

*Land Economics* 94:1, February 2018

“Additionality in U.S. Agricultural Conservation Programs,” by Roger Claassen, Eric N. Duquette, and David J. Smith

**APPENDIX**

**Tables A1 through A7**

**Table A1. Summary of Data Exclusions by Crop and Practice Type**

	Observations per Crop				Total
	Wheat (2009)	Corn (2010)	Barley & Sorghum (2011)	Soybeans (2012)	
Initial count of observations <sup>a</sup>	1,277	1,381	847	758	4,263
Exclusions (by practice type)					
Structural and buffer practices <sup>b,c</sup>	124	153	all	127	
Conservation tillage <sup>b,d</sup>	all	153	227	116	
Nutrient mgmt. (adoption, rate, testing) <sup>b,e</sup>	152	211	274	123	
Nutrient mgmt. (timing, method) <sup>f</sup>	all	211	all	all	
Count after exclusions					
Structural and buffer practices	1,153	1,228	-	631	3,012
Conservation tillage	—	1,228	620	642	2,490
Nutrient mgmt. (adoption, rate, testing)	1,125	1,170	573	635	3,503
Nutrient mgmt. (timing, method)	—	1,170	—	—	1,170

<sup>a</sup> We define initial observations as the set of original field-level observations less those that have missing information on year of adoption, fertilizer use, or field acreage and matching surveys, and geo-coordinates.

<sup>b</sup> Observations are excluded when the field is irrigated or has a reported mean normalized N application rates by crop over the 99th percentile.

<sup>c</sup> The 2011 field-survey did not contain questions on initial year of tenure on field, which is crucial to determining whether survey respondent was involved in soil conservation/buffer practice adoption decision.

<sup>d</sup> The 2009 survey did not have questions about payments for conservation tillage.

<sup>e</sup> Fields are excluded if the farm has confined animal feeding operations (CAFOs) subject to regulation.

<sup>f</sup> Rate and timing analysis done only for corn.

