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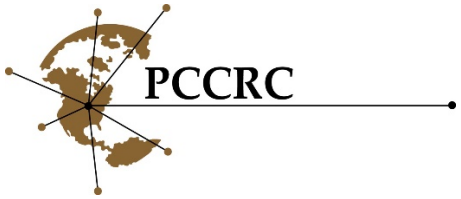
Why Do Farmers Adopt Offset-Eligible Practices: An investigation of framing effects

WORKSHOP: Agricultural Markets for Ecosystem Services
USDA-ERS, Washington, DC

PCCRC

Andrews, Clawson, Gramig and Raymond. "Why Do Farmers Adopt Conservation Tillage? An Experimental Investigation of Framing Effects." *Journal of Soil and Water Conservation*, Forthcoming.



- Emerging markets for emissions offsets
- Potential for conservation program support for climate regulating ecosystem services
- Additionality expected to require expanded/ new adoption of conservation tillage

➢ Framing offset supply opportunities could play an important role in recruiting new adopters

Motivation for research

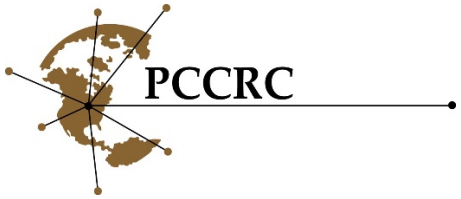
A *frame* is an argument about or conception of an issue

H1: Frames portraying conservation tillage as "profitable" will generate more interest …than a control frame presenting only basic information

H2: Frames discussing potential payments for "environmental benefits" will be better received than frames discussing payment for "storing carbon" to limit climate change

H3: Framing effects will vary based on subjects' prior beliefs and experiences

Hypotheses



Frames developed from interviews with farmers (18), CCAs (6) and conservation specialists (2)

	No mention of payments	**Carbon offset payment**	**Payment for environmental services (PES)**
Control frame (Basic Rationale)	Control frame only	Control + Carbon offset frames	Control + PES frames
Profit frame	Control + Profit frames	Control + Profit + Carbon offset frames	Control + Profit + PES frames

Treatment matrix

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From survey instrument

First, please read the information on conservation tillage in the box below.

Conservation tillage is a system of crop production with little, if any, tillage. It increases the residue cover from the crop that remains on the field after harvest through planting. This results in increased natural recycling of crop residues. By leaving crop residue undisturbed for as long as possible, microbial and other biological activity in the soil feeds on the stalks, leaves and other crop residues. This increases organic matter, improves soil tilth and, ultimately increases soil productivity. These soil conditions retain more moisture for dry periods, yet the improved structure speeds natural infiltration in wet spots. Conservation tillage can also reduce soil erosion by up to 90%, thereby maintaining topsoil and improving water quality.

Conservation tillage can save farmers money. Conservation tillage can reduce labor (fewer trips across the field), equipment costs, and fuel use. While some farmers experience a small drop in yield in the first years of adoption, over time many farmers find they are able to achieve similar yields with conservation tillage as with conventional till. Thus, by lowering costs while maintaining yields, conservation tillage can increase a farmer's profits.

Farmers adopting conservation tillage techniques store additional carbon in their soils. This helps to reduce the build-up of carbon dioxide in the atmosphere linked to the problem of climate change. In some cases, farmers are able to get paid for this stored carbon through market exchanges, as they are paid for providing any other commodity.

Example frame: Control+Profit+Offset

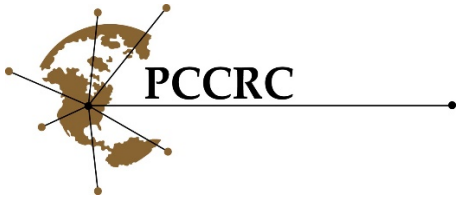
From survey instrument

Some farmers are quite interested in conservation tillage techniques, while others are not as interested in these methods. What about you?

1	2	3	4	5	6	7
Not Interested			Somewhat Interested			Very Interested

- Test for statistically significant difference between the responses to this question, *after* being exposed to different treatments (H1-H2) or given actual tillage adoption behavior (H3)

Measurement of a framing effect



- Population: Row crop (corn, soy, wheat) farmers with 250+ acres
- Sample:
  - 6000 randomly selected subscribers to Farm Journal magazine
  - Randomly assigned to each treatment
  - Larger than USDA-NASS census average farm size
  - Similar to USDA ARMS tillage adoption
- Response rate: 26%
- Acres farmed by respondents: 4,004,811

Population, sampling, etc.

