Leveraging Sustainability Insights to Maximize Agronomic Advice

An Opportunity for Trusted Farmer Advisers & Preferred Technology Providers
What We’ll Cover

Leveraging Sustainability Insights to Maximize Agronomic Advice: An Opportunity for Trusted Farmer Advisers & Preferred Technology Providers

✓ Farmers have greater choice than ever when it comes to analyzing the performance of their management practices—and with customers increasingly asking questions about how their food is produced, it’s vital that farmers and their partners throughout the supply chain are able to incorporate sustainability insights into the data they are already collecting.

✓ We’ll talk about how Trusted Farm Advisers and Preferred Technology Partners can use the Fieldprint Platform to leverage sustainability insights alongside agronomic analysis to help farmers unleash opportunities for sustainability improvements that deliver operational efficiencies, demonstrate continuous improvement to the supply chain, and build consumer trust in food and agriculture.

✓ We’ll highlight Field to Market’s Qualified Data Management Partner program and how industry leading agribusiness are enhancing their agronomic offerings by using the Fieldprint® Application Programming Interface (API) to integrate Field to Market’s industry-accepted sustainability metrics within existing farm management systems and precision agriculture tools, giving farmers even greater choice when it comes to telling their sustainability story.
Background on Field to Market
Field to Market: The Alliance for Sustainable Agriculture focuses on defining, measuring and advancing the sustainability of food, feed, fiber and fuel production
Who We Are

Overview

✓ Field to Market: The Alliance for Sustainable Agriculture brings together a diverse group of grower organizations; agribusinesses; food, beverage, restaurant and retail companies; conservation groups; universities; and public sector partners.

✓ Field to Market strives to create continuous improvements in productivity, environmental quality and human well-being across the agricultural supply chain.

✓ Through innovative tools and resources developed by Field to Market, farmers and organizations across the supply chain are able to better understand sustainability at the field, local and national levels and advance continuous improvement at the landscape level.

✓ Field to Market unites the agricultural supply chain and key stakeholders around a common sustainability framework to drive continuous improvement in the sustainability of U.S. agriculture.

Vision
To harness the collective action of the value chain to support resilient ecosystems and enhance farmer livelihoods.

Mission
To meet the agricultural challenge of the 21st century by providing collaborative leadership that is:
• Transparent
• Grounded in science
• Focused on outcomes
• Open to the full range of technology choices
• Committed to creating productive and profitable opportunities across the agricultural value chain for continuous improvements in environmental outcomes
Field to Market uniquely brings together stakeholders from across the agricultural supply chain and creates unparalleled opportunities for collaboration.

Credibility
Leading universities and conservation groups are actively engaged in Field to Market’s science-based approach to identify opportunities to improve the environmental performance of U.S. food, fiber and fuel production.

Harmonization
Utilizing a multi-stakeholder approach to build consensus, Field to Market creates clear agreed upon terms and definitions and develops metrics and benchmarks that can be universally adopted by all stakeholders.

Efficiency
By providing a common framework to measure the sustainability of U.S. commodity crop production, Field to Market minimizes duplication of efforts and reduces the supplier burden of responding to a proliferation of supply chain surveys.
Uniting the Supply Chain to Deliver Sustainable Outcomes for Agriculture
Sustainability Metrics

✓ Biodiversity
✓ Energy Use
✓ Greenhouse Gas Emissions
✓ Irrigation Water Use
✓ Land Use
✓ Soil Carbon
✓ Soil Conservation
✓ Water Quality
Crops

- Alfalfa
- Barely
- Corn for Grain
- Corn for Silage
- Cotton
- Peanuts
- Potatoes
- Rice
- Sorghum
- Soybeans
- Sugar Beats
- Wheat
Pathways for Continuous Improvement

Our Continuous Improvement program supports members in designing and implementing three types of continuous improvement projects, enabling multiple pathways to help farmers and the value chain achieve specific milestones on their respective sustainability journeys.

