Comparative Analysis of Cover Crop Incentive Programs in the Northeast

Progress report for GNE18-166

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Grant Recipient: Cornell University
Region: Northeast
State: New York
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Project Information

Summary:

Farmers are increasingly interested in planting cover crops to improve soil health, reduce nutrient losses, and enhance pest suppression, and government agencies support the use of cover crops by offering cost-share programs. This research seeks to compare cover crop incentive programs and adoption rates in Maryland, New York, Pennsylvania, and Vermont and to better understand the relationship between farmer adoption and incentive program structure, payment, and restrictions. I will examine existing literature on the barriers to adoption, catalog cover crop incentive programs, and conduct a survey to understand the various benefits and challenges of participating in cover crop incentive programs. New knowledge generated in this project will be used to develop recommendations to improve incentive programs with the goal of increasing the number of farmers who use cover crops and the amount of farmland that is cover cropped in the Northeast. Because cover cropping can improve soil health, help farmers to manage pests and weeds, this research will tackle one of the most significant challenges facing the United States: regenerating soil health and increasing crop viability.

Project Objectives:

To better understand the differences between incentive programs and to identify possible solutions we will pursue the following research and analysis:

1. Compile available data for the last five years to compare program costs, payment structure, implementation or evaluation mechanisms, and farmer adoption rates.

2. Survey at least 300 farmers and 100 program administrators to understand perceptions about cover crops among farmers in each of the four states.

3. Develop policy recommendations to enhance positive and reduce negative externalities of the incentive programs and identify mechanisms that could improve policy or program efficiency, increase adoption rates, and intensify farmer benefits.

Introduction:

The purpose of this project is to analyze cover crop incentive programs in Maryland, New York, Pennsylvania, and Vermont, and to identify challenges and opportunities to make the cover crop programs more appealing to farmers. This is important because cover cropping is an ecologically based practice that is a possible solution to some of challenges that farmers currently face. Throughout the 20th century, farmers across the United States increased their reliance on fertilizers and pesticides (MacDonald et al. 2013) and research has shown that increased use of these off-farm inputs has led to negative consequences. This includes weeds, insects, and pathogens developing resistance to pesticides (Mortensen et al. 2012), soil erosion and nutrient losses into waterways (EPA NPDES 2015), and reduction of soil quality to below the bare minimum critical for nutrient cycling (Lemaire et al. 2014). Poor soil quality results in a consequential cycle that requires increased inputs, which further deteriorates soil health.

Cover cropping provides a sustainable way to mitigate climate change and can help farmers to increase production while regenerating existing farmland (Foley et al. 2011). Farmers that have adopted the use of cover crops have found that it improves soil health, reduces soil erosion, and increases soil organic matter (CTIC. 2017). The 2016-2017 Annual Cover Crop Survey revealed that farmers are seeing yield gains from cover crops with 1.3 and 3.8 percent increased yield in corn and soybeans, respectively. The report also showed that 66 percent of farmers indicated that cereal rye helped suppress weeds (CTIC. 2017). Therefore increased adoption of cover crops can improve ecosystem services.

While the majority of farmers who plant cover crops recognize the benefits noted above, other farmers are reluctant to adopt the new practice because of uncertainties in practices and outcomes (CTIC. 2017). The most significant issue is that many cover crop experiments have been on research farms at land-grant universities and results are not always reproducible. Some farmers are therefore unenthusiastic about spending the time, money, and energy needed to establish the new practice. To increase cover crop performance and the overall benefits relative to costs, researchers and extension educators have been testing cultural practices, breeding new cover crop varieties, and developing on-line decision support tools to help farmers. Government and non-governmental organizations are also offering financial payments to farmers to compensate for the seed, labor, and equipment costs associated with planting cover crops. However, limited research has been done to evaluate these programs in terms of their effectiveness, impact, and opportunities for improvement.

Cooperators

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Research

Materials and methods:

This research intends to bridge the gap between cover crop programs and implementation by building upon existing knowledge and gathering preliminary data. Our focus is to deepen understanding of (i) the cover crop incentive programs across Maryland, New York, Pennsylvania, and Vermont, (ii) what farmers and other stakeholders appreciate and find challenging about these programs, and finally (iii) to provide program recommendations to improve farmer adoption rates and benefits. Building upon existing literature, collecting program data, and surveying farmers and program administrators will best inform these questions.

