



NEVADA DIVISION OF  
**ENVIRONMENTAL  
PROTECTION**



Nevada Department of  
**CONSERVATION &  
NATURAL RESOURCES**



# Soil Health and the Water Connection

NVaCD Annual Meeting – Fallon, NV

November 16th

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# Today's Presentation

## SOIL HEALTH DEMONSTRATIONS

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**Soil Slake Test**

**Water Infiltration Test**

**Rainfall Simulator**

**Importance of Soil Organic Matter and Soil Biology**

**Importance of Soil Aggregation**



# Soil – Water Relationship

## SOIL SERVICES TO WATER

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1. Water Infiltration
2. Water retention – soil water holding capacity
3. Resilient to water and wind Erosion – minimal sediment loss
4. Efficient Nutrient Cycling and Nutrient Retention – Reduce N leaching
5. Retain or degrade chemicals, heavy metals, and other urban pollutants
6. Moderate Temperature: clean cool water into surface water bodies
7. Increase ground water recharge and duration of seasonal stream flows

# Characteristics of a Healthy Functioning Soil

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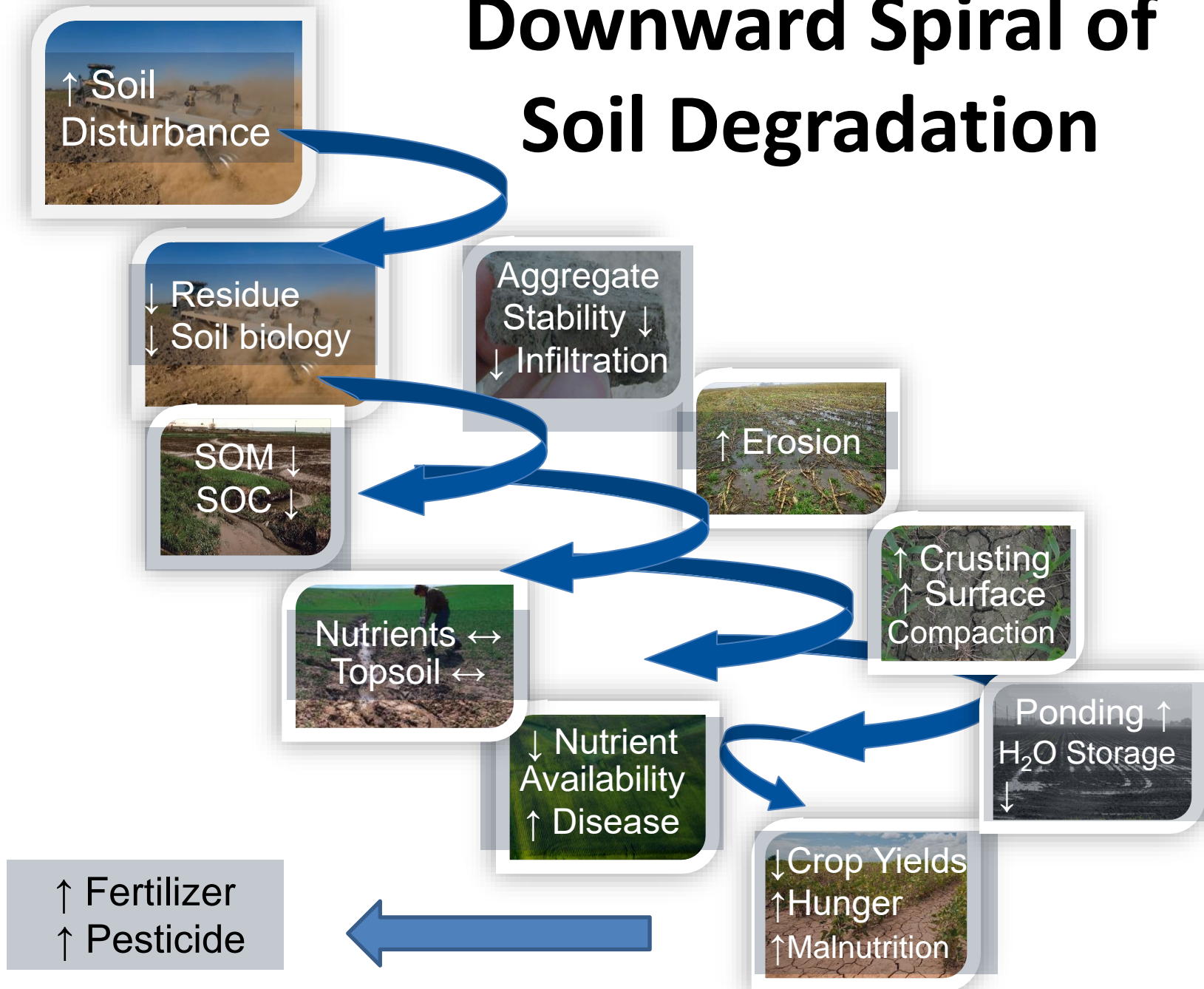
- Good Soil Porosity and Soil Structure
- High levels of stable organic matter
- Active and diverse microbial population
- Efficient nutrient cycling
- Good water storage
- Resistant to degradation
- Sequestering Carbon



