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What Higher Fertilizer Prices Mean for Ohio Corn Nitrogen Rates

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Highlights

- Nitrogen fertilizer prices have moved sharply higher this spring, potentially raising costs for Ohio corn producers.
- When fertilizer gets more expensive, the nitrogen rate that maximizes returns usually moves lower.
- Running a few scenarios through the MRTN calculator shows that revisiting nitrogen rates can help protect margins when fertilizer prices rise.
- On a representative 1,000-acre Ohio corn farm, sticking with pre-shock nitrogen rates could mean \$12,000 to \$28,000 in avoidable margin losses, depending on the fertilizer source and price scenario.

Introduction

After a month and a half of continuing conflict in Iran, energy markets remain in turmoil. At the same time, because of the high energy intensity of fertilizer production, as well as the fact that a considerable share of global fertilizer trade moves through the Strait of Hormuz, disruptions in that region quickly influenced global fertilizer supply and prices ([Glauber, 2026](#); [Schnitkey et al., 2026](#); [Paulson et al., 2026](#)). U.S. retail fertilizer prices rose soon afterward. For example, according to the USDA's Illinois Production Cost Reports, prices were 46.7% higher for urea, 30.4% higher for anhydrous ammonia, and 32.2% higher for nitrogen. As visualized in the data below, all other fertilizer prices also became more expensive during this period. A similar trend was found in Pennsylvania data as well, suggesting that Ohio farmers would face similar cost pressure. With this backdrop of higher input costs, Ohio grain farms' margin squeeze should be of concern. Even though farmers might have procured some fertilizer for this spring already, any additional applications would lead to significantly higher costs. Thus, it will be worthwhile to consider whether and to what extent the cost-saving strategies would work for their farm operations.

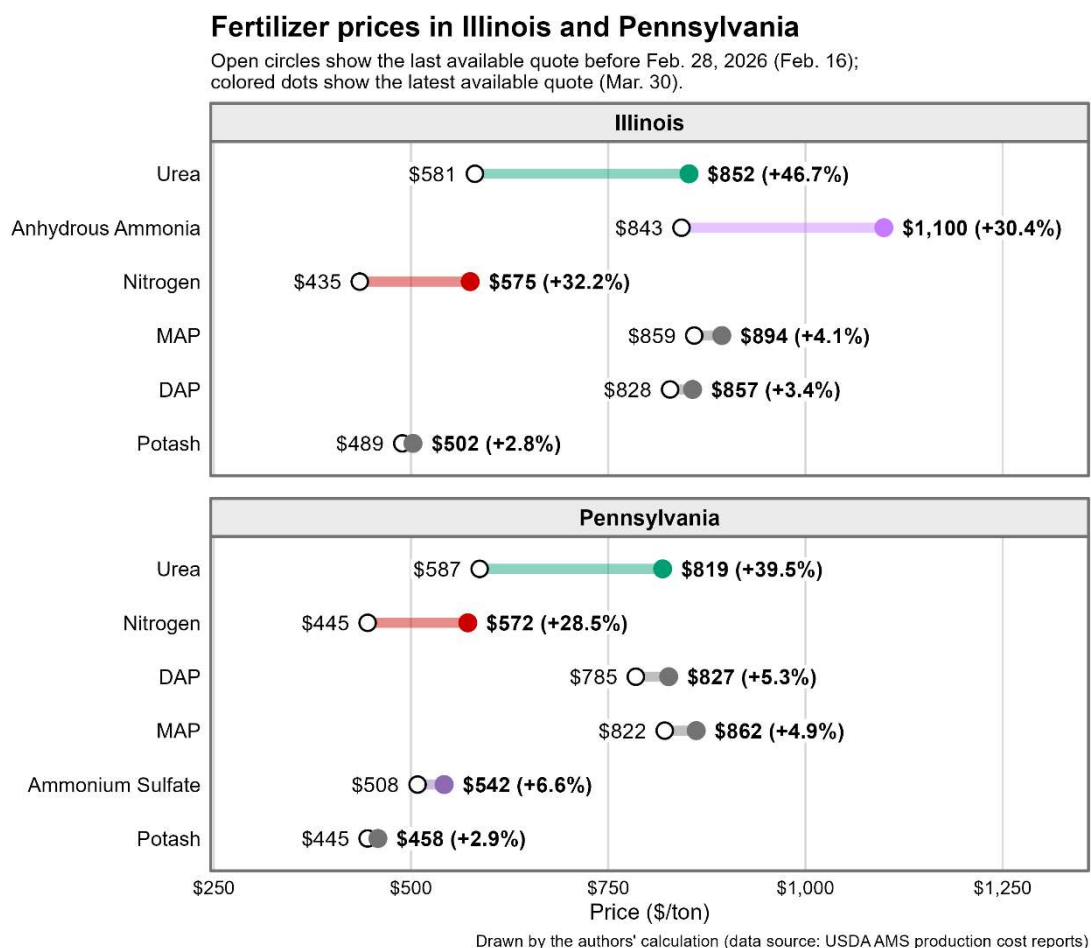
This report focuses on a practical question for Ohio corn growers, who require more nitrogen than soybean growers: *when fertilizer prices rise, how much should nitrogen rates change?* Using the [Maximum Return to Nitrogen \(MRTN\) calculator](#), we examine how the most profitable nitrogen rate changes under different fertilizer and corn price conditions. That is, our goal is to estimate the avoidable cost of sticking with older nitrogen rates after fertilizer prices have increased.

