



350 Community Forum On Regenerative Agriculture

United States Department of Agriculture



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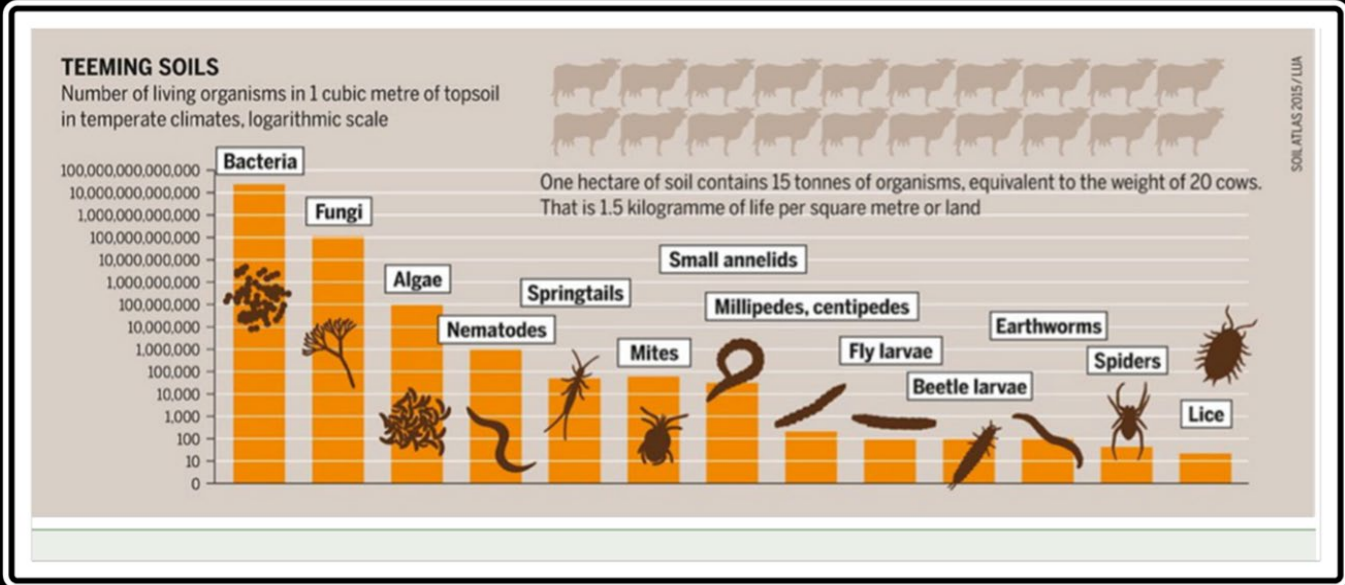
NRCS Soil Health Principles
April 27th, 2024

SOIL HEALTH DEFINITIONS:

NRCS: The continued capacity of the soil to function as a VITAL LIVING ECOSYSTEM that sustains plants, animals, and humans.

CALIFORNIA Defined in SB 859 - Healthy Soils Program:
Soils that enhance their continuing capacity to function as a Biological System, increase soil organic matter, improve soil structure and water- and nutrient-holding capacity, and result in net long-term greenhouse gas benefits.”

Healthy Soil Contains 6.5 Tons of Organisms per Acre = Weight of 8 Cows



A Look at the Biological System of Soil



Functions of Soil Biodiversity

Soil Biodiversity in California Agriculture:

Framework and Indicators for Soil Health Assessment

Prepared by:
California Department of Food and Agriculture
Belowground Biodiversity Advisory Committee

