

A Proposal to Explore how to Value Agriculture Ecosystem Services in Vermont



A Proposal from:

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Vermont has two long standing traditions which permeate through much of its physical and political landscape: Agriculture and Environmentalism. For several years there has been a divide between these interests in relation to water quality, and this has created a division amongst our communities. The stewardship of the land, air, and water is the most important endeavor citizens can strive to achieve. This has become even more apparent that food security and environmental stewardship are reliant on one another and therefore equally important to obtain. Both food and environment are necessary for life, and the foundation for a high quality of life for Vermonters.

The farmers of the State of Vermont, represented through the Franklin-Grand Isle Farmer's Watershed Alliance, the Champlain Valley Farmer's Coalition, and the Connecticut River Watershed Farmers Alliance, along with the University of Vermont Extension are exploring the potential to develop a strategy that would provide Vermonters with both environmental and food security well into the future.

The strategy is to develop a system which monitors, evaluates, and monetizes ecosystem services (ES) provided by agriculture. This creates a mechanism that will encourage and incentivize the agricultural community to adopt and fine-tune ecological practices. Ecosystem services commonly fall into four broad categories: *provisioning*, such as the production of food and water; *regulating*, such as the control of climate and disease; *supporting*, such as nutrient cycles and oxygen production; and *cultural*, such as spiritual and recreational benefits.

The proposed Planning Phase, to occur in 2019, will develop the framework for a program that encompasses all four groups of ES. This planning project will 1) determine methods for monitoring and evaluating the quantity and quality of ES being delivered by agriculture, 2) determine ES metrics and target thresholds, 3) create a system for delivering feedback to stakeholders, 4) develop valuation of various ES to inform the creation of a payment structure, and 5) develop potential mechanisms to pay for the ES. The proposed cost of the planning phase is \$625,000.

A program of this magnitude will require thoughtful planning. It is not sufficient to have a desire to bring stakeholders together around a common goal (food security, environmental resiliency,

protection of Vermont heritage), but we must invest in developing the program in a way that insures its long-term success.

First, we will need to hire a project coordinator(s), under the management of the farmer watershed groups, to manage this extensive project (\$225,000 for 3 years). This position will be responsible for putting together committees, holding meetings, gathering and disseminating information regarding all aspects of the project, and helping put the pieces in place to take this program forward after the initial pilot project is complete. Funds to support travel, stipends, and other costs will be required as stakeholders develop desired ES metrics and payment systems (\$50,000). In addition, firms capable of providing the technology to monitor the desired ES metrics will need to be identified and closely engaged in the project (\$150,000). Lastly experts in the area of PES will need to be engaged to provide input on viable payment models and systems (\$100,000). The total cost for the planning process is estimated at \$625,000.

Project Phase 1, to occur in 2020, will involve field implementation and testing of the proposed ES program on at least one agricultural operation in VT. The pilot site will be chosen by the farmer watershed organizations. This phase will serve as a small pilot to determine the feasibility of the program and resolve any issues with the metrics. Collection of baseline data will occur at several locations to begin to build the models that will be used in this program. Cost \$3.5 M.

Project Phase 2, to occur in 2021, will involve implementation of the proposed ES program on a minimum of 6 diverse agricultural operations. First, this phase will allow for vetting of the design of the system over a more robust landscape. Stakeholders will work together to make sure that the data collected for measuring and verification purposes meet the goals of the project. Second, this will also allow project planners to verify payment rates are in line with the costs of implementation of the strategies developed to compensate farmers. Cost to be determined.

Project Phase 3, to occur in 2022, this phase of the project will finalize the intricacies of all the difference aspects of the programming and scale it up to function statewide. All the additional resources and infrastructure will be identified, acquired, and tested during this phase. The outreach capacity of this system will be ramped up as we seek to move farmers and other stakeholders in to the system.

Project Phase 4, to occur in 2023, will be the official full launch of the ES Program made available to all agricultural operations in the state of Vermont. At this point funding mechanisms, metric and reporting mechanisms, will all be in place and farmers and environmental types will be working together to improve Vermont for Vermonters. It is expected that the overall program will need to be continually modified to meet the changing needs on the ground.

Why This, Why Now?

Throughout history, Vermonters have managed the landscape, utilizing it in many ways as our society and economies shifted. Although this has caused significant changes in our landscape over time, we now face unprecedented threats to the Vermont way of life. Increasingly erratic weather events (climate change) and a “cheap food policy” are undermining the stability and long-term security that Vermonters need to not only survive but prosper. Food and environment

are critical to life. Vermonters continue to lose the ability to feed itself as agricultural land is lost to development (20% since 1982) and the number of skilled agrarians makes up only 1% of our population. At the same time our natural environment continues to suffer even with increased funding and efforts from various business sectors to adopt environmental practices.