Source: Agricultural Resources Management Survey, 2009–2012

**Table A2. Summary of Treatment Model Variables by Treatment Status and Practice Type**

Variable	Filter Strips		Riparian Buffers		Field Borders		Grassed Waterways		Terraces		Conservation Tillage	
	Unmatch		Unmatch		Unmatch		Unmatch		Unmatch		Unmatch	
	Treat	Control	Treat	Control	Treat	Control	Treat	Control	Treat	Control	Treat	Control
<b>Field</b>												
<i>Productivity (NCCPI,0-1)</i>	0.568 (0.18)	0.467 (0.22) ***	0.493 (0.26)	0.468 (0.22)	0.598 (0.16)	0.467 (0.22) ***	0.556 (0.18)	0.461 (0.22) ***	0.510 (0.20)	0.463 (0.22)	0.462 (0.20)	0.496 (0.21)
<i>Highly erodible (=1)</i>	0.194 (0.40)	0.149 (0.36)	0.333 (0.49)	0.149 (0.36) **	0.200 (0.41)	0.147 (0.36)	0.317 (0.47)	0.137 (0.35) ***	0.362 (0.48)	0.136 (0.34) ***	0.235 (0.43)	0.149 (0.36) **
<i>Wetland (=1)</i>	0.000 (0.00)	0.047 (0.21)	0.000 (0.00)	0.046 (0.21)	0.040 (0.20)	0.046 (0.21)	0.024 (0.16)	0.047 (0.21)	0.000 (0.00)	0.049 (0.21) *	0.061 (0.24)	0.037 (0.19)
<b>Farm</b>												
<i>Log operation size (1,000 ac.)</i>	6.825 (1.19)	6.953 (1.27)	6.647 (1.64)	6.949 (1.27)	6.814 (1.23)	6.948 (1.27)	6.894 (1.10)	6.951 (1.29)	7.400 (1.13)	6.932 (1.28) ***	7.286 (1.03)	6.720 (1.25) ***
<i>Manure (=1)</i>	0.028 (0.17)	0.131 (0.34) *	0.000 (0.00)	0.130 (0.34)	0.080 (0.28)	0.130 (0.34)	0.085 (0.28)	0.133 (0.34)	0.052 (0.22)	0.133 (0.34) *	0.071 (0.26)	0.165 (0.37) **
<b>Farmer</b>												
<i>Primarily a farmer (=1)</i>	0.917 (0.28)	0.887 (0.32)	0.733 (0.46)	0.888 (0.32) *	0.880 (0.33)	0.887 (0.32)	0.841 (0.37)	0.887 (0.32)	0.879 (0.33)	0.886 (0.32)	0.908 (0.29)	0.874 (0.33)
<i>Age of operator</i>	59.472 (10.60)	55.549 (11.88)	54.200 (14.46)	55.579 (11.88)	58.080 (11.11)	55.574 (11.87)	60.256 (10.53)	55.576 (11.90)	62.069 (13.16)	55.541 (11.83)	55.367 (11.89)	55.800 (11.90)
<i>College degree (=1)</i>	0.111 (0.32)	0.240 (0.43) *	0.400 (0.51)	0.237 (0.43)	0.240 (0.44)	0.239 (0.43)	0.354 (0.48)	0.232 (0.42) **	0.293 (0.46)	0.234 (0.42)	0.388 (0.49)	0.234 (0.42) ***
<i>Owns field (=1)</i>	0.639 (0.49)	0.493 (0.50) *	0.533 (0.52)	0.494 (0.50)	0.680 (0.48)	0.493 (0.50) *	0.585 (0.50)	0.495 (0.50)	0.603 (0.49)	0.495 (0.50)	0.490 (0.50)	0.507 (0.50)
<b>Other</b>												
<i>EQIP payments in cnty (\$/acre)</i>	0.016 (0.02)	0.017 (0.04)	0.010 (0.01)	0.017 (0.04)	0.008 (0.01)	0.017 (0.04)	0.023 (0.02)	0.016 (0.04)	0.149 (0.20)	0.052 (0.15) ***	0.078 (0.13)	0.053 (0.09) ***
“ <i>in adjacent cntys</i>	0.005 (0.01)	0.006 (0.01)	0.006 (0.00)	0.006 (0.01)	0.005 (0.01)	0.006 (0.01)	0.009 (0.01)	0.006 (0.01) ***	0.062 (0.06)	0.020 (0.04) ***	0.030 (0.04)	0.022 (0.03) **
<i>CRP payments in cnty (\$/acre)</i>	0.390 (0.52)	0.208 (0.40)	0.184 (0.13)	0.210 (0.40)	0.204 (0.17)	0.209 (0.40)	0.332 (0.46)	0.206 (0.40) ***				
“ <i>in adjacent cntys</i>	0.181 (0.15)	0.101 (0.14) ***	0.198 (0.19)	0.101 (0.14) ***	0.141 (0.13)	0.101 (0.14)	0.138 (0.17)	0.100 (0.14) **				
<i>Population density (1,000/acre)</i>	0.083 (0.12)	0.076 (0.14)	0.045 (0.07)	0.076 (0.14)	0.064 (0.05)	0.076 (0.14)	0.074 (0.09)	0.077 (0.15)	0.031 (0.05)	0.078 (0.15) **	0.061 (0.09)	0.087 (0.15) *
<i>MLRA adoption rate (0-1)</i>	0.067 (0.04)	0.035 (0.03) ***	0.037 (0.02)	0.017 (0.03) **	0.064 (0.04)	0.040 (0.04) ***	0.234 (0.13)	0.141 (0.12) ***	0.239 (0.16)	0.061 (0.11) ***	0.433 (0.15)	0.397 (0.18) **
Number of observations	36	2,988	14	2,990	25	2,983	82	2,865	59	2,881	98	2,478

Note: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01; Standard deviations are in parentheses.

