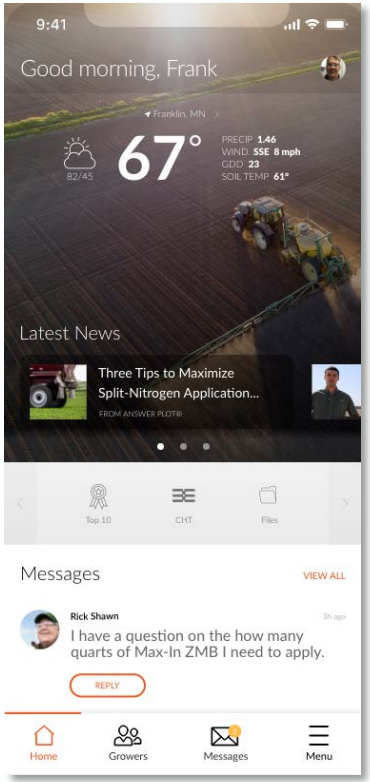
A **dashboard** with access to all the platform modules (i.e. financial planning, ops platform, grain connect) along with **seasonal updates and insights** based on the grower's farm profile.

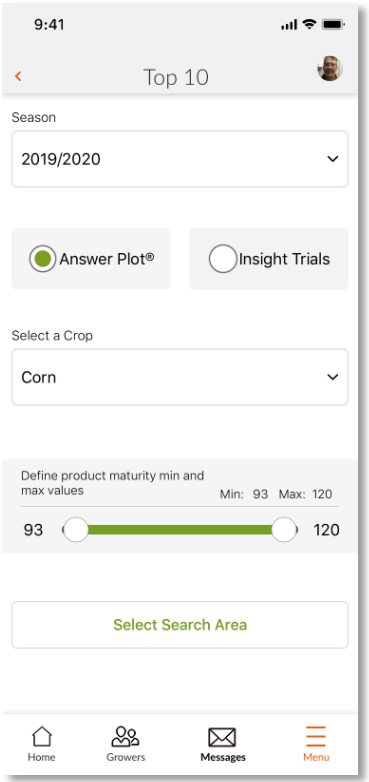
The dashboard also incorporates a **live feed to track all the on-going farm activities,** which gives growers a prompt to take real-time action.

