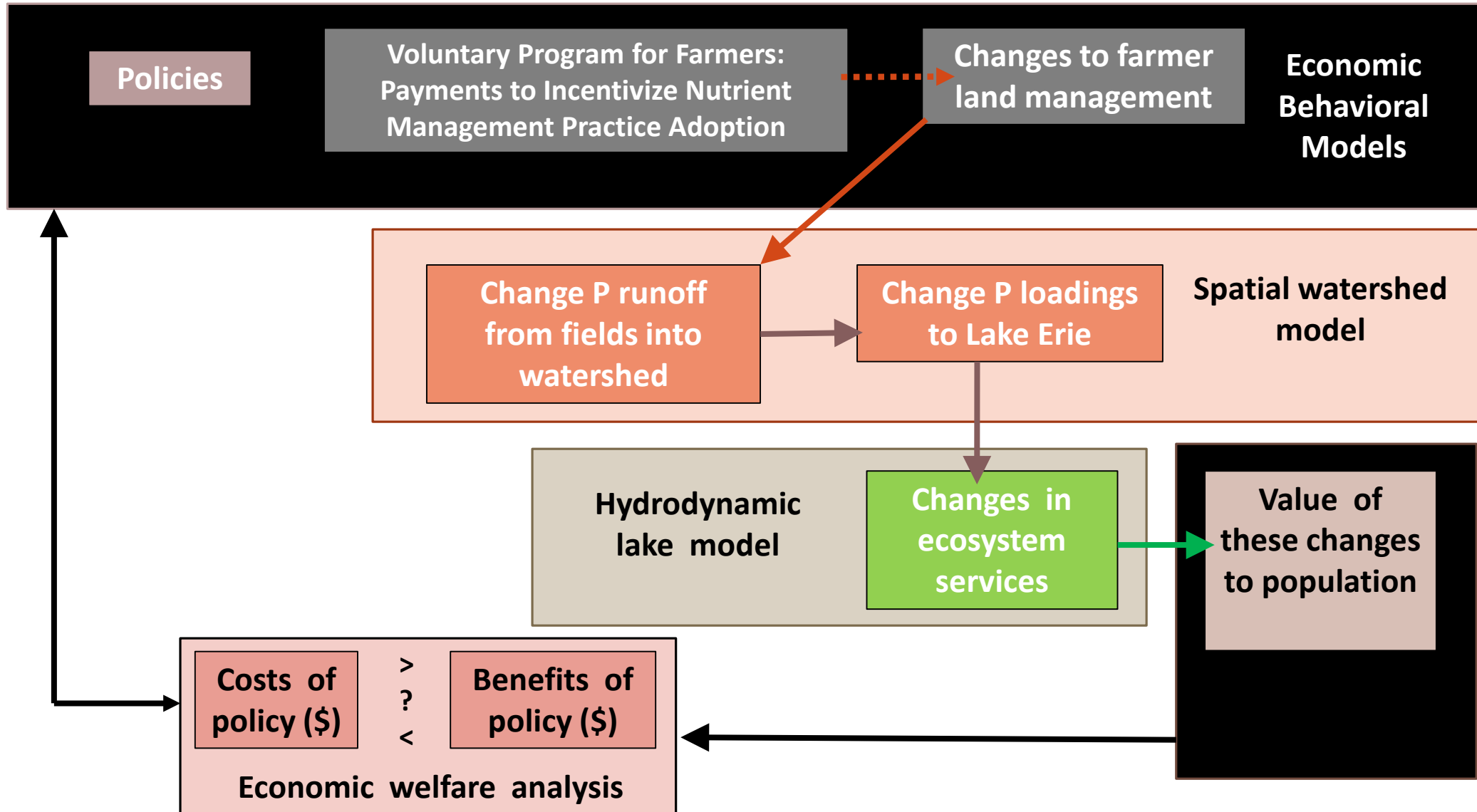


Farmer Willingness to Adopt Nutrient Management Practices

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Conceptual Framework



2012 Farmer Survey

- Sent by mail to 2,000 corn and soybean farmers in the Maumee watershed
 - 817 responses (40.85% response rate).
 - Of these, 596 indicated that they operated a farm in 2011.
 - Analysis limited to 387 farmers with no missing variables of interest.
 - Our sample is skewed toward large farms with high gross sales and farmers who additionally earn off-farm income.

