

## The Performance-based Environmental Policies for Agriculture (PEPA) Initiative

Developing Performance-based Incentives for  
Agricultural Pollution Control



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## The Performance-based Environmental Policies for Agriculture (PEPA) Initiative

Consists of two related projects:

- National Facilitation Project (NIWQP)
  - Providing information and guidance to stakeholder groups around the U.S.
- Pilot-Testing Project (NRCS-CIG)
  - Providing incentives in Iowa and Vermont watersheds

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## The Performance-based Environmental Policies for Agriculture (PEPA) Initiative

- National Facilitation Project (NIWQP)
  - Education and outreach across U.S.
  - Developing specific recommendations with watershed stakeholders
  - Help to secure funds for pilot-testing
  - Distill out lessons learned to inform federal and state policy discussions

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## Motivating Questions:

- How can we assist farmers to take the most cost-effective actions for water quality?
- Can we pay farmers to meet specific environmental performance targets?
- Will performance-based incentives be able to reduce nonpoint source pollution without burdening farm profitability?

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## Overall Goals:

- Reduce nonpoint source pollution from agriculture
- Provide greater flexibility for farmers
- Induce innovation for pollution control
- Improve the cost-effectiveness of government spending
- Improve farm financial performance

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## Performance-based Incentives:

- are payments for achieving specific environmental performance targets, often measured at the farm level;
- allow farmers to achieve specified environmental performance targets in any way they choose;
- incentivize farmers to choose the most cost-effective actions to meet the performance targets;
- provide additional income to farmers for reducing costs for NPS pollution control;
- may provide a cleaner environment and greater accountability for taxpayers.
- are information-intensive.

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## How Do We Get There?

- Link farm management decision-making to environmental outcomes through appropriately designed incentives
- “Internalize the externalities” of agricultural pollution

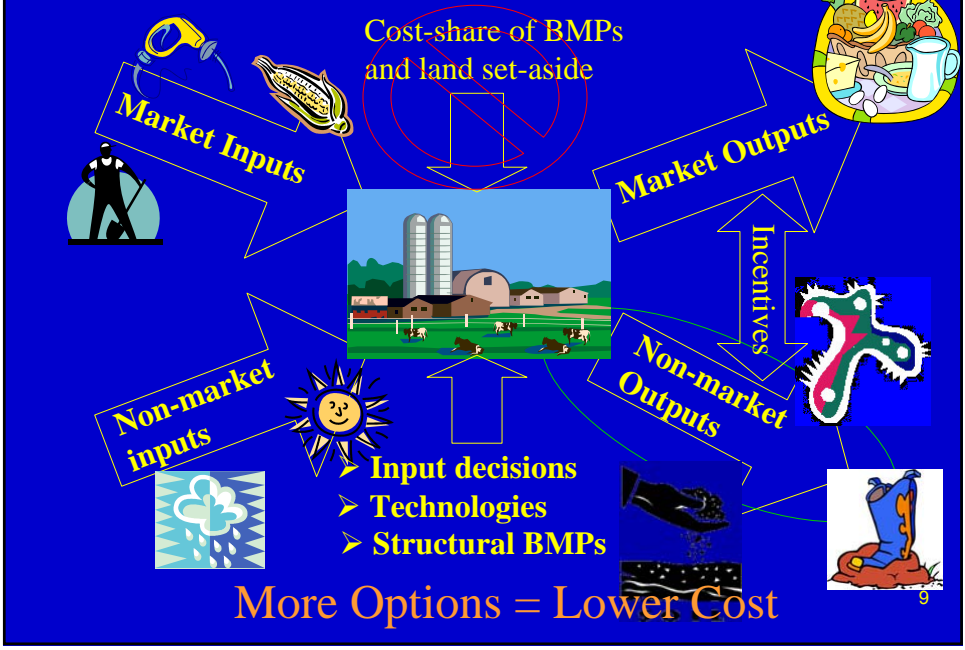
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## The Economic Justification

- There is no “market” for agricultural pollution control
- Current incentives are tied to specific practices
- A well-designed incentive from policy can serve as a “price” for pollution control
- Environmental performance becomes incorporated into farm business planning

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# Incentives for Performance



# Environmental Management Becomes Part of Farm Business Management



## Potential Benefits

- Flexibility
- Induced innovation
- Lower-cost solutions
- Enhanced farm income
  - Not market distorting
  - WTO compatibility