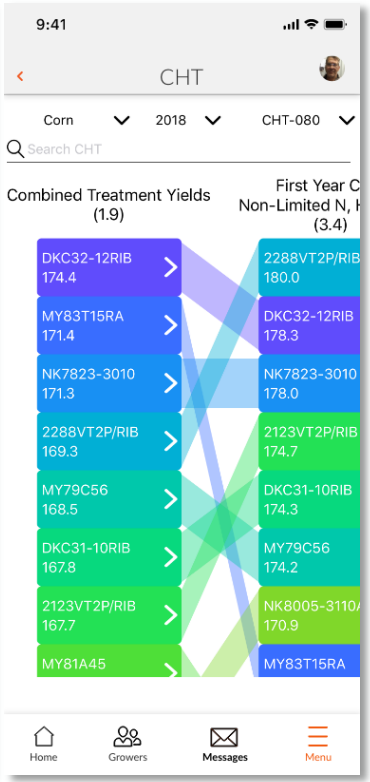


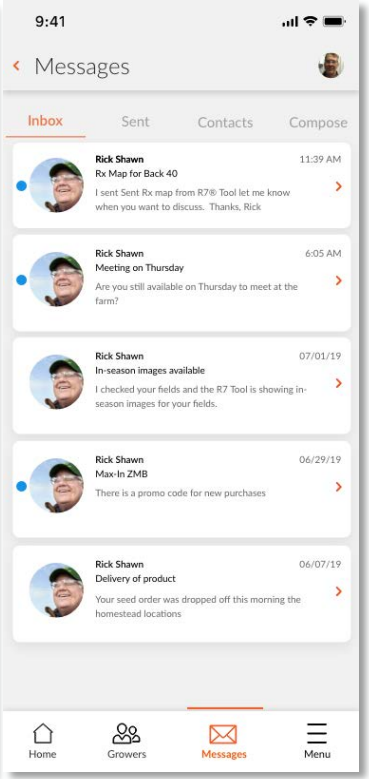


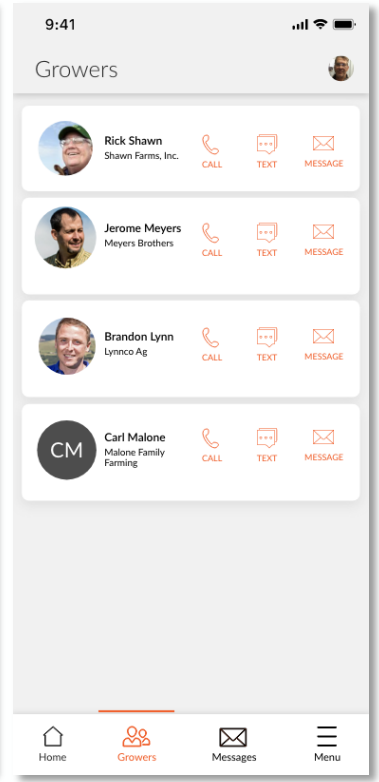
Mock up – Seller APP











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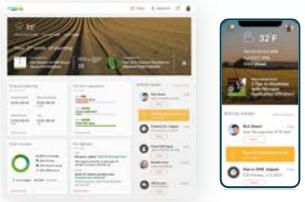
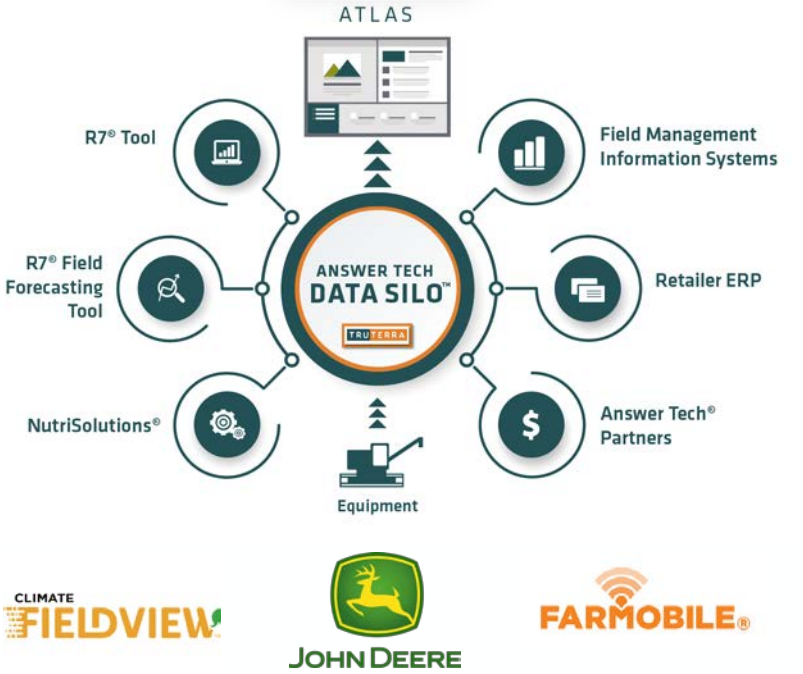
BRINGING THE AGGREGATOR POSITION TO LIFE

