AN INREC OVERVIEW:

Nitrogen Use + Application

Since 2015, the Iowa Nutrient Research & Education Council (INREC) has led efforts to improve nitrogen management in agriculture. Working with agronomy retailers and Iowa State University, INREC tracks progress in nitrogen efficiency and nutrient loss reduction. Key initiatives include more spring and in-season nitrogen applications, increased cover crop adoption, economic optimum nitrogen rates, and expanded nitrification inhibitor use. These practices help optimize nitrogen use, protect water quality, and improve soil health across Iowa.

NITROGEN APPLICATION PRACTICES

TIMING: The most common time for nitrogen application in Iowa is during spring pre-plant, averaging 42.5% of total applications over a nine-year period. Efforts have been made to shift nitrogen applications from fall to spring or in-season to reduce nitrogen losses.

METHODS: The use of nitrification inhibitors with fall-applied anhydrous ammonia is widespread. This method helps in reducing nitrogen loads by approximately 9% compared to applications without inhibitors.

NITROGEN RATES

INREC surveys indicate that commercial nitrogen fertilizer application rates varied due to a variety of factors such as weather and fertilizer pricing. Two of the last three years' surveys show average nitrogen rates below the economic optimum rate.

Commercial Only Nitrogen Rates *(lbs/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.

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CONSERVATION PRACTICES

The adoption of cover crops has surged, with acres increasing from 1.6 million in 2017 to 3.4 million in 2025, an average gain of approximately 225,000 acres per year. Cover crops, primarily cereal rye (77.5%), help in reducing nitrogen and phosphorus losses.

YEAR	ACRES (Millions)
2017	1.6
2018	2.0
2019	2.2
2020	3.1
2021	2.8
2022	3.8
2023	3.8
2024	3.8
2024	3.4

Cover Crop Adoption

Increased adoption of cover crops helps not only to reduce nitrogen loss by about 30%, but also reduces phosphorus loss by about 30% and improves soil health and water quality.

IMPACT + OUTREACH

The Council has been instrumental in driving awareness and engagement among ag retailers, farmers, and landowners. Numerous outreach events and educational programs have been conducted to promote best practices in nutrient management and conservation.

A key part of Iowa NREC is collaboration with organizations, agencies, and farmers within Iowa—but also outside of our state. Outside of Iowa and interested in replicating the Iowa NREC survey? Reach out! We welcome the chance to assist other states in an effort to improve water quality.

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IowaNREC

Looking for more information? Check out the process in more detail on our website.