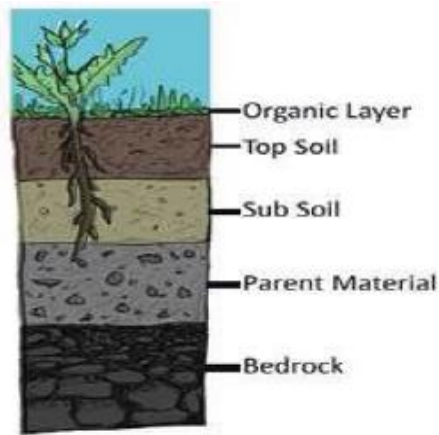


Healthy Soils and Climate Change

Following best management practices for soil health is important for sequestering carbon, reducing greenhouse gas emissions, storing water, and helping make land more resilient to climate change.



Source: Ocean County Soil Conservation District

Soil is an ecosystem within an ecosystem, full of life interacting with its abiotic environment.

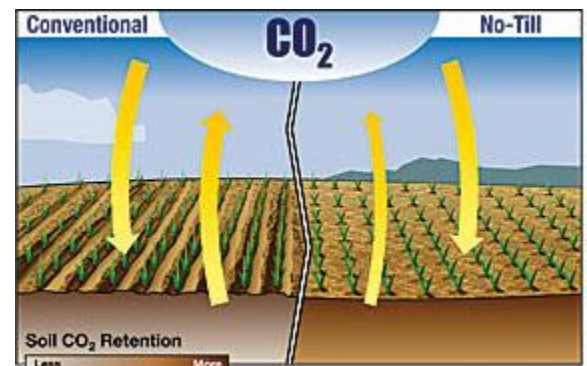
Soil is made up of minerals of various size ranges (such as sand, silt, and clay) and organic matter from living and dead organisms, (such as decayed plant residue), with varying amounts of water and air in soils' pore space.

A healthy soil is dark, crumbly and porous, home to worms and other soil organisms, and provides the right amount of air, water and organic matter for microorganisms to thrive and plants to grow.

A healthy fully functioning soil is full of roots of the strong plants it supports.

How can soil health affect greenhouse gas emissions?

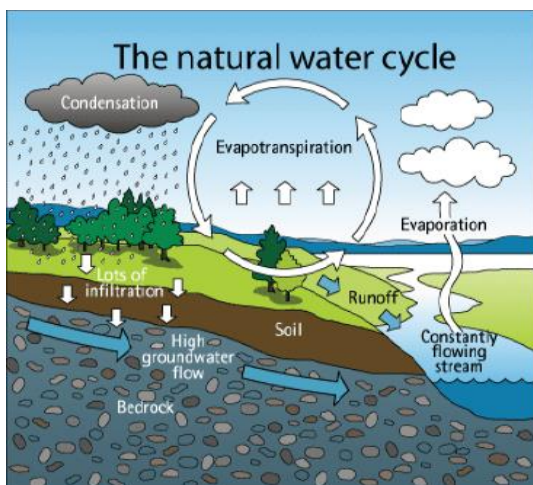
Soils with more soil carbon, or organic matter, function better than those with less soil carbon since organic matter affects critical soil functions. Healthy soils can help sequester carbon. Practices like no-till farming are more likely to sequester carbon and prevent its release into the atmosphere.



Source: US Department of Energy

How can soil health improve our resiliency to climate change?

Soil regulates the drainage, flow, and storage of water and compounds that are dissolved in the water such as nutrients (e.g., nitrogen, phosphorous) and other compounds like pesticides. Soil partitions water for groundwater recharge and/or use by plants and soil animals. Poorly drained and compacted soils deprive vegetation and microorganisms of the oxygen they need to grow. Healthy soils have a higher available water-holding capacity than poor quality soils.



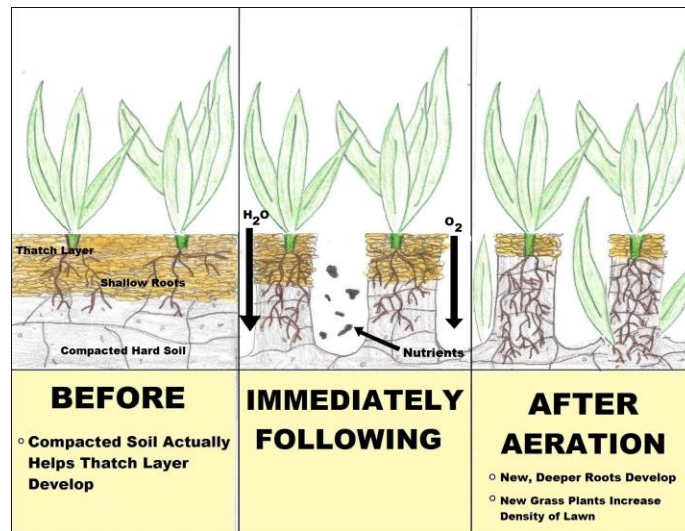
Source: Ocean County Soil Conservation District

Climate change is expected to result in more frequent heavy rainstorms and more frequent periods of drought. Healthy soils improve our resilience to wetter periods because they act as a filter and reservoir, to enable better water infiltration into and percolation through the soil, reduce soil erosion and sedimentation which is better for plant growth, water quality, and flood mitigation. Similarly, healthy soils are important during periods of high heat because of their ability to hold available water and regulate soil temperature.

How can I improve soil health in suburban and urban settings?

Healthy soil provides clean air and water, bountiful crops, pastures, forests, wildlife habitat and landscapes. It does this by cycling and storing nutrients, regulating and partitioning rainwater, creating diverse habitats above and below the soil surface, filtering and degrading toxins, and providing physical support for building and structures.

Benefits of Soil Aerification by Coring



Source: Rutgers Climate Institute and Rutgers Department of Plant Biology and Pathology

Soils in suburban and urban environments are no exception and play a critical role in overall ecosystem health. However, soil compaction is often a limitation to plant growth and soil function in these types of environments. Breaking up compacted zones such as by core aeration or tillage will make the soil more suitable for root development in lawns and gardens, while also improving the water cycle. Once corrected, plant roots and soil microbes will help to maintain the open pore spaces within the soil so that water and nutrients can flow freely in the root zone. The same soil health principles apply no matter where we are in the landscape. We need to keep our soil covered all year long with mulches and plant residues, keep a living root in the ground all the time, disturb the soil with tillage as little as possible, and plant a diversity of species.

Additional Resources

USDA Northeast Climate Hub: climatehubs.oce.usda.gov/northeast-hub

Rutgers Climate Institute: climatechange.rutgers.edu

USDA Natural Resources Conservation Service NJ Office: www.nrcs.usda.gov/wps/portal/nrcs/site/nj/home/

