



Towards a National Soil Health Strategy

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The imperative for a soil health strategy

Healthy soils are the foundation of sustainable food production, enhanced biodiversity and cleaner air and water for present and future generations. The Soil Conservation Council of Canada (SCCC) has a rich history as the face and voice of soil conservation in Canada. The SCCC was founded in 1987 by a group of individuals under the leadership of Senator Herb Sparrow to advocate for the importance of soil conservation on a national scale.

The SCCC is the only national organization to concentrate on the issues of soil health and soil conservation within a broadly based landscape context. It works to build a greater understanding of the importance of soil as an essential resource to society by facilitating the exchange of information with all stakeholders. SCCC Board members include representative farmers, academics, government, input suppliers and environmental non-governmental organization. The SCCC has delivered a number of programs, with the assistance of government funding, and hosts periodic Summits on Canadian Soil Health to examine key and emerging issues affecting soil health.

In 2021/22, the SCCC of Canada partnered with the Compost Council of Canada (CCC) to research and develop a roadmap for improved soils, with an eye to linking this improvement to tackling climate change. The *Recruiting Soil to Tackle Climate Change Roadmap* was developed under the direction a multidisciplinary team and featured extensive engagement and feedback from a range of stakeholders. In addition, an extensive literature search was conducted to gather new and useful information on soil organic carbon.

Based on science and industry leadership, the result was a series of recommended approaches to improving soil health. Recommendation 2 in the Roadmap calls for the development of an Industry driven consensus - based National Soil Health Strategy. Canadian farmers recognize that soil is their greatest asset and that to build or preserve soil that is healthy is an important and attainable goal.

But interest in soil health has become prominent in the minds of many Canadians, and veteran industry observers agree it has never garnered so much attention. The many benefits of soil health have been discussed at great length but can be summarized as Healthy soils provide us with a broad spectrum of benefits that help farms, rural businesses and communities remain viable; are essential to our abundant and safe supply of food, water and air; and create the conditions where biodiversity above and below ground can thrive. At the same time, healthy soils can and do play an oversized role in reducing greenhouse gas emissions and keeping carbon in the soil.

Globally, soils are under grave threats. The 2015 “Status of the World’s Soil Resources” of the Food and Agriculture Organization of the United Nations states: “while there is cause for optimism in some regions, the majority of the world’s soil resources are in only fair, poor or very

poor condition. Today, 33 percent of land is moderately to highly degraded due to the erosion, salinization, compaction, acidification and chemical pollution of soils.”

In Canada, we do not have a comprehensive national analysis of the state of our soils although Agriculture and Agri-Food Canada’s agri-environmental indicators provide model-based indicators including for soil erosion, soil organic matter, soil salinization, and soil cover. In addition, some provincial governments document changes in soils over time including Alberta, PEI, and Quebec. While many Canadian farmers have adopted and implemented conservation tillage and other practices that have improved agricultural soils, there are continuing challenges to maintaining and improving this valuable resource.

Interest, action and investment through an overall strategic approach are evident throughout the world. Australia, England, Scotland, and the European Union for example, have developed soils strategies.

In Canada, although we are just at the beginning stages of developing a soil health strategy, several initiatives are already underway. Examples include:

- The Senate, under the leadership of Senator Rob Black, is undertaking a study on Canadian soil health.
- Agriculture and Agri-food Canada is leading the development of the Sustainable Agriculture Strategy, of which soil is one of the priorities.
- The Canadian Roundtable on Sustainable Crops is completing its Foundations of Sustainable Grain Production, of which one of the four components is Soil and Nutrient Management.
- Some provinces are taking action on soil health including the following.
 - Ontario is in the implementation stage of a provincially based soil health strategy in collaboration with stakeholders.
 - Prince Edward Island launched its Soil First Farming initiative as a cooperative effort between farm organizations and the provincial government.
 - Québec has a Plan d'agriculture durable 2020-2030 that includes objectives for soil health and significant reinvestment in extension services.

Given that the imperative and interest has only increased since the Roadmap was published in 2022, the SCCC is now embarking on the implementation on one of the main recommendations in the Roadmap -- a National Soil Health Strategy (NSHS).

A NSHS has many potential beneficiaries.

For all stakeholders, the NSHS will reduce conflicting or duplicative efforts and improve overall efficiency for public, private and non-profit sector investments in Canadian soil health.

For farmers, ranchers, and other soil managers, it will help build more collaboration, and increase access to technical/professional help to design, build and implement new and proven soil health technologies and widespread adoption across Canada.

