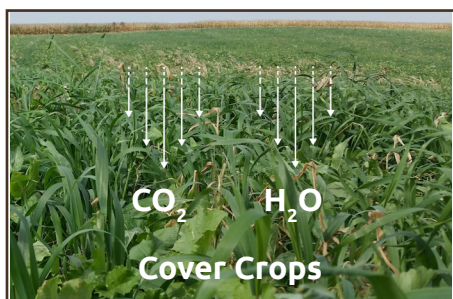


# PLANTS COOL and REHYDRATE the PLANET

## The Radiant Heat Effect and Climate

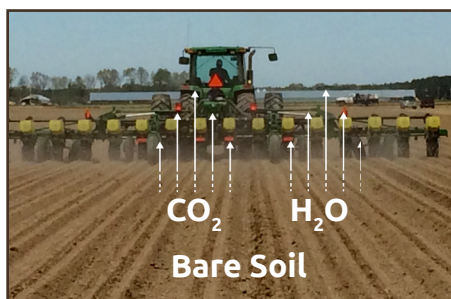
The earth's greenhouse gases (GHGs) are like a blanket that holds in just the right amount of heat to create the conditions for human life. It's a delicate balance influenced by two factors:

### The Heat Holding Capacity of the GHG Blanket



**Drawdown**

Plants convert carbon dioxide (CO<sub>2</sub>), water (H<sub>2</sub>O), and solar energy into carbohydrates through photosynthesis. They deliver liquid carbon to the soil through their roots and feed soil microbes. The microbes bring nutrients to plants and build soil organic matter. The living roots, fungi, and other microbes create a soil carbon sponge that stores stable carbon and reduces excess GHGs.



**Emissions**

Soil, disturbed by tilling or other means, loses the cohesive structure created by plant roots and soil microbes. It also releases CO<sub>2</sub>. Moisture evaporates very quickly, leaving a dessicated surface that repels water and creates dust. Dust particles in the air attract water vapor, but cannot coalesce it into large enough drops to form rain. This results in humid haze that holds heat and limits cooling.

### Radiant Heat from the Earth

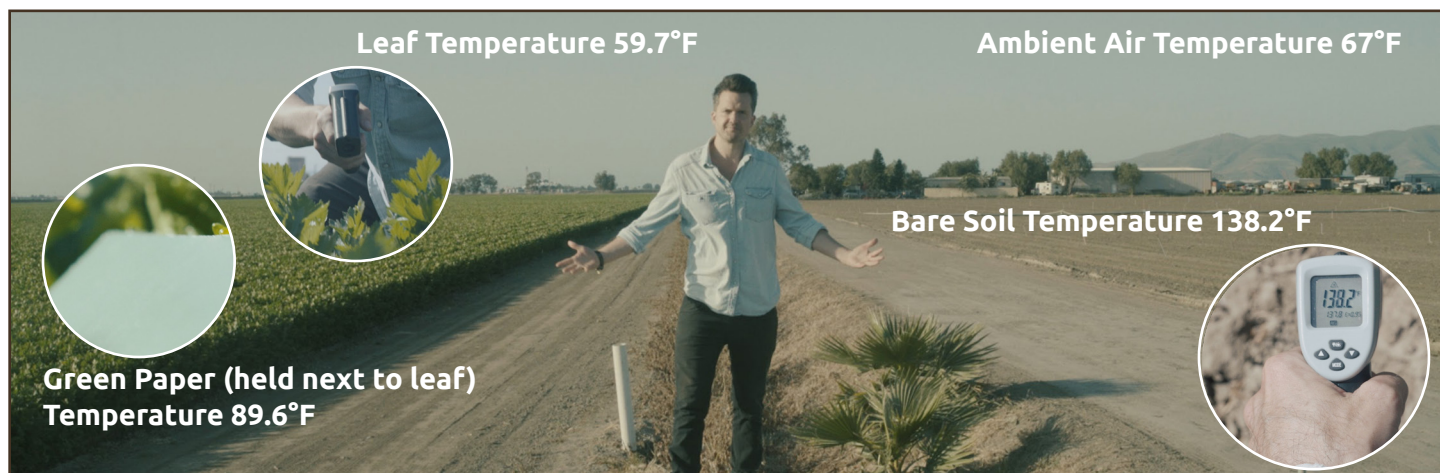


**Radiant Heat**

Bare soil heats to extremely high temperatures and re-radiates heat energy, similar to the effect felt near roads. This heat energy increases exponentially as temperature rises; it is proportional to the fourth power of temperature (T<sup>4</sup> or T<sub>x</sub>T<sub>x</sub>T<sub>x</sub>T<sub>x</sub>). This intense heat creates a high-pressure heat island that pushes low-pressure moisture systems away and adds excess heat to the GHG blanket.

### Plants Cool - Bare Soil Heats

Plants and soil microbes convert atmospheric carbon to stable soil carbon and significantly reduce dust emissions, humid haze, and radiant heat. In addition to natural shading, plants have a cooling effect through photosynthesis.



Finian Makepeace, co-founder of Kiss the Ground, illustrates the temperature extremes between vegetation and bare ground. Recording temperatures on a mild day in California, he discovered that the sun-baked soil was 78.5°F higher than leaf temperature. Under these hot, dry conditions beneficial microbes in the soil cease to function effectively. This lifeless soil remains parched as water runs off, compounding the heat-island effect. It increases drought cycles and turns fertile land to desert.

Biologically active soil with vegetative cover absorbs, retains, and filters water. This living soil sponge reduces flooding, increases resilience to drought and wildfires, and improves water availability and quality. Land management practices that minimize bare soil will improve natural water cycling and reduce global heat dynamics.

### Actions

Apply soil health principles that build biologically active soil:

- Maintain diverse plant cover
- Minimize soil disturbance and compaction

Support farmers and ranchers who practice these principles.