

NATIONAL SUGAR MARKETING

Sugarbeet Sustainability



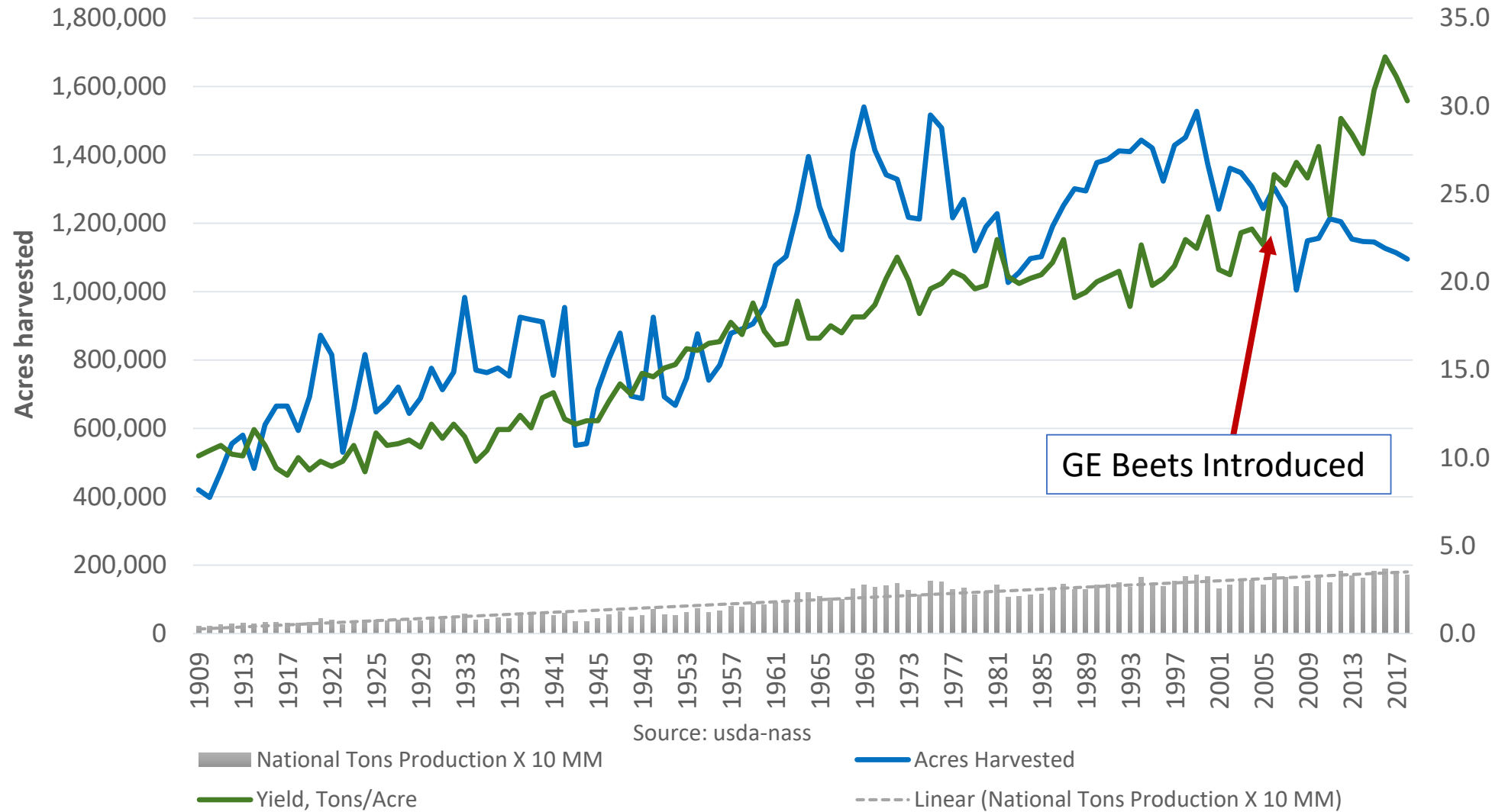
NSM's Sustainability Platform

- Committed to the sustainable growth of our businesses while sharing the story of how today's sugar is produced
- Our grower/owners are innovative with an eye on the long-term future of their farms and factories
- Support the establishment of an aligned, unifying Framework for Sugar Sustainability

