Science Societies

Tighter margins, smarter inputs

Fine-tuning seed, nitrogen, and cover crop decisions

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Photo courtesy of Wikideas1.



As tighter margins and higher input costs pressure corn and soybean budgets in 2026, producers are taking a harder look at every decision that affects profitability. This article explores how applying basic marginal cost and return thinking—along with careful nitrogen management, realistic seeding rates, and data driven evaluations of new products—can help protect returns without sacrificing yield. Earn 0.5 CEUs in Crop Management by reading this article and taking the quiz.

As Corn Belt producers have been tuning up planters and drills for 2026, many have been mulling how to trim corn and soybean production costs. When average fuel prices and some fertilizer costs spiked in early spring 2026, projected crop returns squeezed tighter. That crunch has made it more important than ever to follow some basics that agronomists and ag economists have advocated for decades.

That means paying attention to marginal costs and returns, fine-tuning nutrient programs, and taking a harder look than ever before adopting new products and practices. Here are some basics that Midwestern CCAs and producers can keep in

mind when fine-tuning input decisions in 2026 and years beyond.

Understand marginal costs and returns

Remember: When ag economists talk marginal costs and marginal returns, “marginal” doesn’t mean some sketchy expense or gimmicky marketing plan. A marginal cost is the change in cost associated with producing an additional unit.

Similarly, marginal revenue is the change in revenues associated with selling one more unit of output. If the cost savings are greater than any corresponding decline in returns, everything else remaining constant, it makes good economic sense to cut the costs.

Changing corn seeding rates is a classic marginal cost/return example. For example, if planting an extra 5,000 kernels per acre only bumps up yields by a bushel or two, the added seed cost is likely more than the revenue increase.

Field trials reinforce this reality. In 2025, Purdue University reported that almost 100 field-scale experiments across Indiana showed corn yields remained within one bushel of each other at populations from 28,000 to 35,000 plants per acre. “Modern hybrids can achieve high yields at lower seeding rates and lower plant populations in a similar way that they can also achieve high yields at higher seeding rates and higher plant populations,” says Dan Quinn, Purdue corn specialist. Quinn and other Corn Belt specialists recommend producers review current recommendations for their region and conduct their own on-farm trials with multiple seeding rates.

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Marginal cost-and-return analysis is trickier as more variables are introduced into the equation. For example: the yield impact from changing in seeding rates is easier to quantify than changing to less expensive seed. “The higher priced seed may have more disease resistance, be more resistant to drought, or just have higher yield potential,” says Mike Langemeier, Purdue ag economist.

For soybeans, a North American analysis published in 2019 showed that economic soybean seeding rates ranged from 66 to 80% of the optimal agronomic soybean seeding rate. One rule of thumb for Wisconsin, according to University of Wisconsin (UW) soybean specialist Shawn Conley, is to reduce seeding rates by about 20% in higher-yielding acres and increase rates by 20% on lower-yielding acres, “especially in areas of high white mold concern,” he says.

Most Corn Belt producers have already been fine-tuning seeding rates. (More details are available in this 2024 article.) That means many have been looking harder than ever at their nutrient programs in 2026, especially nitrogen.

Corn N: Know residuals

The same rules of marginal cost-and-return analysis apply to fertilizer inputs. If costs increase enough, past rates may no longer be justified. That means the basics are even more important than ever.



If costs increase enough, past N rates may no longer be justified. Photo courtesy of Alamy/Grant Heilman Photography.

Higher nitrogen costs underscore knowing residual nitrate and ammonium levels. “I think the most important part in terms of nitrogen management is to remember what you already have,” says Rachel Henry, CCA/CPAg and water quality extension associate with The Ohio State University.

Producers in northwest Ohio are often surprised by fall residual levels, says Henry. “Especially if you’ve never had nitrogen deficiency, you might not be counting what you have to start with,” she says. “Extra N may have been applied, or maybe there’s some there that you’re not taking into account.”

In Iowa, the Iowa Nitrogen Initiative (INI) annually reports Iowa residual N levels. “The INI continues to reinforce something we all know but sometimes forget: optimum nitrogen fertilizer rates can vary by more than 100% from field to field and year to year,” says Daniel Andersen, Iowa State University ag engineer.

The INI tests in 2025 and 2024 showed that variability. Nearly all Iowa sites tested in 2024 had less than 25 lb of N in the top 12 inches of soil. In 2025, between one-third and one-half of sites tested above 25 lb N/ac. “That variability is where management opportunity lives,” says Andersen.

