



# Illinois Nutrient Loss Reduction Strategy Survey

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## **BACKGROUND AND PURPOSE OF SURVEY**

The state of Illinois developed a long-range plan, called the Nutrient Loss Reduction Strategy (NLRs), to reduce loss of nutrients from agricultural fields (non-point sources) and also to address urban runoff (point sources). The agricultural portion of that plan was focused on reducing loss of nitrogen and phosphorous through leaching and runoff. The plan recommends a list of cultural practices that producers are encouraged to adopt, or expand, in order to preserve nutrients in their fields and reduce loss of nutrients.

NASS was asked to design and conduct a survey that would establish a baseline set of statistics for some of those practices in the 2011 crop season. In addition, the initial survey was designed to and measure those same cultural practices for the 2015 crop season. The survey has been repeated to gather updated statistics for 2017 and 2019.

## **ACKNOWLEDGEMENTS**

The staff of NASS would like to thank the Illinois Nutrient Research Education Council (NREC) that provided the funding for this project as part of their research and education outreach.

NASS statisticians would also like to thank all of the producers that responded to the survey.

## **SURVEY METHODOLOGY**

**SAMPLING:** NASS staff drew a sample of 1,097 Illinois farms with at least 100 acres of cropland and also less than 5,000 acres of cropland.

**DATA COLLECTION:** NASS mailed questionnaires and return envelopes to producers in January 2020. A second mailing was sent to non-respondents in early February. Following the second mailing, field enumerators phoned the remaining non-respondents in mid-April.

**REFERENCE YEAR:** The 2019 crop season was the reference year for nearly all of the survey questions. The General Knowledge questions are referenced to the time of the interview, in early 2020.

## NITROGEN MANAGEMENT

Many producers are using some type of professional recommendations as they decide how much nitrogen to apply on their corn acres. The NASS survey results show that producers used the MRTN (Maximum Return To Nitrogen) strategy to help determine the amount of nitrogen they would apply to one-third of their 2019 corn acres. In addition to the MRTN strategy, producers used other industry-recommended techniques on 70% of their corn acres.

NOTE: Many producers considered more than one strategy before finalizing their decisions for nitrogen applications. So two or more strategies could have been considered before applying nitrogen to some acres of corn in 2019. Therefore, the sum of percentages in the table below is greater than 100%.

<b>Nitrogen Management Strategy</b>	Acres in 2011	Acres in 2015	Acres in 2017	<b>Acres in 2019</b>
NASS corn planted acres	12,600,000	11,700,000	11,200,000	<b>10,500,000</b>
Acres where an MRTN (Maximum Return To Nitrogen) strategy was used to determine application rates	8,820,000 or 70% of planted acres	9,430,000 or 81% of planted acres	3,730,000 or 33% of planted acres	<b>3,700,000 or 35% of planted acres</b>
Other Industry-approved technique acres	Not asked	Not asked	7,750,000 or 69% of planted acres	<b>7,390,000 or 70% of planted acres</b>

**FERTILIZER APPLICATION STRATEGIES (Nitrification Inhibitors):** The NASS survey showed that 14% of the 2019 corn acres, that are tilled, were fertilized in the fall or winter with a nitrification inhibitor. For non-tilled acres that percentage is 5%.

<b>Fertilizer Application Strategies for corn on tilled acres</b>	Acres in 2011	Acres in 2015	Acres in 2017	<b>Acres in 2019</b>
Acres of corn planted	12,600,000	11,700,000	11,200,000	<b>10,500,000</b>
Fall / Winter nitrogen was applied with a nitrification inhibitor	3,240,000 or 26%	2,970,000 or 25%	3,550,000 or 32%	<b>1,460,000 or 14%</b>
Spring nitrogen was applied with a nitrification inhibitor	Not asked	Not asked	2,790,000 or 25%	<b>2,220,000 or 21%</b>

Producers also used nitrification inhibitors when applying fertilizer in the spring. The NASS survey shows that 21% of corn acres on tilled ground were fertilized in the spring with a nitrification inhibitor and 20% of corn acres on non-tilled ground were fertilized in the spring with a nitrification inhibitor.