July 2023

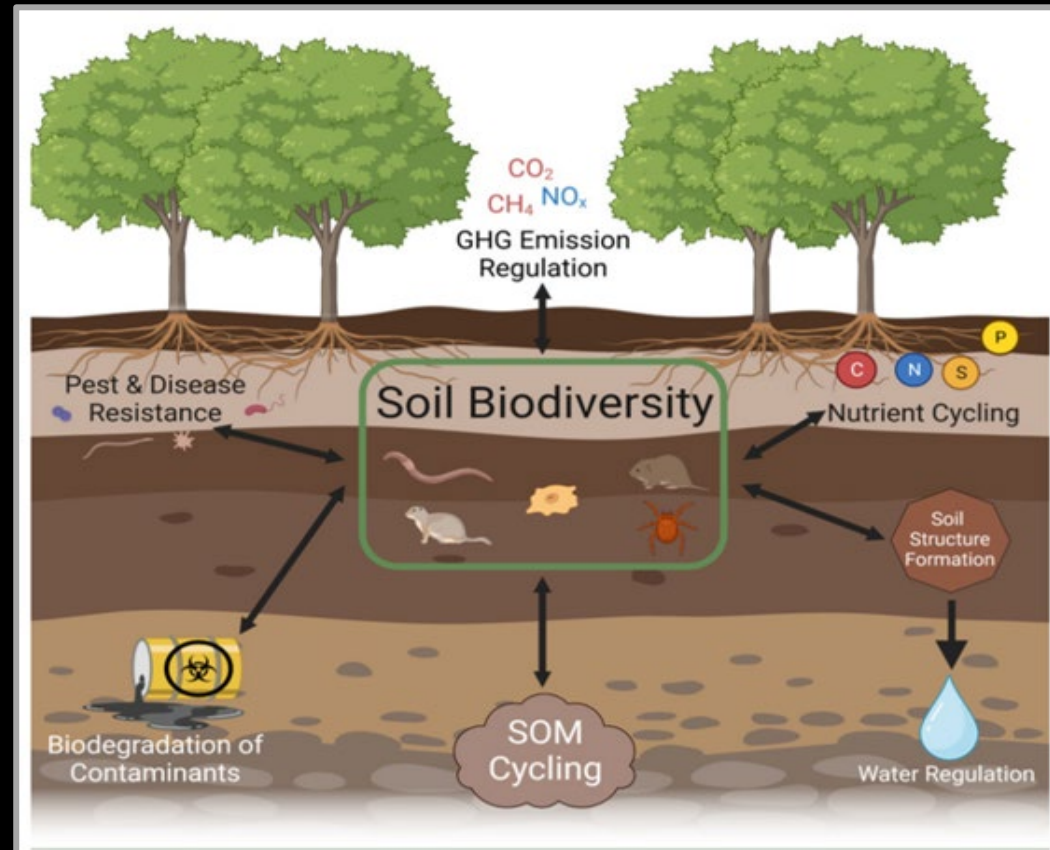
Food and Agriculture Organization of the United Nations