**Table A3. Summary of Treatment Model Variables by Treatment Status and Crop for Nutrient Management Plans**

Variable	Full Sample		Corn		Soybean		Wheat		Barley	
	Unmatch		Unmatch		Unmatch		Unmatch		Unmatch	
	Treat	Control	Treat	Control	Treat	Control	Treat	Control	Treated	Control
<b>Field</b>										
<i>Productivity (NCCPI,0-1)</i>	0.406 (0.21)	0.448 ** (0.22)	0.514 (0.22)	0.545 (0.20)	0.573 (0.18)	0.552 (0.20)	0.321 (0.17)	0.343 (0.19)	0.356 (0.16)	0.295 ** (0.15)
<i>Highly erodible (=1)</i>	0.359 (0.48)	0.157 *** (0.37)	0.188 (0.40)	0.110 (0.31)	0.227 (0.43)	0.124 (0.34)	0.508 (0.50)	0.184 *** (0.39)	0.394 (0.50)	0.268 (0.44)
<i>Wetland (=1)</i>	0.064 (0.25)	0.047 (0.21)	0.031 (0.18)	0.032 (0.18)	0.045 (0.21)	0.039 (0.19)	0.017 (0.13)	0.068 (0.25)	0.182 (0.39)	0.069 ** (0.25)
<b>Farm</b>										
<i>Log operation size (1,000 ac.)</i>	7.420 (1.12)	7.044 *** (1.26)	6.461 (0.88)	6.297 (1.19)	6.657 (1.08)	6.849 (1.06)	8.203 (0.74)	7.675 *** (1.04)	7.309 (0.96)	7.613 (1.20)
<i>Manure (=1)</i>	0.186 (0.39)	0.106 *** (0.31)	0.500 (0.51)	0.251 *** (0.43)	0.091 (0.29)	0.042 (0.20)	0.034 (0.18)	0.022 (0.15)	0.182 (0.39)	0.059 *** (0.24)
<b>Farmer</b>										
<i>Primarily a farmer (=1)</i>	0.923 (0.27)	0.893 (0.31)	0.906 (0.30)	0.866 (0.34)	0.864 (0.35)	0.837 (0.37)	0.983 (0.13)	0.931 (0.25)	0.848 (0.36)	0.958 *** (0.20)
<i>Age of operator</i>	52.859 (10.56)	55.833 *** (11.88)	52.031 (9.57)	55.345 (12.43)	58.955 (10.78)	55.995 (11.12)	51.678 (9.83)	55.825 *** (11.81)	51.061 (11.01)	56.033 ** (11.16)
<i>College degree (=1)</i>	0.359 (0.48)	0.256 *** (0.44)	0.281 (0.46)	0.192 (0.39)	0.227 (0.43)	0.217 (0.41)	0.339 (0.48)	0.299 (0.46)	0.485 (0.51)	0.330 * (0.47)
<i>Owns field (=1)</i>	0.481 (0.50)	0.483 (0.50)	0.781 (0.42)	0.556 ** (0.50)	0.500 (0.51)	0.440 (0.50)	0.339 (0.48)	0.448 (0.50)	0.424 (0.50)	0.487 (0.50)
<b>Other</b>										
<i>EQIP payments in cnty (\$/acre)</i>	0.085 (0.14)	0.056 *** (0.07)	0.094 (0.09)	0.067 * (0.08)	0.103 (0.16)	0.066 * (0.09)	0.044 (0.05)	0.042 (0.05)	0.152 (0.25)	0.058 *** (0.08)
“ <i>in adjacent cntys</i>	0.025 (0.02)	0.023 * (0.02)	0.037 (0.03)	0.026 *** (0.02)	0.030 (0.03)	0.027 (0.03)	0.016 (0.01)	0.017 (0.02)	0.033 (0.03)	0.021 *** (0.02)
<i>Population density (1,000/acre)</i>	0.050 (0.08)	0.070 * (0.14)	0.071 (0.07)	0.096 (0.16)	0.137 (0.15)	0.101 (0.16)	0.023 (0.05)	0.038 (0.10)	0.029 (0.03)	0.035 (0.09)
<i>MLRA adoption rate (0-1)</i>	0.131 (0.09)	0.084 *** (0.06)	0.137 (0.10)	0.079 *** (0.07)	0.156 (0.07)	0.089 *** (0.09)	0.121 (0.06)	0.069 *** (0.06)	0.336 (0.26)	0.144 *** (0.15)
Number of observations	156	3,501	32	1,170	22	635	59	1,125	33	339

Note: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01; Standard deviations are in parentheses.

