

Results and Analysis from Last Year's Water Quality Trading Experiment

Craig Smith
Jeff Peterson
John Leatherman
Sean Fox

2007 Risk and Profit Conference
Department of Agricultural Economics
Kansas State University

Outline

- Refresher on last year's Water Quality Trading (WQT) experiment
- Results
 - Attitudes and behaviors about BMPs, conservation programs, & water quality
 - Choice experiments with hypothetical WQT scenarios
- Summary and discussion
- Possible alternative policy – BMP Auction

Refresher

- Why did we request your participation?
 - If implemented, a Water Quality Trading (WQT) market would create a new revenue stream for producers
 - WQT getting attention at the federal and state levels
 - Funding for your time, attention, and participation
 - Provide us input to help answer questions

Improving Water Quality

- Mandated by the Clean Water Act
- Not simple or cheap
- Current approach
 - Regulate point sources (i.e., wastewater treatment plants)
 - Little flexibility → can be very expensive
- Nonpoint sources (i.e., agricultural fields) release some of the same pollutants into water bodies
 - Nitrogen and Phosphorous (N and P)

Water Quality Trading

- Water Quality Trading (WQT) allows point sources to achieve their discharge limits by paying nonpoint sources to reduce discharges
- Point sources buy “water quality credits”
- Nonpoint sources sell “water quality credits”

Example

- Wildcat Wastewater Treatment Plant must reduce P loading. Facing removal costs of \$100/pound
- Group of farmers can reduce P for \$20/pound
- WQT gives point and nonpoint sources the choice to work out a deal.



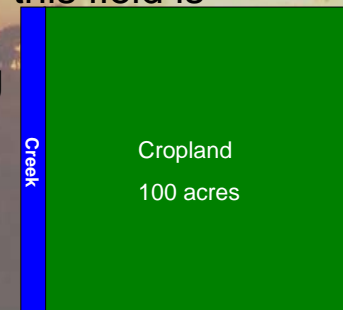
Outcome: Meet P limit at lower overall cost

Instructions for Water Quality Trading Experiment

Your Farm Field

Assume:

- You own the field and have sole authority to enter into a land-use contract
- The current practice on this field is minimum tillage (i.e., chisel-disk leaving at least 30% residue)
- Crop rotation is based on your actual farm



A Hypothetical Situation

- A Water Quality Trading Program has been developed in your area
- Wastewater treatment plants want to buy water quality credits
- You can generate and sell credits on your 100 acre field by adopting a best management practice (BMP)

The Trading Process

- Opportunity to enroll your entire 100 acre field in the market and sell credits
- Must sign a 10-year contract on enrolled acreage, but receive annual payments
- Trading is managed by an entity such as a local Conservation District, or a state or federal agency
- Trading is independent of existing farm programs

Varying Attributes of Trades

- Different buyers have different requirements
- Opportunities vary by:
 - Application time
 - Monitoring method
 - Penalty
 - Best Management Practice
 - Credit Revenue

Example

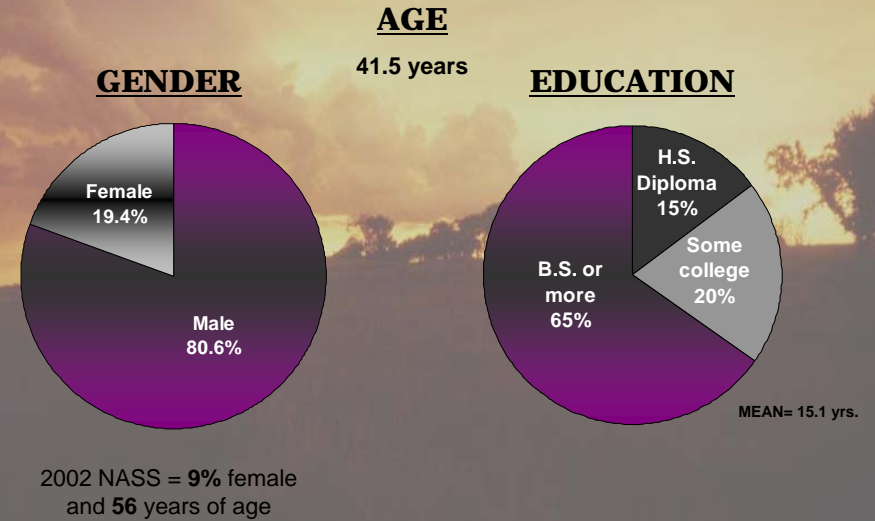
	Option A	Option B	Option C
Application time (hours)	4	4	Do Not Enroll
Monitoring method	Annual verification	Spot check	
Penalty for violations (\$/acre enrolled)	500	250	
Best Management Practice (BMP)	Filter strip (with haying/grazing)	Rotational no-till	
Price and Cost information			
Offer price per credit (\$/credit/year)	\$4.17	\$3.00	
Credits generated per acre enrolled	6	5	
Credit Revenue (\$/acre/year)	\$25.00	\$15.00	

