

The National Sustainable Soybean Initiative:

A Grower-driven Sustainability Program to Enhance US Soybean Production and Markets



Illinois/Wisconsin Soybean Sustainability Survey Results



Background

The National Sustainable Soybean Initiative (NSSI) is working toward streamlining sustainability for soybean growers by creating a coordinated national framework for assessing sustainability and communicating achievements throughout the value chain. With funding from the United Soybean Board (USB), this pilot program is being developed under the National Initiative for Sustainable Agriculture, a producer-led group whose goals are to: 1) Coordinate producer-led, research-driven sustainability programs; 2) Document and measure progress for agricultural entities; and 3) Communicate these advances to the supply chain.

The primary objective of the NSSI program is to provide all segments of the soybean value chain—including growers, processors, manufacturers, retailers, end-users and consumers—with a method for documenting and verifying progress along the sustainability continuum. Soybean growers need a voice in the sustainability discussion that ensures they have a reasonable way forward and that they receive credit for previous advancements. Wisconsin soybean grower Chuck Prellwitz states, *“Being sustainable is more than being able to put a crop in year after year. It is maintaining and improving the world we live in. Better soils, cleaner water, more efficient ways of doing things, and being an integral part of the local community are all parts of being sustainable.”*

Our NSSI program incorporates the following guiding principles that will be carried forward as a basis for the national framework:

- Grower-driven
- Research-based
- Crop and regionally appropriate measurements
- Documented progress in all three components of sustainability: environmental, economic and social

This project is supported by the USB and will continue to engage soybean growers in the development and implementation of assessment tools that meet the quickly building market demands for sustainability. The NSSI program was initiated in the Midwest in 2011. Soybean growers in Illinois and Wisconsin, with help from their state associations, have successfully implemented an assessment system for Midwestern soybean production (www.coolbean.info). This assessment system was developed by growers, researchers, and industry leaders to ensure that it meets grower needs for economic solvency and to ensure access to markets needing sustainability documentation. NSSI designed this system as an entry-level program that provided a convenient way to document, verify and track whole-farm, behind the farm gate sustainability practices on Midwestern farms that focus on soybean production.

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What is Sustainability?

Sustainability is a driving force in all business sectors, and agriculture is no exception. Agricultural sustainability for soybean growers requires on-farm documentation to ensure market access in the US and globally. In general terms, sustainability is a balance of environmental, social and economic criteria that 1) Ensures profitable returns to growers, 2) Uses resources wisely to achieve conservation and environmental management goals, and 3) Provides social investments in communities that develop equitable returns for rural economies.

Adoption of sustainable management systems entails continual improvement over time while ensuring farm productivity and profitability. The NSSI process addresses criteria in environmental (ecosystems, biodiversity, soil, water, crop nutrients, pest management), social (labor, community, consumer) and economic (profitability, energy, carbon, value added) sustainability.

Survey Tool

The survey tool (www.coolbean.info) was developed to accurately assess current practices implemented by soybean growers. This data may be used to meet the sustainability requirements of the value chain both nationally and globally. The questions, which were written to assess sustainability in environmental, social and economic arenas, are easy to answer

and can be used to communicate industry advancement. The questions in the assessment tool were developed by growers and soybean production specialists at the University of Wisconsin-Madison. The assessment process is research-based and developed from best management practices from the Midwestern region.

Preliminary work has been focused in Illinois and Wisconsin; data in this document represents responses from both states. Between 2012 and 2013, we collected and analyzed data from 600 survey responses representing around 275,000 soybean acres. The average size of the farms in the survey was just less than 1,500 acres. These growers on average managed 600 acres of soybeans per farm. Overall, surveyed growers manage over 700,000 acres of cropland.