Using the MRTN Calculator for Fertilizer Savings

To estimate the value of adjusting nitrogen rates after a fertilizer price shock, we use the Corn

Nitrogen Rate Calculator to obtain the Maximum Return to Nitrogen (MRTN), which is the *N* rate that maximizes dollar returns to nitrogen based on a large body of response trials rather than a yield-goal rule. The calculator asks the user to choose the relevant state, region, soil type, and crop rotation, and then enter the corn price and nitrogen fertilizer price for the source of interest. The current tool allows source-specific pricing for anhydrous ammonia, UAN 28, UAN 32, urea, and ammonium sulfate. It also reports a profitable N rate range, defined as the range of rates expected to return within \$1 per acre of the MRTN.

In our analysis, we first enter the baseline corn price and fertilizer price to obtain the baseline MRTN. We then update the fertilizer price, and when relevant the corn price, to generate a new MRTN under the alternative scenario. The economic value of adjustment is calculated by comparing net returns under two cases: (i) updating the nitrogen rate to the new MRTN and (ii) keeping the old pre-shock rate unchanged. The difference between those two outcomes is the cost savings from adjustment. This means readers can replicate the same exercise for their own operation by entering current local prices into the calculator and comparing the updated MRTN with an older planned rate.



Case Study

Let us start by clarifying the assumptions used for each scenario.

Baseline Scenario.

Fertilizer prices are drawn from the Ohio Farm Office Q1 2026 Fertilizer Survey ([Bennett et al., 2026](#)). The survey collected spot prices from 17 retailers across 13 Ohio counties as of January 1, 2026, before the conflict began. At that point, average statewide prices were \$550 per ton for urea, \$381 per ton for UAN28, and \$885 per ton for anhydrous ammonia. For corn, we use a baseline cash price of \$4.51 per bushel, based on the Q1 2026 average Ohio cash corn price reported by Barchart cmdtyView.

- **Baseline Scenario:** Current cash corn price (\$4.51/bu) and pre-conflict Ohio fertilizer prices

The What-If Scenarios.

To see how much changes in fertilizer prices might matter, we consider four what-if scenarios.

	No Price Change in Corn	5% Increase in Corn Price
20% Increase in Fertilizer Price	Scenario 1 (S1)	Scenario 2 (S2)
40% Increase in Fertilizer Price	Scenario 3 (S3)	Scenario 4 (S4)

- **Scenario 1 (S1):** No change in corn price and a 20% increase in fertilizer price
- **Scenario 2 (S2):** A 5% increase in corn price¹ and a 20% increase in fertilizer price
- **Scenario 3 (S3):** No change in corn price and a 40% increase in fertilizer price
- **Scenario 4 (S4):** A 5% increase in corn price and a 40% increase in fertilizer price

Results

Tables 1 through 3 tell a consistent story across all three nitrogen sources. As fertilizer prices rise, the MRTN moves lower. Under the 20% fertilizer price increase scenarios, the MRTN falls by roughly 11 to 12 pounds per acre. Under the 40% increase scenarios, the reduction is larger, about 20 pounds per acre relative to the baseline. The table also makes another important point that it is unavoidable that expected net returns will generally be lower than in the baseline price environment if nitrogen becomes more expensive.

But the more important result is what happens if rates are not adjusted. To see why, focus on

¹ We also allow for the possibility that corn prices rise somewhat at the same time. In two of the four scenarios, the corn price is set 5% above the baseline. That increase is close to the 5.7% increase in Ohio cash corn prices observed after the conflict began, based on a comparison of post-conflict averages from Feb 28 to Apr 3 with pre-conflict averages from Jan1 to Feb 27.

the bottom three rows of each table. “ Δ Return if adjusted” shows how net returns change when the nitrogen rate is updated to the new MRTN under the scenario prices. “ Δ Return if not adjusted” shows what happens when the original baseline rate is held constant even though fertilizer prices have increased. The difference between those two numbers is the adjustment gain—that is, the avoidable loss from sticking with the old rate.

The adjustment gain is not trivial. Under a 20% fertilizer price increase, adjusting to the updated MRTN improves returns by about \$12 to \$16 per acre. Under a 40% fertilizer price increase, the gain from adjustment increases to roughly \$24 to \$28 per acre. Put simply, the more fertilizer prices rise, the more costly it becomes to keep using a pre-shock nitrogen rate.

