“Stack-Up” For Healthy Soils

MAKING SENSE OF SOIL HEALTH
Research Summary

Practices that build soil health:

- Cover Crops
- Reduced Tillage
- Perennials
- Compaction Reduction Strategies
- Minimized Residue Removal
- Good Crop Rotation
- Manure + Organic “Good Stuff”

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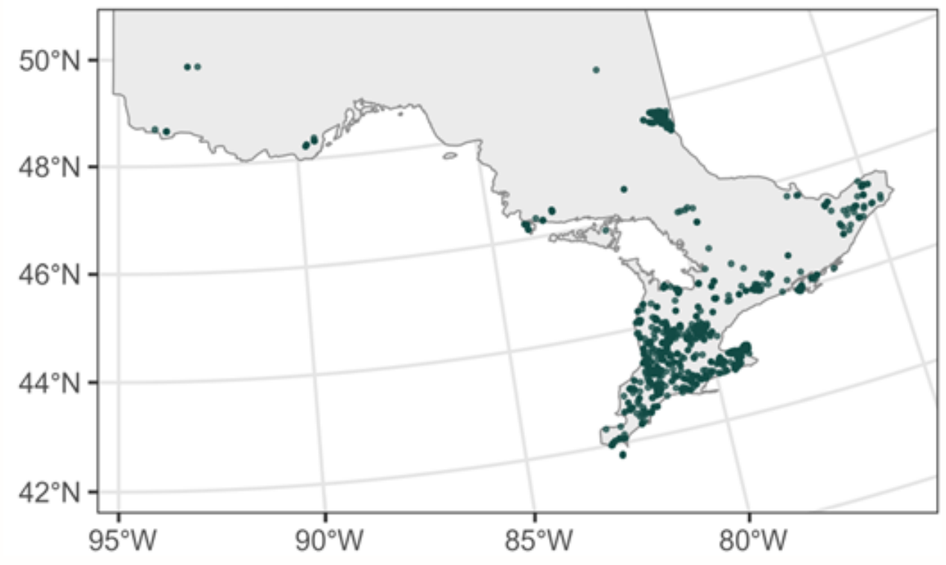
Ground Truthing SHAP Project, 2023-2025

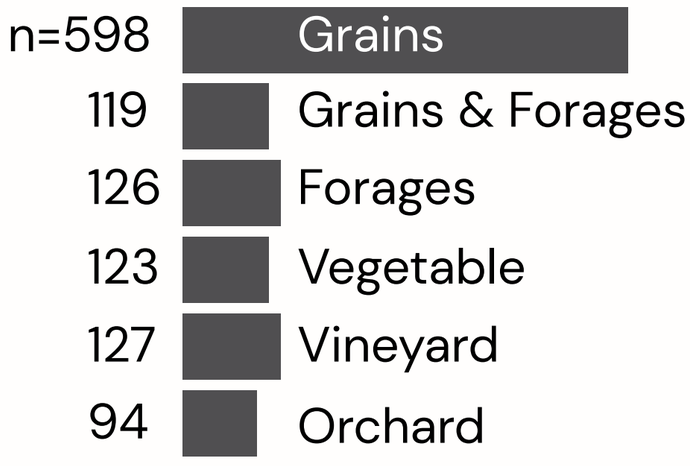
SHAP = Soil Health Assessment and Plan

- Farmers and advisors submitted 1033 soil samples from across Ontario.

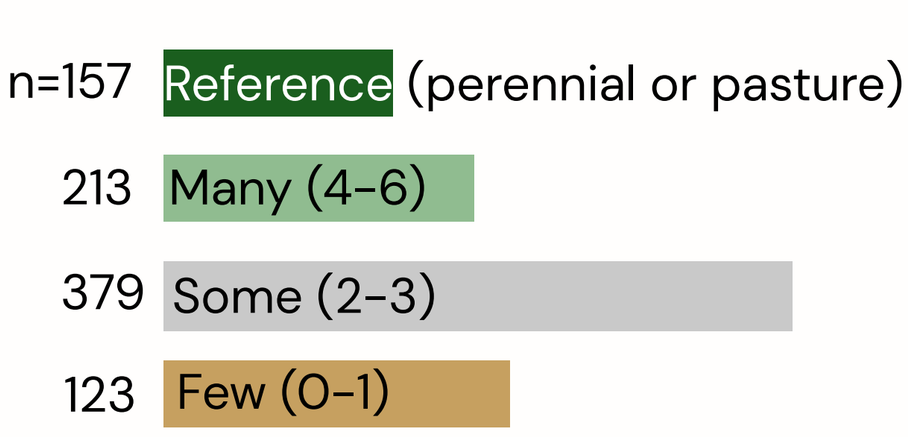


- Soil was analyzed by a commercial lab using 5-analytical indicators.

- Samples came from different **production systems.**



- Results were grouped by the number of **soil care practices** “stacked” in each field.



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AFL AGRICULTURE & FOOD LABORATORY

Ontario farmers and advisors.

