

Soil Health & Assessment

National Association of Conservation Districts (NACD)

Urban and Community Development Webinar Series

Presented by,
Eileen Miller, Soil Health Specialist
USDA NRCS NJ
January 15, 2015





What is soil?

- Soils have four major components: mineral matter, organic matter, air, and water.
- Soil has biological, chemical, and physical properties that are always changing.

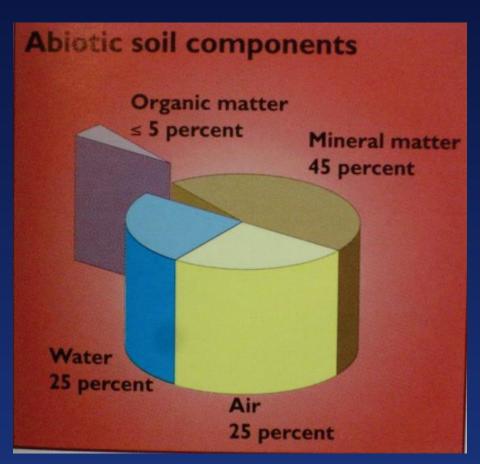


Figure 1.—Four major components of soil volume (Michigan Field Crop Ecology, 1998, E-2646, page 13).



Soil Properties



Inherent- what the soil is born with through soil formation. (texture, depth to bedrock)

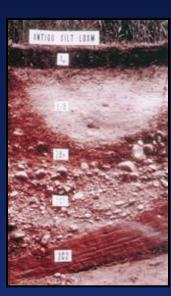
Dynamic- human induced changes-Use and Management

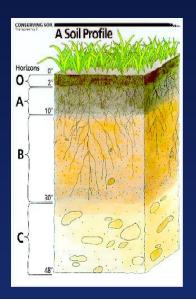




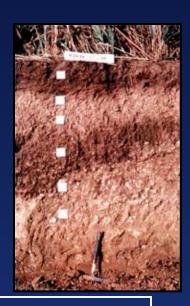
Soils Have Unique Physical, Chemical, and Biological Properties Important to Their Use

color
texture
structure
consistence
roots
pores
other features









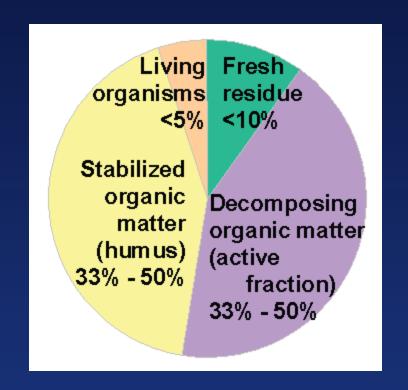
Soil is a natural body of solids, liquid, and gases, with either horizons, or layers or the ability to support rooted plants.

Pedology, the study of soil, is a unique discipline.



Soil Organic Matter

Is necessary for all soil functions, and it is the most important indicator of soil health.

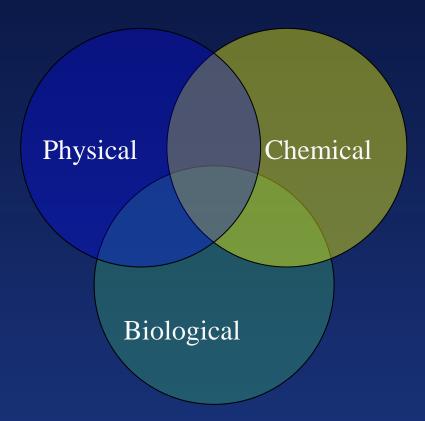






What is Soil Health?

