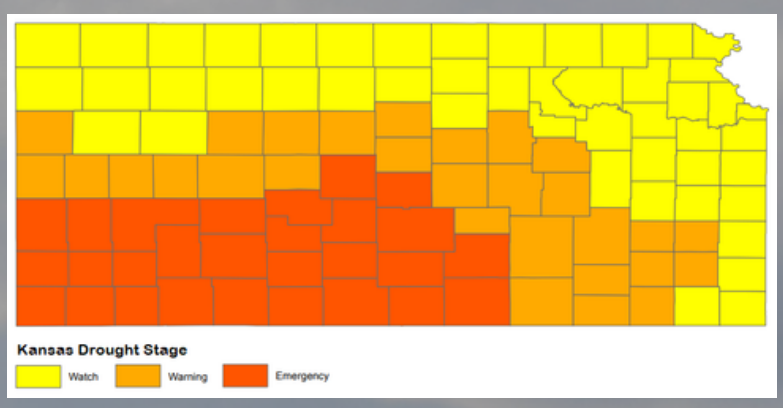
Water Use Efficiency

A simple comparison of water use efficiency for Green Roofs & Agriculture in Kansas



Kansas Water Crisis

- Irrigation accounts for **85%** of water use in Kansas
- **90%** of water in Kansas is pumped from underground
- **70 %** of the Ogallala Aquifer's water will be gone in less than 50 years if nothing is done

What is Water Use Efficiency (WUE)?

WUE is defined as the ratio of biomass accumulation to water consumed for a given period of time.

Biomass Accumulation

- total biomass
- above ground biomass
- harvested biomass
- CO_2 assimilation

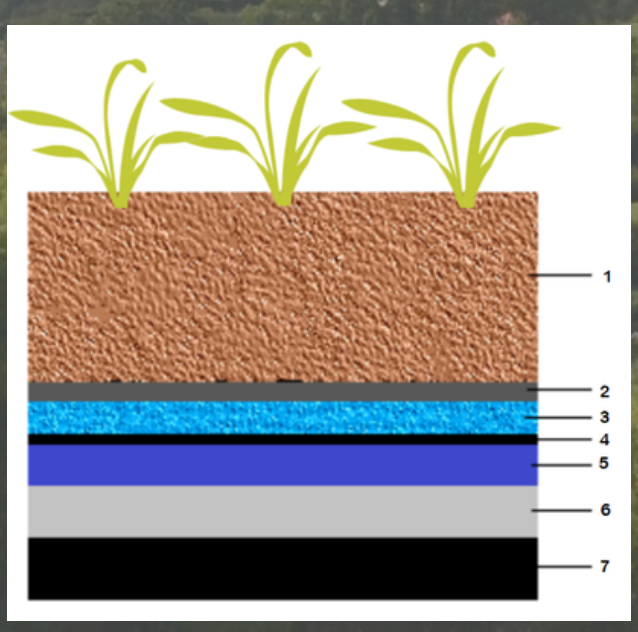
Water Consumed

- transpiration
- evapotranspiration
- total water input

Time

- daily
- seasonal
- instantaneous

Green Roofs



A green roof is a man made ecosystem containing vegetation (1), growth medium (2), and a network of root barriers and/or water proofing membranes (3-6) on top of a roof deck (7). Green roof depths typically range from 4 to 20 inches.

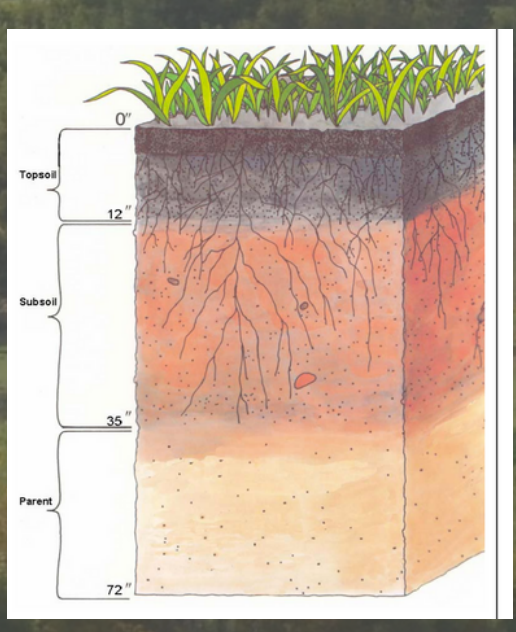
Plant Selection

- CAM photosynthesis pathways
- drought avoidance and tolerance, water storage organs
- other traits that that reduce water loss and heat gain
- Sedums are the most common green roof species

Irrigation Practices

- Most WUE green roof studies report overhead sprinkler systems yield the highest coverage, but this is very dependent on green roof vegetation type and substrate characteristics

Agriculture



A typical Kansas soil consists of a topsoil ranging from 0-12 inches in depth. This is followed by a subsoil horizon, which ranges from 12-35 inches in depth. Beneath the subsoil is the parent layer, which can go as deep as 72 inches.

Plant Selection

- Conventional/genetic breeding has allowed researchers to produce crops that are more water efficient (some of these products are more sorghum fields as they are the most drought tolerant
- researchers are creating a corn and soybeans product that is better at utilizing water)

Irrigation Practices

- Studies have shown subsurface drip irrigation in standard cropping systems improve WUE as much as 95%

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