SUSTAINABLE GARDENING PRACTICES

Sustainable gardening is the ability to grow plants in harmony with nature with minimal impact on the environment.

Compost

Composting manages decomposition to more quickly produce stable organic matter.*

- Compost yard/garden waste and fruits/ vegetable food scraps.
- Use finished compost as a soil amendment.

Manage Soil Heath

Healthy soil produces healthy plants.

- Add organic matter to augment soil to
  - build water/air retention.
  - grow biomass.
  - aid in nutrient retention/exchange.
- Avoid heavy soil tillage and compression.
- Use mulch to suppress weeds and aid in water retention.
- Manage water use to avoid nutrient runoff/leaching and erosion.

Promote Biodiversity

Biodiversity ensures ecosystem sustainability.

- Attract pollinators/beneficial insects:
  - Plant native plants.
  - Leave areas for beneficial insects to live.
  - Put up bird and bat houses.
  - Plant extended-seasons plants.
- Plant gardens/landscapes with a variety of plant species.
- Leverage polyculture to exploit the natural ecosystems.

Minimize Negative Environmental Impact

A clean environment enables healthy life.

- Avoid synthetic fertilizers/herbicides.
- Collect rain water.
- Save seeds.
- Buy local.
- Recycle with gardening in mind.
- Properly dispose of diseased plant materials.

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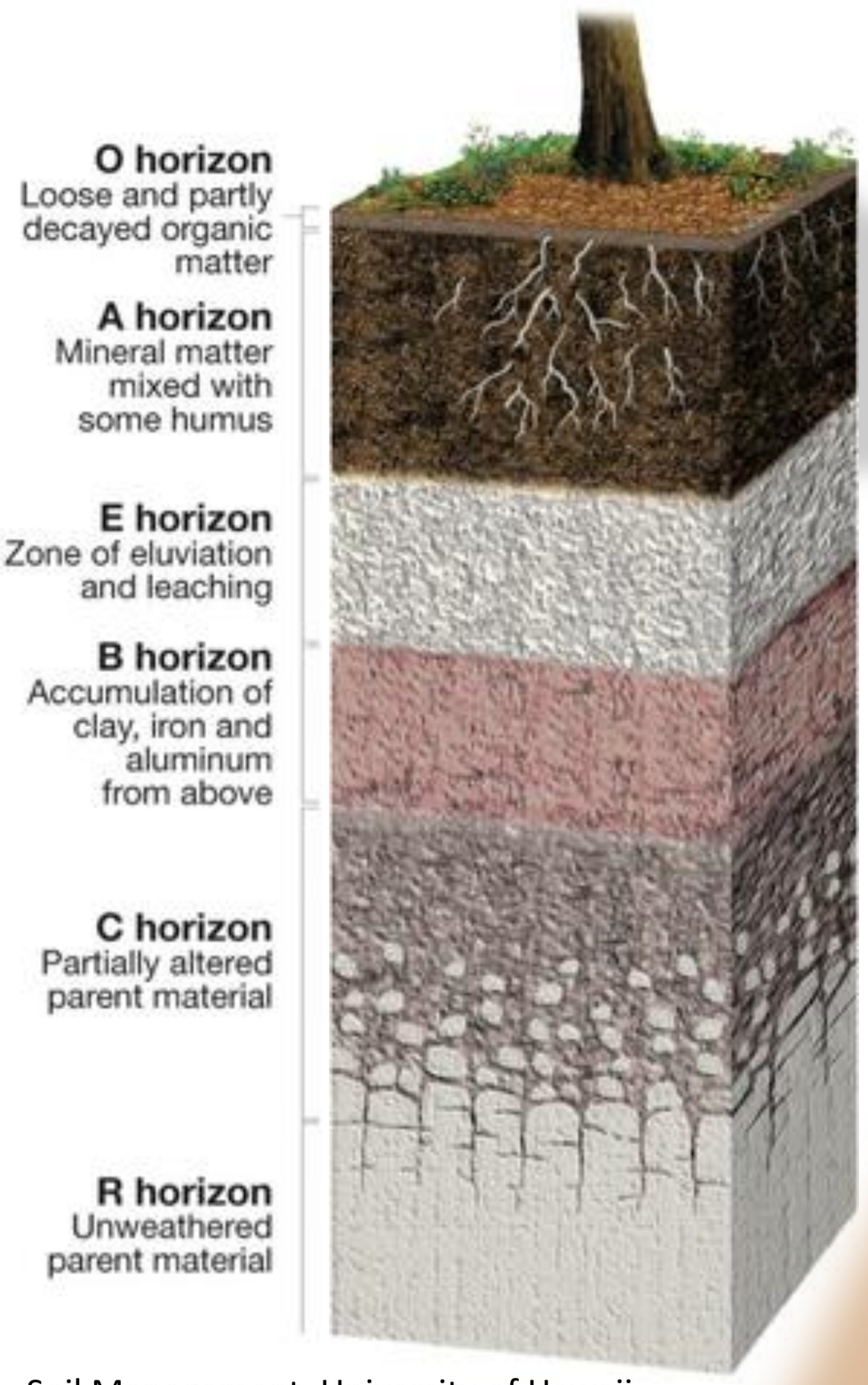
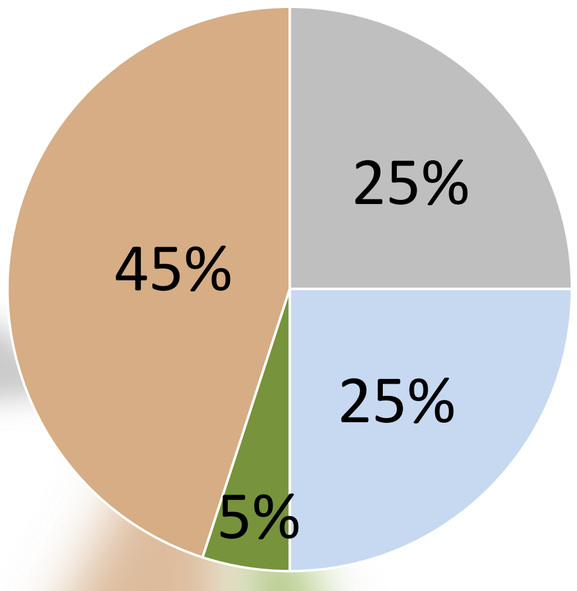
*Organic matter (or organic material) is the residues of dead plants and animals in various stages of decomposition.
http://www.yourdictionary.com/organic-matter#mD1AgEoyyo96D0gz.99

