

SOIL

Organic Matter

Soil

Soil Erosion

Soil Quality Degradation

Subsidence

Compaction

Organic Matter

Salts and Chemicals

Water

Air

Plants

Animals

Energy

Soil Quality Degradation - Organic Matter

Soil organic matter is not adequate to provide a suitable medium for plant growth, animal habitat, and soil biological activity.

What is it?

Soil organic matter is carbon-rich material that includes plant, animal, and microbial residue in various stages of decomposition. Live soil organisms and plant roots are part of the carbon pool in soil but are not considered soil organic matter until they die and begin to decay. The quantity and composition of soil organic matter vary significantly among major ecosystems. Soil in arid, semiarid, and hot, humid regions commonly has less organic matter than soil in other environments.

Why is it important?

Many soil properties impact soil quality/soil health, but organic matter deserves special attention. It affects several critical soil functions, can be manipulated by land management practices, and is important in most agricultural settings across the country. Because organic matter improves soil structure and enhances water and nutrient holding capacity, managing for soil carbon can enhance soil productivity and environmental quality, and it can reduce the severity and costs of natural phenomena, such as drought, flood, and disease. In addition, increasing soil organic matter levels can reduce atmospheric CO₂ levels that contribute to climate change, and improved soil quality/soil health reduces dust, allergens, and pathogens in the air. Ground and surface water quality improve because better structure, infiltration, and biological activity make soil a more effective filter. For example, organic matter may bind pesticides, making them less active.

What can be done about it?

The most practical way to enhance soil quality/soil health, and as a result air and water quality, is to promote better management of soil organic matter or carbon. Practices that increase organic matter include: leaving crop residues in the field, choosing crop rotations that include high residue plants, using optimal nutrient and water management practices to grow healthy plants with large amounts of roots and residue, growing cover crops, applying manure or compost, using low or no tillage systems, and mulching.

Organic Matter at a Glance

Problems / Indicators - Compaction, slaking, soil crusting, crop moisture stress, poor soil structure	
Causes	Solutions
<ul style="list-style-type: none"> • Soil disturbance • Intensive tillage systems • Low crop biomass (surface and subsurface) • Burning, harvesting or otherwise removing crop residues 	<ul style="list-style-type: none"> • Diverse, high biomass crop rotations • Cover crops • Conservation tillage • Rotational or prescribed grazing • Perennials in rotations • Maintain crop residues on soil surface • Animal manure and compost • Water table management