

Tennessee Ag & Forestry Stats

Economic Contributions of Agriculture and Forestry in Tennessee

Jamey Menard, Burton C. English and Kimberly Jensen
Agri-Industry Modeling & Analysis Group (AIM-AG)
Department of Agricultural and Resource Economics

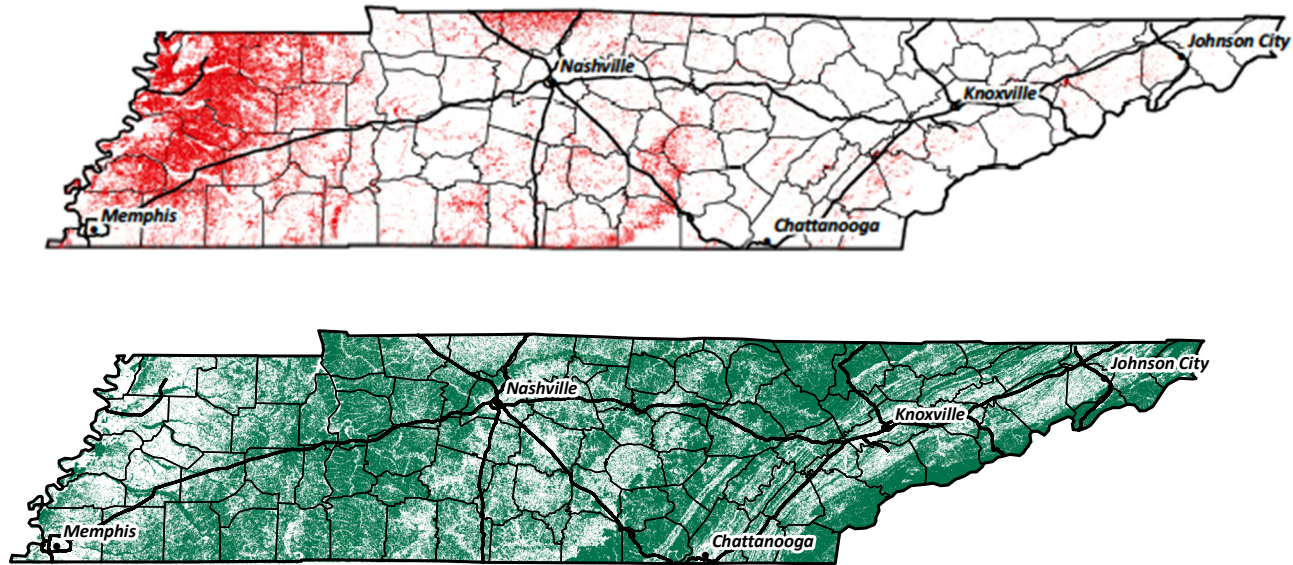
2021

AGRICULTURAL &
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UTIA INSTITUTE OF
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AIM-AG
Agri-Industry Modeling
& Analysis Group



**Jamey Menard, Research Leader
Burton C. English, Institute Professor
Kim Jensen, Professor
Department of Agricultural and Resource Economics**



Location of Cropland (*top*) and Forestland (*bottom*) in Tennessee, 2019

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**Department of Agricultural & Resource Economics
The University of Tennessee
2621 Morgan Circle
Knoxville, TN 37996-4518
(865) 974-7231**

RR 21-004-A

This work is supported by NIFA Hatch project accession number 1024362 project number TEN00574 from the USDA National Institute of Food and Agriculture. Any opinions, findings, conclusions, or recommendation in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture.

Executive Summary

Tennessee's agri-forestry industrial complex includes the primary industries typically associated with agriculture and forest operations such as growing crops, breeding and feeding of livestock, along with management and logging of trees. The industrial complex also includes both input supplying industries and value added-sub-sectors comprised of food and beverage manufacturing, apparel and textiles, and forestry products manufacturing (see Figure 1).

