



Economic Impacts of Connecticut's Agricultural Industry

A Report by
The Department of Agricultural
and Resource Economics

In Cooperation with
The Connecticut Center
for Economic Analysis

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STUDY HIGHLIGHTS

Scope and Methodology

The purpose of this study is to ascertain and document the importance of agriculture and related industries to Connecticut's economy.

The agricultural industry is defined as encompassing crop and livestock production, forest products, and the processing of the state's agricultural production. The study excludes

secondary sectors, such as landscaping and groundskeeping, and agricultural processing that does not use Connecticut agricultural inputs, such as bakeries and distilling, which are economically important but, if included, would overstate the projected output and job impacts attributable directly to the state's agriculture.

Because the agricultural industry purchases goods and services from other industries and hires local labor, its economic impact cascades throughout the state's economy. Agriculture support

services include feed suppliers, veterinary services, equipment manufacturers and repair, and financial services. Farm businesses also support short-term contractual jobs such as in engineering, construction, plumbing, electrical work, and inspection.

In addition, this study does not include the value of ecosystem services, scenic views, and social benefits derived from the agricultural industry's 405,616 acres of land in farms. These non-market benefits are significant and are in addition to the measured economic benefits of the industry.

Using direct sales of the agricultural industry for 2007, this study estimates the total economic impact of agriculture through the use of three economic models of the Connecticut economy. Two are input-output models that translate direct sales into statewide output and jobs to account for agriculture's purchase of goods and services from other industries. The third is a statistical model of the entire state economy that measures agriculture's importance by estimating the loss of output and jobs if the sector were removed from the state's economy.

Results of the Analysis

In 2007 this analysis reveals that the **total impact of Connecticut's agricultural industry** on the state economy (\$212 billion Gross State Product) was up to **\$3.5 billion**, measuring the value of agricultural output as statewide sales generated directly from the industry and through spillover effects on other industries impacted. In addition, the industry contributes about \$1.7 billion in value added, which is the difference between the value of output and the cost of raw materials, i.e., the money left in the hands of residents and business taxes, both of which stay in Connecticut.

- The estimated output impact translates into approximately **\$1,000 per Connecticut resident**.
- **Every dollar** in sales in this industry **generates up to an additional dollar** in the state economy.

The Connecticut agricultural industry **generates approximately 20,000 jobs statewide**.

- Every million dollars of the agricultural production sector's direct sales generates 13 to 19 jobs.
- Agricultural production is more labor intensive than agricultural processing, generating two-thirds of the industry's jobs.

In sum, the agricultural industry has a critical, significant impact on the economy of Connecticut in output, jobs, and the quality of life: **\$3.5 billion in output, 20,000 jobs, and significant social benefits and ecosystem services.**





ECONOMIC IMPACTS OF CONNECTICUT'S AGRICULTURAL INDUSTRY



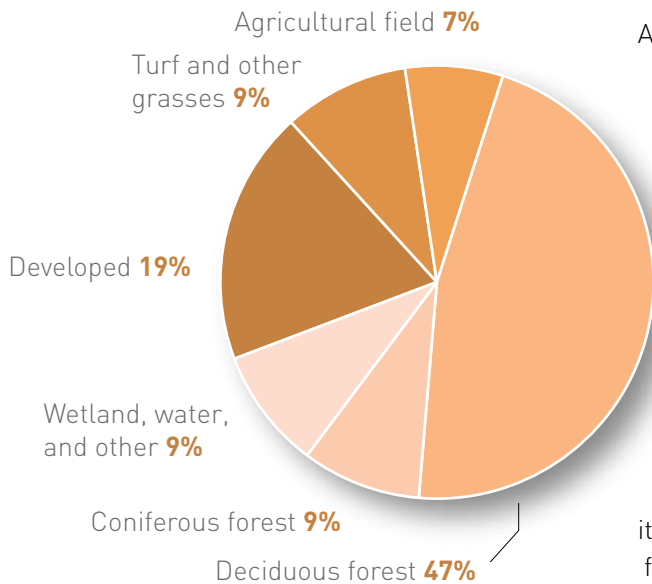
INTRODUCTION

The purpose of this study is to ascertain and document the significance of agriculture and related industries to Connecticut's economy. This study defines the Connecticut agricultural industry as encompassing crop and livestock production, forest products, and primary agricultural processing tied to the state's agricultural production. Because this industry buys goods and services from other industries in the state and hires local labor, its economic impacts cascade throughout the entire state economy.

Using three models of the Connecticut economy, this analysis estimates the 2007 statewide economic impacts of the Connecticut agricultural industry as follows: Statewide sales are in the range \$2.7 to 3.5 billion, generating 16,650-22,753 jobs and approximately \$1 to 1.7 billion in value added. Additional impacts flow from ecological and social benefits from agricultural and forest production and related recreation, wildlife, and quality of life effects.

Figure 1

Total Land Cover in Connecticut (2006)



Total area = 3.18 million acres

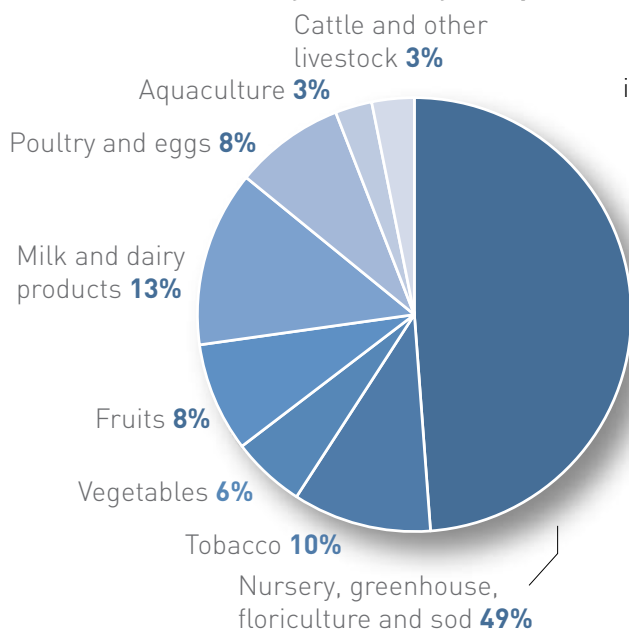
Source: Center for Land Use Education and Research (2006)

Connecticut's Agricultural Industry

Agriculture has been a critical component of the Connecticut economy since Colonial times, when its economy was comprised mainly of agriculture, fishing, lumber, and ship building. Today the importance of agriculture in the state economy is highly visible through not only farms, but also associated forests and primary agricultural processing.

