



Farmer Perspectives on Iowa’s Nutrient Reduction Strategy

The water quality impacts of nutrients from agriculture are increasingly important to Iowans and Iowa agriculture. Corn and other crops are highly dependent on nitrogen and phosphorus. Much of the nutrients that are applied to or are otherwise present in agricultural soils serve the purpose of increasing yields of crops, pasture, and other agricultural products. However, some are lost from fields into waterways, where they degrade water quality in Iowa’s streams, lakes, and other water bodies. Some of those nutrients eventually flow into the Mississippi River and on to the Gulf of Mexico, where they contribute to the formation of oxygen-depleted areas called hypoxic zones. In short, the loss of nitrogen and other nutrients from agricultural activities leads to economic and environmental costs in Iowa and beyond.

In 2013, the state of Iowa released the Iowa Nutrient Reduction Strategy (www.nutrientstrategy.iastate.edu). The strategy is a science and technology-based framework designed to guide actions that reduce the loss of nutrients to surface water. It was developed through a collaborative process between Iowa State University, the Iowa Department of Agriculture and Land Stewardship (IDALS), the Iowa Department of Natural Resources

(IDNR), with support from the USDA Agricultural Research Service (ARS), and the USDA Natural Resources Conservation Service (NRCS). The strategy was prompted by the 2008 Gulf Hypoxia Action Plan, which called for Iowa and other states in the Mississippi River watershed to develop strategies to reduce nutrient loadings to the Gulf of Mexico. The Iowa strategy addresses both “point sources” (e.g., water treatment plants) and “nonpoint sources” (e.g., runoff from crop fields) of nutrients. The Iowa Nutrient Reduction Strategy’s goal for Iowa agriculture is a 41 percent reduction in nitrogen loss and a 29 percent reduction in phosphorus loss.

The strategy document highlights many ways that farmers and agricultural stakeholders can take action to make progress toward those goals. It summarizes research on the effectiveness of “best management practices” in reducing nutrient loss from farmland. The strategy recommends that farmers and landowners, with support from advisers, agribusinesses, farm groups, conservation agencies and organizations, and others, reduce their nutrient footprints by increasing their use of an appropriate, diverse mix of management strategies and conservation practices on the land they farm and/or own.

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The 2014 Iowa Farm and Rural Life Poll included several sets of questions to better understand farmers' awareness and knowledge of the nutrient reduction strategy, awareness and concern about nutrient-related water quality issues, attitudes toward the strategy, and perceived barriers to action. Knowledge of farmers' perspectives about the strategy and its goals can guide public and private efforts to help farmers to reduce nutrient losses. This report presents results from that survey.

Methods

The Iowa Farm and Rural Life Poll is an annual survey of Iowa farmers. It collects and disseminates information on issues of importance to agricultural stakeholders and rural communities across Iowa and the Midwest. Conducted every year since its establishment in 1982, it is the longest-running survey of its kind in the nation. The 2014 Farm Poll questionnaires were mailed in February 2014 to a statewide panel of 2,218 farm operators. Usable surveys were received from 1,128 farmers, resulting in a response rate of 51 percent. ISU Extension and Outreach, the Iowa Agriculture and Home Economics Experiment Station, IDALS, and the Iowa Agricultural Statistics Service are partners in the Farm Poll.

The data are reported for all farmers and also broken down by five corn and/or soybean acreage categories: 1-99 acres, 100-249 acres, 250-499 acres, 500-999 acres, and 1,000+ acres (table 1). Because the Iowa Nutrient Reduction

Strategy is focused largely on reduction of nitrogen and phosphorus loss from crop fields, farmers who plant corn and soybeans, the predominant crops in Iowa, are of particular interest. Further, farmers who plant more than 500 acres of corn represent less than 30 percent of Iowa farmers, but plant about 75 percent of the state's cropland. It is important to consider this disproportional land use when examining the survey results, because the results for larger-scale corn and soybean farmers have implications for a greater proportion of Iowa's farmland and, by extension, the state's surface water resources.

Introductory statement

To ensure that all survey respondents had a similar understanding of the Iowa Nutrient Reduction Strategy, we provided the following introductory text:

The Iowa Nutrient Reduction Strategy is a science and technology-based framework to assess and reduce loss of nutrients to Iowa waters and the Gulf of Mexico. It is designed to direct efforts to reduce nutrients in surface water from both point and nonpoint sources in a scientific, reasonable, and cost-effective manner.

