



SOIL HEALTH
— INSTITUTE —

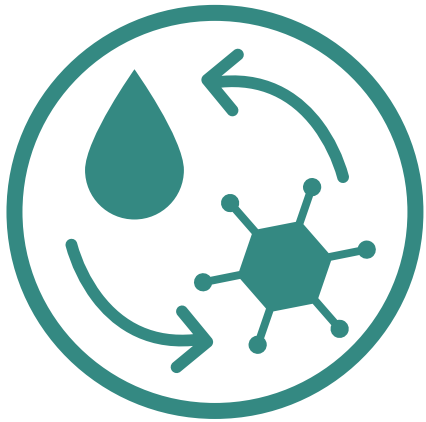
SAFEGUARDING AND ENHANCING SOIL HEALTH IN MANITOBA POTATO PRODUCTION

MANITOBA POTATO DAYS
CAMERON OGILVIE
JANUARY 24, 2024

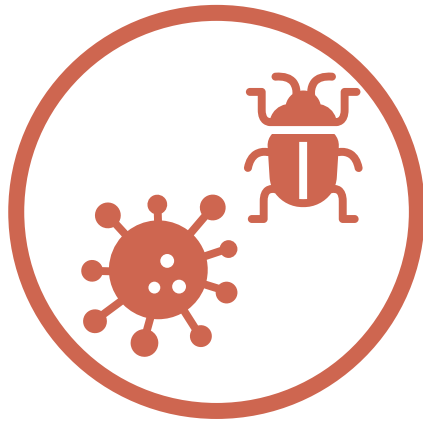
SOIL HEALTH

“The continuous capacity of a soil to ? as a vital, living ecosystem that sustains plants, animals, and humans.” - NRCS

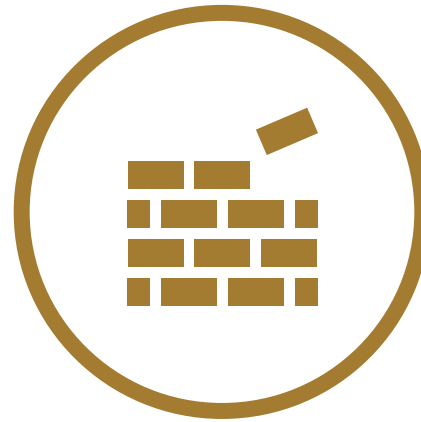
Soil Functions



Water and
nutrient cycling



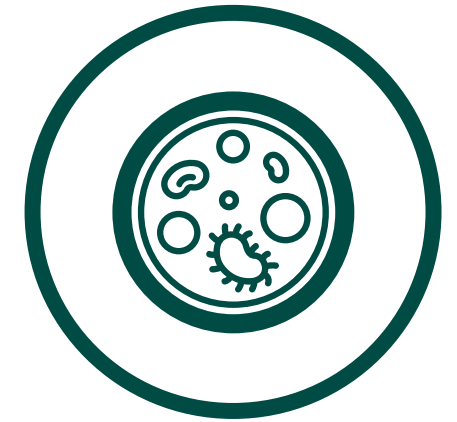
Pest and disease
regulation



Physical stability
and support



Filtering and
buffering pollutants



Habitat



Soil Health Management Principles



Maximize
Living
Roots



Minimize
Disturbance



Maximize
Soil
Cover



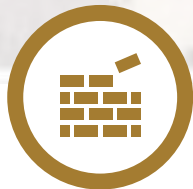
Maximize
Biodiversity





regenerative

“...an approach to farming that uses soil conservation as the entry point to regenerate and contribute to multiple provisioning, regulating and supporting services.” Schreefel et al. 2020


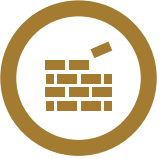



NAPESHM

North American Project to
Evaluate Soil Health
Measurements



Our Recommended Measurements

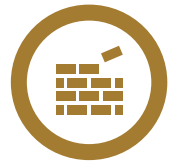
-  1. Carbon mineralization potential
-  2. Aggregate stability
-  3. Soil organic carbon



