KHEA
Knowledge Hub for Organic Agriculture in Eastern Africa

The living soil

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Training of Multipliers

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Implemented by giz

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To have a deeper understanding on soil fertility management options and encourage living soils

what makes the soil come alive or dead?

What are the characteristics and composition of living soils

How do you mimic nature and encourage soil fertility ?

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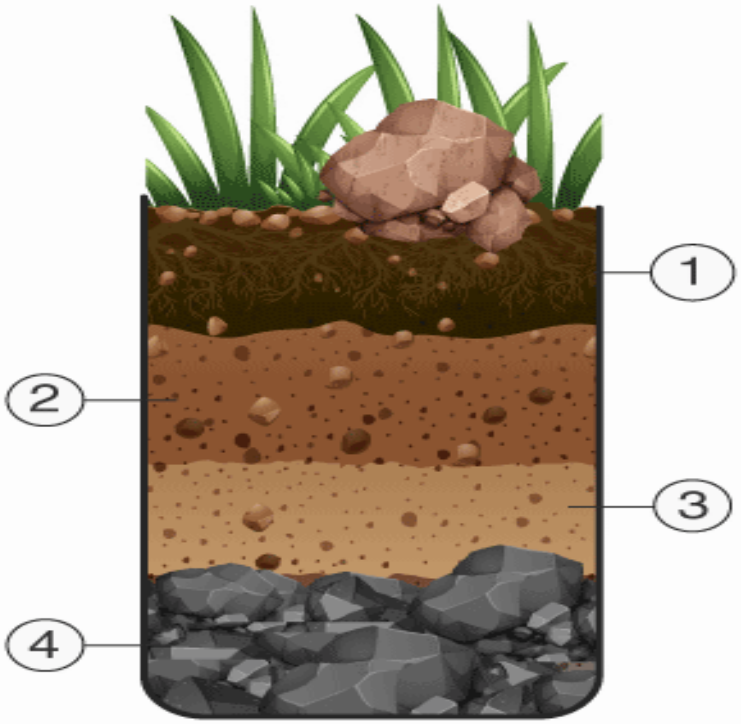
Qoute

'*Hope is not a thing outside us, hope is a process of living. I cultivate hope in every thought and every action*'

Vandana shiva-why the food we eat matters.

