

Developing a Net-Positive Network (NPN) for education and outreach to build healthier soil ecosystems in Western Canada

Organization: Assiniboine Community College (ACC)

Geographic Focus: Western Canada

Confirmed Project Partners:

Rourke Farms Ltd., Farm Management Canada, Manitoba Association of Watersheds, Manitoba Forage and Grassland Association, Manitoba Pulse & Soybean Growers

This project will build an innovative network of regional communities of practice to improve soil health. The farmer-led network will support the knowledge mobilization, transfer and exchange associated with implementing large-scale soil improvement practices supporting nutrient management and soil biodiversity.

While there is a fundamental understanding of what is required to mitigate global warming at the farm level, the challenge is practical implementation, acceptance and widespread adoption. This project will build independent extension and knowledge transfer capacity to Canadian soil managers and farmers who want to adopt soil health practices. It is widely recognized that more training, mentoring, and sharing of agricultural technologies focused on climate change mitigation is needed.

In Phase I (years 1-3), the project will demonstrate activities in growing alternative cover and extended season crops, improving soil nutrient management and crop diversification and rotation to other local producers. To educate the next generation of farmers, the project will develop a curriculum based on best management practices and offer training programs through ACC's Russ Edwards School of Agriculture & Environment. In Phase II (years 4-5), the project will expand into Alberta and Saskatchewan through the network of established partners.



Digital soil resources to support mapping of soil nitrogen mineralization and improved nitrogen management

Organization: Dalhousie University

Geographic Focus: National

Confirmed Project Partners:

Brandon Heung, Dalhousie University; Jacynthe Dessurealt-Rompré, Laval; Kate Congreves, University of Saskatchewan; Luke Laurence, Olds College

Dalhousie University will develop and disseminate digital soil mapping tools to allow farmers to document changes in soil organic matter content, and use this information to estimate the soil's ability to supply nitrogen to inform "Right Rate" nitrogen fertilizer application. The project will be national in scope and use regionally accepted measures of soil nitrogen mineralization to train prediction models and provide site-specific prescription maps to inform more precise nitrogen management at the field scale.

In Canada, routine soil testing to measure nitrogen mineralization is not available in all regions, despite sound science supporting these measures on a regional basis. Research has demonstrated that while there is not a single test that works across regions, within regions there are reliable tests to measure soil nitrogen mineralization. In addition, the ability to map soil carbon content is advanced.



Small grains, big gains for soil health in Ontario

Organization: Ecological Farmers Association of Ontario

Geographic Focus: Ontario

Confirmed Project Partners:

Dr. Tongzhe Li, University of Guelph; Ontario Soil & Crop Improvement Association; Ontario Soil Network; Soils at Guelph

This project uses a reverse auction model to increase and evaluate the adoption of small grains and cover crops using financial incentives. The project will also evaluate the acceptance and adoption of small grains and cover crops using a network approach to education, training, and outreach. This model is a novel approach to incentivizing stewardship in Ontario's agricultural sector.

A major objective of this project is to develop new knowledge on reverse auctions as a potential instrument to encourage beneficial management practice adoption in the agriculture sector in Ontario. The project will also pursue secondary outcomes such as new knowledge on the market opportunities for small grains in Ontario, a better understanding of the impact of farmer networks on best management practice adoption, and eight farmer-led research trials that help advance small grains production for Ontario farmers.



Improving soils through fall-seeded cash and cover cropping

Organization: Farming Smarter Association

Geographic Focus: Southern Alberta

Confirmed Project Partners:

Tech for Nature, Royal Bank of Canada

This project will use small-plot and on-farm research activities carried out in collaboration with farmers. It will engage them directly to develop and evaluate novel best management practices on irrigated and rainfed land in southern Alberta, which is one of the largest and most productive agricultural regions in Canada. This program will evaluate cover crop management strategies that maximize biomass accumulation and explore cover crop establishment to reduce soil erosion following specialty root crops, such as potatoes and sugar beets. The unique farmer-participatory approach enabled through the regional innovation hubs will improve the communication of findings to the farming community, promote farmer feedback during best management practice development, and reduce risk perception around adopting novel best management practices.

Farming Smarter will disseminate project findings through an established infrastructure of diverse knowledge transfer and translation activities including live presentations of findings at field days, workshops, and producer conferences. Articles in magazines, agricultural media outlets, and website news posts will provide project insights. Farming Smarter will also create a dedicated project page on the website for updates.

Farming Smarter will leverage resources and committed financial support from the RBC Tech for Nature program to successfully deliver program goals.



Farmers and soil health in the Greenbelt: motivating change with locally relevant soil assessment

Organization: Greenbelt Foundation

Geographic Focus: Ontario's Greenbelt, and National

Confirmed Project Partners:

Soil Health Institute, Ontario Soil and Crop Improvement Association, Ontario Certified Crop Advisor Association, Soils at Guelph

This project aims to establish Soil Health and Carbon Benchmarks for soil types across the Greenbelt region in Ontario. Benchmarks move soil health from being a concept to a manageable issue, where farmers can evaluate and measure the impact of different beneficial management practices thus leading to greater adoption rates. To do this, the Greenbelt Foundation will work with the Soil Health Institute to group soils based on soil texture, drainage class and other inherent factors, and conduct extensive testing to establish Benchmarks for each soil group. This will include sampling baseline sites (e.g., conventional farming), soil health sites (e.g., sites using cover crops and reduced tillage), and reference sites (e.g., perennial grasses). This will allow farmers to sample their soil and see where their soil falls on the spectrum ranging from the baseline to the reference.

