On-Farm Monitoring and Benchmark Establishment

Developed and used in Canadian Organic Growers' Regenerative Organic Oats (ROO) program.

Results are presented based on the primary ecological process that each metric assesses. Both quantitative and observational metrics are included in the monitoring process.

Monitoring the Water Cycle

- Water infiltration – 3-ring, 3-pour method in-field
- Bulk density – lab analysis
- Soil crusting – observational
- Ponding – observational
- Soil compaction – penetrometer in-field
- Wet aggregate stability – lab analysis
- Slakes test – app in-field

Monitoring the Nutrient/Mineral Cycle

- Soil macro and micronutrient analysis – lab analysis
- pH – lab analysis
- Cation Exchange Capacity (CEC) – lab analysis
- Crop foliar analysis (macro and micronutrients) – lab analysis
- Soil texture – lab analysis
- Soil colour – observational
- Root growth – observational
- Plumps and thins

Monitoring Energy Flow

- Ground cover – observational
- Crop health – observational
- Brix – refractometer in-field
- Organic matter – lab analysis
- Active carbon – lab analysis
- C:N ratio – lab analysis
- Total organic carbon – lab analysis
- Organic carbon per hectare – lab analysis
- Total carbon – lab analysis
- Fungi: bacteria ratio – lab analysis

Monitoring Community Dynamics/Diversity

- Soil Food Web monitoring – lab analysis
  - Bacterial biomass
  - Fungal biomass
  - Total fungal to total bacteria biomass ratio
  - Nematode functional group
  - Nematode abundance
  - Protozoa functional groups (diversity)
  - Protozoa abundance
- Soil respiration – lab analysis
- Diversity of macro-life – observational
- Soil smell – observational
- Crop health – observational

Establishing Benchmarking Sites

As part of the ROO program, each participating farm selects three sites for soil health monitoring. These sites become the baseline against which we assess the impact of the farm's regenerative efforts. As much as possible, sites that are likely to remain under the farm's management/control for at least the next 5 years should be selected. The three sites are:

- **Best Field/Most Consistent** – an agricultural field with good and/or reliable production. Monitoring this site provides insight into the soil that is responding best to current management.

- **Worst Field/Most Inconsistent/Challenging** – an agricultural field with inconsistent or poor production that has potential for improvement. Monitoring this site, and comparing it to the best field provides insight into the soil that may require a change in management (past or present) to reach its full potential.

- **Unmanaged Area** – a non-agricultural area that is as close as possible to being a natural, undisturbed environment with similar (soil) characteristics as the fields selected above. Monitoring this site provides a reference point for comparison and may help identify shifts in soil health that are not related to management.