Reporting on SARE Grant #ONE-420

Understanding farmer decision making in performance-based PES programs through the Vermont Pay-for-Phosphorus program

Benjamin E.K. Ryan & Travis W. Reynolds

PhD Student in Sustainable Development Policy, Economics, & Governance

Department of Community Development & Applied Economics

University of Vermont

NORTHEAST SARE Sustainable Agriculture Research & Education

Reporting on SARE Grant #ONE-420

Understanding farmer decision making in performance-based PES programs through the VT Pay-for-Phosphorus program

Agenda for Today

- Introductions
- Research Findings
- Lunch
- Discussion and Exercise

Benjamin E.K. Ryan
PhD Student in Sustainable Development Policy, Economics, & Governance
Department of Community Development & Applied Economics

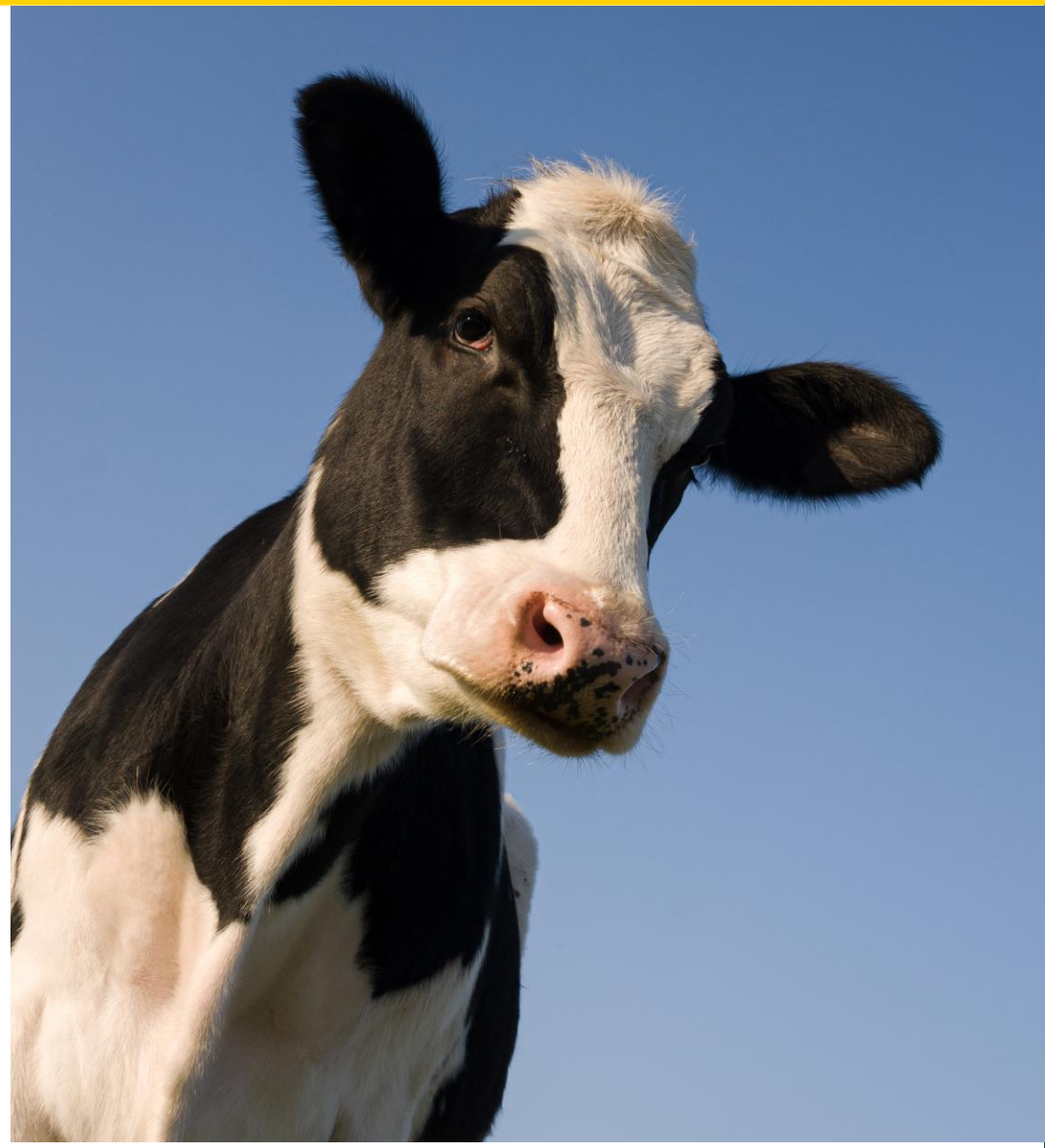
University of Vermont

NORTHEAST SARE Sustainable Agriculture Research & Education

New Ways of Compensating Farmers

- Practice-based programs is the traditional model
    - e.g., EQIP payment for cover crops

- Performance-based programs are new and rapidly emerging
- Opportunity to learn from farmer experiences participating in pilot projects