Which option would you choose? (mark one box only)

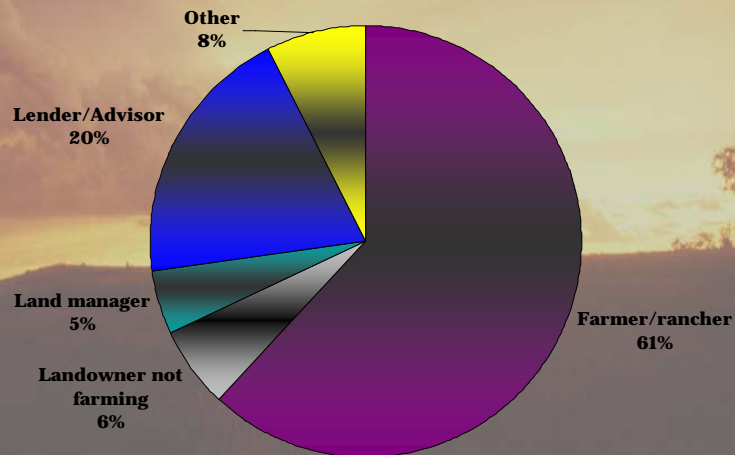
Results

- Data from 136 producers from:
 - 2006 R&P Conference
 - Ag. Profitability meetings:
 - Colby
 - Smith Center
 - 2006 KS Farm Bureau YF&R Conference
- 2 Sections
 - Attitudes & behaviors about BMPs, conservation programs, and WQ
 - Choice experiments with hypothetical WQT scenarios