For agri-food exporters such as grain marketers and food companies, soil health is important in growing access to many global markets. The NSHS will demonstrate an active commitment to soil health goals that customers are setting.

For agri-businesses, the NSHS will help to align business plans with the goals developed by their markets and customers who see soil health as part of their business models.

For individuals, agencies and institutions (public and private) that develop science and technology, this strategy will provide guidance on developing tools and best management practices for acting on soil health.

For the Government of Canada, the NSHS will provide the coordination of actions that help meet Canada's global climate change commitments, build on Canadian agriculture's global reputation for sustainability, and secure our capacity to significantly contribute to world food security.

For the general public, the NSHS will increase knowledge and understanding regarding: the importance of soil health and the benefits it returns to all Canadians; what we as an industry are doing about it; and how soils can be healthy.

The NSHS defined.

The NSHS will be an industry-led framework and plan for collective action to maintain and enhance the soils in Canada, with an immediate view (by 2030) and for the longer term (by 2050)

Elements of that framework will be:

1. Articulation of the objectives the soil health strategy, including the selection of a definition of soil health for the purposes of the NSHS.
2. Setting goals for soil health and identifying tools to assess soil health at different scales, in order to better monitor how the state of soil is progressing.
3. Selection of priority actions that need to be taken to achieve the goals that are set.
4. Identification of priority research and analysis to assist in effectively implementing those actions.
5. Securing of resources, whether by individual stakeholders or collectively, to undertake both priority research and measurement and priority measures.
6. Establishment of a strategy governance system to enable continuing commitment and collaboration on meeting the soil health targets.

7. Creation of stakeholder engagement processes that permit the constant renewal of the NSHS and its implementation.

As noted, many stakeholders are taking an active role in improving soil health in Canada. Among these stakeholders are: regional and national industry-led soil conservation associations; academic and public researchers; farm associations; and private companies and the provincial and federal governments. Good strategies take effort, time and money to ensure they are inclusive, representative, practical and doable. The constructing and implementation of the NSHS will be a multiyear initiative.

Phase 1 - Planning and engagement

The first phase, to be completed by spring 2024, will focus on setting the rationale and need for the strategy, propose objectives and goals , priority measures and supporting research and measurements, articulating an implementation plan and resource needs and commitments, as well as establishing the governance of the NSHS.

SCCC is establishing a coalition of farm and conservation organizations that are prepared to lead and invest in moving the NSHS forward. This coalition will be tasked with developing broader consensus among soil health stakeholders on the scope and details of a NSHS that meets the needs of the agriculture industry stakeholders across Canada and can garner active stakeholder participation.

In Phase 1, building this consensus will be facilitated by comprehensive engagements (discussions/meetings/webinars) to formalize the strategy elements, including an implementation plan that aims to:

- Document the need for and benefits of the NSHS, including how land managers can increase sustainability, profitably and resiliency.
- Create a governance, funding, and support framework.
- Engage and collaborate with agri-business decision makers who provide sustainable products.
- Engage and collaborate with public sector institutions and NGOs that make policy and design programs to support sustainability, climate change adaptation and other areas of national concern.

The results of Phase 1 will includes a workplan for implementing the strategy and the confirmation by a core of stakeholders committed to taking action on soil health. The estimated timeframe for the planning and engagement phase is 6-8 months at an estimated cost of \$100,000.

Proposed Engagement Material

In addition to recommending the development and implementation of a soil health strategy, the recommendations of the Roadmap include elements for strategy implementation. These recommendations, which are based on expert analysis of the state of soil health in Canada and actions that have been effective, will be among the material that is provided during the stakeholder engagement. These suggestions are not to preclude the contributions of those stakeholders to the NSHS, but to optimize the use of stakeholder time by starting with a “straw dog”, as it were.

Components of a National Soil Health Strategy (NSHS)

A NSHS must be multi-faceted to address the many factors contributing to soil health from production practices, behaviour change, market signals, and other influences. The four sections below outline the main areas of emphasis that will be further developed during discussions with stakeholders during Phase 1.

1. Science-Based Soil Health Actions (Research)

Objective: The NSHS will focus on improving our understanding of the production, environmental, and economic impacts of soil degradation and methods to stop, reverse or avoid such impacts in the future.