INCUBATION
Creating enabling conditions by engaging with farmers on the connection between practices and at least one sustainability indicator

INSIGHTS
Offering sustainability insights for farmers and transparency for value chain partners through measurement

INNOVATION
Providing tangible support for farmer innovations guided by a public, project-level continuous improvement plan

Collectively, each project type aims to help farmers and the value chain advance their journey of continuous improvement and achieve enhanced sustainability performance that delivers improved environmental outcomes.
50 Projects Across 33 States
Example Collaboration and Partnership

ICGA Precision Conservation Management Midwest Project

**Summary**
The purpose of the PCM program is 3-fold: 1) allow Illinois commodity crop farmers to voluntarily address regulatory issues and water quality concerns; 2) assist supply chain providers who must demonstrate to stakeholders and customers that products are sustainably sourced; and 3) provide partial budget analysis of agronomic practices to help farmers make sound business decisions regarding implementation of conservation practices. In addition to water quality the project focused resources on nutrient management efficiency implementing strategies for changes in timing and volume along with introducing practices like cover crops to manage the efficient use of fertilizers.

**Sponsors**
IL Corn Growers Association (ICGA), PepsiCo, Mars, and The Nature Conservancy

**Sub-Project Sponsors**
Agrible (Nutrien), IL Farm Bureau, IL Farm Business Farm Management Association, IL Soybean Association, South Central FS, TGM Elevators, University of IL, USDA NRCS (+ 30 other partners who did not make claims)

**Resource Concern(s)**
Soil Quality, Water Quality

**Metric Goals**
Greenhouse Gas Emissions, Soil Conservation, Water Quality
Fieldprint Platform as a Tool
What is the Fieldprint Platform?

Field to Market’s Fieldprint Platform is the analytic engine behind both the Fieldprint Calculator (web application) and the Fieldprint Application Programming Interface (API), which calculates Fieldprint Results by collecting farm level data, benchmarking sustainability performance against Fieldprint Platform Metrics, and identifying opportunities for improvement, in order to form the basis for making sustainability claims.

The Fieldprint Platform is designed to help growers better understand and communicate how management decisions affect overall sustainability performance and operational efficiency. The Platform estimates field level performance on the following environmental sustainability indicators: land use, conservation, soil carbon, irrigation water use, water quality, energy use, greenhouse gas emissions and biodiversity.

Management information entered into the tool are analyzed and transformed into “Fieldprint Results", a graphical rendition and associated numerical results of an agricultural operation’s sustainability performance. These results help growers visualize and assess how efficiencies and environmental impacts fluctuate based on various management decisions. The Platform also allows comparison of performance against state and national averages developed using publicly available data.
Fieldprint Platform | Building Blocks

- NRCS
- CSU
- Sustainability Analytics Engine
- AWS
- Fieldprint Calculator
- Fieldprint API
- Farmer
- Project Admin
- QDMP

API – Application Programming Interface
AWS - Amazon Web Services
CSU - Object Modeling System (OMS) Laboratory, Department of Civil and Environmental Engineering, Colorado State University
QDMP – Qualified Data Management Partner
NRCS - Natural Resources Conservation Service, United States Department of Agriculture
Fieldprint Platform | System Context

- **Crop Years**
  - 2016 Corn
  - 2017 Soy
  - 2018 Corn

- **Data Types**
  - Land
  - Field
  - Geospatial
  - Agronomic
  - Application
  - Operation
  - Crop Rotation System (NRCS)

- **Fieldprint Data**
  - Fieldprint API
  - QDMP FMS

- **Fieldprint Results**
  - Fieldprint Project Administrator
  - Fieldprint Calculator (Web UI)

- **Data Inputs**
  - Trusted Advisors
  - Farmer

- **Analytics Engine**
  - Soils Service
  - WEPP Model
  - WEPS Model

- **Crops**
  - Alfalfa
  - Barley
  - Corn for Grain
  - Corn Silage
  - Cotton
  - Peanuts
  - Potatoes
  - Rice
  - Sorghum
  - Soybeans
  - Sugar Beets
  - Wheat