Data Analysis

Analysis of the data uses Principal Component Analysis (PCA) to preprocess the data and then Data Envelopment Analysis (DEA) to identify key drivers of sustainability. DEA is a widely used technique to measure the performance of individuals to a best practices frontier defined by the best performing individuals. DEA is particularly well-suited for analyzing practice-based assessment tools and summarizing the collected information. The overall process scores each grower relative to the best performing

growers in the collected data, creating a distribution of grower scores for a region as illustrated in the **NSSI Sustainability Scores** graph.

The process helps evaluate grower-driven programs on each farm while generating data needed to evaluate sustainability used to communicate advancements throughout the supply chain. In addition, this method defines the key drivers for sustainability and conservation in the region and identifies where the greatest needs and advancements for the region could occur. Over time, data collection and analysis will demonstrate measurable improvement by individual growers plus allow documentation of the positive shift in the sustainability scores in a region.

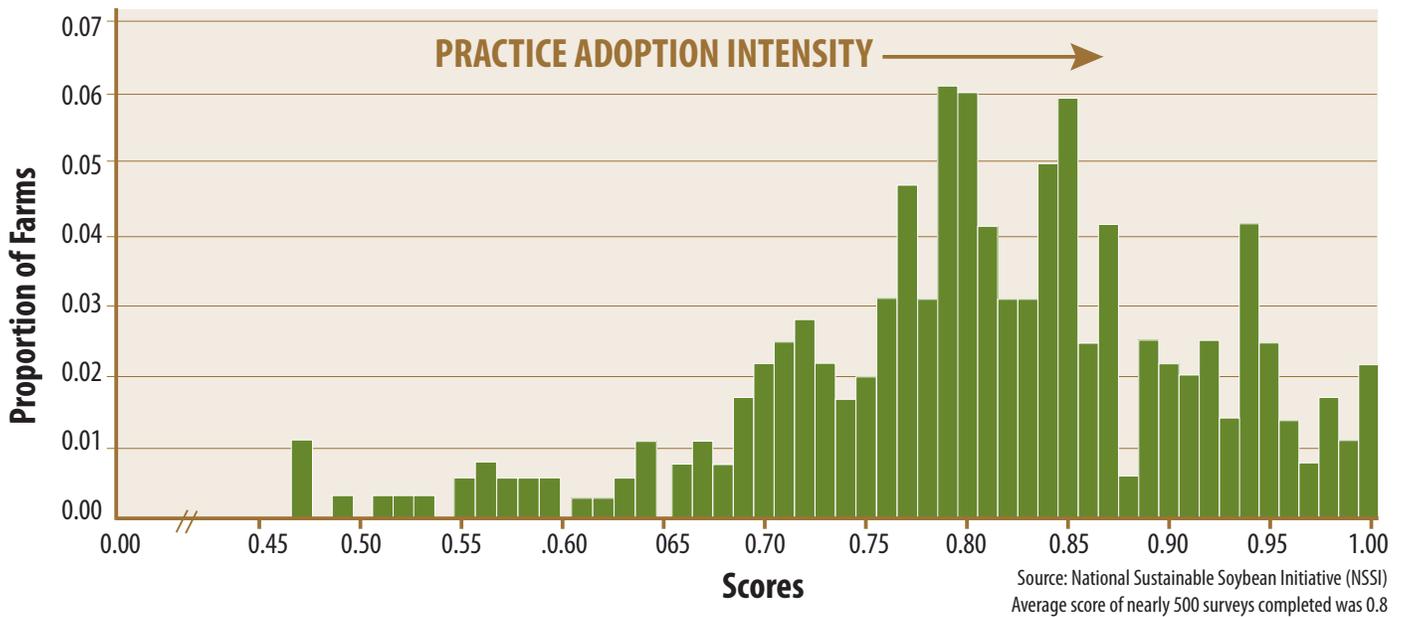
As shown in the **NSSI Sustainability Scores** graph, the data and results demonstrate that the surveyed population (a statistically valid sample) is tightly grouped at the upper end of the sustainability continuum, indicating that a high level of achievement has already occurred.