SOIL PROFILE

BYJU'S The Learning App



1. The O-Horizon (Organic)
2. The A-Horizon or Topsoil
3. The B-Horizon or Subsoil
4. The C-Horizon or Bedrock

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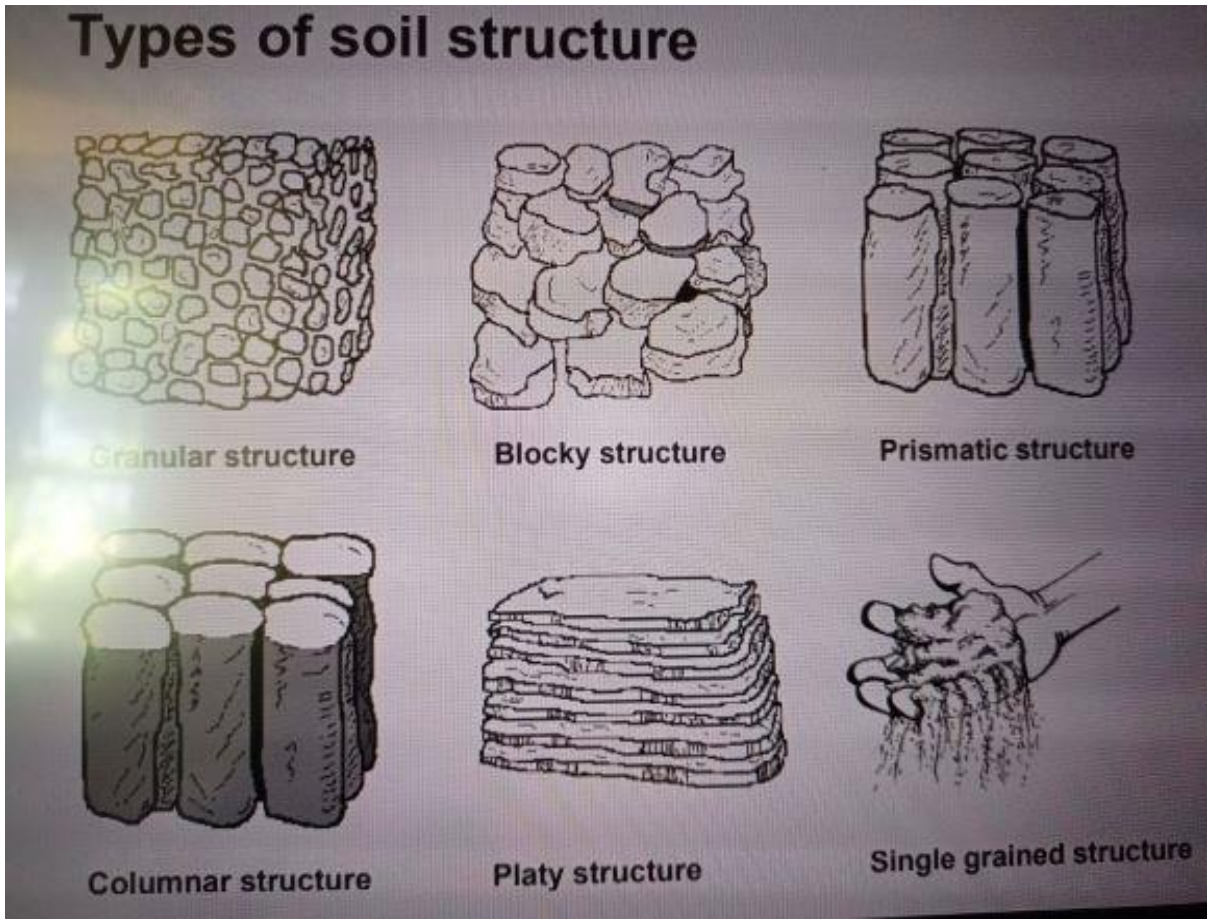
Soil structure and texture



gives particular soils their properties
water holding capacity,aeration,colour,minerals present

