April 24, 2023

OMAFRA Invitation to Standing Senate Committee

The Standing Senate Committee on Agriculture and Forestry has invited the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) to appear as part of its study on the status of soil health in Canada and has asked for information around these questions below. OMAFRA's responses and notes are below.

How is soil health measured, collected, analyzed, and shared in Ontario?

There is currently no common method of measuring and reporting on soil health status between governments, conservation authorities, academia, and industry in Ontario. There are key initiatives in Ontario currently support soil health-related activities, including the Grow Ontario Strategy (2022) and Ontario's Agricultural Soil Health and Conservation Strategy, or "Soil Strategy" (2018). Healthy soil is essential to strengthening Ontario's agri-food supply chain stability and local food production. Together with over 20 partners from the province's agriculture and food commodity organizations, academia and Conservation Authorities, Ontario has committed to developing and implementing activities to promote the health and conservation of Ontario's Agricultural Soil Health and Conservation Strategy. This involves a long-term framework that sets the vision, goals and objectives for soil health and conservation in Ontario to 2030 with accompanying actions and methods to measure progress. The Soil Strategy is the culmination of a process which incorporated input and feedback from agricultural, conservation and academic communities, technical experts, Indigenous communities, partner organizations and the public after over two years of consultations and engagement.

The Soil Strategy framework is based on four Theme Areas:

1. **Soil Management** – Understand how management practices affect soil health across Ontario's variable soil conditions and agricultural systems.
2. **Soil Data and Mapping** – Good decisions rely on good data. Reliable soil data and tools are needed for informed decision-making.
3. **Soil Evaluation and Monitoring** – Soil health status needs to be evaluated across varying landscapes and tracked over time.
4. **Soil Knowledge and Innovation** – Soil knowledge and skills are optimized: sustain soils education, knowledge and skills, support innovation through research, and ensure producers have access to knowledge and support to maintain and enhance soil health.

Themes 2 and 3 of the Soil Strategy are related to "measurement, collection, analysis, and sharing of soil health in Ontario" and have the following goals: 1) Reliable soil data and tools are available to allow for informed decision-making and analysis by producers, industry, government, and the public, and 2) The health and status of Ontario's agricultural soils are tracked over time.

Several key actions have already begun:

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- **On-Farm Applied Research and Monitoring (ONFARM)** (2019-2023): This is an Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) program delivered by the Ontario Soil and Crop Improvement Association (OSCIA) and funded through the Canadian Agricultural Partnership (CAP). It includes on-farm paired trials to identify soil health indicators and examine the effects of various Best Management Practices (BMPs) on cooperator farms; continuation of tracking of soil water quality from the Great Lakes Agricultural Stewardship Initiative's (GLASI) Priority Sub-watershed Project; and findings are shared through the OSCIA website as annual reports and through a data dashboard.
- **Ontario Soil Health Assessment and Planning Tool (SHAP)** (2019-2023): This project seeks to develop a planning tool for producers and advisors to assess the status of soil health, develop standardized in-field and laboratory protocols for soil health indicators, and is planned to be released in late 2023.
- **Ontario Topsoil Sampling Program** (2019-2023): This project was designed to develop a baseline dataset for soil health indicators for agricultural soils in Ontario, to develop interpretive ratings for soil health indicators, and includes collaboration with University of Guelph on testing new potential soil health indicators. A final report summarizing findings and results is expected to be publicly released in late 2023.

Currently, these programs are evaluating several analytical (laboratory) soil health indicators for their applicability in the Ontario context:

- Soil organic matter*
- Permanganate oxidizable carbon (active C)*
- Soil respiration (24-hr, 96-hr*)
- Potentially mineralizable nitrogen*
- Wet aggregate stability*
- Evolved NH_3
- Bulk density
- Soil microbiology (bacteria, fungi)
- Soil aggregate and pore structure
- Magnetic susceptibility

*Indicates soil health indicators proposed for use in Ontario under SHAP

In addition to the analytical soil health indicators, in-field visual soil health indicators are also being evaluated, including the Soil Surface Quality (which describes the general condition of the soil surface and the amount of cover), Soil Structure Quality (which describes the size, appearance, and quality of soil aggregates), and the visual recognition of water, wind, and tillage erosion symptoms.

In the 2023 Ontario budget, the government has committed $9.5 million over the next three years (2023-2025) to improve soil data mapping and soil evaluation and monitoring, and to support key commitments under the Grow Ontario Strategy and Soil Strategy. Soil data and interpretive maps support on-farm decision-making, enabling farmers to innovate and use technology to improve their long-term viability so that they can remain competitive in the global market.