SOIL COMPOSITION



Soil Management, University of Hawaii



Air
Water
Organic Matter
Minerals

Soil Composition affects:

- Water-holding capacity.
- Nutrient-retention and exchange capacity.
- Susceptibility to erosion.
- Leaching potential.

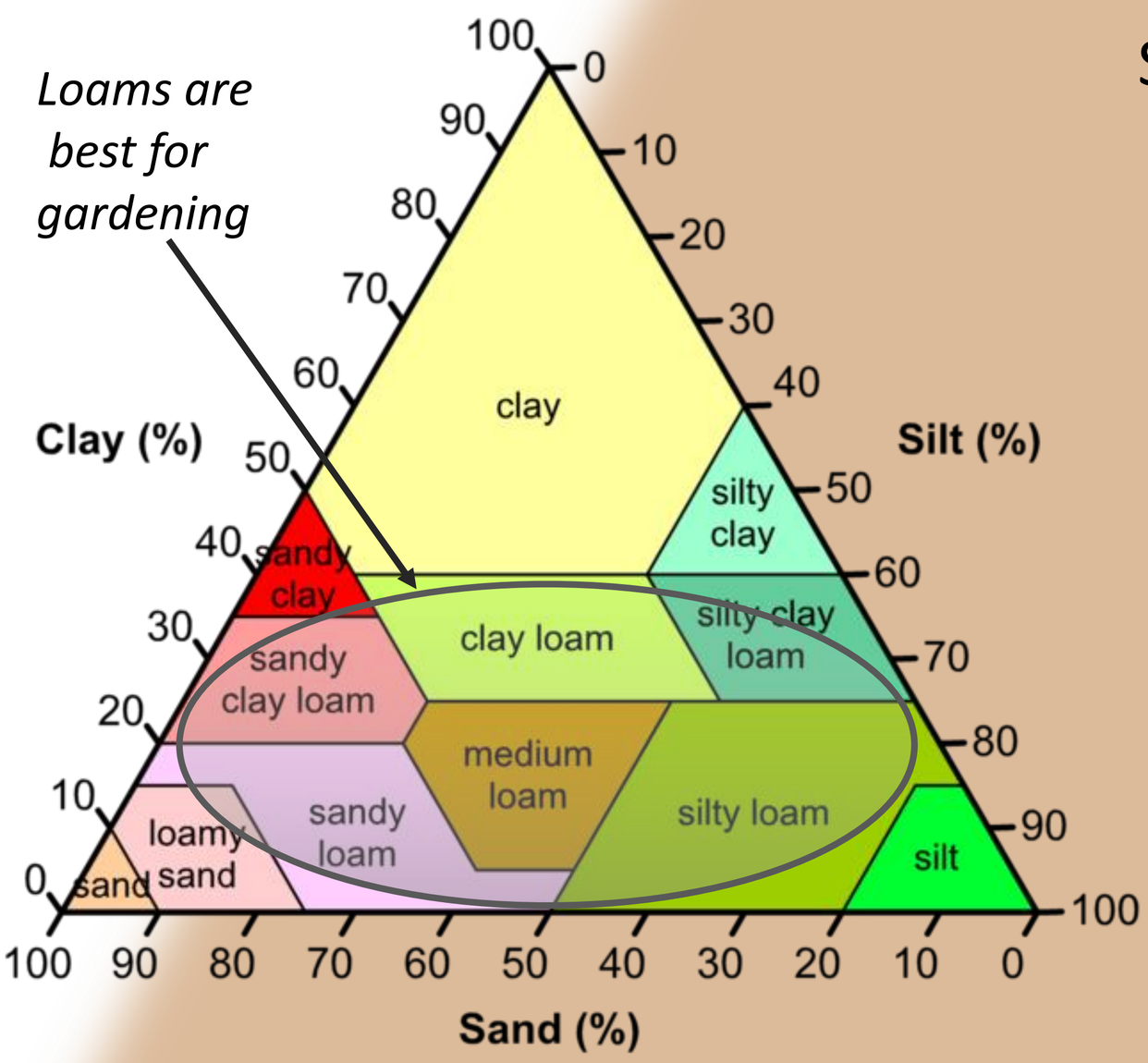
Minerals

(Soil Texture)

Clay

Silt

Sand



Organic Matter

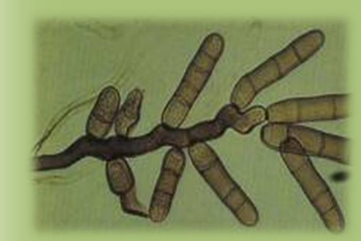
(Compost)

BioMass (10%)

Residue (15%)

Humus (75%)

THE LIVING.



BioMass:
Roots, Fungi, Bacteria

THE ALMOST DEAD.

Residue:
Dead Roots and Organisms

THE VERY DEAD.