Connecticut's geographical area is approximately 3.18 million acres, making it the third smallest state in the U.S. (ahead of Delaware and Rhode Island). In spite of the state's relatively small size, its agriculture continues to thrive, and the amount of farmland currently accounts for 405,616 acres, slightly over 13% of total area (USDA, 2007, page 16, table 8). Forests cover more than half of Connecticut's area (Figure 1).

Figure 2 2007 Sales of Agricultural Products by Commodity Groups



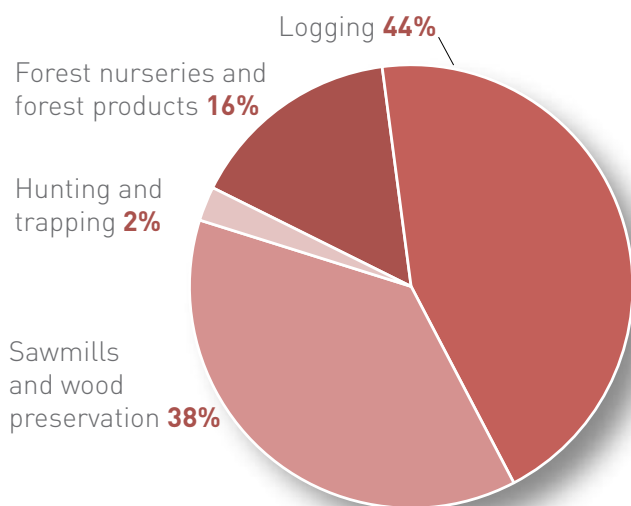
Total sales = \$551.6 million

Source: USDA (2007), page 9, table 2

Moreover, despite its small size, Connecticut agriculture ranks third in New England in terms of agricultural sales at \$551 million in 2007 (USDA, 2007, page 7, table 1). Notably, the value of agricultural products sold has increased in real dollars since 1992. However, state agriculture not only is economically important but is also quite diverse, as illustrated in Figure 2.

In sharp contrast to agriculture nationwide, field crops comprise a minor share of agricultural sales, while the largest agricultural sectors are "green" industries (nursery, greenhouse, floriculture, and sod production), dairy farming, and tobacco. The average farm size is approximately 82 acres, largely small and medium size family farm operations (Lopez and Jeffords, 2010).

Figure 3 2007 Sales of Forest Products and Related Sectors



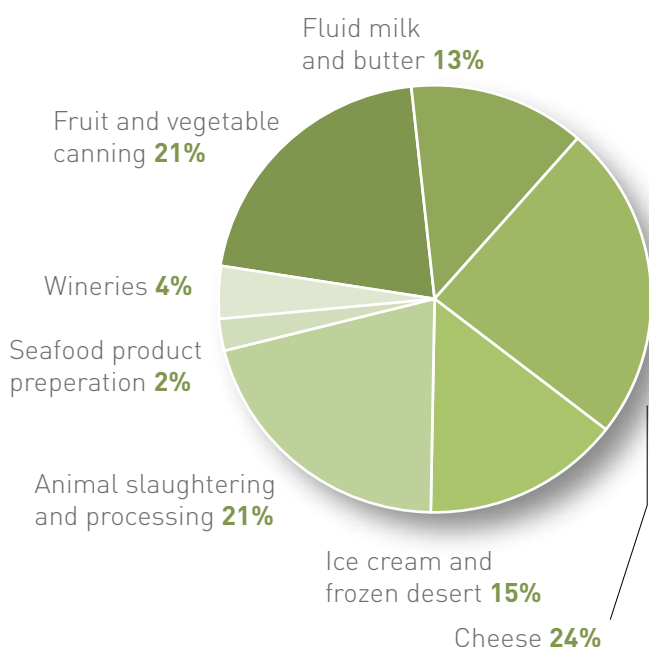
Sales of forest products account for approximately \$131.5 million in 2007 (Figure 3), equivalent to half of the greenhouse and nursery industry (the largest agricultural production sector) or 25% of the state value of crops and livestock products. Thus, forestry-related output and employment are also an important component of the economy. By far, however, the main benefits from forests come from providing open space to state residents, given that they cover more than half of the state's geographical area.

Total sales = \$131.5 million

Source: Federal government data as reported in IMPLAN (2007)



Figure 4 2007 Sales of Primary Agricultural Processing Sectors



Dairy processing leads primary agricultural processing, accounting for more than half of agricultural processing, followed by animal slaughtering and fruit and vegetable canning with nearly identical shares at 21% each (Figure 4). Wineries, with sales of \$38 million in 2007, are enjoying rapid growth and popularity in response to increased demand for local wines, which in turn has increased derived demand for local grapes.

Total sales = \$955 million

Source: Federal government data as reported in IMPLAN (2007)



METHODOLOGY

Economic Models Used

This study uses three standard models of the Connecticut economy to capture the scope of the agricultural industry, its linkages to the rest of the state economy, and to assess its contribution to statewide output and jobs. The three models are:

1. **IMPLAN** (IMpact analysis for PLANning: Minnesota IMPLAN Group, Inc.)
2. **RIMS II** (Regional Input-Output Modeling System: U. S. Department of Commerce)
3. **REMI** (Regional Economic Modeling, Inc.)

IMPLAN and RIMS II look at incremental impacts as the sector increases or decreases in activity via built-in multipliers based on input-output tables of the economy. They both use multipliers that express the change in the level of state output and jobs associated with a unit change in direct sales from a specific sector or industry of the economy. An important feature of the IMPLAN and RIMS models is that they focus on “supply” to an industry, treating the sector of interest as the point of final “demand.” For example, using these models, the impact of the dairy cattle and milk production sector on the fluid milk manufacturing sector would be minimal (except through indirect and induced impacts as defined below), but the impact of the latter on dairy cattle and milk production would be fully accounted for as it is treated as a supplier.