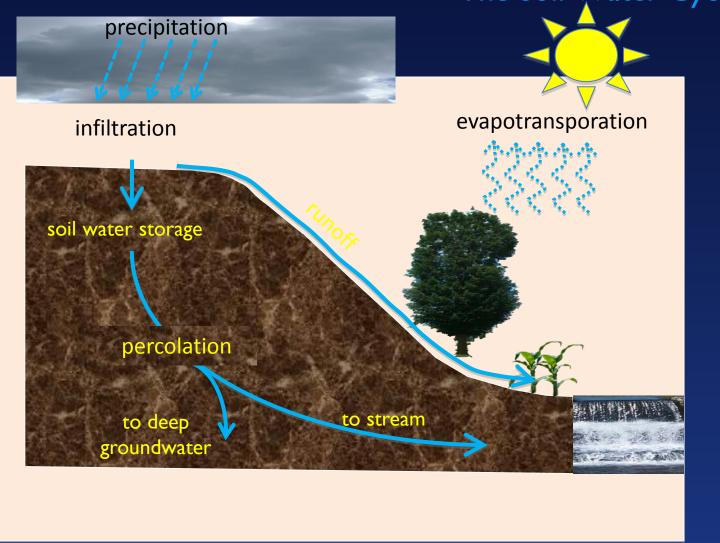
Soil health is defined as "the capacity of a soil to <u>function</u> within ecosystem boundaries to sustain biological productivity, maintain environmental health, and promote plant and animal health.".







The Soil Water Cycle





How can we tell if soil is HEALTHY?

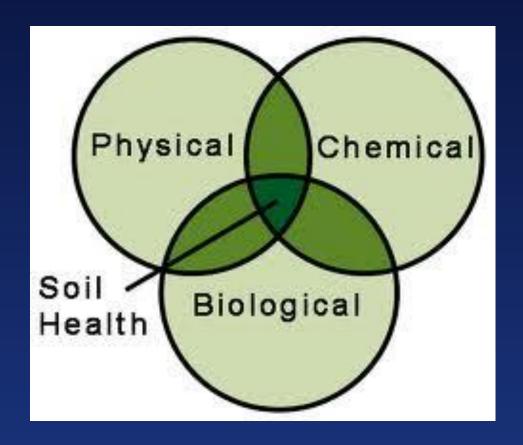








Soil Health Parameters







Physical Components

- Surface Hardness/Compaction
- Structure
- Friability
- Consistence
- Soil Tilth
- Drainage/Infiltration of Rainwater





Chemical Components

- Nutrient Holding Capacity
- pH
- Use of a laboratory Soil Test





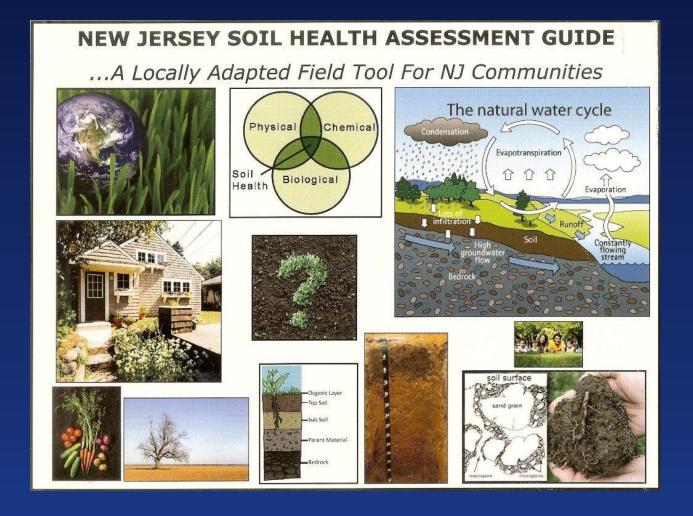
Biological Components

- Organic Matter
- Soil Color
- Roots
- Soil Life
- Plant Growth





The NJ Soil Health Assessment Guide





To get started-Dig a Hole! Visual Observation







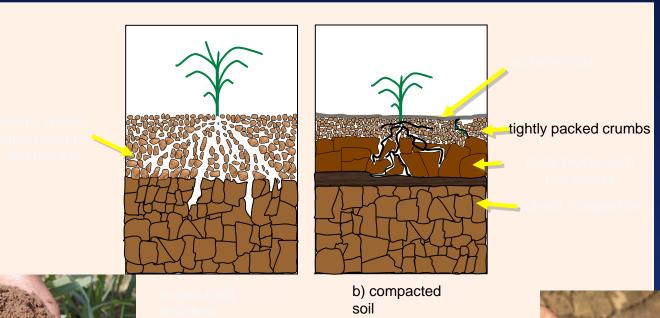


How compacted is the soil?