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## Challenges and Constraints

- Measuring performance
- Information-intensive
  - Farmer information needs
  - Agency information needs
- Appropriately designed incentives
- Shifting gears

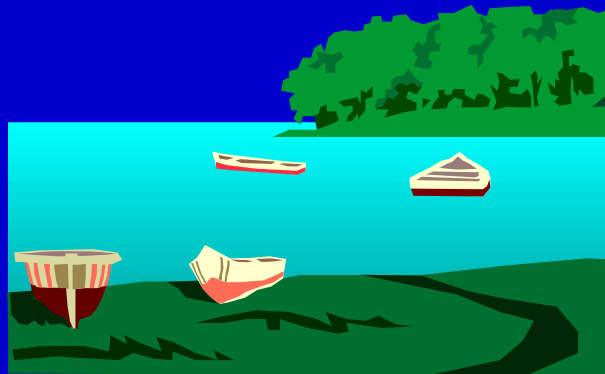
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## Performance Measures

- Where, how, and when environmental performance is measured and monitored
  - Performance target is the specified level(s) of the performance measure that must be met to receive the incentive
- Need measures that are closely related to ultimate water quality concern AND directly influenced by farm management decisions

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## Performance Measures – In the Lake, Bay, or Ocean



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## Performance Measures – In the River



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## Performance Measures – On the Farm



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## Choosing Performance Measures

- Monitoring vs. Modeling
- Monitoring
  - Preferable
    - Accuracy
    - Flexibility
  - Tough to attribute changes to farm
- Modeling
  - Less accurate
  - Less costly
  - Farmer can know outcome before making changes

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## Examples of Farm-level Performance Measures

Resource Concern: Phosphorus Control  
Example: Estimated P Loss (based on Whole-farm P Index Score)

Resource Concern: Nitrogen  
Example: Cornstalk Nitrate Test

Resource Concern: Sediment  
Example: Soil Conditioning Index

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## Performance-based Incentives: From Concept to Action

1. Develop watershed-specific recommendations
2. Pilot-test Recommendations
3. If appropriate, formalize permanent program

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## Criteria for Identifying Watersheds:

- Acknowledged Ag-WQ issue(s)
- Issue can be addressed, in part, with management (i.e. non-structural) changes
- Existing group(s) addressing Ag-WQ issue(s)
- Desire for alternative approaches to solve problem

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## Developing Watershed-specific Recommendations:

- Assemble group of 20-25 people
  - 8-10 farmers
  - Reps from each relevant agency (local, state, federal)
  - Scientists that understand the ag-WQ linkages and local economics
  - Trained, neutral facilitator
- Hold a series of 2-3 meetings with group over 3-6 months
- Produce recommendations for use of performance-based incentives in watershed
- Seek funding to pilot-test recommendations

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## Hungerford Brook and Rock River Watersheds



- 70,526 total acres
- 17,412 acres of cropland
- Largely dairy farming
- TMDL for P in Lake Champlain
- Missisquoi Bay has highest P loads and acute algae blooms

## Pilot-testing PEPA Recommendations Developed with Vermont Stakeholders

- Performance measure: Estimated P loss
- Payment per lb P loss reduced
- With interested farmers, we have:
  - Calculated or updated P Index
  - Discussed changes that farmer would consider
  - Calculated P loss reduction, costs, and cost-effectiveness for each change
- If payment level is greater than cost-effectiveness, it is a good business decision to do.

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## A Few Examples To Reduce P Loss:

- Remove excess P from ration
- Spread manure differently across farm
- Change crop rotation
- Increase riparian buffers
- Rent more land to spread on
- Change tillage practices