Report 2020

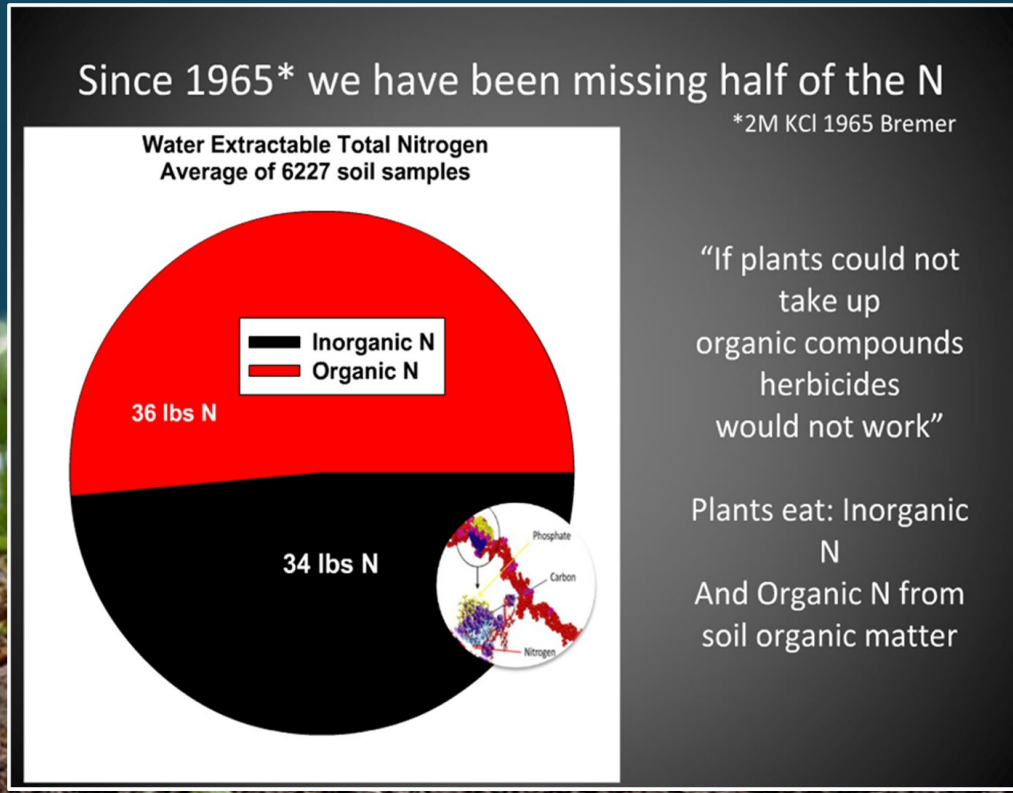
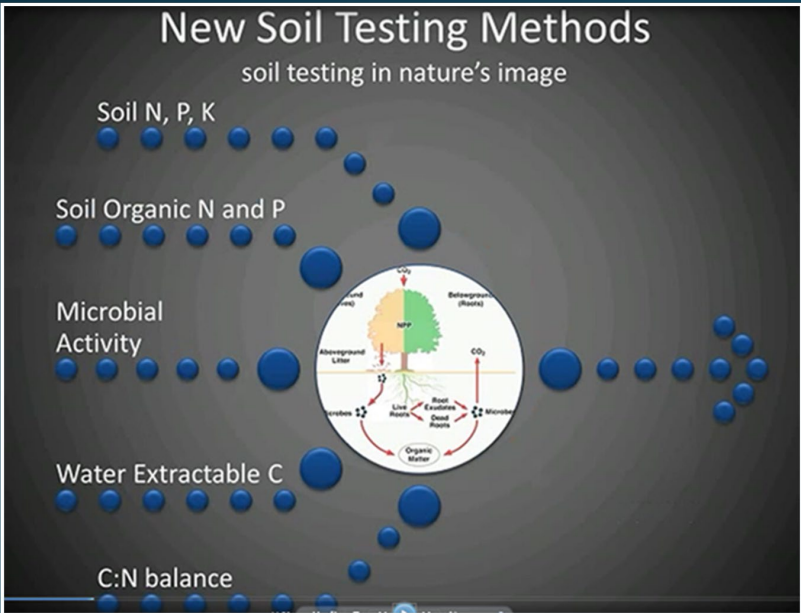
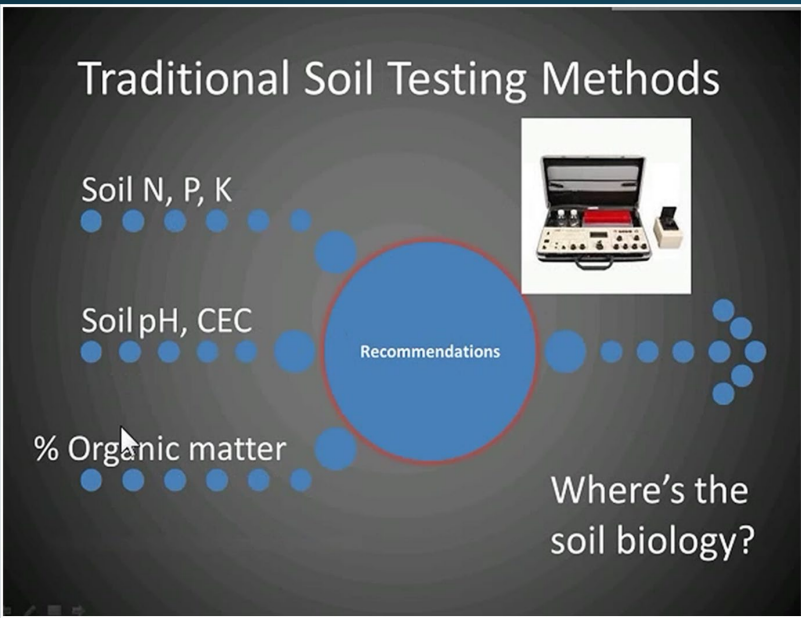
STATE of KNOWLEDGE of SOIL BIODIVERSITY