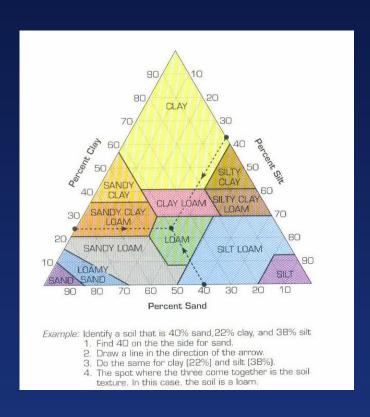
Soil Compaction

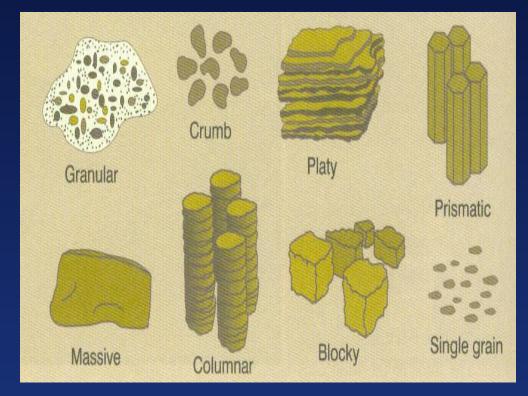






Soil Structure Categories

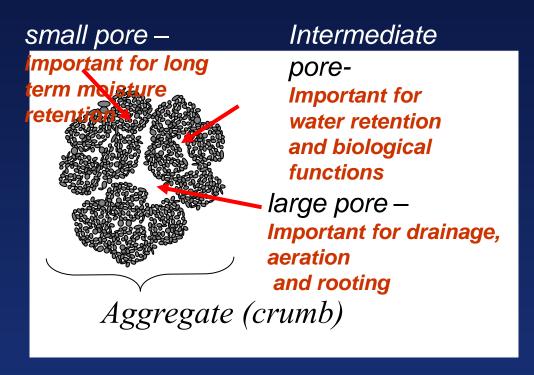








Aggregate Stability





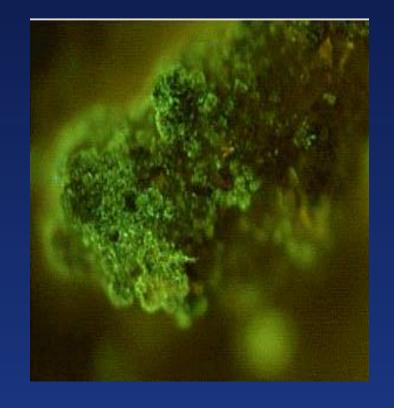
A well aggregated soil has a range of pore sizes.

This medium size soil crumb is made up of many smaller ones. Very large pores occur between the medium size aggregates.



Glomalin A Manageable Soil Glue

A strong glue, glomalin, is produced by a beneficial fungus that grows on plant roots. The glue comes off of the fungus and is deposited on soil particles. This process leads to build up and stabilization of aggregates.





Slake Test Demo





Erosion by Wind & Water





Is your soil FUNCTIONING? Is Rainwater Infiltrating into the soil or ponding?.