Response to Regenerative Management



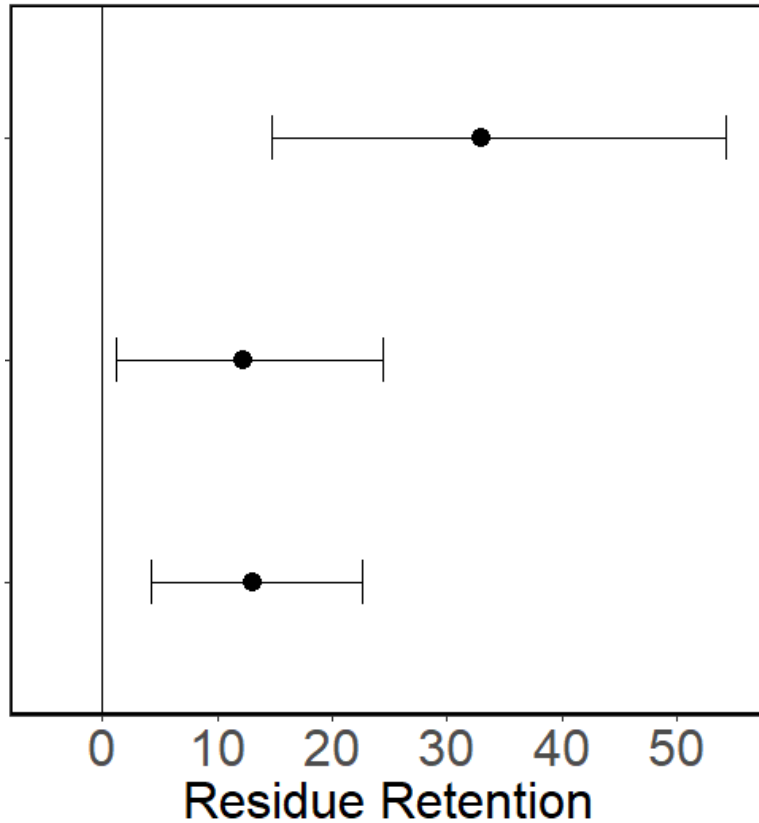
Cmin-24



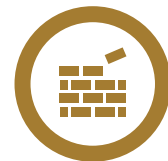
Slakes



SOC