OMAFRA is collaborating with researchers at the University of Guelph and Dalhousie University to develop new tools for the rapid determination of soil properties and soil health indicators. This

research involves analyzing the relationships between soil properties and soil spectral data. Soil spectral analysis (visible and near infrared red, mid-infrared) has the potential to offer quicker turnaround time, generates less environmental waste, and can be used to predict several soil properties with a single sample. Soil samples archived from the Topsoil Sampling Program are currently being analyzed with mid-infrared spectroscopy at Dalhousie University to build a spectral library to develop predictive models.

OMAFRA collaborates with several industry associations and sector partners to raise the profile on soil health across the Province. One example is the Ontario Soil and Crop Improvement Association (OSCIA), in their efforts to increase adoption of soil health best management practices and add capacity and support for soil health among farm leadership in Ontario.

The OSCIA also delivers the Environmental Farm Plan in Ontario which provides an opportunity for producers to assess their farm for actionable improvements to increase environmental conditions. The farmers completed EFP can then be used in conjunction with Provincial cost-share programs to begin implementing farmers unique action plans.

The OSCIA, University of Guelph and OMAFRA also collaborate closely with Certified Crop Advisors (CCA's) and Industry sponsors hosting premier farm knowledge sharing events where newest technologies are profiled, i.e., Canada's Outdoor Farm Show, Ontario Agriculture Conference, Southwest Ontario Diagnostic Days, Eastern Ontario Diagnostic Days, and numerous field demonstration days and bus tours.

OMAFRA has an *ad hoc* team called the OMAFRA Soil Team (established in 2000) which is made up of a diverse group of experts who are passionate about soil and the management of the soil resource and consider it first when advising on issues. The Soil Team operates in an informal, professional capacity to advance soils information and knowledge translation and transfer (KTT) to stakeholders and support OMAFRA policy and program development. The Soil Team contributes to numerous extension activities across the province with focus on Soil Health, including:

- Soil management workshops (since 2000)
- Soil Compaction Day events
- Demonstration plots at Canada's Outdoor Farm Show in Woodstock, Ontario
- Manure Expo/Manure Monday events/webinars
- Participation in AgScape, Agriculture in the Classroom
- Participation with OSCIA regional associations with in-field soil health events
- OMAFRA is an Ex-Offico member on the Ontario Soil Network and supports with technical extension at education events.

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How does Ontario vary, relative to other provinces/territories, with respect to soil degradation?

Three primary indicators of soil degradation in Ontario are: loss of soil organic carbon, soil erosion, and lack of soil cover. According to Agriculture and Agri-Food Canada (AAFC)[1], 82% of agricultural soils in Ontario are estimated to be losing more carbon as carbon dioxide emissions than they sequester as soil organic carbon. In addition, more than two thirds of Ontario soils under agricultural production are in an unsustainable erosion risk category. More than half of agricultural soils in the province are estimated to have low or very low soil cover (covered less than 275 days). Additionally, newer findings show the extent to which soil compaction has become a significant problem in Ontario soils. When comparing soil degradation in Ontario to other provinces, there is a clear divide between eastern and western Canada. Eastern Canada shows moderate to large decreases in soil organic matter, whereas the western provinces show moderate to large increases. These findings are reflective of agricultural production trends in the province over recent decades which show increased annual crop production and decreased perennial crops, increases in tillage, larger fields (loss of windbreaks and fencerows), fewer mixed operations and livestock in general, and use of larger equipment[2]. With regards to risk of erosion, southern Ontario is particularly vulnerable due to the prevalence of annual cropping systems (corn, soybean) and has moderate to very high risk for water, wind, and tillage erosion. However, the risk of erosion has not changed over time despite the conversion from perennial systems to annual systems because of the adoption of conservation tillage[3].