ATLAS
Web Portal & APP





FieldAlytics™
empowering decisions

FIELDREVEAL™

xarvio™ Digital Farming Solutions

Merchant Ag™
agri-business management

Agvance

AgVantage Software

AgWorks
By Ag Retail, For Ag Retail

CLIMATE FIELDVIEW

JOHN DEERE

FARMOBILE®

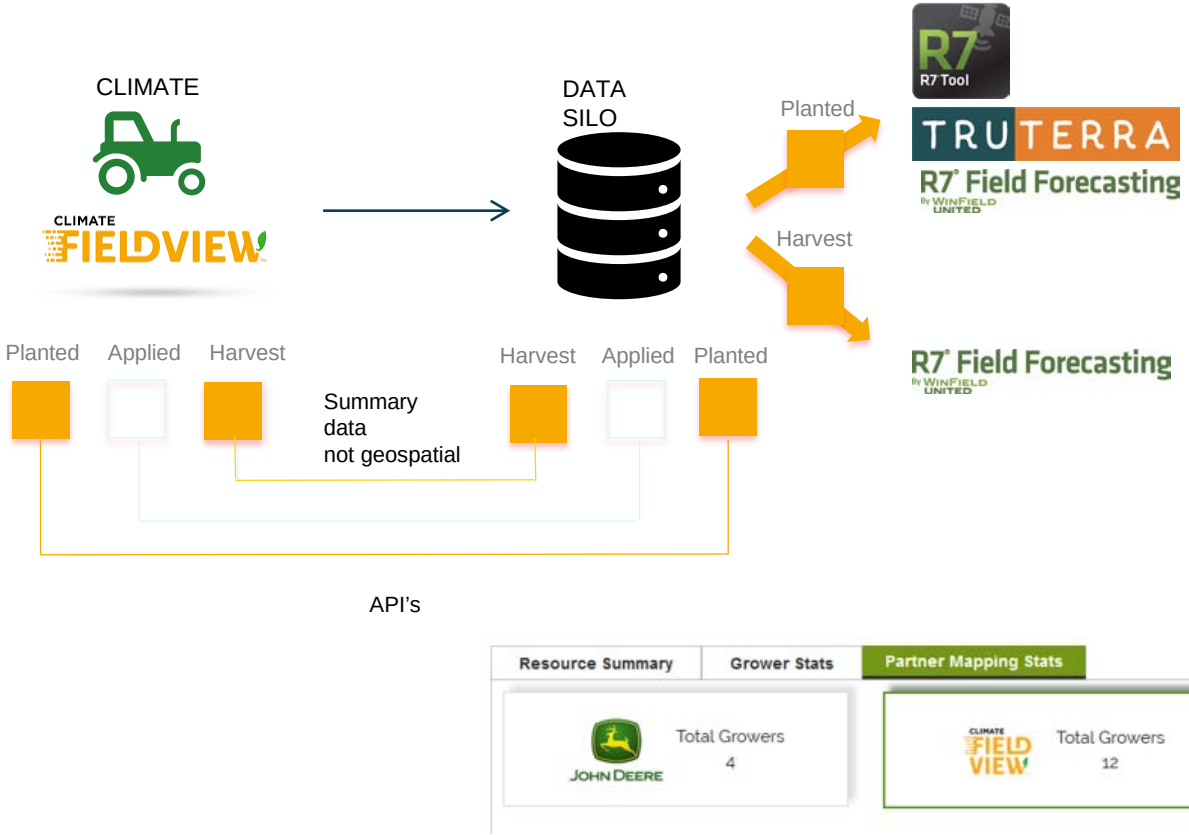
Data Silo Planting / Harvest

Planting Data:

- Planting Date
- Planting Population
- Crop
- Brand
- Hybrid

Harvest Data:

- Harvest Date
- Average Yield
- Total Yield
- Moisture
- Crop



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Data Silo Planting / Harvest

