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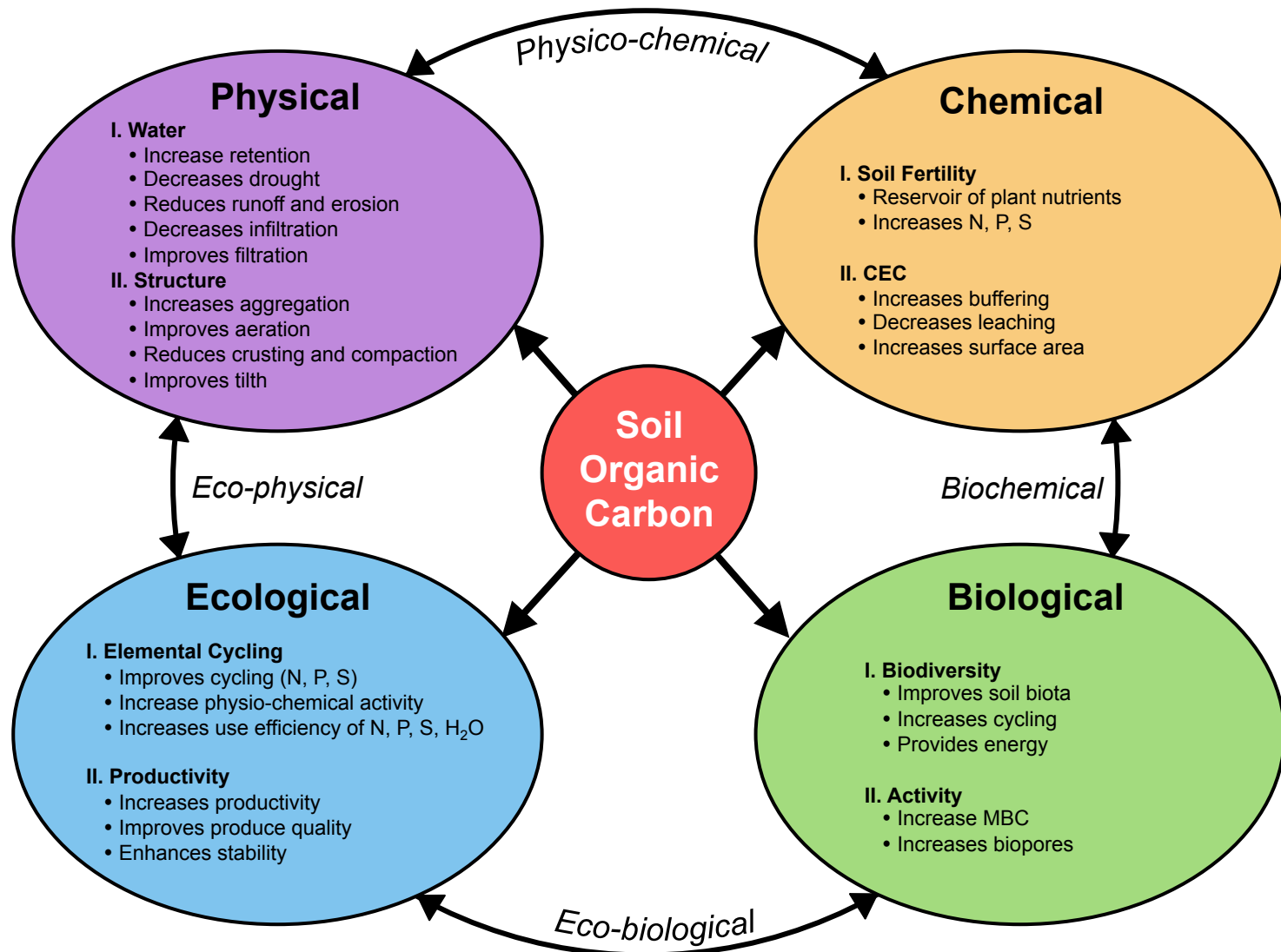
Sustainable Management and Carbon Sequestration in Soils of Africa

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SOC AND SOIL HEALTH





THRESHOLD/CRITICAL LEVEL

Threshold/Critical Level/Tipping Point: Soil processes and properties have threshold levels .Beyond threshold level, there is a drastic regime change . What is the threshold level of SOC in the root zone and profile for major soils of Africa for principal land uses?



