

Climate Change and Agricultural Production: Resilience through Conservation



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Translating climate science into action



Mission:

- (1) Develop and deliver science-based, region-specific information and technologies with USDA agencies and partners for agricultural and natural resource managers to enable climate-informed decision-making
- (2) Provide access to assistance to implement those decisions

Threats to food and fiber production systems

➤ Variable weather conditions

- ✓ Flooding
- ✓ Drought
- ✓ Late-spring freezing
- ✓ Excessive heat
- ✓ Disease pressures



Threats to food and fiber production systems

- **Management**
 - ✓ **Simplicity**
 - ✓ **Market structures**
 - ✓ **Options**



“If **Earth** is the mother of all living things, then **soil** must be its womb, bearing richness beyond comprehension.

Then too, **carbon** in soil should be considered the blood energizing the entire body, enabling the Earth to provide a multitude of **ecosystem services.**”

Will we allow soil carbon to feed our needs?



Why should we care?

❑ Soil is vitally important to many global issues facing society in the coming decades

- *Food security*
- *Climate change*
- *Clean water and its availability*
- *Recycling and nutrient utilization*

❑ Conservation management systems are capable of restoring soil organic carbon for the benefit of society

- *Conservation tillage, pastures, cover cropping, manures*

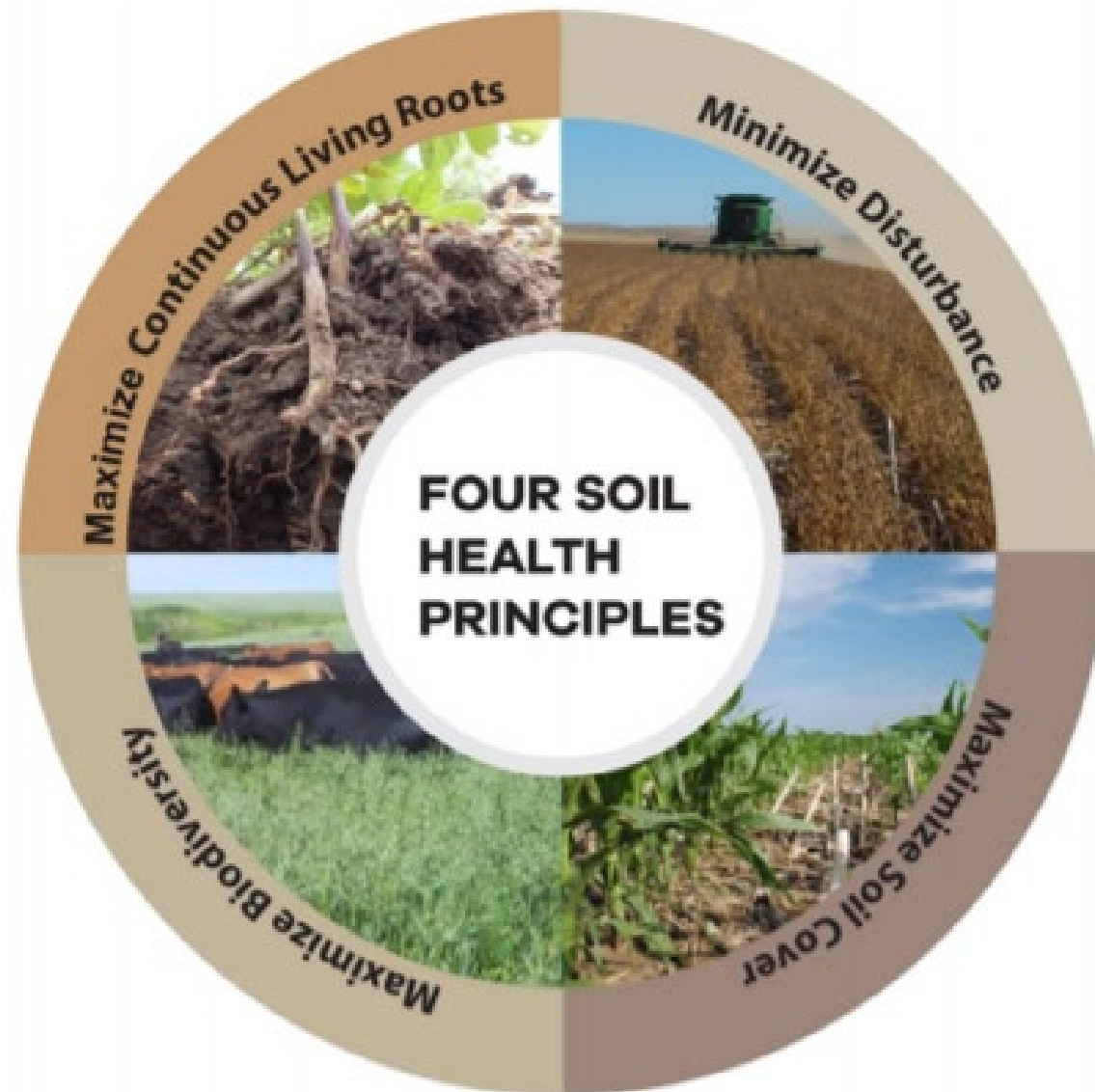
❑ Soil organic carbon powers many ecosystem services

