



Building Soil Health from the Ground Up: The What, Why, and How

Mary Sketch Bryant
Coordinator
Virginia Soil Health Coalition



Soil is more than the dirt below our feet...



**It is a living ecosystem,
And the foundation for life.**



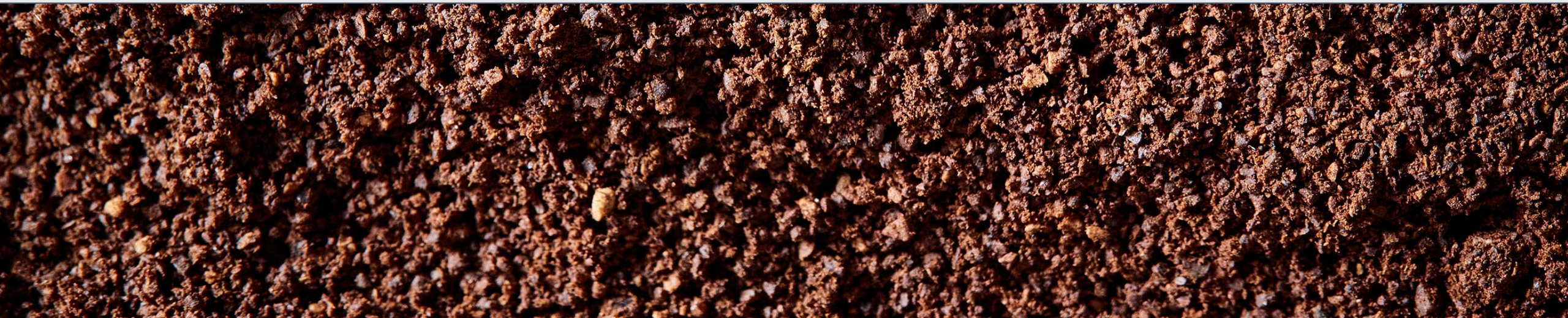


Soil

is the continued capacity of a soil to function as a vital, living ecosystem that sustains plants, animals, and humans.

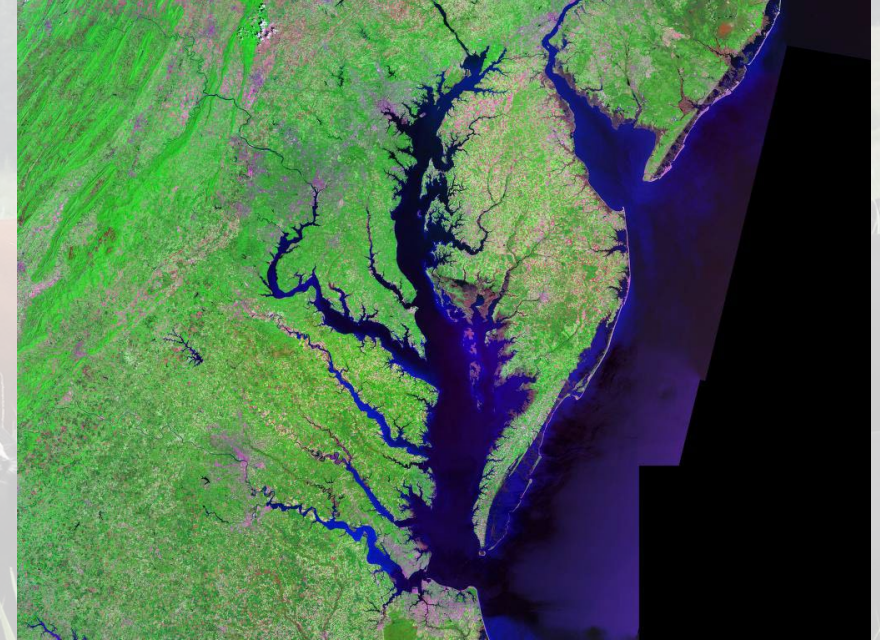
Health

It is often measured by its organic matter, soil biology, or carbon content.