Variable		Analysis Sample	Full Sample	Maumee
Planted Acres (% in each Category)	1-9	6.0 (319)	5.7 (456)	10
	10-49	16.6 (319)	17.3 (456)	28
	50-179	33.5 (319)	35.5 (456)	31
	180-499	25.7 (319)	24.1 (456)	18
	500 plus	18.2 (319)	17.3 (456)	8
% With Off-Farm Income		84.7 (386)	88.3 (806)	66
Farm Gross Sales (% in each Category)	< 50k	32.4 (367)	35.9 (532)	64
	50k-100k	15.5 (367)	17.7 (532)	10
	100k plus	52.1 (367)	46.4 (532)	26

Willingness to Participate Question

“Consider a situation where there is a voluntary program to establish *filter strips*. Sufficient state and federal funds are available to ensure that all applicants will be enrolled. Two options are available. Both options feature *100% reimbursement of the costs* for establishing the entire filter strip plus an annual rental payment detailed below.”

Please circle your preferred ranking for each program at the bottom of each column.

	Program A	Program B	Your Current Situation
Length of Program	10 years	10 years	--
Maintenance	Mowing allowed	Mowing allowed	--
Inspection frequency	Annual, announced	Annual, announced	--
Paperwork burden	~ 10 hours/year	~ 5 hours/year	--
Width of Filter Strip	25 feet	75 feet	--
Annual Rental Payment	\$200/acre	\$125/acre	--
Please rank each program.	Best	Best	Best
<i>Circle one 'Best', one 'Middle' and one 'Worst'</i>	Middle	Middle	Middle
	Worst	Worst	Worst

Which Features Were More Attractive?

- Higher Payments
- Narrower Filter Strips
- Less Paperwork
- For some responding farmers
 - Programs that were perceived to cause less runoff were much more attractive
 - → Wider filter strips generally seen as less likely to cause runoff
- Length of contract
 - Some liked longer contracts
 - As many liked shorter contracts

How costly to stimulate participation?

- If the program were:
 - 5 years
 - 25 foot filter strip
 - 10 hours of annual paperwork
 - Farmer perceives a normal level of effectiveness with respect to the filter strip stopping runoff.
- Group 1 (represents ~ 60% of our sample, but not necessarily 60% of all farmers)
 - Would adopt this program if costs of establishing the filter strip were reimbursed
 - **No Additional Rental Fee Required**
- Group 2 (represents ~ 40% of our sample, but not necessarily 40% of all farmers)
 - Would require annual rental payments of about \$380/acre for land dedicated to filter strip
 - **Plus cost reimbursement**

How costly to achieve particular targets?

- Example: Enrolling 33,000 acres of edge-of-field grass filter strips over 3 years
 - E.g., as if meeting part of the goals in the Western Lake Erie Basin (WLEB) Initiative
- Simulated program would cover
 - 3 years of rental payments
 - 100% cost share for establishing filter strips, valued at \$120.80 per acre (Ohio EQIP 2017)
 - 5 hours of paperwork annually for each farmer
 - Technical assistance costs are assumed to be 20% of total contract payments
- Estimated Cost
 - **\$21 - \$24 million**

Second Survey

- February 2014
 - Surveys were mailed out to a total of 7500 farmers.
 - A total of 3,937 surveys were initially returned.
 - Of these, 599 (15.0%) were refusals and 43 (0.01%) were undeliverable.
 - Additionally, 60 (0.02%) were farmers who didn't have operations in the Maumee watershed.
 - a total of 3,234 surveys were initially included for potential analysis, with an adjusted response rate of 43.12%.

	Census	Sample
Less than \$50,000	38.0%	16.7%
\$50,000-\$99,999	17.1%	20.5%
\$100,000-249,999	20.2%	27.8%
\$250,000-\$499,999	12.3%	15.9%
\$500,000 or greater	12.4%	19.2%

	Type of Tillage (n = 802)	
	Valid %	Frequency
Conventional	26.8	215
Conservation	37.8	303
No-Till	35.4	284

Consider a situation where there are voluntary programs compensating farmers for adopting *one or more agricultural best management practices*. Sufficient state and federal funds are available to ensure that all applicants will be enrolled. There are two available programs for the chosen low productivity field you considered in the previous sections. The programs vary in terms of management practices required and other aspects, all of which are outlined in the table below. Both programs feature occasional inspection to ensure compliance and an annual rental payment detailed below. Your options are Program A, Program B, or continuing with your current situation. *Please circle your preferred ranking for each option at the bottom of each column to the right of the arrow.*