University of Vermont

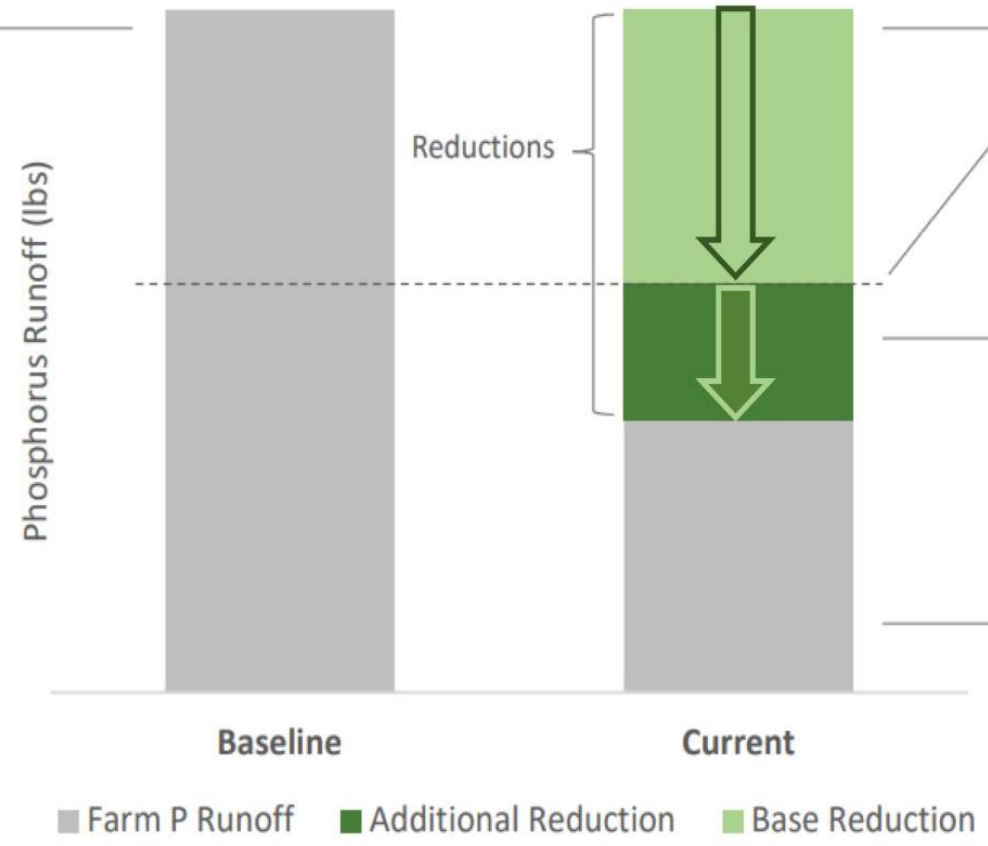
Vermont Pay-for-Phosphorus (PfP)

Threshold

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

Base Farm P Runoff will be modeled based on historic TMDL management scenarios and will act as the baseline from which P runoff reductions are calculated.

Reductions can be achieved via improved nutrient management or conservation practices.



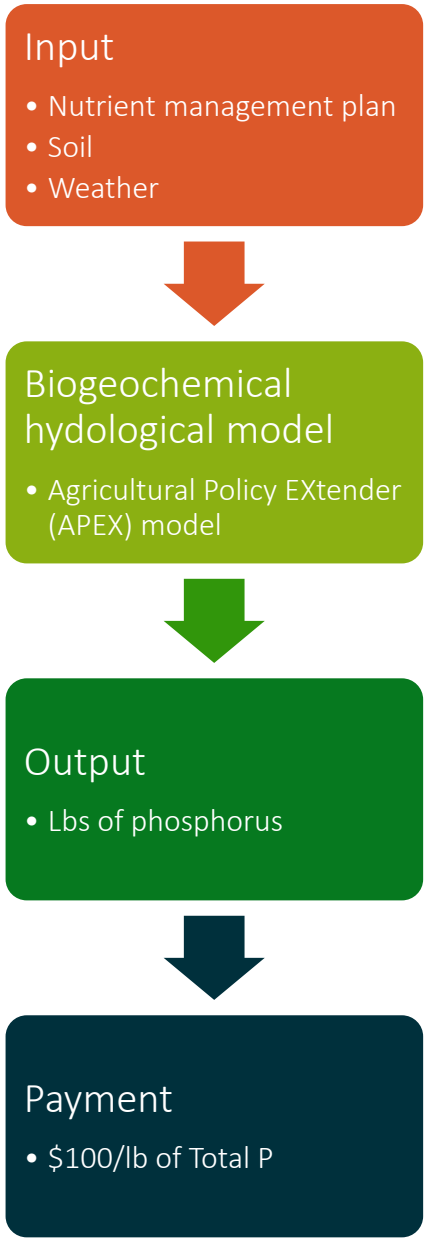
Base Reductions/Threshold corresponds to the P reductions that are estimated to be met through existing programs.

Additional Reductions beyond the threshold will be paid through the VPFP program based on a set price per pound of P.

Current Farm P Runoff based on a farm's current management.