Strategy

- Recognize that there are many different paths to soil health and the ecozones and production systems in Canada are diverse and that some practices fit all soil ecozones, but many are specific to a particular ecozone or production system.
- Engage soil health stakeholders in identifying high priority areas of research that will drive action and investment in widespread adoption of production practices and ensure the sustainability of Canadian soils.
- Develop a deeper understanding of the interests, needs, constraints, and capacity of producers to undertake positive soil health actions to address these limitations.
- Foster cooperation and collaboration among individual Canadian scientists, social scientists, public institutions, agribusiness, subject matter experts, industry and producers to:
 - identify existing and emerging challenges to soil health.
 - keep research investments appropriately focused on high priority soil health issues.
 - identify solutions to key barriers to broad adoption of soil health practices.
 - Identify systems to monitor, measure and report on Canadian soil health on a regular basis.

Actions (examples)

- Settle on a broad definition of soil health that captures and reflects the Canadian experience, our diverse agroecosystems, production systems, and our innovative spirit. At the very least, a definition of soil health should include and recognize the importance of sustainability – year over year the soil is able to support the demands of a high yielding plant (crop), maintain a diverse soil microbiome, and remain a sink for carbon.
- Settle on a set of characteristics or criteria that describe a healthy soil while accounting for different soil ecozones. This would allow farmers to frame management decisions and determine which management practices lead to improved productivity, profitability, and improved soil health relative to the baseline.
- Expand our capacity to monitor, measure and report on the state of soil health in Canada with a priority on understanding the state of soil erosion and soil organic matter loss in Canada and the economic impact on crop production and agricultural industry.
- Increase our understanding of Soil Organic Carbon (SOC) losses/redistribution and the carbon sequestration potential of Canadian soils.
- Establish a list of priority research to discover additional effective and cost-efficient methods for restoring soil organic carbon.
- Quantify the economic costs and benefits of soil health practices to farmers in different regions and in different commodity production systems.

With a definition, assessment and measurement tools, knowledge supports, financial incentives, and risk reduction supports in place, farmers can make improvements and adopt innovations that make a real difference to soil health and will allow them, and society, to realize the benefits for many years to come.

2. Learning, Education and Technology Transfer

Objective: The NSHS will focus on initiatives and partnerships that create information and distribution networks for soil health and conservation knowledge.

Strategy

- Increase the quality and quantity of soil health and conservation information tools available to producers, other soil managers and agricultural professionals in Canada.
- Support new and existing partnerships that are aimed at delivering these extension tools.

Actions

- Enhance the availability of soil health learning and training opportunities for producers, land managers and agricultural professionals.
- Support the development of decision-support tools to help farmers develop their own farm-specific prescriptions of practices to improve soil health.

- Support demonstrations of agriculture as an environment solution provider (subject to economic viability for farmers)
- Increase direct learning and knowledge-sharing efforts for producers (workshops, field days, webinars) and land managers.
- Increase the capacity for farmer-to-farmer learning about soil health systems across Canada.
- Recognize the shared private-public roles in agricultural extension and increase efforts to ensure provision of quality soil health knowledge to farmers through both private and public delivery systems.
- Support adoption of practices by farmers and land managers that improve soil health and productivity, such as:
 - No-till and reduced tillage cropping systems, cover crops and rotations
 - Organic amendments (e.g., compost, manure, digestate)
 - Soil health testing
 - Nutrient management (4Rs)
 - Biodiversity in and above the soil
 - Water management on agricultural lands

3. Supporting Public and Private Interests in Soil Health (Resources)

Objective: The NSHS will inform the development of science-based policy and programs on how to promote soil health and conservation in Canada.

Strategy

- Create a network of stakeholders that can provide unbiased and science-based expertise on soil health and conservation to inform both public and private decision makers.
- Foster relationships between the public sector, non-governmental conservation organizations, individual companies and farmer associations.
- Identify new and innovative financial incentive and risk reduction mechanisms to support farmers in widespread adoption of soil health practices well beyond current levels.
- Identify key areas for additional investment in public and private funding to support increased adoption of soil health practices.

Actions

- Renewed engagement of senior governments in policy, programs and research that support building soil health (i.e., Senate of Canada study on Canadian Soil Health, Ontario's Soil Health Strategy, and Sustainable Agriculture Strategy).
- Expand and build relationships within the private sector to engage businesses in soil health actions.
- Enhance the dialogue between farmers and conservation organizations as to potential beneficial partnerships.

4. Public Engagement (Communications)

Objective: The NSHS will focus on engaging more Canadians on the importance of soil health and conservation and how to make a personal contribution.