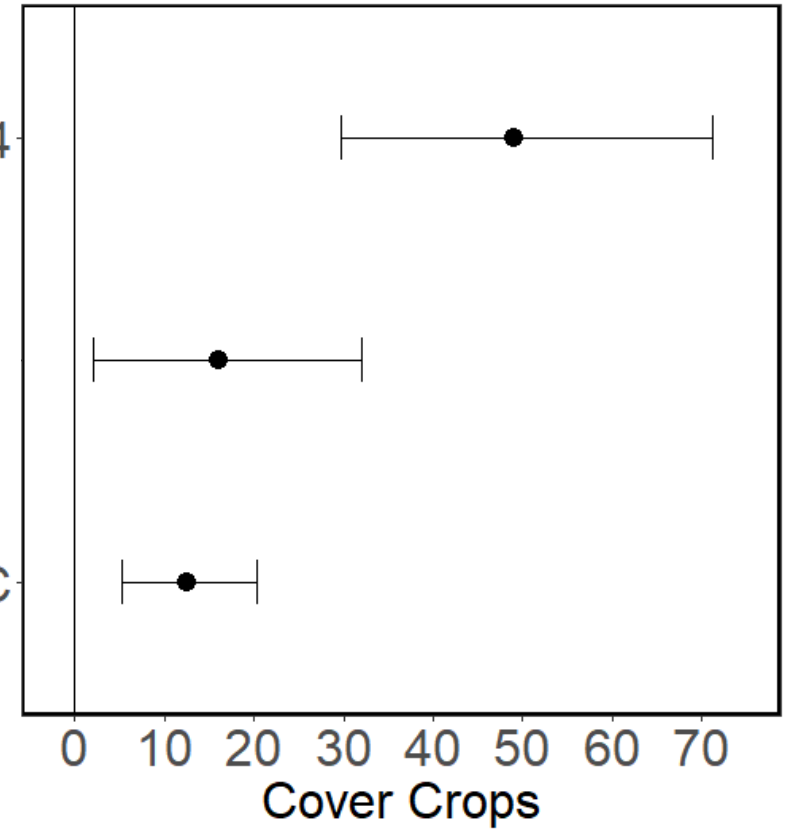
Cmin-24



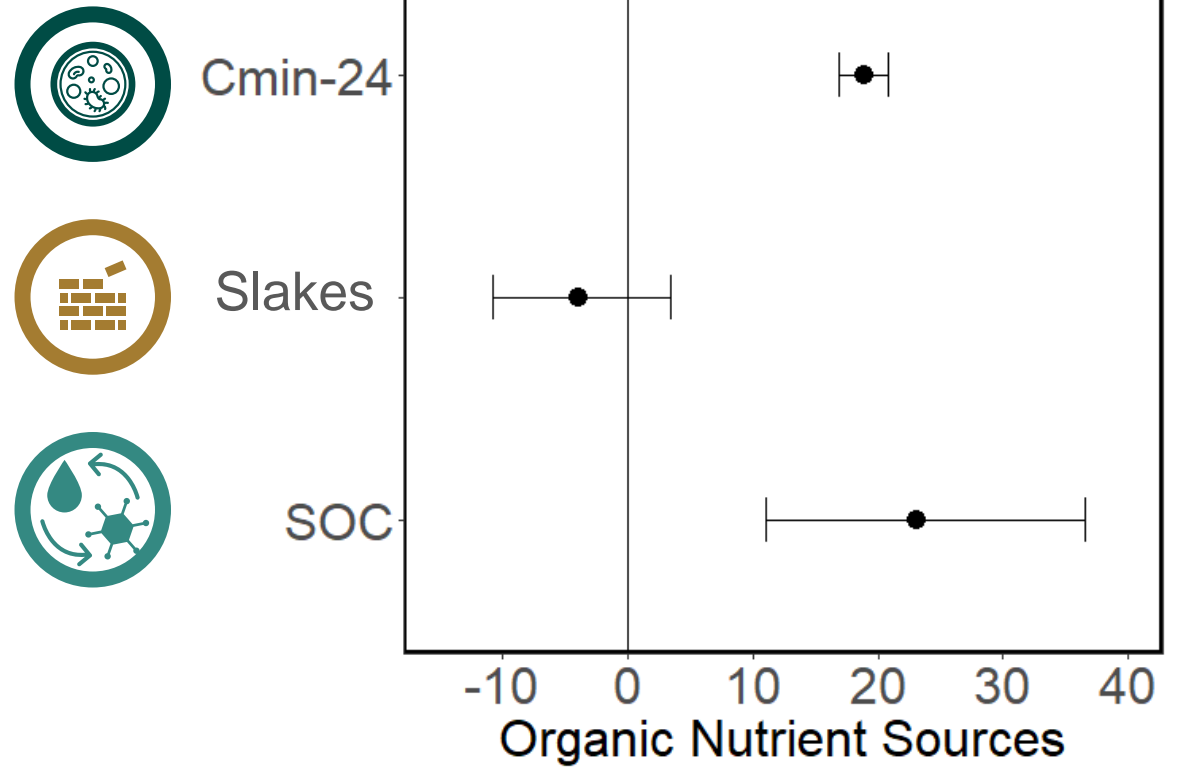
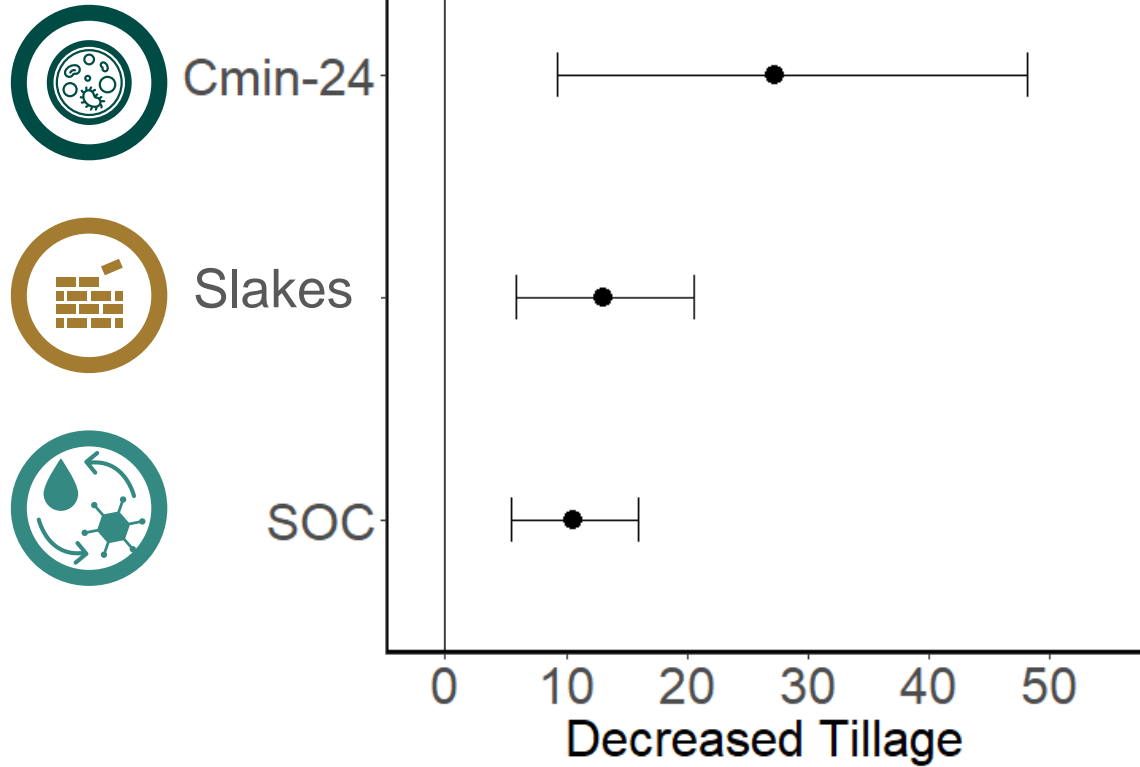
Slakes