CROP YIELD INCREASE WITH INCREASE IN SOC BY 1Mg C/ha

Crop	Yield Increase (kg/ha/Mg C)
Maize	100 - 300
Soybean	20 - 50
Wheat	20 - 70
Rice	10 - 50
Sorghum	80 - 140
Millet	30 - 70
Beans	30 - 60

Lal, 2005



SOIL EROSION AS A CARBON SOURCE

World.....	1.1 Pg C/y
USA.....	15 Tg C/y
Brazil.....	60 Tg C/y
India.....	4.8 - 7.2 Tg C/y
Iceland....	0.01-0.02 Tg C/y
	(60-250 Tg C/1000 yr)

**Emission Avoidance by Conservation-
Effective Measures**



GLOBAL POTENTIAL OF SOC SEQUESTRATION (Pg C/YR)

Cropland: 0.4-1.2

Grazing land: 0.3-0.5

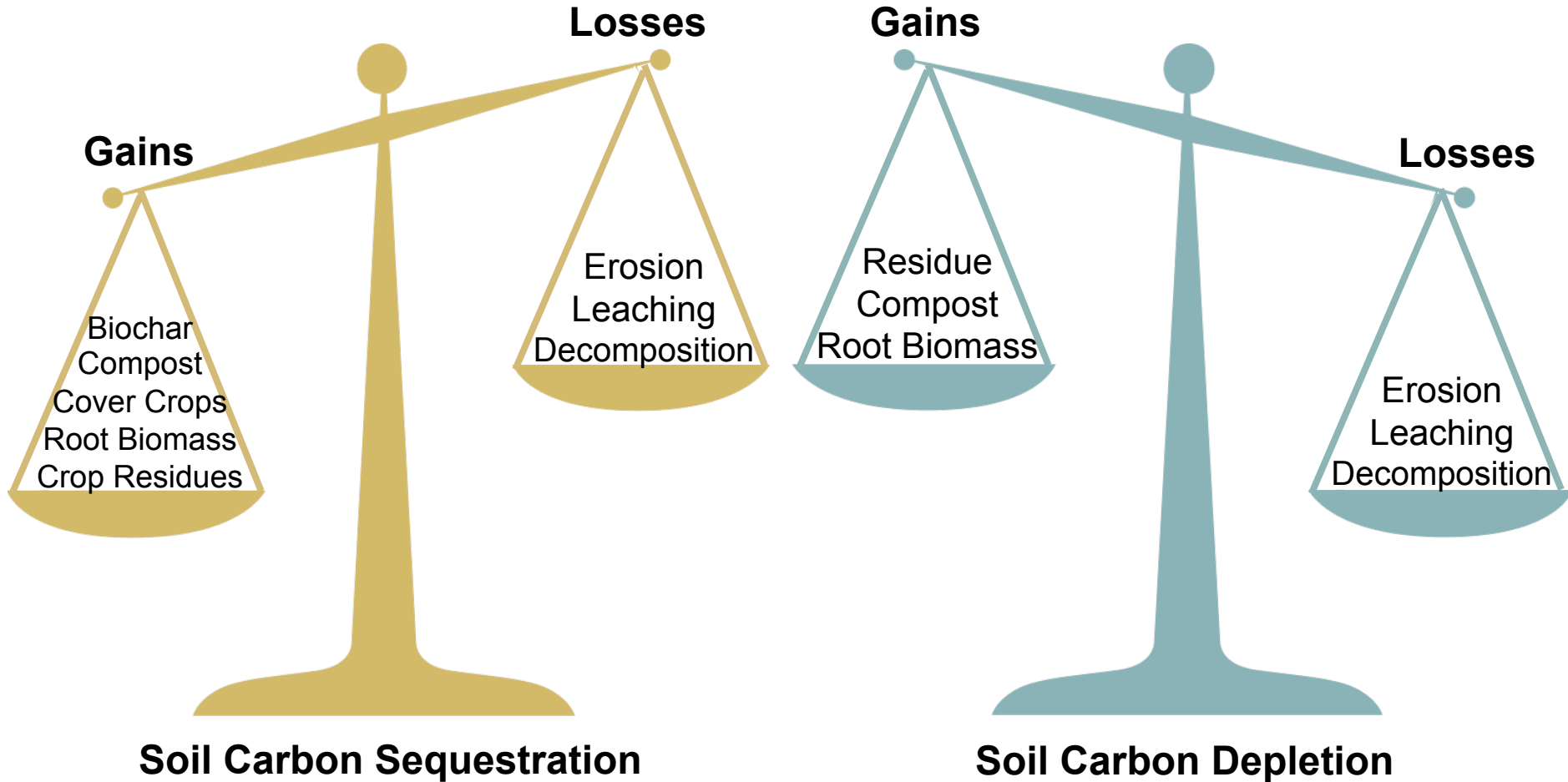
Salt-affected soils: 0.3-0.7

Desertified soils: 0.2-0.7

