

  
3:01 pm, 02 Feb 23

**Nebraska Soybean Board**  
**FINAL Research/Extension Education Report Form**

**Note: Submit this report no later than 60 days after the NSB-funded project officially terminates.**

This post-project 60-day time-frame will allow the Lead PI/Extension Educator time to complete any final data analysis and a final technical report, plus the drafting of any articles for submission to scientific journals.

This completed report will be provided to the National Soybean Checkoff Research Database: [soybeanresearchdata.com](http://soybeanresearchdata.com).

**Project # and Title:**

1718 Nebraska Extension On-Farm Research Initiative

**PI / Extension Educator:**

Laura Thompson

**Co-PI's / Co-Extension Educator's:**

Aaron Nygren and Nathan Mueller, Nebraska Extension, University of Nebraska - Lincoln

**Project Date (Including No-Cost Extension):** 10/1/21 to 9/30/22

**Total Budget for Project:** \$ 34,659

**1. Briefly State the Rationale for the Research.**

The goal of the NOFRN is to provide a state-wide venue by which farmers, crop consultants, government employees, university faculty, and other ag professionals can interact and engage in transformational research to support productive, profitable, and sustainable soybean production. The Nebraska On-Farm Research Network (NOFRN) has been a valuable program to provide transformational learning opportunities for farmers and ag professionals. Additionally NOFRN provides an avenue by which research faculty can engage with farmers to develop research that is relevant in a "real-world" setting. This project builds on the success of the NOFRN, dating back to 1989. This project continues the impactful collaboration initiative among the Nebraska Soybean Board, Nebraska Corn Board, Nebraska Corn Growers Association, Nebraska Dry Bean Commission, and UNL Extension to enable farm research success by using contemporary technologies, tools, and a learning network. The NOFRN is recognized nationally and internationally as a leader in on-farm research. Continued investment in this program enables a sustained positive trajectory of growth and impact that meets the needs of producers today and in the future.

**2. Research Objectives: (copy from original proposal, but keep in a brief bullet format).**

1. Soybean (and corn) producers will focus on on-farm research primarily on priorities identified by Nebraska Soybean Board and Nebraska Corn Board to enhance knowledge, implementation, and profitability of these practices. This proposal has potential to address objectives of research on SCN, SDS, insect control, disease control, and fertility management including in-season nitrogen applications (Nebraska Soybean Board priority areas), as well as additional topics. The Nebraska On-Farm Research Network will facilitate, coordinate, and publicize extension specialist and educator efforts related to these research topics across the state.
2. Soybean (and corn) producers will learn to conduct on-farm research more efficiently and prolifically using contemporary precision agriculture technologies, implementation strategies, and data management practices.
3. Soybean (and corn) producers will embrace an interactive professional learning network that facilitates a co-learning environment focused on applied research that contributes to a systems approach to solving agronomic issues at the grass-roots level whereby on-farm research becomes an important, timely, powerful part of soybean (and corn) production solutions.
4. Soybean (and corn) producers will benefit from a unified, collaborative applied research model supported by the Nebraska Soybean Board, Nebraska Corn Board, Nebraska Corn Growers Association, and Nebraska Extension.

### 3. General Approach Used and (if applicable) the Nebraska Test Location.

The location of the project is statewide in Nebraska. In 2021, over 100 research studies were initiated and over 80 studies were completed on farms across Nebraska, demonstrating the resiliency of this farmer-centric approach to translational research.

The general approach of the NOFRN includes:

1. Develop timely and practical on-farm research protocols, many of which address NSB initiatives.
2. Encourage farmer and crop advisor participation in the program through a variety of recruitment initiatives throughout the year, including:
  - CropWatch articles
  - Email newsletter, newspaper, and winter meetings
  - Social media (Facebook, Twitter)
  - YouTube videos
  - Radio interviews
3. Conduct studies and collect measurements including imagery (drone, airplane, and satellite), time lapse camera pictures, stand counts, other relevant plant measurements, soil tests, and geospatial yield data. Ag technologies are leveraged to make conducting on-farm research simpler for growers, enable innovative experimental designs, gather additional insights, and gain site-specific knowledge of the within-field response to treatments studied.
4. Process and analyze data and review the data analysis in a UNL faculty review day held each December.
5. Generate summary reports for each study and disseminate research findings through a wide variety of venues including popular press, social media, in-person, extension publications, online publications, and scientific journals. More information about research result dissemination is in later sections of this report.