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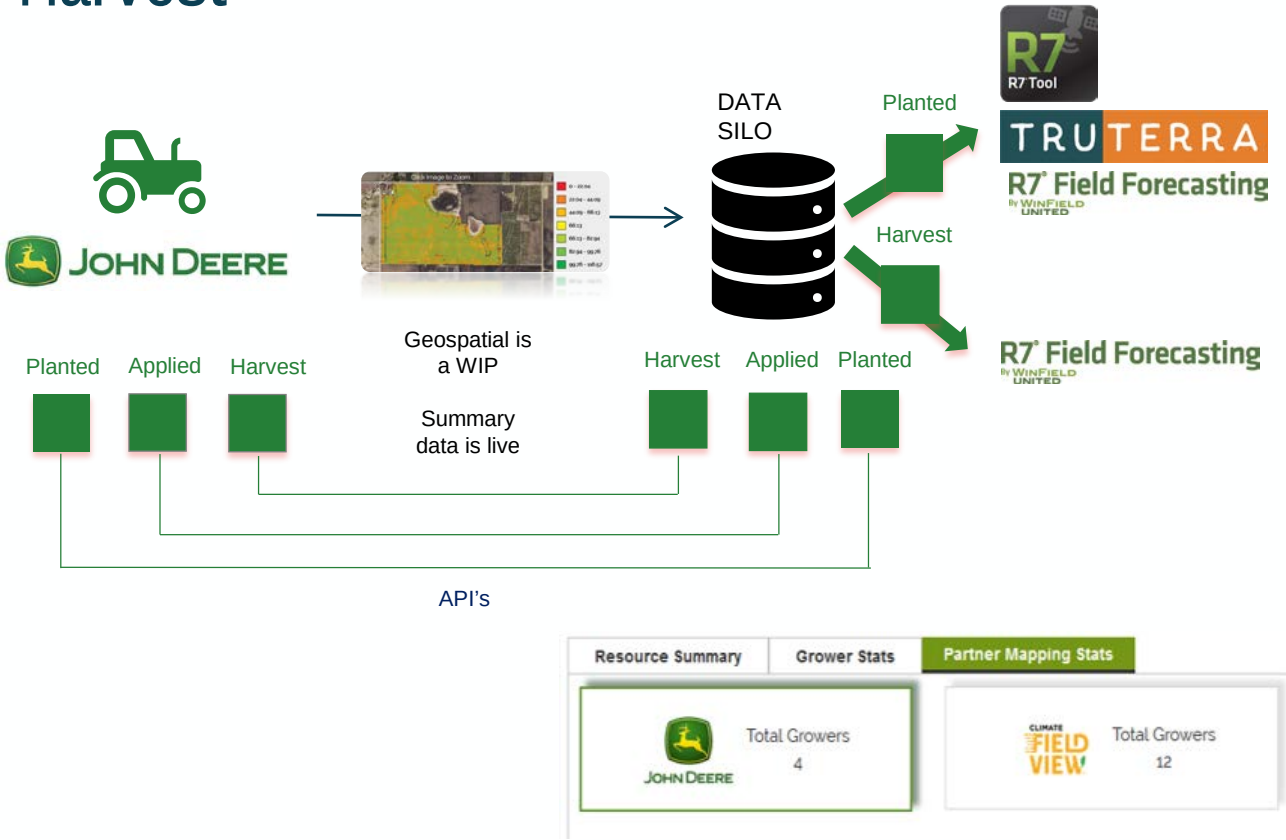

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Trends

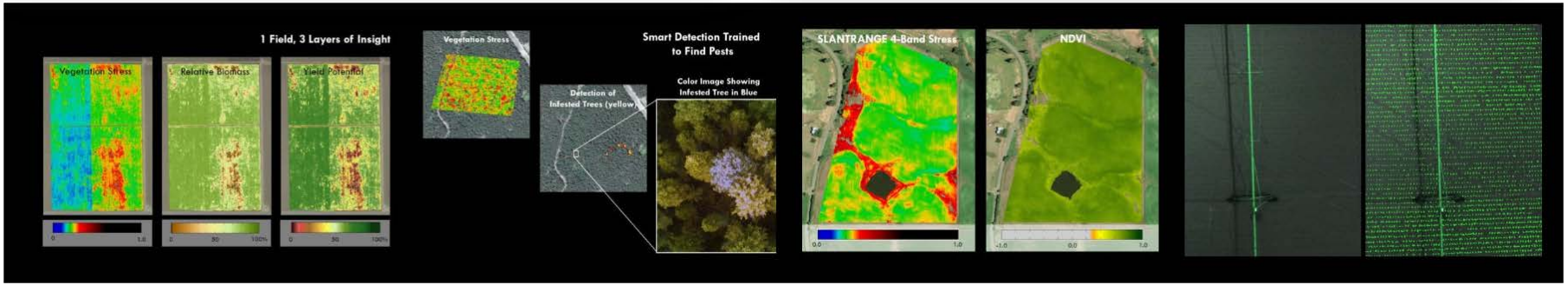
- 2019 vs. 2018: 16% more clear pixels
- 2018 vs. 2017: 2.75x more images processed
- 2017 vs. 2016: 2.5x images processed

- 1 day in 2019 (52% in <24h)
- 3.2 days in 2018
- 3.4 days in 2017
- 4.3 days in 2016