In addition to the above supply chain impacts, REMI is an econometric model of the state economy. REMI estimates economic impacts by assessing the loss of output and employment (including its impact on migration) when a sector is removed from the economy. Thus, rather than focusing on the impact on suppliers, it is concerned with overall statewide impacts. REMI treats employment impacts in a more flexible fashion as it allows migration and job relocation across sectors within the state. Thus, a worker who loses his or her job in the greenhouse industry may end up working at a grocery store, for example, and will not be accounted for in the economy-wide job impacts as the model treats this as a transfer rather than a loss.

The models use as input the direct sales from a sector or the agricultural industry and calculate economy-wide impacts through multipliers (RIMS, IMPLAN) or simulation (REMI), (see Table A1 of the appendix). Note that to the extent that some cash and bartering transactions and self consumption are not reported, particularly by small farmers, direct sales of the agricultural production sector might under-represent the total value of production and therefore the corresponding impacts. Although all three models offer insights into the economic importance of a particular sector of the economy, they differ in some underlying assumptions and in the level of sophistication of the analysis. For completeness, the study reports the outcomes of analyses using all three models.

Sectors Included

Following standard practice, this study relies on the U.S. Department of Commerce (USDC) classification of sectors of the economy. This classification divides the economy into 440 sectors. This analysis takes all sectors classified as agricultural and forestry production and primary agricultural processing to define the scope of the state's agricultural industry. This process results in 24 sectors, described in Table A2 of the Appendix. Note that the IMPLAN and RIMS models are based precisely on the USDC classification. Thus, their multipliers (shown in Table A1 of the Appendix) were readily available. REMI collapses the 440 sectors into 53; a subset of them was closely matched to the 24 USDC descriptions. Examples include grain farming, greenhouse, nursery, and floriculture production, dairy cattle and milk production, cheese manufacturing, and wineries.

The decision to select sectors for inclusion in the scope of this study was based on the USDC classification for agriculture and forestry and, for agricultural processing, the extent of its linkages to state farming. For example, landscaping and

grounds-keeping services, an economically important sector classified as agriculturally-related by the Connecticut Department of Labor, was not included because the U.S. Department of Commerce does not include it as such and to preserve a consistent definition of the scope of agriculture. The Connecticut Department of Labor (2006) projected that this sector would account for more than 14,000 jobs in 2006. Some economically important Connecticut food and beverage processing sectors are also excluded from this study because they do not use agricultural commodities produced in the state in any significant way; examples of such "secondary processing" are chocolate, confectionary, and bakery product manufacturing and distilleries. In 2007, the total sales of excluded food and beverage industries was about \$ 4.7 billion and they employed 6,749 people (IMPLAN, 2007). Including secondary food and beverage processing that do not use state agricultural production would overstate the contribution of agriculture to the state economy.

Measures of Impacts

Using the above models, the study develops three indicators of the economic importance of the agricultural sector:

- **Total impact on state output**, the value of which is measured by statewide sales;
- **Total impact on state employment**, which includes full-time and part-time jobs generated; and
- **Total impact on value added**, which measures the value added to raw materials either at the agricultural or forest production stage or in primary agricultural processing.


Although the primary focus is on the total impacts at the state level, this report also discusses impacts at the county and subsector levels.

For example, the economic importance of the greenhouse, nursery, floriculture and sod production industry (greenhouse and nursery for short) in Connecticut is not limited to the \$269 million worth of goods and services sold by that sector (the *direct impact*). That sector's effect extends to other sectors of the economy (e.g., the transportation and utility sector) because greenhouse and nursery businesses buy goods and services from those other sectors (the *indirect impact*). Also, employees of the greenhouse and nursery establishments likely spend a major portion of their earnings buying goods and services from firms within the state (the *induced impact*). The total sales impact of the greenhouse and nursery industry is the sum of the direct, indirect, and induced impacts. The same reasoning applies to employment and value added impacts of the industry. In the data appendix (Table A1), the RIMS and IMPLAN multipliers are applied to direct sales in the greenhouse and nursery subsector to obtain the total impact on state output, employment and value added.

The REMI model uses direct sales of the entire agricultural industry to assess the impact on statewide output and employment when the agricultural sector is removed. Sector by sector REMI's impacts were not computed due to time and budget constraints, as this would require detailed analysis of each sector. For comparison to RIMS and IMPLAN multipliers, the REMI multipliers are imputed based on the ratio of statewide impacts to direct sales.

Finally, it should be noted that the estimated impacts are limited to Connecticut's economy. For example, if an apple orchard in Connecticut purchases pesticides from a firm in Massachusetts, the indirect impact of this transaction will not be felt in the Connecticut economy.





RESULTS

Total Output Impacts

As shown in the third column of Figure 5, the **total output impact** (i.e., sales) of the agricultural industry is estimated by the three models to be **between \$2.72 and \$3.51 billion in 2007, with an average of \$3.09 billion, in an economy of \$212 billion in Gross State Product** in that year, roughly the size of the economy of Ireland or Israel. These estimated output impacts are significantly higher than the \$2 billion figure used in political circles in the legislature. **On a per capita basis, the agricultural industry generates approximately \$1,000 in sales per Connecticut resident.**

Breaking the total agricultural industry down, the impact of **the agricultural and forest production sector** (column 1) on the state's economy is **between \$1.15 and \$1.82 billion, or \$1.42 billion on average.** The RIMS II estimate for crops and livestock sales is in line with the RIMS estimate provided by Lee and Leonard (2004) for the year 2000. The models project the **impact of the primary agricultural processing sector** (column 2) **between \$1.57 and \$1.93 billion, with an average of \$1.75 billion, more than half coming from dairy processing** (see Figure 4).

Using REMI, the study also estimates the total output impacts of the agricultural industry for each county in Connecticut, as shown in Figure 6. Most of the output impacts are concentrated in the high manufacturing Fairfield, New Haven, and Hartford counties, together accounting for more than 80% of total output impacts.

