2017-2025 Nutrient Reduction Survey

IOWA CORN & SOYBEAN ACRES

This part of the survey starts with statewide corn and soybean acre data from USDA. These numbers form the foundation for the rest of INREC's analysis because they help paint a picture of what's happening across Iowa farmland. Acre trends matter because they drive almost everything else: fertility needs, crop rotations, cover crop opportunities, and conservation impact. When corn or soybean acres shift, it is usually due to a mix of factors such as crop prices, input costs, weather, or global markets. For example, a wet spring might push more acres into soybeans, while strong corn prices could pull them back the following year. Changes in total acres also affect how we interpret conservation practice adoption. Tracking acre trends alongside management practices gives a clearer sense of what is really happening on the ground.

Corn & Soy Acres	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Corn acres (CDL)	13,212,913	13,012,207	13,648,497	13,793,805	12,826,886	12,686,886	12,805,034	13,082,234	13,480,739	13,172,133
Soy acres (CDL)	9,782,215	9,956,734	9,275,193	9,553,928	10,150,325	10,046,351	9,850,104	10,128,623	9,463,201	9,800,742
Corn & soy acres total (CDL)	22,995,128	22,968,941	22,923,690	23,347,733	22,977,211	22,733,237	22,655,138	23,210,857	22,943,940	22,972,875

CDL = USDA Cropland Data Layer

COMMERCIAL ONLY NITROGEN RATES

When we look at commercial-only nitrogen rates, we're talking about fertilizer that comes strictly from commercial sources—no manure inputs. Since 2017, those rates have stayed pretty steady. That tells us farmers are applying what the crop needs, not more, not less. It also shows a good balance between increasing yields and protecting water quality.

The Iowa Nitrogen Initiative has conducted thousands of nitrogen rate trials. The average economic optimum rates illustrate the year to year variability in growing conditions that affect nitrogen use efficiency.

Commercial Only Nitrogen Rates (lb/ac)	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Average N rate on corn in rotation	170.0	172.3	177.5	183.4	170.9	173.4	166.6	179.2	179.7	174.8
Average N rate on continuous corn	200.4	201.9	200.4	208.9	199.9	192.6	185.7	205.0	211.7	200.7
Iowa Nitrogen Initiative Economic Optimum N Rate on corn in rotation							196.0	227.0	169.0	192.0
Iowa Nitrogen Initiative Economic Optimum N Rate on continuous corn							202.0	224.0	180.0	202.0

The economic optimum nitrogen rates are calculated using a 0.1 price ratio of the price of nitrogen compared to a bushel of corn or $0.50/lb N:$5/bu corn.

CROP ROTATION

This section highlights how farmers are rotating crops, whether it is the standard corn-soybean rotation or longer cycles that include small grains or forage crops like alfalfa.

Healthy rotations help break pest and disease cycles, improve soil structure and spread out weather and market risks. Rotation decisions depend on several factors, including weather, yield expectations, input costs and available markets.

Crop Rotation	2022	2023	2024	2025	Average
Continuous Corn	10.6%	12.7%	11.6%	10.9%	11.4%
Corn-Soy	85.3%	84.6%	81.7%	85.2%	84.2%
Extended Rotation	2.0%	1.4%	3.3%	1.5%	2.0%
Corn-Small Grain-Soy	0.2%	0.1%	0.3%	0.0%	0.1%
Other	1.9%	1.2%	3.1%	2.5%	2.2%

COVER CROP PRACTICES

Here you will find data on how many acres are planted with cover crops, the percentage of total acres that represents and how adoption has changed over time. Cover crops protect soil from erosion, hold nutrients such as nitrogen and build organic matter. They are one of the few practices that reduce both nitrogen and phosphorus loss. These benefits align with the goals of the Iowa Nutrient Reduction Strategy. Research from Iowa State University shows that rye cover crops can reduce nitrate losses by around 30% compared to no cover crop in a corn-soybean rotation. Adoption usually grows gradually rather than all at once. Costs, weather and timing all play a role. A late fall or wet spring can make planting or terminating cover crops difficult. For some farmers, the uncertainty of short-term results also slows adoption.

