

THE ECONOMIC
CONTRIBUTION OF THE
**CONNECTICUT
GREENHOUSE
INDUSTRY**
TO THE STATE ECONOMY
2017-2020

A REPORT BY
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FARM CREDIT EAST





INTRODUCTION

Connecticut has a large and vibrant greenhouse sector. Greenhouse growing, also referred to as Controlled Environment Agriculture (CEA), is the practice of producing crops under protective coverings, such as a glass or plastic-covered structure, where the plants' growing environment is precisely controlled, typically by heating in the winter and cooling in the summer. Sometimes additional climate controls are used, such as supplemental lighting, humidity or atmospheric controls.

The greenhouse industry spans both the ornamental horticulture industry as well as the fruit and vegetable sector. The majority of greenhouse crops grown in Connecticut are ornamental crops, but vegetable production in greenhouses is a growing segment of the industry. Both ornamental crops as well as fruits and vegetables fall within the USDA definition of "specialty crops."

TABLE 1: CROPS GROWN UNDER GLASS OR OTHER PROTECTION, 2017

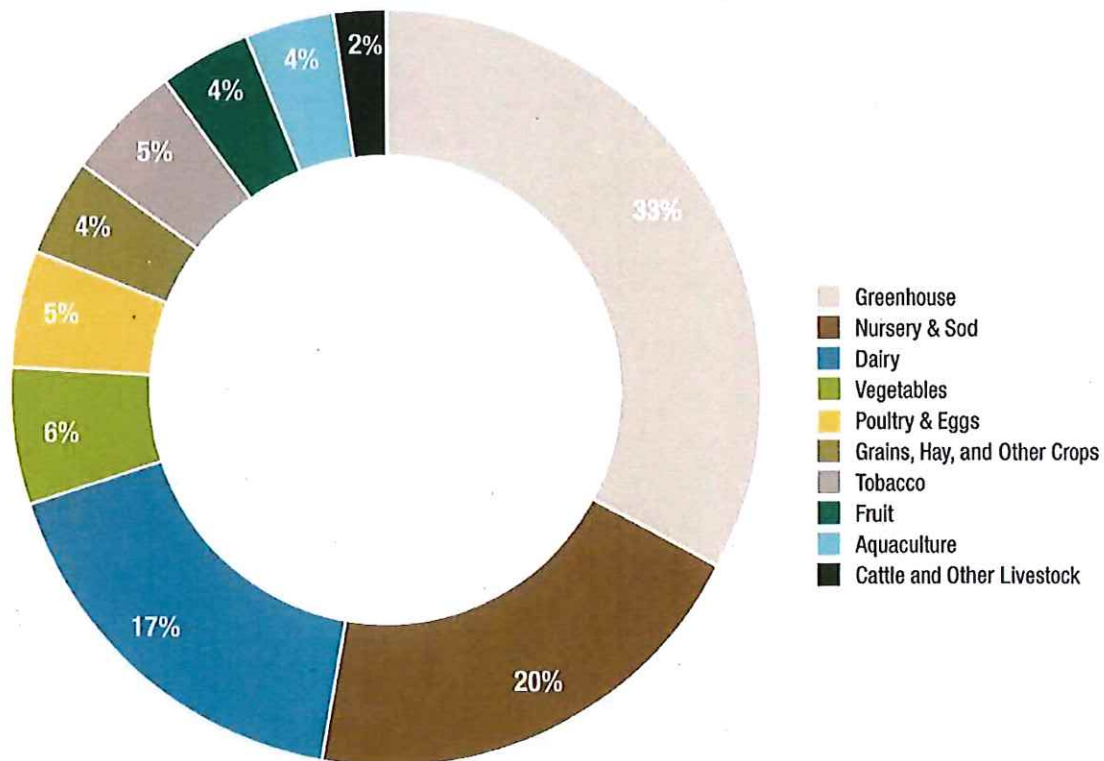
TYPE OF CROP	NUMBER OF FARMS	SQUARE FEET	VALUE OF SALES
BEDDING/GARDEN PLANTS	334	9,644,396	\$ 157,141,759
CUT FLOWERS	40	190,394	\$ 971,986
INDOOR FOLIAGE	43	210,724	\$ 2,363,612
POTTED FLOWERING PLANTS	97	1,416,550	\$ 18,434,782
OTHER FLORICULTURAL CROPS	10	104,838	\$ 561,028
FLORICULTURAL SUBTOTAL	375 ¹	11,566,902	\$ 179,473,167
VEGETABLE TRANSPLANTS TO FARM FIELDS	49	85,971	\$ 238,106
FOOD CROPS GROWN UNDER PROTECTION	159	1,096,377	\$ 6,365,645
TOTAL	583	12,749,250	\$ 186,076,918