U.S. Sugarbeet Sustainability

- Genetically engineered sugarbeets have advanced on-farm sustainability through:
 - Reduced energy needed to grow the crop
 - Reduced diesel fuel use
 - Reduced herbicide use
 - Enabling conservation tillage thereby improving soil health
 - Increased yields (root & sugar) lead directly to improved land use efficiency
- All lead to reduced greenhouse gas emissions

Yield Displaces Acres as Production Increases



How We Benchmark Farm Sustainability

- A subset of our farms voluntarily and anonymously participate in Syngenta's Sustainable Solutions data program
- Engaged with Syngenta and General Mills on a multi-year project to collect and analyze data
- Data analyzed using Field to Market Fieldprint calculator
- Idaho region benchmarks established with USDA Census & University Extension data from 2012-2016

How We Benchmark Farm Sustainability



Select subset of farmers to serve as representative sample of a region.



Calculate the Field To Market footprint for each field.



Develop a vision for continuous improvement.

Sugarbeet Sustainability

Environmental Efficiency Indicators

- ✓ Land Use: Planted area in acres per unit productivity
- ✓ Soil Conservation: Average soil erosion in tons per unit productivity
- ✓ Soil Carbon: Annual average change in soil carbon
- ✓ Energy Use: Total energy used (direct & indirect) in BTUs per unit productivity
- ✓ Greenhouse Gas (GHG) Emissions: Sum of direct and indirect GHG emissions measured as CO₂ equivalents per unit productivity
- ✓ Water Use Efficiency: Average amount of applied irrigation volume per unit productivity (irrigated-dryland yields)
- Nitrogen Use: Quantity of nitrogen applied per unit productivity ***Not a FTM metric***

Algorithms










Benchmarks



Idaho Sugarbeet Scorecard - 2018

Sugar Yield – Performance Comparison to Updated Benchmark (2012-2016)

