



# Soil Health Overview



## What is Soil Health?

Soil health is defined as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. Healthy soil gives us clean air and water, bountiful crops and forests, productive grazing lands, diverse wildlife, and beautiful landscapes.

Soil does all this by performing five essential functions:

- ◆ **Regulating water.**  
Soil helps control where rain, snowmelt, and irrigation water goes. Water flows over the land or into and through the soil.
- ◆ **Sustaining plant and animal life.**  
The diversity and productivity of living things depends on soil.
- ◆ **Filtering and buffering potential pollutants.**  
The minerals and microbes in soil are responsible for filtering, buffering, degrading, immobilizing, and detoxifying organic and inorganic materials, including industrial and municipal by-products and atmospheric deposits.
- ◆ **Cycling nutrients.**  
Carbon, nitrogen, phosphorus, and many other nutrients are stored, transformed, and cycled in the soil.
- ◆ **Providing physical stability and support.**  
Soil structure provides a medium for plant roots. Soils also provide support for human structures and protection for archeological treasures.

## Principles to Manage for Soil Health

Soil health research has determined how to manage soil in a way that improves soil function. These principles apply to operations of any size - from backyards to back forties.

### Armor the Soil



Provide soil cover by reducing disturbance and planting crops that are slow to break down. In grazing systems, leave enough standing and trampled material to protect the soil surface. Residue is important and it is key component of a system grounded in soil health.

### Minimize Soil Disturbance



Especially tillage. Undisturbed root systems are the main contributor to increased organic matter levels in the soil and the building of soil structure.

### Keep a Living Root in the Soil



Keep living roots in the soil as long as possible to increase soil microbial activity. Soil microbes feed on sugars that leak from the plant roots.

### Increase Diversity



Increase plant diversity by varying crop types within your rotation and/or using a "cocktail mix" as a cover crop. Effective grazing systems can also promote plant diversity.

### Integrate Livestock



Livestock add another component of diversity to your system. Soil organisms like earthworms and dung beetles thrive where there is plenty of dung and dead plant material for them to live on.

## Why Farm and Ranch for Soil Health?

Using soil health principles and systems that include no-till, cover cropping, diverse rotations, and effective grazing management increases soil organic matter and improves microbial activity. Benefits of farming and ranching this way include sequestering more carbon, increasing water infiltration, improving wildlife and pollinator habitat—all while harvesting better profits and often better production.



For more information on soil health, contact your local USDA Service Center, visit [Soil Health in Montana](#), or scan  QR code.

