



Konza Environmental Education Program

Building a "Healthy" Soil to Reduce Climate Change Impact



What is healthy soil? What are its benefits?

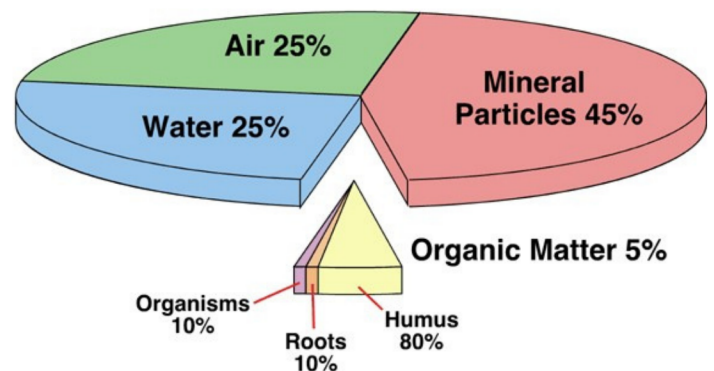
And how do we improve soil health?

Definition:

A healthy soil allows rain and irrigation water to enter and penetrate into the soil, holding it for plant and human use while providing sufficient nutrients for plant growth.

Benefits:

- Reduce stormwater runoff and flooding,
- Recharge aquifers and groundwaters,
- Maintain water levels in creeks and rivers,
- Reduce erosion and irrigation needs,
- Improve plant/tree health with less fertilizer and irrigation
- Improve air and water quality,
- Increase biodiversity.



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How to improve our soil:

1. Soils are made up of mineral particles such as clay, silt, sand and gravel and organic matter with some air and water.
2. While all these components are important, the **soil organic matter** (SOM) is the basis for increasing the soil's ability to provide the maximum benefits.
3. By increasing the SOM by 1%:
 - a. An additional 20,000 gallons of water can be stored per acre.
 - b. An additional 5 tons of carbon can be stored per acre which would equal 29 tons of CO₂ removed from the air.
 - c. The soil organisms responsible for providing plants with their needed nutrients are fed.
4. Soil health means to manage plants and soils to promote soil microbes in capturing carbon and turning it into SOM which can store additional stormwater.

How to protect and increase SOM in our soil:

A. Keep the soil covered to REDUCE:

- 1) Erosion as the top layer of soil has the most SOM and soil organisms.
- 2) Soil temperatures as the soil under mulch or vegetation can be 7-14°F lower, protecting SOM from breaking down.
- 3) Evaporation of soil moisture to benefit plant growth.

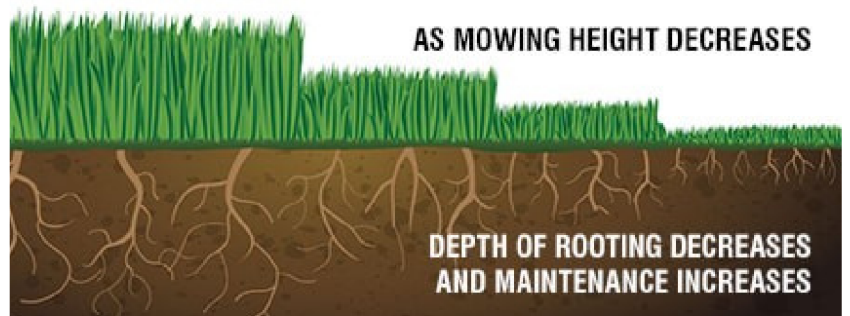
B. Maximize root growth.

C. Minimize disturbance, especially soil compaction.

D. Maximize the types of plants/root systems.

Landscape practices to use for building healthy soils:

- ✓ Create landscape areas that are mulched and do not need to be mowed.
- ✓ Reduce the frequency of mowing turf areas and allow the vegetation to grow to 4-6 inches before mowing to a height of no less than 3.5-4 inches.
- ✓ Rake leaves into landscape areas before mulching.
- ✓ Minimize mowing during drought conditions.
- ✓ Consider creating a pocket prairie with native short grasses and wildflowers, providing a variety of plants and root systems while feeding pollinators.
- ✓ Refrain from using chemical fertilizers and herbicides to protect soil organisms.
- ✓ Use aged compost at the rate of ½ to 1 inch annually.
- ✓ Plant your landscape in layers to diversify plants and cool the area.



Forming stable soil "aggregates" is a sign of a healthy soil..

You know you are on the right path when your soil turns from this to this:



SOM at the surface moves down, capturing and storing carbon	Turn over time
Soluble root exudates and decomposition by-products makes up less than 5% of total soil organic matter.	Minutes to days
Fresh or decomposing plant and animal matter with identifiable cell structure. Makes up 2–25% of total.	2 – 50 years
Older, decayed organic compounds that have resisted decomposition. Can make up more than 50% of total.	Decades to centuries
Resistant organic matter found at deeper levels is an important long-term carbon sink.	Centuries - thousands of years