



Possibility grows here.

Greenbelt Foundation

661 Yonge Street, Suite 500
Toronto, ON M4Y 1Z9

(416) 960-0001

www.greenbelt.ca

Request for Proposals: Business Case for Soil Health

Introduction

The Power of Soil project seeks to inform government policy and farm decision-making to increase adoption of soil health systems by Canadian farmers to benefit farm profitability, environmental quality and climate resilience. This work is being conducted in collaboration with agricultural stakeholders and scientific and technical advisors through an advisory committee (Équiterre and Greenbelt Foundation 2021; Groupe AGECO, Équiterre and Greenbelt Foundation 2020).

One recommendation of the Power of Soil report (Équiterre and Greenbelt Foundation 2021) was to “make the business case for soil health” – see table below.

Table 1

Make the business case for soil health

What

Farming is a business and any new venture must make financial sense. Many groups are gathering and analyzing data to prove the business case for soil health. Yet farmers commonly ask the question “Where’s the business case?” and there are often few answers.

In order to achieve the widespread adoption of soil health practices needed to make a difference in climate change and long-term productivity, many more farmers will need to join the movement. According to Statistics Canada, 60% of Canadian farmers are not eligible in most jurisdictions for existing agri-environmental programs because they do not have a current Environmental Farm Plan. A much larger percentage of farmers needs to be supported to move towards sustainable agriculture practices through creative program design. Attracting tens of thousands of new farmers requires making participation easier and providing multiple entry pathways with fewer administrative barriers.

How

In order to accomplish this goal, the business case for improving soil health systems needs to be made for different production systems in different regions. The Soil Health Institute and the American Farmland

Trust provide good examples of working with farmers and interdisciplinary teams to lay out practical, real-life business cases for soil health in different regions and under different production systems. This kind of work needs to be done across Canada.

As well, context-specific, multi-year, step by step supports offering different types of resources at different stages are key to success. Social science research capacity is also a priority for universities, as understanding how demographic and socioeconomic characteristics of farmers affect uptake of soil health practices is crucial to adapting program design to meet needs.

Who

Governments, researchers, industry, producers

The Power of Soil project is assembling evidence to support broader adoption of soil health practices in Canadian agriculture. Government incentives are an important tool and should be used strategically to overcome market failures and timing of benefits issues. Evidence for a business case for soil health and the return on investment of soil health practices is growing.

Farm businesses rely on evidence-based advice on the return on investment and benchmarking of the cost of new technologies. Adopting new practices and technologies require this specific, localized knowledge.

Soil health practices often require specialized knowledge, training and sometimes equipment to implement. Such significant investments of time and money require economic justification.

The economics of soil health is a long term and a whole-farm proposition and so documentation of costs and savings must be assessed on that basis. Costs and benefits are not uniform over time, and many are concentrated at the beginning of practice change, while benefits may occur well after practice change. Government incentives can influence and remove barriers to the adoption of practices, especially where an anticipated benefit may not accrue for several years.

This project is focused on the private economic costs and benefits of soil health practices. Ecological services provided by agricultural soil are recognized as important but are out of scope of this specific project. Where ecological services are high but private economic costs are higher than private benefits, is where public incentives play an important role.



Remarkable effort has gone into documenting the costs and benefits of soil health practices in recent years. Ontario farmers need the benefit of that research and documentation to inform their choices. Governments also need that knowledge to design incentives and other policy tools to complement and build on the economic benefits of soil health practices.

Purpose

This project is to assemble and evaluate the data and research on the economics of soil health practices in Ontario (and to the extent possible, comparable jurisdictions) and translate that into information useful for farm-level decisions by farmers and farm advisors and for policy and program design by governments. Four objectives are outlined.

1. Document the state of knowledge on the economic costs, savings and benefits associated with soil health practices in crop agriculture in Ontario and jurisdictions with comparable climate conditions and production systems. Methods used for analysis should be identified and compared. Where available, the timing of costs and benefits should be documented to assess return on investment time frames. Lag times in the return on investment should be identified and the potential for government incentives to offset those lag times.
2. Based on the assembled knowledge and studies, estimate the likely costs, savings and benefits due to adoption of soil health practices in Ontario, by practice and commodity or production system where possible. Estimates should correct for differences in costs of production in jurisdictions where and years when the research took place.
3. Assess and identify the gaps in knowledge about the costs and benefits of adopting soil health practices by practice, commodity/production system and soil/climate, where possible. Knowledge gaps should include both those in the broader literature and those specific to Ontario.
4. Identify the approach and methods that should be used to undertake an empirical inventory of the costs, savings and benefits of soil health practices on Ontario farms. This effort would build on results from Objective 2 and address gaps identified in Objective 3. Make recommendations on how studies in Ontario should be done.



Scope of Work

Objective 1: Synthesis of the Knowledge on Business Case for Soil Health Practices

Document the state of knowledge on the economic costs, savings and benefits associated with soil health practices in crop agriculture in Ontario and jurisdictions with comparable climate conditions and production systems. Methods used for analysis should be identified and compared. Where available, the timing of costs and benefits should be documented to assess return on investment time frames. Lag times in the return on investment should be identified and the potential for government incentives to offset those lag times.

