

Using Past Yield Maps to Guide Smarter Nitrogen Rates

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Many farmers assume that to improve fertilizer efficiency, they need new trials, new equipment, and expensive precision tools. In reality, many farmers already have the data they need sitting on a hard drive: years of yield monitor data collected during harvest.

The Hidden Value in “Uniform” Data

Most yield maps come from seasons when nitrogen was applied at a uniform rate—the same amount across the whole field. Because those rates didn’t change, many people think those datasets cannot tell us much about “where fertilizer pays.”

However, a recent study by Park et al. (2024) shows that is not necessarily true. They found that even when nitrogen was applied uniformly, yield maps still revealed meaningful patterns across the field. Some zones consistently reached their yield plateau at lower nitrogen levels, while others needed more. By analyzing those patterns, it is possible to estimate “site-specific”

nitrogen needs — without running new on-farm experiments.

In other words, those combines have been quietly collecting the clues for years. Even without setting up test strips or variable-rate equipment, the yield maps from previous seasons already show which areas respond more or less to nitrogen.

Starting Small: Smarter Uniform Rates

For most producers, setting up full on-farm nitrogen trials can be time-consuming and intimidating. A simpler, more realistic step is what the authors call a “smarter uniform rate.”

That means adjusting the one-rate strategy based on what the field history reveals.

In the Mississippi corn example from their paper, this data-driven approach improved profits by about \$9 per acre with full variable-rate application. But even the “smarter uniform” strategy—just updating the single rate using past data — captured half of that benefit.

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That means real money saved without buying new equipment or overhauling an operation.

Start with What is Available

Neither fancy software nor new variable rate fertilizer application equipment is needed to get started.

Table 1 shows how to make the most of the data available:

Table 1. Start with What is Available

Step	What to do	Quick tip
1	Gather yield data from the past 3–5 years.	More seasons = more reliable patterns. Keep raw files backed up.
2	Clean maps: drop edges, headlands, and slow passes.	Apply moisture correction; grid to manageable cells (e.g., ~2–3 ac).
3	Spot repeat patterns: consistently high/low zones.	“Always low” often flags N loss or drainage issues.
4	Adjust your one rate using those patterns.	Start small: nudge rate up/down; track input cost vs. yield.
5	Add a small check strip next season.	One or two strips is enough to validate and refine.

These small steps are easy to manage and can help growers move toward site-specific management at their own pace.

Better for Your Farm and the Environment

Making nitrogen decisions based on yield map data is not just good for the bottom line; it is also better for the environment. Smarter nitrogen use reduces runoff, lowers costs, and keeps nutrients where the crop can use them.

As Park et al (2024) research emphasizes, the path to precision doesn’t have to start with expensive technology. It can start with understanding data already available.

Key takeaway: Past yield maps hold the information needed for better nitrogen decisions. The best way to start is by using information the combine has been recording all along.

References

Park E, Brorsen BW, Li X. Using Data from Uniform Rate Applications for Site-Specific Nitrogen Recommendations. *Journal of Agricultural and Applied Economics.* 2024;56(1):138-154. doi:10.1017/aae.2023.44

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