Status, challenges and potentialities

itps
Convention on Biological Diversity
European Commission
GLOBAL SOIL BIODIVERSITY INITIATIVE

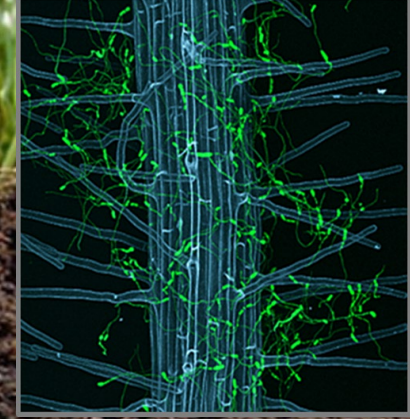
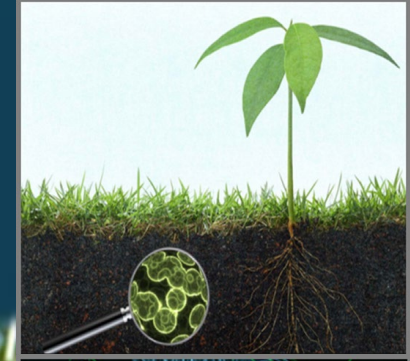


Soil Testing: Traditional vs New Methods For a Biological System



"If plants could not take up organic compounds herbicides would not work"

Plants eat: Inorganic N
 And Organic N from soil organic matter



Understanding Soil Health

Soil Resp.
111.0 ppm
CO₂

Soil Health

H2O Extract		C:N	SHC	Cover Crop Suggestion
Org. C ppm C	MAC 48.5%	13.92	15.48	30% Legume 70% Grass

Microbial Active Carbon (%MAC)

< 25%	Water Extractable Carbon (WEOC) not factor limiting respiration, soils overall fertility, or prolonged cold temp or drought is limiting soil respiration
50 to 75%	Tells you that the soil has a good balance of fertility and WEOC to support microbial biomass, but you are not limited by your WEOC pool.
> 80%	WEOC could become limiting to microbial respiration soon and your management focus should be on introducing more carbon into the system.

31-50	Slightly Below Average	Low to moderate potential for microbial activity; Some N credit may be given
51-70	Slightly Above Average	Moderate potential for microbial activity; Moderate N credit may be given; May be able to start reducing some N fertilizer application
71-100	Above Average	Good potential for microbial activity; Moderate N credit may be given depending on size of organic N pool; Can typically reduce N application rates
101-200	High	High potential for microbial activity; more carbon inputs may be needed to sustain microbial biomass; moderate to high N credit from available organic N pools may be given; N fertilizer reduction can be substantial
>201	Very High	High to very high potential for microbial activity; residue decomposition may be <1 yr.; keeping the soil covered could be a problem in some systems; high potential for N mineralization and N credits from available organic N pools may be given: N fertilizer reduction can be substantial

HANEY SOIL HEALTH ANALYSIS

Nitrogen Comparison

Traditional N lbs/A	Haney N lbs/A	Differ. N lbs/A	Savings N \$/A
8.5	52.3	43.9	45.65



