

Greenhouse Grown PRODUCE

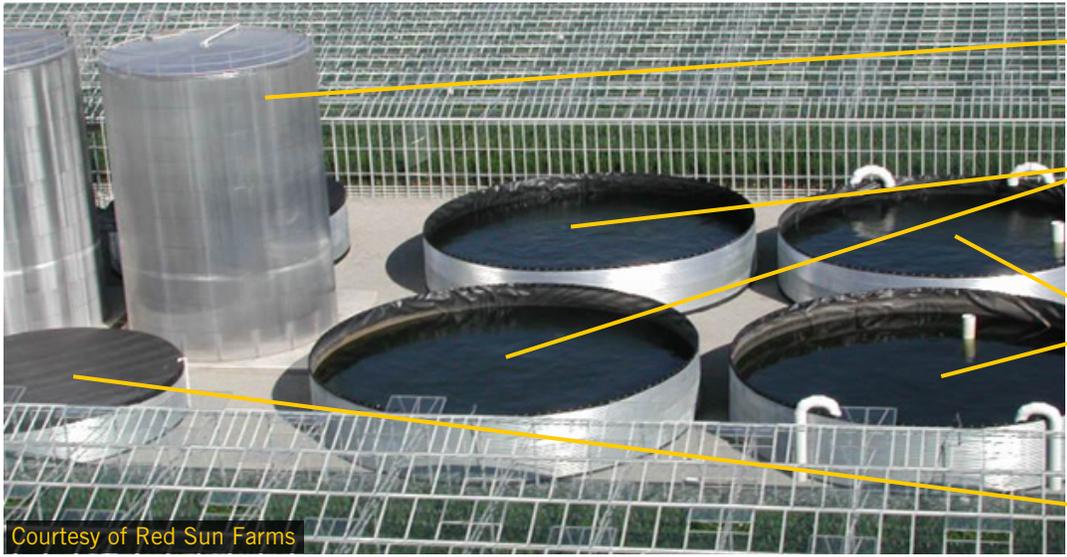
How prevalent is it today?

Did you know?

First evidence of greenhouses date back to 30 AD when the Roman Emperor Tiberius wished to eat cucumbers during the winter.

During the 16th century, France began erecting the first commercial scale greenhouses to produce tropical, medicinal herbs.

England built large scale greenhouses during the Victorian age, primarily for tropical flower production.



- Heat Storage Tanks
- Rainwater Storage Tanks
- Recycled Water and Fertilizer Storage Tanks
- Sterilized Water Storage Tanks

Courtesy of Red Sun Farms

Growing plants in a commercial greenhouse requires significant investment, but this is a growing area in commercial agriculture today. The transparent covering of the greenhouse allows light to enter and warms the interior. Greenhouses are particularly useful if an area has a short growing season or is otherwise difficult to grow product outdoors.

Greenhouses allow for greater control of the growing environment, including temperature, light, shade, irrigation, water, humidity, fertilizer, and pest control. Temperature control is one of the highest costs in a greenhouse operation. Ventilation is also critical to keeping plants healthy. Not only does ventilation help regulate temperature and humidity, but air movement helps prevent plant pathogens from building up. Keeping pests and disease at bay is important since any introduction into the greenhouse can harm the entire crop. Irrigation in a greenhouse is necessary, but can help minimize water usage since there is an ability to recapture, reuse, and recycle water.

Technology is very important in agriculture generally and perhaps even more so in greenhouse production. Not only is

technology important for controlling the environment within the greenhouse, but technology continues to allow improvement in cost cutting measures while also minimizing the impact on our world. For example, carbon dioxide, a waste product from refineries that is vented into the atmosphere, can be used in greenhouses to enrich cultivation since plants use carbon dioxide for photosynthesis. In fact, some commercial greenhouses are located near industry facilities to be able to capture both waste heat and carbon dioxide from refineries.

Since the in-door environment can be controlled, managing pests and disease are also easier to control. Many growers, both field growers and greenhouse growers, use integrated pest management to reduce costly pesticides and herbicides. Many growers will employ lady bugs for aphid control. They might also use eggplants and rye grass as bait plants to attract 'bad bugs' that may enter the greenhouse. Pest control tags and glue boards are used for pest identification and extermination. Greenhouse growers also need to introduce insects (e.g. bees) to help pollinate. Similarly, the ability to trace food to its source for food safety verification is also more controlled with the greenhouse environment.

BENEFITS OF GREENHOUSE GROWING

	FIELD GROWING	LOW TECH GREENHOUSE	HIGH TECH GREENHOUSE
Reliability of Supply	50%	70%	95%
Production Yield	1 time	5-8 times of field yield	12-20 times of field yield
Environmental Control	None	Some Control	Complete Control
Land Use	Maximum	Reduced	Minimum
Water/Fertilizer Use	Maximum	Reduced	Minimum and Recycled
CO ₂ Absorption	Minimal	Increased	Maximum
Pesticide Use	Maximum	Reduced	Minimal to Zero
Labor	Inefficient	Moderate	Efficient - Ergonomic
Food Safety	Minimum	Medium	Maximum

Source: Mastronardi Produce

Common Consumer Questions

What percent of all produce sold in the US is greenhouse grown?

The latest publicly available report with data through 2011 found 22% of fresh tomatoes, 20% of peppers, and 7% of fresh cucumbers sold in the U.S. were greenhouse grown.¹ The percent has continued to grow since then and some suggest that most tomatoes in the U.S. grocery market today are greenhouse grown, largely because of their superior flavor.² Other crops like eggplants, lettuce, and herbs are also grown in greenhouses, though in smaller quantities.

How much of greenhouse grown product is produced hydroponically?

Virtually all of the high-tech greenhouses are grown hydroponically without dirt. Growers use a combination of sawdust, coconut fiber and rockwood for growing their plants.³ With a soilless system, growers can eliminate soil-borne diseases and pests and can better control water and nutrients at the plants' roots.

Given the investment, what is the average cost of a greenhouse product versus one that is grown outdoors?

The premium for greenhouse-grown is normally around 25% at wholesale.⁴ Retail costs vary widely depending on location and product. Commercial greenhouse vegetable production serving the North American market started in Canada in the early 1990s, but Mexico has since surpassed Canada as the leading producer of greenhouse tomatoes, peppers and cucumbers.¹ US production accounts for roughly 3% of the total. Mexico uses low-cost shade house construction which keeps prices competitive.

Is there any measure on the environmental impact of greenhouse grown?

Building a greenhouse is very expensive, but greenhouses use 85% less water, conserve soil, avoid erosion, and use integrated pest management with no or limited chemicals.⁵ Growers can grow 10-20 times the amount of vegetables in the same area as field grown, and can grow produce almost year around.¹ In most cases, air conditioning is not necessary and when it is, an evaporation system keeps the temperature down. Heating is the bigger need. Growers use high efficiency boiler systems to heat their greenhouses.

REFERENCES:

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5. "Greenhouse industry continues to evolve in goal of creating outstanding tomato profile," *The Produce News*, Feb 23-Mar 9, 2015, pg 51.