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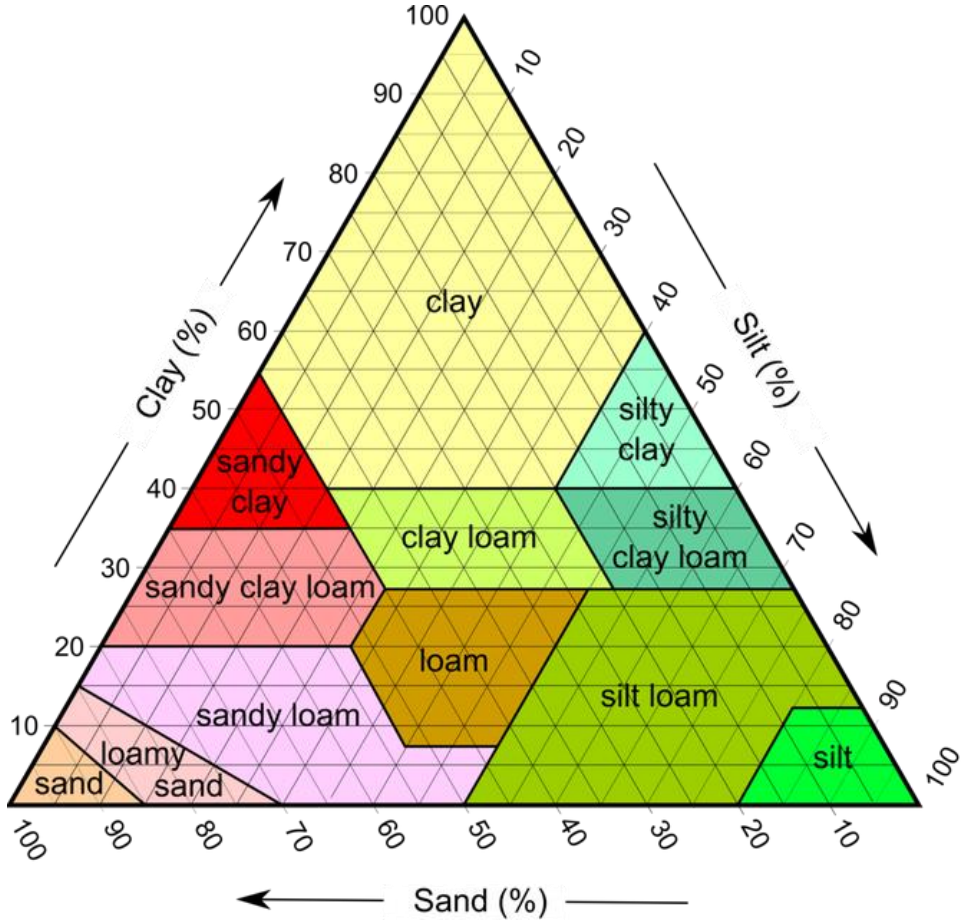
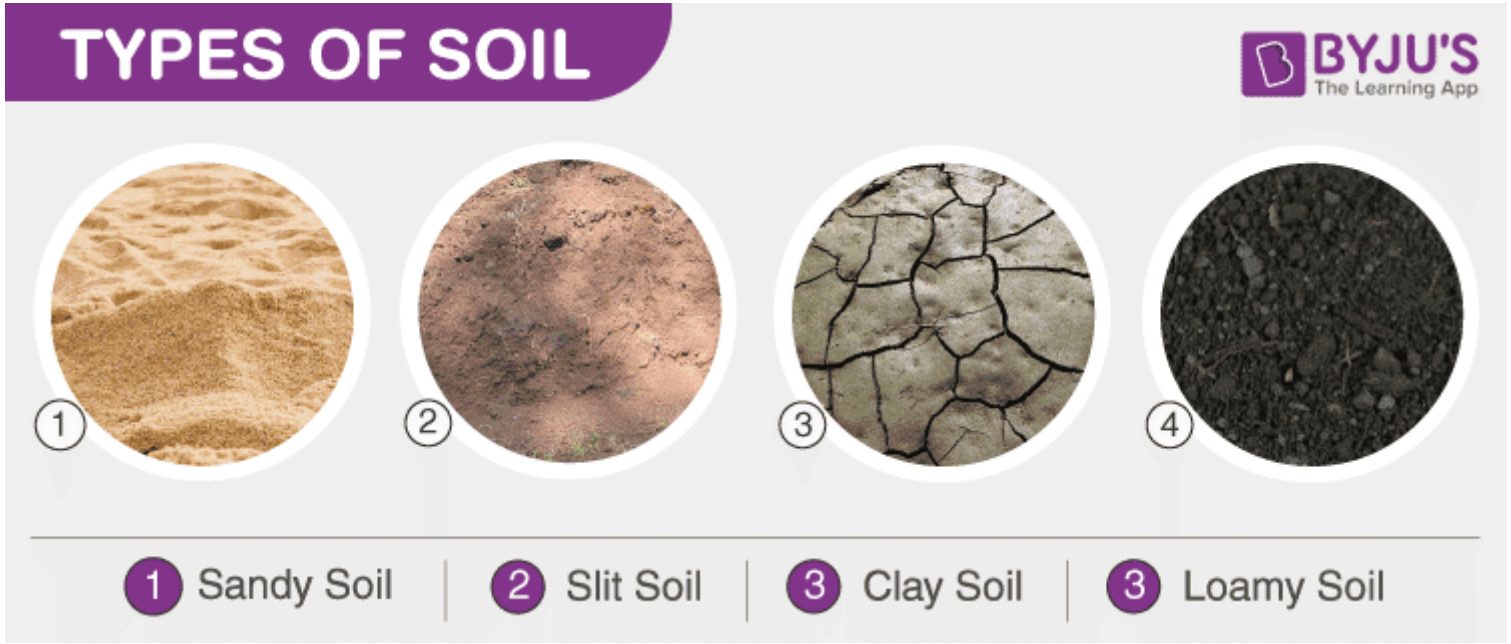
Soil classification by % aggregate of clay,silt and sand