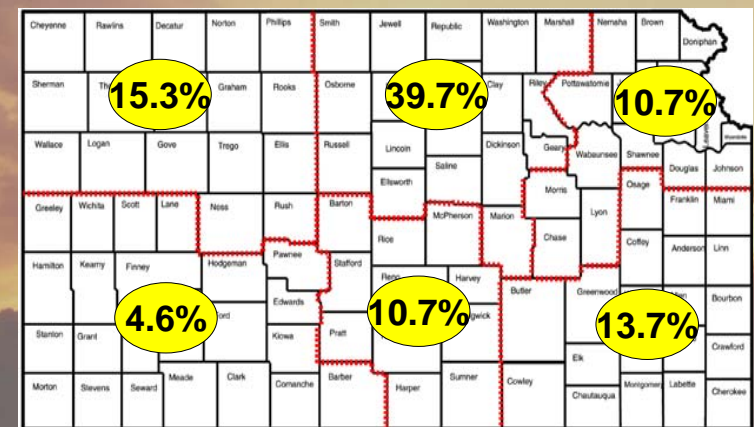
Results



Occupation



Results



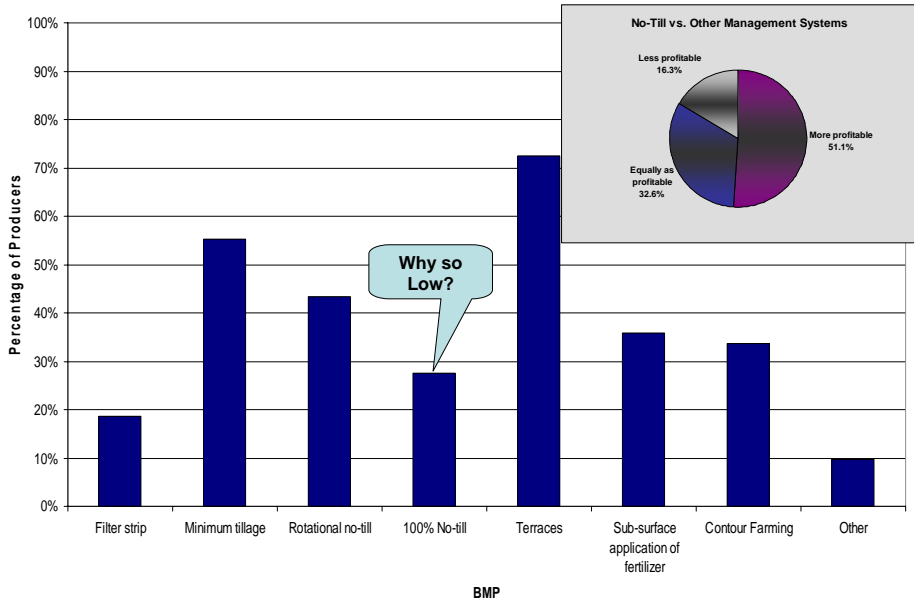
Owned Cropland = 824 acres

Rented Cropland = 804 acres

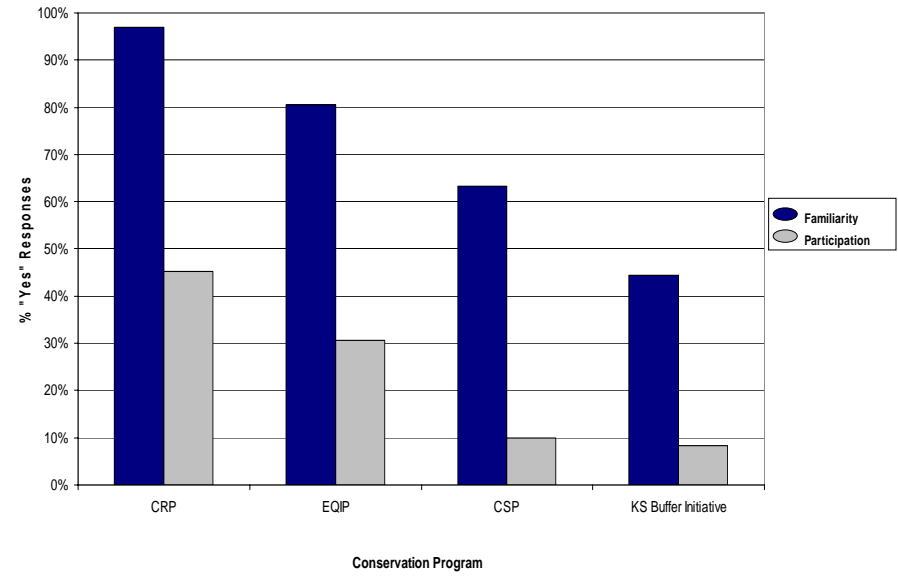
Cropland bordering water = 78.2%

Member of KFMA = 15.8%

BMPs currently in use in farming operation



Familiarity and participation in Conservation Programs

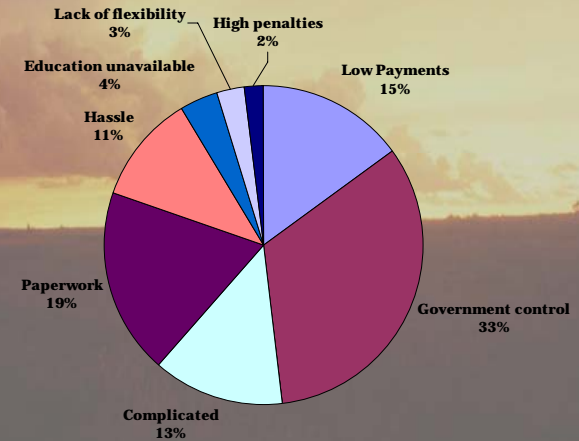


Results

Producer perceptions about BMPs, water quality, and environmental legislation

Perceptions	Strongly Disagree (-2)	Disagree (-1)	Neutral (0)	Agree (1)	Strongly Agree (2)	Mean Response
BMPs reduce nutrient and sediment runoff	2.2	1.5	5.9	58.5	31.9	1.2
Kansas surface water quality needs to be protected	1.5	1.5	3.0	60.0	34.1	1.2
Kansas ground water quality needs to be protected	0.7	0.7	3.7	55.6	39.3	1.3
Mandating BMP installation is unfair to producers	3.0	17.8	34.8	33.3	11.1	0.3