Recent, initial analysis from the Topsoil Sampling Program data (Table 1) corroborates the soil degradation trends reported by AAFC. Furthermore, topsoil thickness data shows that topsoil thickness increases from upper slopes to lower slopes, indicating soil redistribution through erosion processes. Thin topsoil in upper slope positions reduces the fertility of these soils, while accumulation in lower slope positions buries fertile topsoil. Field observations indicate that the average depth of topsoil in Ontario farm soils has almost doubled in the last half century, attributed to the increased size and power of farm tractors[4]. Use of cover crops has increased since the results of the 2016 Census of Agriculture, where 28.5% of respondents indicated use of cover crops in their operation. Based on the 2021 Census of Agriculture and the Topsoil Sampling Program, 30.8% and 38% of respondents, respectively, indicated use of cover crops in their management of land. Finally, bulk density of agricultural soils can be used as a proxy for soil compaction. The Topsoil Sampling Program has identified that fine- and medium-textured soils, which dominate Ontario's agricultural soils, are at or above critical thresholds for soil bulk density, indicating widespread soil compaction.

[1] AAFC. 2016. Environmental Sustainability of Canadian Agriculture: Agri-Environmental Indicator Report Series - Report #4
[2] Statistics Canada. 2016. Census of Agriculture.
[3] AAFC. 2016. Environmental Sustainability of Canadian Agriculture: Agri-Environmental Indicator Report Series - Report #4
[4] Warren et. al., https://doi.org/10.1139/cjss-2020-0092

Table 1. Comparison of measured soil organic matter content against targets established in the Soil Strategy

Soil Texture	Soil Organic Matter (%)	
	Measured	Soil Strategy Target
Sandy	2.7	2.5
Sandy loam	3.3	3.5
Loam	3.7	4.0
Clay loam	4.0	4.5
Clay	4.2	4.5

What is the impact of climate change on soil health in Ontario?

Climate change impacts soil health and food security by increasing extreme weather events, altering precipitation patterns, and increasing average temperature throughout the year. More intense storms increase erosion risk. Often the greatest percentage of soil and nutrient losses in a year occur during one or two intense rainstorms. This has a significant impact on water quality and soil health. There are fewer wide-spread rain events during the growing season that help prevent prolonged dry soil periods. More regional areas experience prolonged dry conditions that reduce crop growth and yield potential. Shorter winters with less snow cover also promote more soil erosion particularly on cultivated fields with no vegetative cover. Less livestock and a trend towards more area in annual crops driven by high corn and soybean prices have resulted in less forages/pastures, woodlots, and wetlands. Warmer temperatures increase carbon dioxide loss from soils into the atmosphere, leading to reduction in soil carbon. Longer growing seasons allow for more opportunities for cover crop growth and greater chance of over winter survival. Longer growing seasons and warmer night-time temperatures also facilitate more insect and disease activity resulting in a greater need for increased diversity in crop rotations. A combination of BMPs that maximize water infiltration and water-holding capacity as well as practices that maintain soil cover (cover crops or residue management), or other practices that maintain or build soil carbon are the best strategies for improved soil health and providing food security.

What types of sustainable agricultural practices have producers adopted to mitigate the impacts of climate change and soil degradation?

Agricultural practices to mitigate the impacts of climate change and soil degradation are commonly referred to as Best Management Practices (BMPs). The general recommendations when it comes to BMPs for soil health are to keep the soil covered (“30% cover 100 % of the time”) and to increase the diversity in annual cropping systems. OMAFRA partnered with the Ontario Federation of Agriculture (OFA), with support from CAP, to develop and release a series of BMP books and info-

sheets (https://bmpbooks.com). There are currently 30 publications available on the website in PDF (Portable Document Format) format which are related to Soil Health. For many of these publications, a parallel project with Farm and Food Care Ontario developed a series of Soil Health Videos.

OMAFRA uses a variety of methods to reach farmers and help ensure that our province's vulnerable soils are protected:

- promote BMPs that help improve soil health and build the soils resilience to the effects of climate change (e.g., prolonged dry conditions, severe storms, etc.) with the goal to minimize risk of topsoil loss;
- cost-share funding for farmers to help them adopt modern technologies to improve soil health; and
- partnering with locally-based conservation authorities, who provide expert advice and support for structural erosion control solutions – and in some cases tree plantings on high-risk soils.

OMAFRA soil and crop specialists work directly with farmers to help them develop new tools, techniques, and practices to improve the health of their soil. Specialists also play a critical role in conveying this information to the broader agricultural community and working together with other agricultural organizations including Ontario Soil and Crop Improvement Association (OSCIA), Certified Crop Advisors (CCA), the Innovative Farmers of Ontario, the Ontario Soil Network, Ecological Farmers Association, Ontario Fruit and Vegetable Growers Association (OFVGA) with demonstrations, field scale research, workshops, or in-field events.

