OPTIMIZING SOIL & PLANT HEALTH IN AGRI-FOOD PRODUCTION

Regenerative Agriculture - its benefits and innovations

Réseau Agroalimentaire de l'Est ontarien
Eastern Ontario Agri-Food Network

PRESENTATION BY :
Eric & Ines Batterton
Owners & Founders of My Nordic Garden

My NORDIC Garden
Natural & Sustainable Kitchen Gardens

INTRODUCTION

Eric & Ines Batterton
Owners & Founders of My Nordic Garden

My NORDIC Garden
Natural & Sustainable Kitchen Gardens

Kitchen Gardens
Raised Beds
Therapeutic Horticulture
Herbalism

Consultations/Coaching
Design
Installations
Planting Plans

Check out our book >>>

MODULES

1. INTRODUCTION TO SOIL HEALTH
2. SOIL TESTING & ANALYSIS
3. BUILDING HEALTHY SOIL WITH COMPOSTING
4. PREVENTING MOLD & FUNGAL DESEASES
5. NUTRIENT MANAGEMENT & FERTILIZATION
6. ORGANIC SOIL AMENDMENTS & ALTERNATIVES
7. CROP ROTATION & PLANT PAIRING
8. WATER MANAGEMENT & IRRIGATION PRACTICES
9. INTEGRATED PEST MANAGEMENT (IPM)
10. SOIL CONSERVATION & SUSTAINABLE PRACTICES

MODULE 1:

INTRODUCTION TO SOIL HEALTH

- What is soil health?
- Components of healthy soil
- Critical role of soil in plant health & climate impact


“A nation that destroys its soil destroys itself.”
Frankin D. Roosevelt

DIRT

mineral components, no organic matter

‘dead’

SOIL

mineral components + organic matter + soil life

‘living’

BASIC FACTS

- 95% of our food grown in topsoil (uppermost layer)
- remaining topsoil only lasts for 60 more harvests (FAO, 2019)

- systemic fertilizers, herbicides, pesticides threatening soil health
- non-sustainable agriculture: heavy machinery, tilling, monoculture, mass live stock
- permaculture & regenerative agriculture to restore soil

SOIL STRUCTURE

sand, silt, clay
water & filtration retention
aeration
plant support (roots)