The Nutrient Reduction Strategy was prompted by the 2008 Gulf Hypoxia Action Plan that calls for Iowa and other states along the Mississippi River to develop strategies to reduce nutrient loadings to the Gulf of Mexico. The Gulf Hypoxia Action Plan establishes a goal of at least

Table 1. Farm Poll respondent distribution by acres of corn and/or soybeans planted in 2013

	— Percent —
Farmers who did not plant corn or soybeans in 2013	21.1
1-99 acres of corn and/or soybeans	14.9
100-249 acres of corn and/or soybeans	19.9
250-499 acres of corn and/or soybeans	18.5
500-999 acres of corn and/or soybeans	14.1
1,000+ acres of corn and/or soybeans	11.4

a 45% reduction in the amount of nitrogen and phosphorus that flows into Iowa's waterways (streams, rivers). The Iowa strategy addresses both "point sources" (e.g., water treatment plants) and "nonpoint sources" (e.g., agriculture) of nutrients. The goal for Iowa agriculture is that nutrient losses into waterways will be reduced by 41% for nitrogen and 29% for phosphorus.

Knowledge of the Iowa Nutrient Reduction Strategy

A first objective was to assess farmer knowledge of the Iowa Nutrient Reduction Strategy (NRS). If farmers do not know about the strategy, they are unlikely to participate or otherwise support it. Immediately following the introductory text about the strategy, the question, "Before reading the description above, how knowledgeable were you about the Iowa Nutrient Reduction Strategy?" was posed. Participants were asked to rate their level of knowledge about the strategy on a 5-point scale ranging from not at all knowledgeable (1) to very knowledgeable (5).

Twenty percent of farmers indicated that they did not know about the strategy prior to reading the introductory text (table 2). Slightly more than one-quarter of farmers indicated that they were slightly knowledgeable. Thirty-two percent of farmers selected the

"somewhat knowledgeable" category. Eighteen percent of farmers categorized themselves as knowledgeable, and four percent indicated that they were very knowledgeable about the NRS.

The subsample of farmers who had produced corn or soybeans in 2013 reported greater knowledge of the Nutrient Reduction Strategy than the sample as a whole (table 2). Further, farmers with larger acreages of corn and soybeans tended to report higher levels of knowledge. Whereas 10 percent of farmers with 1-99 acres of corn and soybean acres indicated that they were knowledgeable or very knowledgeable about the Nutrient Reduction Strategy, 24 percent of farmers with 100-249 acres and 28 percent of farmers with 500-999 acres reported that they were knowledgeable or very knowledgeable. Farmers who had planted 1,000 or more acres of corn and/or soybean rated themselves highest, with 33 percent indicating that they were knowledgeable or very knowledgeable about the Nutrient Reduction Strategy.

Sources of information about the Iowa Nutrient Reduction Strategy

The Nutrient Reduction Strategy has been publicized through many media outlets, agencies, organizations, and private sector firms, and the survey sought to understand where farmers had heard about it. Knowledge about where farmers have heard about

Table 2. Farmer awareness of the Iowa Nutrient Reduction Strategy

	Not at all knowledgeable	Slightly knowledgeable	Somewhat knowledgeable	Knowledgeable	Very knowledgeable
	— Percent —				
All farmers.....	20.2	26.7	31.5	17.7	3.9
All corn and soybean farmers	15.8	27.1	33.6	19.1	4.4
1-99 acres of corn and/or soybeans	26.0	37.0	26.6	9.7	0.6
100-249 acres of corn and/or soybeans	16.3	30.0	30.0	20.5	3.2
250-499 acres of corn and/or soybeans	14.4	24.7	36.6	18.6	5.7
500-999 acres of corn and/or soybeans	9.9	19.7	42.3	21.8	6.3
1,000+ acres of corn and/or soybeans	10.8	22.5	33.3	26.7	6.7

the strategy can point to ways to improve information dissemination. We presented a list of nine information sources through which news about the NRS had been disseminated (table 3), and provided the introductory text, “Information about the Nutrient Reduction Strategy has been publicized through many sources, through what sources have you learned about it?” Farmers were asked to check all of the sources that applied.