Table 1. MRTN Simulation Results: Urea

Metrics	Baseline	Scenario			
	(26Q1)	S1	S2	S3	S4
Assumptions					
Corn cash price (\$/bu)	4.51	4.51 (–)	4.74 (+5%)	4.51 (–)	4.74 (+5%)
Urea price (\$/ton)	550	660 (+20%)	660 (+20%)	770 (+40%)	770 (+40%)
MRTN Results					
MRTN (lb N/acre)	169	158	161	148	151
Net return to N at MRTN (\$/acre)	259	240	258	220	238
Urea cost at MRTN (\$/acre)	103	115	118	127	130
Compared to the 26Q1 Baseline					
Δ Return if adjusted (\$/acre)		–\$19	–\$1	–\$39	–\$21
Δ Return if not adjusted (\$/acre)		–\$31	–\$15	–\$63	–\$48
Adjustment gain (\$/acre)		\$12	\$14	\$24	\$27

Note: Δ Return if adjusted = net return at the scenario MRTN minus the baseline net return. Δ Return if not adjusted = net return at the baseline application rate under scenario prices minus the baseline net return. Adjustment gain = the difference, representing the avoidable loss from not adjusting. Source: Authors’ calculations; Ohio Farm Office; CME Group; CNRC.

Table 2. MRTN Simulation Results: UAN28

Metrics	Baseline	Scenario			
	(26Q1)	S1	S2	S3	S4
Assumptions					
Corn cash price (\$/bu)	4.51	4.51 (–)	4.74 (+5%)	4.51 (–)	4.74 (+5%)

UAN28 price (\$/ton)	381	457 (+20%)	457 (+20%)	533 (+40%)	533 (+40%)
MRTN Results					
MRTN (lb N/acre)	162	151	154	141	145
Net return to N at MRTN (\$/acre)	248	226	244	207	224
UAN28 cost at MRTN (\$/acre)	110	124	126	134	138
Compared to the 26Q1 Baseline					
Δ Return if adjusted (\$/acre)		-\$22	-\$4	-\$41	-\$24
Δ Return if not adjusted (\$/acre)		-\$36	-\$20	-\$65	-\$52
Adjustment gain (\$/acre)		\$14	\$16	\$24	\$28

Note: Δ Return if adjusted = net return at the scenario MRTN minus the baseline net return. Δ Return if not adjusted = net return at the baseline application rate under scenario prices minus the baseline net return. Adjustment gain = the difference, representing the avoidable loss from not adjusting. Source: Authors' calculations; Ohio Farm Office; CME Group; CNRC.

Table 3. MRTN Simulation Results: Anhydrous Ammonia (NH₃)

Metrics	Baseline	Scenario			
	(26Q1)	S1	S2	S3	S4
Assumptions					
Corn cash price (\$/bu)	4.51	4.51 (–)	4.74 (+5%)	4.51 (–)	4.74 (+5%)
UAN28 price (\$/ton)	885	1,062 (+20%)	1,062 (+20%)	1,239 (+40%)	1,239 (+40%)
MRTN Results					
MRTN (lb N/acre)	176	165	168	156	159
Net return to N at MRTN (\$/acre)	271	253	271	235	253
NH ₃ cost at MRTN (\$/acre)	95	107	109	119	121
Compared to the 26Q1 Baseline					
Δ Return if adjusted (\$/acre)		-\$18	\$0	-\$36	-\$18
Δ Return if not adjusted (\$/acre)		-\$30	-\$14	-\$60	-\$44
Adjustment gain (\$/acre)		\$12	\$14	\$24	\$26

Note: Δ Return if adjusted = net return at the scenario MRTN minus the baseline net return. Δ Return if not adjusted = net return at the baseline application rate under scenario prices minus the baseline net return. Adjustment gain = the difference, representing the avoidable loss from not adjusting. Source: Authors' calculations; Ohio Farm Office; CME Group; CNRC.

Implications for Ohio Producers

The main takeaway is not just that nitrogen rates may need to move lower when fertilizer prices rise. It is that failing to revisit planned rates can become costly, especially when fertilizer prices increase sharply. In this case study, the cost of not adjusting appears to be noticeable under the smaller price shock and much larger under the larger one. For a representative 1,000-acre Ohio corn operation, the avoidable loss from keeping the old rate ranged from roughly \$12,000 to \$28,000. Put simply, the benefit of revisiting nitrogen decisions grows as fertilizer prices rise.

For farmers who have not yet updated their spring nitrogen decisions with higher fertilizer prices, the message is simple: when fertilizer prices change sharply, it is worth checking whether the planned rate still makes economic sense. The Corn Nitrogen Rate Calculator is a practical tool for doing that.

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