

## ***Carbon Sequestration and Greenhouse Gas Fluxes in Agriculture: Challenges and Opportunities***

To abate climate change is one of the most pressing modern-day environmental issues.

- The United States is actively engaged in a critical international effort to find solutions to the problems posed by climate change.
- Challenges for agriculture include adapting management and land use to cope with the changing climate and adopting mitigation strategies to decrease agriculture's contributions to greenhouse gases (GHGs).
- These challenges are additional to agriculture's pivotal roles—to produce food, feed, and fiber as well as bioenergy feedstocks and to provide for conservation and protection of natural resources.

Greenhouse gases are present in the atmosphere in small concentrations.

- There are five large global carbon pools: an oceanic pool, a geologic pool, a pedologic pool, an atmospheric pool, and a plant pool.
- Nitrous oxide is a highly stable, long-lived trace gas found in the atmosphere at approximately 1/1,000<sup>th</sup> the concentration of carbon dioxide.
- Methane is a simple hydrocarbon compound that is most familiar as the main constituent of natural gas.



In general, agricultural activities can mitigate emissions by:

- Decreasing GHGs due to agricultural causes.
- Increasing sequestration of carbon in soil organic matter and plant biomass.
- Using sustainable agricultural biofuels with their capacity to offset carbon dioxide emissions from fossil fuels.

Economics govern the adoption of GHG emission-decreasing practices.

- Producers across the United States face different cost and production conditions.
- Incentives may be needed.
- Another popular policy design is “cap and trade,” where a limit on GHG emissions is set and allowances equal in number to the level of the cap can be traded on the open market.

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Experts to Contact for More Information:

Ronald Follett ([ronald.follett@ars.usda.gov](mailto:ronald.follett@ars.usda.gov)), Sian Mooney ([sianmooney@boisestate.edu](mailto:sianmooney@boisestate.edu)), Jack Morgan ([jack.morgan@ars.usda.gov](mailto:jack.morgan@ars.usda.gov)), Keith Paustian ([keithp@nrel.colostate.edu](mailto:keithp@nrel.colostate.edu))

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