Figure 5 **Total Output Impacts, 2007**

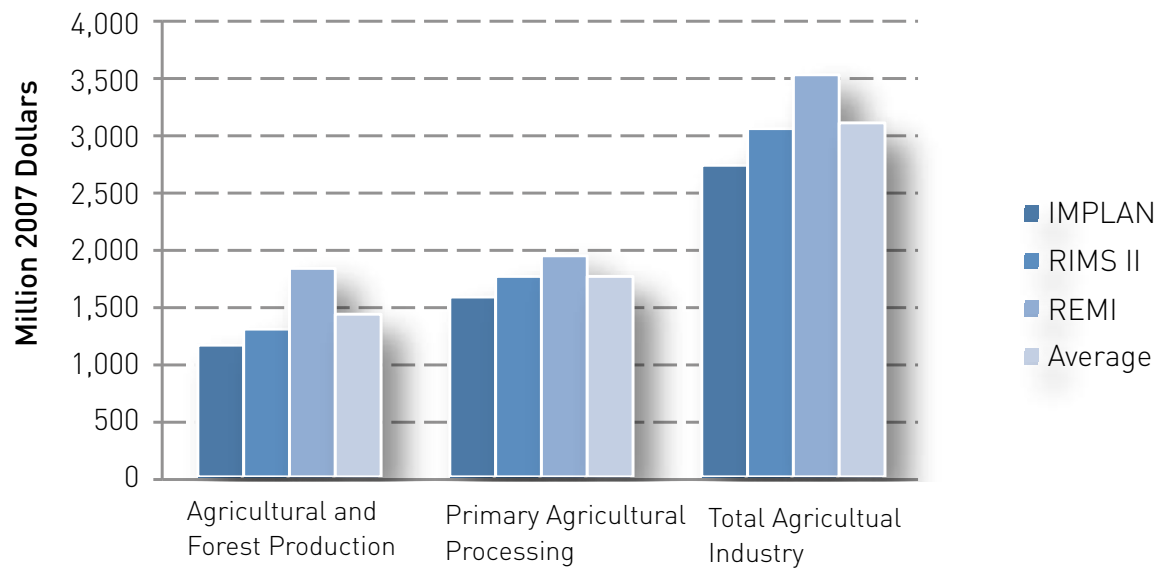


Figure 6 **Total Output Impacts at the County Level, 2007 (Based on REMI Results)**

