A collaborative approach to measuring sustainability in agriculture

Jennifer L. Shaw, Vice Chair Field to Market

February 24, 2015, ASSBT Meeting, Clearwater Beach, FL
My background
The Scottish Highlands
Today’s Talk and Discussion

• Sustainable sourcing – what’s happening?

• An introduction to Field to Market and why it's different

• Field to Market initiatives and what has been learnt

• Where is Field to Market going
Food service and retail companies are driving sustainable sourcing into their global supply chains

• Responding to pressure from environmental groups
• Sustainable Sourcing = procurement of ingredients sustainably produced (e.g., reduced energy, carbon & water)
• Farms matter: ~ 50% of the environmental footprint of food ingredients

Suppliers requested to provide documentation of Sustainability
Field to Market: The Alliance for Sustainable Agriculture focuses on defining, measuring and advancing the sustainability of food, fiber and fuel production
Guiding Principles underscore broad collaboration

- Engage the full supply chain
- Drive continuous improvement
- Initial focus on commodity crops
- Provide collaborative leadership
- Transparent
- Grounded in science
- Remain technology neutral
- Focused on outcomes
- Offer useful measurement tools & resources
- Coordinated and comprehensive approach

Field to Market®
How We Define Sustainable Agriculture

Meeting the needs of the present while improving the ability of future generations to meet their own needs by:

• Increasing productivity to meet future food and fiber demands
• Improving the environment
• Improving human health
• Improving the social and economic well-being of agricultural communities
Environmental efficiency indicators were developed as a first step

- **Land Use:** Planted area in acres per bushel
- **Soil Conservation:** Average soil erosion in tons per bushel
- **Soil Carbon:** Annual average change in soil carbon measured as a Soil Conditioning Index (SCI) of -1 to 1
- **Irrigation Water Use:** Quantity of irrigation water applied in acre-inches per bushel (irrigated – dryland yield)
- **Energy Use:** Total energy used (direct & indirect) in BTU’s per bushel
- **Greenhouse Gas (GHG) Emissions:** Sum of direct and indirect GHG emissions measured as CO₂ equivalents per bushel

Additional indicators are under development
These indicators are at the core of FTM’s deliverables:

**National indicators report:**
Documentation of overall trends

**Grower Fieldprints:**
Individual opportunities for continuous improvement

**Supply chain projects:**
Direct engagement in continuous improvement

**Public data and models**
Collaboratively developed Outcomes based
National Indicators Report

Criteria

- Outcomes based
- Practice/technology neutral
- Transparent and credible science
- On-farm production outcomes within a grower’s control

Data & Methods

- Crops: corn, cotton, potatoes, rice, soybeans, and wheat (2012)
- Indicators: land use, soil loss, irrigation water, energy use, greenhouse gas emissions with socio-economic added in 2012
- Analyzed publicly available data, 1980-2011; U.S. national-scale indicators
- Peer reviewed
Summary Results: Environmental Indicators

- **Resource use/impact** per unit of production ("efficiency")
  - Improvement for all six crops on all five environmental indicators
  - Driven in part by improvements in yield
  - Helps track resource uses vs. production/demand concerns

- **Total resource use/impact**
  - Variability across crops and indicators (increases, decreases)
  - Driven in part by overall increases or decreases in production
Results: Resources per bushel – Wheat

Index of Per Bushel Resource Impacts to Produce Wheat
(United States, Year 2000 = 1)

<table>
<thead>
<tr>
<th>Year</th>
<th>Land Use</th>
<th>Soil Erosion</th>
<th>Irrigation Water Applied</th>
<th>Energy</th>
<th>Greenhouse Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 *</td>
<td>0.029 Planted Acres</td>
<td>0.152 Tons</td>
<td>0.580 Acre Inches</td>
<td>92,862 Btus</td>
<td>23.5 Pounds CO$_2$e</td>
</tr>
<tr>
<td>* Five-year average 1996 - 2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Data are presented in index form, where the year 2000 = 1 and a 0.1 point change is equal to a 10% difference. Index values allow for comparison of change across multiple dimensions with differing units of measure.
Results: Resources per bushel - Soybean