**Requires Little to NO Chemical Inputs!**

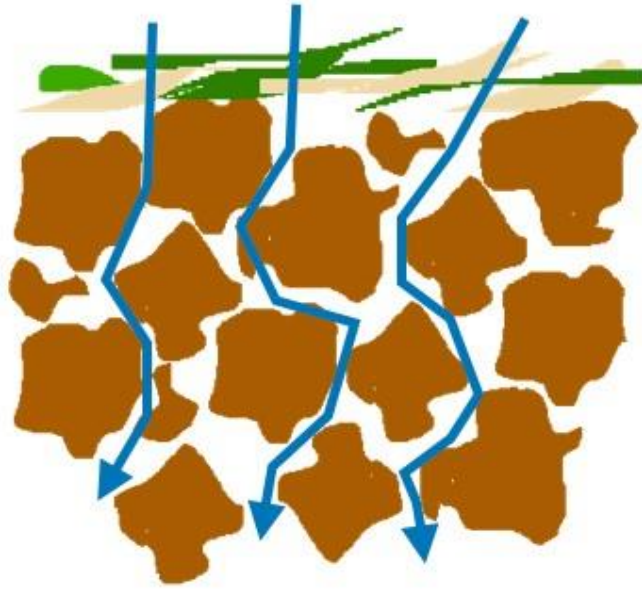


# Downward Spiral of Soil Degradation

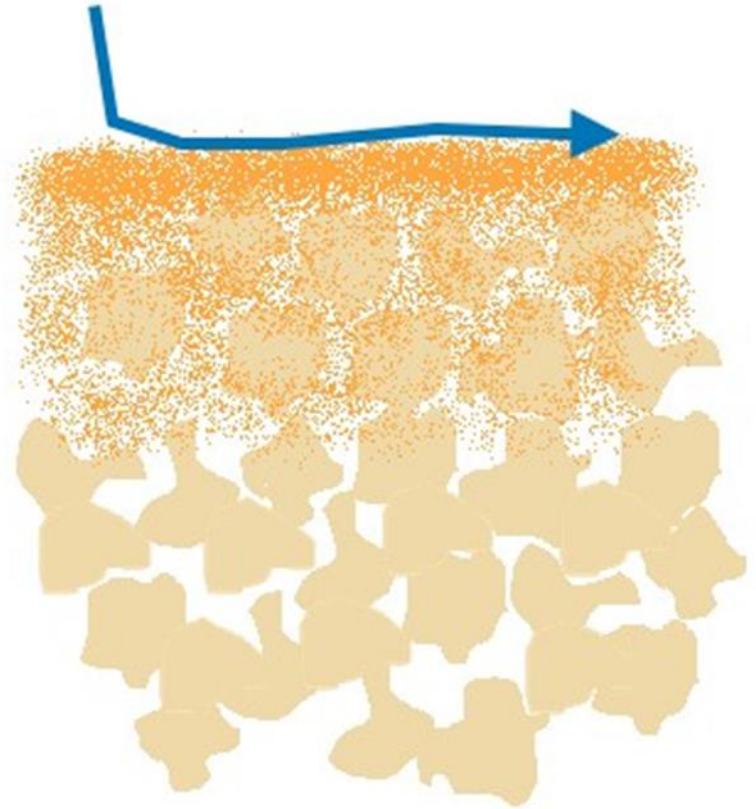
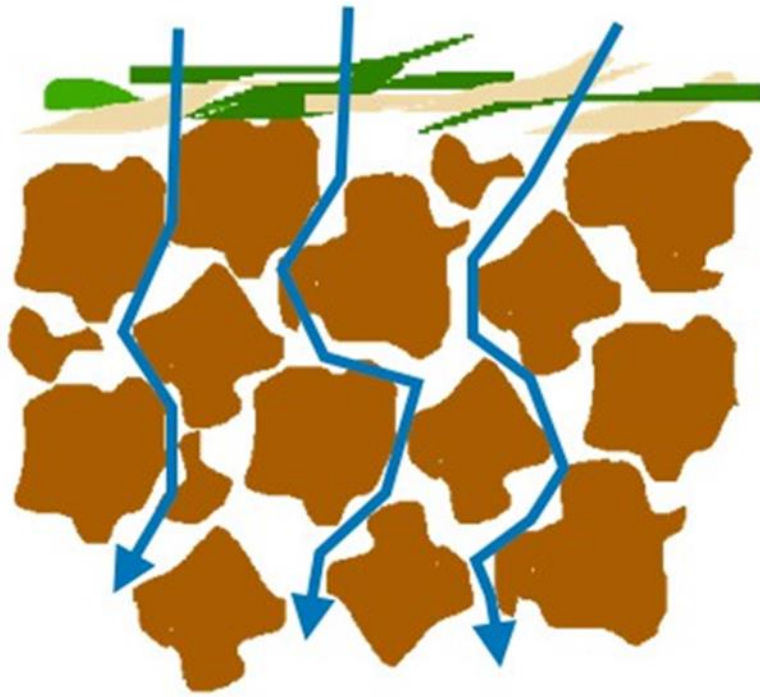


# HEALTHY SOIL HAS GOOD SOIL STRUCTURE, AGGREGATE STABILITY AND POROSITY

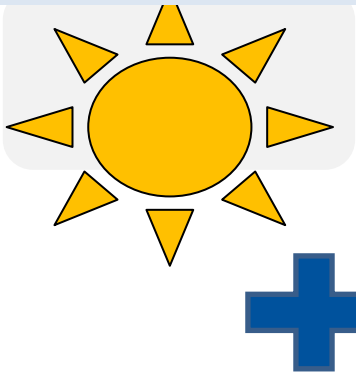
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What creates a healthy soil  
like this one?