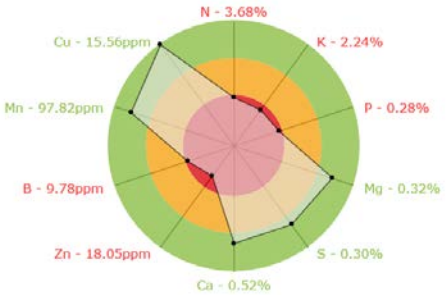
- 2019: 35 maps on average
- 2018: 30 maps on average
- 2017: 20 maps on average

Drone Innovation & Weather stations

American Robotics
SlantRange



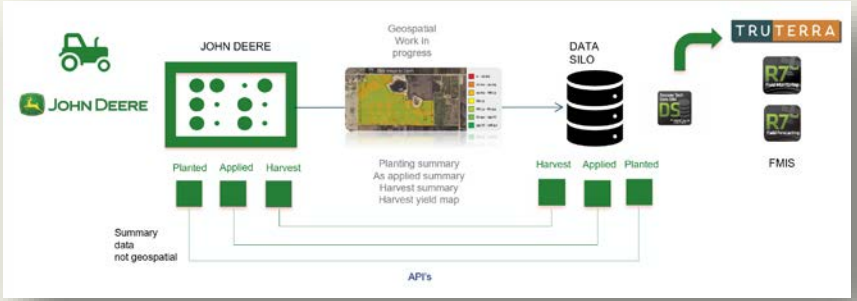
Connectivity – Key to Identifying Nutritional Issues



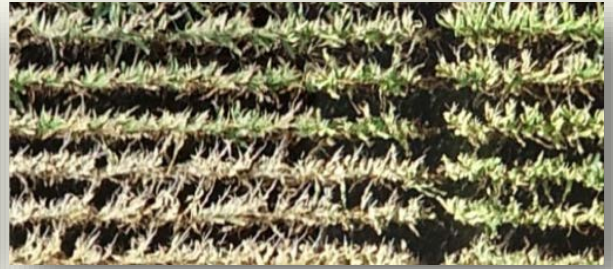
Field ID	VO03NW01
Crop	CORN
Work Order Name	Gadd Ranch: VO03NW01
Nutrient displayed	N
Growth stage	V7
Grower Name	Steve Gadd
Retailer Name	
Sample Name	Sample 3
Sample Date	07/17/2019

Data Movement

Lite Data:



Heavy Data:



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WINFIELD

Redesigning Agriculture

Truterra – 4th Business Unit of Land O' Lakes

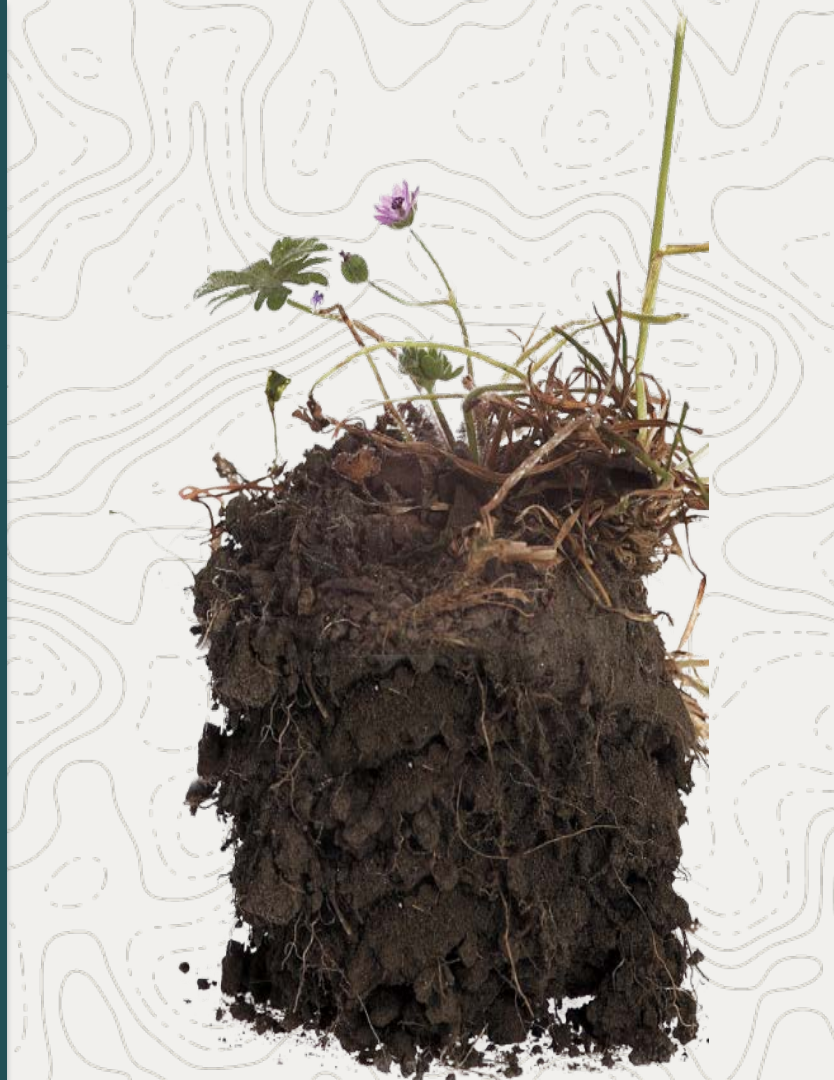
Dairy Foods	Crop Inputs/Insights	Animal Nutrition	Sustainability