Source: USDA Census of Agriculture, 2017

¹Total does not add because many growers reported producing more than one type of crop



FIGURE 1: VALUE OF AGRICULTURAL PRODUCTION IN CONNECTICUT BY COMMODITY GROUPS



Source: USDA Census of Agriculture, 2017. Greenhouse category includes vegetables grown under glass or other protection.

As shown in Figure 1, according to the 2017 USDA Census of Agriculture, the greenhouse sector represents the largest portion of agricultural production in Connecticut by value of production, at approximately one-third of all agricultural receipts. Connecticut ranks 15th among U.S. states in greenhouse square footage.



**ECONOMIC CONTRIBUTION
TO THE
CONNECTICUT ECONOMY**



In August of 2021, Farm Credit East, in collaboration with the Connecticut Greenhouse Growers' Association (CGGA), compiled financial data from CGGA members to identify key financial metrics for the industry. Data from 21 greenhouse growers was examined, representing 11% of the total CGGA membership. While the selected growers represented a small number of producers, they included some of the state's largest growers, and collectively, the survey sample had \$150,724,142 in sales in 2020, representing approximately 64% of the sector's total estimated output.

The greenhouse sector has experienced remarkable growth since the 2017 census was taken. In order to estimate the increase in greenhouse revenue between 2017 and 2020, a panel data set was assembled consisting of the identified growers' sales volumes in the years 2017, 2018, 2019 and 2020. Some individual growers saw sales declines in some years, and others saw substantial increases. The cumulative sales volume of the sample in each year was measured, and

from this, an annual growth rate was obtained. The sample had an aggregate annual growth rate of 5.33% in 2018, 3.73% in 2019, and 16.16% in 2020 (which was a remarkable year for the industry).

These growth rates were applied to the industry sales total from the 2017 USDA Census of Agriculture to estimate the sales volume growth for the industry since the census was taken, resulting in the sales estimates in Table 2. These sales estimates were then used to determine the sector's economic contribution to the Connecticut economy using IMPLAN software.

The economic activity created by the greenhouse industry begins with the actual output of the firms, but goes far beyond that, as it cascades through the local economy. Greenhouse businesses spend money on labor, inputs, taxes, and other goods and services. In turn, their suppliers and employees spend money within their communities, magnifying the impact of the initial economic activity.

²IMPLAN, Inc. Huntersville, NC. IMPLAN.com

It should also be noted that the greenhouse industry makes significant nonmonetary contributions to society and quality of life that are beyond the scope of this study. For example, landscaping of homes, cities and parks contributes significantly to property values and the quality of life in many communities, and provides ecosystem services, such as improved air quality, stormwater mitigation and improved aesthetics. Landscapes, flowers and gardens provide aesthetic appeal and recreational opportunity that enhance the human experience.

Measuring the economic impact of an industry sector requires an appropriate input-output model that captures the interlinkages among sectors of the economy, in this case for the State of Connecticut. To this end, we used the most widely accepted input-output model, IMPLAN. The IMPLAN software estimates the economic impacts of business and commerce in three main ways:

- *The Direct Effects* of the industry: This is the direct economic activity and employment generated by the firms analyzed. For example, sales generated by a grower or wages paid by the greenhouse industry.
- *The Indirect Effects*: This is the spending that occurs by the industry or firms impacted. In other words, the business-to-business effects, such as the impact of greenhouse production on suppliers or utilities. This spending supports both local and out-of-state businesses as a firm purchases production inputs, but the focus here is on state impacts.
- *Induced Effects*: These are the economic impacts created by the spending of employees and owners of the industries impacted as they purchase household goods and services and support the state economy.

The sum of these three effects comprises the total effects or total economic contribution of the industry being analyzed. IMPLAN examines the impacts of changes in sectoral activity via built-in multipliers, based on input-output tables of the economy. These multipliers are unique to each industry sector and each year. They identify the change in state output, value added, and jobs associated with a unit of change in direct spending or sales in a specific sector or industry of the economy. The economic multiplier is a way to quantify the total contribution (direct, indirect and induced) by indicating the impact on the economy for each dollar of output generated by the industry. It is calculated by dividing the total contribution by the direct output.

