



Summary of Research Priority Round Table Discussion

The North Dakota Soybean Council (NDSC) Research Forum & Open House brought together 55 participants, including NDSU researchers and Extension specialists, soybean farmers, and industry representatives, to identify existing and emerging challenges and opportunities and gather input to help guide future NDSC research priorities, investments, and strategic planning efforts.

Roundtable discussions focused on identifying priority challenges, research gaps, and opportunities affecting soybean productivity, profitability, sustainability, and long-term demand across seven topic areas: 1) Integrated Weed Management; 2) Integrated Disease & Insect Management; 3) Soil Health & Cover Crops; 4) Soybean Breeding & Genetics; 5) Other Production Agronomy Topics; 6) Livestock Integration & Production; and 7) New Uses & Value-Added Research.

Several common themes emerged across discussion areas. Participants emphasized the importance of practical research conducted under North Dakota growing conditions and the need to evaluate new technologies, management practices, and products based on both agronomic performance and economic return. Discussions also highlighted the importance of continued collaboration among farmers, researchers, Extension specialists, and industry stakeholders to address both immediate production challenges and future opportunities for the soybean industry.

The following summary captures the major research needs and opportunities identified through the forum.

1. Integrated Weed Management

Herbicide Resistance: Herbicide-resistant weeds remain one of the most significant challenges facing North Dakota soybean production. Participants frequently identified kochia and waterhemp as the most problematic weeds and expressed concern that resistance across multiple herbicide modes of action is reducing the effectiveness of existing management tools. Additional concerns included volunteer crops and weed challenges associated with changing production practices and environmental conditions.

Integrated Management Approaches: Participants emphasized the importance of integrated weed management rather than reliance on herbicides alone. Discussion included pre-emergence, post-emergence, and fall-applied herbicide programs; herbicide performance when



rainfall is inadequate for activation; row spacing and crop competition; cover crops; tillage and other mechanical weed control practices; and practices that reduce weed seed production and slow the development of herbicide resistance.

Environmental Influences on Weed Control: Environmental conditions were identified as an important factor affecting weed management outcomes. Participants noted that limited rainfall during portions of the 2026 growing season reduced activation of some pre-emergence herbicides and contributed to early-season weed escapes, increasing pressure on post-emergence management programs.

Emerging Technologies: Participants discussed the potential role of precision spraying, drones, robotics, remote sensing, artificial intelligence, and other emerging weed-control technologies. While these technologies were viewed as promising tools for scouting, mapping, and targeted applications, participants also raised questions regarding spray coverage, drift, accuracy, cost, performance, and weather-related limitations under North Dakota growing conditions.

Education and Stewardship: Participants emphasized the continued need for education and stewardship efforts related to herbicide selection, application timing, resistance management, and integrated weed-management practices. Maintaining a diverse management toolbox was viewed as essential for preserving the effectiveness of existing weed-control technologies.

Research Priorities

- Management of herbicide-resistant kochia, waterhemp, and other troublesome weeds.
- Optimization of pre-emergence, post-emergence, and fall-applied herbicide programs.
- Herbicide performance under varying moisture and environmental conditions.
- Integrated weed-management approaches that combine chemical, cultural, and mechanical control practices.
- Weed management in saline and other challenging production environments.
- Management of volunteer crops and evolving herbicide-tolerance trait systems.
- Evaluation of precision spraying, drones, robotics, and other weed-control technologies under North Dakota conditions.
- Whole-system approaches to reduce weed seed production and slow the development and spread of herbicide resistance.



- Education on herbicide selection, active ingredients, mixtures, application timing, and effective use for specific weeds.

2. Integrated Disease & Insect Management

Disease Management: Diseases continue to present significant challenges to North Dakota soybean production. Participants identified soybean cyst nematode (SCN), white mold, sudden death syndrome (SDS), root rots, and other soybean diseases as important research priorities. SCN was a recurring topic throughout the discussions, particularly as soybean production expands into new areas of the state. Participants emphasized the importance of continued monitoring, testing, and management efforts, along with the development of additional sources of genetic resistance.

Participants discussed opportunities to improve management of white mold, including disease risk assessment, resistant varieties, row spacing and canopy management, fungicide timing, biological control, and targeted application strategies. Root diseases, including SDS and other root rots, were also identified as important concerns. Participants emphasized the need for improved management tools and a better understanding of environmental and production factors that influence disease development.

Insect Management: Soybean aphids remain an important insect pest in North Dakota soybean production. Participants noted concerns regarding reduced product efficacy and the potential for insecticide resistance to limit management options. Spider mites and grasshoppers were also discussed as recurring challenges, particularly under favorable environmental conditions. Soybean gall midge was identified as an emerging insect pest that warrants continued monitoring and research attention.