	Program A	Program B	Your Current Situation
Length of Program	3 years	3 years	--
Plant winter cover crops	Yes	No	--
Inspection frequency	Annual, announced	Annual, announced	--
Paperwork burden	~ 10 hours/year	~ 2 hours/year	--
Nutrient application restrictions	Phosphorus not to exceed the agronomic soil range of 15-30 ppm	Phosphorus not to exceed the critical agronomic soil level of 15 ppm	--
Grid sampling and variable-rate nutrient application	Yes	No	--
Annual Rental Payment	\$200/acre	\$275/acre	--
Please rank each program.	1 Best	Best	Best
<i>Circle one 'Best,' one 'Middle,' and one 'Worst.'</i>	2 Middle	Middle	Middle
	3 Worst	Worst	Worst

Payment per Acre to Induce Adoption

<u>Program</u>	<u>Average Payment (\$/ac)</u>
<ul style="list-style-type: none">• Lasts three years• 10 hours of annual paperwork• Requires winter cover crops• Grid field sampling• Variable rate nutrient application• Limits Phosphorus to < 30 ppm	

Payment per Acre to Induce Adoption

<u>Program</u>	<u>Average Payment (\$/ac)</u>
<ul style="list-style-type: none">• Lasts three years• 10 hours of annual paperwork• Requires winter cover crops• Grid field sampling• Variable rate nutrient application• Limits Phosphorus to < 30 ppm	\$260 – 360

Payment per Acre to Induce Adoption

<u>Program</u>	<u>Average Payment (\$/ac)</u>
<ul style="list-style-type: none">• Lasts three years• 10 hours of annual paperwork• Requires winter cover crops• Grid field sampling• Variable rate nutrient application• Limits Phosphorus to < 30 ppm	\$260 – 360
<ul style="list-style-type: none">• Same as above but lowers limit to <15 ppm	

Payment per Acre to Induce Adoption

<u>Program</u>	<u>Average Payment (\$/ac)</u>
<ul style="list-style-type: none">• Lasts three years• 10 hours of annual paperwork• Requires winter cover crops• Grid field sampling• Variable rate nutrient application• Limits Phosphorus to < 30 ppm	\$260 – 360
<ul style="list-style-type: none">• Same as above but lowers limit to <15 ppm	\$340 – 415

Payment per Acre to Induce Adoption

<u>Program</u>	<u>Average Payment (\$/ac)</u>
<ul style="list-style-type: none">• Lasts three years• 10 hours of annual paperwork• Requires winter cover crops• Grid field sampling• Variable rate nutrient application• Limits Phosphorus to < 30 ppm	\$260 – 360
<ul style="list-style-type: none">• Same as above but lowers limit to <15 ppm	\$340 – 415
<ul style="list-style-type: none">• Same as 1st only no limit on P ppm	

Payment per Acre to Induce Adoption

<u>Program</u>	<u>Average Payment (\$/ac)</u>
<ul style="list-style-type: none">• Lasts three years• 10 hours of annual paperwork• Requires winter cover crops• Grid field sampling• Variable rate nutrient application• Limits Phosphorus to < 30 ppm	\$260 – 360
<ul style="list-style-type: none">• Same as above but lowers limit to <15 ppm	\$340 – 415
<ul style="list-style-type: none">• Same as 1st only no limit on P ppm	\$200 – 330

Payment per Acre to Induce Adoption

<u>Program</u>	<u>Average Payment (\$/ac)</u>
<ul style="list-style-type: none">• Lasts three years• 10 hours of annual paperwork• Requires winter cover crops• Grid field sampling• Variable rate nutrient application• Limits Phosphorus to < 30 ppm	\$260 – 360
<ul style="list-style-type: none">• Same as above but lowers limit to <15 ppm	\$340 – 415
<ul style="list-style-type: none">• Same as 1st only no limit on P ppm	\$200 – 330
<ul style="list-style-type: none">• Same as 1st only 2 hours of paperwork/yr	

Payment per Acre to Induce Adoption

<u>Program</u>	<u>Average Payment (\$/ac)</u>
<ul style="list-style-type: none">• Lasts three years• 10 hours of annual paperwork• Requires winter cover crops• Grid field sampling• Variable rate nutrient application• Limits Phosphorus to < 30 ppm	\$260 – 360
<ul style="list-style-type: none">• Same as above but lowers limit to <15 ppm	\$340 – 415
<ul style="list-style-type: none">• Same as 1st only no limit on P ppm	\$200 – 330
<ul style="list-style-type: none">• Same as 1st only 2 hours of paperwork/yr	\$150 – 250