- **Metrics**
  - Land Use
  - Soil Conservation
  - Soil Carbon
  - Irrigated Water Use
  - Energy Use
  - Greenhouse Gas
  - Water Quality
  - Biodiversity
Fieldprint Calculator | Interface

Field and Crop Years

Data Entry

Fieldprint Results

https://calculator.fieldtomarket.org/
Fieldprint Calculator | Analysis

4 Energy Use

The Energy Use Metric calculates all energy used in the production of the crop in one year from pre-planting activities through to the first point of sale. It is an efficiency metric, calculated using a series of algorithms and designed to provide feedback on the energy used per unit of crop production.

Your Score

The Energy Use metric includes direct energy used for operating equipment, pumping irrigation water, grain drying and transport as well as embedded energy, which is required to produce crop inputs like seeds, fertilizers and crop protectants.

Energy use is expressed as British thermal units (BTU) per unit of production (e.g. pound or hundred weight). It takes one BTU to raise the temperature of one pound of water 1°F. One gallon of diesel produces 137,452 BTU.

Lower numbers are desirable and indicate less energy used to produce the crop.

Comparison to Benchmarks

Energy Use score in comparison to available benchmarks. Benchmarks are an average of USDA statistical data for the period 2008-2012, to provide context for your scores. Benchmarks should not be interpreted as a specific level of sustainability, or a performance target. State and National benchmarks that are not shown in the table or on the spidergram are not available for the applicable metric.

<table>
<thead>
<tr>
<th>Score</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Score</td>
<td>16863 btu / bushel</td>
</tr>
<tr>
<td>State Benchmarks</td>
<td>18730 btu / bushel</td>
</tr>
<tr>
<td>National Benchmarks</td>
<td>25848 btu / bushel</td>
</tr>
</tbody>
</table>

Breakdown of Energy Use Score Components

Table showing values for each individual component of your Energy Use score, in both BTU / acre and BTU / bushel.

<table>
<thead>
<tr>
<th>Component</th>
<th>Energy (btu / acre)</th>
<th>Energy (btu / bushel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Energy</td>
<td>351,038</td>
<td>7,631</td>
</tr>
<tr>
<td>Application Energy</td>
<td>349,866</td>
<td>7,606</td>
</tr>
<tr>
<td>Manure Loading Energy</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Seed Energy</td>
<td>65,338</td>
<td>1,420</td>
</tr>
<tr>
<td>Irrigation Energy</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Post-Harvest Energy</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transportation Energy</td>
<td>9,446</td>
<td>205</td>
</tr>
<tr>
<td>Total Energy</td>
<td>775,689</td>
<td>16,863</td>
</tr>
</tbody>
</table>

What is the greatest contributor to my Energy usage?

https://fieldtomarket.org/our-program/sustainability-metrics/
Supporting Trusted Advisers
The SPARC Initiative

*Equipping trusted farmer advisers to deliver improved sustainability outcomes*

Sustainability Programming for Ag Retailers and Certified Crop Advisers (SPARC) is a partnership between the Agricultural Retailers Association (ARA), the American Society of Agronomy (ASA) International Certified Crop Advisers Program, Environmental Defense Fund (EDF) and Field to Market: The Alliance for Sustainable Agriculture.

With the public’s growing interest in how food, fiber and fuel is produced, the agricultural community must find innovative ways to increase efficiency and produce more with less, while protecting the environment. Not only do farmers look to their ag retailer and CCA for advice to boosts yields and profits, they are increasingly seeking out agronomic insights that also help improve soil, water and other natural resources.

