UNIVERSITY of GUELPH

SOILS AT GUELPH

So now I have to consider if my dirt is healthy?

Digging a little deeper in the toolbox to solve cropping issues related to poor soil functioning.

Healthy dirt is an oxymoron, just like a comedian I heard expressing frustration about being "skinny-fat". (It's when your body appears thin, but your vitals and lab results are more similar to a person whose body is rounder and less active). He seemed to be longing for a time when it wasn't all so darned complicated and sometimes counterintuitive to know how to be healthy.

This might echo true for readers who wonder why on earth we need to care if soil is healthy.

A few years back, Jennifer Doelman, of Bonnechere Haven Farms in Renfrew County, found herself doubting the value of measuring the health of her soil. Running different soil tests on a historically underperforming part of her farm seemed to show that it was just as fertile, biologically active and rich in organic matter as other more productive parts of her farm. Where these so called "soil health tests" bunk?

Not at all. Turned out, those chemical and biological "indicators" weren't what was limiting crop growth for Doelman. A pair of boots and a spade determined it was a physical soil health indicator, a subsurface compaction layer, that was limiting root growth and therefore limiting the soil's healthy functioning.

To use a human health analogy, a better diet and exercise wasn't going to help out when the problem was a gushing ankle wound.

The prescription?

.

Photo - Doelman and family

For Doelman, strategic vertical tillage in the severely compacted areas, followed by a deep-rooting cover-crop to act as scaffolding for the newly (re)forming soil structure. The result – improved yields and improved drought resistance in those historically troubled zones.

Doelman's case and others are explored in a series of case studies by Soils At Guelph. They look at related concepts from four different perspectives – 1) Soil Carbon, 2) Soil Biology and Agriculture, 3) Using and Losing Soil Nitrogen in Agriculture, and 4) Soil Health. Each also draws on research and explores the implications of management practices.

So why do we talk about the health of dirt anyways?

It's a reminder that soil (not dirt) is a living and dynamic ecosystem (like our bodies). Each part of

the ecosystem plays a role that all together determines its overall health and ability to thrive.

For example, by dealing with the compaction issue, Doelman's soil had better water drainage, which is a function of a healthy soil.

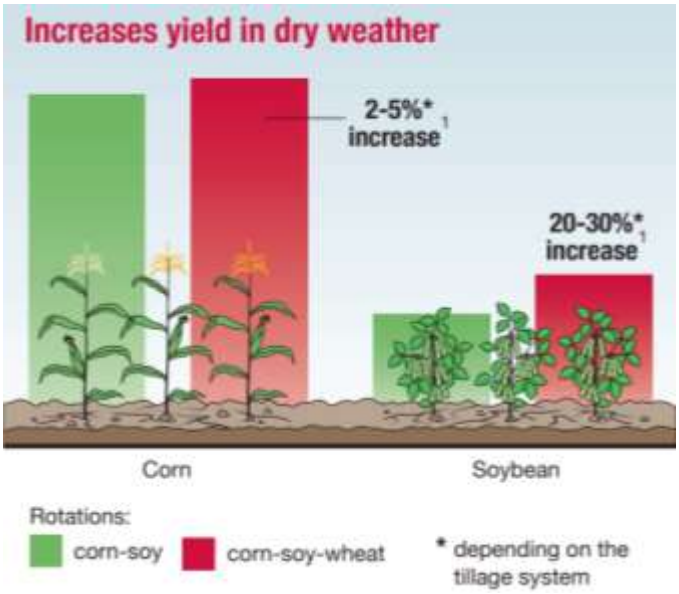

Figure 1 – Long term practices promoting soil health, like rotations including wheat and reduced tillage systems, have been linked higher yields, especially when water is a growth-limiting factor.

In excessively wet years, like this past season, soils across the province that were less healthy or compacted (not to mention, low lying areas too) suffered yield losses. In droughty years, healthier soils have also been shown to be more resilient (Figure 1). For those who aren't as close to the land, the "Soil Health Metaphor" helps to convey the complex challenge of good soil management to a world that often looks for healthy solutions that are bite sized, digestible, and easily served. Every soil has a different starting point and improving "health" will look different across different farm operations.

Conducting soil health assessments both in the field and sending soil to the lab informs on-farm decision making. They expand the tool box for how to diagnose and treat an issue, as Doelman learned. Just like how people are skinny-fat while others are skinny-skinny, sometimes digging a little deeper helps us to see our realities in new ways, allowing us to have a better handle of what is going on.

–

Author Heather White is the Knowledge Mobilization and Communications Coordinator at Soils At Guelph
soils@uoguelph.ca

This article first appeared in the Ontario Farmer January 16th 2024. It was part of a four-part series by Soils At Guelph to support growers and their advisors in understanding the essential role of soil health in crop production and the provisioning of ecosystem services. To see the case study series in full, visit our website, www.soilsatguelph.ca

UNIVERSITY of GUELPH
SOILS AT GUELPH

This case study project is funded in part by the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA), through the Ontario Agri-Food Innovation Alliance.

Soils At Guelph
Alexander Hall Building
50 Stone Road East
Guelph, Ontario, N1G 2W1
soils@uoguelph.ca