- *Water and nutrient cycling*
- *Climate regulation*
- *Food, feed, fiber, and fuel production*



Conservation management approaches

Our relationship with soil starts the process...





No-till planting

Catawba County NC, corn grain production

Cover cropping

A close-up photograph of a field of multi-species cover crops. The plants are a mix of green and purple flowers, with some red flowers visible. The ground is covered with a layer of dry, yellowish-brown cotton stalks and other plant debris. The background is a blurred field of similar plants under a clear blue sky.

Halifax County NC, multi-species after cotton

Crop rotation



Rowan County NC, corn after soybean

Managed grazing



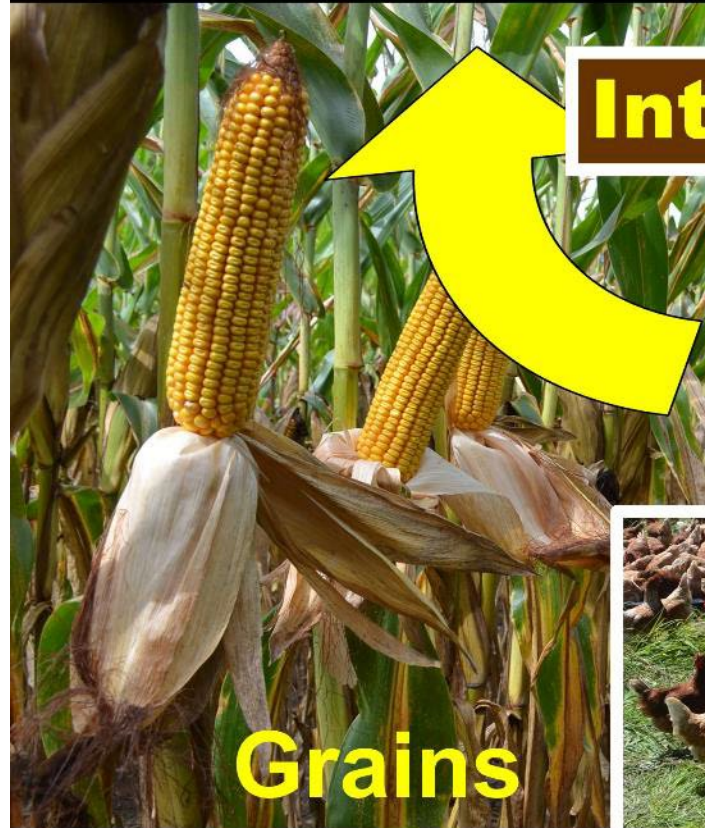
Randolph County NC, grazing fall-stockpiled fescue

Animal manures

Davidson County NC, dung pats on pasture



Integrated crop-livestock systems



Integration



Silvopasture



**Trees, forages, and livestock integrated
into a working system on a farm**

Conservation agricultural systems for the future



+
**agroforestry
and/or
silvopasture**

+
**integrated crop-
livestock systems**

*Corn-
Wheat/clover-
Cotton/rye-
peanut*

+
**sod
rotations**

+
**diverse
rotations**



**No
tillage**

+
**cover
crops**

Time →

↑
Sustainability goals



Sustaining family farming