SOC



Response to Regenerative Management

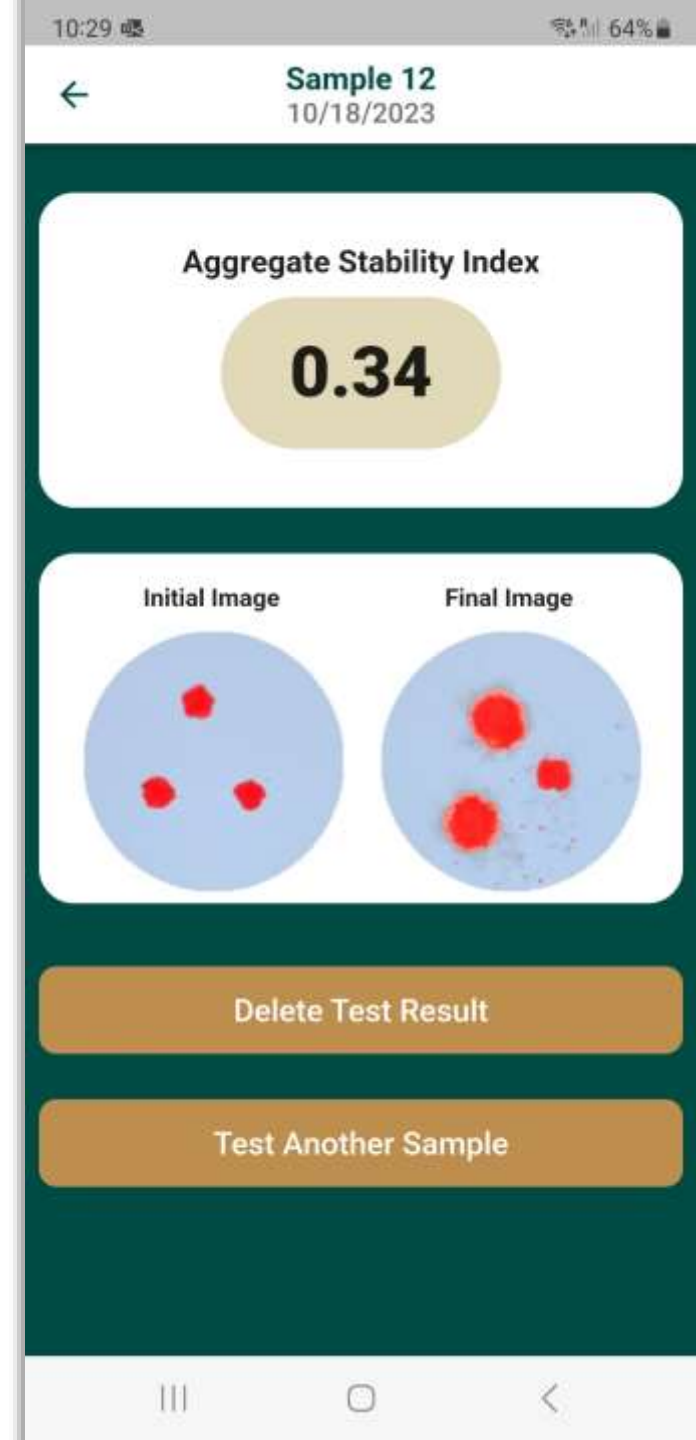


Standardizing Laboratory Analysis

- SOP's available on our website
- USDA NRCS now reimbursing farmers who use SHI's recommended measurements



Available NOW!

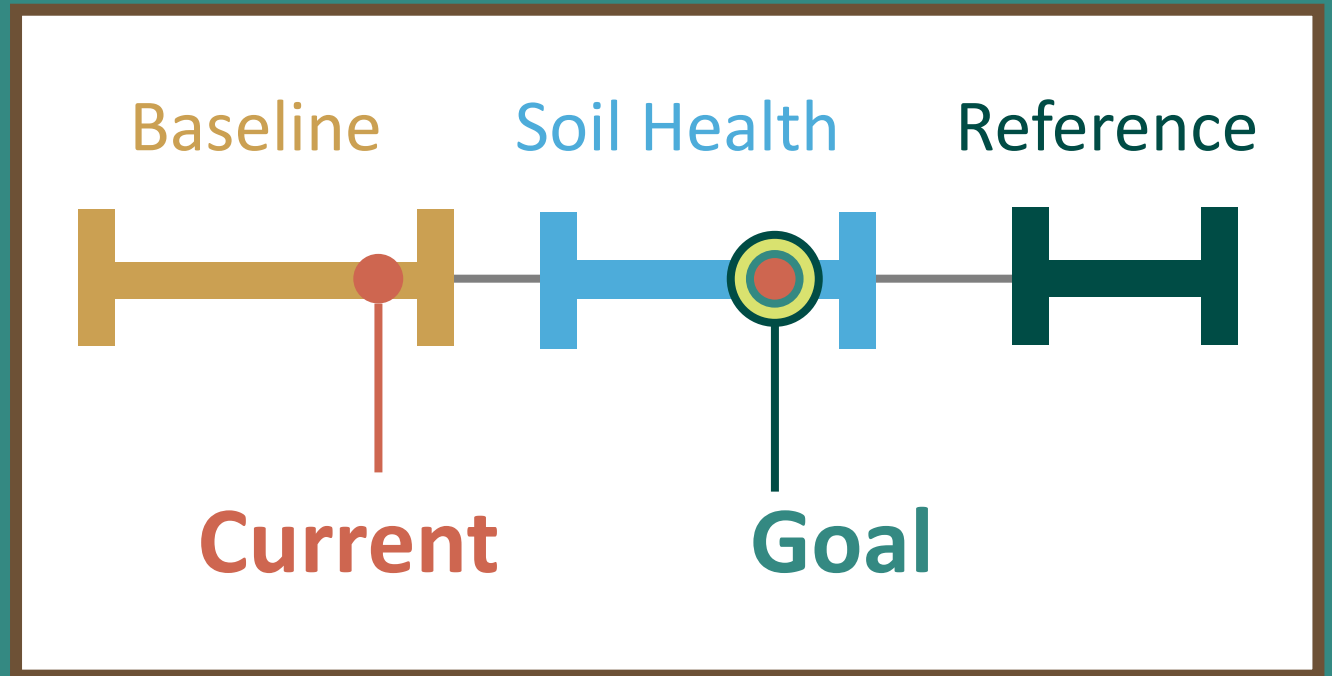




Is my soil healthy?

Compared to what?