Survey Results

The initial results have been extremely encouraging. The industry as a whole has already adopted many of the practices that are recommended in sustainable systems. The information gathered through this program is shown in the **Survey Results** table.



NSSI Sustainability Scores



Survey Results: Sustainability Practice Adoption and Percentage of Growers in Illinois and Wisconsin Implementing Research-based Practices:

Environmental Practices

Rotate crops (at least two years)	93%
Calibrate planting equipment	92%
Use practices that limit soil compaction	90%
Clean and sanitize equipment	42%
Take soil samples to determine nutrient levels	86%
Use filter strips or some natural bio-filter on the landscape	77%
Use reduced and/or no-till practices that maintain residue on soil surface	91%
Work fields in contour strips to limit soil loss	91%
Update nutrient management plan annually	64%
Have a soil and water conservation plan	66%
Follow recommended guidelines for nutrient applications	92%
Use clean, quality, and pest-free seed	90%
Use scouting practices	88%
Use thresholds for pest management decisions	85%
Maintain scouting records for more than two years	38%
Use GPS technologies on the farm	48%
Conduct on-farm research with science-based partners	68%
Attend informational and educational sessions about farm, crop and/or ecosystem services	78%
Attend university sponsored educational field days during the growing season	60%
Calibrate spray equipment to limit overspray	83%
Have a written drift management plan	34%
Use technologies to minimize drift	84%

Survey Results: Sustainability Practice Adoption and Percentage of Growers in Illinois and Wisconsin Implementing Research-based Practices:

Use certified applicator for crop inputs	90%
Use cultural practices for insect, disease and weed management	95%
Control problem weeds in rotational crops	68%
Manage noxious weeds on the farm to limit spread to sensitive ecosystems	76%
Rotate modes of actions to limit pesticide resistance	80%
Use diverse modes of action in rotational crops to control problem weeds in rotational crops	75%
Base spot spray or cultivation decisions on scouting reports	60%
Select resistant varieties for insect control	72%
Manage crops to avoid insect pests from previous to current year crop	48%
Rotate crops to avoid soil borne disease	62%
Monitor disease concerns using crop management websites	75%
Develop an ecological management plan for land management and plant community restoration on privately owned lands	28%
Utilize practices to conserve native wildlife and biodiversity	73%
Enroll in conservation incentive programs	34%
Attend ecological training sessions	23%

Economic Practices

Complete a cost or production analysis for farm and crop	82%
Maintain a production plan each year	75%
Use marketing plans for economic sustainability	53%
Track market information at least twice per week	78%
Maintain diverse business plan by growing multiple crops	79%
Utilize risk management tools for farm disasters	69%
Track crop productivity and document trends over the last ten years	73%
Have a farm succession plan	47%

Social Practices

Have ability to trace back from field to distribution chain	38%
Use practices that limit energy use (energy efficient lighting, use of biofuels, limit vehicle/equipment idling)	90%
Improve fuel efficiency of farm vehicles and equipment over time	53%
Utilize a recycling program on the farm	58%
Provide educational opportunities for farm employees	16%
Buy production inputs from local (e.g. state) sources	82%
Maintain a written human resources plan	10%
Provide some benefits to employees	89%
Involved in community service organization	63%
Educate communities on local agricultural issues	66%
Serve as local community leaders	33%
Subscribe to trade journals	80%

Highlights of Sustainability Achievement from Survey Results

Environmental

Soybean acres in Illinois and Wisconsin account for 10% of national production. Sustainability is important in this region and results show that growers are implementing many practices to ensure productivity while maintaining environmental quality and ecological biodiversity.

