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VOLUNTARY COMPLIANCE: ENCOURAGING BEST MANAGEMENT PRACTICES TO REDUCE NUTRIENT LOSS

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ILLINOIS CORN FARMERS' CONCERNS ABOUT NUTRIENT LOSS AND THE ADOPTION OF BEST MANAGEMENT PRACTICES

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Abstract

Nitrogen fertilizer runoff in the Mississippi River Valley has caused a hypoxic zone in the Gulf of Mexico. Through efforts such as the Illinois Nutrient Loss Reduction Strategy (Illinois NLRS) (Illinois EPA, 2015), farmers are being challenged to voluntarily make production changes to limit the amount of nitrogen they lose from their fields through runoff. If these issues are not resolved through voluntary compliance, there is a possibility that policy actions may be taken that will require farmers to change their production practices. Best Management Practices (BMPs) currently recommended to reduce nutrient loss include cover crops, different application timing, bioreactors, wetlands, and buffers. However, the adoption of new or unfamiliar farming practices such as these BMPs is inherently risky for farmers. We have conducted a thorough review of the available literature on Best Management Practices, farmers' risk perception, and risk tolerance as we study ways to encourage on-farm decision making that will voluntarily reduce nutrient loss.

With the help of nutrient loss experts at the Illinois Corn Growers Association (ICGA), we surveyed the membership of the ICGA. This survey helps us gain a more detailed understanding of how farmers view and are responding to concerns about nutrient loss, and their willingness to voluntarily comply with nutrient loss reduction goals. This group of individuals was chosen because they would be most affected by regulation limiting nitrogen timing or application. The survey was designed using the *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method* handbook (Dillman, Smyth, and Christian, 2014).

Questions addressed farmers' awareness of and concern for nutrient loss issues, implementation of BMPs, and demographic characteristics. We received 762 completed surveys for a 19.9% response rate. The majority of respondents (90.9%) believe that nutrient loss negatively impacts the environment, and 88.1% are very or somewhat concerned about the implementation of regulation because of nutrient loss. This study will help us understand the steps farmers are already taking to voluntarily address nutrient runoff and will contribute to encouraging more widespread adoption of Best Management Practices.

Objectives

- Assess farmers' awareness and opinions of Illinois Nutrient Loss Reduction Strategy.
- Measure farmers' implementation of BMPs.
- Determine characteristics of farmers willing to implement BMPs.
- Evaluate geographic differences.

Methodology

- A twenty-four (24) question survey was developed to determine whether Illinois corn farmers believe that nutrient loss is a problem and if they are making changes in their practices in response to it.
- Questions pertained to farmers' demographics, nutrient loss concerns, and production practices such as nitrogen timing.
- Six questions addressed farmers' demographics, five questions pertained to nutrient loss, five questions asked farmers about conservation practices, eight questions pertained to nitrogen timing/application and where these farmers obtain their information about fertilizer input use.

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Results

Land tenure and the use of BMPs.

Land Tenure	Cover Crops (n=718)		Use of edge-of-field practices (n=716)	
	Yes	No	Yes	No
Tenant Operated	36.5%	63.5%	51.7%	48.3%
Owner Operated	36.1%	63.9%	47.6%	52.4%

Regional differences in adoption of new practices.

Region	Operational Changes (n=735)		Cover Crops (n=734) †		Edge of Field Practices (n=733)	
	Yes	No	Yes	No	Yes	No
North	81.3%	18.7%	33.6%	66.4%	46.2%	53.8%
Central	79.7%	20.3%	35.7%	64.3%	53.3%	46.7%
South	72.1%	27.9%	50.8%	49.2%	46.7%	53.3%

† $\chi^2\ (2) = 6.240^*$ ($p < 0.05$).

Respondents' perspectives on nutrient loss.

Respondents' familiarity with the Illinois Nutrient Loss Reduction Strategy (n=753)	Number	%
Very familiar	128	17.0
Somewhat familiar	370	49.1
Slightly familiar	151	20.1
Not at all familiar	104	13.8
Respondents' level of Concern with nutrient loss (n=754)		
Very concerned	310	41.1
Somewhat concerned	288	38.2
Slightly concerned	134	17.8
Not at all concerned	22	2.9
Respondents' perception of negative environmental impact from nutrient loss (n=734)		
Yes	667	90.9
No	67	9.1
Respondents' regulation concerns due to nutrient loss (n=752)		
Very concerned	407	54.1
Somewhat concerned	256	34.0
Slightly concerned	79	10.5
Not at all concerned	10	1.3

Demographic influence on adoption of BMPs.

	Operational Changes (n=747)		Cover Crops (n=746)		Edge of Field Practices (n=745)	
	Yes	No	Yes	No	Yes	No
Age						
25 and under	66.7%	33.3%	33.3%	66.7%	66.7%	33.3%
26-35	92.0%	8.0%	48.0%	52.0%	62.5%	37.5%
36-45	86.4%	13.6%	38.6%	61.4%	55.8%	44.2%
46-55	84.7%	15.3%	41.4%	58.6%	52.5%	47.5%
56-65	78.4%	21.6%	35.6%	64.4%	54.3%	45.7%
66+	76.6%	23.4%	33.8%	66.2%	44.7%	55.3%
Education						
Less than high school	80.0%	20.0%	40.0%	60.0%	40.0%	60.0%
High School/GED	74.6%	25.4%	31.3%	68.7%	48.1%	51.9%
Associate's degree/some college	76.6%	23.4%	37.0%	63.0%	50.7%	49.3%
Bachelor's degree	84.7%	15.3%	39.0%	61.0%	51.3%	48.7%
Master's degree or higher	80.8%	19.2%	38.5%	61.5%	53.8%	46.2%

Implications

In the present, the hypoxic zone in the Gulf of Mexico continues to grow each year from nutrient runoff in the Mississippi, and the Illinois corn farmers appear to be well informed of, and responsive to, this issue. The Illinois NLRS outlines ambitious nutrient loss reduction goals for 2025, which gives approximately a decade for achievement from the time the Illinois NLRS was released. If these goals are not met, there is a high level of concern about regulation being implemented on fertilizer application. Voluntary nutrient loss reduction is vital if farmers wish to avoid fertilizer regulation being implemented. Overall, this study found that operators whether tenant or owner, regardless of age, education level, or region are making changes to their operations as whole, whether it be in the nitrogen timing or the use of a BMP. Further investigation of other practices and methods operators are doing to reduce the amount of nutrient runoff from their agricultural field may be examined in future studies.

Drainage Water Management at ISU

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