Healthy Soils Support Ecosystem Function

- ❖ Increase resilience to extreme weather
- ❖ Reduce erosion
- ❖ Enhance water quality
- ❖ Improve human health
- ❖ Provide pollinator habitat
- ❖ Increase carbon sequestration
- ❖ Reduce greenhouse gas emissions



The Chesapeake Bay

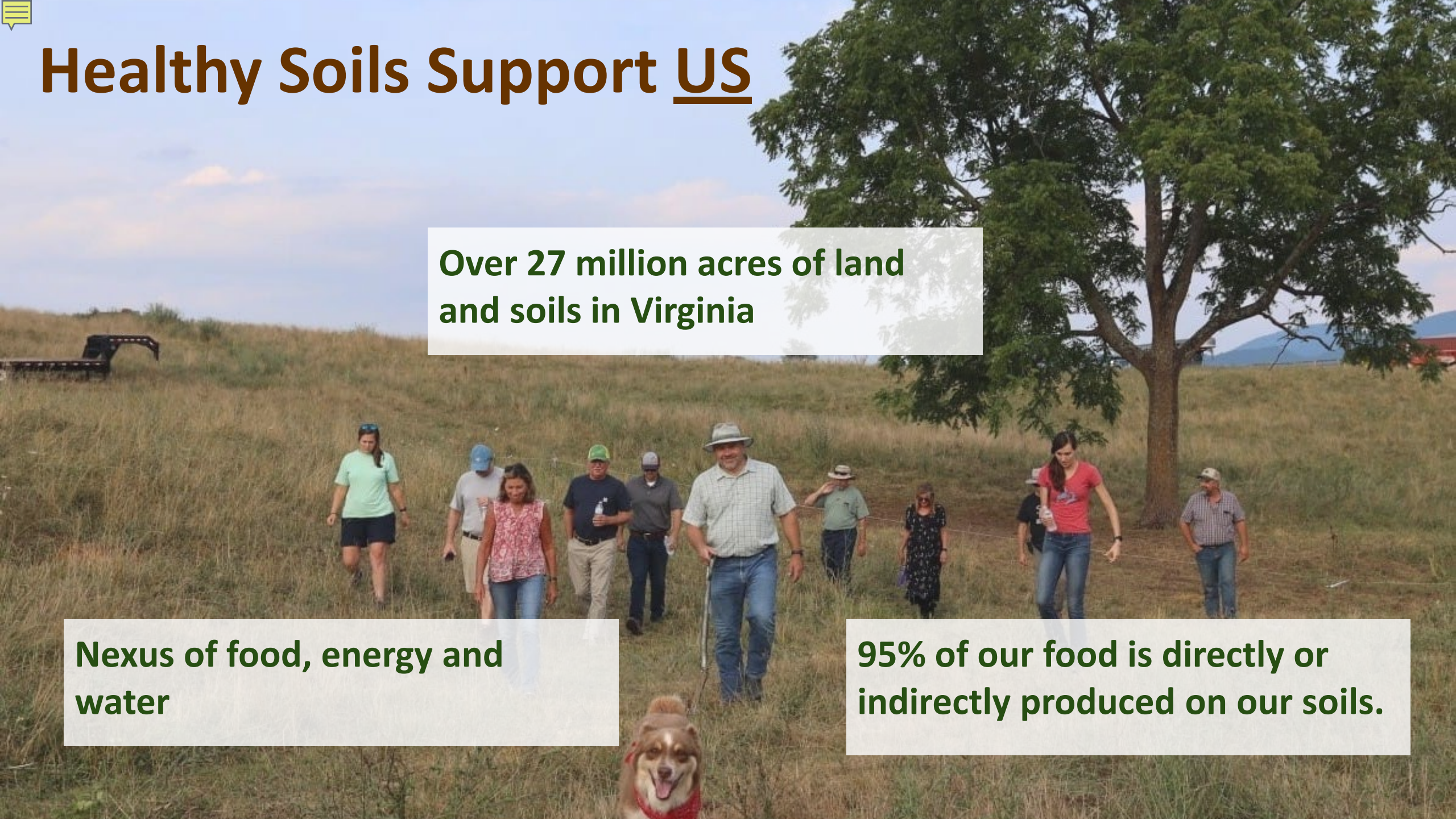


Healthy Soils Support US

Over 27 million acres of land and soils in Virginia

Nexus of food, energy and water

95% of our food is directly or indirectly produced on our soils.