Tools and programs that are publicly available include:

- AgriSuite, which includes farm management tools such as the Phosphorous Loss calculator (PLATO), the Greenhouse Gas (GHG) calculator, and the Soil Water Ag Erosion calculator
- In current development, a Soil Health Assessment and Planning (SHAP) tool and guide is being prepared to help farmers and their advisors identify soil health challenges on their farm and management practices to address them.
- Risk based tools like Environmental Farm Plan and Farmland Health Check-Up

In addition to building a baseline soil health dataset, the Topsoil Sampling Program collected operational information from each farm sampled, such as current crop, crop rotation, type and intensity of tillage, use of organic amendments, and use of cover crops. Once all laboratory analyses are complete for soil health indicators, the management data will be analyzed with the soil health indicator data to provide insight about the effect of different management systems on soil health across Ontario. University of Guelph soil scientists will further study the soils sampled to enhance current knowledge about Ontario soils and what impacts change.

Knowledge Translation and Transfer (KTT) efforts to provide BMP information to agricultural producers has helped farmers improve their management practices towards improving soil health

and building resilience. Interest in cover crops has resulted in more cover crops after wheat harvest, inter-seeding into soybeans or corn, and overwinter cover utilized for grazing, spring harvest or for plant green (soybeans planted into cereal rye stubble). Cover crops provide biomass and store carbon while improving organic matter, soil structure, infiltration capacity, and help to break pest cycles and suppress weeds. Ontario also had the highest proportion of farms planting winter cover crops at 30.8% adoption[5].

Although regionally specific, from 2015 to 2020, use of windbreaks, has increased based on the Census of Agriculture. Windbreaks provide protection against wind erosion, a process where high winds can move topsoil rich in organic matter and nutrients out of fields and into roads, ditches, and waterways. Wind erosion can also lead to sandblasting of crops, providing a vector for crop pest infestations.

Residue management is another important BMP for protecting our soils. The adoption of no-till management practices continues to expand, although at slower rates. Part of this comes from continued difficulty with managing corn residue from high yielding crops leading to more acres with some tillage ahead of planting. Another practice, strip tillage, has gained popularity and expanded residue cover and the 4R principles of right time, right place for fertilizer application. Strip tillage prepares the seed rows ahead of planting, often concurrent with fertilizer application, but leaving undisturbed residue between the rows, and providing protection from erosion and runoff. Planting winter wheat and soybeans with no-till equipment remains a customary practice and based on the Census of Agriculture, no-till increased from 28.2% to 30.4% in Ontario from 2015 to 2020. Residues are important as they: provide organic matter inputs to topsoil; act as mulch and protect the surface of the soil from the impact from rain and runoff; protect the surface from compaction; help to keep the soil cooler and prevent the surface from drying out; and can help reduce the emergence of weeds. Additional benefits of leaving residues after harvest are improvements in soil structure, increased infiltration, and better water storage capacity in the soil.

Finally, you cannot manage what you cannot measure. Soil testing is critical in understanding and managing the soil resource. This is especially true for fertility sampling to determine crop fertilizer needs based on economic yield goals while minimizing potential phosphorus and nitrogen losses to air or water. Adoption of farms soil sampling in Ontario was 36.4% according to the 2021 Census of Agriculture, higher than the national average of 31%. Soil testing is also a critical component to the adoption of precision agriculture and variable-rate management of inputs such as seeding rates, nutrients, and pesticides. Currently, 18.3% of Ontario farms report the use of variable-rate application, 23% report using automatic guidance steering systems, and 17.7% report using geographic information systems to manage farm operations. Soil properties, and soil health, can vary significantly across a single field, and management strategies that divide fields into management zones (precision agriculture) often reflect this variability.

[5] Statistics Canada. 2021. Census of Agriculture.

In Ontario, more than four million acres of farmland are rented, leased, or share-cropped, which represents approximately 35% of the agricultural land base in Ontario. Rented land remains a challenge for implementing soil health BMPs, because soil health, building organic matter, and economic benefits are realized through long-term land management. It is difficult to justify investments in rented land, especially with short-term contracts. Research has shown that producers are less likely to use cover crops or apply organic amendments to rented land but are as likely to use conservation tillage because the investment in equipment has already been made for their owned land[6]. Rented land with longer-term lease agreements, or with profit share arrangements, could increase adoption of BMPs on rented farmland.

To ensure that soil research meets the needs of Canadian farmers, what type of collaboration is needed between the Government of Canada, the provinces/territories, researchers, and industry?