Emerging Technologies: Participants discussed the potential role of drones, robotics, remote sensing, mapping technologies, and other digital tools for disease and insect monitoring. These technologies may provide opportunities for earlier detection, improved scouting, and more targeted management decisions. Participants emphasized the importance of evaluating these tools under various growing conditions and determining whether they provide practical and economic value to soybean farmers.

Product Evaluation and Decision Support: Participants also discussed the need for independent evaluation of seed treatments, biological products, and other crop-protection tools. Treatment decisions should account for pest pressure, environmental conditions, yield potential, and economics. Improved decision-support tools that integrate agronomic and economic



considerations were identified as opportunities to improve management decisions and resource allocation.

Research Priorities

Disease Management

- SCN testing, monitoring, and management and additional sources of genetic resistance.
- Resistance and management options for SDS, root rots, and other important soybean diseases.
- White mold management, including disease risk assessment, resistant varieties, canopy and row-spacing management, fungicide timing, biological control, and targeted applications.
- Evaluation of seed treatments, biological products, and other disease-management tools under various growing regions in North Dakota.
- Impact of crop rotation and other production practices for long-term disease management.
- Evaluation of disease interactions, including relationships among SCN, SDS, and other production constraints.

Insect Management

- Management of soybean aphids where insecticide resistance or reduced product efficacy limits control.
- Management of spider mites, grasshoppers, and other insect pests under changing environmental conditions.
- Monitoring and management of emerging insect threats, including soybean gall midge.
- Evaluation of genetic resistance for insect management.
- Development of treatment thresholds and decision-support tools that account for pest pressure, environmental conditions, yield potential, and economics.

Technology and Decision Support

- Earlier detection, scouting, mapping, and monitoring of diseases and insect pests.



- Evaluation of drones, robotics, remote sensing, and other technologies for disease and insect detection, monitoring, and management.
- Evaluation of targeted and site-specific pesticide and biological applications.

3. Soil Health & Cover Crops

Soil-Related Production Constraints: Soil-related constraints were among the most frequently discussed production issues. Participants identified IDC, salinity, soil pH, fertility, soil moisture, erosion, and residue management as important challenges affecting soybean productivity across North Dakota. These constraints often vary considerably among fields and regions, creating a need for management strategies that can be adapted to local growing conditions.

Soil Health: Participants expressed strong interest in practical soil health indicators that can be measured, interpreted, and linked to crop performance. Discussions included soil biology, microbial communities, nutrient cycling, and the relationship between soil-health measurements and soybean productivity. Participants emphasized the need to better understand how soil-health characteristics influence crop performance and long-term productivity.

Soil Biology and Biological Products: Participants discussed opportunities to improve understanding of soil biology, including microbiome interactions, rhizobia, inoculation practices, and biological products. Interest in biological products continues to grow; however, participants emphasized the need for independent evaluation of product performance. Understanding when and where biological products provide consistent agronomic and economic benefits was identified as an important research need.

Cover Crops: Cover crops generated considerable discussion as both a potential opportunity and a management challenge. Participants recognized potential benefits for erosion control, weed suppression, soil improvement, grazing, and overall soil health. However, moisture use was repeatedly identified as a concern, particularly in drier environments and during years with below-average precipitation. Participants emphasized the need to better understand which cover crop species, mixtures, and management practices can provide benefits while minimizing competition with subsequent crops.

Cover Crops and Cropping Systems: Participants also discussed the role of cover crops within broader cropping systems. Questions were raised regarding the effects of cover crops on soybean establishment, IDC management, salinity, soil biology, diseases, SCN pressure, and crop productivity. Research is needed to identify situations where cover crops are most likely to



provide agronomic and economic benefits and to develop practical recommendations for their use in North Dakota production systems.

Economics and Practical Implementation: Participants emphasized that soil-health practices should be evaluated based on agronomic performance, practicality, and economic return. While many conservation practices provide potential long-term benefits, adoption often depends on costs, management requirements, and expected returns. Understanding the economic impacts of soil-health practices was identified as an important component of future research efforts.

Research Priorities

Soil Health

- Develop practical soil health indicators for North Dakota production systems.
- Improve understanding and management of soil pH and its effects on soybean production.
- Management of soil salinity, including evaluation of soil amendments and crop performance under saline conditions.
- Improve IDC management, including variety selection, mapping, and targeted management approaches.
- Soil fertility and nutrient management, including nutrient movement under various tillage systems.
- Improve understanding of soil biology, microbiome interactions, rhizobia, inoculation, and biological products in relation to crop performance.
- Residue management and soybean establishment in high-residue systems.
- Approaches for addressing soil erosion and managing marginal or nonproductive areas.
- Evaluate soil-health practices based on agronomic performance, practicality, and economics.