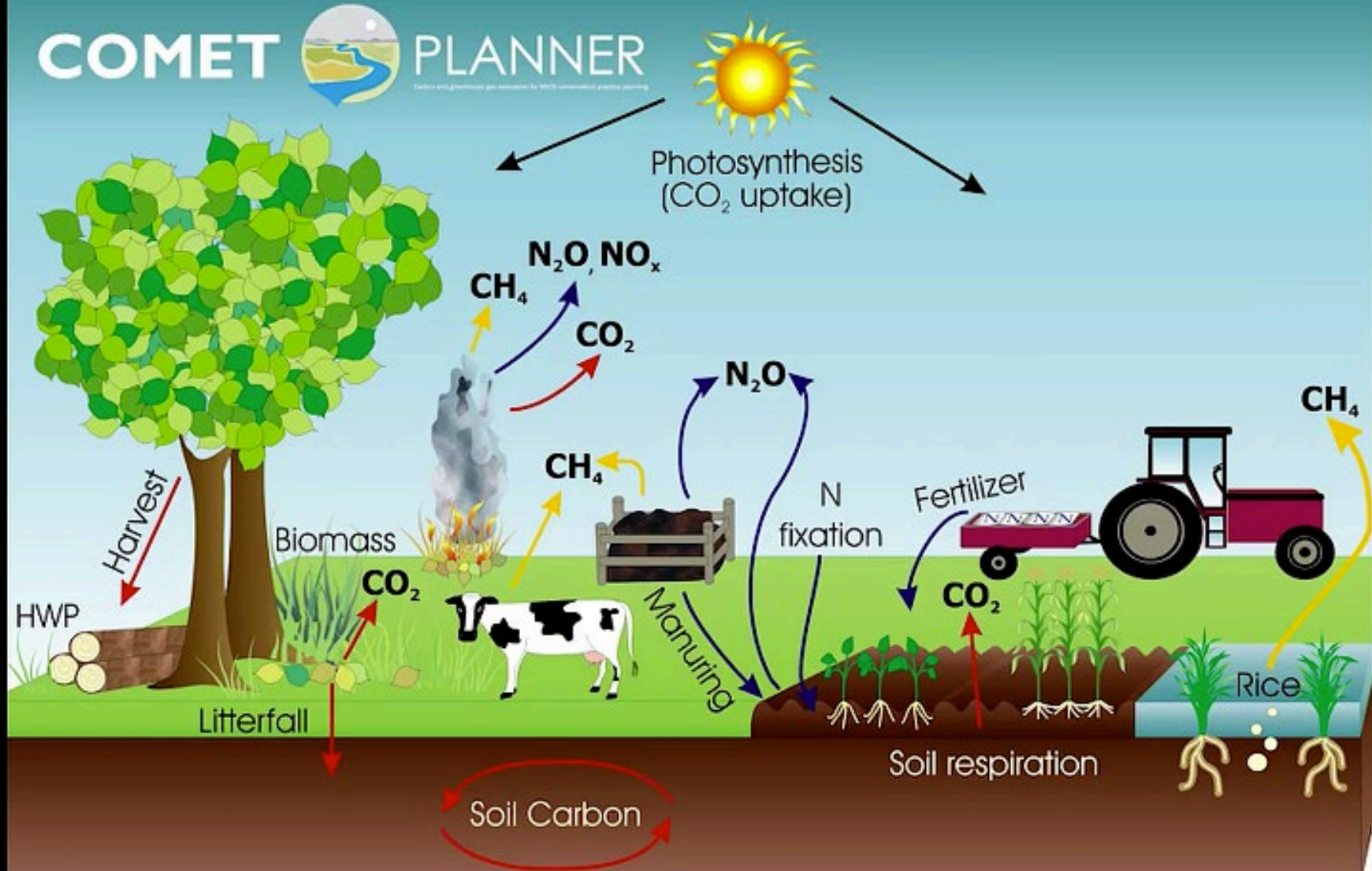


Soil Health and Climate Resilience

- ❖ Humans have increased the amount of carbon dioxide in the atmosphere by 45% since the Industrial Age
- ❖ **Sequestration:** the process in which CO₂ is removed from the atmosphere and stored “in the ground.
- ❖ About 25% of emissions have been captured by forests, farms, and grasslands
- ❖ It is predicted that soils have lost between 50-70% of original carbon stock such as through tillage
- ❖ **BUT healthy soil can store more carbon!**



COMET PLANNER



A photograph of a dense forest with tall, thin trees and a path leading through them. The trees are mostly deciduous with green leaves, and the ground is covered in fallen leaves and low-lying vegetation. The lighting is soft, suggesting an overcast day or a shaded forest interior.

What can we do?

Four Principles of Soil Health

1. Keep Soil Covered

1. It's the first step in protecting it from erosion, but also buffers soil temperature, slows rainfall runoff, and aids rainfall infiltration.

2. Minimize Soil Disturbance

1. Both physical and chemical. This proactive measure can heal and protect properties of the soil and ultimately enhance the biological component of soil life.

3. Maximize Living Roots

1. Doing this longer throughout the year fuels biological activity, aids nutrient cycling, and contributes to improved soil structure.

4. Energize with Diversity

1. Use different crop species and integrate livestock where possible for specific purposes to enhance biological component of soil life.