Soil by aggregate composition; appearance



Soil classification by colour/prevalence of minerals

Recently soil atlas [links]

Soil destructive practices

- Monocropping/continous tillage
- Burning of organic matter
- Use of Synthetics in form of fertilizers, pesticides and herbicides
- Deforestation and displacing more native trees with exotics
- Overgrazing
- Man made structures like road constructions and buildings

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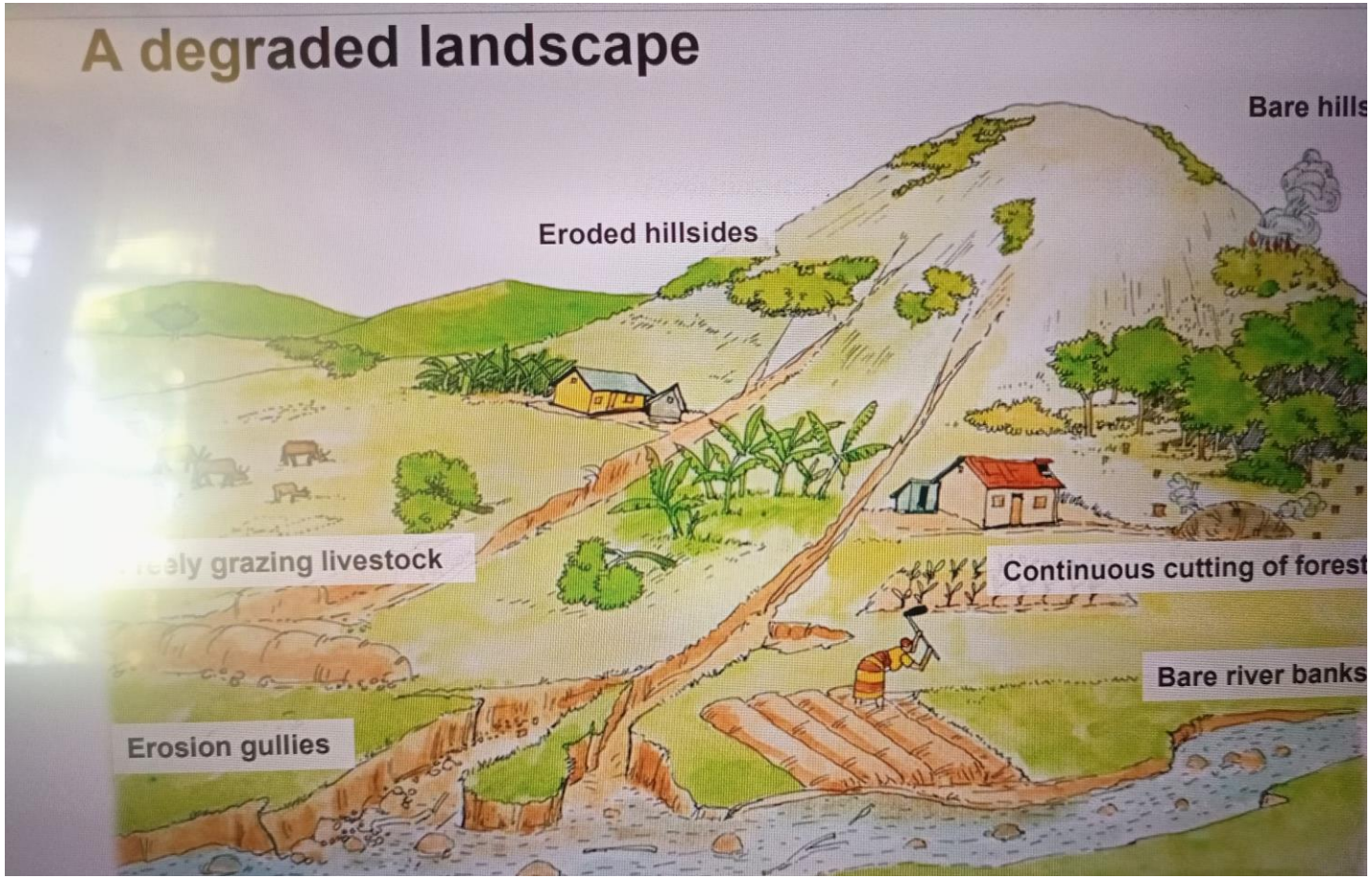
Soil destructive practices contd