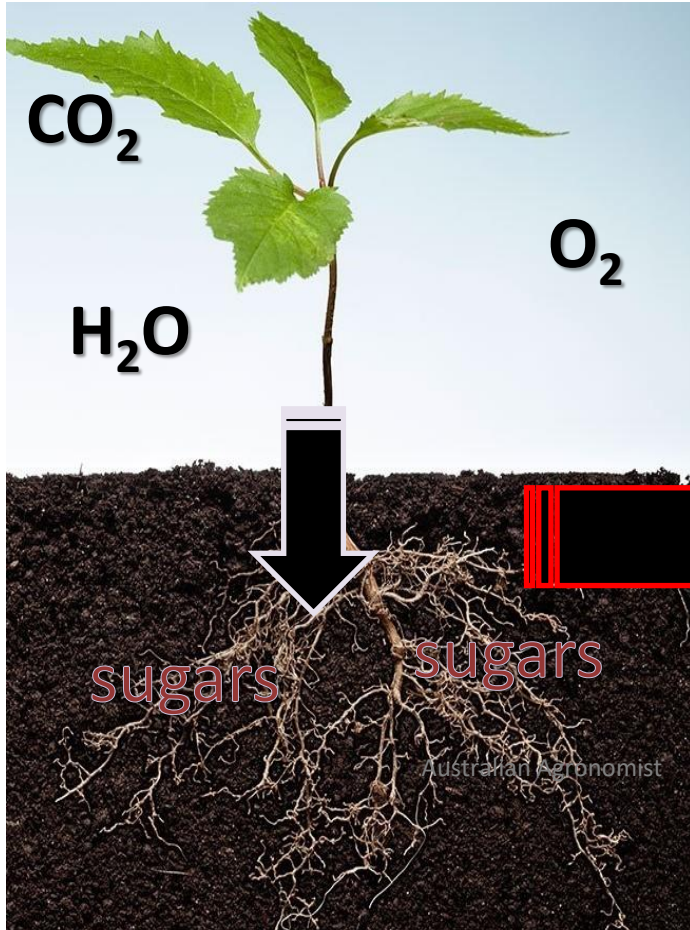






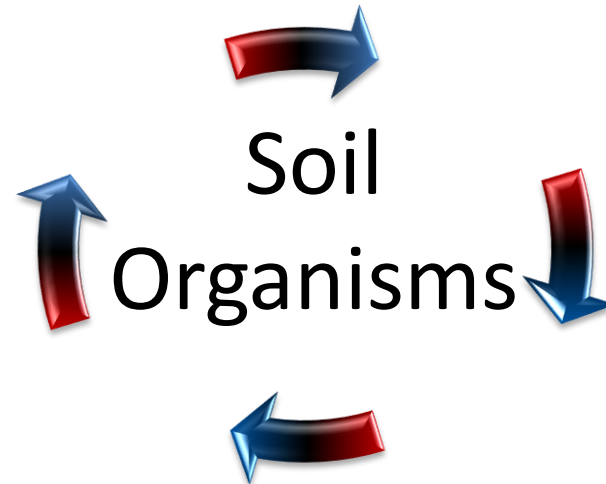
# 1. Capture Solar Energy

## 2. Liquid Carbon Pathway



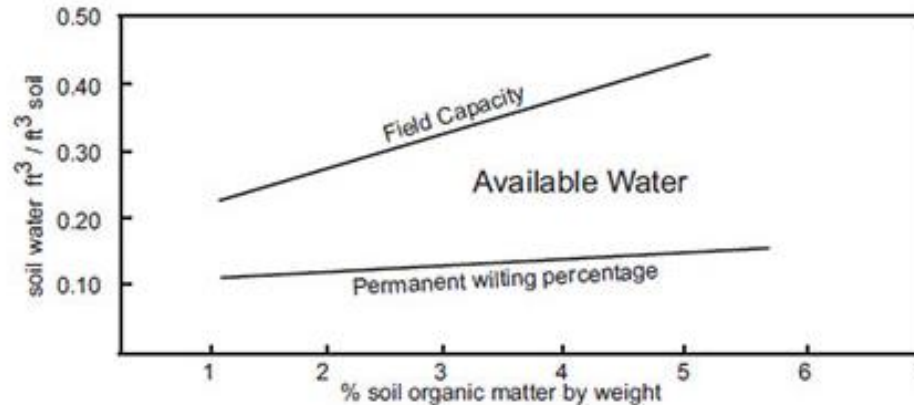
Creates a biological hot spot:

## The Rhizosphere





# Soil Organic Matter Water Relationship



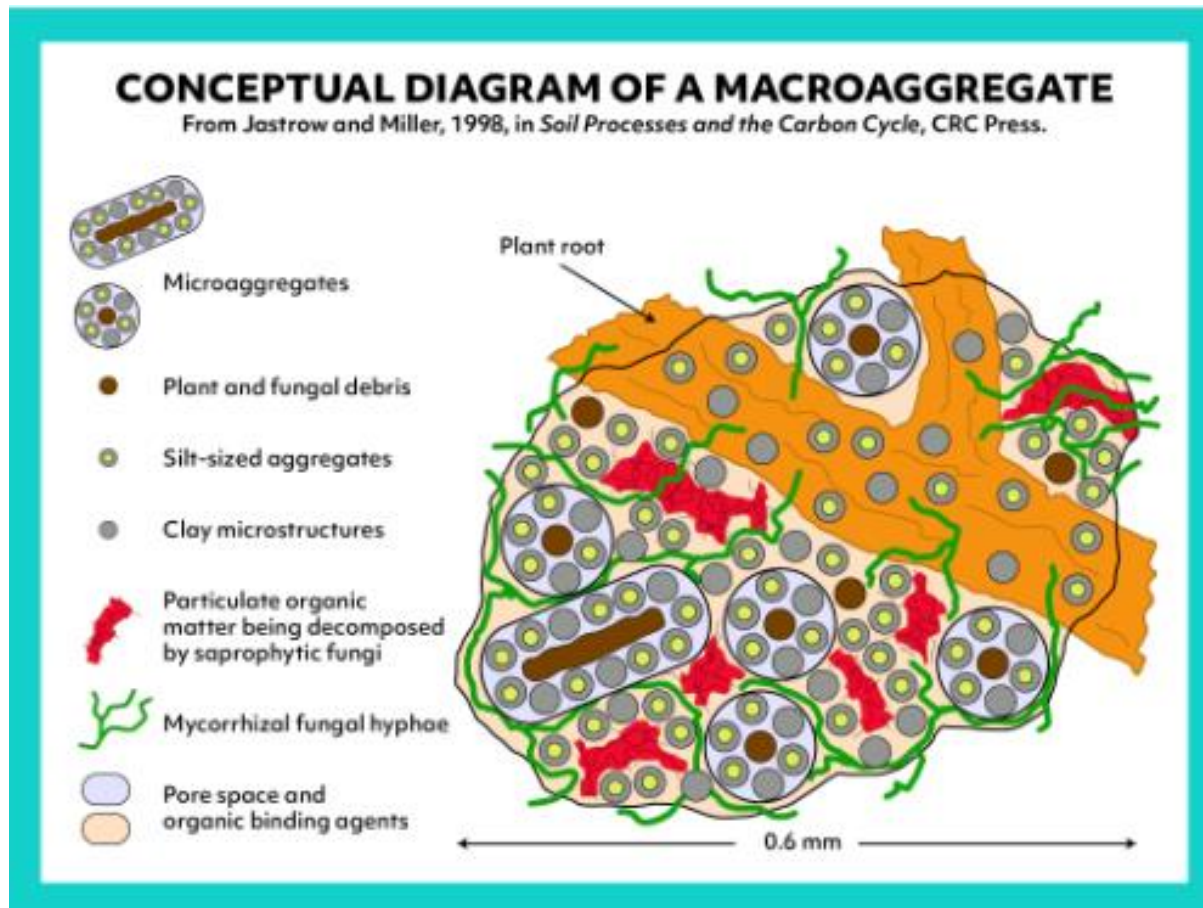
*Figure 2. Effect of increasing organic matter on available water capacity of silt loam soils. Adapted from Hudson, SWCS, 1994.*

Every **1%** increase in OM (0.5% SOC)

**25,000** gal increase in available soil  
water per acre  
(NRCS)

# Soil Aggregates

Well aggregated soil plays a critical role in water infiltration, water availability, nutrient cycling, gas exchange, and soil ecosystem function



# Leading Causes of Water Quality Impairment

## NPS POLLUTION

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**Soil erosion** – run off, sediment delivery

**Nutrient loss** – Nitrogen, Phosphorus, Salts

**Pesticides** – ground water contamination

**Bacteria** – livestock manure





# Soil Health Benefits to Farms



## Additional Benefits Reported by 100 Farmers

Benefit	% Responding Yes
Increased Yield	67
Reduced Fertilizer Input	83
Increased Crop Resilience	97
Increased Access to Field	93
Improved Loan, Land, Insurance Terms	41
Improved Water Quality	100
Protects License to Operate	98
Increased Soil Organic Matter	54



# SOIL HEALTH BENEFITS TO FARMS

## Summary of Findings from 100 Farms

- Average farm size was 1940 acres
- SHMS reduced average production costs by:
  - \$24/acre for corn
  - \$17/acre for soybean
- SHMS increased net farm income for:
  - 85% of farmers growing corn
  - 88% of farmers growing soybean
- SHMS increased average net farm income by:
  - \$52/acre for corn
  - \$45/acre for soybean
- Additional benefits reported by farmers:
  - 93% reported increased access to their fields
  - 97% reported increased resilience to extreme weather





Healthy  
Soils  
Healthy  
Watershed



Questions?

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Nevada Division of Environmental Protection  
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