The INI has developed N-FACT, a nitrogen fertilizer decision tool for Iowa producers. “While it is currently only applicable to Iowa, it helps us understand some of the factors that may be driving site-to-site and year-to-year differences in the economic optimum N rate,” says Andersen. “Especially in places where they may have been dry over winter and fall, the residual N impact (from last year) might allow us to make better fertility decisions if we are willing to measure and take credit.”

Maximize return to N



This photo is from Rachel Henry’s research trial in 2024 where she found that the MRTN rate (160 lb/ac) was the most profitable even

though it did not have the highest yields or best N use efficiency.

A decision tool available to all producers in the Corn Belt is cornnratecalc.org, which calculates maximum return to nitrogen (MRTN). Such calculators can help simplify marginal cost/revenue analysis. But remember: any analysis depends on the information used. For MRTN, be sure that you or the producers you advise are counting any residuals. "The MRTN can be a starting point or a comparison point. But it's super important to tie things to what rates you have been using in the past," says Rachel Henry.

Henry conducted field research in 2024 to verify the MRTN was providing sound guidance for corn following a cereal rye cover crop. The results showed that the MRTN rate, which was 160 lb/ac, was the most profitable. But the results also illustrated the value of a marginal cost-and-return analysis: The MRTN rate did not have the highest yields or best N use efficiency. "This can be overlooked as the MRTN rate provided the highest returns over N, thus making the producers more money," wrote Henry, in the project summary.

Counting what you have: cover crops

Like postharvest residual N levels, the benefits from cover crops over time can also be surprising. In northwestern Ohio, Rachel Henry works with one producer who annually samples biomass from his cover crop cocktail of 12 to 16 species. Nitrogen calculated from the biomass averaged 152 lb/ac per year from 2020 to 2025; however, the annual value ranged from 106 to 225 lb. "In 2025, he applied 120 pounds of N per acre for the whole year, and his corn yielded right at the county average," says Henry.

“We say 20 pounds of nitrogen per 1 percent of organic matter. So, if you have 3 percent organic matter, that’s a solid 60 pounds (of available N) that you might not be thinking of. When nitrogen is as expensive as it is, that can really add up.”

The nitrogen benefit from cover crops goes beyond legumes. Cover crop biomass helps maintain and build organic matter. “We say 20 pounds of nitrogen per 1 percent of organic matter,” says Rachel Henry. “So, if you have 3 percent organic matter, that’s a solid 60 pounds (of available N) that you might not be thinking of. When nitrogen is as expensive as it is, that can really add up."

Cover crop acreage continues rising: The University of Missouri Center for Regenerative Agriculture estimated U.S. farmers planted 21 million acres of cover crops in 2025, up from 15 million in 2017. Longer-term cover cropping provides many boosts associated with improved soil health, like increased microbial stability, which will give better pathways for nutrient movement in the soil. “Building that aggregate stability and water-holding capacity by adding organic matter will help cycle nutrients better. Building soil health is kind of a cheap way to help your crops in the long run,” says Rachel Henry.

Cover crops to reduce soybean weed control costs?

In any year, producers are mulling possible ways to reduce weed control costs and cut down on applications. Even in the tightest margin years, a back-to-the-basics approach can be best: good crop scouting, correct timing, and all the other parts of a sound agronomy program.

More recently, cover crops have also emerged as a possible tool to reduce weed control costs and weed pressure. Corn Belt research in this area has focused on cereal rye (winter rye). “Cereal rye isn’t a silver bullet, but when properly managed, it’s a powerful tool in the weed management toolbox, reducing herbicide pressure, slowing resistance development, and improving the sustainability of Wisconsin cropping systems,” wrote UW weed scientists Rodrigo Werle and Guilherme Chudzik, in recommendations published on the Badger Crop Network.

The Wisconsin trials showed later termination of cereal rye in early planted soybean maximized suppression of waterhemp and giant ragweed without hurting soybean yield. At least 3,500 to 4,500 lb/ac of dry cereal rye biomass are needed to suppress waterhemp and giant ragweed, according to the Wisconsin research.



Corn Belt research has focused on using cereal rye to reduce weed control costs and weed pressure. NRCS/SWCS photo by Lynn Betts. CC BY 2.0.

The Wisconsin trials found a 3,500-lb cereal rye biomass when the cover crop was terminated at heights of 19 to 26 inches. Cereal rye heights of 31 to 33 inches yielded 4,250 to 4,500 lb of dry biomass.

Control from the cereal rye cover crop also required an effective preemergent soil residual herbicide program. And the UW researchers found general soil health and resilience benefits from using cereal rye cover crops for five years or more.

Reducing costs: To test or not to test?