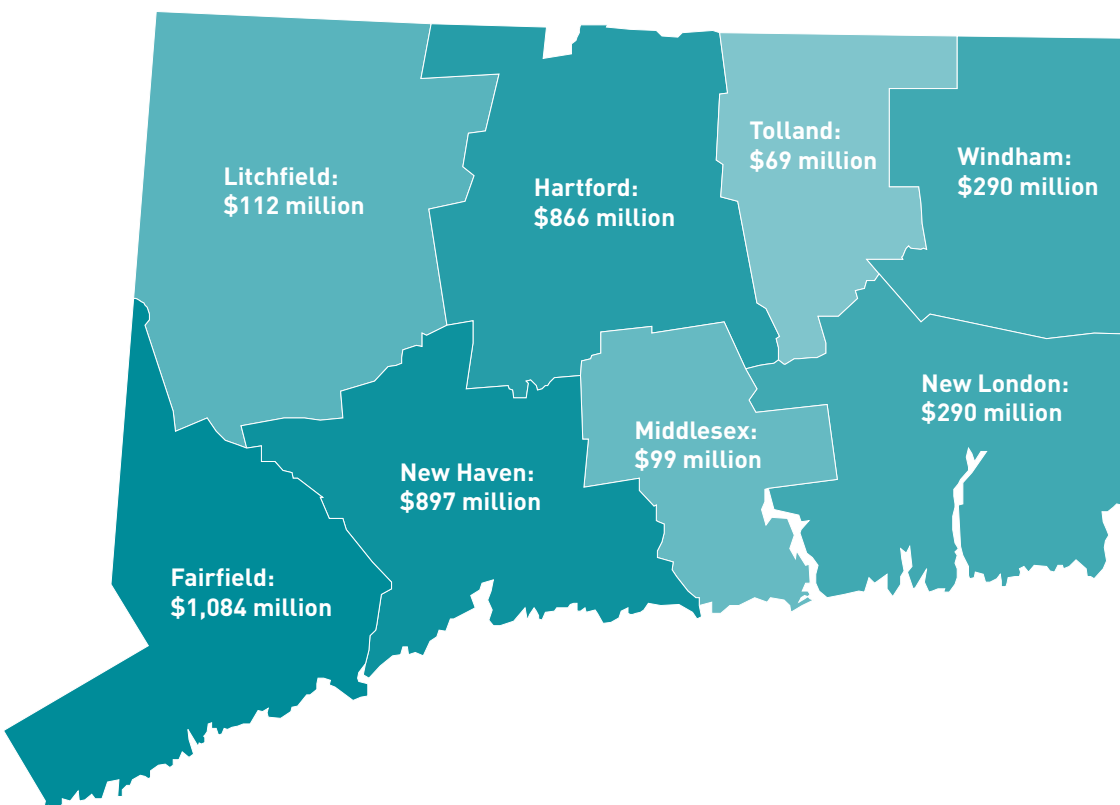


Table 1 Statewide Output Impact of Sectors in the Agricultural Industry

		2007 million dollars		
Sector		RIMS II	IMPLAN	REMI
Agricultural and forest production	Grain farming	2.6	2.1	–
	Vegetable and melon farming	37.8	31.0	–
	Fruit farming	56.9	46.6	–
	Greenhouse, nursery, floriculture, and sod	461.3	373.2	–
	Tobacco farming	106.0	85.3	–
	All other crop farming	59.0	48.5	–
	Cattle ranching and farming	16.1	15.2	–
	Dairy cattle and milk production	114.1	97.3	–
	Poultry and egg production	111.2	121.6	–
	Animal production (except cattle, poultry, and eggs)	58.8	60.0	–
	Forest nurseries, forest products, and timber tracts	30.0	25.3	–
	Commercial logging	83.0	75.8	–
	Sawmills and wood preservation	72.1	77.4	–
	Commercial fishing	58.9	42.6	–
	Hunting and trapping	5.5	4.9	–
	Support activities for agriculture and forestry	45.5	41.9	–
	Total for agricultural and forest production	1,290	1,150	1,820
Primary agricultural processing	Fruit and vegetable canning, pickling, and drying	371.0	327.4	–
	Fluid milk and butter manufacturing	220.0	206.9	–
	Cheese manufacturing	387.2	406.2	–
	Ice cream and frozen dessert manufacturing	274.4	240.3	–
	Animal (except poultry) slaughtering and processing	271.4	261.1	–
	Poultry processing	28.1	27.1	–
	Seafood product preparation and packaging	39.4	36.1	–
	Wineries	69.9	63.2	–
	Total for primary agricultural processing	1,750	1,570	1,930
Total for the agricultural industry		3,040	2,720	3,510
Some special sub-sectors	Cut Christmas trees	6.6	5.3	–
	Maple syrup production	1.4	1.1	–
	Horses and other equine production	6.8	6.9	–
	Aquaculture	21.3	21.7	–

Note: Sector by sector output impacts were not estimated for the REMI methodology due to time and budget constraints since this task would require a detailed analysis of each sector.



Table 1 presents more detailed IMPLAN and RIMS II estimates of statewide sales impacts from individual sectors of the agricultural industry (as noted above, REMI results are not available at the sector level). Table 1 shows that the greenhouse, nursery, floriculture and sod production; fruit and vegetable canning, pickling, and drying; cheese manufacturing; ice cream and frozen desserts manufacturing; animal slaughtering; and fluid milk manufacturing sectors generated the highest sales statewide. The estimates for the dairy industry as a whole (farming and processing) coincide with the estimates developed previously in the study by the Department of Economic and Community Development and the University of Connecticut (2009).¹

Table A1 of the appendix shows the RIMS and IMPLAN output and employment multipliers used in the analysis and notes the imputed REMI multipliers. The latter indicate that for every dollar of sales in the agricultural industry, the economy generates an additional dollar statewide. The corresponding IMPLAN and RIMS multipliers indicate a \$1.54 and \$1.72 return per dollar. These lower figures are not surprising because these input-output models focus narrowly on supply to the industry, defining final demand (output) at the state agricultural industry level rather than for the entire state economy.



¹Both Perry and Stack (2009) and Hall et al. (2005) present much larger estimates for the impact of the greenhouse industry due to the inclusion of landscaping and retail and distribution of ornaments, garden supplies and equipment, which are outside the scope of the present study. Reagan and Prisloe (2003) present larger estimates for the egg industry in 2003, starting from a larger direct sales figure than the federally reported one used in this study for 2007.

Total Employment Impacts

Figure 7 shows that the estimated impact of the total agricultural industry on state employment is between 16,650 and 22,753 jobs. The lower estimate by REMI is due to this model's allowance for migration and more flexible adjustment across sectors; that is, this model allows for the possibility of workers leaving the state or readily transferring to other industries should an industry vanish. Nonetheless, the number of jobs all three models estimate seems to be on the low side when compared to the jobs directly provided by the sectors included in the study, as reported by the USDA's Economic Research Service (2005) for 2002, the last year these statistics were reported. Thus, the jobs estimates should be considered conservative.

This study shows that Connecticut's agricultural industry is an important contributor to employment in the state. Agricultural and forest production activities generate two-thirds of the agricultural jobs, projected as ranging from 10,660 to 15,429 jobs, with an average across models of 13,258. Primary agricultural processing activities add another 5,637 to 7,324 jobs.

When comparing sectors, the highest job generator is greenhouse, nursery, floriculture and sod production (4,186 to 6,833 jobs), followed by cheese manufacturing; animal slaughtering and processing; fruit and vegetable canning, pickling and drying; tobacco farming; support activities for agriculture and forestry; fruit farming; and fluid milk manufacturing.

The multipliers presented in Table A1 of the Appendix reveal interesting information. Although it is not surprising that agricultural production is more labor intensive than primary agricultural processing, the agricultural production sector generates between 13 and 19 jobs per million dollars in sales, more than twice the jobs generated by agricultural processing (estimated to be between 6 and 7 jobs). Across sectors, the highest job creators per million dollars in sales are support activities for agriculture and forestry (31 to 59 jobs), greenhouse, nursery, floriculture and sod (15 to 28 jobs), tobacco farming (15 to 28 jobs), animal production (10 to 36 jobs), and commercial fishing (22 to 27 jobs).

