

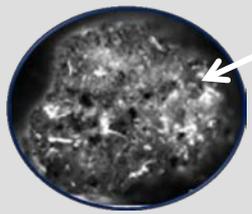
Soil Health & Dynamic Soil Properties in Irrigated Agriculture

The maintenance of a high degree of soil aggregation is one of the **MOST** important goals of soil management.

Macroaggregate



Microaggregate



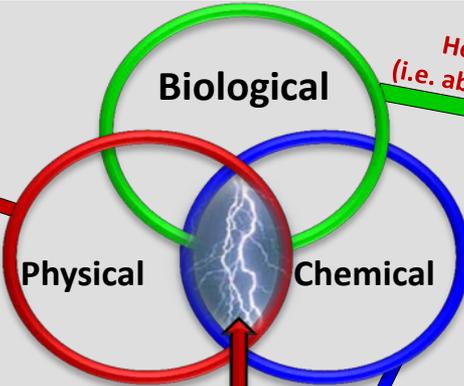
Irrigation Water is held within the pores of macro- and micro-aggregates (this water is the **Soil Solution**)



Irrigation Water (iw)

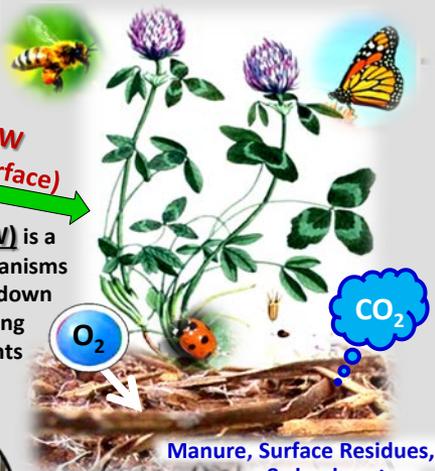
Use a IWM plan & appropriate Irrigation system to optimize water use.

ECiw (TDS), SAR, pH



Healthy Soil = a diverse SFW (i.e. above & below the soil surface)

The **Soil Food Web (SFW)** is a complex association of organisms responsible for breaking down crop residues and cycling plant-available nutrients in the soil.



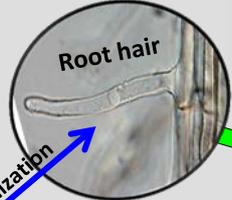
O₂

CO₂

Soil Solution (soluble nutrients)

Factors affecting nutrient cycling (availability):

- Quantity & Quality of Organic Matter inputs (C:N ratio)
- Soil Moisture content (& its pH and Salinity/SAR)
- Aeration
- Temperature

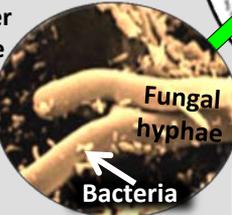


Root hair

Immobilization

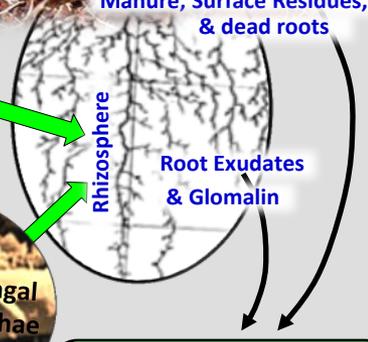
Nutrients & Water Uptake

Immobilization



Fungal hyphae

Bacteria



Manure, Surface Residues, & dead roots

Mineralization: the conversion of an element from an organic form to an inorganic state as a result of microbial decomposition.

Decomposition

Humus

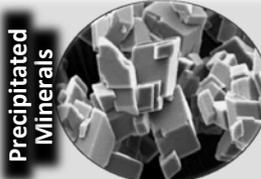
Formation

Various species of **fungi and bacteria** can solubilize mineral elements from the mineral soil.

Minerals Solubilized



Leaching to maintain salt balance



Precipitated Minerals

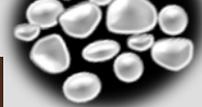
Dissolution

Precipitation

NOTE: Water-stable aggregates are created by the SFW & its interactions with the living roots. These aggregates provide the optimum environment for biological & chemical processes.

Fe & Al Oxides

P fixation



Exchangeable Cations



USDA is an equal opportunity provider & employer

- Achieving Soil Health:**
- Crop Diversity
 - Living Roots
 - Cover the soil
 - Less disturbance
 - Livestock Integration where applicable

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(<http://www.nm.nrcs.usda.gov/technical/handbooks/iwm/nmiwm.html>)

Water-Stable Soil Aggregates



Slake Test