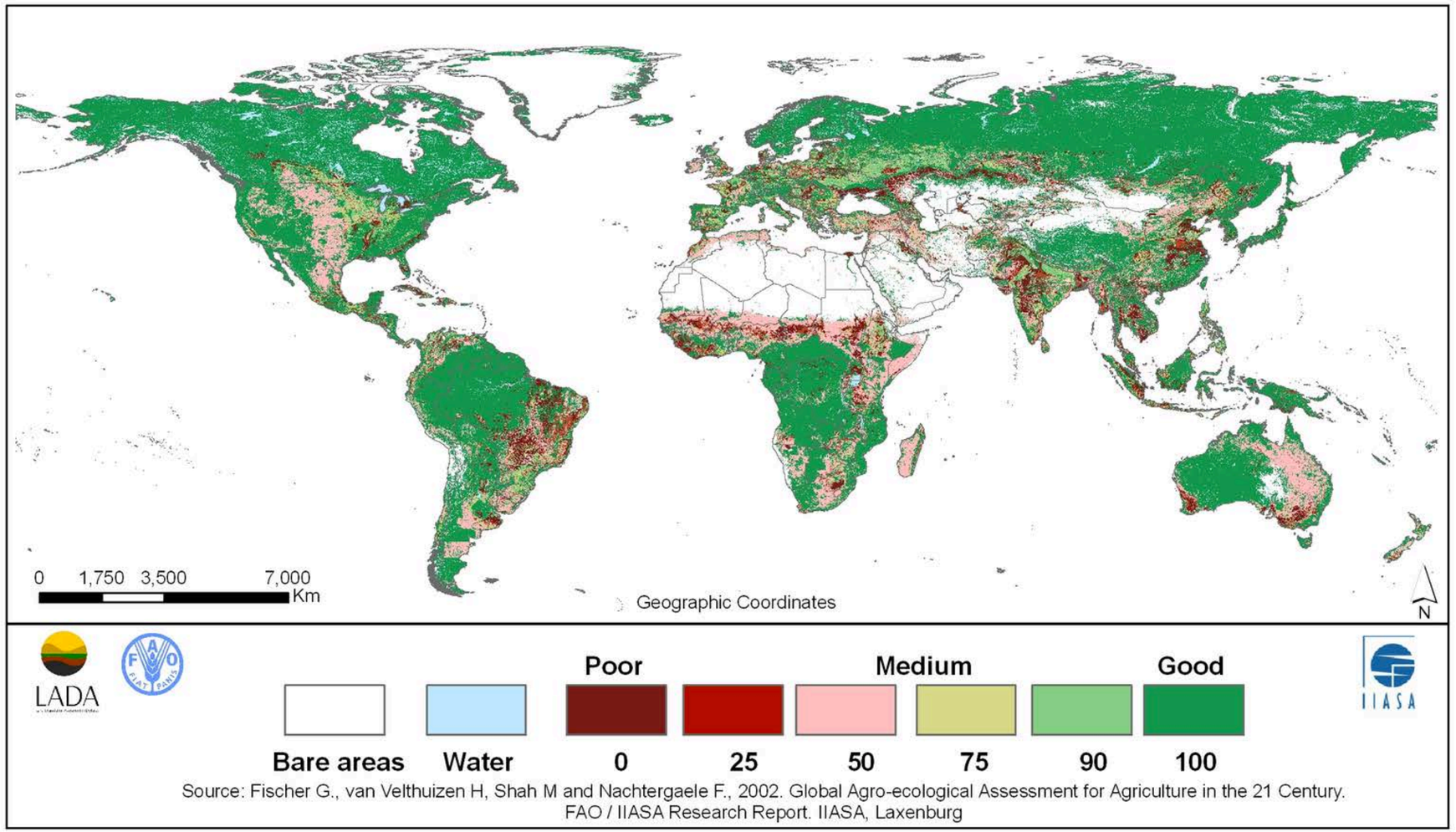
SOIL CHEMISTRY

cycle nutrients
organic matter
water filtration ability
carbon storing ability

SOIL LIFE

microflora, microfauna, macroflora
filter pollutants
decomposing

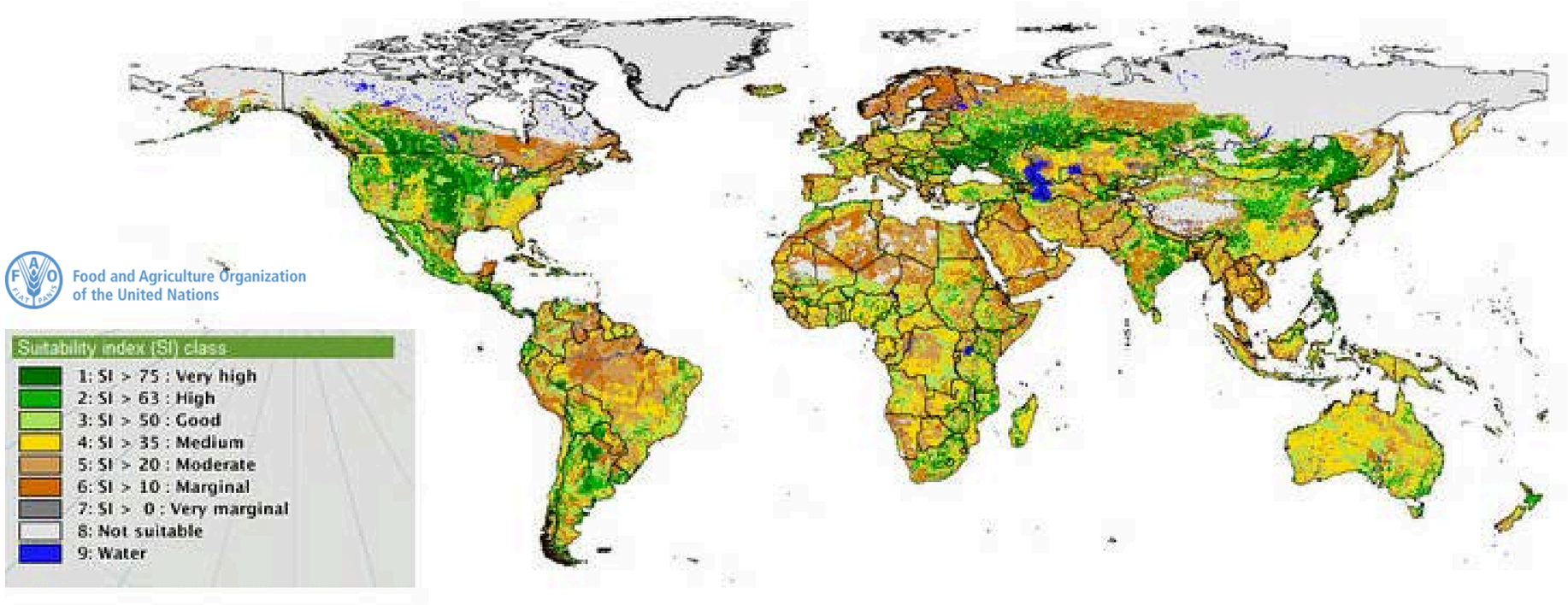
Relative Global Soil Health



Soil health status for present land use - GLADIS report

relative soil health is considered correct when soils are **under natural vegetation**