At Truterra…

Sustainability means:

1. Supporting profitability and resiliency for farmers

2. Protecting natural resources



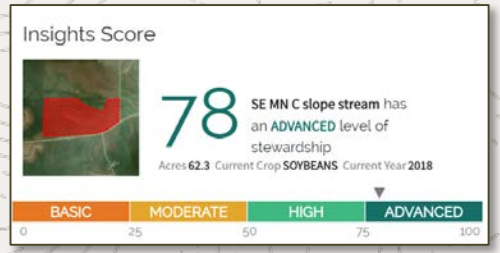
Partners / Stakeholders

Up Stream	Mid-Stream	Down Stream	Licensee	Ecosystem Credit	Conservation Partners
Farmers Ag Retailers	WinField United John Deere Cargill Syngenta Corteva agriscience AGCO Your Agriculture Company Bayer	Campbell's Walmart Tate & Lyle Nestlé Purina	AGI SureTrack conservis AgXata Houston Engineering Inc.	Ecosystem Services Market Consortium REG NORI Microsoft	Quail Forever Pheasants Forever Iowa Soybean Association USDA Department of Agriculture EDF The Nature Conservancy La Crosse Seed Environmental Initiative National Fish and Wildlife Foundation NFWF Field to Market University of Minnesota

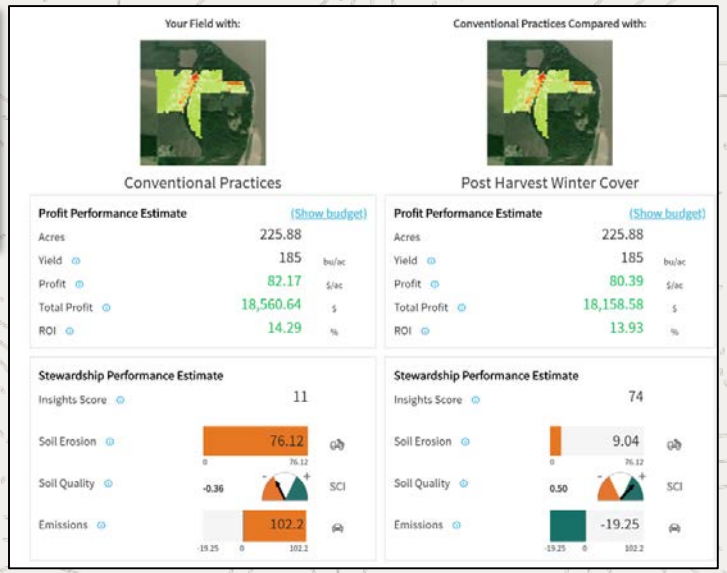
Today

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

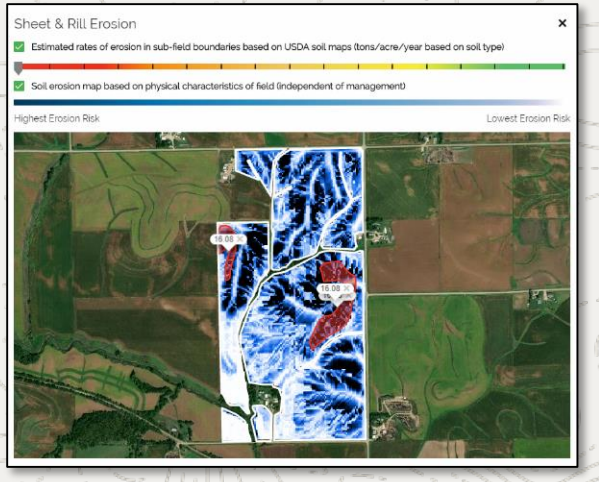
Stewardship Score



Profit Insights

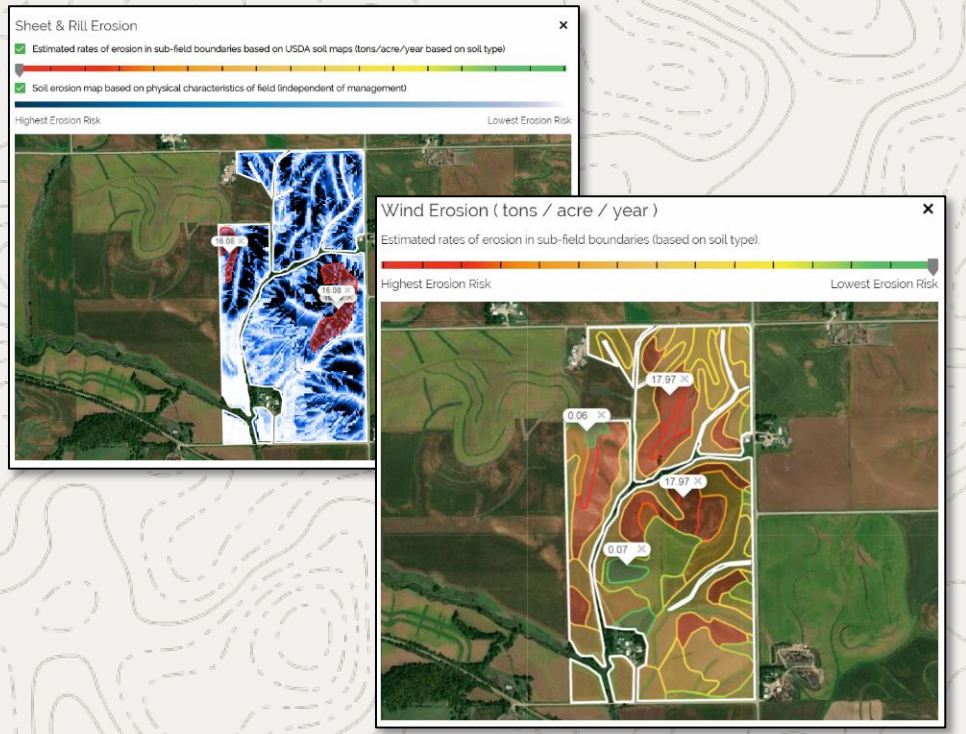


Precision Soil Insights



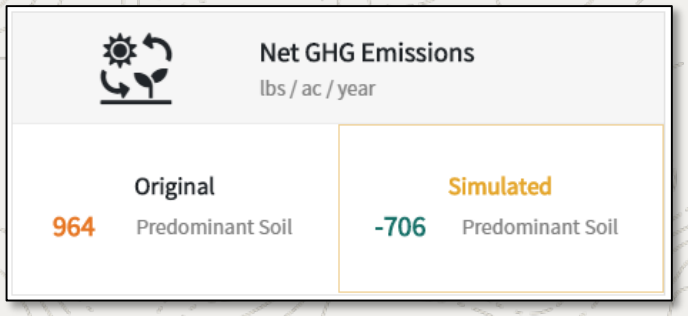
Precision Soil Insights

Hi-Res Water and Wind Erosion Risk



Soil Carbon Trend

Net GHG Emissions



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