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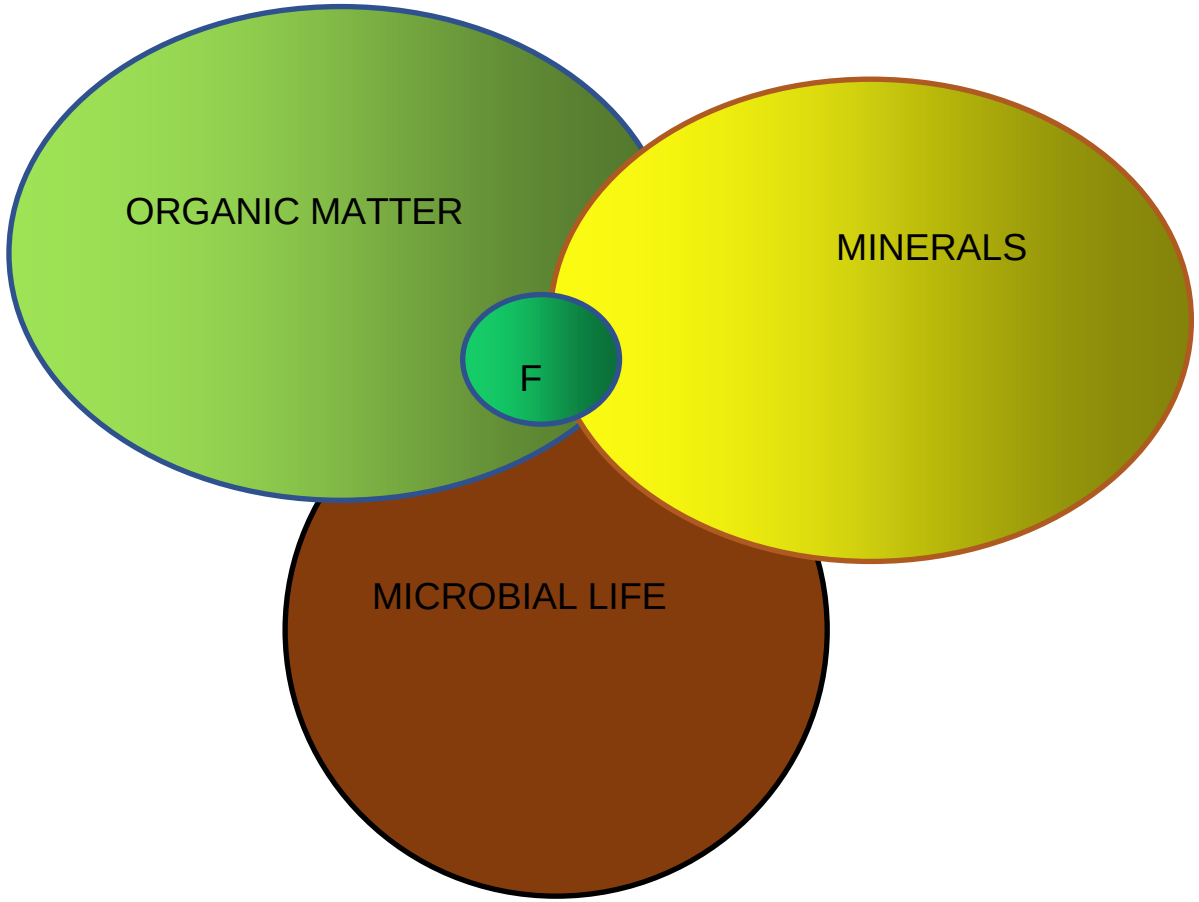
Characteristics and composition of living soils [3 M]

