NRCS California Climate Conversations | Module 1

# Climate Foundations

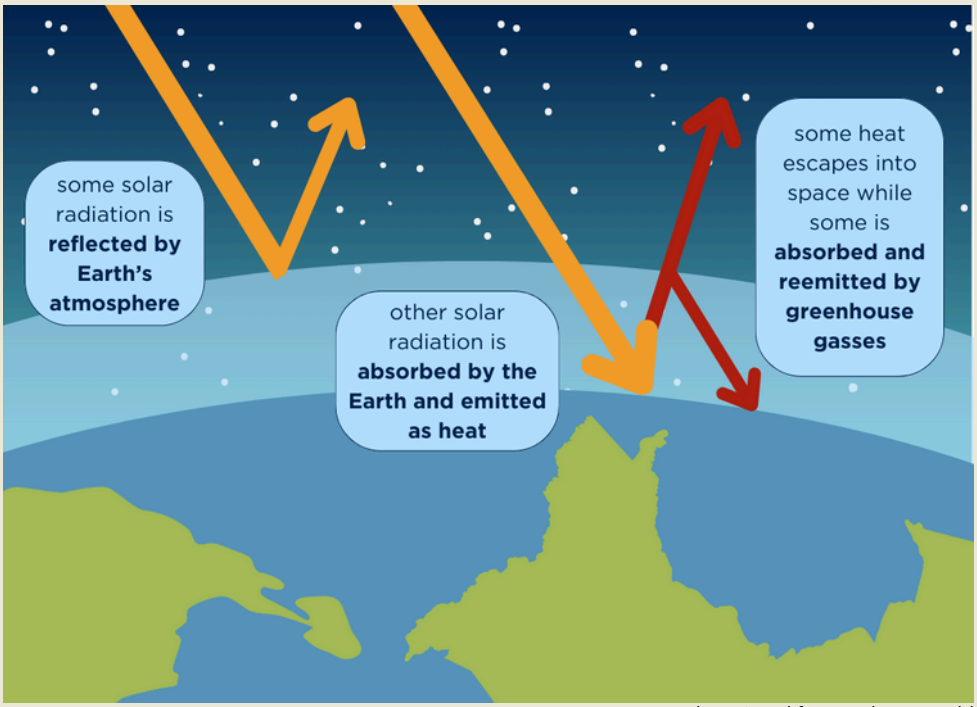
*This document supplements the USDA California Climate Hub's "Climate Conversations" workshop series, which aims to enhance climate literacy among USDA-NRCS and RCD field staff to support programs under the Inflation Reduction Act. It serves as a reference to understand and explain climate change to clients. This document provides information on the fundamentals of climate change.*

## What is Climate Change?

**Weather** describes short-term atmospheric conditions, while **climate** is the long-term average of weather conditions. One might say that the weather is cold today or that it will be a rainy week. Climate, on the other hand, is used to describe the weather conditions of a region in general terms over years or decades. For example, one might say California has mild, rainy winters. Not every winter day is rainy across California, but on average, the winters are wet. Climate can vary from year-to-year, a phenomenon called **climate variability**. However, decades-long trends in weather conditions show that the Earth's climate is getting warmer. This long-term trend is called **climate change**. This factsheet discusses where this extra heat is coming from and how it is changing Earth's climate.

## The Greenhouse Effect

The Earth receives energy from the Sun in the form of solar radiation, about 70% of which is absorbed by the Earth's atmosphere and surface. The solar radiation that is absorbed by Earth's surface is re-radiated back into the atmosphere as thermal energy (heat). **Greenhouse gasses** — which include carbon dioxide, methane, nitrous oxide, and water vapor — trap some of this heat and prevent it from escaping into space. This process is known as **the greenhouse effect**, and it plays a key role in keeping the Earth's atmosphere a habitable temperature. However, when the amount of greenhouse gas in the atmosphere increases, so does the amount of trapped heat in the atmosphere. This throws off the balance of energy flowing into and out of the atmosphere and increases global temperatures. Increases in greenhouse gasses can be from **natural sources**, like volcanoes and forest fires, or **anthropogenic sources**, caused by human activities like the burning of fossil fuels. Agriculture accounts for over 10% of the country's greenhouse gas emissions, with the largest sources being livestock and soil management.




*(USDA California Climate Hub)*

This figure provides a simplified representation of the heat-trapping effects of greenhouse gasses in the Earth's atmosphere.