Ontario is improving the collaboration between government, researchers, industry, and landowners by launching the 20-member Soil Action Group (SAG) with the goal of working together to implement actions to support soil health under the Soil Strategy. Current focus of the SAG has been to develop an implementation plan to ensure coordination and optimization of our collective efforts to enhancing agricultural soil health in Ontario. There is federal AAFC representation on SAG to support opportunities for collaboration.

Soil heath indicators differ across various regions of the country – they are regionally specific, much like the types of soil degradation. The evaluation of soil health indicators in Ontario has already been shown to differ from other jurisdictions[7], and interpretation of soil health indicators is also sensitive to cropping systems and soil texture[8]. Some practices to improve soil health, for example, conservation tillage measures, have been successful in improving soil carbon levels in prairie soils, whereas this practice alone has shown to be insufficient to increase carbon levels in Ontario soils.

Data collection is a critical component to monitoring soil health in Ontario and contextualizing soil health for Canada. Collection of baseline soils information as part of a systematic Soil Resource Inventory is as important as soil research/innovation to meet the needs of Canadian farmers and farm managers. A commonly used quote, “If you can’t measure it, you can’t improve it,” is well-suited to the status of soil data in Ontario and in Canada today, and especially as it relates to soil health. There is a lot of discussion about improving soil health, but without baseline soil information, there are no means to measure if improvements are being made. It is important to recognize that there is often a lag in soil health responses to farm management meaning that soil health improvements can take several years or decades to accurately measure improvement after conservation efforts are taken.

[6] Deaton et al., https://doi.org/10.1111/agec.12433
[7] Chahal et al., https://doi.org/10.1139/cjss-2021-0145
[8] Amsili et al., https://doi.org/10.1016/j.soisec.2021.100012

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OMAFRA's AgMaps on-line tool provides producers with access to the most up-to-date soil mapping information. Soil resource inventory, or soil survey and mapping, was traditionally a tri-agency responsibility: federal, provincial/territorial, and academia. In fact, Institutes of Pedology existed in most provinces to prioritize, plan, execute, and report on soils within their respective geographies. At the core of this arrangement was AAFC, specifically the Canadian Soil Information Service (CanSIS), responsible for maintaining a national repository of soil information, publishing soil data, publishing Canadian soil science standards, and providing soils expertise and advice to clients. These are not "research" initiatives or responsibilities, they are operational in nature. Diminishing investment in soil resource inventory in the last three decades and retirement of the previous generation of pedologists has resulted in a fractured and disorganized network across Canada for maintaining and updating soil information with no federal leadership. In Ontario, soil maps are often referred to as "legacy" soil maps, in part due to their age. In fact, most soil maps in Ontario date back to the 1950s and 1960s and need major updating (see map in Appendix). There is a need for new soil resource inventory across Canada, for a national repository of soil data, for modernization of data systems, updating of data standards, and for national leadership and guidance for these activities. Included in the 2023 Ontario Budget funding announcement, OMAFRA will build the Ontario Agricultural Soil Information System (OASIS) which will include server infrastructure to store soil data safely and securely, field data collection applications to standardize soil data collection, provide the mechanisms to disseminate soil information, and provide resources for data analysis and reporting.

Soil resource inventories are used to generate new soil maps and interpretive products such as maps of soil physical and chemical property, soil erosion potential, soil carbon stock and sequestration potential, soil health, and agricultural suitability and capability. The latter are of renewed importance given climate change and our need to adapt and build resilience in our soils. It is also important to note that soil resource inventories occur in both forest and agricultural landscapes, which can lead to silos at multiple levels of government because agriculture and forestry are managed in different departments (e.g., AAFC & Natural Resources Canada).

This is also a need to focus on working with industry to provide a forum for collecting and aggregating data that will help with metrics for improvements made, justification for dollars spent etc., (i.e., 4R (Right source, Right rate, Right time, Right place) nutrient stewardship where industry collects data on the number of acres managed using 4R principles). Farmers are reluctant to have their data shared with government, therefore there is a need for a different approach to collecting and sharing data to help measure change. Precision agriculture technology is resulting in a lot of data being collected by industry on all aspects of crop production. Diversifying how data is collected and aggregated is important to improve how change is measured.