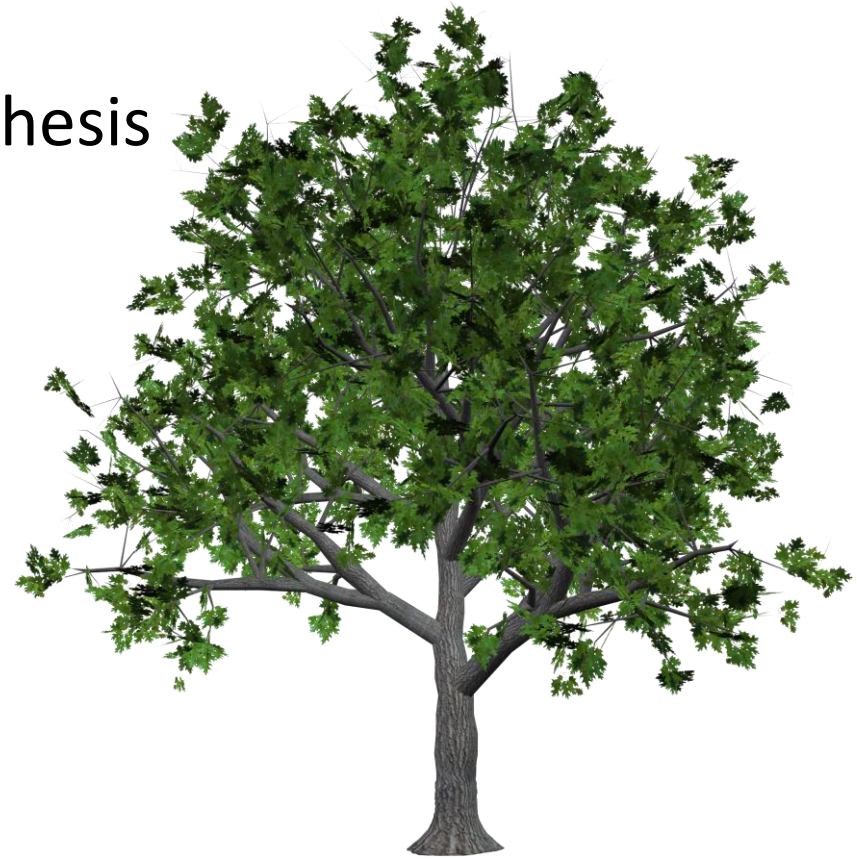


Soil organic matter[Trees =miracle of life]

Conversion of sun energy into sugars-photosynthesis

Recycling of organic matter=carbon cycle

Primary producers in the food web



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Factors affecting properties of living soil

- Temp
- Moisture
- Carbon dioxide
- Oxygen
- Light
- water

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Plant leaves

Biomas from a tree-80%
self maintance
20% root exudate
Starch =long term energy store[roots, seeds]
Leaves=layer of microbes;[Yeast-bacteria-fungi-protozoa-algae]

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Recycling process [3D]

DEATH AND DECAY OF PLANTS[3D]

DEPOSITION

DECOMPOSITION

RE**D**ESTRIBUTION

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Minerals /elements

- Determine physiological functions of plants[leaf colour, flowering, rooting, fruiting]
- Absence of some minerals leads to symptoms of deficiency
- Processed through weathering of rocks
- processes[chemical, biological, physical]