### 4. Describe Deliverables & Significance Attained for Each Research Objective.

In 2020, 84 on-farm research studies were conducted in Nebraska counties. Data collection and processing of 2022 on-farm research studies is ongoing; it is estimated that over 80 studies will again be successfully completed, analyzed, and reported. Topics include cover crops, seeding rate, seeding date, relative maturity groups, growth promoters, fungicide and insecticide foliar applications, in-furrow fungicides, seed treatments for sudden death syndrome, row spacing, and more. Those participating in the on-farm research network were able to work with Extension Educators to gain the skills to conduct research on their own farms. Numerous collaborations with multi-state efforts, UNL researchers, UNL teaching faculty, and Nebraska NRCS result in high quality work and an expanded program reach. The results of the 2021 studies were shared in a hybrid approach to the Annual Results Update Meetings with 6 simultaneous small group locations with meeting sites connected for several streamed presentations in Feb. 2022. Through these meetings:

- 93% learned new information about how to set up an on-farm research plot
- 85% had a better understanding of cover crop management as a result of the programming
- 79% learned new information about crop production practices
- 86% learned new information about available ag technologies
- 96% have a better understanding of how ag technologies can be used to conduct on-farm research
- 91% noted they use or plan to use the "results finder" database to review research information

Those attending the annual results meetings in February 2022 represented over 1.4 million row crop acres. The value of the knowledge gained in anticipated practice changes averaged \$8.56/acre, resulting in a total program value of \$12 million.

Attendees identified areas they planned to change based on information at the meetings. The most common responses were:

- (1) Having confidence to reduce soybean planting population
- (2) Planting soybeans earlier
- (3) Improve N management (adjust rate and/or timing, utilize sensor technology, more N through the pivot)
- (4) Implement cover crops and better understand cover crop management
- (5) Better understand how digital technology can help with conducting on-farm research.

Selected attendees comments:

"Always nice to hear real world research and results."

"Not biased, down-to-earth research."

"I liked the presentations, and the book is great."

"I will try more things to learn more before fully adopting new products and/or practices."

This is a unique program as the farmers participating in the research play a large role in delivering the research information. This is well received by the other farmers in attendance and is often a highlight for attendees. Research has shown this method of delivery has high impact and we are proud to offer a venue that delivers information in this unique way.

#### 4. Describe Deliverables & Significance Attained for Each Research Objective. (continued)

The on-farm research network also seeks to both make use of precision ag technologies for conducting on-farm research and also educate farmers and agronomists about these technologies. To this end, we continue to develop online training courses for leveraging digital technologies to conduct on-farm research. Current courses (<https://digitalag.teachable.com/courses/category/digital%20ag>) are available for CCA credits.

This year we launched the "Farmer Focus" CropWatch article series to share results from on-farm research and feature quote from interviews with the farmers who did the on-farm research studies. These articles were well received, totaling over 6,000 article views.

An objective of the on-farm research network is to establish partnerships with others interested in conducting and using on-farm research data. To this end, numerous research collaborations with multi-state efforts, UNL researchers, UNL teaching faculty, and the NRCS, resulted in high quality work and expanded program reach.

#### 5. List where the Project Research Results/Findings were Publicized.

1. Results of 2021 studies were shared at the Results Update Meetings in Feb. 2022 at 6 locations and online.
2. The 2021 Growing Season Results book was published as an official UNL Extension Circular: L. Thompson, et al. (2022). Nebraska On-Farm Research Network: 2021 Growing Season Results (EC3059). (pp. 205). <https://on-farm-research.unl.edu/pdfs/research/result-publications/2021research-results.pdf>
3. Research reports are available in our interactive online database: <http://resultsfinder.unl.edu/> During the FY, there were nearly 7,000 page views of research studies on this site.
4. 17 CropWatch articles were published, many as part of our "Farmer Focus" article series designed to share research results from the cooperating farmer's perspective. CropWatch articles include:
  - a) Optimize your Nitrogen Investment with Precision Agriculture Technologies, b) On-Farm Research Indicates Importance of Cover Crops for Soil Health in Nebraska, c) University Part of Global On-farm Research Movement, d) Growers to Share Local On-farm Research Results, e) From Data to Decisions: The Nebraska On-Farm Research Network Helps Farmers Find Answers, f) Nebraska On-Farm Research 2021 Results Available Now, g) Starter Fertilizer - When is it Needed?, h) Optimize Your Operation's Efficiency with On-farm Research, i) Expanding the Integrated Weed Management Toolbox: Winter Cover Crop Impacts on Weed Dynamics in Eastern and Central Nebraska, j) Farmer Focus: Nebraska Growers Put Pivot Bio to the Test Via On-Farm Research Studies, k) Farmer Focus: Nebraska Producers Evaluate Practices to Increase Soybean Yield, Profit Through On-Farm Research, l) Farmer Focus: Growers Evaluate Xyway(TM) LFR(R) Fungicide as an Alternative to Aerial Applications, m) Farmer Focus: Producer Engages in On-Farm Research Project to Cut Input Costs, n) FarmBits Podcast Features Nebraska Extension, On-Farm Research Initiatives, o) Farmer Focus: Improving the Bottom Line through Cover Crops with On-Farm Research, p) NASA's Earth Sciences Division Visits Nebraska Farms, q) Assessing Soil Health at the Field Scale: Putting Reference Soils and Sampling Strategies All Together
5. Consistent with objectives to be a national leader in on-farm research, numerous national level publications and presentations have raised the national prominence of the NOFRN and disseminated research results to extension and researcher professionals.