**Table A4. Estimated Coefficients of Treatment Models**

	(1)	(2)	(3)	(4)	(5)	(6)
	Filter Strips	Riparian Buffers	Field Borders	Grassed Waterways	Terraces	Cons. Tillage
<i>NCCPI (0-1)</i>	3.59*	-3.51*	1.28	2.00	0.14	-1.83
	(1.70)	(-1.78)	(0.62)	(1.42)	(0.09)	(-1.12)
<i>Highly erodible (=1)</i>	3.01***	1.57	0.80	1.04**	1.44***	0.52
	(2.82)	(1.48)	(1.00)	(2.05)	(3.06)	(0.66)
<i>Wetland (=1)</i>	-0.036	0.87	0.40	0.80	-1.08	-0.65
	(-0.02)	(0.42)	(0.33)	(0.70)	(-0.41)	(-0.44)
<i>Log operation size (1k ac.)</i>	0.25	-0.082	0.21	0.16	0.44***	0.37***
	(1.34)	(-0.33)	(1.03)	(1.21)	(2.64)	(3.07)
<i>Manure (=1)</i>	-1.66	-1.54	-0.31	-0.66	-0.50	-0.51
	(-0.92)	(-0.91)	(-0.26)	(-0.77)	(-0.43)	(-0.46)
<i>Primarily a farmer (=1)</i>	0.077	-1.01	-0.26	-0.20	-0.52	-0.018
	(0.13)	(-1.53)	(-0.42)	(-0.57)	(-1.19)	(-0.05)
<i>Age of operator</i>	0.026	-0.012	0.0098	0.029***	0.037***	-0.0054
	(1.60)	(-0.54)	(0.53)	(2.77)	(2.92)	(-0.57)
<i>College degree (=1)</i>	-0.80	0.72	0.18	0.58**	-0.014	0.60***
	(-1.56)	(1.49)	(0.39)	(2.36)	(-0.04)	(2.62)
<i>Owns field (=1)</i>	0.67*	0.20	0.92**	0.23	0.70**	0.32
	(1.82)	(0.41)	(2.10)	(0.95)	(2.31)	(1.39)
<i>EQIP \$/acre</i>	11.9	16.3*	17.4*	-1.76	2.12	3.40
	(1.41)	(1.80)	(1.91)	(-0.23)	(1.27)	(1.12)
“ in adjacent counties	42.2	47.6	-15.1	17.1	15.4**	31.1***
	(0.78)	(1.25)	(.)	(0.50)	(2.08)	(2.66)
<i>CRP \$/acre</i>	0.83*	-0.15	0.027	0.79*		
	(1.94)	(-0.14)	(0.03)	(1.85)		
“ in adjacent counties	3.55	7.42**	6.45*	-1.13		
	(1.56)	(2.21)	(1.88)	(-0.47)		
<i>Pop. density (1,000/acre)</i>	-0.70	1.30	-1.54	-0.46	-0.40	-1.34
	(-0.44)	(1.07)	(-0.37)	(-0.44)	(-0.31)	(-1.06)
<i>MLRA adoption rate – “AR”</i>	32.8*	-14.2	12.7	9.31***	0.56	-1.83
	(1.91)	(-0.30)	(0.99)	(2.80)	(0.15)	(-0.84)
<i>Corn field (=1)</i>	0.61	1.60	1.76	0.088	0.80	
	(0.51)	(1.24)	(1.47)	(0.13)	(1.14)	

	(1)	(2)	(3)	(4)	(5)	(6)
	Filter Strips	Riparian Buffers	Field Borders	Grassed Waterways	Terraces	Cons. Tillage
<i>Sorghum or barley field (=1)</i>						0.52 (0.50)
<i>Soybean (=1)</i>	1.09 (0.82)	0.91 (0.57)	1.38 (1.08)	0.19 (0.23)	0.56 (0.67)	1.22*** (3.08)
<i>AR x NCCPI</i>	-31.1 (-1.09)	82.3 (1.58)	-0.28 (-0.01)	-4.94 (-1.02)	3.87 (0.72)	4.41 (1.25)
<i>AR x Highly erodible</i>	-51.6** (-1.99)	-26.4 (-0.90)	-4.89 (-0.53)	0.050 (0.03)	-2.28 (-1.34)	-0.36 (-0.24)
<i>AR x Wetland</i>	-2.75 (-0.10)	-32.2 (-0.50)	-0.46 (-0.06)	-1.65 (-0.32)	1.30 (0.12)	2.83 (1.07)
<i>AR x Log(acres)</i>	0.41 (0.13)	0.87 (0.16)	1.40 (0.57)	-0.14 (-0.29)	-0.32 (-0.56)	-0.22 (-0.67)
<i>AR x Corn field</i>	7.74 (0.68)	0.68 (0.01)	-10.2 (-0.91)	-2.99 (-1.03)	-2.61 (-0.91)	
<i>AR x S/B field</i>						0.55 (0.27)
<i>AR x Soybean field</i>	0.90 (0.07)	-13.9 (-0.27)	-5.16 (-0.45)	-5.13 (-1.59)	-0.53 (-0.18)	
<i>AR x Manure</i>	6.21 (0.26)	-3.89 (-0.20)	-0.59 (-0.04)	0.69 (0.28)	1.96 (0.50)	-0.33 (-0.14)
<i>EQIP x Corn field</i>	-6.94 (-0.79)	-11.4 (-1.19)	-15.7* (-1.69)	2.92 (0.35)	-1.02 (-0.50)	
<i>EQIP adj. x Corn field</i>	-76.4 (-1.14)	-52.9 (-1.30)	-16.1 (-0.35)	-11.4 (-0.30)	-5.11 (-0.61)	
<i>EQIP x S/B field</i>						-2.70 (-0.82)
<i>EQIP adj. x S/B field</i>						-33.6*** (-2.70)
<i>EQIP x Soybean field</i>	-6.14 (-0.67)	-11.7 (-1.24)	-16.7* (-1.74)	5.03 (0.62)	-1.90 (-1.06)	-5.19 (-0.96)
<i>EQIP adj. x Soybean field</i>	-257 (-1.48)	-34.7 (-0.75)	-46.9 (-0.66)	-16.3 (-0.39)	-14.1 (-1.47)	-44.7** (-2.48)
<i>CRP x Corn field</i>	-0.74 (-0.77)	-1.80 (-0.74)	-0.60 (-0.36)	-0.94 (-1.39)		
<i>CRP adj. x Corn field</i>	-2.99 (-0.96)	-4.22 (-0.94)	-6.47 (-1.35)	2.13 (0.79)		