One way that producers look at cost-cutting, to increase the bottom line per acre, is the amount spent on various testing and crop-consulting services. The value of some tests may vary by region—even by field. One example in Ohio is the pre-sidedress soil nitrate test (PSNT). “It’s a mixed bag here when it comes to PSNT test before sidedress,” says Rachel Henry.

That can especially be the case in fields with cover crops, which can affect PSNT reliability. Starter nitrogen can also sway PSNT results, depending on where you pull the sample from. If you use PSNT—as for any other analysis or service—be sure the test is properly conducted and evaluate that data within the context of field history. “In our setting here in Ohio, the PSNT test doesn’t hurt—but it warrants some caution,” says Henry.

New products: to spend or not to spend?

Producers might also search for a yield boost by adopting newer products, such as fertilizer enhancers and biostimulants. Again, agronomists and ag economists point to using research-based data and a marginal cost-and-return analysis before spending to boost yields.



Before spending on new products such as fertilizer enhancers and biostimulants to boost yields, be sure you are using research-based data and a marginal cost-and-return analysis. Photo courtesy of Adobe Stock/S. Leitenberger.

Phosphorus fertilizer enhancement products, some of which can potentially benefit soybean production in fields with soil pH extremes, are an example. For Wisconsin soybean producers, "Of all the products currently available, maleic-itaconic polymers have been studied the most extensively and have the best evidence for success when extremes in soil pH are present," wrote UW soybean specialists, in January 2026.

More testing and research are needed to evaluate efficacy of the various phosphorus enhancement products, according to the UW team. Like so many other practices, any one product or practice should not be viewed as a silver bullet; agronomic basics reign supreme. "A strong nutrient management program based on the 4Rs remains the best strategy for long-term fertilization success," they concluded.

The story is similar for new and novel soybean seed treatments. A study across 22 states, published in the December 2025 issue of *Field Crops Research*, looked at nine different biostimulant products commercially available for soybean seed treatment. The researchers found no significant yield differences between treated and untreated controls. "Agronomic practices affected yield more than any biostimulant products," they reported.

The researchers, who conducted the project through the *Science for Success* soybean research network, did not write off biologicals. They cautioned the need for producers to understand the product biology and recommended they conduct their own on-

farm trials before going “all in” on a new product.

It’s another example of how paying attention to agronomic and economic basics is a solid strategy for managing production costs in any season.

Dig deeper

“Corn Plant Populations and the Potential for Reducing Seed Costs” by Daniel Quinn, Purdue University

“The Right Way to Cut Costs” by Michael Langemeier, Purdue University

“Just the Facts Jack: Soybean Planting Date, Seeding Rate, Pre-Herbicide Timing, and Seed Treatment Recommendations” by Rodrigo Werle and Guilherme Chudzik, University of Wisconsin

“Insights From the Iowa Nitrogen Initiative: What Residual N Means for 2026” by Daniel Andersen, Iowa State University

“Using the Maximum Return to Nitrogen (MRTN) Framework to Determine Optimum Nitrogen Rate Following a Cereal Rye Cover Crop” by Rachel Cochran, Ohio State University

“Using Cereal Rye Cover Crop to Boost Weed Control Without Hurting Soybean Yield” by Rodrigo Werle and Guilherme Chudzik, University of Wisconsin

“Phosphorus Fertilizer Enhancement Products—What Do We Know?” by Rianne Wagner, Matt Ruark, Chris Clark, and Shawn P. Conley, University of Wisconsin

Self-study CEU quiz

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1. In economic terms, what does "marginal cost" refer to?

a. A hidden or risky expense.

b. The total cost of production per acre.

c. The average cost of all inputs.

d. The change in cost when producing one additional unit.

2. What did Purdue University field trials show regarding corn seeding rates?

a. Higher seeding rates consistently produced higher yields.

b. Yield differences were large across all planting populations.

c. Modern hybrids performed similarly across a wide population range.

d. Lower seeding rates reduced yield stability.

3. According to research summarized in the article, economic soybean seeding rates typically fall within what range of the agronomic optimum?

a. 40–60%.

b. 50–65%.

c. 66–80%.

d. 90–100%.

4. What was the key conclusion of the multistate soybean biostimulant study referenced in the article?

a. Most biostimulants significantly increased yields.

b. Agronomic practices influenced yield more than biostimulants

c. Yield response varied widely by product and location.

d. Biostimulants were most effective under stress conditions.

5. Which statement best describes the purpose of Maximum Return to Nitrogen (MRTN) calculators?

a. To balance nitrogen costs with expected revenue returns.

b. To estimate the highest possible corn yield.

c. To recommend a universal nitrogen rate.

d. To eliminate the need for soil testing.

This quiz was drafted with AI assistance and reviewed by humans for accuracy and appropriateness.

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