Humus:
Stabilized OM

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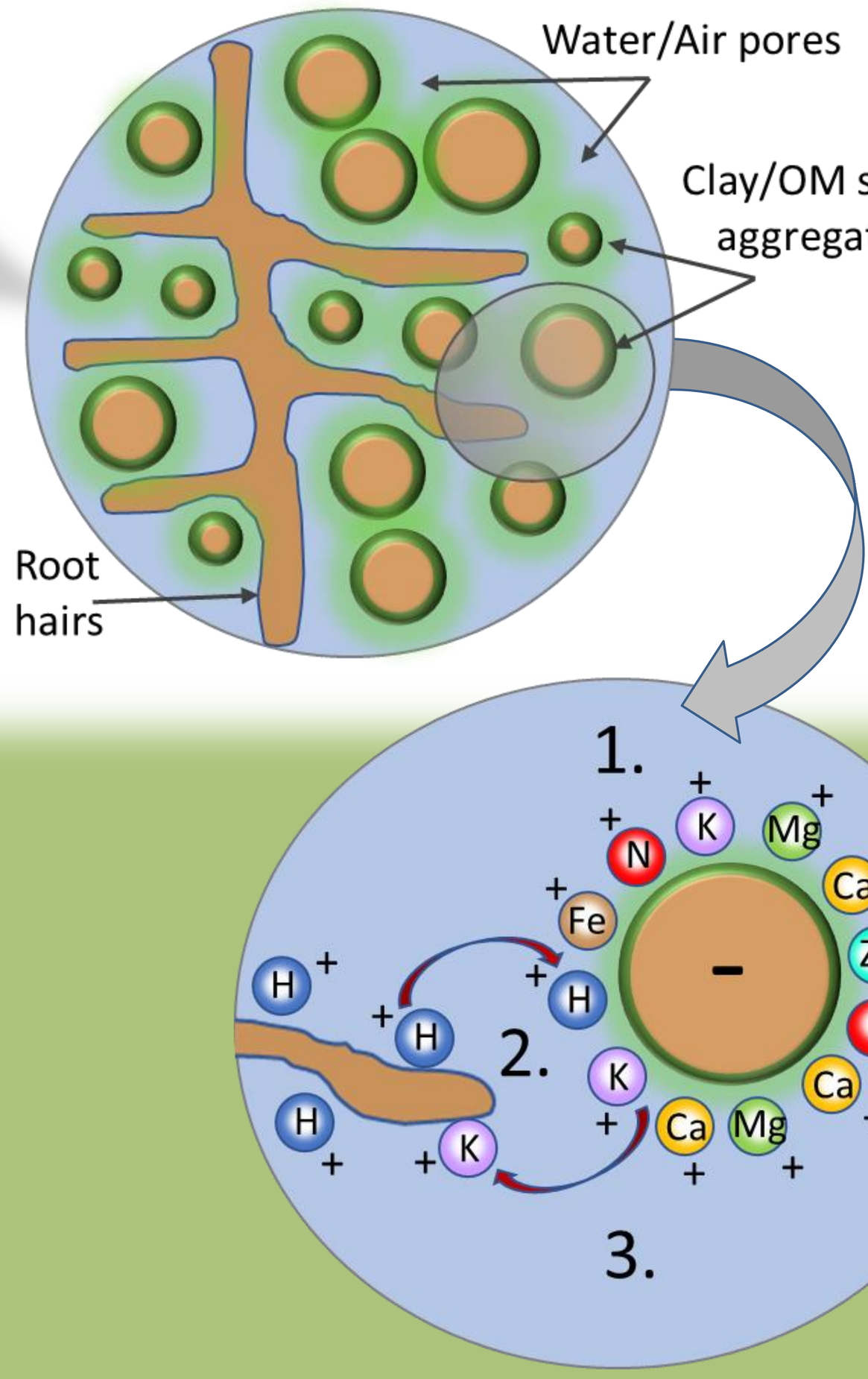
https://soilhealth.cals.cornell.edu/files/2016/12/04_CASH_SH_Series_Texture_Fact_Sheet_040517-10sn6o7.pdf

SOIL SCIENCE

Soil aggregates are arrangements of soil particles, minerals and organic matter.



Essential Plant Nutrients			
Type	Element		+/-
Non-Mineral Nutrient	C	Carbon	*
	O	Oxygen	*
	H	Hydrogen	+
Primary Mineral Nutrients	N	Nitrogen	+/-
	P	Phosphorous	-
	K	Potassium	+
Secondary Mineral Nutrients	Ca	Calcium	+
	Mg	Magnesium	+
	S	Sulfur	-
Micro-Nutrients	Fe	Iron	+
	Cl	Chlorine	-
	Mn	Manganese	+
	B	Boron	-
	Zn	Zinc	+
	Cu	Copper	+
	Mo	Molybdenum	-
	Ni	Nickel	+
	Co	Cobalt	+

*neutral

Cation Exchange Capacity (CEC)

OM has the highest CEC rate (2-3 times higher), followed by clay, silt and sand.

OM is essential for healthy garden soil.

1. Clay particles and humus (- anions) attract positively charged nutrients (cations).

2. Mineral nutrients are exchanged for hydrogen ions from the plant root.

3. Nutrients move from regions of higher concentration to lower, aided by osmosis and transpiration.

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