Cover Crop Practices | Percentage	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Cover crop planted	6.9%	8.8%	9.5%	13.3%	12.1%	16.6%	17.0%	16.7%	14.8%	12.8%
Rye cover crop	69.4%	82.8%	81.3%	90.9%	80.8%	81.8%	86.6%	89.6%	77.5%	82.3%
Oat cover crop	9.1%	9.8%	2.8%	1.3%	5.5%	4.4%	6.1%	4.3%	5.3%	5.4%
Species mix	NA	NA	11.20%	6.7%	12.30%	8.5%	5.5%	5.5%	8.0%	8.2%
Other cover crop	21.5%	7.4%	4.80%	1.10%	1.5%	5.3%	1.7%	0.6%	9.1%	5.9%

Cover Crop Practices | Acres*	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Cover crop planted	1,586,664	2,021,267	2,177,751	3,105,248	2,780,243	3,773,717	3,851,373	3,876,213	3,395,703	2,952,020
Rye cover crop	1,101,145	1,673,609	1,770,511	2,822,671	2,246,436	3,086,901	3,335,289	3,473,087	2,631,670	2,460,147
Oat cover crop	100,204	164,014	49,574	36,695	123,554	135,824	203,453	149,343	179,972	126,959
Species mix	NA	NA	243,908	208,052	341,970	320,766	211,826	213,192	271,656	258,767
Other cover crop	341,133	149,574	104,532	34,158	41,704	222,649	65,473	23,257	309,009	143,499

COMMERCIAL NITROGEN APPLICATION PRACTICES

Here, we're looking at how commercial nitrogen fertilizer is applied, including timing, methods and the management decisions that can help reduce nutrient losses. The 4Rs approach (right rate, right source, right time, right place) guides these efforts. Timing can vary based on weather, fertilizer prices, soil conditions and other factors, with spring being the most widely used application period. Farmers also use a combination of fall, spring and in-season applications to meet crop needs. Nitrification inhibitor use is another important part of the picture, helping protect fall-applied nitrogen from loss.

Commercial Nitrogen Application Practices | Percentage	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Fall anhydrous ammonia applied	38.9%	24.1%	23.5%	28.9%	43.1%	50.3%	49.5%	42.0%	51.3%	39.1%
EPA-labeled inhibitor with fall anhydrous ammonia	NA	NA	NA	NA	NA	NA	63.1%	62.0%	62.1%	62.4%
Nitrapyrin inhibitor with fall anhydrous ammonia	72.6%	73.9%	84.8%	83.8%	86.0%	64.7%	NA	NA	NA	77.7%
Fall only	NA	NA	14.0%	17.4%	22.4%	27.8%	34.7%	23.9%	22.7%	23.3%
Spring pre-plant only	42.1%	56.3%	50.9%	46.7%	40.3%	33.8%	36.5%	41.9%	34.3%	42.5%
Spring pre-plant & in-season	9.9%	15.4%	16.9%	13.8%	13.2%	14.5%	10.5%	12.3%	13.2%	13.3%
In-season only	2.1%	1.1%	1.1%	3.8%	1.7%	1.0%	2.5%	1.8%	0.7%	1.8%
Fall & spring pre-plant	NA	NA	11.6%	9.7%	14.3%	14.4%	10.2%	10.7%	20.7%	13.1%
Fall & in-season	NA	NA	3.2%	5.4%	4.7%	6.1%	3.7%	8.0%	6.1%	5.3%
Fall & spring & in-season	NA	NA	2.3%	3.2%	3.4%	2.3%	2.0%	1.4%	2.3%	2.4%
Variable rate applied	NA	NA	8.7%	10.1%	16.1%	9.8%	15.2%	12.2%	10.8%	11.8%