	(1)	(2)	(3)	(4)	(5)	(6)
	Filter Strips	Riparian Buffers	Field Borders	Grassed Waterways	Terraces	Cons. Tillage
<i>CRP x Soybean field</i>	-1.50* (-1.91)	1.52 (1.14)	0.36 (0.32)	-0.91 (-1.46)		
<i>CRP adj. x Soybean field</i>	0.83 (0.25)	-10.6 (-1.51)	-6.91 (-1.45)	2.48 (0.85)		
<i>Constant</i>	-9.26*** (-3.04)	1.43 (0.45)	-7.32** (-2.50)	-6.99*** (-3.03)	-7.90*** (-3.00)	-6.57*** (-3.20)
State indicators	Yes	Yes	Yes	Yes	Yes	Yes
Crops included	Corn, Wheat, Soybeans	Corn, Wheat, Soybeans	Corn, Wheat, Soybeans	Corn, Wheat, Soybeans	Corn, Wheat, Soybeans	Corn, Sorghum, Barley, Soybeans
Payment programs	CRP, EQIP, Other	CRP, EQIP, Other	CRP, EQIP, Other	CRP, EQIP, Other	EQIP, Other	EQIP, CSP, Other
Adopt. before farmer tenure	Excl.	Excl.	Excl.	Excl.	Excl.	n/a
Observations	2,988	2,990	2,983	2,865	2,881	2,478
# of treated	36	14	25	82	58	98
Coefficient of Discrimination	0.07	0.13	0.04	0.06	0.17	0.06
Adjusted count pseudo R <sup>2</sup>	0.19	0.25	0.12	0.21	0.28	0.19

Note: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01; t-statistics in parentheses

**Table A5. Estimated Coefficients of Nutrient Management Treatment Models**

	(1)	(2)	(3)	(4)	(5)
	Full Sample	Corn	Soybean	Wheat	Barley
<i>NCCPI (0–1)</i>	1.65 (1.60)	3.57* (1.85)	–0.33 (–0.15)	0.96 (0.42)	5.19 (1.41)
<i>Highly erodible (=1)</i>	0.96** (2.02)	1.02 (1.24)	1.11 (1.27)	1.11 (1.54)	1.25* (1.68)
<i>Wetland (=1)</i>	–0.32 (–0.42)	0.41 (0.24)	–0.53 (–0.23)	–0.83 (–0.50)	0.47 (0.32)
<i>Log operation size (1k ac.)</i>	0.24** (2.29)	0.43** (2.01)	0.16 (0.65)	0.41** (2.06)	–0.20 (–0.67)
<i>Manure (=1)</i>	1.20*** (2.70)	1.77*** (2.61)	1.69 (0.94)	1.05 (0.84)	1.68 (1.22)
<i>Primarily a farmer (=1)</i>	–0.080 (–0.24)	–0.20 (–0.31)	0.097 (0.14)	0.16 (0.18)	–0.47 (–0.59)
<i>Age of operator</i>	–0.020** (–2.51)	–0.027 (–1.59)	0.021 (0.91)	–0.028** (–2.04)	–0.038** (–2.03)
<i>College degree (=1)</i>	0.31 (1.62)	0.70* (1.67)	0.20 (0.39)	–0.27 (–0.88)	0.61 (1.29)
<i>Owns field (=1)</i>	0.27 (1.48)	1.25*** (2.85)	–0.078 (–0.17)	–0.083 (–0.27)	–0.21 (–0.43)
<i>EQIP \$/acre</i>	4.37* (1.88)	1.98 (1.03)	3.48* (1.84)	5.72* (1.90)	1.05 (0.60)
“ in adjacent counties	–0.39 (–0.04)	5.25 (0.57)	1.01 (0.11)	–5.27 (–0.49)	31.5** (2.02)
<i>CRP \$/acre</i>					
“ in adjacent counties					
<i>Pop. density (1,000/acre)</i>	–0.99 (–0.91)	–2.39 (–1.03)	0.51 (0.51)	0.26 (0.13)	–1.21 (–0.55)
<i>MLRA adoption rate – “AR”</i>	12.8*** (3.35)	21.4*** (3.05)	3.59 (0.54)	5.74 (0.83)	8.74** (2.28)
<i>Corn field (=1)</i>	–0.27 (–0.42)				
<i>Sorg. or barley field (=1)</i>	0.78 (1.53)				