Table 2 details the economic contribution of the greenhouse sector to the state's economy for the years 2017-2020. In 2020, the industry generated an estimated \$236 million in sales, and contributed approximately \$390 million to the economy of Connecticut. The economic multiplier for the four years studied averaged 1.7, meaning that for every dollar of sales made by greenhouse growers in Connecticut, approximately 70 cents of additional economic activity was generated throughout the broader state economy. Economic multipliers vary by industry sector and typically range from about 1.4 to 2.1.

TABLE 2: ECONOMIC CONTRIBUTION OF THE GREENHOUSE SECTOR TO THE CONNECTICUT ECONOMY, 2017-2020

YEAR	DIRECT OUTPUT ³	INDIRECT ⁴	INDUCED	TOTAL ECONOMIC CONTRIBUTION	ECONOMIC MULTIPLIER
2017	\$ 186,076,918	\$ 58,708,141	\$ 73,947,918	\$ 318,732,977	1.71
2018	\$ 195,985,571	\$ 66,500,476	\$ 77,632,561	\$ 340,118,608	1.74
2019	\$ 203,298,489	\$ 56,380,661	\$ 76,671,647	\$ 336,350,797	1.65
2020	\$ 236,142,329	\$ 65,268,646	\$ 88,655,170	\$ 390,066,144	1.65

Sources: USDA Census of Agriculture, Farm Credit East, IMPLAN

³2017 output was obtained from the USDA Census of Agriculture. 2018-2020 output was estimated based on industry growth rates. See text for more detail.

⁴See text for definitions of Indirect and Induced impacts.

TABLE 3: EMPLOYMENT CONTRIBUTION OF THE GREENHOUSE SECTOR IN CONNECTICUT, 2017-2020

YEAR	DIRECT EMPLOYMENT ⁵	WORKER INCOME ⁶	TOTAL JOBS SUPPORTED	WORKER INCOME ⁷	JOBS MULTIPLIER
2017	2,830	\$ 79,347,054	3,733	\$ 130,151,729	1.32
2018	3,118	\$ 80,049,648	4,061	\$ 134,020,913	1.30
2019	3,045	\$ 82,033,707	3,935	\$ 132,416,005	1.29
2020	3,476	\$ 95,286,643	4,492	\$ 153,550,203	1.29

Source: IMPLAN

TABLE 4: TAX IMPACT OF THE GREENHOUSE SECTOR IN CONNECTICUT, 2017-2020

YEAR	TAX IMPACT: FEDERAL	TAX IMPACT: STATE	TAX IMPACT: MUNICIPAL ⁸	TOTAL TAX IMPACT
2017	\$ 29,868,177	\$ 7,769,078	\$ 5,288,616	\$ 42,925,871
2018	\$ 28,724,854	\$ 7,832,926	\$ 4,768,148	\$ 41,325,928
2019	\$ 29,952,117	\$ 9,689,635	\$ 7,809,302	\$ 47,451,054
2020	\$ 34,625,530	\$ 11,201,503	\$ 9,027,783	\$ 54,854,816

Source: IMPLAN

Table 3 details the jobs supported by the greenhouse industry both through direct employment and through indirect and induced economic activity. In 2020, the greenhouse industry had approximately 3,500 direct employees and supported 4,500 jobs in the economy. The jobs multiplier for the green industry was 1.3, which means for every 10 direct employees in the industry, an additional three jobs were supported elsewhere in the state's economy.

Table 4 details the 2017 tax impact of the greenhouse industry. Both the local and federal tax impacts of the industry were significant. The state and local tax impact is comprised of property taxes, which are generally submitted to municipalities; sales taxes, which are generally submitted to the state; and other state and local taxes, such as vehicle excise taxes and other miscellaneous taxes and fees. Overall, in 2020, the industry contributed more than \$20 million in state and local taxes and nearly \$35 million in federal taxes, for a combined total of \$55 million.

⁵Includes full- and part-time or seasonal jobs

⁶Represents wages received by direct employees

⁷Represents wages received by both direct and supported employees

⁸Includes property taxes paid



RISING COSTS





Although the Connecticut greenhouse sector has seen rising revenues in recent years, it faces challenges with rising costs of inputs and doing business. While Connecticut does offer certain advantages in terms of proximity to consumer markets, it can also be a challenging location to run a business.

