



Soil Health Principles

Objectives

1. List and explain the soil health principles
2. Identify and explain how conservation practices address soil health principles
3. Identify *core* soil health practices in your region



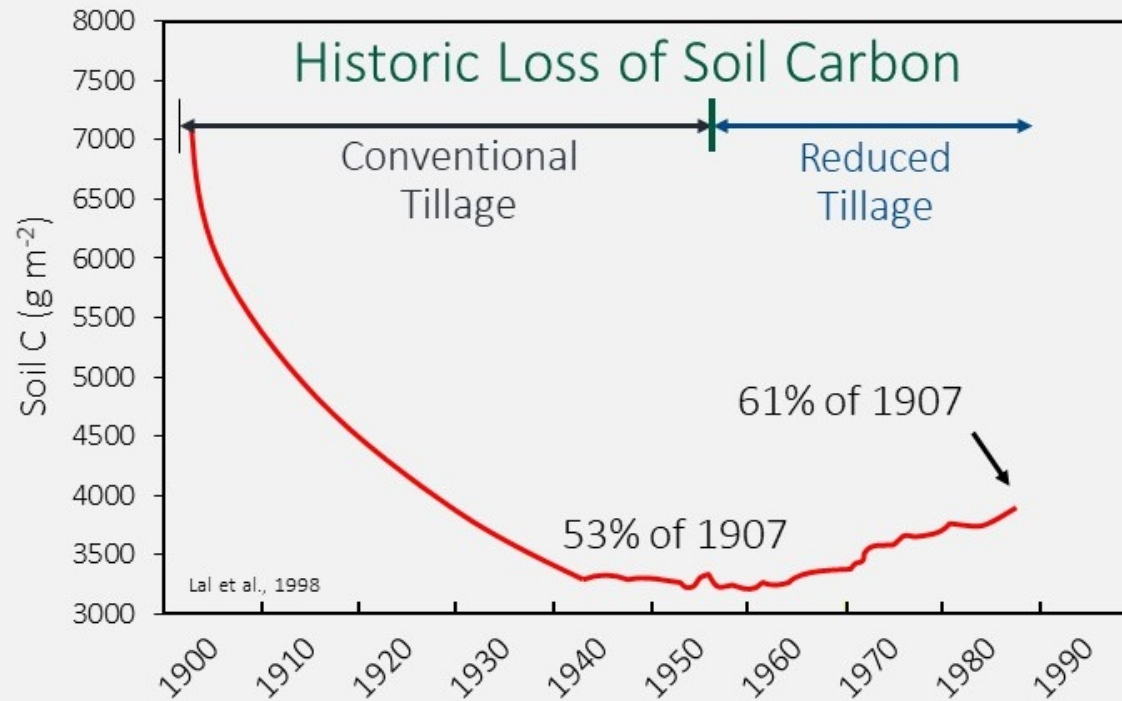


What are General Characteristics of Cultivated Soils?

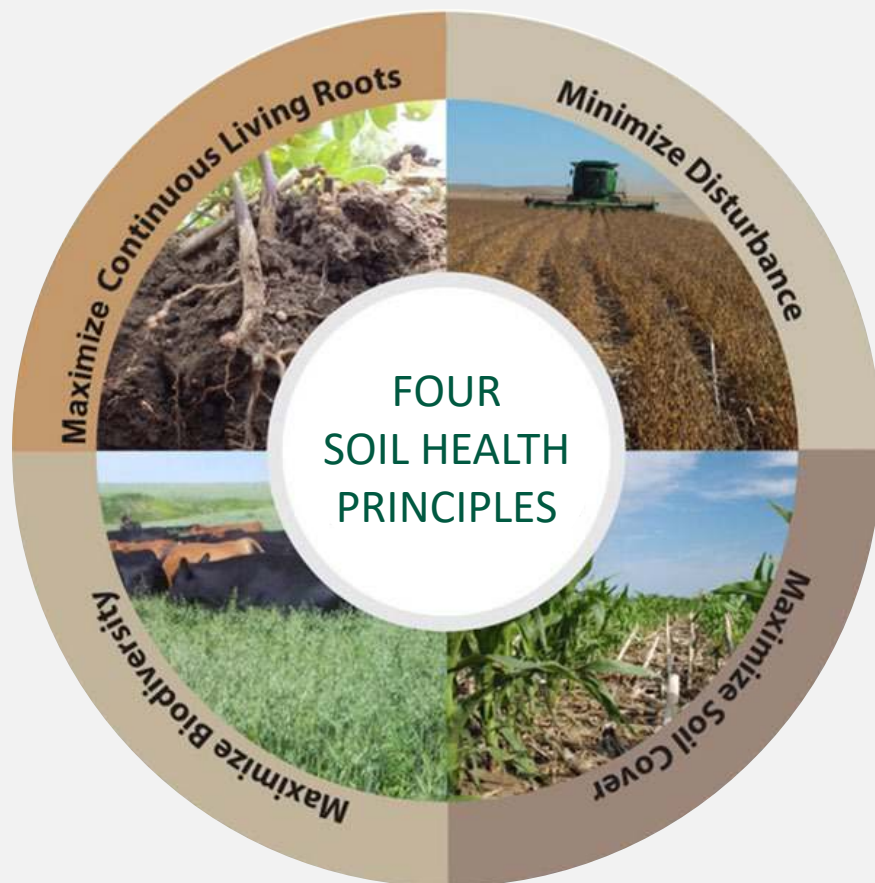
- ↓ H_2O Infiltration & Storage
- ↓ Biological Activity
- ↓ Biological Diversity
- ↓ Efficient Nutrient Cycling
- ↑ Summer Temps
- ↓ Contribution to Vigor
- ↑ Erosion Potential
- ↓ Aggregation