Total: 1.2-3.1

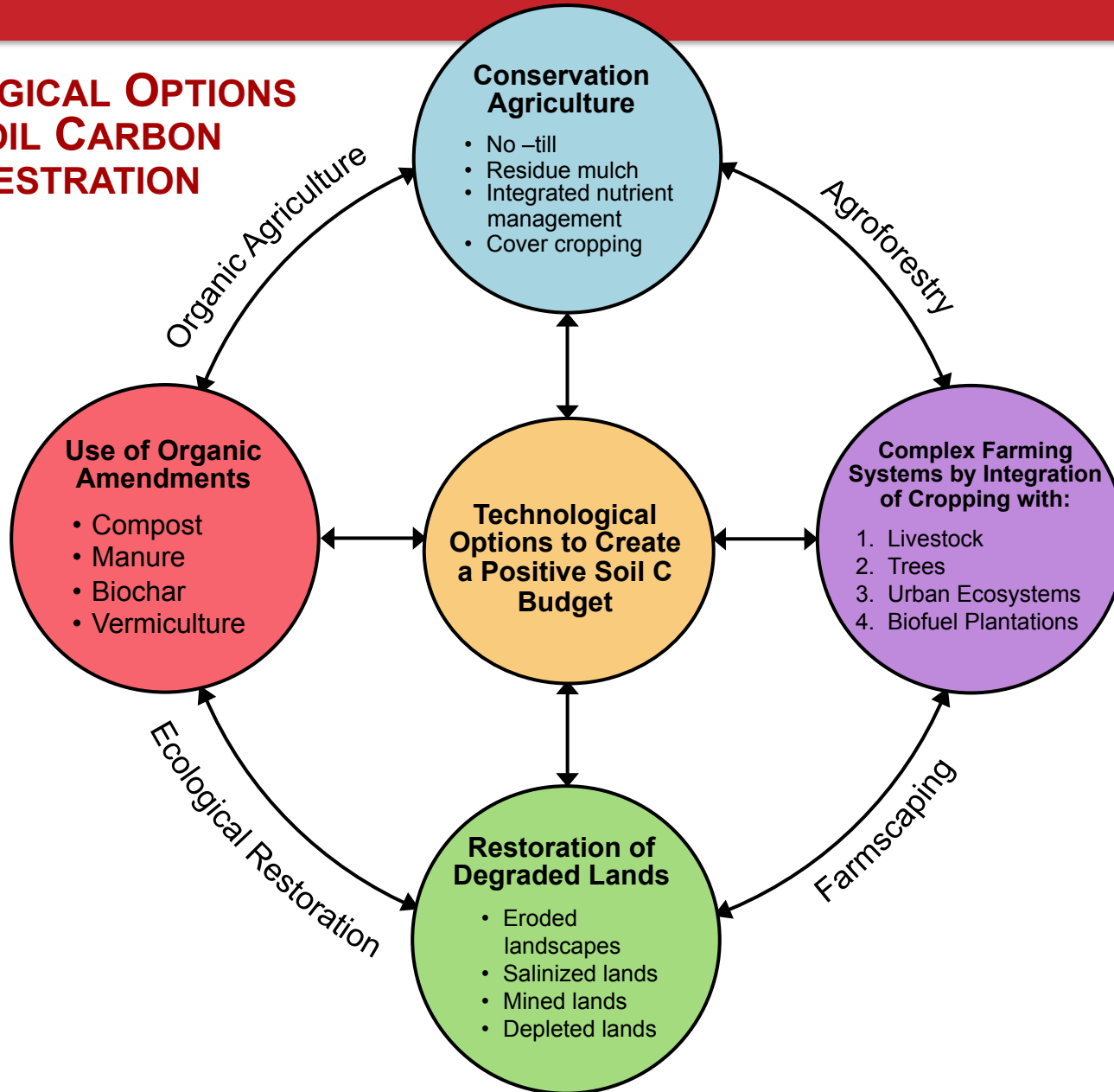


CREATING POSITIVE C BUDGET





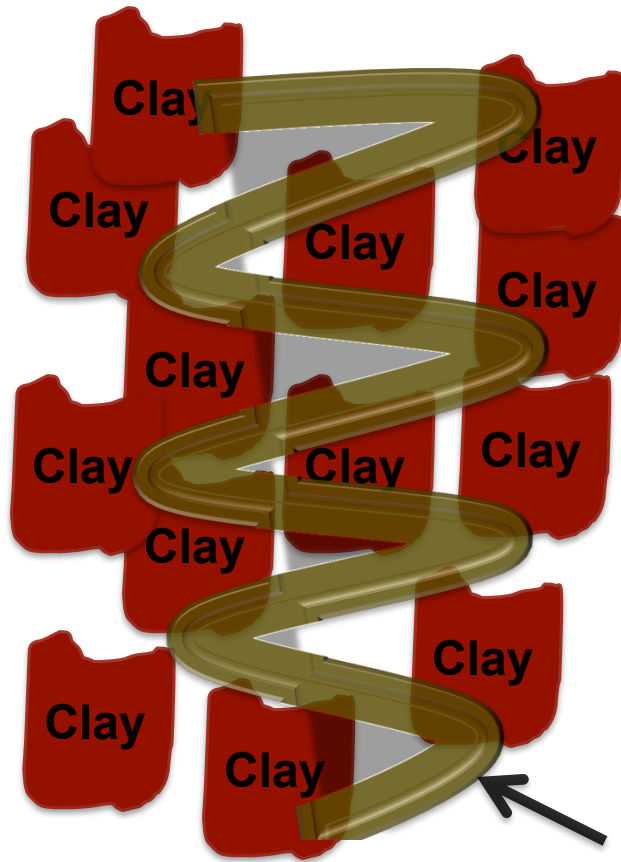
TECHNOLOGICAL OPTIONS FOR SOIL CARBON SEQUESTRATION



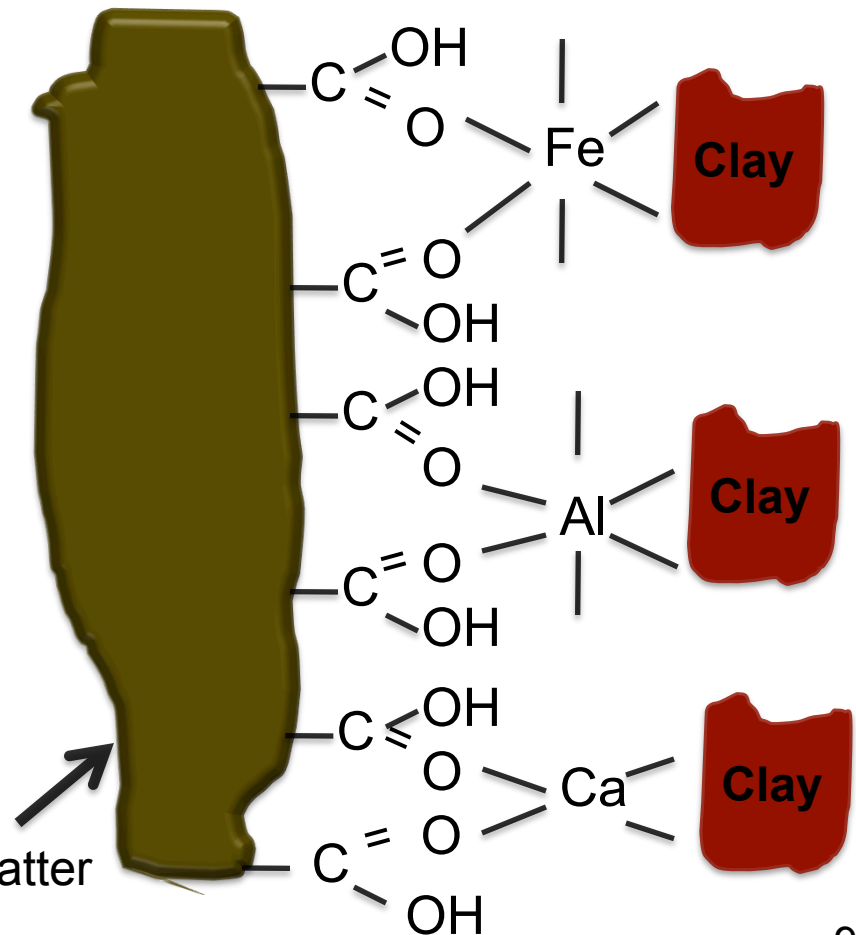


SOIL MICROAGGREGATE FORMATION (<250 μm) AND SOM STABILIZATION(MRT)

