Iowa Nutrient Research and Education Council Survey of Agricultural Retailers

Conducted in Partnership with Iowa State University

Background

The Iowa Nutrient Reduction Strategy (NRS) calls for the development of a public-private reporting system capable of documenting the use of nutrient management and conservation practices within the state for calculating nutrient load changes associated with adoption. Elements of this system include a system managed by the Iowa Nutrient Research and Education Council (INREC) to measure practice adoption and provide aggregate information to Iowa State University for nutrient load calculations.

Selected data are provided on pages 48 to 49 of the 2018-19 NRS Annual Progress Report, which can be accessed at www.nutrientstrategy.iastate.edu. This appendix describes the survey procedure and the complete results of the 2017 and 2018 surveys.

INREC collaborated with Iowa State University (ISU) College of Agriculture and Life Sciences and the ISU Center for Survey Statistics and Methodology (CSSM) to develop the survey procedure and instrument. The survey provides a statistically representative sample of farm fields across Iowa, relying on a randomized and representative sample of in-field practices during each crop year. Survey results are aggregated and then provided to ISU

INREC Survey Process Summary

- INREC collects survey information on all the in-field N and P management practices listed in the INRS Nonpoint Source Science Assessment (NSSA).
- 150 agricultural retailer locations are randomly selected across Iowa each year to collect survey information from utilizing their farmer customer records on in-field management practices. Randomly selected locations are stratified across eight Major Land Resource Areas (MLRAs) of the state based on each MLRA's percentage of row crop acres to ensure a properly apportioned representative sample from all areas of the state.
- At each retailer location, 10 farmers are randomly selected to survey, and for each farmer one farm field is randomly selected for data collection. The selected farmers are notified with an option to opt out of being included in the survey process.
- INREC utilizes four regional liaisons to meet in person with the agricultural retailers, carry out the random selection protocols, and input data in an online survey form on a private, secure server that is maintained by INREC.
- The average time spent at each retailer location to carry out the random selection protocol and collect the information is approximately 1 hour.
- INREC provides an aggregate dataset of the compiled responses to CSSM for statistical processing to extrapolate practice usage information to statewide scale.

Randomized Sample Selection Procedure

The following sampling procedure is conducted using a spreadsheet with randomized selections of farmers' records at each participating agricultural retailer location; there are five columns. The first column is the ID number from 1 to 600, corresponding to up to 600 locations in the sample. The second column is the first letter of the last name of the farmer for identifying the starting point. The third

column gives the section number (high/low). The forth column is the direction in which the field is being sampled (N/E/S/W), and the fifth column is the second direction to break a tie.

If the total number of farms in a location is less than 50, sample every 5th farm after the starting point.

If the total number of farms in a location is between 50-99, sample every 10th farm after the starting point.

If the total number of farms in a location is between 100-199, sample every 20th farm after the starting point.

If the total number of farms in a location is 200 or above, sample every 30th farm after the starting point.

Example: Suppose retailer location 1 serves 150 farms.

1. The first row and the second column is M. So we find the first farm with the last name starting with M, which becomes the starting record. If there is no farm with last name starting with M, we find the next farm with the last name starting after M as the starting record.
2. 150 farms are between 100 and 199, so we count from the starting record to the 20th record, which becomes the first sample. Count to the 40th record for the second sample, and continue until enough sample is selected at this location. If there is a non-response, record the basic information for the non-response, and count from the last sample to the next 20th record as a new sample.
3. The first row third column is High. For all the selected farms from the first location, select the section with the highest section number.
4. The first row forth column is West. We select the west most field in the section from (3) to survey.
5. The first row fifth column is South. If there are more than one fields which can be considered west most, select the most southern one to survey.

2017 Crop Year INREC Survey Data Extrapolation

	State Average	*State Standard Error (SE)*
Average N Rate on Corn in Rotation (lb/ac)	170.0	1.0
Averate N Rate on Continuous Corn (lb/ac)	200.4	3.4