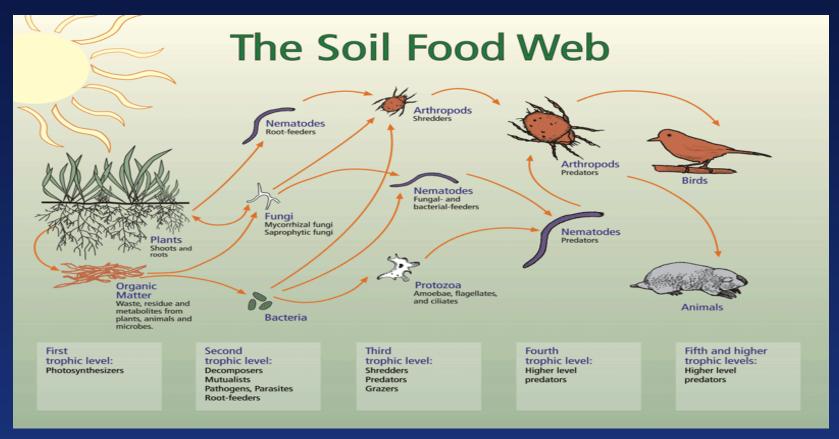








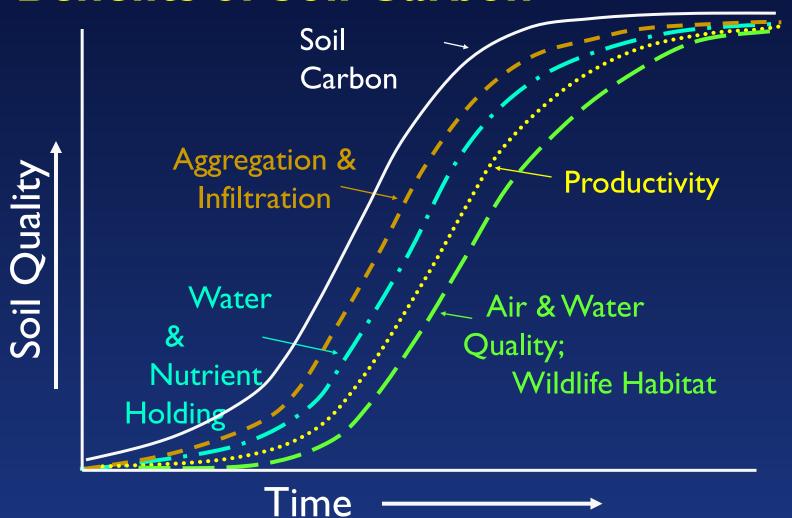
BIOLOGICAL



The living systems occurring above and below the ground surface are determined by the properties of the soil.



Benefits of Soil Carbon





Organic Matter, Color, & Roots



- Color
- Structure
- Porosity
- Root density







Soil Life

- Dark color
- Organic residue
- Earth worms
- Macropores

Dull don't stay

Roots





Plant Growth

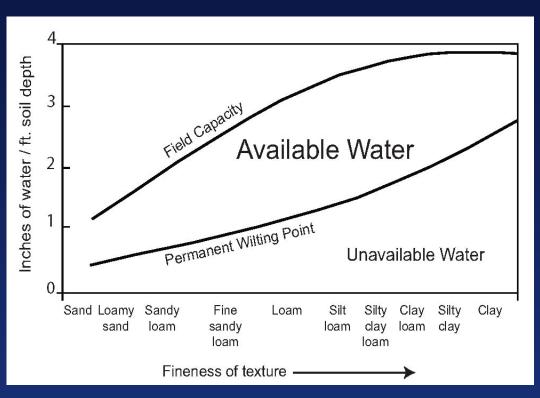






Moisture Retention

Available water capacity is the amount of soil moisture available to plants.

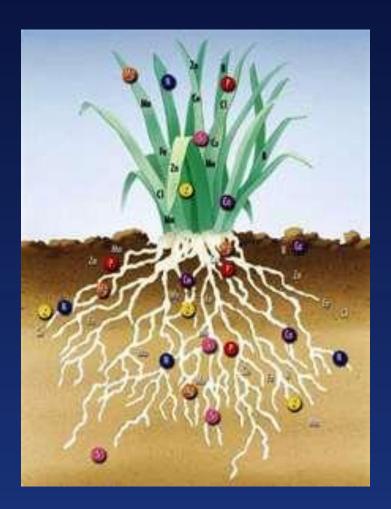






CHEMICAL

Nutrient Holding
Capacity
pH
Organic Matter & Clay
Content play a major
role.







Lab Assessments-Don't Guess, Soil Test!









What if I score FAIR to LOW?

 There is a solutions page that will give reasons why as well as ideas on how to improve the situation.





How to Improve Soil Health

- till the soil as little as possible
- grow as many different species of plants as possible to provide maximum diversity of species.
- keep living plants in the soil as long as possible
- and keep the soil surface covered with residue year round





CONCLUSION

 Assessing Soil Health helps us determine the level of Soil Function.

 Proper Soil Management results in a more resilient soil that functions in ways that improve and sustain our soil for future generations.



United States Department of Agriculture Natural Resources Conservation Service





To access the Soil Health Assessment Guide on line version go to soildistrict.org Hard copy versions also available.

For More Information of Soil Health go to our website at: www.nrcs.usda.gov

My Contact Information: Eileen Miller, Soil Health Specialist USDA NRCS

Eileen.miller@nj.usda.gov

Thank You!