HEALTHY SOIL
FROM SOIL HEALTH MANAGEMENT SYSTEMS

Economic Benefits



Reduced Inputs and Costs



Lower Risks from Weather and Pests



Higher Yields and Productivity

Environmental Benefits



Nutrient and Microbial Enhancement



Soil and Water Retention



Soil Structure Improvements

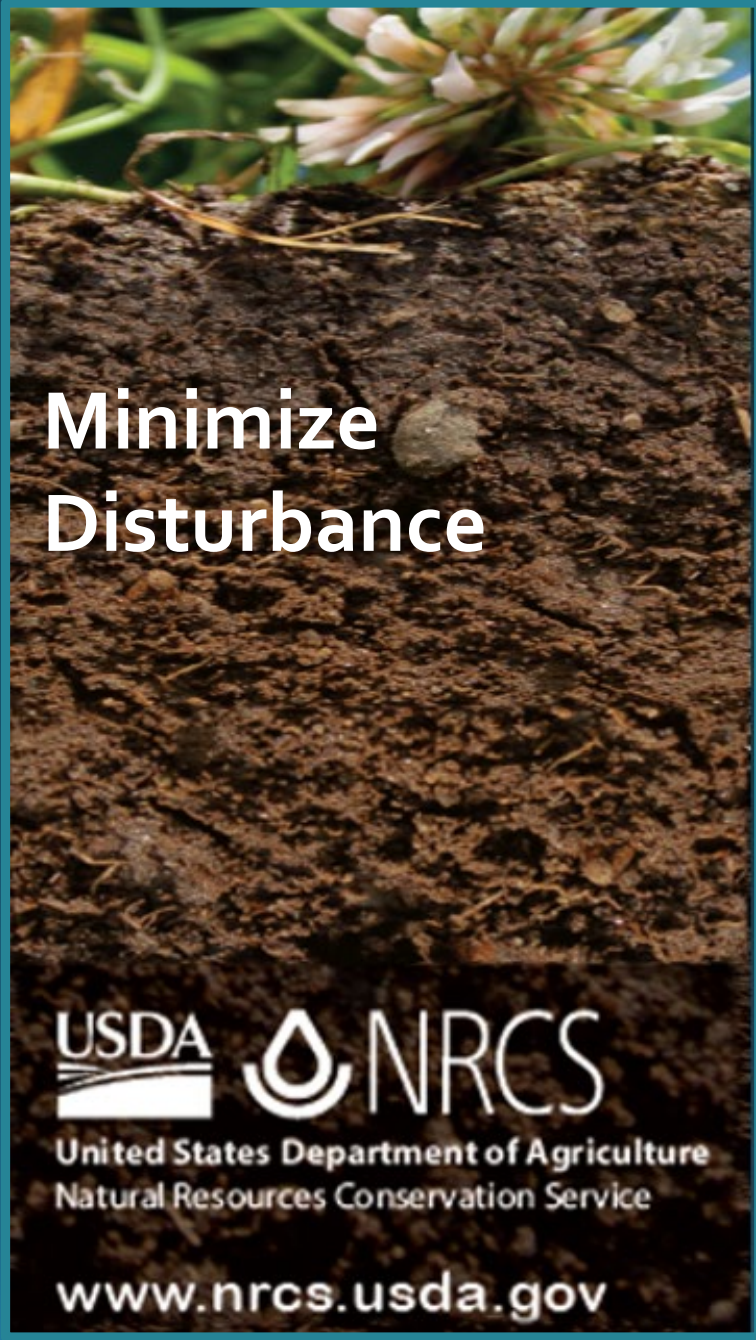


Principles of Soil Health

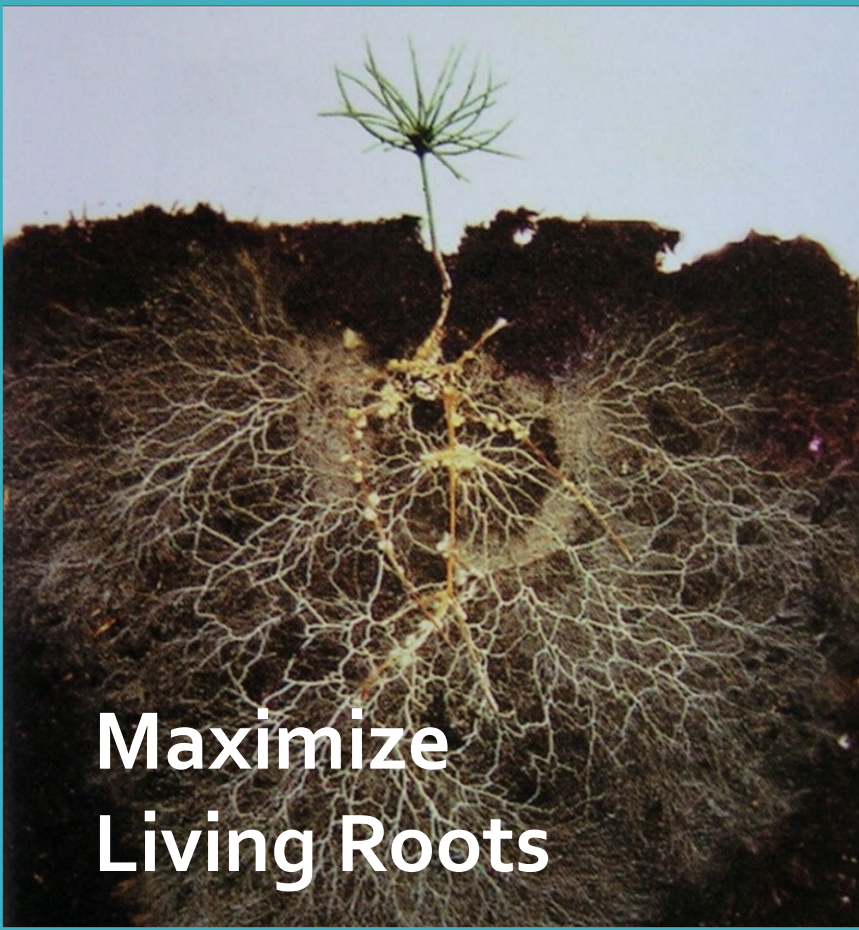
A Living Ecosystem



Maximize Diversity



Minimize Disturbance



Maximize Living Roots



Maximize Soil Cover

USDA **NRCS**
United States Department of Agriculture
Natural Resources Conservation Service

www.nrcs.usda.gov

Soil Health Management System

How does it help environmentally and economically?

		DECREASES PEST PRESSURES	IMPROVES NUTRIENT USE EFFICIENCY	IMPROVES WATER QUALITY	CONSERVES WATER	IMPROVES PLANT HEALTH	IMPROVES WATER EFFICIENCY TO CROPS	SAVES NON-RENEWABLE RESOURCES	IMPROVES AIR QUALITY	INCREASES PLANT POLLINATION
Conservation Crop Rotation Growing a diverse number of crops in a planned sequence in order to increase soil organic matter and biodiversity in the soil.		✓	✓	✓	✓	✓	✓	✓	✓	✓
Cover Crop An un-harvested crop grown as part of planned rotation to provide conservation benefits to the soil.		✓	✓	✓	✓	✓	✓	✓	✓	✓
No Till A way of growing crops without disturbing the soil through tillage.				✓	✓	✓	✓	✓	✓	
Mulch Tillage Using tillage methods where the soil surface is disturbed but maintains a high level of crop residue on the surface.				✓	✓	✓	✓	✓	✓	
Mulching Applying plant residues or other suitable materials to the soil surface to compensate for loss of residue due to excessive tillage.		✓		✓	✓	✓	✓		✓	
Nutrient Management Managing soil nutrients to meet crop needs while minimizing the impact on the environment and the soil.			✓	✓		✓	✓	✓	✓	
Pest Management Managing pests and promoting the growth of healthy plants with strong defenses, while increasing stress on pests and enhancing the habitat for beneficial organisms.		✓	✓	✓		✓	✓	✓	✓	✓



Questions