Environmental legislation is often unfair to producers	0.7	14.1	33.3	40.7	11.1	0.5
Kansas surface waters are polluted	0.7	21.5	34.8	38.5	4.4	0.2
Kansas groundwater supplies are polluted	1.5	30.6	39.6	27.6	0.8	0.0

Why do some producers choose not to participate in conservation programs?



WQT Results: Individual Characteristics

Variable	Marginal Effect on Pr(C) (%)
Acres	-0.00194
Water bodies*	6.00
Filter strip	-4.68
No-till***	-9.09
No-till profits*	-0.548
Protect water**	-3.08
New regs*	2.11
Male	-2.65
Age***	0.424
Education*	2.74
Farmer***	13.4

*, **, *** Significant at the 90%, 95%, and 99% level of confidence, respectively

Results: Trading Attributes

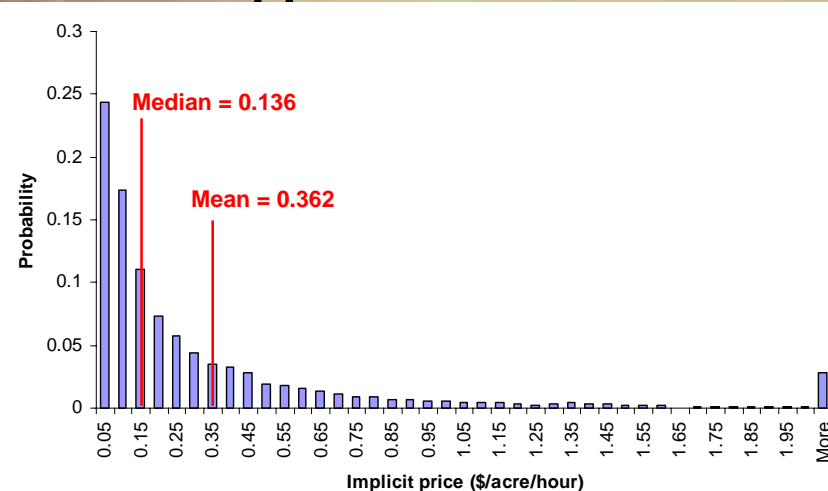
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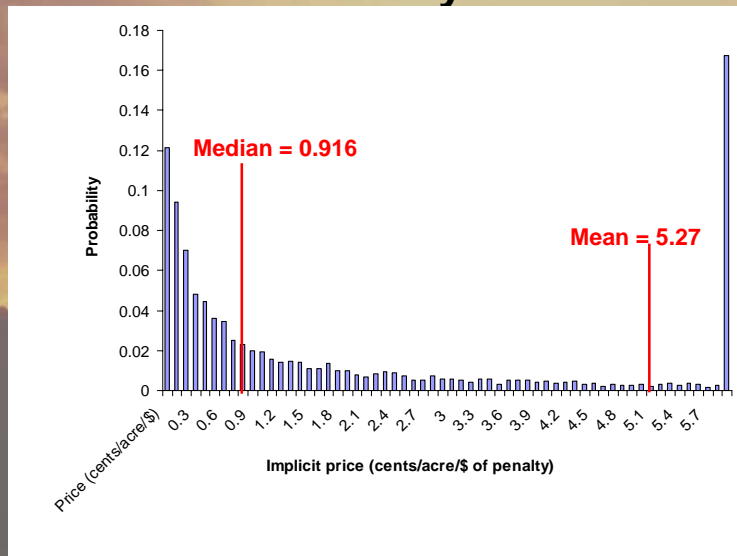
Results: Trading Attributes