Figure 7 Total Employment Impacts, 2007

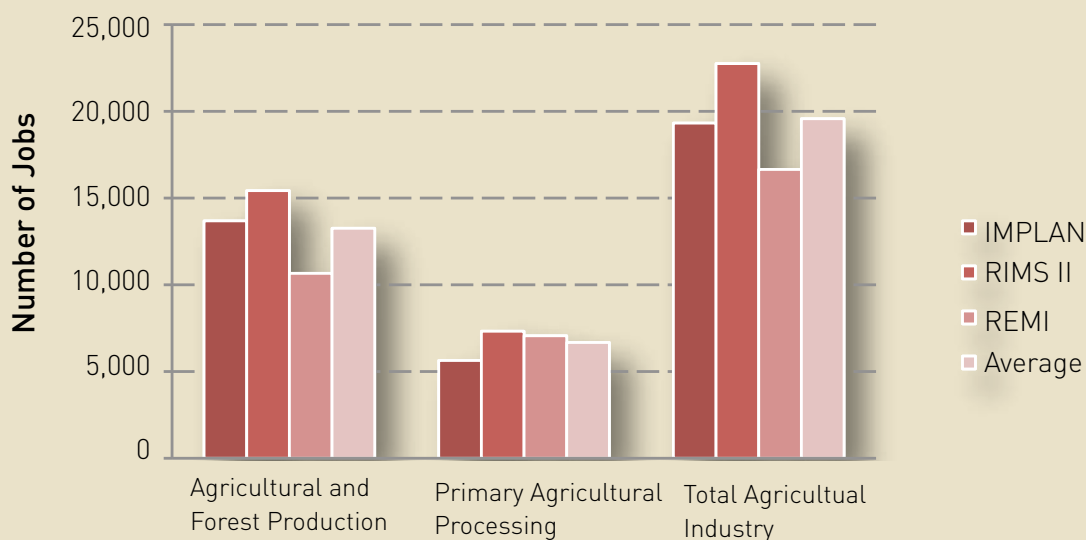


Table 2 – Statewide Employment Impact of Sectors in the Agricultural Industry

2007 million dollars

	Sector	RIMS II	IMPLAN	REMI
Agricultural and forest production	Grain farming	13	42	–
	Vegetable and melon farming	445	261	–
	Fruit farming	782	609	–
	Greenhouse, nursery, floriculture, and sod	6,833	4,186	–
	Tobacco farming	823	1,604	–
	All other crop farming	577	372	–
	Cattle ranching and farming	97	163	–
	Dairy cattle and milk production	1,060	1,000	–
	Poultry and egg production	647	596	–
	Animal production (except cattle, poultry, & eggs)	404	1,529	–
	Forest nurseries, forest products, and timber tracts	179	108	–
	Logging	658	578	–
	Sawmills and wood preservation	381	385	–
	Fishing	851	708	–
	Hunting and trapping	40	50	–
	Support activities for agriculture and forestry	789	1,495	–
	Total for agricultural and forest production	15,429	13,686	10,660
Primary agricultural processing	Fruit and vegetable canning, pickling, and drying	1,452	890	–
	Fluid milk and butter manufacturing	829	797	–
	Cheese manufacturing	1,612	1,442	–
	Ice cream and frozen dessert manufacturing	1,032	790	–
	Animal (except poultry) slaughtering & processing	1,146	1,163	–
	Poultry processing	136	134	–
	Seafood product preparation and packaging	177	172	–
	Wineries	319	248	–
	Total for primary agricultural processing	7,324	5,637	7,062
	Total for the agricultural industry	22,753	19,322	16,650
Some special sub-sectors	Cut Christmas trees	97	60	–
	Maple syrup production	13	9	–
	Horses and other equine production	47	178	–
	Aquaculture	146	553	–

Note: Sector by sector employment impacts were not estimated for the REMI methodology due to time and budget constraints since this task would require a detailed analysis of each sector.



Value Added Impacts

An important measure of the impact of an economic sector on the well-being of people in a state is the amount of value added to a product or service in that state. [Value added by an economic activity is the sum of: salaries and wages earned by all workers in the state, income received by self-employed individuals, payments received by individuals and corporations in the form of interest, rents, royalties, dividends, and profit, and indirect business taxes paid by individuals to businesses (IMPLAN, 2004).] Thus, much of the value added by an economic activity such as the agricultural industry sector in a state ultimately shows up as money in the hands of the residents of the state, which they can then spend buying goods and services. Inducing further economic activity in the state. The benefits of the value added by one economic sector, such as the agricultural industry in Connecticut, thus reach throughout the state's economy. It should be noted that the value added impact is a part of the output impact of agriculture reported above.

As shown in Figure 8, value added by the agricultural industry is in the range of \$1.04 to \$1.71 billion. The agricultural and forest production sub-sector adds value to the tune of \$0.61 to \$1.17 billion. This is more than the value added by the primary processing sub-sector (\$0.42 to \$0.70 billion), although the output impact of the primary processing sub-sector is larger than that of the production sub-sector. This may be attributable to the relatively higher use of out-of-state inputs by the processing sectors. Table 3 shows that the following sectors add significant value within the state: greenhouse, nursery, floriculture and sod production (the significant leader); cheese manufacturing; fruit and vegetable canning, pickling, and drying; and ice cream and frozen dessert manufacturing.