**Index of Per Bushel Resource Impacts to Produce Soybeans**
(United States, Year 2000 = 1)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000 *</th>
<th>Unit - per Bushel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use</td>
<td>0.027</td>
<td>Planted Acres</td>
</tr>
<tr>
<td>Soil Erosion</td>
<td>0.131</td>
<td>Tons</td>
</tr>
<tr>
<td>Irrigation Water Applied</td>
<td>0.766</td>
<td>Acre Inches</td>
</tr>
<tr>
<td>Energy</td>
<td>44,840</td>
<td>Btus</td>
</tr>
<tr>
<td>Greenhouse Gases</td>
<td>8.2</td>
<td>Pounds CO₂e</td>
</tr>
</tbody>
</table>

* Five-year average 1996 - 2000

**Note:** Data are presented in index form, where the year 2000 = 1 and a 0.1 point change is equal to a 10% difference. Index values allow for comparison of change across multiple dimensions with differing units of measure.
The Grower Fieldprint®
Measuring Field Level Outcomes and Identifying Opportunities for Improvement
How do growers get a Fieldprint?

- An online Fieldprint Calculator education tool for row crop farmers that indexes their agronomics and practices or....
- Farm management tools from trusted providers with Fieldprint Calculators built-in or linked-in
- Helps growers evaluate their farming decisions and compare their sustainability performance
- Provides comparisons to
  - Their own fields
  - Previous year’s performance
  - Regional, state and national averages
Measuring at the Field Level
The Fieldprint values shown for a selected crop on the slider bars are plotted on the above Spidergram. The Spidergram axes are relative indices representing your resource use or impact per unit of output in each of the five resource areas. Lower values closer to the center indicate a lower impact on each resource. Your results (blue) are compared to your state (orange), county (red), pilot (purple) and national (green) averages (50).

The values on the slider bars are relative indices, where lower values (0) indicate greater efficiency and/or lower impacts on the particular resource area and higher values (100) indicate lower efficiency and/or higher impacts on the particular resource area.
Fieldprint® Projects
Implemented through Supply Chain Partnerships
Fieldprint Projects

- Demonstrate implementation of indicators on the ground to test utility at the grower level and through the supply chain
- Engage farmers across geographies, crops, and supply chains
- Sponsors include grower organizations, supply chain companies, conservation organizations, and NRCS
Supply Chain Partnerships in 15 States

Other crops including barley and sugarbeet complete the rotation
Fieldprint Projects include Sugar Beet

What American Crystal set out to do:

- Establish a baseline using Field to Market indicators
- Identify efficiencies that lead to higher productivity and profitability with improved natural resource management.
- Tell the important story of sustainable agriculture.

What has been accomplished?

- Fieldprint data collected from 23 growers for 2013-2014 production.
- 29,000 acres of sugar beets on 239 fields characterized representing over 725,500 crop tons produced.
The path forward recognizes the rotation as key. Efficiency, cost management and future improvements.

Opportunities & Incentives for Improvements

Learning's from Aggregate Information

Potato Processor & Shipper

Thresher Wheat

Sugar Processor

Sustainable Sourcing Claims Downstream

Efficiency Delivered Through Shared Cost

Field to Market

USDA

Benchmarks

Data Facilitators

Syngenta

Sourcing Region

(boundaries & participation represent sourcing by GMI & other downstream companies)

Grower Pilot Participants Capturing Data with Land.db

Grower & Regional Story

SE ID Crop & Rotation Analyses

GROWER PILOT

PARTICIPANTS

CAPTURING DATA WITH LAND.db
Grower comments.
Fieldprint Project in Idaho

“Great Report that covers the basics, energy use, land use, water use, way they are farming. Like the way it compares at the national, state & down to the field. Great way to present the information.”