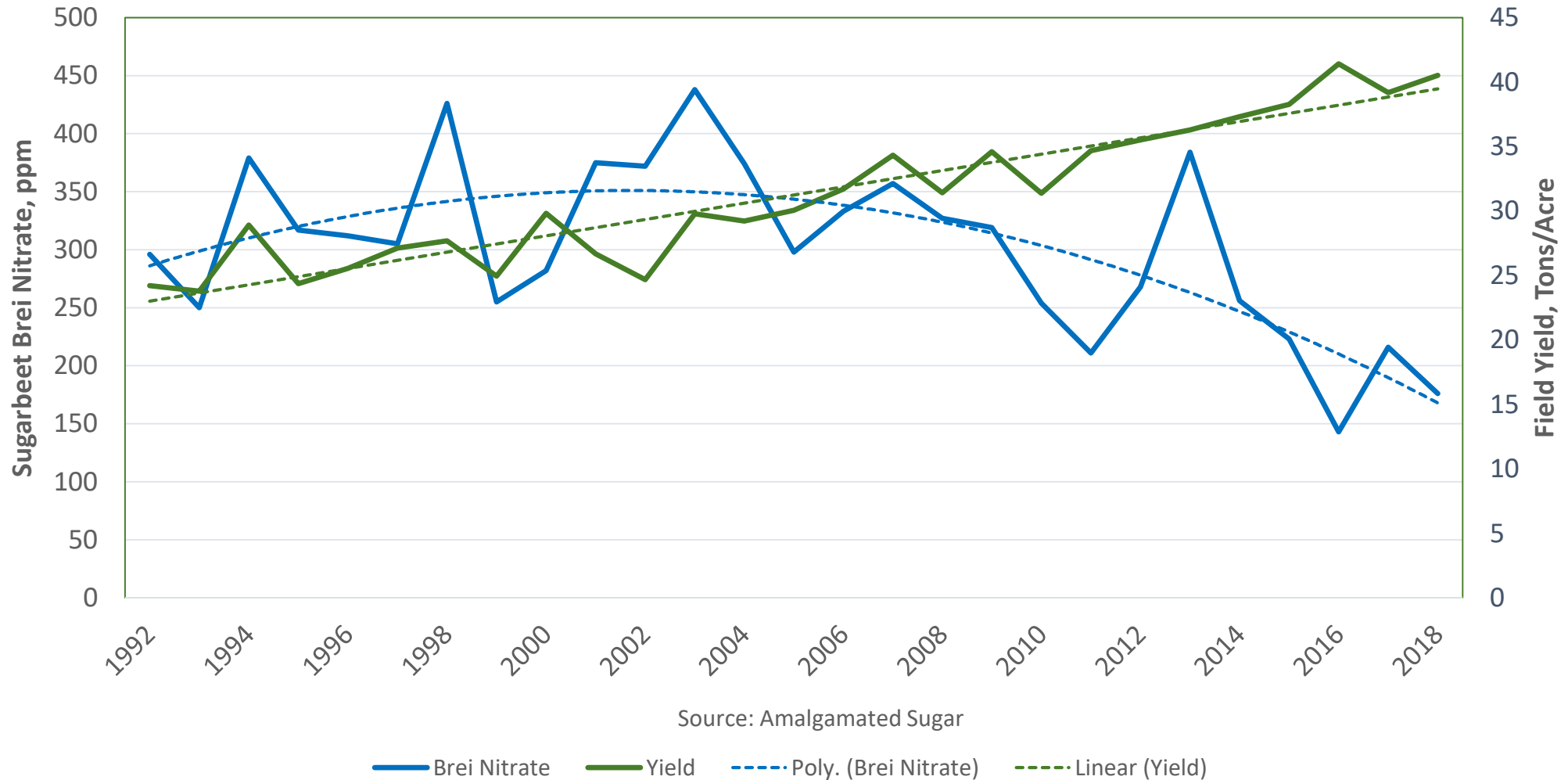
Idaho Sugar Beet (2010-2018) Program Compared to the Original Region Benchmark							
Performance Comparison	Sugar Yield	Land Use*	Soil Conservation*	Energy Use*	GHG Emissions*	Water Use*	Nitrogen Use
	<i>lb/acre</i>	<i>acre/lb</i>	<i>tons/lb/yr</i>	<i>BTU/lb</i>	<i>lbs CO₂ eq/lb</i>	<i>acre-inch/lb</i>	<i>lbs N/lb</i>
Program results more efficient than the region benchmark	 10%	 9%	 9%	 19%	 27%	 28%	 55%
Program results less efficient than the region benchmark							

- The grower results are being summarized across all years of participation, e.g. 2010-2018 years of data.
- Region benchmark values reflect irrigated sugarbeet production for Southeast Idaho. Sugarbeet is currently a USLE crop so there is no output for SCI. Benchmark established with USDA Census & University Extension data from 2012-2016. Average sucrose of 17.2% was used in reference of the benchmark and default recovery % of 88.5% was used for both benchmark and program.
- The region benchmark sugar yield was 11,357 lb/ac (17.20% sucrose) and the grower program yield was 12,492 lb/ac (17.84% sucrose).
- *Field to Market: The Alliance for Sustainable Agriculture Fieldprint calculator environmental efficiency indicators.

Benefits of Nitrogen Fertility Management

- Improves Sugar Content
- Reduced Impurities in the Sugarbeets
 - Less molasses
 - Improved purification
- Less Applied Nitrogen by the Grower
 - GHG reduction
 - Energy reduction
 - Less likely to impact groundwater
 - Reduces grower's input costs
- Only apply what is needed, nothing more