<b>Fertilizer Application Strategies for corn on non-tilled acres</b>	Acres in 2011	Acres in 2015	Acres in 2017	<b>Acres in 2019</b>
Acres of corn planted	12,600,000	11,700,000	11,200,000	<b>10,500,000</b>
Fall / Winter nitrogen was applied with a nitrification inhibitor	Not asked	Not asked	1,040,000 or 9%	<b>540,000 or 5%</b>
Spring nitrogen was applied with a nitrification inhibitor	Not asked	Not asked	1,020,000 or 9%	<b>2,070,000 or 20%</b>

## FERTILIZER APPLICATION STRATEGIES (Timing of Applications)

For the timing of fertilizer applications, the Nutrient Loss Reduction Strategy (NLRs) recommends several specific strategies. The NASS survey asked producers about which of those strategies they used, if any, in preparation for the 2019 corn crop.

Strategy 1 – Fall and Winter N (nitrogen) applied was less than 50% of total nitrogen applications.

Strategy 2 – Fall and Winter N was 0% of total nitrogen (all spring applications).

Strategy 3 - Less than 50% of N applied in Fall and Winter, with remaining nitrogen applications split between pre-plant and side-dress applications.

<b>Fertilizer Application Strategies for corn on tilled acres</b>	Acres in 2011	Acres in 2015	Acres in 2017	<b>Acres in 2019</b>
Acres of corn planted	12,600,000	11,700,000	11,200,000	<b>10,500,000</b>
STRATEGY 1 - Fall / Winter N was 50% or less of total N	940,000 or 7%	950,000 or 8%	780,000 or 7%	<b>330,000 or 3%</b>
STRATEGY 2 - Fall / Winter N was 0% of total N (all Spring applications)	2,480,000 or 20%	2,660,000 or 23%	1,850,000 or 17%	<b>1,720,000 or 16%</b>
STRATEGY 3 - Less than 50% FALL / WINTER applications, with remaining nitrogen applications split between pre-plant and side-dress applications	1,730,000 or 14%	2,220,000 or 19%	1,790,000 or 16%	<b>1,930,000 or 18%</b>

Those same questions were also asked about corn on non-tiled acres. Those results are presented in the table below.

<b>Fertilizer Application Strategies for corn on non-tiled acres</b>	Acres in 2017	<b>Acres in 2019</b>
Acres of corn planted	11,200,000	<b>10,500,000</b>
STRATEGY 1 - Fall / Winter nitrogen was 50% or less of total nitrogen	340,000 or 3%	<b>110,000 or 1%</b>
STRATEGY 2 - Fall / Winter nitrogen was 0% of total nitrogen (all Spring applications)	1,250,000 or 11%	<b>990,000 or 9%</b>
STRATEGY 3 - Less than 50% FALL / WINTER applications, with remaining nitrogen applications split between pre-plant and side-dress applications	930,000 or 8%	<b>740,000 or 7%</b>

## PHOSPHOROUS

Since 2011, many producers have reduced the amount of phosphorous they apply on their cropland. NASS survey results show that producers made those reductions on 7.4 million acres of tilled cropland and 3.8 million acres of non-tiled cropland.

Also, many producers have changed their phosphorous application methods from broadcast to subsurface, or banding. The NASS survey shows that those changes were made on 1.44 million tilled acres and 870,000 non-tiled acres.