We will submit our project to the Cornell University Institutional Review Board and anticipate that the research will be deemed except since we will not collect unique personal information from survey or interview participants.

For our initial study, we will have conversations with farmers and program administrators to ensure that we have considered all relevant factors. As part of the proposal development process we reached out to members of the Northeast Cover Crops Council. We contacted representatives at the agriculture departments in New York, Maryland, and Vermont and they have agreed to answer questions to help complete our research. Additionally, we have been in touch with individuals at Cornell University, The Pennsylvania State University, The University of Vermont, University of Delaware, and the Economic Resource Service and Natural Resource Conservation Service at the USDA all whom have agreed to collaborate on this study.

1. *Program Assessment:*

To address the first objective, we will create a rubric to empirically compare various aspects of cover crop programs, including but not limited to, effectiveness, unintended effects, equity, cost, feasibility, & acceptability. Effectiveness will measure if the programs are resulting in the intended outcomes, including both positive and negative externalities. Equity can be measured using ArcGIS to map the distribution of programs across agricultural areas. Equity will also include farm production type (dairy, vegetable, etc.), farm size, and will consider demographic and socio-economic status. Cost refers to the cost of the program as compared to the number of acres planted, and feasibility will measure the return on investment. The final measurement is acceptability, which will show whether or not farmers value the programs.

The program assessment will result in a comprehensive evaluation of the

distribution and impacts of cover crop programs across each state. It will also summarize the logistical differences between states and explain why the programs are inherently different. Since we are examining programs at both the state and federal level, we understand that each has a different set of priorities, so we intend to highlight how farmers interact with specific program features and to identify both challenges and potential solutions. The rubric will use quantitative nominal measures to rate each appropriate category whenever appropriate, which we will supplement with a survey and interviews.

2. *Survey:*

The survey in this project will be created using Qualtrics (Qualtrics, LLC.; Provo, UT) and will be distributed over a variety of networks during a 5-month period. We will target conventional and organic farmers, including farmers that use cover crops and those that do not. We will request various organizations, including the Cornell FieldCrops.org, the Natural Resources Conservation Service, the Northeast Organic Farming Association, and similar farming organizations distribute the survey to their agricultural networks. We will also ask cover crop researchers and extension agents to distribute the survey. We will include a link for participants to share the survey with potential participants, i.e., snowball sampling to reach farmers outside of our direct network (Biernacki and Waldorf, 1981). PI and Faculty Advisor, Dr. Ryan has proven these survey methods successful in research regarding growers' perspectives of cover crop use and breeding (Wayman et al. 2017).

We will design the survey based off our initial analysis and plan to include the following information: (i) survey background, (ii) demographic information, (iii) cover crop experience, and (iv) involvement in state or county incentive programs. Farmers will be re-routed to different sections of the survey depending on their responses (i.e., if they plant cover crops or if they do not). Our survey will also ask open-ended questions so that respondents have a chance to describe their experiences and make recommendations in their own words.

4. *Data Analysis, Program Recommendations, and Dissemination*

We will use both quantitative methods to analyze data from the program assessment and survey. We will seek support for our quantitative analysis from the Cornell Statistical Consulting Unit – and based off of preliminary discussion – will likely use either a chi-squared test or regression analysis to understand the relationship between program features and cover crop outcomes. We will use NVivo, which is a computer software program, to analyze our qualitative data. We will use this analysis to draw parallels between the programs and to identify ways to improve effectiveness, intended effects, equity, cost, and acceptability. The final objective is to develop recommendations that will enhance incentive programs effectiveness, increase adoption rates, and improve farmer benefits in the four participating states.

Participation Summary

332 Farmers participating in research

Education & Outreach Activities and Participation Summary

2 Other educational activities: Poster presentation at the Northeast Cover Crop

Council Conference

PARTICIPATION SUMMARY:

40 Farmers

200 Number of agricultural educator or service providers reached through education and outreach activities

Education/outreach description:

NECCC Poster 2019

NECCC Poster 2018

Information Products

SARE Sustainable Agriculture Research & Education US Department of Agriculture

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