As farming becomes increasingly complex, many factors must be considered by farmers as they make decisions about planting; fertilizing; managing for disease and pests; and conserving energy, soil and water. A new opportunity emerges for trusted advisers—like CCAs, retail agronomists, extension agents and NRCS field staff—to help farmers navigate this complex decision matrix by combining agronomic advice with sustainability insights to drive continuous improvement in the productivity, profitability and environmental outcomes of farmers’ operations.
SPARC Resources

Discover opportunities to learn more about the most pressing issues facing the future of food, fiber and fuel and connect your farmer-customers to the resources they need to participate in supply chain sustainability programs.

- **Access Knowledge and Resources:** Help your farmer customers improve the productivity, profitability and environmental outcomes of their operations.

- **Build Capacity:** Engage in training opportunities to learn how to offer combined agronomic and sustainability insights to farmers.

- **Make the Business Case:** Understand how to demonstrate the economic benefits both to your farmer clientele and your business.

We believe that sustainability outcomes can be improved by pre-competitively strengthening the ability of CCAs and ag retailers to deliver sustainability services that provide both agronomic and environmental benefits.
Resources for Trusted Farmer Advisers

SPARC Resources

Know the Issues: Partners in Stewardship
Fact sheets to share with your clients and start the discussion about how—with your help—farmers can better understand the challenges and opportunities of sustainable agriculture, where they can improve the sustainability performance and efficiency of their operation, how to demonstrate progress and share their story.

SPARC Sustainability Training Manual
Manual used by ag retailers who wish to train their staff on sustainability. Intended as a companion to the online modules, the manual offers discussion points and key questions to help teams gain a deeper understanding of the value to both their clients and their business of offering products and services that support improved environmental outcomes.

Online Learning Modules
Hosted in the American Society of Agronomy’s Online Learning Classroom, this series of learning modules covers the what, why and how of agricultural sustainability and the role of the trusted adviser in driving continuous improvement.

Economic Case Studies
These five case studies explore the economic benefits of implementing practices that improve environmental outcomes for farming operations. Each case study profiles a farmer that has “done well by doing good,” in Iowa, Illinois, Indiana, Nebraska, and Tennessee.

Kelly Murray Young, Educational Resource Manager, kyoung@fieldtomarket.org
https://fieldtomarket.org/our-program/sparc/
Qualified Data Management Partners
Qualified Data Management Partners

✔ Builds an ecosystem in which precision agriculture, decision support and farm management software solution companies (QDMPs) can innovate and build enhanced solutions around sustainability measurement.

✔ Provides growers with expanded access to the industry’s most accepted and recognized sustainability measurement framework – enabling growers to use their Preferred Technology Provider.

✔ Science and technology has been used to help unlock agronomic insights - they can also reveal opportunities for sustainability improvements when integrated in QDMP systems.

✔ Provides the supply chain as a whole with greater flexibility and additional options when seeking data management partners for Projects.
Extending the Fieldprint Platform

QDMP – Process and Resources

QDMP Data Management License Agreement: Use of the Fieldprint API requires a fully executed data management license agreement. Agreement addresses important legal considerations and other considerations like reporting and restrictions on use.

Fieldprint API Toolkit: Important guidelines governing usage of Field to Market trademarks and communications about the Fieldprint Platform. Includes examples and guidance around presentation of data.

Fieldprint API Documentation: Fieldprint API described (documented) using the Swagger Specification (OpenAPI Specification). Documentation is maintained on our developer portal. Also includes ongoing release notes.

SharePoint Portal: Portal provides additional support artifacts such as listing of data inputs, guidance on data migration, example API endpoint request and response examples, and guidance in areas such as project benchmarks.

Quality Assurance: As outlined in API Toolkit, engagement leading up to integration release includes data mapping review, review of data input sources, quality assurance to include running test cases, and final walkthrough and approvals.
Extending the Fieldprint Platform

Fieldprint API – Providing Technical Integration

Fieldprint Platform API - Version 3

Last Updated: July 18, 2019

Field to Market’s Fieldprint is the analytic engine behind both the Fieldprint Calculator and the Fieldprint Application. Data, benchmarking sustainability performance against Fieldprint Platform Metrics, and identifying opportunities for improvement.