Cover Crops

- Identify cover crop species and systems that provide benefits while minimizing soil-water use, particularly during dry growing conditions.



- Evaluate cover crops for erosion control, weed suppression, compaction management, IDC management and soil improvement
- Cover crop establishment through evaluation of species selection, mixtures, planting methods, and timing.
- Develop practical guidance for when and where cover crops are most likely to provide agronomic and economic benefits.
- Effects of cover crops on diseases, insects and subsequent crops.
- Evaluate opportunities to integrate cover crops with grazing and more diverse cropping systems.

4. Soybean Breeding & Genetics

Disease Resistance and Stress Tolerance: Participants identified soybean breeding and genetics as important tools for addressing persistent production challenges and improving soybean productivity across North Dakota. Discussions highlighted the importance of developing improved resistance to SCN, SDS, and other economically important diseases. Participants also emphasized the need for improved tolerance to IDC, salinity, drought, excess moisture, and other environmental stresses that can limit soybean performance across diverse production environments.

Adaptation, Yield, and Agronomic Performance: Maintaining high yield potential remains a primary objective of soybean breeding programs. Participants emphasized the need for varieties adapted to North Dakota's diverse growing regions, maturity requirements, soil conditions, and environmental challenges. Plant architecture and harvestability were also discussed, including higher first-pod placement to reduce harvest losses and improve harvest efficiency. Continued evaluation of potential tradeoffs between yield and additional traits was viewed as important to maintain overall agronomic performance.

Seed Quality and Value-Added Traits: Participants discussed opportunities to develop soybean varieties with characteristics suited to food-grade, identity-preserved, and other value-added markets. Improving seed quality and composition traits that support specific end uses was identified as an opportunity to increase soybean value while maintaining strong agronomic performance.



Research Priorities

- Develop improved resistance to SCN, SDS, and other economically important soybean diseases and insect pests.
- Identify and develop new sources of genetic resistance as existing resistance sources become less effective.
- Develop soybean varieties with improved tolerance to IDC, salinity, drought, excess moisture, and other production constraints.
- Improve adaptation to diverse North Dakota environments, including low- and high-pH soils and varying maturity zones.
- Maintain and improve yield potential across diverse North Dakota production environments.
- Improve plant architecture and harvestability, including higher first-pod placement to reduce harvest losses.
- Improve characterization and evaluation of stress tolerance among soybean varieties.
- Evaluate potential tradeoffs associated with the incorporation of new traits.
- Develop soybean varieties with characteristics suitable for food-grade, identity-preserved, and other value-added markets.
- Improve seed quality, composition, and end-use traits while maintaining strong agronomic performance.
- Connect soybean genetics with emerging food, industrial, and specialty market opportunities.

5. Other Production Agronomy Topics

Soybean Establishment and Management: Participants discussed management practices that influence soybean establishment, productivity, and profitability. Topics included seeding rates, plant populations, row spacing and planting equipment. Participants emphasized the need to refine management recommendations that account for differences in production environments across the state.



Harvestability and Seed Quality: Participants also discussed opportunities to improve harvestability and maintain seed quality. Management practices that reduce harvest losses, improve harvest efficiency, and maintain grain quality were viewed as important considerations for soybean production systems. Food-grade and identity-preserved soybean production were also discussed, including the need for management recommendations that address end-user requirements while maintaining agronomic performance.

Economics and Decision Making: Across many production agronomy topics, participants emphasized the importance of evaluating management practices based on both agronomic performance and economic return. Research that helps producers understand when practices provide sufficient value to justify their cost was viewed as particularly important.

Research Priorities

- Refine soybean establishment and production recommendations, including seeding rates, plant populations, row spacing, equipment performance, and management practices across various production environments.
- Improve management approaches that enhance harvestability, maintain seed quality, and reduce harvest losses.
- Develop production recommendations for food-grade and identity-preserved soybeans, including variety selection, production practices, and end-user requirements.
- Evaluate agronomic practices based on both agronomic performance and economic return.
- Improve understanding of production risks, costs, and expected outcomes to support farm-level decision making.

6. Livestock Integration & Production

Soybean Utilization in Livestock Systems: Participants discussed opportunities to strengthen connections between soybean production, regional soybean processing, and livestock production. Increased regional soybean processing has expanded supplies of soybean meal and other coproducts, creating opportunities to increase utilization within North Dakota and the surrounding region. Discussions focused on identifying ways to capture additional value from these products while supporting both crop and livestock producers.