Commercial Nitrogen Application Practices | Acres*	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Fall anhydrous ammonia applied	5,139,823	3,135,942	3,207,397	3,986,410	5,528,388	6,381,504	6,338,492	5,494,538	6,915,619	5,125,346
EPA-labeled inhibitor with fall anhydrous ammonia							3,999,588	3,406,614	4,294,599	3,900,267
Nitrapyrin inhibitor with fall anhydrous ammonia	3,731,512	2,317,461	2,719,872	3,340,611	4,754,414	4,128,833				3,498,784
Fall only	NA	NA	1,910,790	2,400,122	2,873,222	3,526,954	4,443,347	3,126,654	3,060,128	3,048,745
Spring pre-plant only	5,562,636	7,325,873	6,947,085	6,441,707	5,169,235	4,288,167	4,673,837	5,481,456	4,623,893	5,612,654
Spring pre-plant & in-season	1,308,078	2,003,880	2,306,596	1,903,545	1,693,149	1,839,598	1,344,529	1,609,115	1,779,458	1,754,216
In-season only	277,471	143,134	150,133	524,165	219,340	126,869	320,126	235,480	94,365	232,343
Fall & spring pre-plant	NA	NA	1,583,226	1,337,999	1,834,245	1,826,912	1,306,113	1,399,799	2,790,513	1,725,544
Fall & in-season	NA	NA	436,752	744,865	602,864	773,900	473,786	1,046,579	822,325	700,153
Fall & spring & in-season	NA	NA	313,915	441,402	436,114	291,798	256,101	183,151	310,057	318,934
Variable rate applied	NA	NA	1,187,419	1,393,174	2,065,129	1,243,315	1,946,365	1,596,033	1,455,920	1,555,336

MANURE PRACTICES

These numbers reflect how manure is being used, including how many acres receive it, what types are applied and when applications occur. Manure remains a key nutrient source for Iowa farmers, providing nitrogen, phosphorus and organic matter that feed the soil. Fall application is still the most common, although spring application is slowly increasing as farmers look to better match nutrient release with crop needs. While Iowa is a large producer of livestock, approximately 80% of the corn acres receive no manure.

Manure Practices | Percentage	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
No manure used	81.5%	81.4%	80.8%	82.0%	79.7%	78.8%	76.5%	77.5%	74.7%	79.2%
Beef manure used	6.8%	10.3%	8.8%	6.3%	9.5%	9.0%	11.8%	10.2%	12.2%	9.4%
Beef & liquid swine manure used	0.0%	0.0%	0.3%	0.1%	0.1%	0.2%	0.4%	0.1%	0.1%	0.1%
Liquid swine manure used	7.6%	5.4%	7.4%	8.1%	8.1%	8.9%	8.3%	7.9%	9.1%	7.9%
Poultry manure used	1.6%	1.7%	1.9%	1.2%	1.6%	1.4%	1.7%	0.9%	2.6%	1.6%
Dairy manure used	2.5%	1.1%	0.8%	2.1%	1.1%	1.7%	1.5%	3.3%	1.2%	1.7%
Liquid swine manure fall applied	94.7%	84.2%	78.5%	87.3%	82.4%	91.8%	83.1%	91.2%	76.7%	85.5%
Liquid swine manure spring applied	1.8%	2.5%	11.7%	3.4%	7.0%	4.7%	5.6%	0.0%	7.7%	4.9%
Liquid swine manure fall & spring applied	3.5%	13.3%	9.9%	9.4%	10.6%	3.6%	11.3%	8.8%	15.6%	9.5%

Manure Practices | Acres*	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
No manure used	10,768,524	10,591,936	11,027,986	11,310,920	10,223,028	9,997,266	9,795,851	10,138,731	10,070,112	10,436,039
Beef manure used	898,478	1,340,257	1,201,068	869,010	1,218,554	1,141,820	1,510,994	1,334,388	1,644,650	1,239,913
Beef & liquid swine manure used	0	0	40,945	13,794	12,827	25,374	51,220	13,082	13,481	18,969
Liquid swine manure used	1,004,181	702,659	1,009,989	1,117,298	1,038,978	1,129,133	1,062,818	1,033,496	1,226,747	1,036,144
Poultry manure used	211,407	221,208	259,321	165,526	205,230	177,616	217,686	117,740	350,499	214,026
Dairy manure used	330,323	143,134	109,188	289,670	141,096	215,677	192,076	431,714	161,769	223,850
Liquid swine manure fall applied	950,960	591,639	792,841	975,401	856,118	1,036,544	883,202	942,549	940,915	885,574
Liquid swine manure spring applied	18,075	17,566	118,169	37,988	72,728	53,069	59,518	0	94,460	52,397
Liquid swine manure fall & spring applied	35,146	93,454	99,989	105,026	110,132	40,649	120,098	90,948	191,373	98,535