Desirable Attributes of Healthy Soils

1. Fertility – nutrient cycling and availability to plants
2. Structure – aggregate stability, tilth, mellowness
3. Depth – Availability for root growth and expansion
4. Drainage and aeration – water and air cycles and exchange
5. Minimal pests – balance of beneficial insects
6. Free of pollutants and toxins – buffering and detoxifying ability
7. Resilience against stressors -- drought, rainfall, mismanagement

Magdoff, F. & Van Es, H. (2021). *Building soils for better crops: Ecological management for healthy soils, Fourth edition*. Sustainable Agriculture Research and Education (SARE) Handbook Series 10.



Feed & Diversify the Soil Biota

Boosts pollinators

Increases soil organic matter

Increase diversity and nutrient cycling

Enhance plant growth

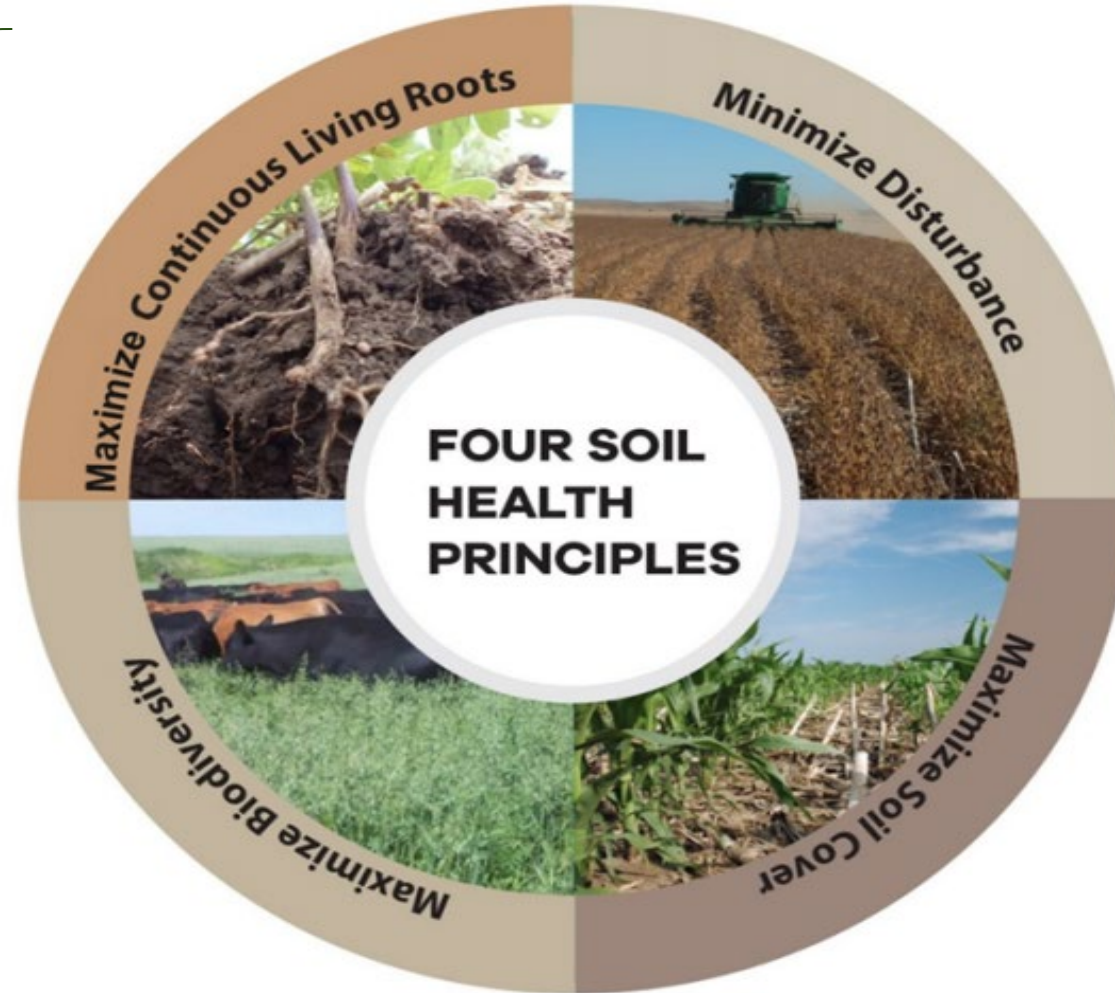


Chart from NRCS

Protect Soil Aggregates and Organic Matter

Reduces erosion

Buffers temperature and moisture

Maintains soil organic matter

Protects microbial community

It's all about the microbes.