Crop-Livestock Integration: Participants discussed opportunities to better integrate livestock and cropping systems. Cover crop grazing, nutrient cycling, manure utilization, and the use of marginal or less productive land were identified as potential areas for further research. Integrated crop-livestock systems were viewed as opportunities to improve resource utilization while supporting long-term agricultural sustainability.

Adoption and Economics: Participants emphasized that livestock integration must be economically and logistically practical. Feed value, transportation costs, infrastructure requirements, labor availability, and management complexity were all identified as factors influencing adoption. Understanding the economic feasibility of livestock utilization and integrated production systems was viewed as an important research need.

Research Priorities

- Evaluate opportunities to increase utilization of soybean meal and soybean coproducts within North Dakota livestock production systems.
- Identify nutritional, transportation, infrastructure, and economic barriers to greater utilization of locally produced soybean feed ingredients.
- Develop feeding recommendations and producer education programs that support greater utilization of soybean meal and coproducts.
- Evaluate crop-livestock integration systems, including cover crop grazing, nutrient cycling, manure utilization, and opportunities to improve productivity on marginal or saline land.
- Evaluate practical grazing arrangements and technologies, including custom grazing, precision grazing, and virtual fencing.
- Improve understanding of the economic feasibility and long-term value of integrated crop-livestock systems.

7. New Uses & Value-Added Research

Expanding Soybean Utilization: Participants discussed opportunities to increase demand and create additional value for soybean oil, meal, hulls, protein, and other soybean-derived materials. Discussions focused on identifying new applications that can increase utilization of soybean products while creating additional value for soybean farmers. Participants emphasized



that increasing soybean utilization is important not only for developing new opportunities but also for strengthening long-term demand for soybean products.

Industrial, Environmental, and Energy Applications: Participants identified opportunities for soybean-derived materials in a variety of industrial, environmental, and energy applications. Examples discussed included biobased polymers, bioplastics, coatings, additives, activated carbon, water-treatment technologies, environmental remediation, biodiesel, sustainable aviation fuel, and other renewable-material applications. Food-grade soybeans, protein-rich ingredients, specialty soybean products, and identity-preserved markets were also identified as areas of interest.

Demand Creation and Commercialization: Participants emphasized that technical performance alone is not sufficient to create successful new-use opportunities. Research should also consider demand potential, cost competitiveness, scalability, processing requirements, feedstock availability, and commercialization potential. Projects that demonstrate a clear pathway to adoption and increased utilization of soybean products were viewed as particularly valuable.

Research Priorities

- Increase utilization of soybean oil, meal, protein, hulls, and other soybean-derived products through the development of new applications and uses.
- Expand opportunities for soybean meal and processing coproducts in food, feed, industrial, and other value-added applications.
- Develop biobased industrial materials, including polymers, bioplastics, coatings, additives, and other renewable-material applications.
- Explore environmental applications, including soybean-derived materials for water treatment, filtration, and environmental remediation.
- Develop higher-value food and protein applications, including food-grade soybeans, protein-rich ingredients, specialty products, and identity-preserved markets.
- Evaluate energy-related opportunities, including biodiesel, sustainable aviation fuel, and other applications that expand demand for soybean oil.
- Connect soybean genetics and composition traits with end-use opportunities that improve suitability for food, industrial, and specialty markets.



- Support commercialization-focused research that considers technical performance, demand potential, cost competitiveness, scalability, processing requirements, and potential soybean utilization.
- Prioritize opportunities capable of creating measurable value for soybean farmers through new product development or expanded utilization of existing soybean products and coproducts.

Conclusion

The 2026 North Dakota Soybean Council Research Forum & Open House highlighted both persistent production challenges and emerging opportunities for North Dakota soybean farmers. Participants identified herbicide resistance, diseases and insect pests, soil-related constraints, and soybean genetics as important areas for continued research investment. Discussions also identified opportunities to increase soybean utilization through livestock integration, new uses, value-added products, and other demand-driven applications.

Across all discussion areas, participants emphasized the importance of practical research conducted under North Dakota growing conditions. Research priorities should focus on delivering solutions that improve productivity, profitability, sustainability, and long-term value for soybean farmers. Participants also emphasized the need to evaluate new practices, products, and technologies based on both agronomic performance and economic return.

The research needs and priorities identified through this forum are intended to help guide future NDSC research investments and strategic planning. Continued collaboration among farmers, researchers, Extension specialists, industry representatives, and other stakeholders will be critical to addressing emerging challenges and capturing new opportunities for North Dakota soybean production and utilization.