Soil health can be improved by using beneficial management practices, but adoption of soil health systems is hindered because farmers need practical and effective measurements for assessing the current status of their soil and a way to evaluate progress over time. Measuring management-induced changes in soil health can provide insight into farmers' progress of establishing more climate-smart systems that promote enhanced ecosystem services and processes. Research shows that improving soil health increases carbon sequestration, reduces greenhouse gas emissions, increases drought resilience, enhances water quality, boosts crop yield, increases nutrient availability, provides pollinator habitat, and suppresses many plant diseases. Yet today, less than 18% of the Greenbelt's farmland is managed using the basic soil health practice of cover cropping. To bring these on-farm and environmental benefits to scale, this project will provide farmers with the information they need to know when and how to adopt management systems to improve soil health.

Once benchmarks have been tested, established, and accepted, the Greenbelt Foundation will develop and implement social network-based outreach programs, with the support of Ontario partners, that inform and train farmers and their advisors on using soil health tests and benchmarks. Soil sampling will be offered to 300-500 farms over the 4-year project. Once sampling is conducted, benchmarks are set by farmers and their advisors based on individualized goals.

The project will be supported by an effective communication strategy to recruit farmers not currently engaged with stewardship programs, as well as a public campaign promoting the positive role of farmers in supporting biodiversity and climate change actions.



Aiming high, Soils Impact People: building an enabling environment to transform Canadian agriculture

Organization: Guelph University, Soils at Guelph

Geographic Focus: Ontario

Confirmed Project Partners:

Ontario Ministry of Agriculture, Food and Rural Affairs, Ontario Soil Network, Rural Ontario Institute's Advanced Agricultural Leadership Program

Soils At Guelph, in partnership with the Ontario Ministry of Agriculture, Food and Rural Affairs, Ontario Soils Network, and the Rural Ontario Institute, aim to amplify soil health knowledge using a three-pronged outreach project that will serve a variety of stakeholder groups.

Firstly, Soils At Guelph will enhance the interpretation of soil health tests for all users. The project builds on previous work done in the province in developing SHAP - the Soil Health Assessment and Planning tool. Through testing, training and encouraging uptake of SHAP, the project will generate and upscale information to prioritize six ecological best management practices that have the greatest influence on soil organic matter.

Secondly, through surveys and workshops, Soils At Guelph will learn from and strategize with traditionally 'non-engaged' farmers. This will magnify current efforts that have focused on innovators and early adopters. The project will investigate how to reach and engage farmers that do not have an interest in soil health in order to increase the reach and scale to other regions.

Lastly, using the information generated during the previous activities, Soils At Guelph will engage, educate, and train stakeholders beyond the farm level that ultimately have a significant pull/push on farm-level decisions.



Developing a registry to drive best management practice adoption through the ecological goods and services marketplace

Organization: The Resilience Institute

Geographic Focus: Alberta, Manitoba, and Saskatchewan

Confirmed Project Partners:

Food Water Wellness Foundation

This pilot project aims to establish a registry to enable producers to build ecosystem service credits, and connect producers to potential purchasers of those credits, in order to support a market for ecological outcomes tied to management practices.

The project will directly contribute to the program goal by using financial and agronomic incentives to encourage and motivate producers to adopt beneficial management practices that increase soil organic matter to improve biodiversity and resilience. Through the registry, producers will receive verification of the effects their management changes are having, followed by financial incentives. The project is designed to be scalable and the long-term goal is to expand the project across Canada.



Indigenous Soil Health Learning Circles for resilient prairie agroecosystems

Organization: University of Saskatchewan

Geographic Focus: Saskatchewan, Alberta, and Manitoba

Confirmed Project Partners:

Saskatchewan Aboriginal Lands Technicians, International Buffalo Relations Institute

This project aims to establish a network of Soil Health Learning Circles, integrating Indigenous prairie ecological knowledge, directed towards First Nations land managers and community members as well as the Indigenous and non-Indigenous farmers who farm First Nations land. The project will deliver evidence-based and culturally significant outreach and education to successfully improve prairie soil health, biodiversity, and soil organic matter for First Nations agroecosystems. Importantly, this project is grounded in Indigenous knowledge and respect for prairie ecological relationships, including the buffalo as a keystone species and a relative to Plains Indigenous peoples as put forward in the Buffalo Treaty.

Currently, conventional agricultural production is the dominant economic land use on First Nations lands in the Canadian Prairies. Most of this land is farmed by non-Indigenous farmers, often with little input about agricultural practices from the First Nations. However, many First Nations aim to take stronger control over agricultural land management that improves economic outcomes, while better aligning with Indigenous values centering ecological stewardship and biodiversity—even if land continues to be leased to non-Indigenous farmers. Achieving this goal requires learning about soil health from two perspectives (Indigenous and western science-based)—and for two historically disparate populations (First Nations and non-Indigenous farmers).

The geographic focus is the prairie-parkland region of Saskatchewan, Alberta and Manitoba. This project leverages an Agricultural Climate Solutions Living Lab Project “Bridge to Land Water Sky” led by Mistawasis Nêhiyawak in partnership with Muskeg Lake Cree Nation and other organizations and funded by Agriculture and Agri-Food Canada. The Bridge Living Lab will work with First Nations and farmers that farm their land through co-development of beneficial management practice “bundles” that encompass crop diversification, reduced input use, landscape diversification as well as restoration of marginal croplands to grassland for grazing.

The Soil Health Learning Circles will translate the outcomes of this first-of-its-kind Indigenous-led Living Lab to a broader geographic audience, reaching First Nations and farmers who farm First Nations lands across the Prairies and addressing the barriers Indigenous Peoples face in the agricultural sector. Most importantly it will celebrate Indigenous knowledge as a key factor in building a more innovative and climate resilient agricultural sector that will have global impacts.