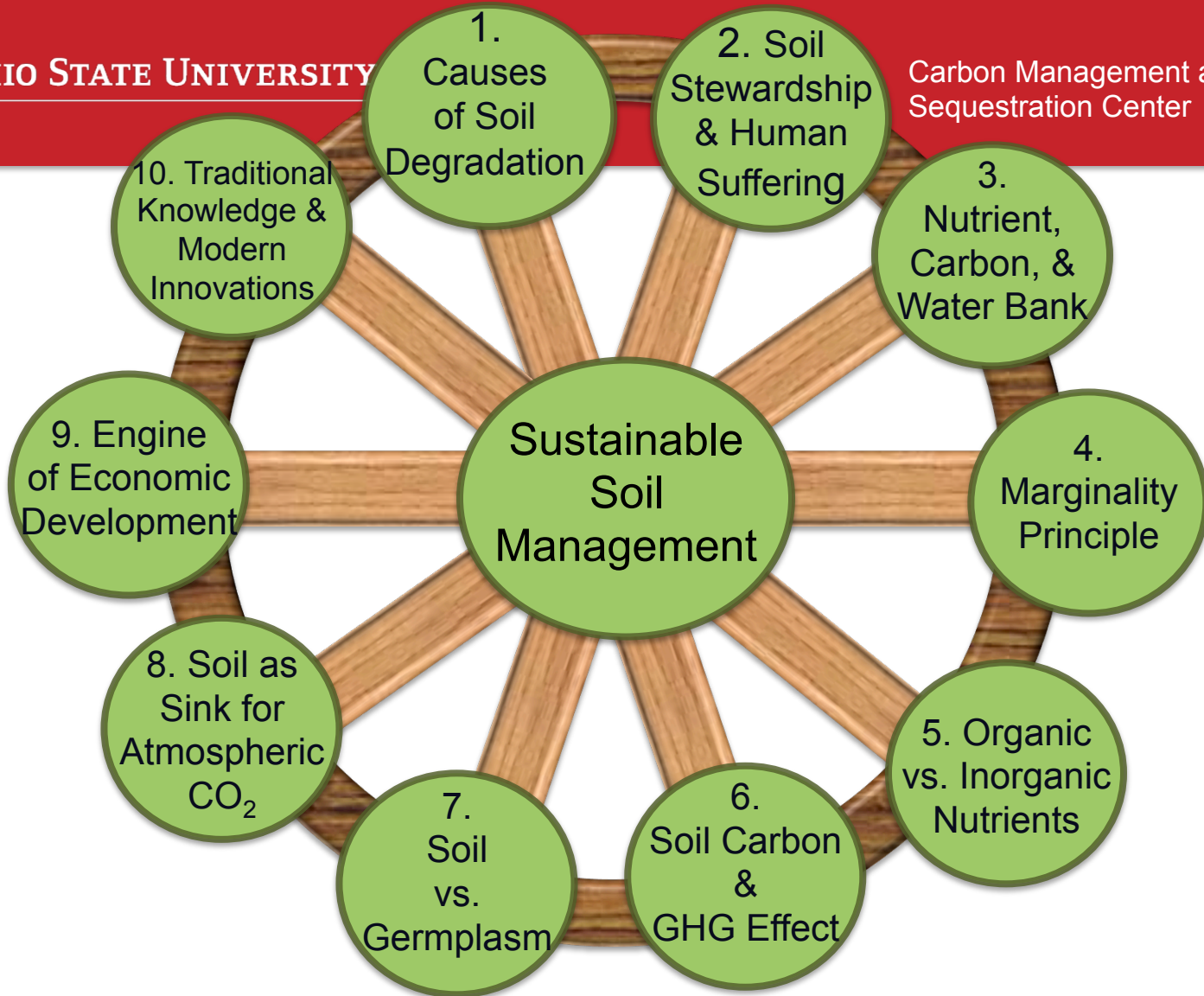
Strongly sorbed polymer



Cation bridges



Organic Matter



- Soil can be a source or sink of GHGs depending on land use and management
- Soil is a source of GHGs when used for agriculture, especially when fertilized and tilled
- Soil is a sink of GHGs when used for forest, grassland, or other natural ecosystems
- Soil is a source of GHGs when used for urban development, especially when paved and sealed
- Soil is a sink of GHGs when used for urban development, especially when green roofs and walls are used
- Soil is a source of GHGs when used for industrial purposes, especially when used for energy production
- Soil is a sink of GHGs when used for industrial purposes, especially when used for carbon capture and storage
- Soil is a source of GHGs when used for energy production, especially when used for coal-fired power plants
- Soil is a sink of GHGs when used for energy production, especially when used for wind and solar power
- Soil is a source of GHGs when used for energy production, especially when used for nuclear power
- Soil is a sink of GHGs when used for energy production, especially when used for hydrogen production



LONG-TERM COMMUNITY-BASED GLOBAL BENCHMARK SITES ON LINKING SOIL CARBON SEQUESTRATION TO FOOD, CLIMATE AND

OTHER ECOSYSTEM SERVICES

*The answer lies in harnessing
the power of agriculture, soil,
and natural resources.*

Improved Agriculture Matters

Through targeted and efficient
use of existing resources



PRIORITIES FOR AAA

Priorities for SOC research in Africa are to establish:

1. Critical levels for diverse land uses and eco-regions,
2. Rates of net SOC sequestration and societal value,
3. Ecosystem services provisioned by SOC,
4. Transects across land uses and ecoregions,
5. Synergies between 4PT and AAA



ADVANCING GLOBAL PEACE

Depleting Soil Organic C Pool, Degrading Soils, Recurring Drought, Marginal Use Efficiency of Fertilizers and Other Inputs, Low Crop Yields, Perpetual Poverty and Hunger, High Infant Mortality Due to Hunger and Malnutrition are as Real Threat to Global Peace and Security as are ICBMs and Nuclear Weapon Proliferation Because the Health of Soil, Plants, Animals, People and Ecosystems are One and Indivisible