- 91% use reduced and/or no-till practices to maintain residues on soil surface, ensuring at least 30% of the ground is covered during the season. Research has shown that maintaining cover greatly reduces soil loss.
- Practices to limit soil compaction are used by over 90% of growers. These practices improve infiltration, promote crop productivity and limit soil loss.
- 91% use contour strips, which limit soil loss and pesticide runoff while promoting soil health.
- 86% use soil sampling to determine nutrient levels in the soil. This ensures accurate nutrient applications during the season.
- Scouting for insects (73%), weeds (75%), and diseases (39%) occurs regularly during the growing season. More importantly, over 85% use scouting thresholds as indicators for pest control measures, ensuring adequate and limited needs of pesticide applications.
- 95% use cultural management strategies to limit disease, insect and weed concerns in the field.
- Native wildlife and biodiversity are maintained or enhanced on 73% of the farms. Growers are actively using practices to conserve species diversity.

Economic

Soybean growers produce multiple crops in diverse farming systems that foster thriving rural economies. Growers themselves must remain economically competitive if they are to maintain soybean access to national and international markets.

- 79% grow multiple agricultural crops on their farm while 22% also have livestock to maintain economically diverse production systems.
- 73% have tracked and increased their productivity in the last five years. Enhancing productivity is a major requirement as pressures on land resources and the need for food production continue to increase.
- Risk management tools were used on 69% of farms, including crop insurance (69%), property insurance (85%) and business insurance (79%). These tools help support farm stability during adverse times.
- 78% track market information at least twice per week. Growers use this information to adapt to changing markets and economic conditions.

Social

Soybean growers are critical in maintaining rural communities.

- 82% buy their farm inputs from local sources, which helps to maintain rural communities and local businesses.
- 66% actively communicate the positive aspects of agriculture in their towns and rural lands. Of these growers, 63% are part of a local service organization in their communities while 33% consider themselves leaders of their rural communities. This type of participation—leadership positions with church, school boards or other civic groups—keep these rural communities thriving.
- 90% have used practices to conserve energy, including using efficient lighting, biofuels, and equipment operation. Fuel efficiency of vehicles and implements have improved on 53% of farms.
- At least some benefits are provided to 90% of employees. These included vacation, education reimbursements, paid holidays, health and dental insurance, and retirement packages.

For more information, contact Shawn Conley, program director and soybean specialist at the University of Wisconsin-Madison (spconley@wisc.edu, 608-262-7975) or discuss the program with the USB and any participating growers!





Why complete the survey? For the sustainability effort in agriculture to be practical, the process must start with the grower. Filling out the assessment survey that documents practices and level of sustainability allows producers and regions to:

1. Create a baseline for individual farms and the larger industry.
2. Determine advances and changes that have already occurred.
3. Push for continual improvements.
4. Stay ahead of the regulatory curve.
5. Ensure access to different markets.
6. Identify research questions for further advancements.
7. Communicate a positive image of agriculture to the larger community.

Work To Do

The industry has made great strides; the NSSI process and use of documentation has provided opportunities to see where simple changes can be made to help growers improve their sustainability. For example, only 10% of the operations maintain a written human resources plan for farm employees, but such a plan is an important step for long-term management. Farm succession planning, which ensures long-term agricultural commitment to the landscape and ultimately food security, has only occurred on 47% of growers' operations.

By working together, the industry-research-grower team is developing effective tools that help implement best management practices to advance long-term sustainability.

Next Steps

Sustainability is not an end point but a continual improvement process. The results from this survey are from the 2012 cropping season and represent a baseline documentation of on-farm practices. This data will be used to begin communicating sustainability achievements to the value chain. The NSSI program is using this approach as an entry-level engagement into sustainability that will encourage broad grower participation. Once engaged, improvements can be monitored, assessed and communicated along the sustainability continuum.

Final Thoughts

The NSSI program is currently expanding this effort to engage other regions, ensuring that regional issues are highlighted. The program is an evolving process, and we are actively working to continue improving on-farm sustainability while maintaining economic returns to all entities by promoting risk management efforts and research-based practices. Finally, we will continue to communicate these advancements throughout the soybean value chain, which includes growers, processors, manufacturers, retailers, end-users, consumers, national and international partners.