In a 2019 analysis by the financial network CNBC, Connecticut was ranked 35th in overall business climate among U.S. states, and 43rd in cost of doing business.⁹ CNBC noted that Connecticut ranked highly in education and technology but gave the state a grade of “D” in cost of doing business as well as economy, and a “D+” in infrastructure.

One aspect of the state’s high cost of doing business is the cost of labor in Connecticut. In 2019, the state passed a law increasing the minimum wage five times over a five-year period, going from the then-rate of \$10.10 per hour to \$15.00 in June of 2023, a 49% increase. Thereafter, the minimum wage will be indexed to the U.S. Department of Labor’s Employment Cost Index, mandating further increases. Connecticut’s median hourly wage of \$21.68 ranked third among U.S. states, after Alaska and Massachusetts.¹⁰ While this is positive in terms of consumer spending power, it puts local growers at a disadvantage when product can be easily brought in from lower-wage states.

Beyond the cost of labor, the availability of workers is also a challenge in Connecticut. The greenhouse industry offers a number of jobs at a wide range of skill levels, ranging from entry-level laborers, to higher-skilled technicians and growers, to sales and management positions. Growers across the state report that finding and retaining employees at all skill and experience levels represents a significant challenge and a barrier to growth of the sector.

Input costs are also a major headwind for the industry. Energy and utility costs in Connecticut are consistently some of the highest in the nation. The greenhouse sector uses packaging inputs such as plastics and cardboard, both of which have significantly increased in price recently. The U.S. Bureau of Labor Statistics Producer Price Index for Plastics and Resins Manufacturing increased by 46% from July 2020 to July 2021, hitting a new record high.¹¹

These price increases and supply constraints represent serious challenges for the Connecticut greenhouse industry. While top-line revenues have increased over the past four years, costs have also risen substantially, and qualified employees are becoming increasingly difficult to find. These factors have squeezed margins for greenhouse growers in the state and make their businesses more difficult to operate profitably.

⁹<https://www.cnbc.com/2019/07/10/americas-top-states-for-business-2019.html>

¹⁰<https://www.governing.com/archive/wage-average-median-pay-data-for-states.html>

¹¹<https://fred.stlouisfed.org/series/PCU325211325211>



SUMMARY



Connecticut has a large and vibrant greenhouse sector. Greenhouse growing, also referred to as Controlled Environment Agriculture (CEA), spans both the ornamental horticulture industry as well as the fruit and vegetable sector. The majority of greenhouse crops grown are ornamental crops, but vegetable production in greenhouses is a growing segment of the industry. Both ornamental crops as well as fruits and vegetables fall within the USDA definition of "specialty crops."

The greenhouse industry makes significant contributions to the state economy and employment base of Connecticut. It is the largest agricultural sector in the state, representing approximately one-third of all agricultural output by value, followed by nursery and sod, dairy, and other sectors.

The Connecticut greenhouse industry consists of 583 firms growing on nearly 13 million square feet of production space. In 2020, the Connecticut greenhouse industry had an estimated \$236 million in revenue and contributed \$390 million to the state's economy. The economic multiplier for the greenhouse industry averaged 1.7, meaning that for every dollar in greenhouse sales, approximately 70 cents in additional economic activity is generated in the broader economy.

The industry employed roughly 3,500 people and supported nearly 4,500 jobs through both direct employment and economic impact. Workers employed by the greenhouse sector earned \$95 million in wages, while the industry supported nearly \$154 million in wage earnings throughout the economy. The jobs multiplier of the greenhouse sector was 1.3, meaning that for every 10 workers directly employed by the industry, an additional 3 jobs were generated elsewhere in the economy.

The greenhouse industry also has a significant impact on local, state and federal tax revenues. The industry had a combined tax impact of nearly \$55 million in 2020. The industry generated \$35 million in federal tax revenues, \$11 million for the state of Connecticut and \$9 million for municipalities throughout the state.

While the Connecticut greenhouse industry is a significant contributor to the state's economy and has seen an average growth rate of 8.4% over the past four years, rising costs and shortages of available workers constrain the industry and present challenges for future growth and profitability. Connecticut labor costs are higher than those in other states and continue to increase. Prices for greenhouse production inputs have also seen sharp increases in recent years.

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