The productivity of conventional agricultural systems are maintained with increased technology, labor, fuel, nutrients, pesticides, water...

The Challenge



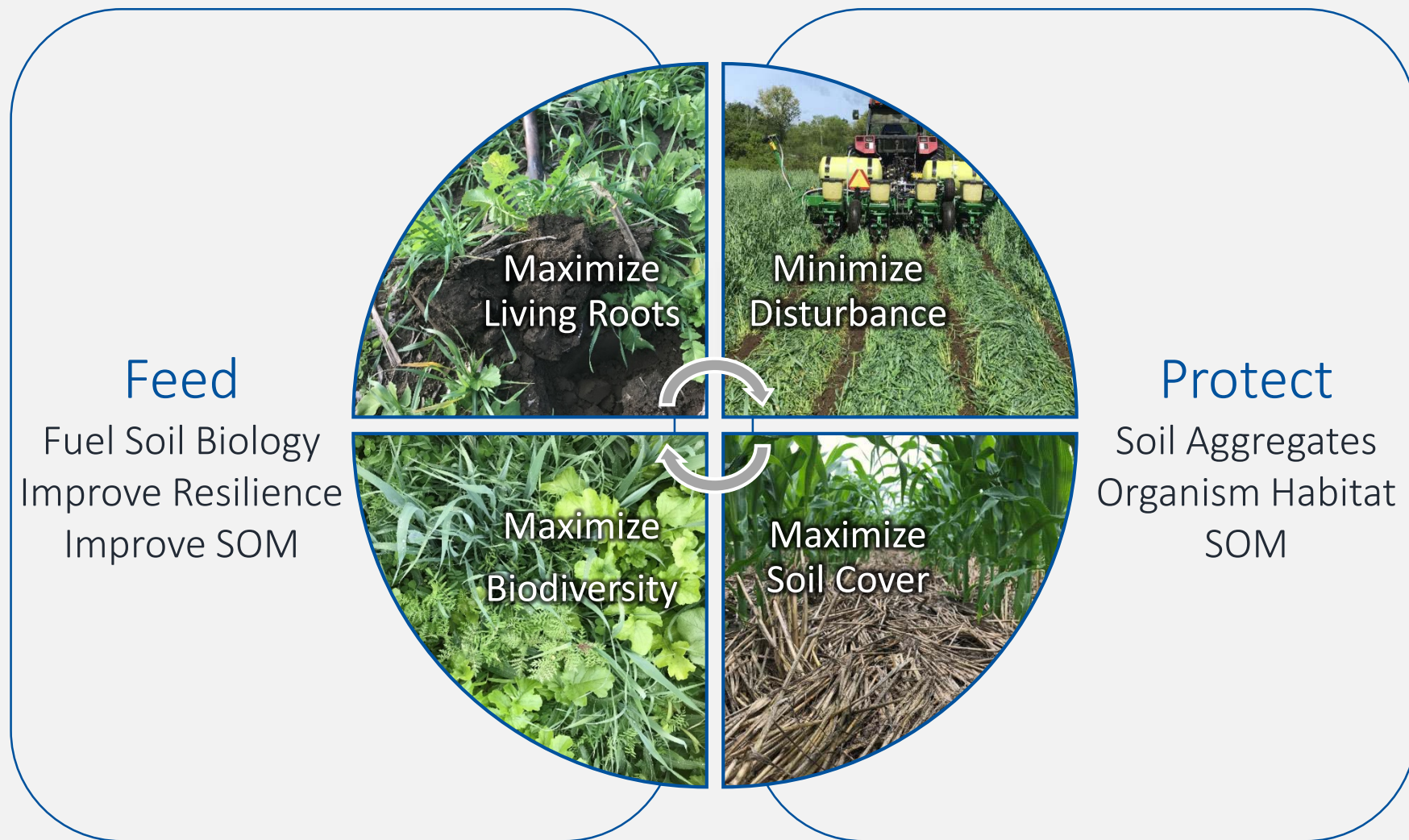
The 4 Principles that Conserve the Soil Ecosystem



1. Minimize Disturbance
2. Maximize Living Cover
3. Maximize Biodiversity
4. Maximize Continuous Living Roots

List the most common practices
that are used in your area.