	(1)	(2)	(3)	(4)	(5)
	Full Sample	Corn	Soybean	Wheat	Barley
<i>Soybean (=1)</i>	0.86 (1.45)				
<i>AR x NCCPI</i>	-3.58 (-0.62)	-19.3* (-1.79)	5.36 (0.59)	10.3 (0.63)	-8.32 (-1.26)
<i>AR x Highly erodible</i>	0.30 (0.09)	-2.09 (-0.45)	-1.33 (-0.27)	3.13 (0.59)	-2.13 (-0.85)
<i>AR x Wetland</i>	8.57 (1.22)	9.84 (0.61)	15.1 (1.16)	-3.58 (-0.18)	6.23 (0.68)
<i>AR x Log(acres)</i>	-0.028 (-0.06)	-2.16 (-0.37)	-6.38 (-1.26)	-0.20 (-0.34)	2.41* (1.93)
<i>AR x Corn field</i>	-2.82 (-0.57)				
<i>AR x S/B field</i>	-7.57** (-2.29)				
<i>AR x Soybean field</i>	-8.25* (-1.85)				
<i>AR x Manure</i>	-0.87 (-0.31)	-6.45 (-1.56)	-3.39 (-0.32)	8.44 (0.68)	-2.46 (-0.94)
<i>EQIP x Corn field</i>	-1.82 (-0.63)				
<i>EQIP adj. x Corn field</i>	7.53 (0.61)				
<i>EQIP x S/B field</i>	-2.65 (-0.98)				
<i>EQIP adj. x S/B field</i>	16.3 (1.22)				
<i>EQIP x Soybean field</i>	0.34 (0.12)				
<i>EQIP adj. x Soybean field</i>	-1.02 (-0.08)				
<i>Constant</i>	-6.70*** (-3.67)	-9.52*** (-4.12)	-5.59* (-1.80)	-6.45*** (-2.90)	-1.22 (-0.44)

---

	(1)	(2)	(3)	(4)	(5)
	Full Sample	Corn	Soybean	Wheat	Barley
State indicators	Yes	Yes	Yes	Yes	Yes
Observations	3,501	1,170	635	1,125	339
# of treated	156	32	22	59	33
Coefficient of Discrimination	0.09	0.12	0.09	0.14	0.27
Adjusted count pseudo R <sup>2</sup>	0.27	0.32	0.22	0.34	0.44

---

Note: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01; t-statistics in parentheses