- Discussion QUESTION
- name some minerals and their functions plants

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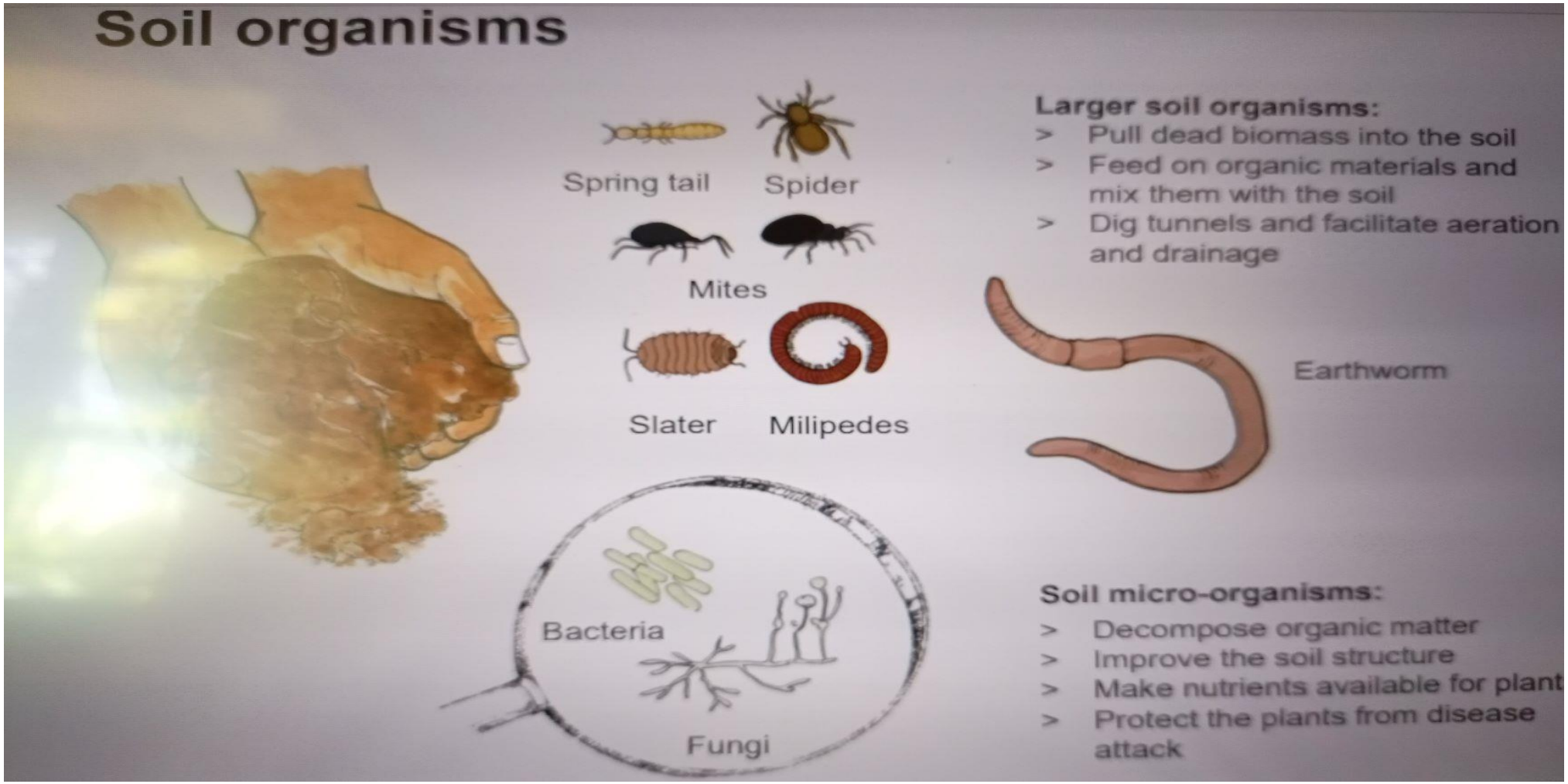
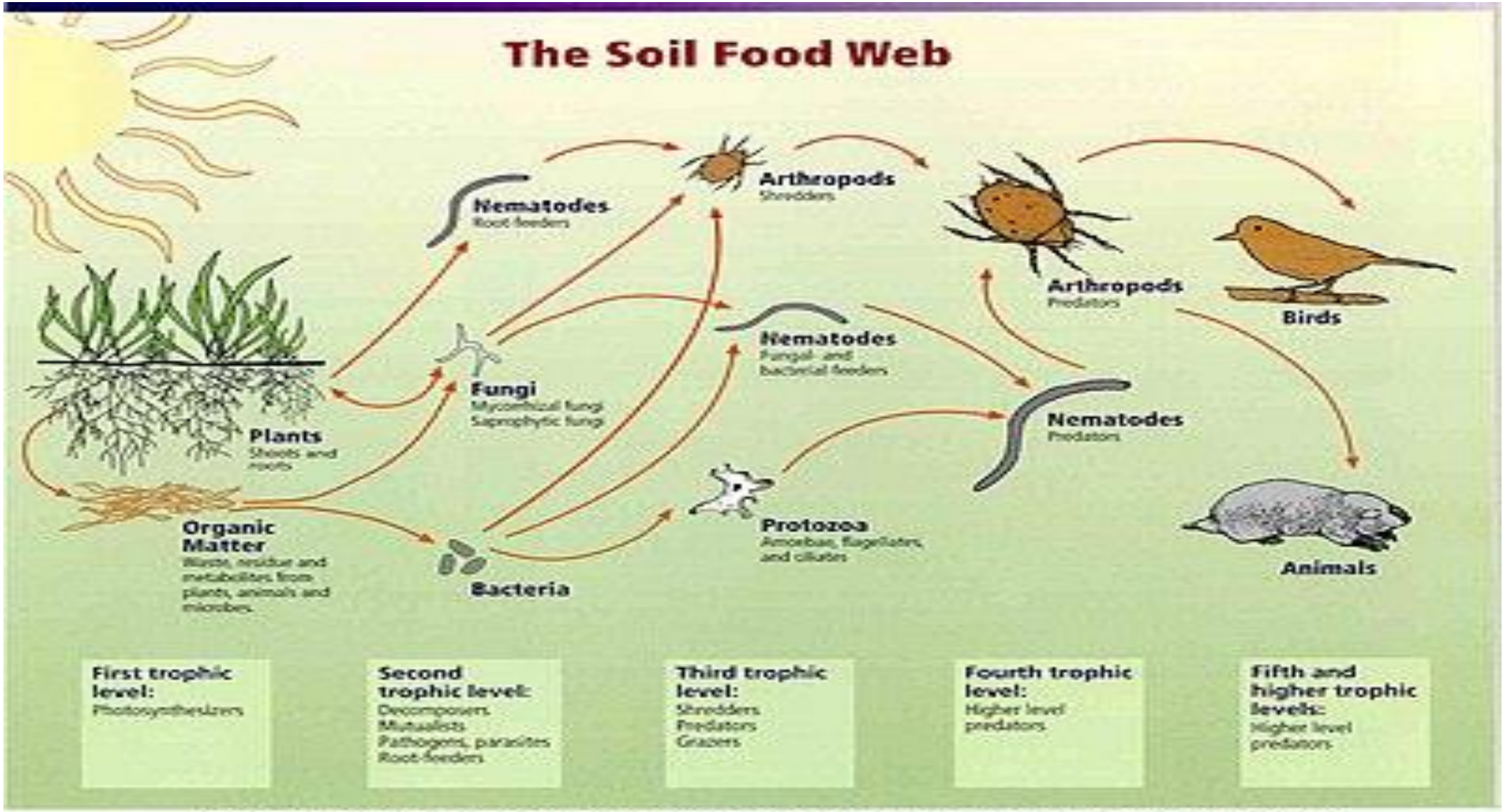
Microbes;[their importance in the soil]





Relationships between soil food web, plants, organic matter, and birds and mammals
Image courtesy of USDA Natural Resources Conservation Service
http://soils.usda.gov/sqi/soil_quality/soil_biology/soil_food_web.html.

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Why microbes are important contd

- **Eg Mycorrhiza**
- live in symbiosis with plant roots.
- enlarge the surface of the roots and penetrate small soil pores.
- support the plants in taking up nutrients and water.
- improve the soil structure and preserve moisture.
- are sensitive to chemical fertilizers and pesticides.

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How to mimic nature[practicals]

- Composting
- Green manures
- Mulching
- Crop diversity
- Food forests
- Fermentations

Practicals/strategies Encouraging and managing living soils

- Soil erosion control[earthworks]
- **A frame and contouring,[swales,terracing[fanya juu,fanya chini,stone barriers,trash lines,intergrated trees on contours,vertiver grass,mulches in gardens etc]**
- **Fermented biofertilizers [Bokashi making ,Solid Native microbes and lactic acid bacteria practicals]**
- **Composting,vermicompost etc**
- **Liquid teas**