Strategy

- Use science-based information to improve the understanding of Canadians of the importance of soil to society, economy and the environment.

Action

- Develop an ongoing information campaign on soil health in Canada, including helping Canadians become aware of their personal link to soil health and productivity.
- Present opportunities for Canadians to turn their awareness into actions (small or large), such as tools for urban and non-farm landowners to manage soil health.

Phase 2 – Implementation

Depending on the result of Phase 1, implementation could begin immediately, building upon the current work supporting soil health improvements by core stakeholders participating in the NSHS. However, there is an expectation that incremental actions and resources will be needed, and that additional participants in the NSHS strategy could significantly enhance the capacity to deliver results. Accordingly, implementation will be a staged process with new and expanded initiatives being implemented over time according to suitability, need and resource availability.

Appendix 1 Roadmap Recommendations from Recruiting Soil to Tackle Climate Change

<u>Intervention Area</u>	<u>Rec #</u>	<u>Recommendations</u>	<u>Lead Entity</u>
<u>Building the Future [institutional framework]</u>	<u>1</u>	The agricultural industry and the federal government should work together to create a non-government entity (e.g., "Soil Health Roundtable") that can provide the leadership necessary to develop and achieve a vision and plan that will secure the future of soil health in Canada. Action: Senior government should initiate a process where stakeholders work together to develop consensus on the ways and means of creating, funding, and maintaining such an entity.	Federal Government
	<u>2</u>	Develop a consensus-based National Soil Health Strategy. Action: Stakeholders and senior governments should task the Roundtable with developing a National Soil Health Strategy via a multi-stakeholder process.	Soil Health Roundtable
<u>Making the Case [motivation]</u>	<u>3</u>	Build a basic understanding among soil managers of how management practices impact soil health and soil organic carbon (SOC). Action: The Roundtable should be tasked with the design and implementation of a five-year program with the goal of reaching 100,000 farmers with soil health education and training.	Soil Health Roundtable
	<u>4</u>	Develop a mechanism to sustain communications and collaboration between farmers, other soil managers, scientists, and researchers. Action: Establish a National Soil Carbon Science Advisory Board, in collaboration with the Living Labs Program, Canadian universities, and other relevant stakeholders. The board's mandate should be to convene annual meetings for the review of existing research and the establishment of common priorities for research investment. The focus should be projects that are targeted at farm-level issues and result in usable and practical solutions for farmers.	Soil Health Roundtable
	<u>5</u>	Promote and enable leadership activities among leading-edge farmers (innovators and early adopters) that will facilitate the sharing of their knowledge and experience with other farmers. Action: Support 200 soil champions in one-to-one and group mentoring of their colleagues with respect to practices that increase SOC.	Soil Health Roundtable
	<u>6</u>	Raise the public profile of soil to the same level of importance as air and water. Action: Launch a public engagement initiative (over five years) to raise and sustain the key role soil plays in providing multiple important benefits to all Canadians.	Soil Health Roundtable
<u>Making it Work [tools]</u>	<u>7</u>	Build independent extension and knowledge transfer capacity to the point where it is available to all Canadian soil managers and farmers who want to adopt soil health practices. Action: Invest over five years to make soil-health related extension and knowledge transfer available across Canada (this would ideally be delivered by the provinces).	Federal Government

<u>Intervention Area</u>	<u>Rec #</u>	<u>Recommendations</u>	<u>Lead Entity</u>
	8	<p>Create a program that preserves existing knowledge of our soils, gathers new information, conducts monitoring of changes, and reports to Canadians on a regular basis.</p> <p>Action: Establish a national government agency/department charged with preserving and managing existing and new information relevant to soils, including beneficial management systems and practices.</p>	Federal Government
<u>Strengthening the Business Case [incentives]</u>	9	<p>Accelerate efforts in developing tools to assess all the costs and benefits, on-farm and off-farm, associated with improving soil health.</p> <p>Action: Identify/create a formal set of tools for integrating ecological services into cost-benefit analysis related to soil management.</p>	Federal Government
<u>Clearing the Tracks [obstacles]</u>	10	<p>Identify and gradually amend government policies and programs with the goal of making them as compatible as possible with practices that improve soil health and build soil carbon.</p> <p>Action: Senior governments should systematically review agricultural policies and programs on an ongoing basis, with the goal of removing obstacles to the adoption of improved soil management practices.</p>	Governments at all levels in Canada