Publications:

  - 1) Laura Thompson joined contributors from 7 countries in writing "On-Farm Experimentation to transform global agriculture." The article appears in the prestigious journal Nature Food. (Lacoste, M., Cook, S., Mcnee, M., Gale, D., Ingram, J., Bellon-Maurel, V., Macmillan, T., Sylvester-Bradley, R., Kindred, D., Bramley, R., Tremblay, N., Longchamps, L., Thompson, L., Ruiz, J., Garcia, F. O., Maxwell, B., Griffin, T., Oberthür, T., Huyghe, C., Zhang, W., Mcnamara, J., Hall, A. (2021). On-Farm Experimentation to transform global agriculture. Springer Nature Nature Food, 1-8.)
  - 2) Luck, J., Thompson, L. 2021. Adding Value to Farm Data by Leveraging Precision Agriculture Technologies for On-Farm Research. Western Economics Forum (WEF) A Journal of the Western Agricultural Economics Association. Volume 19. P.4-11.

Presentations:

  - 1) Thompson, L., Puntel, L., Archontoulis, S., Grassini, P., A Creative Economy for Sustainable Development, ASA, CSSA and SSSA, Salt Lake City, UT, "Improving Site-Specific Nitrogen Fertilizer Recommendations for Corn through Crop Modeling", International, peer-reviewed/refereed, Accepted. (November 8, 2021).
  - 2) Cesario Pinto, J., Mueller, N., Thompson, L., Puntel, L., A Creative Economy for Sustainable Development, ASA, CSSA and SSSA, Salt Lake City, UT, "Site-Specific Winter Wheat Yield and Protein Response to N in Nebraska", International, peer-reviewed/refereed, Accepted. (November 8, 2021).
  - 3) Thompson, L., Puntel, L., Luck, J., Mueller, N., Nygren, A., Rees, J., 1st International Conference on Farmer-centric On-Farm Experimentation, International Society of Precision Agriculture, INRAE, #DigitAg, Montpellier, France (online), "From Data to Decisions: Facilitating Transformational Learning through the Nebraska On-Farm Research Network", International, peer-reviewed/refereed, Accepted. (October 13, 2021).
6. Extension presentations and publications:

Thompson presented about the program at farmer and crop advisor conferences including Prairie Cereals Summit Alberta Canada, OntAg Conference Ontario, Missouri CCA conference, CVA Evolution of Farming Conference, and Mid-winter CCA conference by Nebraska Agri-Business Association. Through a new partnership with the UNL Crop Production Clinics, local Extension Educators participating in the NOFRN gave presentations about their local on-farm research results at 9 meetings in January.
7. Popular Press, TV, Radio:

The program was featured in 3 Nebraska Farmer articles and 1 article in Crops & Soils magazine. Thompson completed 2 interviews about the Nebraska On-Farm Research Network on Pure Nebraska, 1 interview on KTIC radio, and numerous educators discussed on-farm research in Farm Bits Podcast interviews.
8. Program awareness:

We hosted booths to share information at the Women in Ag Conference, Kearney Ag Expo, and Extension Amplify Conference.

**Note:** The Final Report comprised of the above listed items must be kept to THREE PAGES.

A Technical Report of no more than TEN PAGES (preferably fewer) can be appended to this report.

**Submit the form with the following file name format: #XXX\_FINAL\_Project Title\_LastName**

Please submit this completed form with attached files to the Agriculture Research Division, [jmcmahon10@unl.edu](mailto:jmcmahon10@unl.edu), based on the reporting schedule given to you.

If you have any questions, please call Jen McMahon at the Agricultural Research Division (402) 472-7082.

Please click to attach technical reports, etc.  Please check your information before submitting the form.

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