On the research side, we need to collaborate with economic disciplines to measure the economic impact of healthier soils derived from various practices. The cost-benefit of on-farm practices (e.g., carbon storage potential of diverse crop rotations and cover crops) is important when promoting adoption by farmers. However, research on promising technologies like soil spectral analysis should

also be explored to more efficiently measure soil properties that increase our soils data and our opportunities for running soil analyses. There is interest across many disciplines for accurate soils and related environmental data. The data and analyses used to understand agricultural soil health and mapping are also relevant for forestry, ecology, hydrology, and mining interests. There needs to be greater communication and collaboration between local and regional governments (e.g., AAFC, Canadian Forest Service, etc., with OMAFRA) as well as between ministries within the same jurisdiction (e.g., OMAFRA and Ontario Ministry of Natural Resources and Forestry (OMNRF). Collaborating with researchers at academic institutions expands our capacity to monitor and research soil health and we should continue to foster relationships between OMAFRA and these research institutions.

Equity, Diversity, and Inclusiveness in Cost-Share Programs for Agricultural Producers in Ontario

In the Canadian Agricultural Partnership (CAP) (between 2018 and 2023), there was no specific focus on the collection of demographic information. Some voluntary information was collected regarding partnerships with Indigenous Peoples. There was a focus on diversity and inclusion through regional activities (focus on the North) and equity (focus on Indigenous Peoples).

For the newly launched (April 1, 2023) Sustainable Canadian Agricultural Partnership (Sustainable CAP), Ontario will be collecting voluntary demographic self-identification information from all cost-share programming applicants. This is in support of the multilateral framework agreement with Canada, which has a Collective Outcome to which all parties to the agreement will be contributing. In Sustainable CAP, all parties have agreed to increase diversity and inclusion in the Sector by delivering results which will “enhance Sector resiliency, diversity, equity and inclusion, and public trust.”

Further, per the Sustainable Canadian Agricultural Partnership: Multilateral Framework Agreement (2023-24 to 2027-28 fiscal years), “the Parties commit to better support the participation of Indigenous peoples and other underrepresented and marginalized groups, such as women, youth, visible minorities, 2SLGBTQI+ people, persons with disabilities, and members of English and French linguistic minority communities in the Sector’s diverse range of roles and support work to address barriers to entry” (s.5.2.2) and “the Parties will strengthen relationships and enhance engagement with Indigenous peoples in order to support Sector participation and the revitalization of Indigenous food systems” (s.5.2.3).

Ontario will achieve its commitment to contribute to the pan-Canadian target of “contributing to an additional two – three percent (2-3%) increase in the proportion of funded Ultimate Recipients that are women, youth and/or Indigenous peoples, compared to total funded Ultimate Recipients” through the design, delivery and promotion of its cost-shared programming.

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Within OMAFRA, staff are exploring additional opportunities to reduce barriers to participation in funding programs and further opportunities for equity, diversity and inclusion.

Recommendations to Improve the Status of Soil Health in Ontario and in Canada

- Focused efforts on standardizing the measurement and reporting of soil health status to inform all stakeholders in the agricultural sector, with acknowledgement of regional differences.
- Develop standardized baseline soil health tests for soil and crop research projects which could be used as reference values for soil health tracking. Past projects have not retained original data in digital formats, which speaks again to the need for a national data repository (e.g., Tillage 2000 project in Ontario measured soil organic matter – if sample locations had been better documented, scientists could go back to re-measure)
- Promotion of cooperation/sharing of research among the provinces keeping in mind that there are differences among responses to soil health tests among regions of the country.
- A national recognition of the importance of soil health; how it is changing in Canada; and how soil health affects agricultural practices and agricultural production both now and in the future.
- Renewed investment in soil resource inventory, including new data collection, modern data infrastructure, and updated data standards to build and maintain a relevant and modern baseline of soil information in Ontario and across Canada.
- Ontario Agricultural Soil Health and Conservation Strategy focuses on 4 areas of interest: Soil Management, Soil Data and Mapping, Soil Evaluation and Monitoring, and Soil Knowledge and Innovation. A soil working group comprised of government, conservation authorities, producer organizations and academics was tasked with prioritization of goals and activities outlined in the strategy.
- Role of research is only part of the solution – Changes need to be practical and be incorporated as part of the full farm management plan and must be economically sustainable.

This Ministry response is informed by the technical expertise and presentations delivered to the committee by Christine Brown, Field Crop Sustainability Specialist and by Land Resource Specialists, Daniel Saurette, Jim Warren and Christoph Blackford, in addition to contributions from others within OMAFRA.

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Appendix 1: Status of Ontario Legacy Soil Survey maps by decade