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Directions: Please **write the number of acres in your farming operation that were in each tillage category by crop type and year** as defined below. This should include all land for which you actively made farm management decisions, including land you own and land you lease from others.

	2009			2010		
	Corn	Soybeans	Wheat	Corn	Soybeans	Wheat
No-till or Strip-till (Leaving the soil undisturbed from harvest to planting, or for strip-till disturbing less than 30% of the row width. Planting or drilling is in a narrow seedbed or slot created by disk openers.) 44%	35%	54%	43%			
Other Conservation Tillage (Leaving more than 30% residue on soil surface after planting using full-width tillage.) 29%						
Conventional Tillage (Leaving less than 30% residue on soil surface after planting. Includes moldboard plow, chisel plow, or rippers, followed by multiple secondary tillage trips.) 27%						

Survey Instrument: Tillage Grid

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Percentages do not sum to 100% due to rounding

Tillage System	Percentage of Farmers (n)	Cumulative Percentage of Farmers by Tillage Category (n)	Farm Size by Tillage Category		
			Mean Hectares (Acres)	Median Hectares (Acres)	Standard Deviation (Acres)
No-till only	23% (333)	Conservation Tillers: Only utilize conservation tillage and/or no-till, 55% (810)	534.2 (1320)	384.5 (950)	561.7 (1388)
No-till and conservation till	17% (254)				
Conservation till only	15% (223)				
No-till and conservation till and conventional till	13% (188)	Combination Tillers: Utilize a combination of tillage techniques that include no-till, 26% (380)	609.9 (1507)	418.0 (1033)	584.4 (1444)
No-till and conventional till	13% (192)				
Conservation till and conventional till	7% (96)	Conventional Tillers: Do not utilize no-till on any cropland, 20% (293)	497.8 (1230)	323.7 (800)	753.5 (1862)
Conventional till only	13% (197)				

Farmers' Use of Different Tillage Practices

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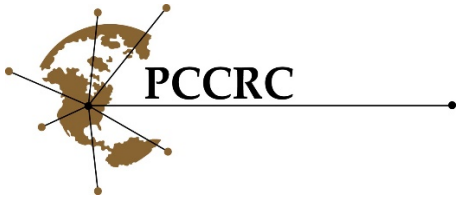
Percentages do not sum to 100% due to rounding

Tillage Categories	Corn Belt (n = 622)	Northern Plains (n = 302)	Lake States (n = 228)	Mountain/ Pacific (n = 111)	Appalachia/ Southeast/ Delta (n = 88)	Southern Plains (n = 75)	Northeast (n = 56)
Conservation Tillers	55%	66%	45%	58%	52%	36%	52%
Combination Tillers	32	20	22	14	31	23	27
Conventional Tillers	14	15	33	29	17	41	21

Farmers' Tillage Practices by Region



Not Important		Somewhat Important		Very Important
1	2	3	4	5

- "Very Important" considerations:
  soil erosion (62%), soil productivity (61%), lower labor/fuel costs (53%)
- Less than "Somewhat Important":
  Carbon storage to address climate change (47%), offset payments for conservation tillage (61%)

❑Non-adoption:
Yields (64%), compaction (47%)

Results: Adoption decision

ANOVA

H1: Impact of profit frame

	Basic Rationale [a]		Basic Rationale+Profit [a]	
	All Subjects	Conventional Tillers	All Subjects	Conventional Tillers
Mean Interest in Conservation Tillage [b,c]	5.58	***4.64***	5.57	***4.17***
Percent Requested Information [d,e]	61.5	57.6	60.7	52.8

H3: Prior experience matters

H2: Impact of payment frames

	No Payment		Carbon Offset Payment		Payment for Environmental Services	
	All Subjects		All Subjects		All Subjects	
Mean Interest in Conservation Tillage [a,b]	5.50		5.59		5.64	
Percent Requested Information [c,d]	62.6		61.2		59.7	

Results: Framing

- Prominent arguments made to promote conservation tillage are not expected to be effective in stimulating additional adoption

- Contrast Effect: No-till non-adopters (most?) resistant to profit frames
  - Consistent with research that experts are less susceptible to framing effects

Conclusions

Phase 2

- Objective: Identify conflict-displacing frame to promote conservation tillage among remaining non-adopters

- Convenience sample:
  Attendees at the 2012 Fort Wayne Farm Show

- Status: Finalizing data analysis and manuscript in progress

Follow-up field experiment

Thank you

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