To document this knowledge will require review and assembly of research from both academic, industry and other sources that cover the economics of soil health costs, savings, benefits and return on investment.

Ideally documentation of the economics of entire soil health systems, or combinations of practices would be best. However, most research looks at single or small numbers of practices in combination.

There are several obvious sources of information now available. Recent work by the Soil Health Institute (Soil Health Institute 2021a, b) on case studies of 100 farms across the United States using partial budget analysis is important. Another important source is work by the American Farmland Trust on their Retrospective Soil Health Economic Calculator, case studies and development of a Predictive Soil Health Economic Calculator (American Farmland Trust 2021; American Farmland Trust and NRCS 2020).

There are extensive studies in Ontario by Agriculture and Agri-food Canada, University of Guelph and others on many aspects of cover crops, crop rotation, tillage and other practices that include economic evaluation (e.g. Chahal et al. 2020; Janovicek et al. 2021). Previous reviews of research also exist (Rejesus et al. 2021; Yani et al. 2020). Studies also include those by farm groups such as the Grain Farmers of Ontario, Ontario Soil and Crop Improvement Association and others.

To complete a review on economics of selected soil health practices, singly or in combination requires a focus on a group of practices, as the Soil Health Institute work focused on no till and cover crops (Soil Health Institute 2021a, b). As this is a literature review rather than empirical data collection and interviews the range of BMPs can be broader. An initial list of potential practices of interest include no till, reduced tillage, strip till, cover crops, diverse crop rotations, nutrient management, organic



amendments, and rotational grazing. A final list for the study can be arranged between the client and the consultant.

Soil health is a consideration for many crop and livestock producers. Practices differ between production systems as much as between individual crops. So, the type of crop rotation or use of manure will differ between various crop and livestock systems. The different production systems of interest including grains and oilseeds, field vegetables, tree fruit and small fruit, dairy, hogs, beef, sheep and others. Soil health research may not be available for all these systems, but the gaps in knowledge can be identified.

The context for all this research is the cost of production and return on investment for different commodities in Ontario. This includes the cost of land, inputs, rental, custom work and other costs. These are documented by the Ministry of Agriculture, Food and Rural Affairs (2021).

Assembly of this research and extraction of data on the costs, savings, benefits, and return on investment is a first step in the project.

Objective 2: Estimates of the Costs and Benefits of Soil Health Practices for Ontario

Based on the assembled knowledge and studies, estimate the likely costs, savings and benefits due to adoption of soil health practices in Ontario, by practice and commodity or production system where possible. Estimates should correct for differences in costs of production in jurisdictions where and years when the research took place.

To be useful for farmers' decision making, the data should be expressed in a format useful for agronomic planning and analysis. The fact sheets produced by the Soil Health Institute and American Farmland Trust are one way of expressing the data in an accessible format. A useful format can be discussed with project advisors.

As noted already, soils, climate, production systems and cost of production differ between areas where soil health economics have been done. Yet there are broad similarities between Ontario and many other jurisdictions, especially adjacent parts of US and Canada. Adjustments should be made to reflect the differences between jurisdictions or general caveats expressed.



Objective 3: Gaps in Knowledge on Business Case for Soil Health

Assess and identify the gaps in knowledge about the costs and benefits of adopting soil health practices by practice, commodity/production system. Knowledge gaps should include both those in the broader literature and those specific to Ontario.

It is anticipated that some production systems and regions have better documentation on soil health economics. As a recent review shows research has concentrated on certain practices and regions (Rejesus et al. 2021).

As noted, information on the economics of soil health practices will differ for the various production systems of interest including grains and oilseeds, field vegetables, tree fruit and small fruit, dairy, hogs, beef, sheep and others. What is needed is an articulation of what the gaps and limitations of the economics of soil health practices are in general and more specifically for production systems in Ontario.

Objective 4: Recommendations for Study of Ontario Farms for Costs and Benefits of Soil Health Practices

Identify the approach and methods that should be used to undertake an empirical inventory of the costs, savings and benefits of soil health practices on Ontario farms. This effort would build on results from Objective 2 and address gaps identified in Objective 3. Make recommendations on how studies in Ontario should be done.

More research and study of soil health practice economics is needed in Ontario to assist farmers in making decisions and governments in designing the best support tools and incentives. This additional research would build on the results for Objective 2 and address gaps and limitations. But how should that research be done?

One model is to follow the case study approach with partial budget analysis communicated in fact sheets used by the Soil Health Institute and the American Farmland Trust. That would allow comparisons and whole farm approaches. But other approaches may have merits as well (e.g. Net Present Value). The consultant will examine different approaches and their relative merits.

Given the potential gaps in knowledge for different commodities and production systems, the research may require several steps and the consultant will assess this. The consultant will also identify potential additional stakeholders, researchers and partners that may be interested in collaborating on the research in Ontario and addressing gaps and limitations.