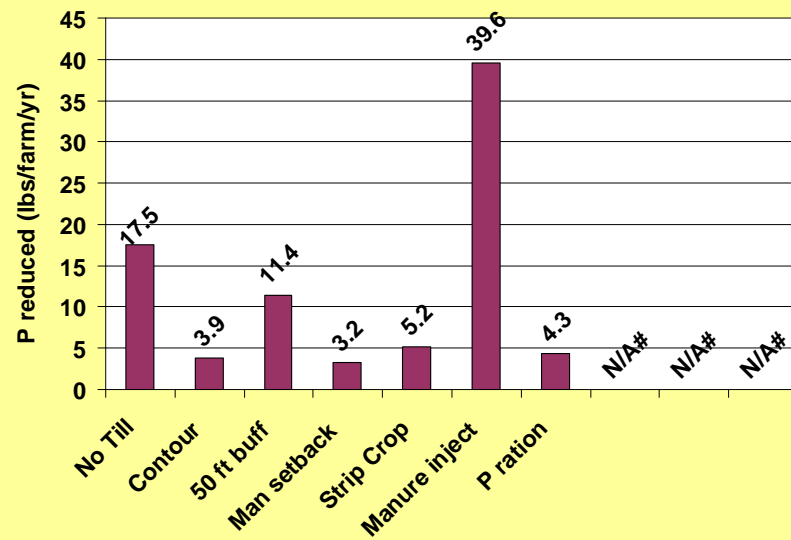
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## Example: Set of Scenarios to Reduce P Loss

<u>Scenario #</u>	<u>Short Name</u>	<u>Description of changes</u>
Scenario 1	No-till	Spring chisel to no tillage on fields G01, G06C, H02A, H02B, H02C, and G06.
Scenario 2	Contour	Plow and plant on the contour when fields H02, H02B, H02C are in corn.
Scenario 3	Buffers	Added 50' not harvested buffer on fields G01 (500' length buffer on southern edge of field), G06C (750' buffer on portion along G06B), H02A (550' length buffer along southwest edge of field), H02B (430' length buffer along southwest edge of field), H02C (440' length buffer along southwest edge of field).
Scenario 4	Manure Set-back	Manure setback 50' nearest waterways on fields G01, G06C, H02A, H02B, and H02C
Scenario 5	Strip Cropping	Strip cropping (hay and corn) on fields H02A, H02B, H02C
Scenario 6	Manure Injection	Manure injection on all fields except G02B & H01 (from not incorporated on hay fields and chisel plow on corn fields)
Scenario 7	Ration P	Decrease P in feed ration for milkers from 0.45% to 0.39%.

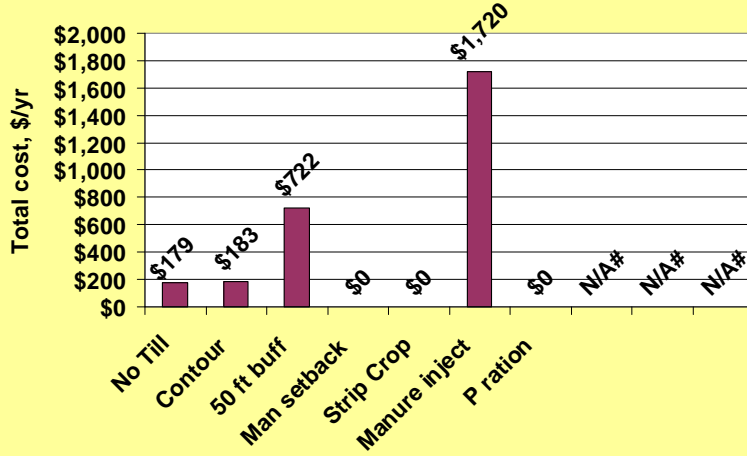
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Graph #1: Reduction of Runoff P

