Biases in Nutrient Management Planning

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Nutrient Management Planning

- Consider Nutrient Value of All Sources
- Consider Existing Nutrients in Soils
- Consider Nutrient Needs of Crop

Nutrient Management Planning

- 27 States Require Livestock Producers to have NMP (2002)
- All CAFOs Required to have NMP
- Of 24 states surveyed in 2005, 11 have programs to certify private sector preparers

Impacts of Nutrient Management Planning

- Maryland Department of Agriculture Estimated Average Nutrient Reductions from Nutrient Management Planning (1990):
  - 34 Pounds Nitrogen per Acre
  - 41 Pounds Phosphorus per Acre
    - Sample Biased Towards Animal Operations

Nutrient Management Planning in Maryland

- 1989 MD Cooperative Extension/MDA begins Voluntary Program

- 1993 MD Creates Certification Program for NM Plan Consultants
  - Fertilizer Dealers
  - Independent Crop Consultants
  - Farmers
  - Others

- 1998 Mandatory Nutrient Management Planning Law Passed
  - Phases-in Requirement

- 2005 Phase-in Complete

Nutrient Management Planning in Maryland

- Restrict Study to Period Where NMP Voluntary (487 Surveys: Data Collected in 1998)

- Examine:
  - Characteristics of farmers voluntarily adopting NMPs

  - Look for systematic differences in fertilizer application rate recommendations made by different plan preparers

Survey Summary

Question	Response	Weighted Population Percentage
Do you have a nutrient management plan? (N = 399)	No	62.26
	Yes	37.74
Who prepared your nutrient management plan? (N = 221)	CES	52.46
	Fertilizer dealer	13.93
	Crop consultant	6.47
	Self	11.13
	Other	16.02
Does the plan recommend that you decrease/use the same/increase fertilizer application rate on corn? (N = 165)	Decrease	27.28
	Stay the same	63.28
	Increase	9.44

Determinants of NMP Adoption in Maryland

Variable	Coefficient
Farm management experience (years)	-
Education (greater than high school = 1)	+
Total land operated (acres)	**+****
Percent of acreage rented	-
Crop Herfindahl index	-
Percent of corn, soybean, & small grains in acreage	**+****
Number of cattle	**+*****
Intensive poultry operation (Yes = 1)	+
Percent of income earned on-farm	-
Percentage of moderately sloped land in operation	+
Percentage of highly sloped land in operation	-
Distance to nearest surface water body (miles)	**-***

*** denotes significance at 1% level, ** significance at 5% level,
* significance at 10% level.

Choice of NMP Preparer in Maryland

Do Farmers Chose NMP Preparer to Maximize Possibility of Desired Recommendation?

- Preparer Model Run to Test for Simultaneity Bias in Rate Recommendation Model
- Found No Systematic Correlation Between Preparer Choice and Rate Recommendation

- Did Find Trend Over Time of Fewer Farmers Preparing Own Plan

Recommendation of NMP Preparer in Maryland Fertilizer Dealers

Farms with Commercial Poultry Operations

Recommendation	Frequency	
	Fertilizer Dealers	Extension
Increase Application Rate	1 in 11	1 in 27
Decrease Application Rate	1 in 16	1 in 6.4

Farms without Commercial Poultry Operations

Recommendation	Frequency	
	Fertilizer Dealers	Extension
Increase Application Rate	1 in 24	1 in 64
Decrease Application Rate	1 in 7	1 in 3.3

Recommendation of NMP Preparer in Maryland Independent Crop Consultants

Farms with Commercial Poultry Operations

Recommendation	Frequency	
	Consultants	Extension
Increase Application Rate	1 in 4	1 in 27
Decrease Application Rate	1 in 50	1 in 6.4

Farms without Commercial Poultry Operations

Recommendation	Frequency	
	Consultants	Extension
Increase Application Rate	1 in 8	1 in 64
Decrease Application Rate	1 in 24	1 in 3.3

Recommendation of NMP Preparer in Maryland Self Prepared by Farmer

Farms with Commercial Poultry Operations

Recommendation	Frequency	
	Farmer	Extension
Increase Application Rate	1 in 106	1 in 27
Decrease Application Rate	1 in 2.3	1 in 6.4

Farms without Commercial Poultry Operations

Recommendation	Frequency	
	Farmer	Extension
Increase Application Rate	1 in 256	1 in 64
Decrease Application Rate	1 in 1.6	1 in 3.3

Recommendation of NMP Preparer in Maryland Other Preparer

Farms with Commercial Poultry Operations

Recommendation	Frequency	
	Other	Extension
Increase Application Rate	1 in 14	1 in 27
Decrease Application Rate	1 in 12	1 in 6.4

Farms without Commercial Poultry Operations

Recommendation	Frequency	
	Other	Extension
Increase Application Rate	1 in 33	1 in 64
Decrease Application Rate	1 in 5.5	1 in 3.3

Lessons from Biases in NMP Recommendations

- Plans Prepared by Professional Consultants (and, to a Lesser Extent, Fertilizer Dealers) Unlikely to Improve Productive and Environmental Efficiency
  - Oversight of NMP Preparers Desirable

- Extension Could Be More Aggressive in Recommending Cuts in Fertilizer Application Rates

Questions?

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