

# The Carbon Soil Opportunity: Organic Farming Helps Counter Climate Change



12-03-2024 ~ *Switching to organic products is an easy way to eat healthier and support the environment.*

Climate change is no longer an abstraction. I can literally see it at my front door. My figs ripened in October 2024, which has never happened before as it was never warm enough during that month. In my home state of Oregon, [wildfires set new records this year](#), with almost 2 million acres [burned](#).

Meanwhile, in my hometown, Eugene, we had the [longest stretch](#) of consecutive days when temperatures reached at least 100 degrees Fahrenheit in the summer. It's hard for me to think about the world that I will leave to my grandchildren. So I look for what I can do, and believe it or not, there's hope right at the grocery store; buying organic can contribute to combating climate change. Organic farmers actually store carbon in the soil, meaning there's less in the air to change our climate.

A series of long-term studies mentioned below demonstrate that organic farming increases soil carbon. In other words, organic farming is carbon farming. [Federal law defines organic farming](#) as a farming method, so we know what we're buying. Organic farmers use cover crops, mulches, and crop rotations to build healthy soil. They utilize various techniques to prevent pest problems, using only certain pesticides, which have been thoroughly reviewed as a last resort. You can support carbon farming by buying organic.

The Intergovernmental Panel on Climate Change's (IPCC) [2023 Synthesis Report](#) states that carbon sequestration in agriculture has one of the highest potentials for reducing carbon dioxide emissions. Carbon sequestration, or carbon farming,

uses farming techniques to increase soil carbon, keeping it out of the atmosphere (For more details about carbon farming and farmers who are using the method, see “[How Land Use Is a Tool for Solving Climate Change](#)” and “[Carbon Farming: A Sustainable Agriculture Technique That Keeps Soil Healthy and Combats Climate Change.](#)”)

Referring to the IPCC recommendations, the World Economic Forum’s November 2024 article [states](#), “[E]nhancing soil carbon sequestration through regenerative agriculture could sequester up to 23 gigatons of carbon dioxide by 2050, a substantial portion of the mitigation required to limit global warming to 1.5 degrees Celsius.”

### *Studies on Organic Farming and Soil Carbon—the Big Picture*

Organic carbon farming has been documented by scientists for decades. In 2012, researchers from Switzerland, Scotland, and Italy [published](#) a meta-analysis of 74 studies that were pairwise comparisons of organic and conventional farms growing various crops around the world—from all continents except for Africa and Antarctica. The researchers measured soil carbon in three ways (if the underlying study provided the necessary data): the soil carbon concentration, the amount of soil carbon per unit area, and the rate at which the soil carbon measurements changed. They found that for all three measurements, soil carbon was greater at the organic farms than conventional farms. They concluded that “organic farming has the potential to accumulate soil carbon.”

Meanwhile, a [2017 study](#) by Northeastern University and the Organic Center—which studied more than 1,000 soil samples from both organic and conventional farms across 48 states in the U.S.—“found that organic soils had 13 percent higher soil organic matter and 44 percent higher long-term carbon storage than conventionally managed soils.”

### *Crops That May Be on Your Grocery List*

Eating organic fruits and vegetables is better for the environment and has overall health benefits. “Not only does organic production help reduce public health risks, mounting evidence shows that food grown organically are rich in nutrients, such as Vitamin C, iron, magnesium, and phosphorus, with less exposure to nitrates and pesticide residues in organically grown fruits, vegetables, and grains when compared to conventionally grown products,” [states](#) the Organic Trade Association.

Below is a list of popular items we regularly purchase from grocery stores. I chose these products because they are foods that most of us buy often. For each food, There is at least one study showing that choosing organic can help support carbon sequestration and, therefore, allows us to play our part in combating climate change:

### *Corn*

[A 2015 review article](#) examined six long-term organic and conventional corn farming comparisons. Each study involved one site, with some plots managed organically and others managed conventionally. Four studies were done in the Midwest, one in California, and one in Maryland. All the studies grew corn in rotation with other crops. The studies were initiated between 1981 and 1998, and these plots had been continuously used for farming between 10 and 24 years when soil carbon was measured.