Global Soil Suitability

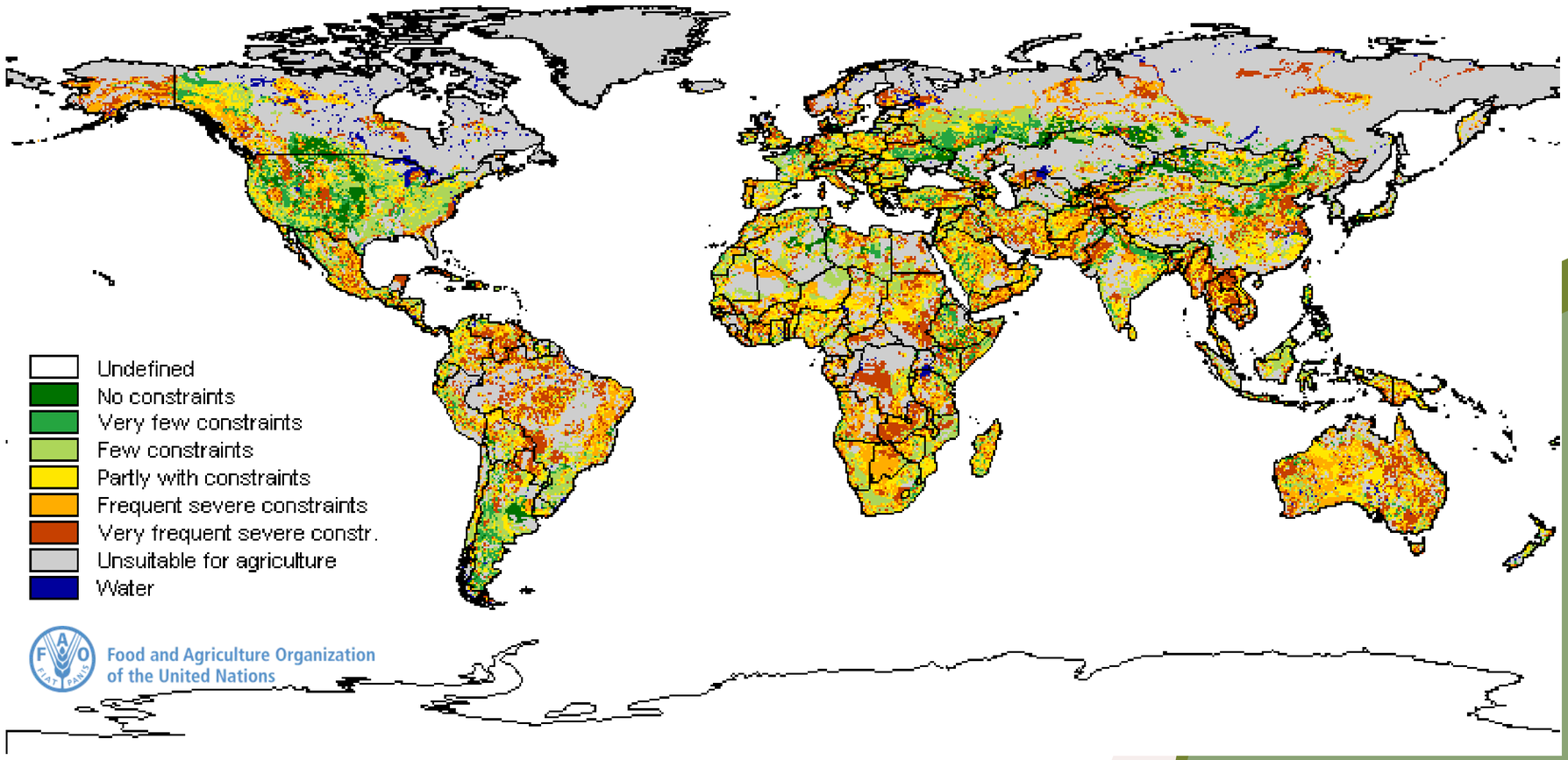


Soil Suitability at low input (IIASA/FAO)

Soil Health Indicators

- nutrient availability
- workability
- oxygen availability to roots
- nutrient retention capacity
- toxicity
- salinity
- rooting conditions

Absolute Global Soil Health



Soil constraints combined (FAO)

Absolute soil health: the deviation of the actual soil from an ideal soil

Soil Health Indicators

- nutrient availability
- workability
- oxygen availability to roots
- nutrient retention capacity
- toxicity
- salinity
- rooting conditions

WHAT IS HEALTHY SOIL?

<u>Characteristics of healthy soil:</u>