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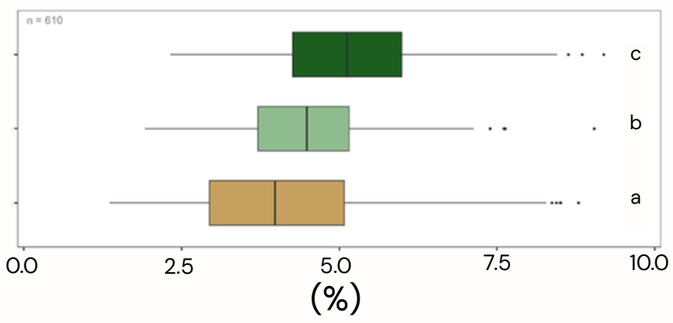
Results of Measuring Soil Health Using 5 Analytical Indicators

SOIL ORGANIC MATTER

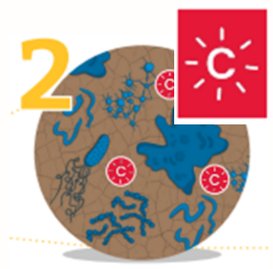
Key Finding: Stacking soil care practices increases soil organic matter.

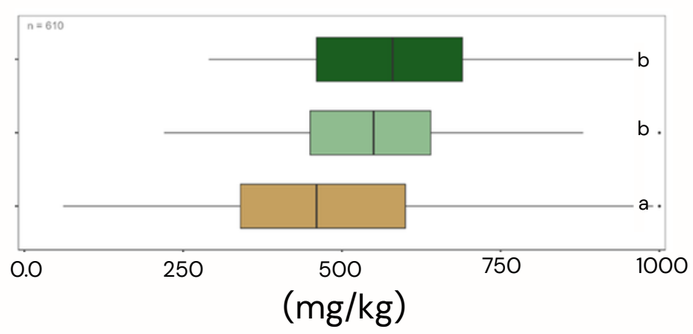


- Levels can take **several years to change.**

ACTIVE CARBON

Key Finding: Active carbon levels are lower when soil care practices are not implemented. When multiple practices are "stacked", the results are similar to pasture and perennial systems.





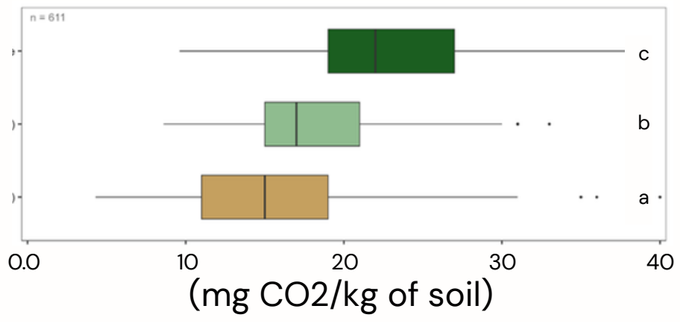
- Levels **respond quickly** to management changes.

Number of soil care practices "stacked" per sample:

- Perennial or pasture
- Many (4-6)
- Few (0-1)

RESPIRATION

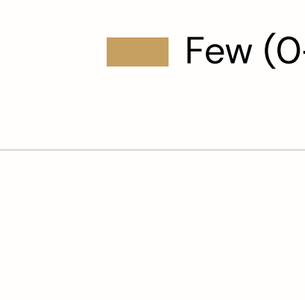
Key Finding: Stacking soil care practices increases soil respiration levels.



- Soil **microbes** 'breathe' as they work. Some release carbon dioxide. Measuring this 'breath' can tell us how active and healthy soil life is.

POTENTIALLY MINERALIZABLE NITROGEN

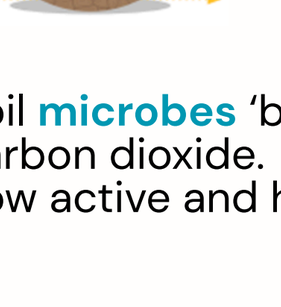
Key Finding: Results were variable - especially in the pasture and perennial sites. There was no difference between management. Further research is needed to better understand why.

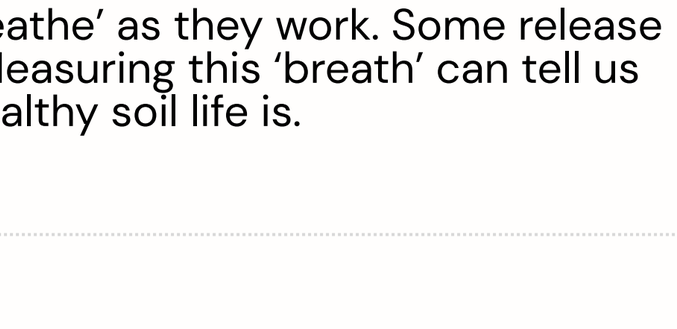


- Can show how much **organic** nitrogen is available to soil **microbes** for plant use.

AGGREGATE STABILITY

Key Finding: Most results were high (>75%). This limits meaningful insights into the effect of soil management. Other methods to measure aggregate stability are being evaluated.





- When stable, soil aggregates resist erosion, crusting and compaction, support roots and reduce water stress.

From: Ground Truthing SHAP Project, 2023-2025

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