Pacific Northwest Sugarbeet Production Reducing Nitrogen Yields Many Benefits



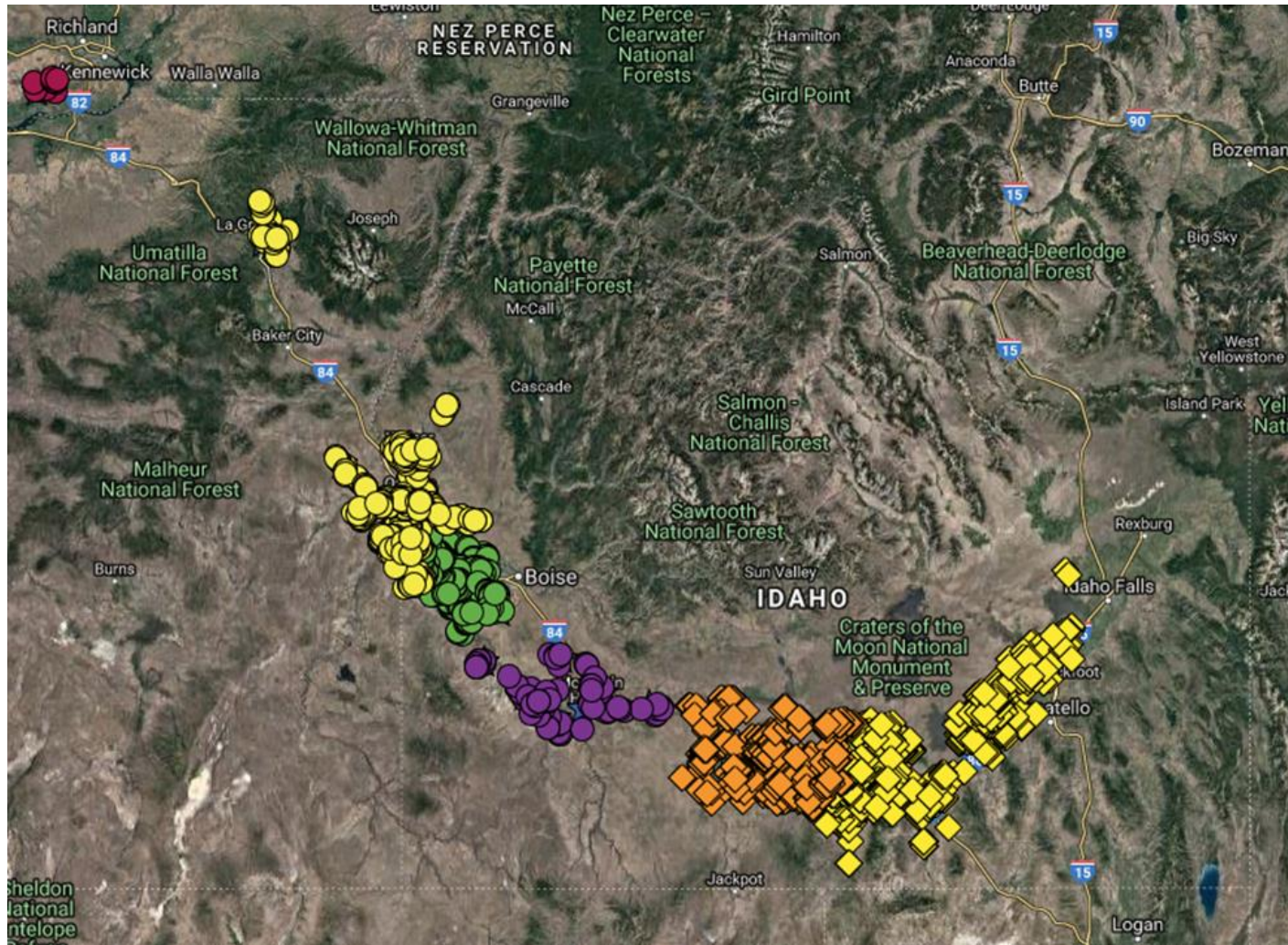
What is the Value Proposition for our Growers?

- Supply chain value and benefits (all sectors) must be greater than the costs
- Sustainability targets should be cost-effective, realistic and based on proven technology
- Avoid the cost/burden of complying with multiple, overlapping and inconsistent requirements
- One sustainability standard for sugar marketed and sold in the U.S.

Sugarbeet Industry Committed to Continuous Improvement

- Long term demonstrated industry improvement
 - Yield growth & improved land utilization
 - Reduced pesticide usage
 - Reduced diesel fuel usage
 - Less nitrogen fertilizer used
 - Soil conservation enabled with GE technology
- U.S. Sugarbeet Sugar is the most Sustainable Option

Amalgamated Sugar 2018 Field Production



Thank You