- crumbly/fluffy structure
- air and water pockets
- microorganisms
- earthworms
- nematodes
- fungi
- pleasant smell (forest smell)
- organic matter (dark brow color)

IMPORTANCE OF SOIL HEALTH

- crucial element of sustainable & regenerative agriculture
- significantly impacting crop yields, ecosystem stability & long-term success of farms
- vital for promoting plant growth & resilience
- adapting to climate change

NUTRIENT MANAGEMENT

rich in essential nutrients > crucial for crop development

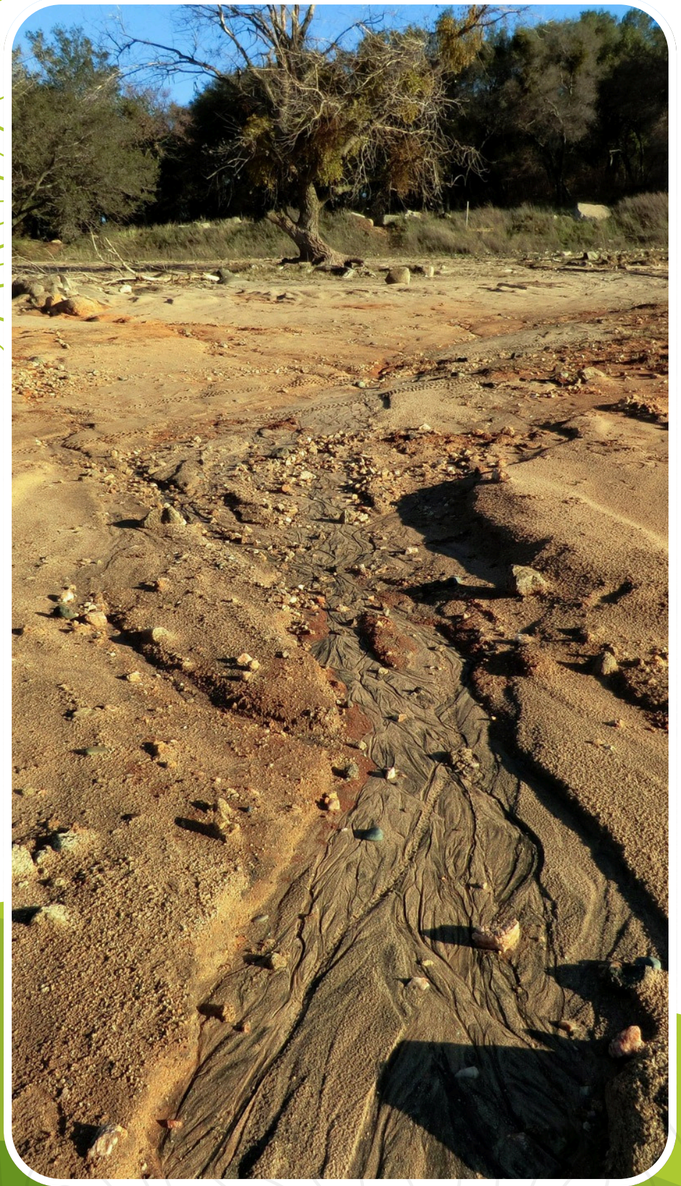
WATER RETENTION

high water retention > minimizing irrigation > enabling crops to better endure drought conditions