This project comes at a critical time to intervene in this downward trend as it will provide the conduit to enhance Vermont's resiliency to climate change while providing financial stability to protect our future ability to provide food to Vermonters. Our natural and agricultural ecosystem in Vermont will be able to quickly and significantly benefit from a system that provides payments to the farmers for measurable improvements in ES.

Monitoring and Evaluation Systems for Ecosystem Services

Payment for Ecosystem Service (PES) models require a mechanism by which to monitor and evaluate the services being rendered. Examples of PES models that have been implemented in the United States include the NRCS Conservation Reserve Program (CRP) program and Vermont's Current Use Program. Both programs make payments to participants based on a set of criteria that landowners must comply. In both of these examples the metrics are very easy to measure as the desired outcome is simply not to farm (NRCS CRP) or only farm (Current Use) the enrolled parcel. The outcomes of the implementation of these PES programs are not being measured except in tallies of total acreage into or out of the program.

This PES proposal is much more complex in its scope. It involves the implementation of a suite of instrumentation and technology, existing and emerging, to monitor environmental indicators (water, biomass, air), provide continuous data for evaluating effectiveness of practices, and to determine payment levels to the farmers. Ideally, this system will allow farmers to make real time decisions on how to improve the ES on their operations allowing Vermonters to achieve both environmental and food security requirements.

The Planning Phase of the proposed project would focus on selecting methods for monitoring and evaluating the quantity and quality of ES being delivered by agriculture and determining the ES metrics and target thresholds.

Phase 1 of the project, to begin fall of 2019, would implement a pilot program for gathering the ES data from Vermont's agricultural operations. Specific farm level data will be collected from a variety of operations to begin the development of robust models that predict ES.

Ecosystem Service Valuation

This project is revolutionary in that it proposes to pay farmers based on outcomes; the degree to which the ES is being provided will determine the payment. In this system, the methods used to obtain the outcome are determined by the farmer and are not considered in the payment structure. For example, soil health is one ES that can be provided by agriculture. It is widely accepted that healthier soil is better able to absorb and store water and carbon. Payment would be made to the farmer based on meeting specific soil health outcomes. How the farmer manages the soil to obtain this level is up to them. What is important is that the payment rate is high enough to add

viability to the farm without discouraging participation because the payment is viewed as being inconsequential to the farms viability.

The Planning Phase of the proposed project would focus on developing valuation of various ES to inform the creation of a payment structure.

Funding Mechanisms

When looking at PES models, there are many different funding mechanisms that have been developed to provide payment for ES provided. Here in Vermont, some have been done through tax credits (Current Use Program) and some have been done through direct payments from government entities. This raises the question of where do the funds come from?

This project proposes to pay for achievement (outcomes) versus paying for inputs. Measurable outcomes, that are agreed upon by a variety of stakeholders, will be developed and valued through this system. It's important to keep in mind that the payment levels will likely be higher than in traditional pay for practice-based systems as the payments will more accurately reflect true and opportunity costs incurred. The benefits of this program will benefit all Vermonters and protect the Vermont landscape for generations to come. It should be viewed as an investment in our future.

The Planning Phase of the proposed project would focus on developing potential mechanisms to pay for the ES. A team of stakeholders will be gathered to provide input and ideas for development of a payment mechanism. Possible government, industry, and private funding streams and opportunities will be evaluated.

Potential Stakeholders

The idea of paying agriculture for ecosystem services, and the impact it could have on the future of Vermont from an environmental and food security perspective, makes everyone in Vermont a stakeholder. However, first and foremost, this needs to be a farmer-driven process. Farmers will be represented initially through the 3 farmer-led water quality organizations throughout the state. This group of organizations will work together to start the planning phase of the ES project. One aspect of the planning phase will to secure collaboration and participation from other stakeholders including environmental groups, government agencies, and other interested parties.

There are many areas of expertise that will essential to developing the ES program. Farmers, scientists, educators, environmental interests, and government personnel will need to have input into this program as all will be impacted by its implementation. Within the scope of the initial project will be the creation of various advisory committees which will be tasked with developing different aspects of this project.

This project is being put forth by the farmers and they will need help in bringing it to fruition. The power of this project is that it is being brought forth from the bottom up, not the top down. The farmers are already invested, they simply need to connect with the other stakeholders to fully develop and implement the ES program. We hope that other stakeholders are willing to assist the farmers with the development of this ES program to assure its success and allow all Vermonter's to reap the rewards.