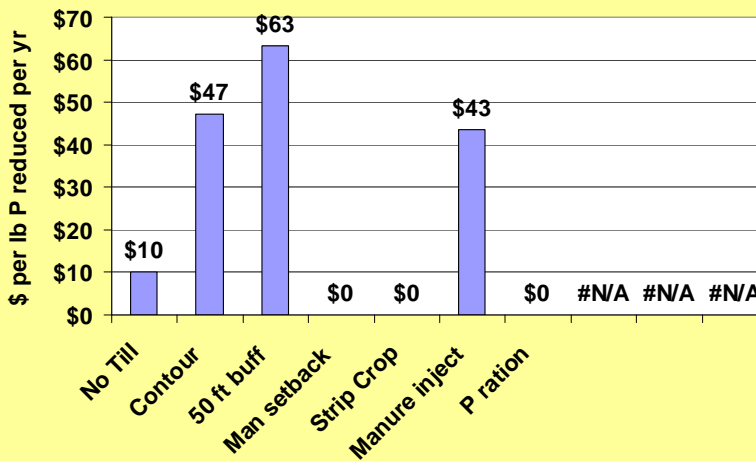


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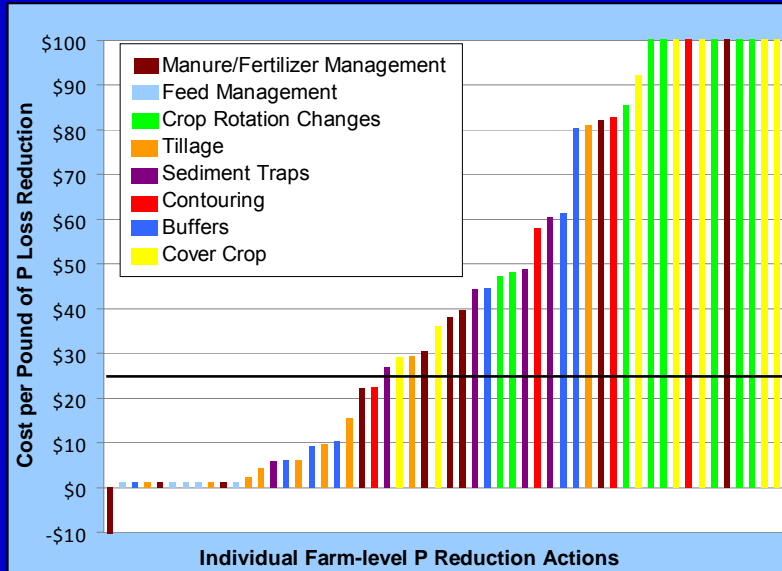
Graph #2: Total Cost of Management Changes



Graph #3: Cost to Reduce P Loss by 1 Pound

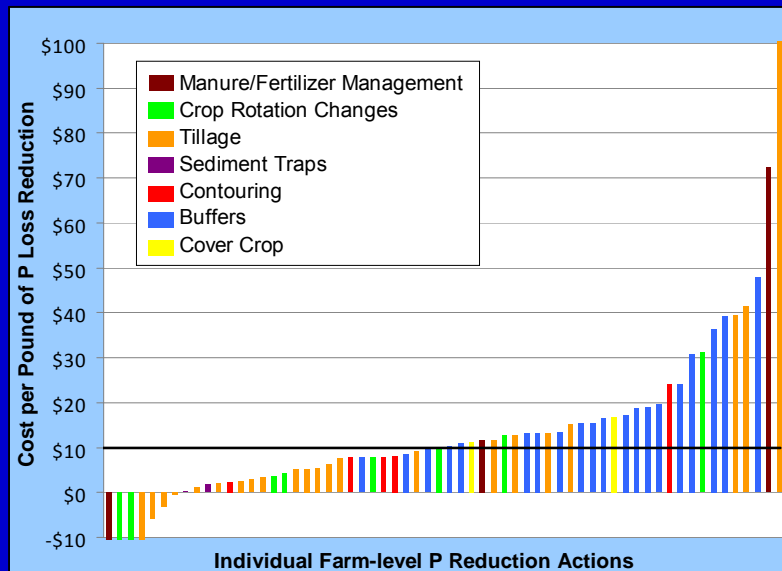


## Cost of Specific P Reduction Actions per lb. of P Loss Reduced on Vermont Farms



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## Cost of Specific P Reduction Actions per lb. of P Loss Reduced on Coffee Creek Farms



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## Results of Good Business Decisions

Watershed	P Loss Reduced (lbs/acre/yr)	Farm Cost (\$/lb P)	Farm Profit (\$/lb P)	Sediment Loss Reduced (tons/acre/yr)
Iowa	0.88	-\$0.61	\$10.61	1.58
Vermont	0.26	\$4.86	\$20.14	1.01

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## Conclusions:

- Performance-based incentives:
  - A general approach that can be targeted at a variety of issues
  - Need to be watershed-specific
  - Have the potential to improve cost-effectiveness
  - Require a lot of work to develop
- National Facilitation project is designed to:
  - Help groups develop recommendations and pilot-test
  - Compile lessons learned from across U.S.
  - Inform federal and state policy discussions

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## For More Information:

### Visit the project website:

[www.flexincentives.com](http://www.flexincentives.com)

(Please provide feedback - select "*National Facilitation*" then "*Evaluation*" link)

### Contact the Project Director:

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