PHOSPHORUS APPLICATION PRACTICES

When we look at this category, we see the methods of application, the use of soil testing and how practices have evolved over time. Targeted applications, such as commercial phosphorus incorporated with the planter, knifed bands or liquid injection, are less common but show modest adoption, with variability by year and field conditions. Some type of incorporation is the best practice to reduce phosphorus loss from surface runoff. Soil testing remains central to phosphorus management, with nearly 80% of fields tested for phosphorus, and most phosphorus applications occurring when soil-test levels are at or below optimum, ensuring efficient use of nutrients and minimizing environmental impact.

Phosphorus Application Practices | Percentage	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Commercial P incorporated with planter	11.0%	3.8%	1.2%	2.7%	0.6%	0.7%	1.6%	0.9%	0.8%	2.6%
Commercial P applied in knifed bands	2.9%	2.7%	2.7%	3.0%	2.7%	1.1%	4.0%	6.6%	3.5%	3.2%
Commercial P broadcast & incorporated in 1 week	47.0%	70.3%	69.1%	40.4%	43.2%	37.9%	31.4%	31.6%	27.8%	44.3%
Liquid P (commercial/manure) injected	1.8%	3.8%	8.9%	7.8%	5.0%	6.8%	5.6%	1.8%	5.6%	5.2%
Other P application type (unincorporated)	37.4%	19.5%	18.1%	46.0%	48.4%	53.5%	57.4%	59.2%	62.3%	44.6%
Variable rate applied	NA	NA	49.6%	45.7%	57.0%	52.8%	61.5%	58.3%	58.9%	54.8%
Soil testing for P	81.2%	72.1%	85.5%	80.6%	81.2%	79.6%	82.2%	77.1%	78.1%	79.7%
P application when at or below optimum levels	74.3%	94.4%	94.3%	99.1%	98.2%	95.4%	91.0%	94.9%	100.0%	93.5%

Phosphorus Application Practices | Acres*	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Commercial P incorporated with planter	2,529,464	872,820	275,084	630,389	137,863	159,133	362,482	208,898	183,552	595,520
Commercial P applied in knifed bands	666,859	620,161	618,940	700,432	620,385	250,066	906,206	1,531,917	803,038	746,445
Commercial P broadcast & incorporated in 1 week	10,807,710	16,147,166	15,840,270	9,432,484	9,926,155	8,615,897	7,113,713	7,334,631	6,378,415	10,177,382
Liquid P (commercial/manure) injected	413,912	872,820	2,040,208	1,821,123	1,148,861	1,545,860	1,268,688	417,795	1,284,861	1,201,570
Other P application type (unincorporated)	8,600,178	4,478,943	4,149,188	10,739,957	11,120,970	12,162,282	13,004,049	13,740,827	14,294,075	10,254,497
Variable rate applied	NA	NA	11,370,150	10,669,914	13,097,010	12,003,149	13,932,910	13,531,930	13,513,981	12,588,435
Soil testing for P	18,672,044	16,560,606	19,599,755	18,818,273	18,657,495	18,095,657	18,622,523	17,895,571	17,919,217	18,315,682
P application when at or below optimum levels	13,873,329	15,633,212	18,482,569	18,648,908	18,321,660	17,263,256	16,946,496	16,982,897	17,919,217	17,119,061

SOIL TEST P LEVELS

This section shows the statewide average of soil test phosphorus levels across the three most common soil testing methods. Monitoring soil-test phosphorus helps ensure fertilizer is applied only where needed, supporting both yield and environmental goals.

Soil Test P Levels	2022	2023	2024	2025	Average
Average Bray-P1 (ppm)	31.2	34.4	33.7	36.4	33.9
Average Olsen (ppm)		20.9	28.8		24.9
Average Melich-3 (ppm)	36.1	34.1	41.9	44.4	39.1

TILLAGE PRACTICES

This section breaks down the tillage methods used before corn and soybeans and how those patterns have shifted over time. Reducing tillage leaves more crop residue to protect the soil from erosion which reduces phosphorus loss. Conservation tillage and no-till continue to play major roles in Iowa cropping systems. No-till is especially common before soybeans, while conservation tillage remains a popular choice before corn. Overall, the trend continues toward less intensive tillage as farmers look to improve soil health, protect water quality and support long-term productivity.