<b>Reductions in phosphorus applications</b>		2017 Acres	2019 acres
Tiled acres	Acres where phosphorus application rates were reduced since 2011	4,440,000	<b>7,410,000</b>
Non-tiled acres	Acres where phosphorus application rates were reduced since 2011	2,150,000	<b>3,800,000</b>
Tiled acres	Acres where placement of phosphorus applications were moved from broadcast to subsurface or banding	1,530,000	<b>1,440,000</b>
Non-tiled acres	Acres where placement of phosphorus applications were moved from broadcast to subsurface or banding	280,000	<b>870,000</b>

When asked about the reasons for reducing phosphorous applications, producers gave the responses below:

- The Illinois Agronomy Handbook removal rates were updated was cited as the reason for phosphorous reductions on nearly 4.5 million acres.
- Soil test results were cited as the reason for reductions on nearly 9.5 million acres.
- Other reasons, including cost, were cited as reasons for reductions on just over 5 million acres.

NOTE: The questionnaire allowed for producers to cite several reasons as evidence to reduce phosphorous applications on the same acres.

<b>Reasons for reducing phosphorus applications</b>	2017 Acres	2019 Acres
The Illinois Agronomy Handbook removal rates for phosphorus were updated	2,390,000	<b>4,460,000</b>
Soil test information	4,520,000	<b>9,470,000</b>
Other reasons, including cost	2,420,000	<b>5,030,000</b>

## COVER CROPS

The NASS survey included questions on seeding of cover crops, in 2019, on both tilled and non-tiled acres of corn and soybeans. The questions were phrased to capture cover crops seeded into standing 2019 crops, or after the 2019 crop was harvested.

Results show that farmers seeded 930,000 acres of cover crops on tilled acres and 480,000 acres of cover crops on non-tiled acres.

<b>Cover Crop questions (tilled and non-tiled acres)</b>	<b>Acres</b>
Corn / Soybean acres planted to cover crops after the 2019 crop season on tilled ground.	930,000
Corn / Soybean acres planted to cover crops after the 2019 crop season on non-tiled ground.	480,000
Corn / Soybean acres planted to cover crops after the 2017 crop season on tilled ground.	290,000
Corn / Soybean acres planted to cover crops after the 2017 crop season on non-tiled ground.	420,000
Corn / Soybean acres planted to cover crops after the 2015 crop season on tilled ground.	490,000
Corn / Soybean acres planted to cover crops after the 2015 crop season on non-tiled ground.	630,000
Corn / Soybean acres planted to cover crops after the 2011 crop season on tilled ground.	220,000
Corn / Soybean acres planted to cover crops after the 2011 crop season on non-tiled ground.	380,000

The NASS survey included a series of general knowledge questions about the Nutrient Loss Reduction Strategy and best management practices (BMP's).

NOTE: While the reference year for the most recent survey was the 2019 crop season, the survey questions were asked to producers in 2020. And on the previous survey, the general knowledge questions were asked to producers in early 2019.

<b>General Knowledge Questions</b>					
<b>Percent of Farms reporting in 2020</b>	<b>Not at all knowledgeable</b>	<b>Slightly knowledgeable</b>	<b>Somewhat knowledgeable</b>	<b>Knowledgeable</b>	<b>Very knowledgeable</b>
Nutrient Loss Reduction Strategy	26.9	29.9	20.7	10.7	11.8
MRTN strategy	30.2	29.0	17.6	14.7	8.5
Wood chip bioreactors	54.7	17.2	14.4	11.5	2.2
Constructed Wetlands	42.1	20.5	16.5	17.9	3.0
Cover crop management	9.1	24.7	27.7	26.1	12.4
<b>Percent of Farms reporting in 2019</b>	<b>Not at all knowledgeable</b>	<b>Slightly knowledgeable</b>	<b>Somewhat knowledgeable</b>	<b>Knowledgeable</b>	<b>Very knowledgeable</b>
Nutrient Loss Reduction Strategy	21.0	27.0	38.4	11.6	2.0
MRTN Strategy	20.3	33.5	25.5	14.1	6.6
Bioreactors	53.8	23.0	15.0	5.5	2.7
Constructed Wetlands	19.7	29.6	38.0	10.2	2.5
Cover Crops Management	15.2	16.7	35.5	28.4	4.2