Brief Explanation

- Nutrient Management Plans (field boundaries, soil tests and records of management practices) are data inputs
- Precision technologies may be used to collect data farm practices (manure injection)
- Model-based performance scenarios for management options (APEX)
- Whole farm included, field-level outputs



University of Vermont

Research

University of Vermont

Project Objectives

- *Objective 1: Conduct semi-structured interviews and farm visits with producers enrolled in the VT PfP program to gather data on farmer perspectives and perceptions of the program.*
- *Objective 2: Develop an understanding of the motivations, concerns, and decision- making of different types of producers as it relates to PES programs, generally, and the VT PfP program, specifically.*

University of Vermont

Project Objectives (cont.)

- *Objective 3: Communicate interview findings and facilitate critical discussion among different types of producers.*

- *Objective 4: Communicate findings to relevant farmers, agencies, and institutional partners.*

University of Vermont

Interview questions

- Have you participated in **payments for ecosystem services (PES) programs** previously?
- What are your motivations for participating in PES programs?
- Do you think it is better to compensate farmers for the *implementation of certain practices* or the *production of certain outcomes*?

University of Vermont

Interview Questions (Cont.)

- What **advantages** do you see in a production-based PES program, like the VT PfP, if any?
- What **disadvantages** do you see in a production-based PES program, like the VT PfP, if any?
- What **concerns**, if any, do you have about the VT PfP program?
- What aspects of how the program will be administered are **clear** to you?
- What aspects of how the program will be administered are **unclear** to you?

University of Vermont

Motivations for Participating

- Economic payments
- Water quality improvement
- Soil health information

University of Vermont

Concerns- Complexity

Program details and deadlines

“Think it's just me being overwhelmed and dense and not my computer months of the year but given that it's a farmer program, I feel like it should be super streamlined.”

“[It is] unclear is what records I'm supposed to keep that I'm not already keeping, if any. How I'm supposed to report those records when I'm supposed to report to who I'm supposed to report”

Concerns – Limitations of Model

Certainty in measuring management practices and the natural environment (e.g. soil types) accurately

“I don't think it is giving the incentive that it should in some of the soil types. There's some light river bottom soils that you just can't do enough to get the payment”

Recommendations

University of Vermont

Recommendations

- More inclusive and innovative practices- Expand the management practices and environmental variables (soil types) that are modelled by FarmPrep (e.g., increase injection depth)

- Mechanism for payment or model result to be appealed
- Explainability of model limitations could be increased
- Technical assistance could be supported more

University of Vermont

Questions

- What are some positive experiences you have had with programs paying for conservation or water quality?

- What changes would you like to see in programs similar future programs?

University of Vermont

SWOT Analysis

- Widely used for identifying both internal and external factors influencing project performance

Strengths

- Economic (direct payments)
- Environmental outcomes monitored
- Ability to share environmental outcomes (social and legal)
- Flexibility in management
- Technical assistance providers instrumental
- Record-keeping
- One more time each year to look at and think about nutrient management at the field level

Weaknesses

- Model certainty accurately measuring management practices
- Natural environment (e.g. soil types)
- For payments less than expected, little ability to correct or change payment based on results
- Administrative burden (data input and paperwork)
- Data entry “clunky”
- Lack of transparency of backend of the model

Opportunities

- Expand management options (e.g. injection depth)
- Explainability of the back end of the model
- Visualization and analysis of field level trends
- Data integration could benefit from Artificial Intelligence (AI) if used responsibly

Threats

- Financial longevity of program past initial funding

- Bias toward certain production types, the program does not work well for diverse, small-scale producers (producers feel systemically excluded and their efforts not rewarded)

Discussion Question 1

- What are ways to improve the program
- What worked?
- What did not work?
- What are opportunities to do better?

University of Vermont

Discussion Question 2

- Many folks did not substantially change their practices and thus were in large part paid for the performance of practices they adopted prior to the program.

- As this differs from past programs, is it more important to reward those that have adopted eligible practices in the past or to incentive change from those that have not?

University of Vermont

Discussion Question 3

- In what ways could you imagine improvements in measurement in using artificial intelligence and precision agriculture tools?
- What aspects of AI would be important?
    - Transparency and explainability of model results
    - Agency and autonomy of decision-making
    - Data security and privacy
    - Technical robustness

Thank you all

Many thanks to all the participating farmers who provided extensive input and feedback on their experiences and motivations in participating in the Vermont Pay-for-Phosphorus Program. This report does not reflect the positions of the funder nor those acknowledged.

Funded by:
United States Agency of Agriculture-Sustainable Agriculture Research and Education

Acknowledging the many institutions that facilitated this research:
University of Vermont (UVM)
Gund Institute for Environment
Department of Community Development and Applied Economics (CDAE)
Food Systems Research Center
UVM Extension
Vermont Agency of Agriculture, Food and Markets
Natural Resource Conservation Service
Nutrient Management Planners/Crop Advisors

University of Vermont

Future Reseach Participation

Contact me:

Beryan@uvm.edu

Acknowledgement

This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, through the Northeast Sustainable Agriculture Research and Education program under subaward number ONE22-420.

NORTHEAST SARE
Sustainable Agriculture Research & Education

University of Vermont