The most common sources from which farmers learned about the Nutrient Reduction Strategy were the farm press (63 percent), Iowa State University Extension and Outreach (45 percent), the Natural Resources Conservation Service or Soil and Water Conservation District (41 percent), and government agencies such as IDALS (39 percent) (table 3). Commodity or farm organizations also played a prominent role, with 35 percent of farmers reporting that they learned about the strategy from such

organizations. Thirty percent of farmers learned about the strategy through the popular press. The least common information sources through which farmers learned about the Nutrient Reduction Strategy were local agricultural retailers (14 percent), seed company salespersons (9 percent), and independent/private crop advisers or agronomists (8 percent). About 18 percent of farmers indicated that they had not heard of the Nutrient Reduction Strategy prior to reading the description.

Compared to the overall sample, the subsample of farmers who had planted corn and/or soybeans in 2013 reported that they had heard about the Nutrient Reduction Strategy from more sources (table 3). Comparisons by size of corn and soybean acreage show that percentages varied across size categories, but few differences were statistically significant. A notable exception was that greater proportions of farmers in the highest acreage categories

Table 3. Sources of information on the Iowa Nutrient Reduction Strategy

	All farmers	Farmers who planted corn and/or soybeans in 2013, acres						
		All corn/soy	1-99	100-249	250-499	500-999	1,000+	
			— Percent Checked —					
I had not heard about it until now.....	18.2	14.8	23.2	17.4	14.8	9.4	6.2	
The farm press (magazines, TV programs, websites, that focus on agriculture).....	63.1	80.1	76.0	80.0	82.0	84.0	76.9	
Iowa State University Extension and Outreach	44.5	56.9	45.7	52.4	56.7	63.2	68.6	
Natural Resources Conservation Service or Soil and Water Conservation District ...	41.0	51.5	49.6	51.4	48.9	57.6	50.4	
Government agency (e.g., Iowa Department of Agriculture and Land Stewardship)	39.1	49.9	42.6	48.6	50.0	54.9	53.7	
Commodity or farm organization (e.g., Soybean Assn, Corn Growers, Farm Bureau)	35.3	46.9	33.3	42.7	48.3	52.1	59.5	
The popular press (general interest newspapers, TV programs, magazines)...	30.3	36.2	42.6	43.2	34.8	28.5	29.8	
Local agricultural retailer (e.g., fertilizer, agricultural chemical dealer)	13.8	17.7	15.5	20.5	15.2	16.0	21.5	
Seed company salesperson.....	9.3	11.8	11.6	12.4	8.4	13.9	13.2	
Independent/private crop adviser or agronomist.....	8.2	10.2	3.9	9.7	9.0	12.5	16.5	
Average number of sources (farmers who had heard about it only)	3.4	3.6	3.2	3.6	3.5	3.8	3.9	

had learned about the strategy through Iowa State University, commodity organizations, or independent crop advisers compared to farmers in lower acreage categories. Conversely, a greater proportion of farmers in the lowest acreage categories had learned about it through the popular press, compared to farmers in the higher acreage categories. Overall, farmers who were aware of the strategy had heard about it from an average of 3.4 sources. On average, corn and soybean farmers had heard about it from more sources than the overall sample, and larger-scale corn and soybean farmers had heard about it from more sources than smaller-scale farmers.

Farmers’ Perspectives on the Iowa Nutrient Management Strategy

A major objective of the 2014 Farm Poll was to understand farmers’ perspectives regarding the Nutrient Reduction Strategy and issues related to nutrient management more generally. Two items focused on farmer awareness and concern about agriculture’s impacts on water quality. Several items measured farmer support for the strategy and related actions to reduce nutrient loss into waterways. A number of survey items examined potential economic and other barriers to progress toward Nutrient Reduction Strategy goals.

Awareness and concern about water quality

A substantial majority—76 percent—agreed that they were concerned about agriculture’s impacts on Iowa’s water quality (table 4).

A slight majority (52 percent) agreed that nutrients from Iowa farms contribute to hypoxia in the Gulf of Mexico. A notable proportion of farmers—40 percent—reported uncertainty about the impacts of nutrients from Iowa on Gulf hypoxia. No significant differences were found by corn and soybean acreage category.

Attitudes toward the Iowa Nutrient Reduction Strategy

The results for the items measuring attitudes toward the Nutrient Reduction Strategy and related actions showed that Iowa farmers were generally supportive. Eighty-four percent agreed that farmers should do more to reduce nutrient and sediment runoff into waterways (table 5). Farmers also expressed substantial support for the Nutrient Reduction Strategy specifically: 72 percent agreed with the statement, “I would like to improve conservation practices on the land I farm to help meet the Nutrient Reduction Strategy’s goals,” and 48 percent agreed with the statement, “Helping to meet the Nutrient Reduction Strategy’s goals is a high priority for me.” Sixty percent of farmers agreed that fertilizer and agriculture chemical dealers should do more to help farmers address nutrient losses into waterways.