Tillage Practices | Percentage	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Conservation tillage before corn	56.3%	52.3%	46.5%	23.0%	25.4%	29.7%	23.3%	22.9%	30.9%	34.5%
No-till before corn	26.4%	22.2%	29.4%	29.5%	31.6%	29.6%	32.7%	29.1%	29.7%	28.9%
Conventional tillage before corn	NA	25.4%	24.1%	47.5%	43.0%	40.6%	44.0%	48.0%	39.4%	39.0%
Conservation tillage before soy	42.6%	34.6%	33.8%	18.5%	19.6%	27.7%	22.1%	16.0%	19.2%	26.0%
No-till before soy	43.2%	41.0%	44.6%	47.3%	53.3%	46.9%	49.7%	55.3%	49.4%	47.8%
Conventional tillage before soy	NA	24.4%	21.6%	34.2%	27.1%	25.5%	28.3%	28.7%	31.4%	27.7%
Combined corn & soy conservation tillage acres	50.5%	44.6%	41.3%	21.2%	22.8%	28.8%	22.8%	19.9%	26.1%	30.9%
Combined corn & soy no-till acreage	33.5%	30.3%	35.6%	36.8%	41.2%	37.2%	40.1%	40.5%	37.8%	37.0%
Combined corn & soy conventional tillage acres	NA	25.0%	23.1%	42.1%	35.9%	33.9%	37.2%	39.6%	36.1%	34.1%

Tillage Practices | Acres*	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Conservation tillage before corn	7,438,870	6,805,748	6,341,092	3,171,203	3,260,594	3,768,005	2,983,573	2,995,832	4,168,244	4,547,742
No-till before corn	3,488,209	2,888,710	4,012,658	4,069,172	4,053,296	3,755,318	4,187,246	3,806,930	4,001,083	3,807,733
Conventional tillage before corn	NA	3,305,101	3,289,288	6,552,057	5,515,561	5,150,876	5,634,215	6,279,472	5,311,411	5,129,420
Conservation tillage before soy	4,167,224	3,445,030	3,135,015	1,767,477	1,989,464	2,782,839	2,176,873	1,620,580	1,815,988	2,544,276
No-till before soy	4,225,917	4,082,261	4,136,736	4,519,008	5,410,123	4,711,739	4,895,502	5,601,129	4,671,982	4,693,701
Conventional tillage before soy	NA	2,429,443	2,003,442	3,267,443	2,750,738	2,561,820	2,787,579	2,906,915	2,975,230	2,710,258
Combined corn & soy conservation tillage acres	11,606,094	10,250,778	9,476,107	4,938,679	5,250,058	6,550,844	5,160,446	4,616,411	5,984,233	7,092,017
Combined corn & soy no-till acreage	7,714,126	6,970,971	8,149,394	8,588,180	9,463,419	8,467,057	9,082,748	9,408,059	8,673,066	8,501,434
Combined corn & soy conventional tillage acres	NA	5,734,544	5,292,729	9,819,501	8,266,299	7,712,695	8,421,794	9,186,387	8,286,642	7,839,678

Data Notes:

** These numbers are extrapolated using USDA's corn and soybean acre numbers across Iowa.*

*** Years without data reflect how survey questions evolve with the NRS science assessment as practices are added or refined.*

Out of the 550+ agricultural retailers in Iowa, 80 retail locations were selected at random and stratified across eight major land resource areas based on the percentage of row crops each year. About 1,000 of the potential 1,500 surveys are completed, ensuring oversampling of Iowa State University's target of 500 surveys for statistical significance.

INREC aggregates the data to ensure confidentiality, and the Iowa State University Center for Survey Statistics and Methodology extrapolates the data for statewide adoption. Iowa State University models nutrient load reduction based on performances documented in the NRS science assessment.