

Comparing Conventional and Organic Agriculture

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The Organic Certification

Organic is a certification that is regulated by the USDA National Organic Program (NOP). Foods that are USDA certified organic, including fresh produce, processed foods and animal products, are grown and processed according to specific federal standards. Organic foods can be identified by the USDA organic seal featured on the tag or packaging. Although the packaging for some food items may say “Made With Organic” or “Organic Ingredients,” if the product does not have the organic seal, it is not certified organic by the USDA.

If you shop at a local farmers market or farmstand, vendors will advertise whether their produce was grown organically. To be considered certified organic, farms and gardens must complete an organic certification process. If they receive the certification, they will display it when selling produce at farmers markets or farm stands. If you’re living in the Bay Area, you’ll likely see farms with a CCOF Organic Certified label.



<https://www.usda.gov/topics/organic>



<https://www.ccof.org/certification/labeling-and-logos>

If you see a farm or garden selling produce without an organic certification, avoid immediately discrediting their farming practices. Becoming certified is a process that can be costly for the farmer—it takes land, time and money. Because profit margins on farms are so small, farmers may not have the capital to transition to organic land. Also, on small scale farms or gardens, there simply may not be enough personnel to complete the paperwork associated with the application and maintenance of the certification. So, if you see a garden or farm selling produce without an organic certification, engage in conversation with the grower and ask questions to learn more!

Comparing Organic and Conventional Agriculture

In the context of our food system, there are two primary types of agriculture: organic and conventional. The differences between organic and conventional agriculture can be identified by taking a closer look at the inputs and growing practices of each.

Differences Between Organic and Conventional Growing Practices

Conventional	Organic
Uses synthetic fertilizers to promote plant growth. Synthetic fertilizers are petroleum based, meaning they are derived from fossil fuels .	Uses natural fertilizers to promote plant growth. Natural fertilizers are derived from animal and plant matter .
Uses synthetically produced insecticides and herbicides to reduce pests, disease and weeds.	Uses natural methods (see Organic Pest Management Guide or video) to reduce pests, disease and weeds.
Uses GMO seeds.	Does not use GMO seeds.

Implications of Conventional and Organic Agriculture

Now that we have a clear understanding of the basic differences between organic and conventional agriculture, let's take a look at the implications of both types of agriculture on the environment, society, and public health.

Implications of Conventional Agriculture

Water	Synthetic fertilizers, primarily nitrogen- and phosphorus-based, are water soluble and contain nutrients that are readily available to plants after the fertilizer is applied to the soil. However, because they are water soluble, a process called leaching can occur, in which rain and irrigation water dissolve the fertilizer and carry excess nutrients into our waterways. This pollution of synthetic fertilizers in rivers, lakes, and oceans affects our supply of drinking water and causes damage to aquatic ecosystems.
Soil	Conventional growing practices, like heavy tillage and monocropping, can increase soil erosion and soil compaction and decrease water holding capacity, organic matter, and microorganisms. These changes decrease the overall health and productivity of soil. When farming on less healthy and productive soil, conventional farms apply heavy amounts of synthetic fertilizers and pesticides to maintain high crop yields.
Biodiversity	The application of synthetic insecticides can harm beneficial insects including bees and other pollinators, limiting the biodiversity of the natural ecosystem. As well, the use of GMO seeds limits the agricultural biodiversity on conventional farms, increasing the risk of crop loss from pests and diseases.
Energy Inputs and Emissions	The energy inputs for conventional agriculture exceed the energy inputs for organic agriculture. The greenhouse gas (GHG) emissions from conventional agriculture also exceed the GHG emissions from organic agriculture. The largest energy input in conventional agriculture is the production of synthetic fertilizer, specifically nitrogen fertilizer. The production and use of these synthetic inputs, including fertilizer and fuel, contributes to the emissions associated with conventional agriculture.
Public Health	Conventional farming exposes farmworkers to high concentrations of synthetic pesticides and chemicals, which can cause cancer, infertility and birth defects. Conventional farming also exposes consumers to small amounts of synthetic fertilizers and pesticides through the pollution of our waterways and through pesticide residue on crops.

Implications of Organic Agriculture (aka Ecosystem Services)

<p>Water</p>	<p>Organic fertilizers, which include compost and animal manure, contribute to enhanced soil structure and improve water and nutrient retention in the soil. The nutrients in organic fertilizers have to be converted into their inorganic forms by bacteria and fungi in the soil before they can be used by plants. This means that the nutrients in the fertilizer are released into the soil more slowly. All of these factors reduce the leaching of nutrients into our waterways and improve the health of the soil. Healthier soils also have a higher water holding capacity, which means that organic farms may have higher yields than conventional farms during drought years.</p>
<p>Soil</p>	<p>The soil building practices that are central to organic farming include crop rotation, inter-cropping, cover cropping, organic fertilizer and low tillage. These practices improve soil formation and structure, increasing nutrient and water retention, decreasing soil erosion, and increasing soil biodiversity, all of which protect farms from drought, pests and diseases.</p>
<p>Biodiversity</p>	<p>Organic farming conditions, such as the lack of synthetic pesticides and the diversity of crops, strengthen the native ecosystem and attract a wide range of beneficial birds, insects, pollinators and pest predators. Also, since organic farmers are not using modern GMO seeds, they are more likely to use a greater genetic diversity of seeds. This biodiversity of seeds and animal life improves crop resilience and yields on farms and also helps to maintain traditional seed stocks.</p>
<p>Energy Inputs and Emissions</p>	<p>Because organic farms use natural alternatives to synthetic fertilizer, the energy inputs and GHG emissions are lower for organic agriculture compared to conventional agriculture. However, similar to conventional farms, organic farms require fuel as an input, contributing to GHG emissions through the production and burning of fuel on the farm. Despite these emissions, organic farming actually contributes to the sequestration of carbon in the soils. Many of the organic soil management practices, including minimum tillage and cover cropping, increase the amount of carbon returned to the soils for storage.</p>
<p>Public Health</p>	<p>With no synthetic pesticides and limited nutrient runoff, organic farms reduce health implications for farmworkers and for consumers. Researchers are still studying whether organically grown produce is more nutritious than conventionally grown produce.</p>

Price Difference Between Organic and Conventional

The price of the produce is another factor that must be considered when comparing organic and conventional agriculture. It is clear that the price of organic produce is almost always higher than the price of conventional produce. However, the explanation for this price disparity is a little more nuanced—it is influenced by the limited production, high demand, and small scale of organic operations.

What this price difference means for the community is that *organic produce is simply not accessible to all consumers*. It is not the only way to eat sustainably and should not be the expectation. However, if you are willing and able to pay the higher price for organic produce, you now have a better sense of what you're paying for (e.g., less leaching, improved soil health, increased biodiversity, and healthier working conditions for farmworkers).

One Final Note: Differences Within Organic Agriculture

When considering organic produce, it's important to note that small-scale and large-scale organic farms may implement different types of organic growing practices. Smaller organic farms are often able to implement more of the favorable organic growing practices than larger organic farms can. These growing practices include:

Cover Cropping	Crop Rotations	Inter-cropping
Organic No-Till	Rotational Grazing	Composting

If possible, look to support those smaller-scale farms located in your community.

Resources

Want to learn more? Check out some of these resources:

- [The Rodale Institute](#)
- [Food and Agriculture Organization of the United Nations](#)
- [Regenerative Organic Alliance](#)
- [CCOF Organic Certifier](#)
- [USDA Organic](#)