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Soil Health Literature

The Science Behind Healthy Soil



unlock the SECRETS IN THE SOIL

Soil Health

Soil Quality Indicator Sheets

A series of information sheets for physical, chemical and biological indicators is available to help conservationists and soil scientists with soil health assessment. Factors affecting, relationship to soil function, methods for improvement, and measurement options are discussed for each topic. Review the How-to Guide to get started.

Note: Soil Quality Kit Guides that serve as soil property lesson plans for teachers and educators are available at [Soil Quality for Educators](#).

> [Soil Quality Indicator Sheets How-to Guide \(PDF, 416KB\)](#)

Physical Properties

- > [Physical Indicators – Overview \(coming soon\)](#)
- > [Aggregate Stability \(PDF, 380KB\)](#)
- > [Available Water Capacity \(PDF, 210KB\)](#)
- > [Bulk Density \(PDF, 340KB\)](#)
- > [Infiltration \(PDF, 315KB\)](#)
- > [Slaking \(PDF, 500KB\)](#)
- > [Soil Crusts \(PDF, 250KB\)](#)
- > [Soil Structure and Macropores \(PDF, 480KB\)](#)

Chemical Properties

- > [Chemical Indicators – Overview \(PDF; 344KB\)](#)
- > [Reactive Carbon \(PDF, 1.0MB\)](#)
- > [Soil Electrical Conductivity \(PDF, 210KB\)](#)
- > [Soil Nitrate \(PDF, 673KB\)](#)
- > [Soil pH \(PDF, 265KB\)](#)

Biological Properties

- > [Biological Indicators – Overview \(PDF; 375KB\)](#)
- > [Earthworms \(PDF, 485KB\)](#)
- > [Particulate Organic Matter \(PDF, 1.8MB\)](#)
- > [Potentially Mineralizable Nitrogen \(PDF, 611KB\)](#)
- > [Soil Enzymes \(PDF, 220KB\)](#)
- > [Soil Respiration \(PDF, 329KB\)](#)
- > [Total Organic Carbon \(PDF, 210KB\)](#)



Soil Quality Indicators

Physical, Chemical and Biological Indicators for Soil Quality Assessment and Management

What is soil quality? Soil quality is the capacity of soil to function as a medium for plant growth and as a store of water and nutrients. It is the ability of soil to perform the functions necessary for its intended use.

Soil functions include:

- providing biological diversity and soil structure
- filtering, buffering, and holding water and nutrients
- providing a medium for plant growth and soil structure
- providing physical stability and support

Soil quality is affected by many factors, including:

- soil texture
- soil structure
- soil chemistry
- soil biology
- soil management practices

How is soil quality measured? Soil quality is measured by using a variety of indicators that are grouped into physical, chemical, and biological categories. Each indicator is measured using a specific method, and the results are combined to provide an overall soil quality score.



Soil Quality Indicators

Infiltration

Infiltration is the downward flow of water into the soil. The rate at which water enters the soil is called the infiltration rate. This rate is affected by soil texture, soil structure, soil moisture, and soil temperature.

Factors Affecting Infiltration:

- Soil texture: Clayey soils have a lower infiltration rate than sandy soils.
- Soil structure: Well-structured soils have a higher infiltration rate than poorly structured soils.
- Soil moisture: Saturated soils have a lower infiltration rate than dry soils.
- Soil temperature: Warmer soils have a higher infiltration rate than cooler soils.

Measurement: Infiltration is measured using a double-ring infiltrometer. This device consists of two rings that are pushed into the soil. Water is poured into the rings, and the rate at which it infiltrates the soil is measured.



Soil Quality Indicators


Soil Respiration

Soil respiration is the release of carbon dioxide from the soil. It is a measure of the biological activity in the soil. Soil respiration is affected by soil temperature, soil moisture, and soil organic matter.

Factors Affecting Soil Respiration:

- Soil temperature: Warmer soils have a higher soil respiration rate than cooler soils.
- Soil moisture: Saturated soils have a higher soil respiration rate than dry soils.
- Soil organic matter: Soils with high organic matter have a higher soil respiration rate than soils with low organic matter.

Measurement: Soil respiration is measured using a soil respiration chamber. This device consists of a chamber that is pushed into the soil. The amount of carbon dioxide that is released from the soil is measured.



Soil Quality Indicators

Soil Electrical Conductivity

Soil electrical conductivity (EC) is a measure of the ability of soil to conduct an electric current. It is a measure of the amount of dissolved salts in the soil. EC is affected by soil texture, soil structure, and soil chemistry.

Factors Affecting Soil Electrical Conductivity:

- Soil texture: Clayey soils have a higher EC than sandy soils.
- Soil structure: Well-structured soils have a higher EC than poorly structured soils.
- Soil chemistry: Salty soils have a higher EC than non-salty soils.

Measurement: EC is measured using an EC meter. This device consists of two electrodes that are inserted into the soil. The amount of current that flows between the electrodes is measured.