



Possibility grows here.

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The Power of Soil: Climate-Smart Agriculture Jumpstarting Soil Health in Ontario and Canada

Canada's farmers are on the frontlines of worsening climate impacts. Adaptation strategies are needed to maintain yield, harvests, plant and animal health and profitability. Losing productivity as a result of increasing climate risks negatively affects farm families' livelihoods, the profitability of the agriculture sector, the viability of rural communities, and Canada's GDP.



Photo: M. Luymes

Ontario's agricultural greenhouse gas (GHG) emissions currently represent 7.6% of Ontario's emissions¹, and are projected to increase somewhat to 2030. GHGs associated with animal production (methane CH₄ and nitrous oxide N₂O, particularly) will remain the largest source in agriculture, but are projected to decrease. The projected GHG increase is mostly emissions from crop production, which include carbon dioxide and the more potent GHG, nitrous oxide.

In addition to reducing GHG emissions, practice changes in the agriculture sector to increase soil health, and adapt to climate impacts, can help sustain both farm livelihoods and food security.

Federal and provincial governments have been promoting and funding soil health practice adoption for a long time, including under the current Canadian Agricultural Partnership. Yet many barriers persist and adoption rates remain modest. New approaches are needed to jumpstart adoption and remove barriers. Bringing innovative ideas from other jurisdictions and knowledge directly from farmers is needed to make adoption much more attractive to farmers. These could include measures like better access to technical advice, incentives that recognize ecological services, carbon offsets for agriculture and support for farmer-to-farmer learning. That is the purpose of this project.

Soil health: A win-win for cost-effective climate adaptation and mitigation in agriculture

Important ways to reduce the GHG footprint of crop production (and some animal production) include soil health² strategies. Soil health strategies increase soil organic matter taking carbon out of the atmosphere and increasing crop production resilience (water management, nutrient management, etc.), helping to meet agriculture's climate adaptation needs. Furthermore, soil health

¹ Current emission calculations for crop production do not include some elements including, the manufacture of mineral fertilizers and gain or loss of soil carbon.

² Soil health is defined as "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans" (Natural Resources Conservation Service of the USDA) and includes physical, chemical and biological aspects such as soil carbon, aggregation, microbial biomass, water retention and other features.



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strategies tend to also reduce overall GHG emissions (e.g. reduction of nitrous oxide emissions, on-farm fuel use, and fertilizer and pesticide use, etc.). While some of Canada's soils have shown significant gains in soil health, many of Ontario's agricultural soils are losing organic matter and there is significant potential to improve soil health, to sequester carbon, use nutrients more efficiently and reduce overall emissions from agricultural production.

The Power of Soils: Growing a more sustainable, prosperous and lower-GHG agriculture sector

Over the next three years, this project will build evidence to advocate for new and innovative policies, strategies, programs, funding, education, research and tools to drive more widespread adoption of soil health strategies that increase soil carbon, reduce the overall GHG footprint, build farm adaptation, and minimize other environmental risks.

This project will bring together farmers, agronomists, research scientists, farm organizations, agribusiness, food industry, conservation groups, policy makers, and other stakeholders to:

- (1) confirm the farm management practices and approaches that improve soil health and reduce the GHG footprint of the agricultural sector based on the scientific literature,
- (2) assess the extent of soil health practice adoption and model how additional adoption would affect GHG emissions and soil health,
- (3) identify barriers to adoption directly from farmers and from current research knowledge,
- (4) identify new policies to substantially support farmers to adopt soil health approaches and overcome the barriers to adoption, and
- (5) raise awareness and build consensus on what new policies are required to spur widespread adoption of these management approaches.

The knowledge and insights gained from this research will be used to build support for better consideration of agriculture and soil health in the new federal climate plan, the next federal-provincial-territorial framework after the current Canadian Agricultural Partnership, and potential improvements to Business Risk Management Programs to ensure climate risks to farm businesses are properly considered and soil health is supported, while respecting the main purpose of stabilizing income.

Équiterre and the Greenbelt Foundation are partners in this project. Équiterre leads the national effort and the Greenbelt Foundation leads Ontario aspects, with national and Ontario advisory committees guiding project direction.

