

What is organic agriculture?

An ecological production management system that promotes and enhances biodiversity, biological cycles, and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain, or enhance ecological harmony. The primary goal of organic agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people.

— The U.S. Department of Agriculture
National Organic Standards Board

In general, crop produce or products that qualify as organic must be:

1. free from genetic modification;
2. grown without synthetic chemicals; and
3. processed without food additives or ionizing radiation.



More about organic

The transition period from conventional to organic takes three years. To sell a product as organic, the crop must be raised on land that has received no synthetic chemicals (fertilizers, herbicides, insecticides or fungicides) for three years prior to harvest. To learn more about how to become certified, contact the Iowa Department of Agriculture and Land Stewardship or your local certifier.

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ISU Organic Agriculture:
<http://extension.agron.iastate.edu/organicag>.

Leopold Center:
www.leopold.iastate.edu



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Photographs provided by Kathleen Delate, ISU Department of Horticulture and Agronomy, and the Leopold Center.

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The Long-Term Agroecological Research (LTAR) Experiment

Since 1998, the LTAR experiment has studied side-by-side comparisons of organic and conventional systems using identical crop varieties. Results suggest that organic systems provide similar yields and much higher economic returns while improving soil quality.



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Iowa State University
Neely-Kinyon Research
and Demonstration Farm

What is LTAR?

LTAR is a randomized, replicated comparison of organic and conventional agriculture near Greenfield, Iowa—one of the longest running replicated comparisons in the country. The project began in 1998 with support from the Leopold Center for Sustainable Agriculture, as part of the Organic Agriculture Program at Iowa State University.



The project compares the following crop rotations using identical crop varieties, each repeated four times in 44 plots:

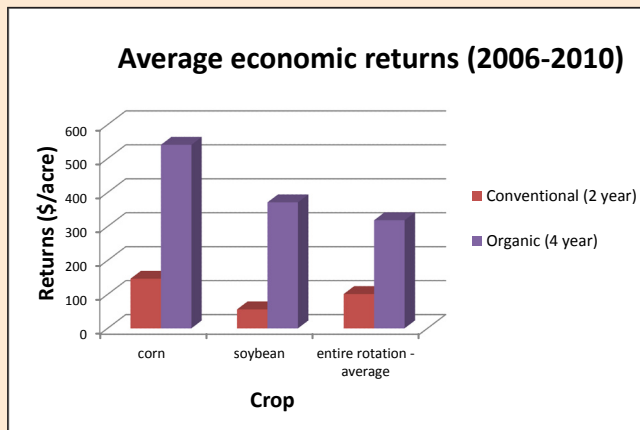
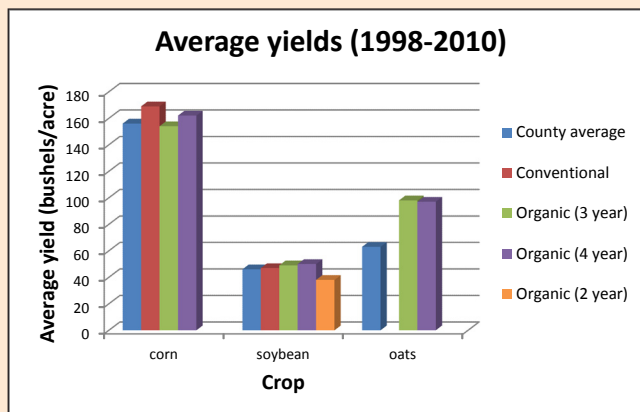
- **Conventional corn-soybean (2 year)**
- **Organic corn-soybean-oat/alfalfa (3 year)**
- **Organic corn-soybean-oat/alfalfa-alfalfa (4 year)**
- **Organic soybean-wheat/red clover (2 year)**

Farming practices

- The conventional rotation receives synthetic nitrogen amendments, herbicides and pesticides according to Iowa State University recommended rates.
- The organic plots receive local compost made from a mixture of corn stover and manure.
- Organic corn and soybean plots receive an average of two rotary-hoeings and two row cultivations per season for weed management.
- A 30-foot buffer separates the organic and conventional plots.
- The U.S. Department of Agriculture's National Organic Program certifies the organic plots annually.
- Crops are mechanically harvested with combines and hay rakers/balers.

Similar yields produced

- Averages from 13 years of the LTAR experiment show that yields of organic corn, soybean and oats have been equivalent to or greater than conventional counterparts.
- A 12-year average for alfalfa and 8-year average for winter wheat also show no significant difference between organic yields and the county averages.



Above: Organic rotations offer similar yields and much higher returns to management (after deducting labor, land and production costs) than conventional crops.

Organic offers greater profit

- On average, returns to management (after deducting labor, land and production costs) for organic systems are **roughly \$200 per acre greater** than conventional returns, according to actual LTAR data and modeling.
- Organic systems have lower production costs because they eliminate the need for expensive herbicides and synthetic fertilizers.
- Organic crops have higher value on the market.

Soil quality improved

- Total nitrogen increased by 33 percent in the organic system.
- Researchers measured higher concentrations of carbon, potassium, phosphorous, magnesium and calcium in the organic soils.
- Organic soils have lower acidity.
- The results suggest that organic farming can create greater efficiency in nutrient use and higher carbon sequestration potential.

Tips for weed management

- Use timely tillage and longer crop rotations.
- Rye and alfalfa add allelopathic chemicals to the soil that help prevent weed establishment.
- An alfalfa cover crop in the winter fosters habitat for insects and animals that eat weed seeds.
- To compensate for seed losses that occurs during tillage, use higher seeding rates.
- Skilled management is an adequate replacement for synthetic chemicals.