About 48 percent of Farm Poll participants indicated that helping to meet the Nutrient Reduction Strategy’s goals was a high priority for them (table 5). Forty-six percent reported that they would be willing to have someone help them to evaluate their farm operation’s effectiveness in terms of reducing nutrient loss into waterways. About half of farmers

Table 4. Awareness and concern about agriculture’s impacts on water quality

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
	—Percent—				
I am concerned about agriculture’s impacts on Iowa’s water quality	0.8	3.8	19.3	60.8	15.3
Nutrients from Iowa farms contribute to hypoxia in the Gulf of Mexico	1.0	6.5	40.3	40.9	11.2

selected the “uncertain” category in response to the items, “I am confident that the Nutrient Reduction Strategy will lead to major reductions of nitrogen and/or phosphorus in waterways,” and “Helping to meet the Nutrient Reduction Strategy’s goals is a high priority for agricultural advisers.” Evaluation of differences by acres of corn and soybeans did not detect substantial differences in responses between size categories for any of the support-related survey items.

Evaluation of potential barriers to action

Several items asked farmers to rate their agreement or disagreement with statements about potential barriers (primarily economic) to nutrient management-related conservation action. Fifty-six percent of farmers agreed that landlords are often unwilling to spend money on conservation (table 6). Similarly, 55 percent agreed with the statement, “Short-term pressure to make profit margins makes it difficult to invest in conservation practices whose benefits are mostly long-term.” Forty percent of respondents indicated that they believed that they had done all they could to reduce nutrient loss from their farm operations.

Thirty-three percent agreed with the statement, “Most of the benefits from farmer investments in practices to address water quality go to non-farmers.” Thirty percent of farmers indicated that they cannot afford to take land out of production to put it into conservation practices, and just 16 percent of agreed that the cost of further reduction of nutrient losses from their farm operation would be too high. Nearly fifty-five percent selected “uncertain” on this item, however. Evaluation of differences by acres of corn and soybeans did not detect substantial differences in responses between size categories for any of the barrier-related survey items.

Discussion and Conclusion

The 2014 Iowa Farm and Rural Life Poll examined Iowa farmers’ awareness of and attitudes toward the Nutrient Reduction Strategy. Since the NRS was implemented only several months prior to the survey, the results can be viewed as an early measure of farmer perspectives on the strategy and its goals. In general, the results show that farmers were both aware of the NRS and supportive of it.

Table 5. Support for the Nutrient Reduction Strategy and related actions

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
	—Percent—				
Iowa farmers should do more to reduce nutrient and sediment run-off into waterways	0.2	1.9	14.3	63.3	20.3
I would like to improve conservation practices on the land I farm to help meet the Nutrient Reduction Strategy’s goals...	0.8	3.7	23.6	63.6	8.3
Fertilizer and ag chemical dealers should do more to help farmers address nutrient losses into waterways	1.0	8.8	30.8	51.9	7.6
Helping to meet the Nutrient Reduction Strategy’s goals is a high priority for me	2.0	11.3	39.0	41.6	6.0
I would be willing to have someone help me to evaluate how my farm operation is doing in terms of keeping nutrients out of waterways	4.5	10.3	38.9	40.5	5.7
I am confident that the Nutrient Reduction Strategy will lead to major reductions of nitrogen and/or phosphorus in waterways	2.8	9.3	50.3	35.4	2.2
Helping to meet the Nutrient Reduction Strategy’s goals is a high priority for agricultural advisers (e.g., ag retailers)	2.3	14.8	49.4	29.6	4.0

Table 6. Barriers to nutrient management-related conservation action

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
	—Percent—				
Landlords are often unwilling to spend money on conservation.....	1.6	12.1	30.4	46.4	9.6
Short-term pressure to make profit margins makes it difficult to invest in conservation practices whose benefits are mostly long-term.....	1.8	14.7	28.2	48.1	7.3
I have done all I can to reduce losses of nitrogen and/or phosphorus from my farm operation	1.4	20.6	37.8	32.2	8.0
Most of the benefits from farmer investments in practices to address water quality go to non-farmers	2.5	21.9	42.3	28.2	5.2
I can't afford to take land out of production and put it into conservation practices	6.0	30.4	33.0	26.1	4.4
The cost of further reduction of nutrient losses from my farm operation would be too high	4.2	24.7	54.6	14.4	2.0

