



Important Role of Organic Agriculture in Addressing Climate Change

Organic agriculture has led innovations in farming for decades, particularly in the development of climate-friendly soil building techniques and farm inputs. Healthy soil is the cornerstone of organic agriculture and a critical solution for addressing climate challenges. Organic farming practices help mitigate climate change by keeping roots in the soil, preventing soil erosion, and sequestering soil carbon. Nutrient-rich, biodiverse soils foster the ability of crops to withstand and adapt to extreme weather-induced events such as droughts, floods, fire, and high winds. Accelerating the adoption of organic agricultural practices in the U.S. and abroad will go a long way toward solving the global climate crisis.

ORGANIC ELIMINATES A SIGNIFICANT SOURCE OF NITROUS OXIDE EMISSIONS

EPA estimates that U.S. agriculture contributes 8.6% to the country's anthropogenic greenhouse gas (GHG) emissions, releasing the equivalent of 574 million metric tons of carbon dioxide annually into the environment, mostly from fossil fuel production and use. Nitrous oxide emissions from soils comprise 50.4% of all domestic agricultural emissions.ⁱ The chemical is a long-lived GHG and ozone depleter, with 310 times the global warming potential of carbon dioxide.ⁱⁱ

- Organic regulations (§205.105) prohibit the use of synthetic substances in crop production.
- Prohibiting synthetic fertilizers in organic eliminates a significant agricultural source of N₂O emissions. Since nitrogen is an essential plant nutrient, many organic farmers apply soil amendments such as manure and compost, and grow leguminous cover crops, to fix nitrogen in the soil.
- Efficient nitrogen use is key to reducing GHG emissions; aerated organic soils have low mobile nitrogen, which reduces N₂O emissions from agricultural fields.ⁱⁱⁱ
- The use of synthetic pesticides is prohibited in organic agriculture. Synthetic pesticides disrupt nitrogen fixation and inhibit soil life. The absence of pesticides in the soil allows diverse organisms and beneficial insects to decompose plant residues and help sequester carbon.

ORGANIC PRACTICES CAN MITIGATE CLIMATE CHANGE

Healthy, biodiverse soils are integral to thriving organic farming systems and they also impact climate change. As biologically active soils break down crop residues, they release carbon dioxide and nutrients. Stabilized soil organic carbon that adheres to clay and silt particles or resists decomposition is sequestered and can remain in soils for decades or even millennia.

- Organic regulations (§205.203) require the implementation of soil fertility and crop nutrient management practices to maintain or improve soil such as crop rotations, cover cropping, and the application of plant and animal manures.

- Research has shown that if the standard practices used by organic farmers to maintain and improve soils were implemented globally, it would increase soil organic carbon pools by an estimated 2 billion tons per year – the equivalent of 12% of the total annual GHG emissions, worldwide.^{iv}
- Cover crops, routinely planted by organic farmers after harvesting cash crops, rebuild soil nitrogen and improve carbon sequestration by adding soil organic matter. Planting deep-rooted cover crops like forage radish or cereal rye further aid in the long-term sequestration of carbon.
- Compost is an important organic farming soil amendment and, when used judiciously and in combination with cover crops, it accrues more soil organic carbon than when used alone.
- Adding compost to rangeland and intensively managing and rotating livestock can increase plant productivity and heighten carbon sequestration.
- Diverse crop rotations, using plants with deep, extensive root systems, play an important role in sequestering carbon. Research has shown that although most soil biological activity occurs near the earth's surface to take advantage of the sun, 53% of the global soil organic carbon is found at depths 12-39 inches below the surface.^v
- Prudent green and animal manure applications, crop rotations, intercropping, and cover cropping improve farm soils and help prevent soil erosion, which depletes the amount of carbon the soil is able to store.

ORGANIC AGRICULTURE INCREASES RESILIENCE TO CLIMATE CHANGE

By design, organic agriculture builds resilience into the system of food production. Growing strong crops and livestock on healthy soils with bountiful biodiversity above and below ground facilitates the ability of organic systems to tolerate, adapt to, and recover from extreme weather conditions.

- High levels of organic matter in organic farm soils increase soil water retention, porosity, infiltration, and prevent nutrient loss and soil erosion. These soil properties make agriculture more resistant to flooding, drought, high winds, and the loss of soil organic carbon.
- Diverse cropping and intercropping on organic farms keep pest and predator relationships in check, decreasing crop susceptibility to insect pests and disease and increasing crop resiliency and adaptability to the extreme variabilities of climate change.
- “Given its potential for reducing carbon emissions, enhancing soil fertility and improving climate resilience, Organic Agriculture should form the basis of comprehensive policy tools for addressing the future of global nutrition and addressing climate change.”^{vi}

ⁱ Environmental Protection Agency (EPA). (2018) *Sources of Greenhouse Gas Emissions*.

<https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

ⁱⁱ Shonbeck, M. et al. (2018) *Soil Health and Organic Farming, Organic Practices for Climate Mitigation, Adaptation, and Carbon Sequestration*, Organic Farming Research Foundation, p. 2. <https://ofrf.org/soil-health-and-organic-farming-ecological-approach>

ⁱⁱⁱ UNCTAD/WTO, FiBL. (2007) *Organic Farming and Climate Change*, Doc. No. MDS-08-152.E. Geneva, Switzerland. <http://orgprints.org/13414/3/niggli-et-al-2008-itc-climate-change.pdf>

^{iv} Shonbeck, M. et al. (2018) p. 42.

^v *Ibid*, p. 12.

^{vi} International Federation of Organic Agriculture Movements (IFOAM). <https://www.ifoam.bio/en/advocacy/climate-change>