MICROBIAL DIVERSITY

lively microbial community > promotes nutrient cycling & enhances plant health > improved resilience in crops

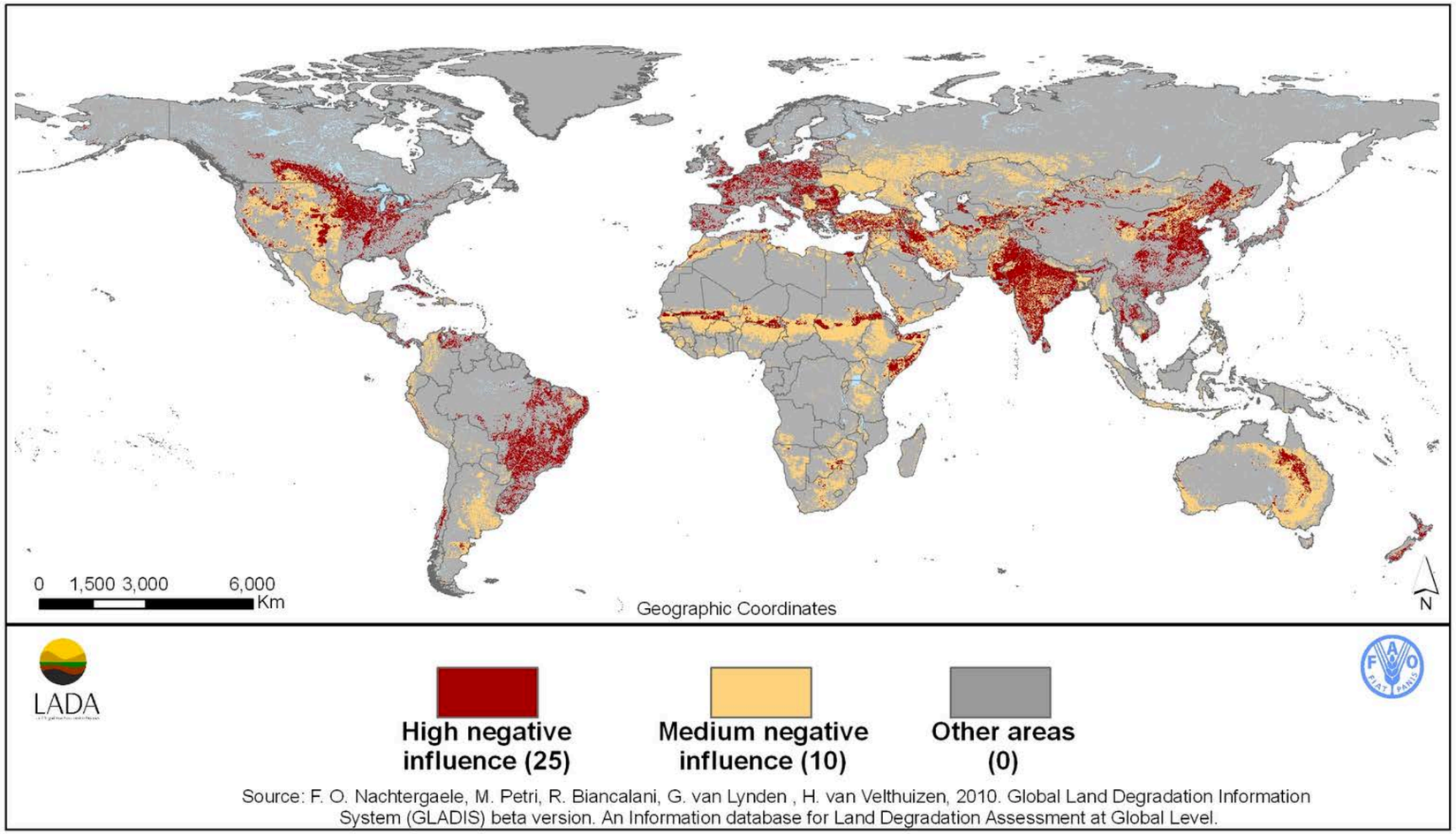
SOILS IN DANGER



- Compaction
- Tilling
- Over-Fertilization
- Monoculture
- Livestock Pressure

- Erosion (wind/water)
- Salination
- Drought
- Little to no soil life
- Depleting of Nutrients/ Organic Matter

Global Soil Compaction



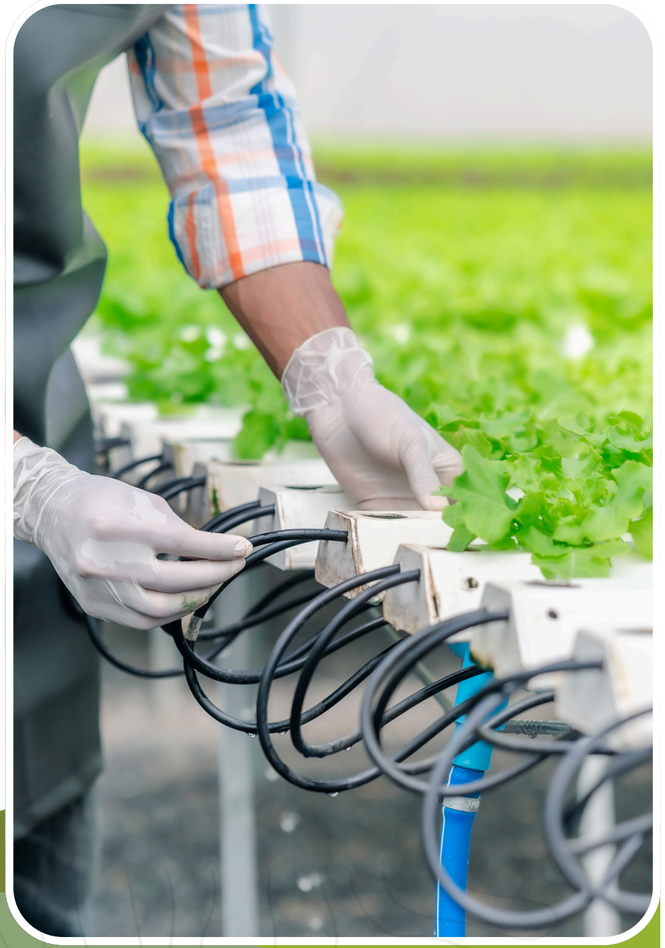
Livestock pressures and mechanization pressure in agriculture (FAO)

Soil Health Indicators

- oxygen availability to roots
- rooting conditions
- water retention

REGENERATIVE AGRICULTURE vs SUSTAINABLE AGRICULTURE