Soil Health Principles to Support High Functioning Soils



How Soil Health Principles Support Soil function – PROTECT



- Maintain stable aggregates
- Manage erosion
- Buffer temperature
- Reduce evaporation
- Maintain soil organic matter

Minimize Disturbance

Excessive (chronic) Disturbance can:

- ↓Habitat for soil organisms
- Destroy soil structure

What Types of Disturbance are Common in Agriculture?

- Physical (tillage)
- Chemical (fertilizer, pesticides, soil amendments)
- Biological (grazing, non grazing, fallow systems, monoculture community)

Dr. Don Reicosky

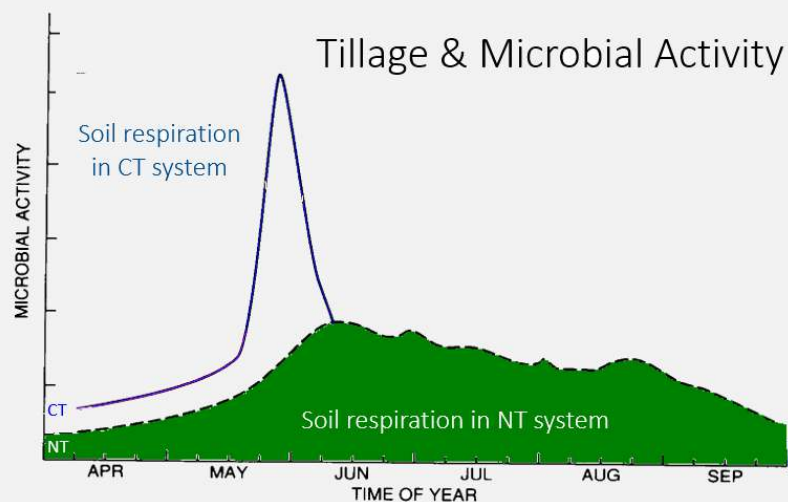


What Practices Minimize Disturbance?



Photo: Echo –Y Farms

- Residue & Tillage Mgmt. (329/345)
- Conservation Cover (327)
- Nutrient Mgmt. (590)
- IPM (595)
- Prescribed Grazing (528)



Why Maximize Soil Cover?

- ↓ Erosion
- ↑ Infiltration
- ↓ Evaporation
- Moderate Soil Temp
- Habitat for Soil Organisms ↑
- Food for Biota ↑
- Mitigate Compaction from Machines & Livestock



What Practices Maximize Soil Cover?

- Cover Crop (340)
- Residue & Tillage Mgmt. (329/345)
- Conservation Cover (327)
- Mulching (484)
- Controlled Traffic (334)
- Forage & Biomass Planting (512)
- Prescribed Grazing (528)



How Soil Health Principles Support Soil Function – FEED



- Stimulate below-ground diversity
- Increase SOM
- Improve nutrient cycling
- Enhance plant growth
- Break pest cycles
- Increase predator & pollinator populations



How Do We Maximize Living Roots?

- Grow crops in the off-season
- Avoid fallow & ↓ re-cropping interval
- ↑ time in perennial crops
- Manage rotations & forage height

What Practices?

- Conservation Crop Rotation (328)
- Conservation Cover (327)
- Cover Crop (340)
- Forage & Biomass Planting (512)
- Prescribed Grazing (528)



How Do We Maximize Biodiversity?

- Grow diverse cover crops & legumes
- ↑ diversity of crop rotations
- Integrate livestock & graze cover crops
- ↑ time in diverse perennial crops

What Practices?

- Conservation Crop Rotation (328)
- Conservation Cover (327)
- Cover Crop (340)
- Forage & Biomass Planting (512)
- IPM (595)
- Prescribed Grazing (528)

Core Practice Review

Cons. Crop Rotation (328)

Principles Addressed

- ☐ Disturbance
- ☒ Cover
- ☒ Diversity
- ☒ Roots



Flax / Chickpeas added to wheat rotation

Conservation Cover (327)

Principles Addressed

- ☒ Disturbance
- ☒ Cover
- ☒ Diversity
- ☒ Roots



Cover Crop (340)

Principles Addressed

- ☐ Disturbance
- ☒ Cover
- ☒ Diversity
- ☒ Roots



Core Practice Review

Residue/Tillage Management (329, 345)

Principles Addressed

- ☒ Disturbance
- ☒ Cover
- ☒ Diversity
- ☐ Roots



Mulching (484)

Principles Addressed

- ☒ Disturbance
- ☒ Cover
- ☒ Diversity
- ☐ Roots



Nutrient Management (590)

Principles Addressed

- ☒ Disturbance
- ☐ Cover
- ☐ Diversity
- ☐ Roots



Core Practice Review

Prescribed Grazing (528)

Principles Addressed

- ☒ Disturbance
- ☒ Cover
- ☒ Diversity
- ☒ Roots



Pasture and Hayland Planting (512)

Principles Addressed

- ☒ Disturbance
- ☒ Cover
- ☒ Diversity
- ☒ Roots



The Ohio State University

Integrated Pest Management (595)

Principles Addressed

- ☒ Disturbance
- ☐ Cover
- ☒ Diversity
- ☐ Roots



Strips of flowering cover crops in potato field

Discuss Practices in Your Area That Address the 4 Principles



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