UNHEALTHY SOIL WITH POOR STRUCTURE



HEALTHY SOIL WITH GOOD STRUCTURE

Balance Sheet for Healthy Soils

Tend to Reduce Soil Health	Tend to Promote Soil Health
Aggressive tillage	No-till or reduced tillage
Aggressive traffic on wet ground	Controlled traffic/compaction prevention
Annual/seasonal fallow	Cover crops/relay crops
Monocultures	Diverse crop rotations
Annual crops	Perennial crops
Crop-only farms	Crop/livestock integration
Crop residue removal	Crop residue retention
Inadequate fertilization	Adequate fertilization
Inorganic fertilizers	Organic fertilizers (manures)
Broad spectrum pesticides and herbicides	Integrated pest management (IPM)

Soil Health: A Bridge and Doorway



AMY HICKS
Amy's Organic Garden


#4TheSoil
#4TheFuture
Learn How @ 4TheSoil.org



Learn How @ 4TheSoil.org
#4TheSoil
#4TheFuture

*Seventh Annual Small Ruminant
Conference & Field Day: The Basics*

RENARD TURNER
Vanguard Ranch, LTD



MIKE PHILLIPS
Valley View Farms

#4TheSoil
#4TheFuture
Learn How @ 4TheSoil.org



Bringing the Past Forward -- Mike Phillips of Valley View Farms



Nurturing Community, Soil Health, and Restorative Justice – Jonathan McRay of Silver Run Forest Farm



4 The Soil Awareness Initiative

- ❖ Amplify and complement on-going soil health messaging and educational thrusts and priorities
- ❖ Personalize and humanize – and possibly popularize
- ❖ Refresh and reinforce the four core soil health principles:
- ❖ Raise general awareness of soil as a critical resource
- ❖ To get more people involved to see care for the land and soil as an expression of their values and ethics and who they are: soil health as bridge and doorway
- ❖ To socially market what farmers are doing to care for soil
- ❖ To be a building block of a consumer-facing educational awareness and branding effort as a win-win-win relationship in the marketplace



We can all be "4 The Soil"!

4 THE SOIL

[4 Core Principles](#) [Take the Pledge!](#) [Learn More](#) [Spread the Word](#) [Tips & Resources](#)

Join the Movement. Take the Pledge!

YES, I am 4 the Soil!

I will follow the 4 Core Principles of Soil Health Management whenever they are compatible with my land management goals and operations.

(Check the box at end to get on the mailing list for regular updates and information about soil health in Virginia)

* Indicates required field

Name *

Email *



- ❖ 4 The Soil: A Conversation podcast launched in September 2021
- ❖ Collaboration with Jeff Ishee of On The Farm Radio and Ennis Carter of Social Impact Studios
- ❖ New episodes the 2nd and 4th Tuesdays of the month

Resources and To Get Involved

For more ideas and resources, check the website and social media:

www.4thesoil.org and <https://www.virginiasoilhealth.org/>

For questions or ideas about enhancing the initiative:

Mary Sketch Bryant, Virginia Tech/Virginia Soil Health Coalition, mksketch2@vt.edu

Eric Bendfeldt, Virginia Tech & VA Cooperative Extension, ebendfel@vt.edu

“Our **community**
is only **as good as its soil.**
If the soil is good and **people are**
working that soil and then **you'll**
have services. You'll have
the fire department, **you'll have**
hospitals, you'll have doctors.
You'll have all the
professions.”

~ David Kline, Amish farmer, author, and naturalist





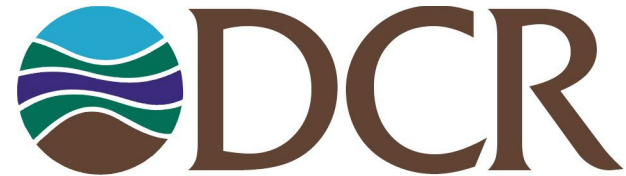
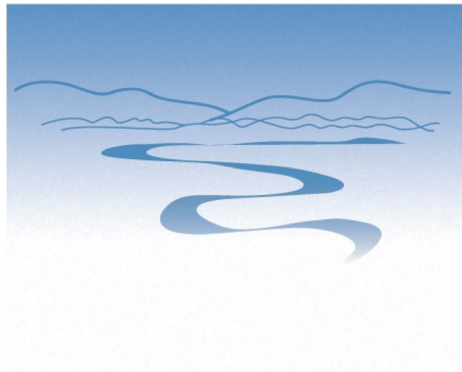
NFWF



Chesapeake Bay Program
Science. Restoration. Partnership.

Chesapeake Bay Stewardship Fund

AGUA FUND, INC.



Virginia Department of Conservation & Recreation



DEPARTMENT OF AGRICULTURAL, LEADERSHIP,
AND COMMUNITY EDUCATION