SUSTAINABLE AGRICULTURE



- harmony between farming and the environment
- improve soil health
- conserve water
- protect ecosystems

agricultural practices support (not detract from) natural resources - keeping the as-is state

REGENERATIVE AGRICULTURE

- focus on **soil health**: improving soil health which has been degraded by the use of heavy machinery, fertilizers and pesticides in intensive farming
- minimize tillage

> conserve water

> keep carbon in the soil

> fungi & other soil organisms undisturbed

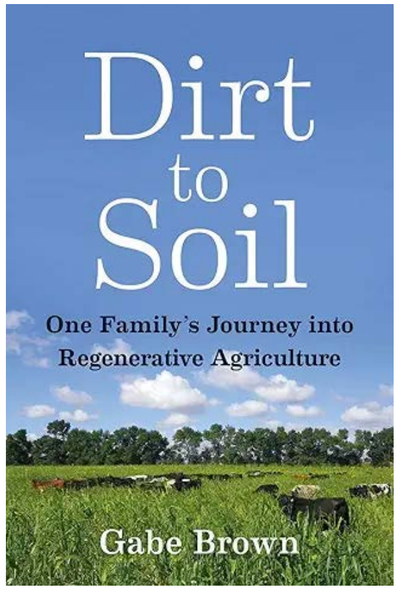
- crop rotation
- crop diversification
- cover cropping
- rotating pastures of grazing animals