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Management information entered into the tool are analyzed and transformed into “Fieldprint Results”, a graphical representation. It helps growers understand and communicate the efficiency and environmental impact of their farm operations.

| GET | /Endpoints | Pull a full list of available API endpoints |
| POST | /Calculator |
| POST | /CalculatorReport |
| POST | /FieldData/SSURGO |
| POST | /ScaledBenchmarks |
| GET | /ReferenceData/AbandonmentReasons |
| GET | /ReferenceData/AlfalfaDryingSystems |
| GET | /ReferenceData/AlfalfaHarvestTypes |
| GET | /ReferenceData/ApplicationTimes |

Sample JSON Example:

```json
{
  "texture_id": 1,
  "om_content": {
    "value": 2,
    "unit": "%"
  },
  "rotation": {
    "year": 2017,
    "crop_id": 2,
    "previous_crop_residue_burned": false,
    "previous_yield": {
      "value": 0,
      "unit": "bu/ac"
    },
    "previous_rotation_practice_id": 2,
    "cover_crop": false,
    "tillage_class_id": 3,
    "cr1mod_id": 278639,
    "conservation_practice_ids": [],
    "wind_barrier": false,
    "tile_drainage": false,
    "nutrient_plan": false,
    "nutrient年产_ids": [
      1,
      2,
      3,
      4
    ],
    "soil_condition_id": 1,
    "application_rate_id": 7,
    "application_method_id": 3,
    "integrated_npm_management_id": 9,
    "land_conversion": false,
    "land_conversion_type_id": null,
    "land_conversion_acres": {
      "value": 0,
    }
  }
}
```
Extending the Fieldprint Platform

QDMP Status

✔ Field to Market now has six (6) Qualified Data Management Partners.

✔ Now working with two additional partners – anticipating announcements towards end of 2019.

✔ Partners come from throughout the supply chain – we are seeing additional interest at the processor and commodity level.

✔ The Fieldprint Platform (Calculator and Fieldprint API) are at Version 3 (deployed in Fall 2018). Version 3 was a complete re-write of the code base and database. Provided a much improved API for integration.
Qualified Data Management Partners

Integration of Sustainability Creating Scalable Engagement with Growers, Processors, Ag Retailers & CPG Companies

Data Input
- Grower Data
- Sustainability Metrics
- Field to Market
- Partner Data & System Integrations

Best-in-Class Grower Tools
- Crop Modeling
  - Agronomics
  - Predictive Analytics
  - Crop Monitoring

Delivery of Brand Promise Through Sustainability
- Grower Value
- Market Pull
- Sustainability

Agrible Platform - Turning Data into Insights
- Recordkeeping
- Sustainability
- Predictive Analytics
- Weather

Insights give you the power to make the best decisions.

Individual company screen captures are for illustrative purposes only.
Bunge Centerfield

Centerfield is a partnership between growers, food companies and Bunge. Bunge works with farmer customers to collect farm-level data on key sustainability metrics. The information is aggregated and shared with participating growers and food customers who are interested in learning more about their supply chains. Centerfield is now integrated with the Fieldprint Platform; Fieldprint data is collected via an app and the output is displayed directly on the Bunge Centerfield website.

Individual company screen captures are for illustrative purposes only.
Qualified Data Management Partners

Individual company screen captures are for illustrative purposes only.
Growers using Syngenta’s Land.db® software benefit from metrics in the FPP for their crop production planning and analyses

- **Recruitment & Training**
- **Data Collection by Grower**
- **Aggregate Data Analyses**
- **Reporting & Outreach**

**Field to Market®** metrics included in training

Data used to create a **Fieldprint®**

Benchmark comparisons of individual to many growers provide insights

Individual company screen captures are for illustrative purposes only.
Qualified Data Management Partners

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More Information

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