The consultant will complete these tasks and summarize the work in an interim report, final report and fact sheet suitable for extension purposes.

Project Activities

The four objectives will be met within the following activities:

1. An interim written report with the presentation of preliminary results to project to advisors, as well as discussion of subsequent phases (e.g. Template for fact sheets).
2. A final written report with executive summary and fact sheet(s) accessible to farmers, farm advisors, agronomists, agrologists, economists and public servants.
3. A presentation with supporting PowerPoint, including slides with key findings and summaries.

Project Timeline

The project should be completed by **November 30th, 2021**.

Proposal Requirements

Proposals should include the following:

- A description of your understanding of the assignment and the proposed approach;
- A proposed project timeline with key decisions, touchstone meetings, milestones and project completion dates;
- CV for the consultant (and any other team members) that clearly outlines their qualifications relevant to this assignment;
- Three examples of similar projects completed;
- Three references relevant to this assignment;
- A time/task breakdown by project team member (if more than one consultant); and,
- A proposed budget in the region of \$25,000.

Eligibility

Contractors should have expertise and experience in the areas of agricultural economics, agronomy, cost of production, soil science, crop science, and agri-environmental



science. Demonstrated experience and leadership on projects of similar focus and scope is an advantage.

The Greenbelt Foundation reserves the right to choose any or none of the vendors responding to this request for proposals.

Any questions and completed proposals should be directed to:

Thomas Bowers
Interim Director Research and Policy
Greenbelt Foundation
tbowers@greenbelt.ca

Proposals must be received by email no later than JULY 21st, 2021.



References (illustrative not exhaustive; provided to illustrate the type of information available.)

American Farmland Trust. 2021. Quantifying Economic and Environmental Benefits of Soil Health. <https://farmland.org/project/quantifying-economic-and-environmental-benefits-of-soil-health/>

American Farmland Trust and USDA Natural Resources Conservation Service. 2020. Soil Health Case Study: Steve Gould, HaR-Go Farms, NY. https://s30428.pcdn.co/wp-content/uploads/sites/2/2020/02/NY_HarGoFarms_Soil_Health_Case_Study_AFT_NRCS.pdf

Environmental Defense Fund, Soil Health Partnership and K·Coe Isom. 2021. Conservation's Impact on the Farm Bottom Line. <https://www.soilhealthpartnership.org/wp-content/uploads/2021/02/Conservation-Impact-On-Farm-Bottom-Line-2021.pdf>

Équiterre and Greenbelt Foundation. 2021. The Power of Soil: An Agenda for Change to Benefit Farmers and Climate Resilience. <https://d3n8a8pro7vhm.cloudfront.net/greenbelt/pages/14625/attachments/original/1614349880/PowerOfSoil.pdf>

Groupe AGECO, Équiterre and Greenbelt Foundation. 2020. Power of Soil: Assessment of Best Approaches to Improving Agricultural Soil Health in Canada. <https://d3n8a8pro7vhm.cloudfront.net/greenbelt/pages/14625/attachments/original/1614349924/FinalAgecoReport.pdf>

Chahal, I., R. Vyn, D. Mayers & L. Van Eerd. 2020. Cumulative impact of cover crops on soil carbon sequestration and profitability in a temperate humid climate. *Scientific Reports* 10, 13381 (2020) <https://doi.org/10.1038/s41598-020-70224-6>

Janovicek, K., D. Hooker, A. Weersink, R. Vyn, W. Deen. 2021. Corn and soybean yields and returns are greater in rotations with wheat. *Agronomy Journal* 113: 1691-1711. <https://doi.org/10.1002/agj2.20605>

Ontario Ministry of Agriculture, Food and Rural Affairs. 2021. Cost of Production and Budgets, <http://www.omafra.gov.on.ca/english/busdev/production.html>

Rejesus, R., S. Aglasan, L. Knight, M. Cavigelli, C. Dell, E. Lane, and D. Hollinger. 2021. Economic dimensions of soil health practices that sequester carbon: Promising research directions. *Journal of Soil and Water Conservation* 76(3):55A-60A doi:10.2489/jswc.2021.0324A

Soil Health Institute. 2021a. Soil Health Business Case: Economics of Soil Health Systems <https://soilhealthinstitute.org/economics/>

Soil Health Institute. 2021b. Economics of Soil Health Systems in Ohio: A project to evaluate profitability of soil health systems on 100 U.S. farms. <https://soilhealthinstitute.org/wp-content/uploads/2021/05/Economics-of-Soil-Health-Ohio-04-15-21-v-Final.pdf>



Yanni SF, De Laporte A, Rajsic P, Wagner-Riddle C, Weersink A (2020). The environmental and economic efficacy of onfarm beneficial management practices for mitigating soil-related greenhouse gas emissions in Ontario, Canada. *Renewable Agriculture and Food Systems* 1–14.

<https://doi.org/10.1017/S1742170520000320>

