The NRCS Soil Health Initiative

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Building A Successful Conservation System To Regenerate Soil Health AND Protect our Water
**Soil Quality vs. Soil Health**

**Quality:** capacity of the soil to function  
*Doran and Parkan, 1993*

**Health:** the continued capacity of the soil to function as a *vital living ecosystem* that sustains its, animals, and humans

*USDA-NRCS, Soil Health Institute-Partnership-Renaissance, 2015*
Soil Health Campaign

NRCS has made soil health the centerpiece of its conservation planning and on-the-ground delivery approach...Since 2012, NRCS and its partners have helped producers install soil health practices on more than 40 million acres of working agricultural lands.

— Jason Weller, NRCS Chief. “NRCS soil health effort is deep, impactful and taking root across the nation” Agri-Pulse Communications
Soil Health Principles

- Crop Rotation
- Cover Crop
- Reduced Tillage
- Controlled Traffic
- Avoid Tillage When Wet
- Nutrient Management
- Rotational Grazing
- Mulching
- Forage and Biomass Planting

Provide Continuous Living Roots

Minimize Disturbance

Maximize Biodiversity

Maximize Soil Cover
Soil Health

Physical

Chemical

Organic Matter

Biological

Management
Organic Matter
Habitat & Food Source for Soil Biota

- Plant growth enhancement
- Aggregate formation
- Water flow
- Water storage
- Water filtration
- Decompose residues
- Influence atmospheric composition
- Detoxify
- N fixation
- Nutrient cycling
- Pathogen suppression
- Soil Biota
If soil organisms are not provided food source and habitat, the soil is subject to:

– Compaction
– Crusting
– Loss of aggregate stability
– Decreased ability to cycle nutrients

Aggregate stability will only regenerate biologically.
Downward Spiral of Soil Degradation in annual systems

1. Active tillage, insufficient residues, low, no surface cover
2. Organic decreases, erosion, compacted
3. Aggregates break down
4. Surface becomes compacted, crust forms
5. Infiltration decreases
   Erosion by wind and water increases
6. More soil organic matter, nutrients, and top soil lost
7. MORE ponding & persistent wetness, but LESS soil water storage;
   less rooting; lower nutrient access by plants; less diversity of soil organisms, more disease
8. Crop yields decline
9. Hunger and malnutrition, especially if little access to inputs
**Goal:**

N-WIN Regenerative Soil Health Management Systems Become the National Norm

- Better crop yields & quality; lower cost, risk, environmental impact
- Field conditions more resilient and consistent
- More SOC, nutrients, and top soil built
- Less energy, inputs and tillage needed, more water stored, better rooting, more nutrient access, greater soil organism diversity, less disease
- Aggregates rebuilt
- Tillage, more higher diversity, cover
- AWHC increases
- SOC increases, rooting reduces compaction

**do not disturb**

**mix it up**

**discover the cover**

**tap into roots**
Interseeding
Aerial Seeding
High Residue Systems
High Residue Systems
Manure Management
Developing standards for ‘current best available’ SHA’s with public & private partners

Standard public testing beyond nutrient availability and organic matter:
- Water partitioning
- Soil metabolic activity
- Bioavailable carbon
- Bioavailable nitrogen
- Microbial community structure and diversity
Integrate soil health status into NRCS conservation planning process

Soil Health Management Plan

– Help producers assess and understand soil health status; choose soil health management systems
– Develop pilot plans
– Evaluate and adjust
– Offer through certified planners
Strengthening the Science of Soil Health through the new NRCS SHIELD network

Health Inventory & Evaluation for Land use Decisions

decide on indicators and standard methods, meta analysis for preliminary interpretations

build and populate NRCS soils database for SH indicators and metadata

monitor soil health on benchmark soils

assess management impacts

build decision tools and integrate info into NRCS programs and standards to facilitate field implementation of assessment and improved soil health management systems
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