BENCHMARKS



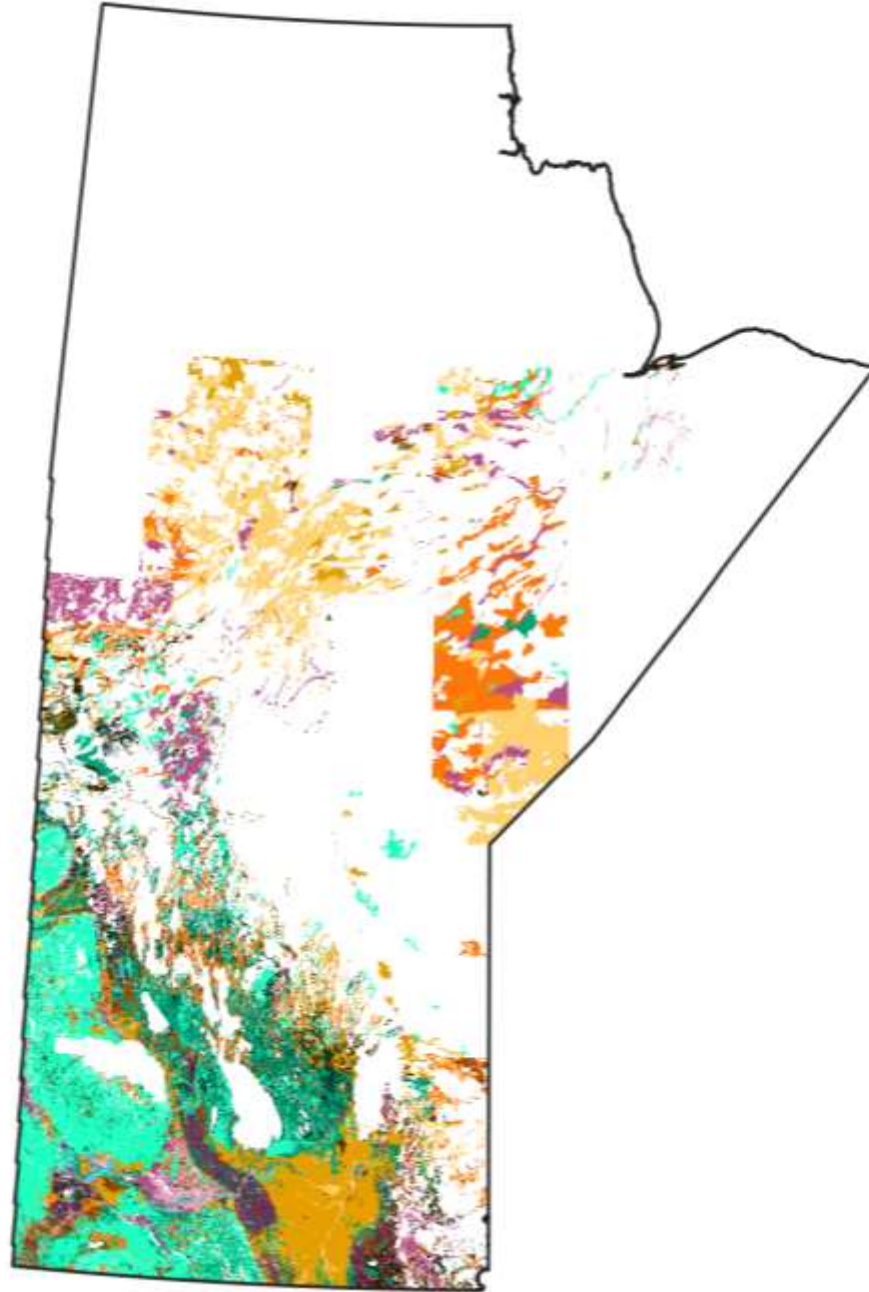
All map units

- 467 unique IDs



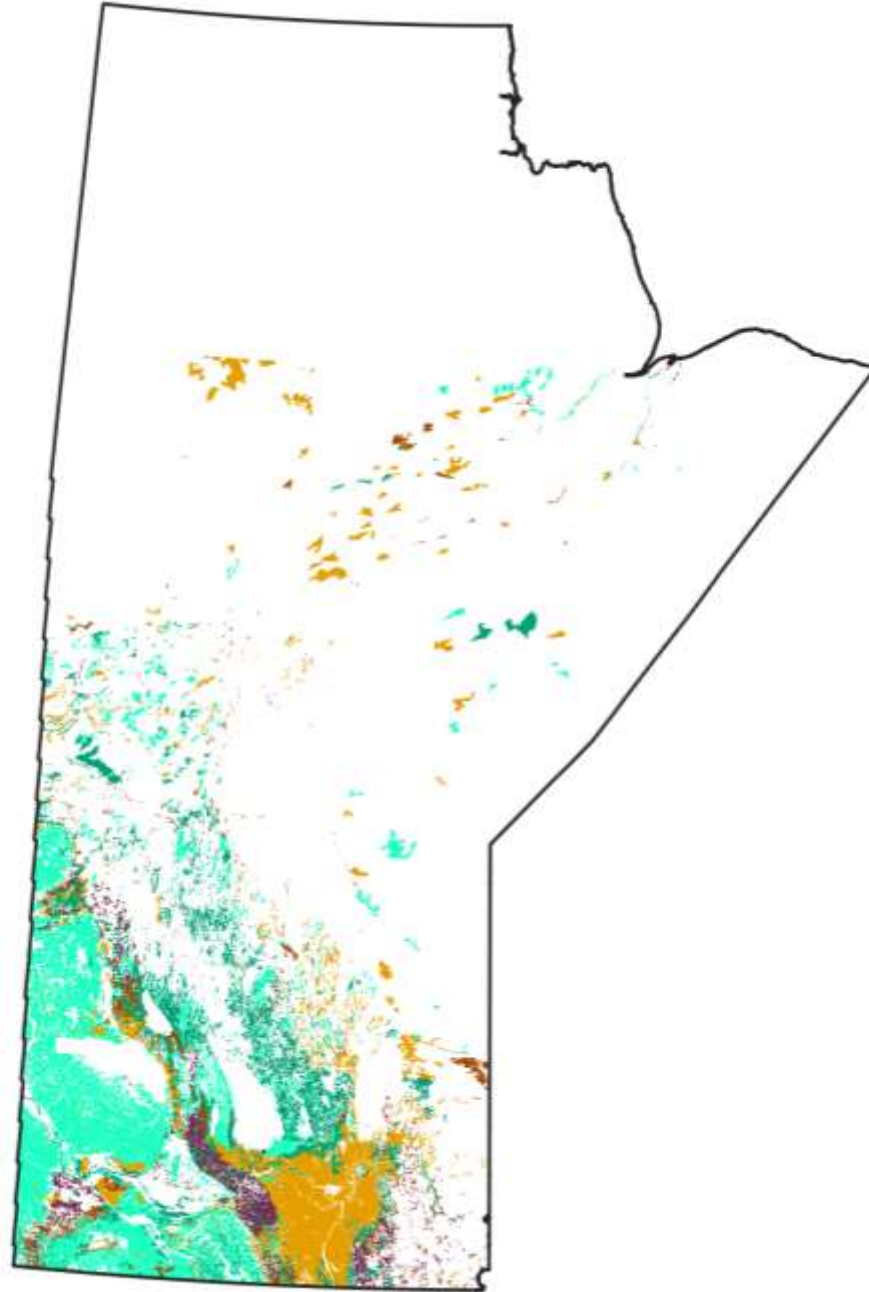
Soil Health Sampling Groups

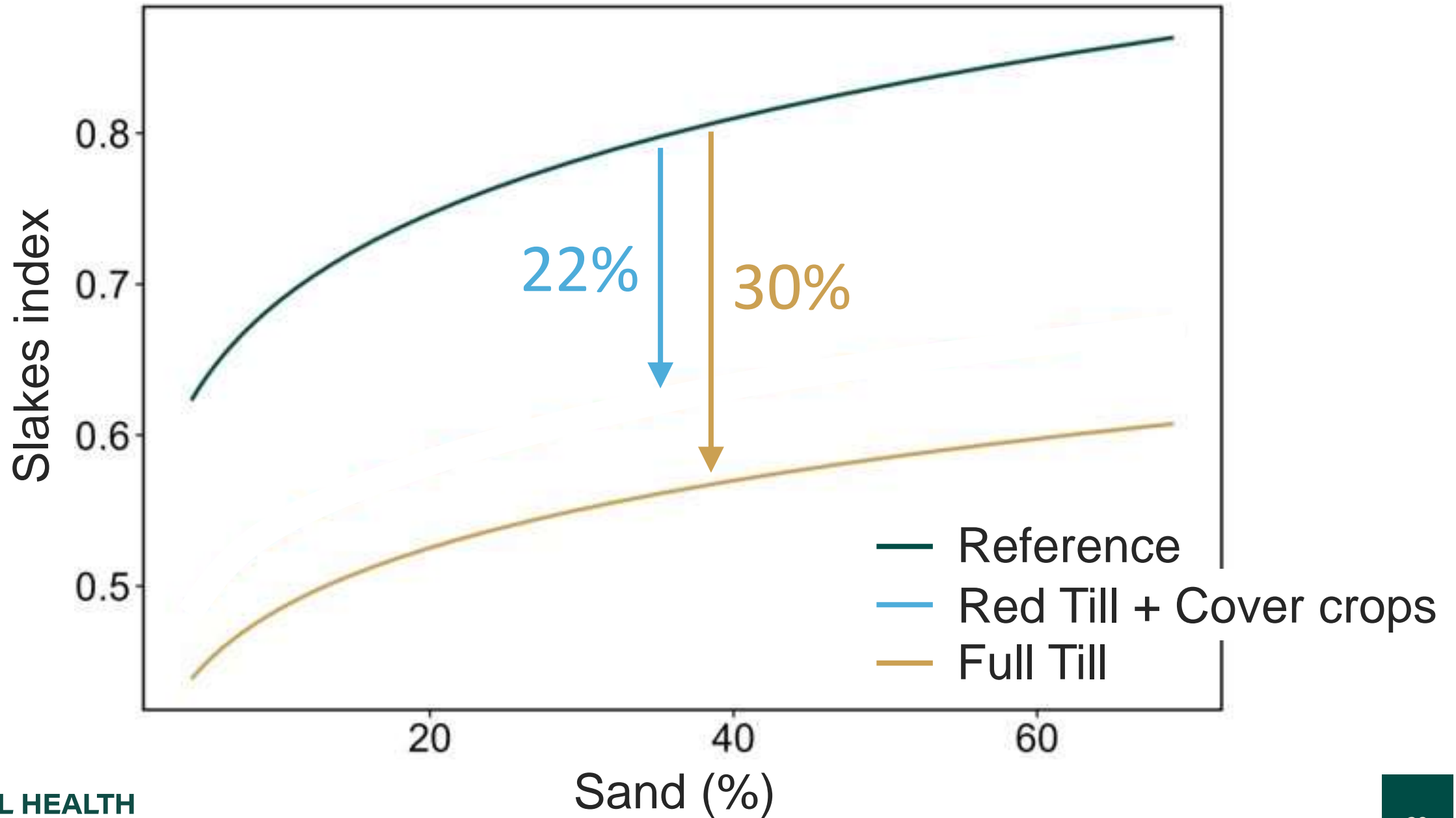
- 19 SHSGs

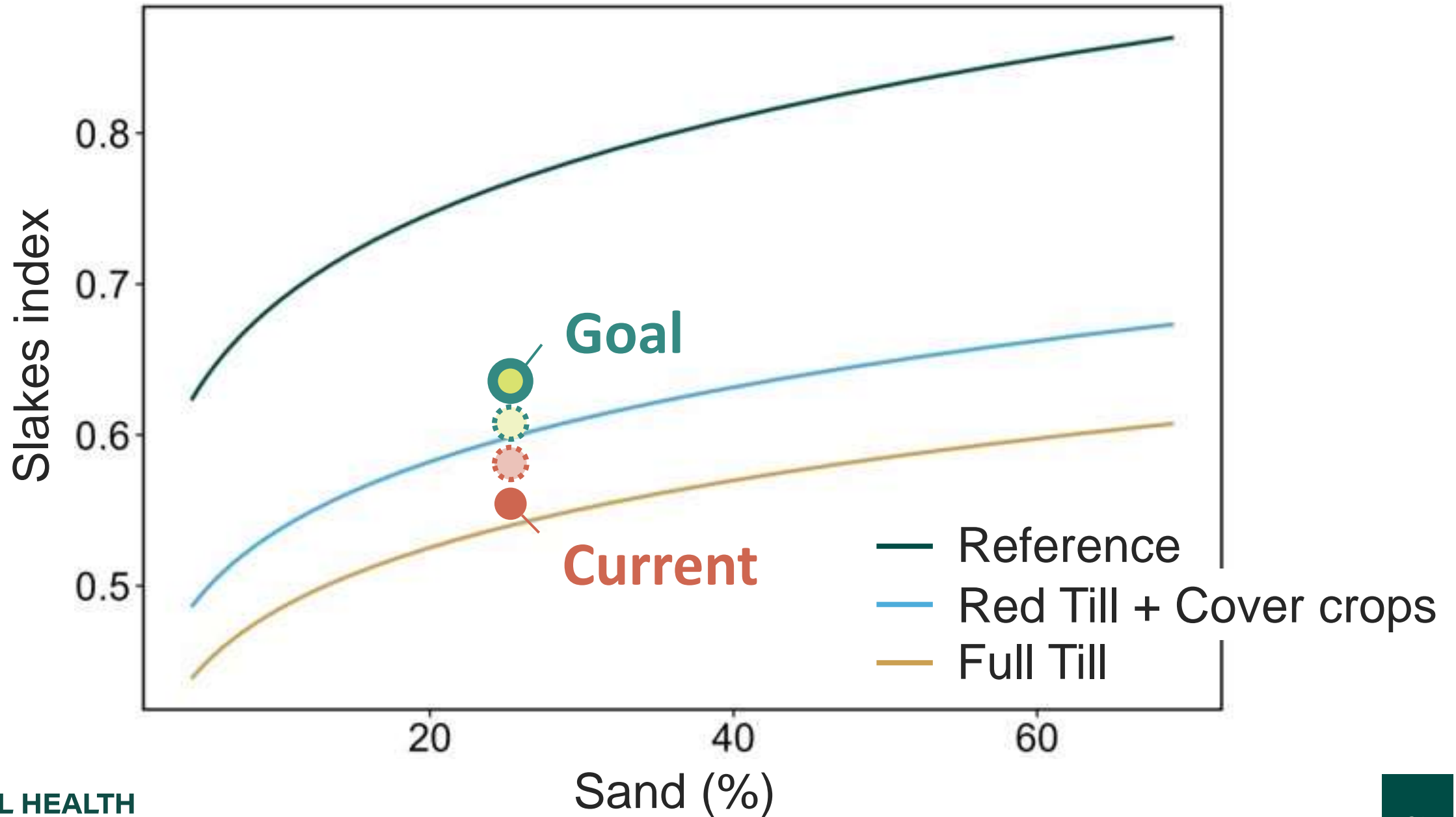


Soil Health Sampling Groups

- 4 SHSGs represent >75% of cropland







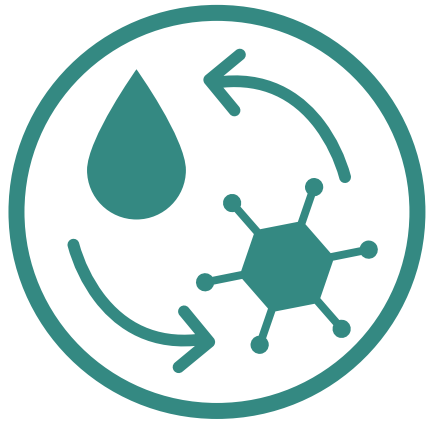


McCain

Soil Functions

WINS

CHALLENGES



Water and nutrient cycling



Habitat

A red tractor is visible in the background, partially obscured by a large pile of harvested potatoes in the foreground. The ground is sandy and shows tracks from the tractor. The scene is outdoors, likely in a field.

Threats to Potato Production

1. Erosion / Compaction

2. Nutrient Leaching

3. Pests / Disease

1. Erosion / Compaction

Successful strategies:

- Reducing tillage (practices, passes, intensity)
- Cover crops

Cautionary tales:

- May need to make modify to equipment or planting density



Homer Vander Zaag, Alliston ON
PotatoesinCanada.com/webinars

2. Nutrient Leaching

Successful strategies:

- Nitrogen budgets
- Tillage timing
- Non-leguminous cover crops

Cautionary tales:

- How much adjustment to fertility?
(particularly N)



3. Pests / Disease

- Fumigation has consequences that are hard to turn back

Successful strategies:

- Green manures and composts
- Rotation

Cautionary tales:

- No “silver bullet” that works for all pests in all years

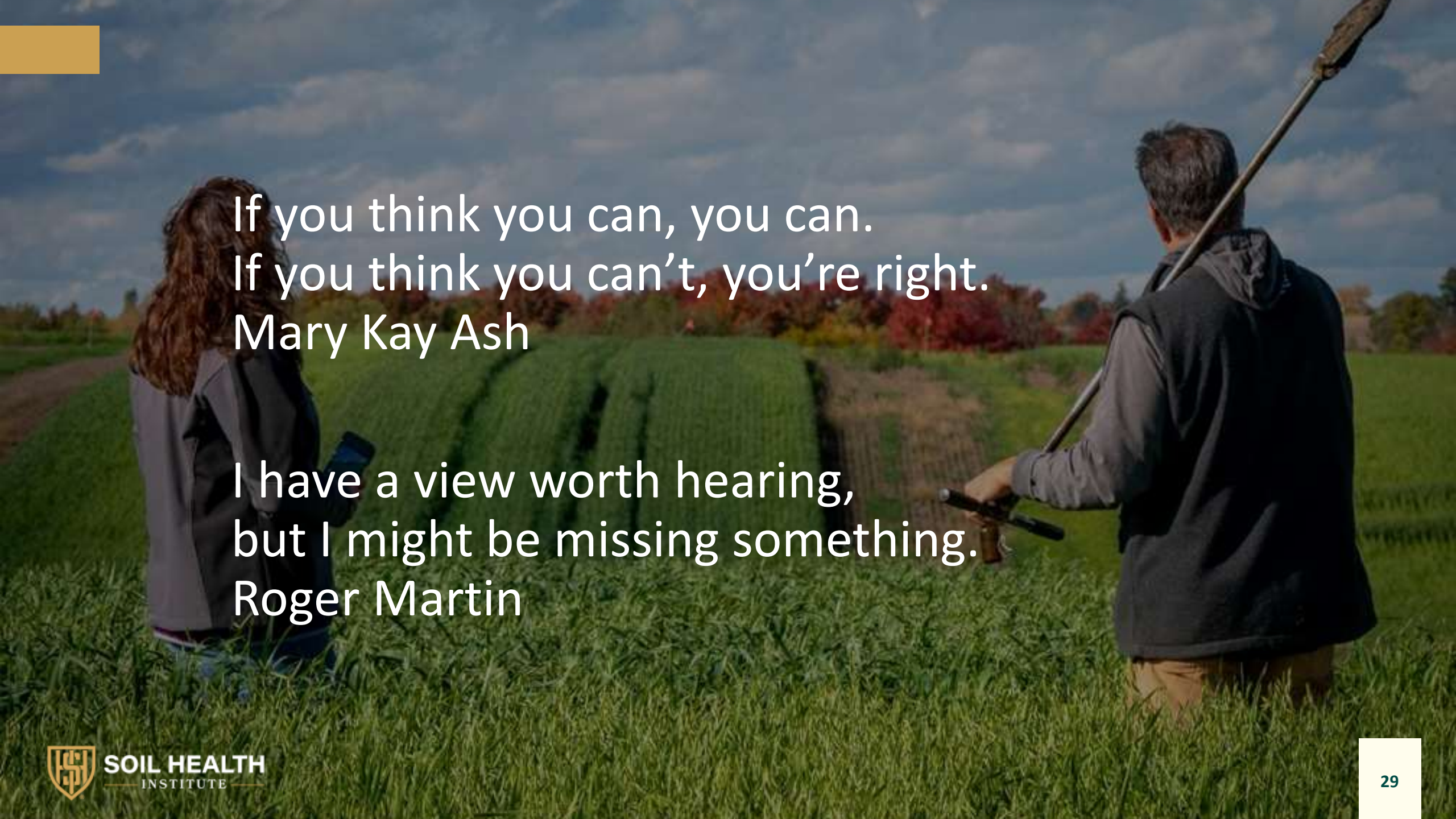


Collins et al. 2006; Sennett et al. 2021; Hills et al. 2020; Larkin et al. 2011; McGuire 2003; Ball-Coelho et al. 2003; Bélair et al. 2006; Sritharan et al. 2006; Hooks et al. 2010; Reynolds et al. 2000; Davis et al. 2010; Goicoechea 2009; Oka 2010; Larkin et al. 2011; Larney et al. 2016; Chen et al. 2022; Larkin and Tavantzis 2013

What's needed?

1. On-farm adaptation and experimentation
2. Survey of impacts on farm profitability
3. Nutrient management in regenerative systems



A woman with long brown hair, wearing a grey jacket, stands on the left side of a lush green field, looking towards the right. On the right side, a man in a dark grey hoodie and brown pants stands with his back to the camera, holding a long-handled shovel over his shoulder. The field is filled with rows of green plants, and the background shows a line of trees with autumn foliage under a blue sky with scattered clouds. A solid yellow rectangle is in the top-left corner.

If you think you can, you can.
If you think you can't, you're right.
Mary Kay Ash

I have a view worth hearing,
but I might be missing something.
Roger Martin

Strategies for Manitoba?

1. Sell the straw!

- Residue is good. Roots are better.
- Better establishment, seed-soil contact
- Soaks up leachable N
- Better soil tilth in the spring
- Straw revenue offsets costs of the cover crop
- Get some manure back?



Strategies for Manitoba?

2. Fall hilling with cover crops

- Residue is good. Roots are better.
- Minimizes soil disturbance and improves soil structure
- Reduces soil erosion
- Soaks up leachable N
- Allows for direct planting in the spring
- Equipment modification?



Homer Vander Zaag, Alliston ON
PotatoesinCanada.com/webinars

Strategies for Manitoba?

3. Intensifying potato production with full-season service crops

- Effective suppression of pests and disease
- Lots of biomass production
- Flexible field access
- Lost revenue can be recouped through higher yields and intensity







Acknowledgments

Wayne Honeycutt

Cristine Morgan

Mara Cloutier

Nate Looker

Jenny Bower

David Lamm



Contact

Cameron Ogilvie

cogilvie@soilhealthinstitute.org

519-994-4313