**Table A6. Covariate Balancing**

Variable	Filter Strips		Riparian Buffers		Field Borders		Grassed Waterways		Terraces		Conservation Tillage	
	Match		Match		Match		Match		Match		Match	
	Treat	Control	Treat	Control	Treat	Control	Treat	Control	Treat	Control	Treat	Control
<b>Field</b>												
<i>Productivity (NCCPI,0-1)</i>		**				**						
	0.568 (0.18)	0.497 (0.21)	0.502 (0.27)	0.464 (0.22)	0.598 (0.16)	0.485 (0.22)	0.556 (0.18)	0.558 (0.21)	0.510 (0.20)	0.506 (0.20)	0.462 (0.20)	0.465 (0.21)
<i>Highly erodible (=1)</i>	0.194 (0.40)	0.167 (0.37)	0.357 (0.50)	0.277 (0.45)	0.200 (0.41)	0.159 (0.37)	0.317 (0.47)	0.335 (0.47)	0.362 (0.48)	0.380 (0.49)	0.235 (0.43)	0.238 (0.43)
<i>Wetland (=1)</i>	0.000 (0.00)	0.038 (0.19)	0.000 (0.00)	0.034 (0.18)	0.040 (0.20)	0.046 (0.21)	0.024 (0.16)	0.031 (0.17)	0.000 (0.00)	0.015 (0.12)	0.061 (0.24)	0.064 (0.25)
<b>Farm</b>												
<i>Log operation size (1,000 ac.)</i>	6.825 (1.19)	6.929 (1.28)	6.602 (1.69)	6.878 (1.34)	6.814 (1.23)	6.925 (1.27)	6.894 (1.10)	6.861 (1.26)	7.400 (1.13)	7.430 (1.27)	7.286 (1.03)	7.280 (1.17)
<i>Manure (=1)</i>	0.028 (0.17)	0.099 (0.30)	0.000 (0.00)	0.091 (0.29)	0.080 (0.28)	0.125 (0.33)	0.085 (0.28)	0.100 (0.30)	0.052 (0.22)	0.070 (0.25)	0.071 (0.26)	0.077 (0.27)
<b>Farmer</b>												
<i>Primarily a farmer (=1)</i>	0.917 (0.28)	0.897 (0.30)	0.786 (0.43)	0.795 (0.40)	0.880 (0.33)	0.882 (0.32)	0.841 (0.37)	0.862 (0.35)	0.879 (0.33)	0.878 (0.33)	0.908 (0.29)	0.899 (0.30)
<i>Age of operator</i>	59.472 (10.60)	57.239 (11.88)	56.000 (13.14)	54.320 (10.90)	58.080 (11.11)	55.998 (11.81)	60.256 (10.53)	59.965 (11.77)	62.069 (13.16)	61.959 (12.33)	55.367 (11.89)	55.034 (11.91)
<i>College degree (=1)</i>	0.111 (0.32)	0.199 (0.40)	0.429 (0.51)	0.428 (0.49)	0.240 (0.44)	0.247 (0.43)	0.354 (0.48)	0.352 (0.48)	0.293 (0.46)	0.311 (0.46)	0.388 (0.49)	0.379 (0.49)
<i>Owns field (=1)</i>	0.639 (0.49)	0.547 (0.50)	0.500 (0.52)	0.545 (0.50)	0.680 (0.48)	0.523 (0.50)	0.585 (0.50)	0.574 (0.49)	0.603 (0.49)	0.626 (0.48)	0.490 (0.50)	0.487 (0.50)
<b>Other</b>												
<i>EQIP payments in cnty (\$/acre)</i>	0.016 (0.02)	0.023 (0.08)	0.010 (0.02)	0.035 (0.10)	0.008 (0.01)	0.019 (0.06)	0.023 (0.02)	0.032 (0.08)	0.149 (0.20)	0.174 (0.40)	0.078 (0.13)	0.080 (0.15)
“ <i>in adjacent cntys</i>	0.005	0.006	0.006	0.010	0.005	0.006	0.009	0.010	0.062	0.062	0.030	0.030

Variable	Filter Strips		Riparian Buffers		Field Borders		Grassed Waterways		Terraces		Conservation Tillage	
	Match		Match		Match		Match		Match		Match	
	Treat	Control	Treat	Control	Treat	Control	Treat	Control	Treat	Control	Treat	Control
	(0.01)	(0.01)	(0.00)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.06)	(0.08)	(0.04)	(0.03)
<i>CRP payments in cnty (\$/acre)</i>	0.390	0.288	0.185	0.258	0.204	0.221	0.332	0.327				
	(0.52)	(0.54)	(0.14)	(0.55)	(0.17)	(0.42)	(0.46)	(0.51)				
“ <i>in adjacent cntys</i>			**									
	0.181	0.128	0.179	0.193	0.141	0.109	0.138	0.139				
	(0.15)	(0.16)	(0.18)	(0.22)	(0.13)	(0.15)	(0.17)	(0.16)				
<i>Population density (1,000/acre)</i>	0.083	0.081	0.047	0.106	0.064	0.076	0.074	0.079	0.031	0.046	0.061	0.065
	(0.12)	(0.14)	(0.07)	(0.23)	(0.05)	(0.14)	(0.09)	(0.13)	(0.05)	(0.11)	(0.09)	(0.11)
<i>MLRA adoption rate (0-1)</i>			***			*						
	0.067	0.046	0.036	0.042	0.064	0.045	0.234	0.224	0.239	0.209	0.433	0.436
	(0.04)	(0.04)	(0.02)	(0.11)	(0.04)	(0.05)	(0.13)	(0.15)	(0.16)	(0.19)	(0.15)	(0.17)
Number of observations	36	2,988	14	2,990	25	2,983	82	2,865	59	2,881	98	2,478

Note: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01; Standard deviations are in parentheses.