“Think we will use this as a barometer to gauge what we are doing. If we get way out of line, we need to make different choices.”

“Its all here. Can see the important stuff.”

“Can see why power companies and others offer incentives to improve irrigation, because it is the biggest factor of energy.”

“Found this was the easiest farm program to use. Have tried other software. Land.db is the most user friendly, and the service is great.”

“Fair measuring stick. Fun to see how it all came together.”

Source: AgConnections
Future of Field to Market
Building a Supply Chain Sustainability Program
The Future: FTM’s basic functions

1. Becoming the standard for sustainability measurement in commodity agriculture
2. Aggregating information, benchmarks and reporting
3. Identifying credible opportunities for change and improvement
4. Enabling supply chain sustainability claims through coordination with other initiatives

By 2020, engage 50 million acres in the Supply Chain Sustainability Program
FTM connects to supply chain initiatives beyond the farm

- The Sustainability Consortium (TSC) provides tools such as Key Performance Indicators (KPIs)
- These provide a common framework for companies to measure & compare products and suppliers
- TSC KPI’s in surveys can be addressed by implementing FTM indicators
Walmart uses the TSC™ Toolkit in their Sustainability Index

TSC KPI Questions can use FTM information e.g.,

1. _______ kg CO₂e per metric tonne of sugar supply harvested.
2. _______% of our sugar supply, by mass purchased in the last twelve months, is represented by the number reported above.
3. _______ cubic meters of irrigation water use per metric tonne of sugar supply harvested.
4. _______% of our sugar supply, by mass purchased in the last twelve months, is represented by the number reported above.
5. _______ metric tonnes of soil erosion per metric tonne of sugar supply harvested.
6. _______% of our sugar supply, by mass purchased in the last twelve months, is represented by the number reported above.
Retailers expect consistent reporting in a global economy. Walmart uses providers such as The Sustainability Consortium and The Field to Market Initiative to rank suppliers on sustainability.
FTM has a two phase program design

- **Phase One: 2015**
  - Scale fieldprint projects through license agreements for Fieldprint Calculator integration or links with other tools/platforms
  - Connect to resources (programs, experts, technologies) that drive improvements
  - Protocols to support and verify claims of 1) participation 2) measurement and 3) impact

- **Phase Two: 2016 – Beyond**
  - Updated and improved metrics & algorithms
  - Integration with a greater number of tools/platforms
  - Establish additional partnerships for continuous improvement
  - Support “Impact” claims
Value of Field to Market
A Common Sustainability Framework from Farm to Fork
Value of the Field to Market Approach

• **Food and retail companies** can access aggregated information to enable corporate goals and commitments for sustainable sourcing. Coordination with other supply chain initiatives make reporting efficient.

• **Agribusinesses** can realize business opportunities through decision support tools, technologies, programs and initiatives to grower customers.
Value of the Field to Market Approach

- **Grain buyers** can access aggregated information to enable the supply of sustainably sourced commodities as specified by food and retail companies. FTM Coordination with other supply chain initiatives make reporting efficient.

- **Conservation organizations** have full confidence in a sustainability framework that can become the focal point of their agricultural work and goals for agricultural sustainability.
Value of the Field to Market approach

- **Farmers & growers** can evaluate their current footprint efficiently across their rotation & connect to tools, technologies and programs that facilitate & document continuous improvement. Opportunity to ensure market access through an outcomes-based, technology neutral approach.

- **Commodity Organizations** have opportunities to support members with market access, and communicating sustainability messages to the supply chain and consumers.
Thank You
For More Information
Visit www.fieldtomarket.org

Field to Market Contacts:
Betsy Hickman, Director of Communications & Membership. Bhickman@fieldtomarket.org
Rod Snyder, President. Rsnyder@fieldtomarket.org

Jennifer.Shaw@syngenta.com