In five of the six studies, soil carbon capture increased in instances of organic treatments compared to conventional treatments. (The one exception was a plot that used to be a dairy farm and had high soil carbon levels at the beginning of the study.) The review article concludes, “These results suggest that organic farming practices have the potential to reduce nitrate leaching, foster carbon sequestration, and allow farmers to remain competitive in the marketplace.”

### *Wheat*

An [11-year comparison](#) of organic and conventional wheat farming (with other crops grown in rotation) in Nebraska found that soil organic matter (one way to measure carbon) was higher in the organic plots than in conventional plots.

### *Tomato (in rotation with corn)*

California’s Century Experiment has compared organic and conventional tomato (and corn) farming since 1993. [Measurements](#) of soil organic carbon showed that the concentrations in organic plots were two to three times higher than in the conventional plots. The study authors noted that the increases occurred throughout the soil profile, down to a depth of 6 feet.

### *Potato (in rotation with wheat and corn)*

A [long-term field study](#) in Switzerland that compared organic and conventional

farming systems showed that soil organic carbon was higher in the organic plots. The researchers collected soil samples over two decades after the experiment started. A [study](#) in Germany found that while carbon was sequestered in the organic plots for more than 15 years, in the conventional plots, the soil lost carbon.

### *Almonds*

In 2018 and 2019, researchers in California [compared](#) eight conventional almond orchards with eight organic orchards. (The researchers identified the organic orchards as “regenerative,” but all were certified organic.) The trees in the orchards had been growing for between three and 38 years. Total soil carbon was about 30 percent greater in organic orchards than in conventional orchards. The researchers concluded: “Our results support the notion that converting agriculture to regenerative systems could contribute to remediating several imminent global problems, including climate change diminishing water resources, biodiversity loss, agricultural pollution, human health problems, and diminishing rural economies.”

### *Strawberries (in rotation with broccoli and lettuce)*

In 2004 and 2005, researchers, mainly from Washington State University, [compared](#) 13 pairs of organic and conventional strawberry farms in Watsonville, California. The farms had been either organic or conventional for at least five years. They found that the amount of carbon in the soil from organic farms was higher than 21 percent compared to conventional farms.

### *Apples*

Scientists from Washington State University and the United States Agency for International Development [compared](#) conventional and organic apple production in a commercial orchard in the Yakima Valley. Trees were planted in 1994, and soil measurements were taken in 1998. At that time, soil organic carbon in the organic plots was about 15 percent higher than in the conventional plots.

### *Citrus*

Two studies, one from [Brazil](#) and the other from [Italy](#), showed that total organic soil carbon was higher in organic citrus orchards than in conventional orchards.

The increase in soil carbon was 30 percent in the Italian study and 300 percent in some Brazilian measurements.

### *Extra Benefits*

Organic farming benefits people who grow and harvest food because they are exposed to fewer pesticides. According to a 2024 [study](#) from California, researchers looked for seven common herbicides and two fungicides in carpet dust from homes in the Central Valley and the San Francisco Bay Area. The frequency at which each pesticide was detected and its amount increased in homes where larger amounts of pesticides were used nearby. None of these pesticides are used on organic farms.

“Our findings suggest that most of these herbicides and fungicides travel from the field via primary and secondary drift to homes in the surrounding area, potentially impacting the health of children and other vulnerable groups,” the study published in Environmental International [states](#).

Organic farming also benefits those of us who eat the food. In 2024, [Consumer Reports](#) (CR) analyzed pesticide contamination of 59 common fruits and vegetables. The data came from the U.S. Department of Agriculture, spanning seven years, and included both conventional and organic produce. The analysis by CR found that pesticide contamination posed significant risks in 20 percent of conventional foods but in almost none of the organic foods. Eating more organic produce ensures a healthier diet.

### *Tackling a Global Problem With Personal Choices*

Climate change is an enormous and complex problem, and the solutions are also complex. There’s no single silver bullet that can fix the crisis, including carbon farming. Even its [proponents](#) state that converting power generation to solar or wind energy and reducing the destruction of natural ecosystems are more significant measures for reducing greenhouse gas emissions.

However, while organic food is sometimes hard to find and more expensive, it is a relatively simple step that many of us can incorporate into our daily lives, providing a crucial opportunity to help mitigate climate change.

*By Caroline Cox*

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