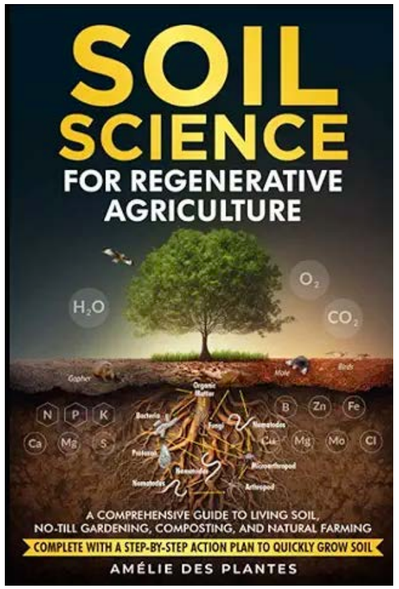
restoring natural resources/soil

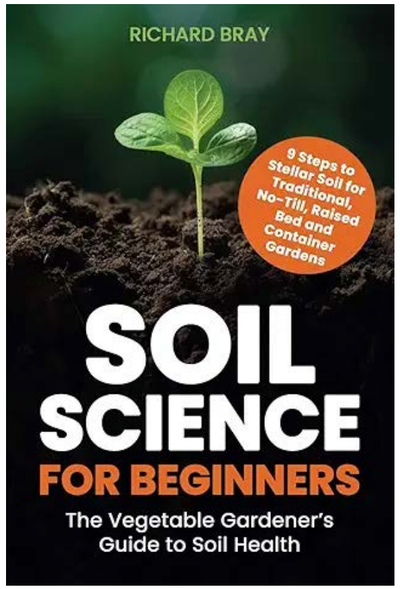
CONCLUSION

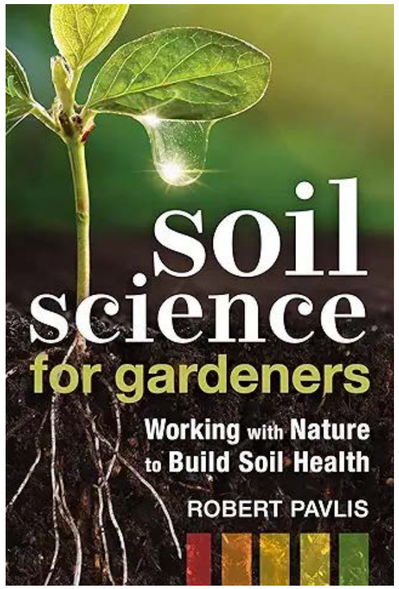
- Regenerative agriculture promotes health and regeneration of soil ecosystems.
- Maintains soil fertility and structure through regenerative practices
- Ensures continued productivity for crop yield.
- Balances environmental priorities with agricultural output.

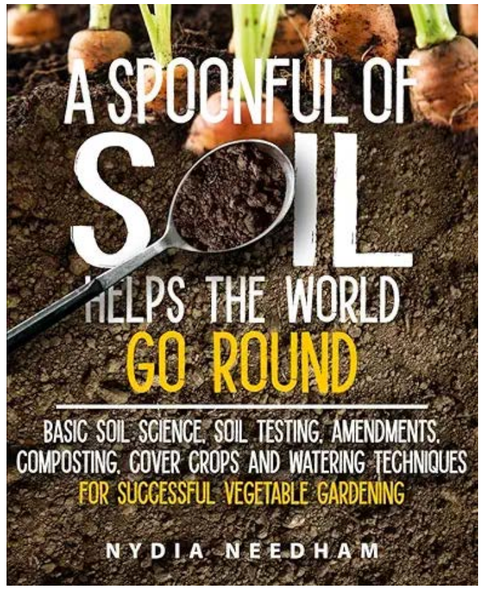
RESOURCES











FAO - Food & Agriculture Organization of the United Nations

www.fao.org/soils-portal/soil-degradation-restoration/global-soil-health-indicators-and-assessment/global-soil-health/en/

Dr. Elaine's Soil Food Web School

www.soilfoodweb.com

THANK YOU