

Soil Health Analysis and Regenerative Agriculture Parameters

The widely used Haney test is currently used by many to measure soil health. The test factors in the CO₂ respiration, water extractable carbon, and water extractable nitrogen. These are key features in the health of the soil. However, this is not all that can impact soil health.

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Terra Ag Technologies goes beyond these parameters.

We use CO₂ respiration, the respiration response, amino N, aggregate stability, water soluble carbon, Organic Matter, and total carbon to calculate the soil regeneration score.

The CO₂ respiration, reported as microbial rate on the report, is aimed at measuring the amount of CO₂-C a soil can produce over a 24hr incubation period following a significant drying and rewetting event. The respiration response, reported as Soil response, is the measure of respiration from 30 cubic centimeters of soil. This helps offset corrections from either very loose or very dense soils. It helps to improve the score to reflect a higher importance on the microbial population and activity in the soil.

Amino N, reported as Soil Amino-N, is used to measure the organic nitrogen in the soil. This nitrogen is a portion of the total nitrogen that is available to be mineralized by microbes. This is a more robust test than just water soluble due to extracting and measuring organic nitrogen, rather than just what is plant's available.

We measure both, **water extractable organic carbon and total carbon** in the soil to get a better measure of what is in the soil and better idea of the health of the soil. Water extractable organic carbon (WEOC) is a measure of the organic carbon or food that is readily available to microbes in the soil. The WEOC is a small fraction of the organic matter in the soil but there is no direct relationship between the two. The total carbon can be measured directly or through organic matter. Since both play an important role in the ability for microbial activity to function and improve, both are used to calculate the soil regeneration score.

Finally, we use **aggregate stability**, reported as Crumb Aggregates. This is a direct measure of the structure of the soil. A properly maintained soil will have a high aggregate stability allowing the soil to better hold onto water, minerals, and carbon. A high aggregate stability in soil also strengthens the plant root structure and health of the plant.

These reported values for soil health are compared to what would be the highest score and average to give a score. These factors in soil health directly impact **the microbial mass** and function in the soil. Therefore, a score that is rising means that the regenerative agriculture practices in place are working to help improve the health of the soil. However, this is a change that will take time to see improvements. The other key factor in how successful regenerative agriculture can be is the type of soil. With every soil health report, we include the most predominant soil types around the farm and give a range that we expect the health of the soil to fall within. This allows scoring to be compared to soils within the area based on the history of performance of those soils rather than general soil type assumptions.

We also measure soil fertility. We do calculate the fertility of the soil as a function of the health and available nutrients for the intended crop to be grown. The nutrient score is calculated as an average of the N, P, and K in the soil versus what is needed for the crop to be grown capped at 100 percent. This is averaged with the soil health score to give an overall fertility score.