Figure 8 **Total Value Added Impacts, 2007**

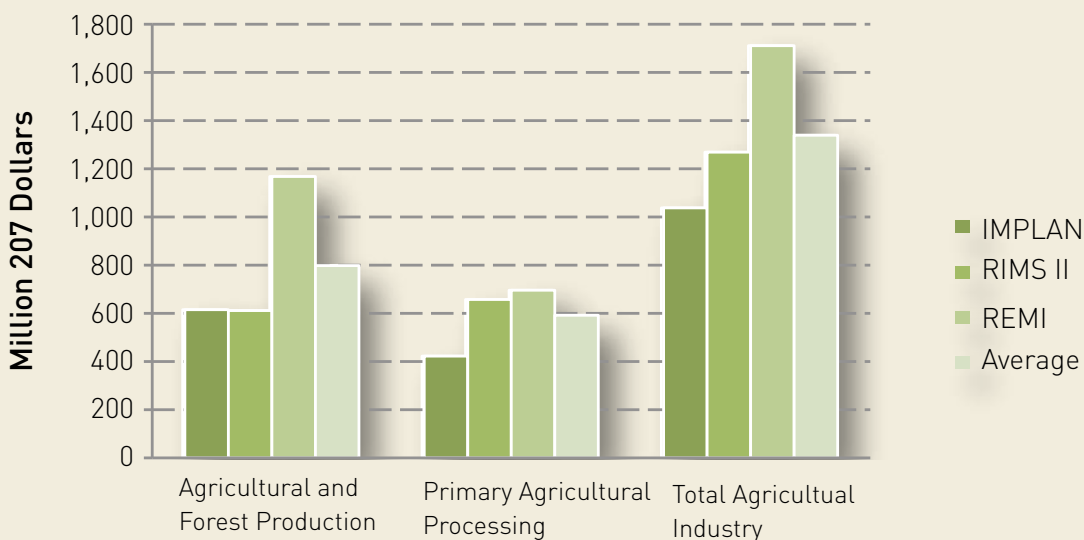


Table 3 – Statewide Value Added Impact of Sectors in the Agricultural Industry

2007 million dollars				
Sector		RIMS II	IMPLAN	REMI
Agricultural and forest production	Grain farming	1.1	0.5	–
	Vegetable and melon farming	20.3	12.8	–
	Fruit farming	31.2	27.3	–
	Greenhouse, nursery, floriculture, and sod	283.3	253.8	–
	Tobacco farming	40.8	26.4	–
	All other crop farming	25.8	19.4	–
	Cattle ranching and farming	4.9	4.4	–
	Dairy cattle and milk production	51.9	43.8	–
	Poultry and egg production	33.9	38.5	–
	Animal production (except cattle, poultry, and eggs)	31.4	32.9	–
	Forest nurseries, forest products, and timber tracts	13.5	15.3	–
	Commercial logging	35.0	43.5	–
	Sawmills and wood preservation	24.6	26.3	–
	Commercial fishing	35.4	31.4	–
	Hunting and trapping	2.7	3.2	–
	Support activities for agriculture and forestry	26.4	30.8	–
	Total for agricultural and forest production	611.5	615.2	1,168
Primary agricultural processing	Fruit and vegetable canning, pickling, and drying	144.3	93.5	–
	Fluid milk and butter manufacturing	74.7	58.4	–
	Cheese manufacturing	107.0	95.7	–
	Ice cream and frozen dessert manufacturing	105.5	74.7	–
	Animal (except poultry) slaughtering and processing	73.4	59.8	–
	Poultry processing	9.7	8.2	–
	Seafood product preparation and packaging	13.6	11.5	–
	Wineries	28.3	20.8	–
	Total for primary agricultural processing	657.5	422.5	696.0
Total for the agricultural industry		1,269	1,037.7	1,711.0
Some special sub-sectors	Cut Christmas trees	4.0	3.6	–
	Maple syrup production	0.6	0.4	–
	Horses and other equine production	3.6	3.8	–
	Aquaculture	11.3	11.9	–

Note: Sector by sector value added impacts were not estimated for the REMI methodology due to time and budget constraints since this task would require a detailed analysis of each sector

Non-traditional Impacts

The results presented above are confined to traditional economic impacts. In addition to the output (sales), employment, and value added impacts, the agricultural industry provides significant non-market social benefits and ecosystem services through its 405,616 acres of land in farms.

Social Benefits

By maintaining the rural and historical New England landscape that visitors to Connecticut find so attractive, working farms are integral to the state's tourism industry, which is major employer. Working farms define the scenery that people enjoy on country drives in the state. Local farms and farmland are valued for their tranquility and natural beauty, and this connection to nature via farmland scenery encourages well-being and social health. In addition, destinations such as wineries, pick-your-own orchards, pumpkin patches, and corn mazes help attract tourists. Finally, farmers' markets, farm stands, and farm-to-table events can boost sales for area businesses.

Ecosystem Services

Farmers and the land they steward provide a variety of ecosystem services and environmental benefits. Many agricultural products depend on good soils, favorable climate conditions, and clean water. A typical Connecticut farm's cropland, pasture, wetlands, and woodlands act as a natural filter for surface and subsurface water, and provide not only aquifer recharge areas but habitats for many land and aquatic species, pollination zones, feeding and breeding areas for local bird populations, and stopovers for migrating birds. Farmland helps to regulate soil nutrients and minimize flooding, and acts as a "sink" to sequester carbon and help curtail global warming.



CONCLUSION

This study is the first comprehensive effort to evaluate the impact of the Connecticut agricultural industry on the state economy, defining this industry as encompassing agricultural and forestry production and primary agricultural processing.

The Connecticut agricultural industry contributes up to \$3.5 billion in output per year to the state economy and generates approximately 20,000 jobs. Beyond this, the industry significantly contributes to enhancing the quality of life for Connecticut residents by providing important ecological and social benefits to Connecticut residents.

Although the goal was to provide an assessment of the economic importance of the agricultural industry as a whole, further study is needed to develop a full understanding of the contribution specific subsectors of the industry make and to quantify non-traditional benefits, particularly those stemming from land in farms and forestry. From a policy perspective, further study is needed on the effectiveness of policy instruments to spur the growth of the agricultural industry and preserve it for future generations, including the use of tax credits and subsidies, as well as the return to private and public investments to enhance economic viability. All these extensions are fruitful avenues of inquiry, but beyond the scope of this study.





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Table A1:
2007 Data and Multipliers for the Connecticut Agricultural Industry

	Sector	Direct Sales (\$2007 million)	Direct Employment (Number of jobs)	
Agricultural and forest production	Grain farming	1.547	38	
	Vegetable and melon farming	23.532	200	
	Fruit farming	35.081	507	
	Greenhouse, nursery, floriculture, and sod	269.351	3,354	
	Tobacco farming	56.696	587	
	All other crop farming	34.749	269	
	Cattle ranching and farming	11.068	133	
	Dairy cattle and milk production	75.577	843	
	Poultry and egg production	74.452	213	
	Animal production (except cattle, poultry, & eggs)	41.882	1,354	
	Forest nurseries, forest products, and timber tracts	20.511	49	
	Commercial logging	58.505	449	
	Sawmills and wood preservation	49.388	194	
	Commercial fishing	31.353	620	
	Hunting and trapping	3.268	35	
	Support activities for agriculture and forestry	25.086	1,374	
	Total for agricultural and forest production	812.046	10,219	
Primary agricultural processing	Fruit and vegetable canning, pickling, and drying	198.677	308	
	Fluid milk and butter manufacturing	125.911	201	
	Cheese manufacturing	229.411	306	
	Ice cream and frozen dessert manufacturing	141.259	278	
	Animal (except poultry) slaughtering and proc.	182.439	422	
	Poultry processing	16.226	73	
	Seafood product preparation and packaging	23.071	71	
	Wineries	37.877	106	
	Total for primary agricultural processing	954.871	1,765	
	Total for the agricultural industry	1,766.917	11,984.000	
Some special sub-sectors	Cut Christmas trees	3.840	48	
	Maple syrup production	0.801	6	
	Horses and other equine production	4.868	157	
	Aquaculture	15.142	490	

Notes: For REMI, the imputed output multipliers (ratio of statewide output impact to the direct sales of agriculture) for agricultural and forest production, primary agricultural processing, and the entire

