

California Agriculture Greenhouse Gas Emissions

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.

What are the current greenhouse gas emissions in California?

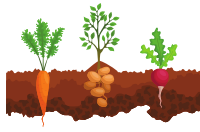
The transportation sector remains the largest contributor to California's greenhouse gas (GHG) emissions, followed by industry, electricity generation, agriculture, and the residential/commercial sectors. However, total emissions have been on a steady decline, reaching approximately 373 million metric tons of CO₂ equivalent (MMTCO₂e) in 2022—a 2.4% reduction from 2021 and a 20% reduction from 2000. Agriculture is a significant contributor to California's GHG emissions. In 2022, the sector emitted approximately 32 million metric tons of CO₂ equivalent (MMTCO₂e), accounting for about 8% of the state's total GHG emissions.

What are the GHGs coming from agriculture and what are their primary sources?

Carbon Dioxide



Combustion Systems

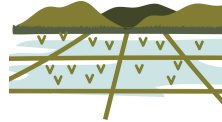


Organic Matter Decomposition



Livestock Digestion & Manure

Methane



Rice Cultivation

Nitrous Oxide



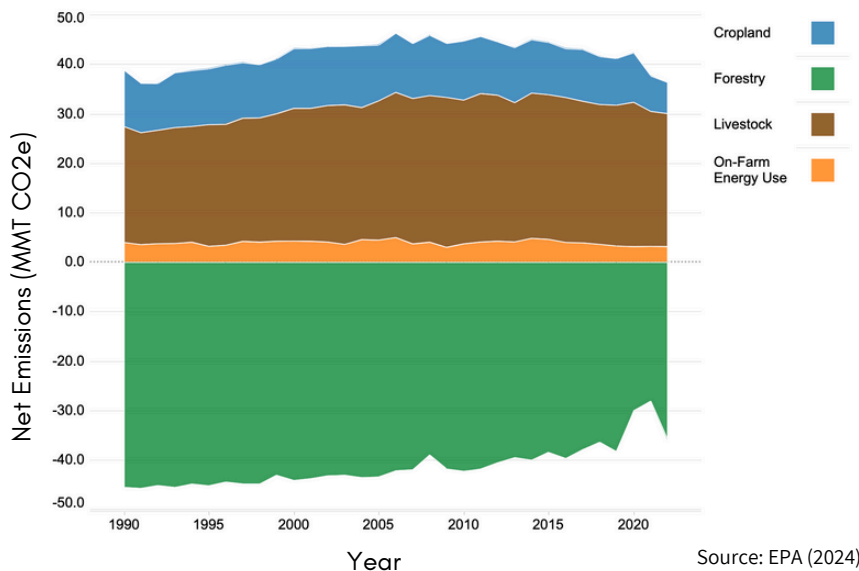
Nitrogen Fertilizer



Manure

How do different land uses contribute to GHG emissions in California?

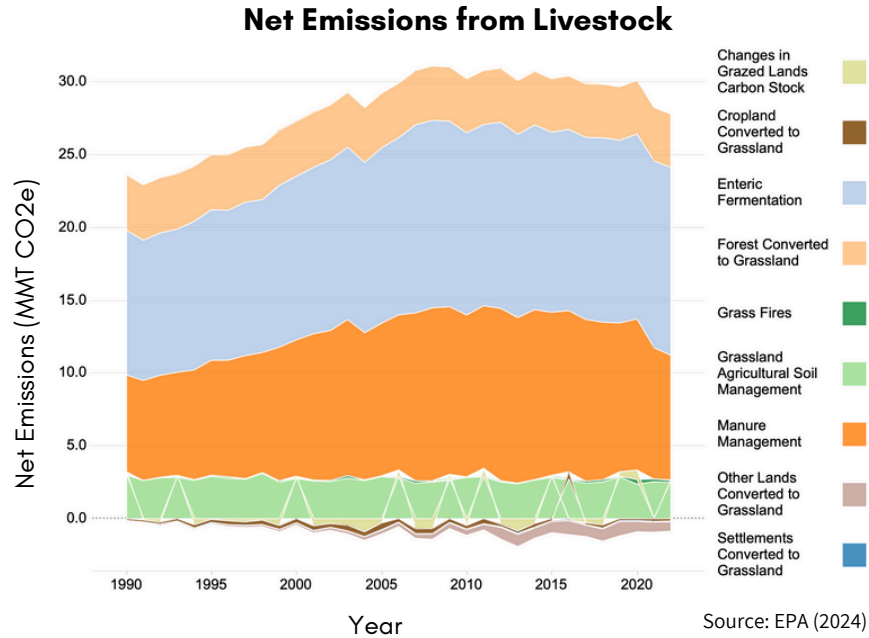
Net Emissions from Agricultural Sectors



The agricultural sector plays a dual role in GHG dynamics, acting both as a source of emissions and a carbon sink. In California, forests serve as the largest reservoir for carbon storage, contributing significantly to mitigating climate change. The majority of agricultural emissions stem from livestock operations. Cropland emissions and on-farm energy use, such as fuel consumption and irrigation energy, contribute a smaller share to the sector's overall GHG footprint. These dynamics highlight opportunities for practices to reduce emissions and enhance carbon sequestration.

What are the GHG sources from livestock?

Methane emissions from enteric fermentation are the largest contributor, followed by methane and nitrous oxide emissions from manure management. In California, dairy cattle dominate these emissions, with anaerobic lagoons being a significant source highlighting the need for improved waste and feed management that reduce emissions such as anaerobic digesters.



What are the GHG sources from cropland?

Cropland emissions are primarily driven by soil management practices, which account for the largest share of emissions. These emissions stem from activities such as fertilizer application, soil tillage, and organic matter decomposition, leading to the release of nitrous oxide or carbon dioxide. The second largest source of emissions comes from rice cultivation, where methane is released from flooded fields during the growing season due to anaerobic conditions. These practices highlight the need for conservation practices that reduce emissions such as nutrient management, reduced till, or irrigation water management for rice cultivation.

