Boots on the Ground: Validation of Benchmarking Process Through Integrated On-Farm Partnership

Funding: $476,744

Principal Investigators

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Overview of project objectives

Previous analysis of farmer survey data is the starting point for NCSRP to prioritize on-farm research efforts. Such data obtained during the first three-year NCSRP-funded benchmarking project came from farmers across the Midwest addressing soils, topographies, weather and growing conditions, management practices, yields and more. The data revealed an average yield gap of 20-30% between current soybean yield and potential yield as determined by climate, soil and genetics. Researchers were then able to develop Technology Extrapolation Domains (TEDs) – different geographies with enough similarities on all parameters surveyed – that the researchers could identify management practices that may be most important first targets for farmers to increase productivity and profitability.

Part two, another three-year collaborative project, has now partnered on-farm research networks in Nebraska, Wisconsin, Ohio, Michigan, Iowa, Minnesota and North Dakota to evaluate agronomic practices with greatest potential for increasing soybean yields for a given combination of climate and soils. The goal is to prioritize future on-farm research projects and build robust experimental plans for those on-farm efforts to further evaluate and quantitate the real effects and opportunities for farmers to drive improvements to increase soybean yield, input use efficiency and net profit while minimizing the environmental footprint. Because the on-farm trials are run across a wide range of climates and soils, results could ultimately be useful to farmers in all soybean-growing regions.

Key results

Researchers identified more than 10 management practices that explain yield gaps in soybean fields in the North Central region. However, the challenge with traditional on-farm research is the strong focus on evaluating changes in single factors – such as late planting versus early planting – without sufficient attention on other management practices not being evaluated. The one-factor-at-a-time approach means the potential benefit of a technology may not be fully realized if other management factors need some adjustment for full optimization of that technology. Thus, a robust evaluation of agricultural technologies should include tactical changes in other management practices to exploit the synergies among them, as well as demonstrate the urgent need for a shift from the current "single-factor comparison" model to a more meaningful and farmer-oriented “system comparison.”

Benefit to farmers

By the end of this three-year project, we will have validated a novel research approach that uses self-reported on-farm production practices and on-farm validation to identify management practices with greatest impact on farm yield and profit. On-farm validation of the identified strategies across all examined regions will affect 60 million acres of soybeans across the North Central region. Farmers also will benefit from strengthened state-to-state research collaboration through managed coordination of the on-farm partnership, farmer-to-farmer networks, and learning key management practices that increase soybean productivity and return on investment.

USB National Soybean Checkoff Research Database Link

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