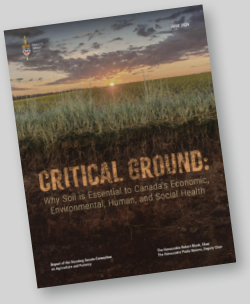
MEASURING SOIL HEALTH in Canada

Why is soil health testing **NOT** standardized yet?

This resource examines the challenges involved in establishing a national consensus on soil health measurement in Canada.

The need for a standardized, country-wide approach was highlighted as a key recommendation in the Senate of Canada's 2024 report, *Critical Ground – Why Soil is Essential to Canada's Economic, Environmental, Human, and Social Health.*



Together with an accredited lab, Ontario farmers, advisors, and researchers have been piloting a 5-indicator approach to soil health testing since 2023.

1 SIZE MATTERS.

Canada is big. Within that vastness, soils have developed in different conditions. For example, prairie soils, forest floor soils and soils formed on glacial deposits all have different physical, chemical, and biological characteristics. Soils are also inherently variable because they are formed from different parent materials.

A single standardized method may not accurately reflect soil health across these diverse soils.

2 THE BLUEPRINT REFLECTS THE BUILDER.

To make soil health testing feasible, decision-makers must weigh what is practical in real-world conditions.

This involves several judgment calls. What is a reasonable price for a farmer or advisor to pay for a soil health test, and how does that compare to the actual cost of analysis? How easily can farmers integrate soil health results into their existing soil data systems? What is the current lab capability? Which methods can be performed with current lab equipment and expertise, and which would require new instruments or technician training?

These factors often carry different levels of importance for different stakeholders.

As a result, decision-makers must come to an agreement on which considerations should take priority when selecting soil health measurement approaches.

3 OLD SHOES ARE EASIER TO WEAR.

Soil health evaluation started by comparing indicators in long-term experiments, favouring indicators that revealed treatment differences.

While there is no doubt about commitment to objectivity, the more that is known about a soil health indicator method in a region, the more likely that region will prefer that indicator method.

How this relates to on-farm conditions in the province, let alone across Canada is only recently being assessed. Additionally, existing investments by provinces, institutions and researchers make abandoning established methods costly, as it risks losing continuity with historical data.

4 ROME WASN'T BUILT IN A DAY.

The drive to develop a global consensus on soil health testing remains an emerging yet still elusive goal.

That lack of agreement may be unsurprising given that soil health research spans only a few decades.

After more than a century of soil fertility research, there is still no single, agreed-upon way to measure soil phosphorus. Canadian laboratories continue to use at least three different phosphorus extraction methods, and in Ontario the Olsen (sodium bicarbonate) test is accredited largely because it best predicts crop response in local soils, not because it represents a universal standard. Similar variability exists for other indicators, such as cation exchange capacity, which can be measured in multiple ways and is often calculated rather than directly determined to reduce costs.

CHALLENGES OF SOIL HEALTH STANDARDIZATION IN CANADA:

- The diversity of soils across Canada
- Differences on measurement priorities
- Preference follows regional familiarity
- Indicator research is relatively new

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