Farmers know about the strategy

Most farmers knew about the Nutrient Reduction Strategy, and more than half rated themselves as at least “somewhat knowledgeable” about it. Corn and soybean farmers, for whom the NRS is perhaps most relevant, reported higher levels of knowledge than farmers as a whole. Furthermore, farmers with more corn and/or soybean acres indicated higher knowledge levels: more than two-thirds of farmers in the 500-999 and 1,000+ acreage categories expressed that they were at least somewhat knowledgeable, compared to 37 percent of those with fewer than 100 acres.

These results are important because awareness of the NRS is a critical first step toward participation in actions to help meet the strategy’s goals. That a majority of farmers knew about the strategy means that progress has been made toward attaining this first step. Further, because farms with more than 500 acres represent most of Iowa’s cropland, the finding that larger-scale farmers were more knowledgeable about the NRS indicates that the stewards of most of Iowa’s cropland have already crossed the awareness threshold.

Farmers had heard about the NRS from some sources more than others. As expected, the farm press had been instrumental in raising awareness of the NRS, especially among larger-scale

farmers. Likewise, ISU Extension and Outreach and the USDA–NRCS had been important sources of information about the strategy. Commodity organizations and state government agencies also appear to have been important sources of information about the NRS.

In contrast, few farmers reported that they had heard about the Nutrient Reduction Strategy from private sector entities such as agricultural retailers and seed company sales representatives. This finding suggests that Iowa State, IDALS and other groups that are leading the NRS should work more closely with their private sector partners to help engage them as messengers.

It is important to recognize that this survey was conducted in early 2014, about seven months after the formal launch of the Iowa Nutrient Reduction Strategy. Since that time, Iowa State, IDALS, and other groups have integrated NRS information into numerous meetings, workshops, and trainings for both farmers and their private sector advisers. Many such events take place over the winter months, so for numerous private sector advisers, winter 2014–2015 might have been their first opportunity to learn enough about the NRS to start promoting it with their farmer clients. It is possible that private sector agricultural advisers have begun to incorporate more discussion of the NRS and

nutrient management into their work with farmers, but Iowa State, IDALS, and other partners should continue their effort to engage agricultural retailers, seed dealers, and other agricultural advisers in the effort to promote action to support the NRS.

Farmers are concerned

Most farmers expressed concern about agriculture's impacts on Iowa's water quality. This is an important finding because awareness and concern are critical precursors of behavior change. If people are not aware of or concerned about a given issue, they are unlikely to act on it. Since more than 75 percent of farmers agreed that they are concerned about agriculture's water quality impacts, this suggests that there is a strong foundation of awareness and concern on which to build greater farmer participation and more intensive and widespread adoption of nutrient management practices.

Considering the high levels of concern about the impact of agriculture on Iowa's water quality, it was somewhat surprising that 40 percent of farmers were uncertain about whether or not nutrients from Iowa farms contribute to hypoxia in the Gulf of Mexico. Given the amount of attention Gulf hypoxia has received in recent years, and the role that the Hypoxia Task Force played in encouraging Iowa to develop the NRS, this result was

unexpected. It suggests that respondents were more aware and concerned about local water quality impacts than more distant ones.

Farmers are willing to act

Results showed that Iowa farmers were generally supportive of the Iowa Nutrient Reduction Strategy and its goals, and are willing to take action. Nearly all respondents believed that farmers should do more to reduce agriculture's water quality impacts, and about three-quarters were interested in taking steps to improve conservation practices on the land they farm to help meet NRS goals. Importantly, respondents indicated openness to receiving help from advisers: about 60 percent agreed that fertilizer dealers—the group that most farmers look to for nutrient management advice—should do more to help their clients address nutrient loss. Further, nearly half expressed willingness to have someone help evaluate the effectiveness of their nutrient management practices.

Viewed as a whole, the results of the 2014 Farm Poll indicate that substantial progress has been made in raising farmers' awareness of the Nutrient Reduction Strategy. This is a critical step. However, the challenge going forward will be to translate awareness and positive attitudes into much more widespread use of conservation practices and farming systems that lead to sustained progress toward nutrient loss reduction goals.

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