Variable	Marginal Effect (%)		Implicit cost (\$/a/unit)
	Pr(A)	Pr(B)	
Flexibility	7.85	7.74	-4.037
Appl. Time	-0.37	-0.37	0.362
Penalty	-0.025	-0.026	0.053
Spot Check	0.19	0.18	0.091
Revenue	2.64	2.73	----

Distribution of Implicit Prices for Application Time



Distribution of Implicit Price for Penalty



Main WQT Findings

- Producers had widely varying perceived costs of some trading attributes
 - Penalty, application time
- Producers are not sensitive to monitoring
- Producers strongly prefer flexibility
- Perceived fear of future regulation is not widespread but would reduce WQT participation by some producers

Summary of Findings

- No simple answer to ↑ BMP adoption & participation in conservation programs
- Perception gap over severity of WQ problems b/t producers and govt. agencies
 - Producers agree that BMPs do improve WQ and that WQ needs to be protected
 - Many producers don't see what all the fuss is about
- Many producers say that participation is limited because of:
 - Excessive paperwork, program complexity, “hassle” of living up to program obligations
 - Any innovations to simplify or reduce producers' time commitment would be a worthwhile investment

Summary of Findings

- Many producers uncomfortable with govt. control over their land-use decisions
 - Cons. Programs should limit the amount of restrictions placed upon enrollees
 - More flexibility
- Increasing payment levels could increase participation, but was not a major factor
- WQT shows potential, but many roadblocks to overcome

Possible Alternative – BMP Auctions

- Producers submit bids to supply the watershed with WQ improvements
- Bids are ranked by amount of WQ improvements generated per dollar
- Producer who offers WQ improvements at lowest price is contracted with first
- Process repeated until a predetermined point is reached
- BMP auctions identify and purchase the most cost-effective WQ improvements for a specified budget

BMP Auction - *mechanics*

Goal: reduce sedimentation in Pomona Lake

<input checked="" type="checkbox"/>	Best Management Practices—see back for definitions	Erosion Reduction Efficiency	Treated Field Acres	Total Bid Price (dollars)
<input type="checkbox"/>	Establish riparian vegetative buffer (check width):			
<input type="checkbox"/>	__ less than 30' wide	25%	_____	_____
<input type="checkbox"/>	__ 30' to 60' wide	50%	_____	_____
<input type="checkbox"/>	__ greater than 60' wide	75%	_____	_____
<input type="checkbox"/>	No-tillage (check option):			
<input type="checkbox"/>	__ Option #1	40%	_____	_____
<input type="checkbox"/>	__ Option #2	75%	_____	_____
<input type="checkbox"/>	Farm on the contour	35%	_____	_____
<input type="checkbox"/>	Establish contour grass strips	50%	_____	_____
<input type="checkbox"/>	Re-shape existing terraces	25%	_____	_____
<input type="checkbox"/>	Establish terraces	30%	_____	_____
<input type="checkbox"/>	Establish permanent vegetation on entire field	95%	_____	_____
<input type="checkbox"/>	Establish grassed waterways	50%	_____	_____
<input type="checkbox"/>	Alter crop rotation away from continuous soybeans	25%	_____	_____
<input type="checkbox"/>	Other (explain):	TBD	_____	_____

BMP Auction - *mechanics*

Auction managers:

1. Rank the bids in order based on \$/ton of sediment reduction
2. Contract with producer who will reduce sediment loads for the lowest price
3. Repeat process until the funds are exhausted

BMP Auction - *benefits*

- Several benefits to coupling a BMP Auction with flexible implementation funding:
 - Funds can be targeted to highest impact investments and exceed limits of existing programs
 - Producers offered flexibility of choosing alternative BMPs that work best for their operation and name their price
 - Provides valuable insights into the incentive levels required to adopt BMPs
 - Guide future policies and investments