

CLIMATE CHANGE



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Efficiency of energy use of organic farms is high. Organic agriculture performs better than conventional agriculture on a per hectare scale, both with respect to direct energy consumption (fuel and oil) and indirect consumption (synthetic fertilizers and pesticides).

CO2 emissions per hectare of organic agriculture systems are 48 to 66 percent lower than in conventional systems. The main effects of organic agriculture that are responsible for this difference are:

- the maintenance and increase of soil fertility by the use of farmyard manure;
- the omission of synthetic fertilizers and synthetic pesticides;
- the lower use of high energy consuming feedstuff.

Reduced Water Use

Organically managed soils have a high potential to counter soil degradation as they are more resilient both to water stress and to nutrient loss. Organic farmers feed their soils with organic fertilizers, and they can thus enhance degraded and problematic soils. The water and nutrient retention capacity is increased thanks to a high level of organic matter and permanent soil cover. Microorganisms have a good feeding base and create a stable soil structure. Due to the resulting high moisture retention capacity the amount of water needed for irrigation can be reduced substantially.

Greater Resistance to Increase Temperatures

Organic agriculture's use of compost and crop diversity means it will also be able to better withstand the higher temperatures and more variable rainfall expected with global warming.

“Organic agriculture not only enables ecosystems to better adjust to the effects of climate change but also offers a major potential to reduce the emissions of agricultural greenhouse gases.”

~ Food and Agriculture Organization of the United Nations

Making Informed Choices: Climate Change and Agriculture

*“Organic farming is a powerful new tool in the global warming arsenal,”
said Anthony Rodale, chairman of the Rodale Institute.
“It puts agriculture into a lead role - in regenerating the environment.”*

What is Climate Change?

A natural atmospheric shield surrounds the earth and stabilizes the average temperature, making life on earth possible. The energy from the sun reaching the earth is balanced by the energy that the earth emits back to space. This is called the greenhouse effect. Greenhouse gases trap some of this energy that the earth releases to space. These gases in the atmosphere act as a thermostat controlling the earth's climate.

Global warming is the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuation.

What is the Carbon Cycle?

Carbon, the fourth most abundant element in the universe is the building block of life. It is the element that anchors all organic substances, from fossil fuels to DNA. On earth, carbon cycles through the land, ocean, atmosphere, and the earth's interior.

The movement of carbon, in its many forms, between the atmosphere, oceans, biosphere, and geosphere is described by the carbon cycle. This cycle consists of several storage pools of carbon and the processes by which the various pools exchange carbon. If more carbon enters a pool than leaves it, that pool is considered a net carbon sink. If more carbon leaves a pool than enters it, that pool is considered a net carbon source.

The carbon cycle includes the uptake of carbon dioxide (CO₂) by plants through photosynthesis, its ingestion by animals and its release to the atmosphere through respiration and decay of organic materials. Human activities such as the burning of fossil fuels contribute to the release of CO₂ in the atmosphere.

How Does Carbon Sequestering Work?

Crops and other plants remove CO₂ from the atmosphere and, as they are harvested, their residue and roots are deposited into the soil where portions can remain for long periods as soil organic matter. This process is known as

carbon sequestration; plants and soils act as 'sinks' for atmospheric CO₂. Carbon sequestered in vegetation and soil is captured in the sink, providing a significant boost in the efforts to reduce greenhouse gases.

How Does Agriculture Contribute to Climate Change?

Agriculture contributes over 20 percent to global greenhouse gas emissions that are due to human activity. The conversion of ecosystems to farmland is a major source of CO₂; not only due to losses of plant biomass but also through increased decomposition of soil organic matter caused by its disturbance, and the energy costs of various agricultural practices such as fertilization and irrigation.

The greatest source of greenhouse gases in agriculture is from fertilizers. The production of fertilizer is an energy intensive process, and when it is applied to the land it emits nitrous oxide. The combined impacts of the production and use of chemical fertilizers is estimated to contribute as much as 3-5 percent to the long term greenhouse effect.

How Can Organic Agriculture Effect Climate Change?

Carbon sequestration

Findings from The Rodale Institute's 23-year Farming Systems Trial[®] comparing organic and conventional cropping systems show organic/regenerative agriculture systems reduce CO₂, a major greenhouse gas - positioning organic farming as a major player in efforts to slow climate change. The Rodale Institute's 23-year findings show that organic grain production systems increase soil carbon 15 to 28 percent.

The ability of organic agriculture to be both a significant carbon sink and to be less dependent on fossil fuel inputs has long-term implications for global agriculture and its role in air quality policies and programs.

Increasing soil organic matter for the soil's carbon bank is a principle goal of organic agriculture. Organic agriculture relies on the carbon bank and stimulated soil microbial communities to increase soil fertility, improve plant health, and support competitive crop yields. This approach utilizes the natural carbon cycle to reduce the use of purchased synthetic inputs, increase energy resource efficiency, improve economic returns for farmers, and reduce toxic effects of fertilizers and pesticides on human health and the environment.

Reduced greenhouse gas production

Organic agriculture not only enables ecosystems to better adjust to the effects of climate change but also offers a major potential to reduce the emissions of agricultural greenhouse gases. Moreover, mixed farming and the diversity of organic crop rotations are protecting the fragile soil surface and may even counteract climate change by restoring the organic matter content.

RESOURCES

United States Department of Agriculture (USDA) – www.usda.gov

Food and Agriculture Organization of the United Nations (FAO) - www.fao.org;

<http://www.fao.org/DOCREP/005/Y4137E/y4137e02b.htm>

The Rodale Institute - www.rodaleinstitute.org

<http://www.strauscom.com/rodale-release/>; <http://www.strauscom.com/rodale-whitepaper/>

Soil Association - www.soilassociation.org

Energy Manager Training - www.energymanagertraining.com

Other important issues available in the
Making Informed Choices series, include:

Eco Fibers

Fair Trade

GMO (Genetically Modified Organisms)

Organic Cotton: Your Healthier Choice

Pesticides



Organic Exchange (OE) is a nonprofit organization with staff in over ten countries committed to expanding global organic fiber agriculture, using organic cotton as the original catalyst. Improving organic cotton production addresses key environmental issues impacting cotton and also facilitates discussions about agricultural issues worldwide including: biodiversity, food security, poverty alleviation, strengthening rural communities, water quality and utilization, soil protection, and climate change impacts.

OE brings together brands, retailers, supply chain partners, farmers, and other key stakeholders to learn about the social and environmental benefits of organic agriculture and develop new business models and tools that support greater use of organic fibers and sustainable textiles.

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