	IMPLAN Multipliers		RIMS II Multipliers	
	Output Multiplier	Employment Multiplier (Jobs per million dollars)	Output Multiplier	Employment Multiplier (Jobs per million dollars)
	1.3512	27.2195	1.6783	8.4067
	1.3182	11.0773	1.6058	18.9137
	1.3283	17.3562	1.6226	22.2838
	1.3854	15.5416	1.7126	25.3696
	1.5038	28.2957	1.8691	14.5180
	1.3969	10.7127	1.6980	16.5996
	1.3728	14.7188	1.4540	8.7853
	1.2878	13.2283	1.5101	14.0217
	1.6330	8.0080	1.4930	8.6910
	1.4322	36.5061	1.4037	9.6439
	1.2327	5.2488	1.4605	8.7427
	1.2962	9.8715	1.4193	11.2393
	1.5677	7.8031	1.4590	7.7149
	1.3601	22.5649	1.8777	27.1393
	1.5086	15.3307	1.6694	12.2839
	1.6708	59.6088	1.8134	31.4404
	1.4162	16.8537	1.5886	19.0002
	1.6482	4.4801	1.8676	7.3075
	1.6429	6.3328	1.7470	6.5840
	1.7707	6.2865	1.6878	7.0277
	1.7014	5.5930	1.9427	7.3042
	1.4312	6.3749	1.4876	6.2811
	1.6726	8.2714	1.7331	8.3602
	1.5647	7.4345	1.7071	7.6819
	1.6686	6.5478	1.8463	8.4299
	1.6442	5.9034	1.8327	7.6701
	1.5394	10.9354	1.7205	12.8772
	1.3854	15.5416	1.7126	25.3696
	1.3969	10.7127	1.6980	16.5996
	1.4322	36.5061	1.4037	9.6439
	1.4322	36.5061	1.4037	9.6439

agricultural industry are 2.24, 2.02, and 1.99, respectively. The imputed employment multipliers (ratio of statewide employment impact to the direct sales of agriculture) are 13.13, 7.39, and 9.42, respectively. Note that direct employment data were not used in the calculations.

Table A2: Description of Sectors Included in the Study

Sector	Description
Grain farming	Raising dry peas and beans or corn; other grain farming
Vegetable and melon farming	Growing root and tuber crops or edible plants and/or producing root and tuber or edible plant seeds
Fruit farming	Apple orchards; grape vineyards; strawberry farming; berry (except strawberry) farming
Greenhouse, nursery, floriculture, and sod	Growing crops of any kind under cover and/or growing nursery stock and flowers
Tobacco farming	Tobacco farming, field and seed production
All other crop farming	Hay farming; all other miscellaneous crop farming (e.g. aloe)
Cattle ranching and farming	Raising cattle for both milking and meat production
Dairy cattle and milk production	Milking dairy cattle
Poultry and egg production	Breeding, hatching, and raising poultry for meat or egg production
Animal production, except cattle and poultry and eggs	Raising bees, horses and other equines, rabbits and other fur-bearing animals, and producing products such as honey and other bee products
Forest nurseries, forest products, and timber tracts	Operating timber tracts for the purpose of selling standing timber; forest nurseries and gathering of forest product
Logging	Cutting timber; cutting and transporting timber; producing wood chips in the field
Sawmills and wood preservation	Logs or bolts transforming into boards, dimension lumber, beams, timbers, poles, ties, shingles, shakes, siding, and wood chips; cutting and treating round wood and/or treating wood products made in other establishments to prevent rotting
Fishing	Commercial catching or taking of finfish, shellfish, or miscellaneous marine products from a natural habitat
Hunting and trapping	Commercial hunting and trapping; operating commercial game preserves, such as game retreats; operating hunting preserves
Support activities for agriculture and forestry	Crop harvesting primarily by machine, soil preparation, farm labor contracting, farm management services

Table A2 *continued*

Primary
agricultural processing

Sector	Description
Fruit and vegetable canning, pickling, and drying	Manufacturing canned, pickled, and dried fruits, vegetables, and specialty foods
Fluid milk and butter manufacturing	Manufacturing processed milk product, such as pasteurized milk or cream and sour cream and/or manufacturing fluid milk dairy substitutes from soybeans and other nondairy substances; creamery butter manufacturing
Cheese manufacturing	Manufacturing cheese products (except cottage cheese) from raw milk and/or processed milk products and/or manufacturing cheese substitutes from soybean and other nondairy substances
Ice cream and frozen dessert manufacturing	Manufacturing ice cream, frozen yogurts, frozen ices, sherbets, frozen tofu, and other frozen desserts (except bakery products)
Animal (except poultry) slaughtering, rendering, and processing	Slaughtering animals (except poultry and small game); meat processing from carcasses; rendering and meat byproduct processing
Poultry processing	(1) Slaughtering poultry and small game and/or (2) preparing processed poultry and small game meat and meat byproducts
Seafood product preparation and packaging	Canning seafood (including soup); smoking, salting, and drying seafood; eviscerating fresh fish by removing heads, fins, scales, bones, and entrails; shucking and packing fresh shellfish; processing marine fats and oils; and freezing seafood
Wineries	Growing grapes and manufacturing wines and brandies; manufacturing wines and brandies from grapes and other fruits grown elsewhere; blending wines and brandies

Notes: The following agricultural production sectors were excluded from the analysis because no direct sales were reported for these sectors in 2007: (1) oilseed farming, (2) cotton farming, and (3) sugar cane and sugar beet farming. Only the agricultural processing sectors shown in the table above were included in the analysis because these processing activities have strong linkages with agricultural production in the state. Thus the following food processing industries in Connecticut were excluded from this study even though these industries are active in the state as of 2007: (1) other animal food manufacturing, (2) fats and oils refining and blending, (3) breakfast cereal manufacturing, (4) chocolate and confectionery manufacturing from cacao beans, (5) confectionery manufacturing from purchased chocolate, (6) non-chocolate confectionery manufacturing, (7) frozen food manufacturing, (8) bread and bakery product manufacturing, (9) cookie, cracker, and pasta manufacturing, (10) snack food manufacturing, (11) coffee and tea manufacturing, (12) flavoring syrup and concentrate manufacturing, (13) seasoning and dressing manufacturing, (14) all other food manufacturing, (15) soft drink and ice manufacturing, (16) breweries, (17) distilleries, and (18) tobacco product manufacturing.



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