Practice	*State Acreage Extrapolation*	*State Acreage SE*
Cover Crop Planted	1,597,614	216,951
Rye Cover Crop	1,108,954	105,962
Oat Cover Crop	144,610	69,079
Other Cover Crop	344,051	97,843
Fall Anhydrous	5,136,775	219,953
Nitrapyrin Inhibitor w/ Anhydrous	3,731,524	128,265
All Spring Pre-Plant	5,563,671	221,451
Spring Pre-Plant & In-Season	1,307,086	144,136
All In-Season	281,723	69,675
Other Timing	923,658	104,424
No Manure Used	10,765,242	193,116
Beef Manure Used	900,069	126,538
Liquid Swine Manure Used	998,307	131,982
Poultry Manure Used	207,798	59,463
Dairy Manure Used	324,858	78,707
Dairy & Beef Manure Used	16,638	16,608
Liquid Swine Manure Fall Applied	945,796	28,530
Liquid Swine Manure Spring Applied	17,504	17,471
Liquid Swine Manure Fall & Spring Applied	35,007	24,012
Commercial P Incorporated w/Planter	2,523,799	268,686
Commercial P Applied in Knifed Bands	656,919	130,326
Commercial P Broadcast & Incorporated w/n 1 week	10,807,030	409,178
Liquid P (commercial/manure) injected	416,049	116,801
Other P Application Type	8,591,331	410,207
Soil Testing for P	18,682,577	316,465
P Application Only When At/Below Optimum Levels	13,875,230	337,197
Conservation Tillage Before Corn	7,441,970	222,514
No-Till Before Corn	3,486,345	182,576
Other Tillage Before Corn	2,284,597	159,731
Conservation Tillage Before Soy	4,169,316	176,793
No-Till Before Soy	4,221,350	166,235
Other Tillage Before Soy	1,391,549	114,278
Combined Corn/Soy Conservation Tillage Acreage	11,611,287	399,307
Combined Corn/Soy No-Till Acreage	7,707,695	348,811
Combined Corn/Soy Other Tillage Acreage	3,676,146	274,009

2018 Crop Year INREC Survey Data Extrapolation

	State Average	*State Standard Error (SE)*
Average N Rate on Corn in Rotation (lb/ac)	172.3	1.1
Averate N Rate on Continuous Corn (lb/ac)	201.9	3.0

Practice	*State Acreage Extrapolation*	*State Acreage SE*
Cover Crop Planted	2,015,688	244,917
Rye Cover Crop	1,669,641	99,201
Oat Cover Crop	197,070	83,353
Other Cover Crop	148,977	60,920
Fall Anhydrous Applied	3,135,808	194,935
Nitrapyrin Used w/Fall Anhydrous	2,318,399	77,755
All spring pre-plant (No Fall N)	7,331,631	232,101
Spring pre-plant & in-season (No Fall N)	2,004,263	163,639
All in-season (No Fall N)	137,166	43,656
Other Timing	321,107	79,566
No manure Used	10,590,004	178,941
Beef manure Used	1,343,993	145,656
Liquid swine manure Used	700,854	96,282
Poultry manure Used	215,760	56,852
Dairy manure Used	141,833	46,947
Dairy & beef manure Used	19,763	19,735
Liquid Swine Manure Fall Applied	590,008	32,598
Liquid Swine Manure Spring Applied	17,446	17,416
Liquid Swine Manure Fall & Spring Applied	93,400	27,555
Commercial P Source Applied	19,845,650	275,950
Commercial P Incorporated w/Planter	862,841	170,834
Commercial P Applied in Knifed Bands	627,900	133,481
Commercial P Broadcast & Incorporated w/n 1 week	16,143,905	334,296
Liquid P Injected into Soil	865,364	143,614
Other P Application Type	4,468,931	304,265
Soil Testing for P Utilized	16,563,845	378,236
P Application Only When Soil Test Levels At/Below Optimum (Crop Removal Rate)	6,333,859	318,013
P Application Only When Soil Test Levels At/Below Optimum (Optimum Soil Test Level Target)	9,298,523	327,981
Conservation Tillage Before Corn	6,805,748	211,209
No-Till Before Corn	2,890,908	193,162
Conventional Before Corn	3,299,680	151,912
Other Tillage Before Corn	15,871	15,845
Conservation Tillage Before Soy	3,441,481	183,567
No-Till Before Soy	4,081,526	185,224
Conventional Before Soy	2,433,727	125,716
Other Tillage Before Soy	0	0
Combined Corn/Soy Conservation Tillage Acreage	10,247,229	394,776
Combined Corn/Soy No-Till Acreage	6,972,434	378,385
Combined Corn/Soy Conventional Acreage	5,733,407	277,628
Combined Corn/Soy Other Tillage Acreage	15,871	15,845