**Table A7. Covariate Balancing for Nutrient Management Plans**

Variable	Full Sample		Corn		Soybean		Wheat		Barley	
	Match		Match		Match		Match		Match	
	Treat	Control	Treat	Control	Treat	Control	Treat	Control	Treated	Control
<b>Field</b>										
<i>Productivity (NCCPI,0–1)</i>	0.406 (0.21)	0.432 (0.21)	0.514 (0.22)	0.518 (0.22)	0.573 (0.18)	0.590 (0.16)	0.321 (0.17)	0.342 (0.18)	0.356 (0.16)	0.321 (0.17)
<i>Highly erodible (=1)</i>	0.359 (0.48)	0.291 * (0.45)	0.188 (0.40)	0.206 (0.40)	0.227 (0.43)	0.198 (0.40)	0.508 (0.50)	0.335 *** (0.47)	0.394 (0.50)	0.312 (0.46)
<i>Wetland (=1)</i>	0.064 (0.25)	0.057 (0.23)	0.031 (0.18)	0.075 (0.26)	0.045 (0.21)	0.031 (0.17)	0.017 (0.13)	0.049 (0.22)	0.182 (0.39)	0.116 (0.32)
<b>Farm</b>										
<i>Log operation size (1,000 ac.)</i>	7.420 (1.12)	7.252 (1.27)	6.461 (0.88)	6.545 (1.18)	6.657 (1.08)	6.831 (1.08)	8.203 (0.74)	7.888 ** (1.01)	7.309 (0.96)	7.471 (1.22)
<i>Manure (=1)</i>	0.186 (0.39)	0.151 (0.36)	0.500 (0.51)	0.394 (0.49)	0.091 (0.29)	0.092 (0.29)	0.034 (0.18)	0.036 (0.19)	0.182 (0.39)	0.095 (0.29)
<b>Farmer</b>										
<i>Primarily a farmer (=1)</i>	0.923 (0.27)	0.911 (0.28)	0.906 (0.30)	0.905 (0.29)	0.864 (0.35)	0.864 (0.34)	0.983 (0.13)	0.950 (0.22)	0.848 (0.36)	0.905 (0.29)
<i>Age of operator</i>	52.859 (10.56)	54.092 (11.45)	52.031 (9.57)	53.048 (11.26)	58.955 (10.78)	59.386 (10.39)	51.678 (9.83)	53.813 (11.48)	51.061 (11.01)	54.375 (12.40)
<i>College degree (=1)</i>	0.359 (0.48)	0.306 (0.46)	0.281 (0.46)	0.298 (0.46)	0.227 (0.43)	0.310 (0.46)	0.339 (0.48)	0.310 (0.46)	0.485 (0.51)	0.371 (0.48)
<i>Owns field (=1)</i>	0.481 (0.50)	0.487 (0.50)	0.781 (0.42)	0.728 (0.45)	0.500 (0.51)	0.443 (0.50)	0.339 (0.48)	0.404 (0.49)	0.424 (0.50)	0.451 (0.50)
<b>Other</b>										
<i>EQIP payments in cnty (\$/acre)</i>	0.085 (0.14)	0.079 (0.12)	0.094 (0.09)	0.087 (0.10)	0.103 (0.16)	0.106 (0.13)	0.044 (0.05)	0.046 (0.07)	0.152 (0.25)	0.086 ** (0.13)
“ <i>in adjacent cntys</i>	0.025 (0.02)	0.026 (0.03)	0.037 (0.03)	0.035 (0.03)	0.030 (0.03)	0.033 (0.03)	0.016 (0.01)	0.017 (0.02)	0.033 (0.03)	0.024 ** (0.02)
<i>Population density (1,000/acre)</i>	0.050 (0.08)	0.061 (0.12)	0.071 (0.07)	0.078 (0.12)	0.137 (0.15)	0.130 (0.18)	0.023 (0.05)	0.036 (0.10)	0.029 (0.03)	0.039 (0.09)
<i>MLRA adoption rate (0–1)</i>	0.131 (0.09)	0.116 ** (0.09)	0.094 (0.09)	0.087 (0.10)	0.156 (0.07)	0.180 (0.17)	0.121 (0.06)	0.09 *** (0.07)	0.336 (0.26)	0.198 *** (0.20)
Number of observations	156	3,501	32	1,170	22	635	59	1,125	33	339

Note: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01; Standard deviations are in parentheses.