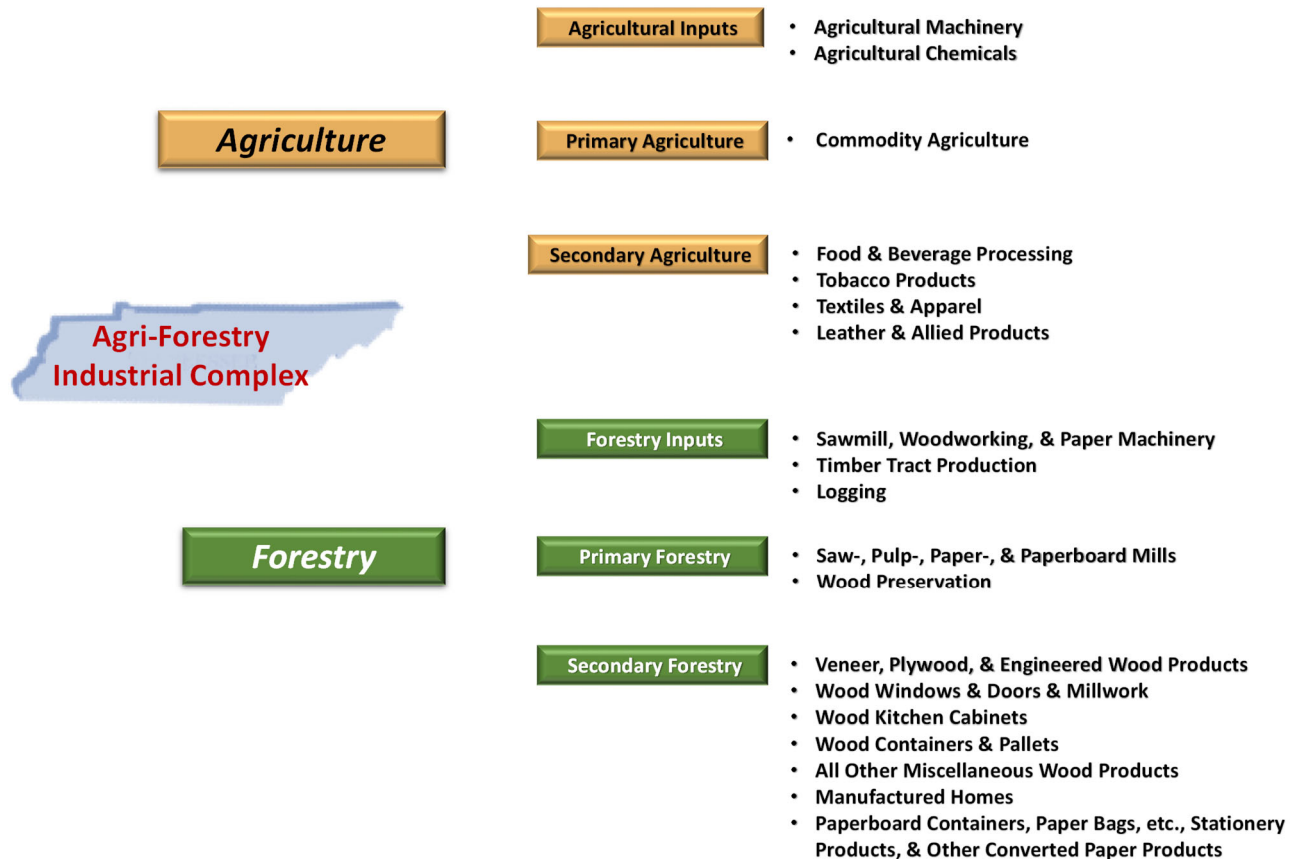


Figure 1. Graphic of Tennessee Agri-Forestry Industrial Complex used in this Analysis

In 2019, the agri-forestry industrial complex directly and indirectly (i.e., including multiplier effects) contributed \$78.0 billion to the Tennessee economy. In terms of gross output this value was 10.5 percent of the economic activity conducted in the state. An estimated 342,658 individuals work in industries comprising the complex, or 8.2 percent of total employment in Tennessee. Agriculture generated \$56.3 billion in output or 7.5 percent such activity in Tennessee provided 257,000 jobs, with 101,121 (both full- and part-time) jobs in agricultural production. Forestry included the management and logging of trees; sawmills (primary forestry products), including pulp and paper mills, plus forestry products manufacturing (secondary forestry products). Forestry accounted for 2.9 percent of the state's economy, employed over 85,500 Tennesseans, and generated \$21.7 billion in output.

The 2019 output and employment multipliers for agricultural commodities and forestry activities (i.e., logging, sawmills, and pulp-, paper-, and paperboard-mills) ranged from 1.107 to 1.930 for total industrial output (economic activity) and 1.029 to 4.479 for employment. The sawmill industry's output multiplier of 1.783 indicates that for every dollar invested in the sawmill industry, an additional \$0.783 of economic activity

is generated. The employment multiplier of 2.264 indicates that for every job created in the sawmill industry, an estimated 1.264 additional jobs are added in other industries.

For purposes of comparison, in 2019 Tennessee's economy totaled \$746.0 billion in output and had close to 4.2 million jobs. Industry sectors with larger magnitudes of direct economic activity other than the agri-forestry industrial complex were services (\$237.5 billion) and manufacturing (\$141.7 billion), real estate (\$61.6 billion), government (\$52.9), and then agri-forestry (\$50.6 billion) (Figure 2). Industry sectors with larger magnitudes for direct employment than the agri-forestry industrial complex were services (1,929.9 thousand), followed by government (474.5 thousand), retail trade (375.8 thousand), manufacturing (267.2 thousand), construction (243.6 thousand), and then agri-forestry (186.9 thousand) (Figure 3). For direct value-added (or contribution to gross state product), the agri-forestry industrial complex ranked eighth at \$15.2 billion behind retail trade (\$21.5 billion), wholesale trade (\$24.7 billion), manufacturing (\$39.5 billion), real estate (\$40.4 billion), government (\$41.3 billion), and services (\$142.7 billion) (Figure 4).

Comparing recent growth for total industry output (economic activity) in agriculture and forestry as a percentage of Tennessee's total economy indicates relatively stagnant growth for the years depicted in Figures 4 and 5. For both **direct** (Figure 5) and **total (with multiplier effects)** (Figure 6) output for agriculture and forestry, the largest growth as a percentage of the state's total economy occurred in 2006. **Compared to the 2017 Tennessee agri-forestry economic contributions report, the state's overall economy grew by a nominal value of \$61.4 billion but the direct agri-forestry industrial complex (without multiplier effects) decreased by \$2.4 billion.**

When comparing a county's **direct** (without multiplier effects) agriculture and forestry economic activity to its total economic activity (all industries) for each of Tennessee's 95 counties, Clay County had the highest share of economic activity for commodity agriculture (crop and livestock breeding and feeding) at 15.0 percent. For all agriculture (includes direct agriculture, plus agricultural input supplying and agriculture-based manufacturing sectors), Moore County had the highest share of economic activity at 64.8 percent). For direct forestry (i.e., the management and logging of forests), Grundy County had the highest level of direct economic activity at 1.5 percent). For all forestry (includes direct forestry, plus input supplying industries and forestry manufacturing), Hardin County had the highest share at 23.7 percent). Combining both agriculture and forestry, Moore and Meigs Counties had the largest shares of local economic activity at 65.5 percent and 34.0 percent, respectively (see Table 24, page 35).

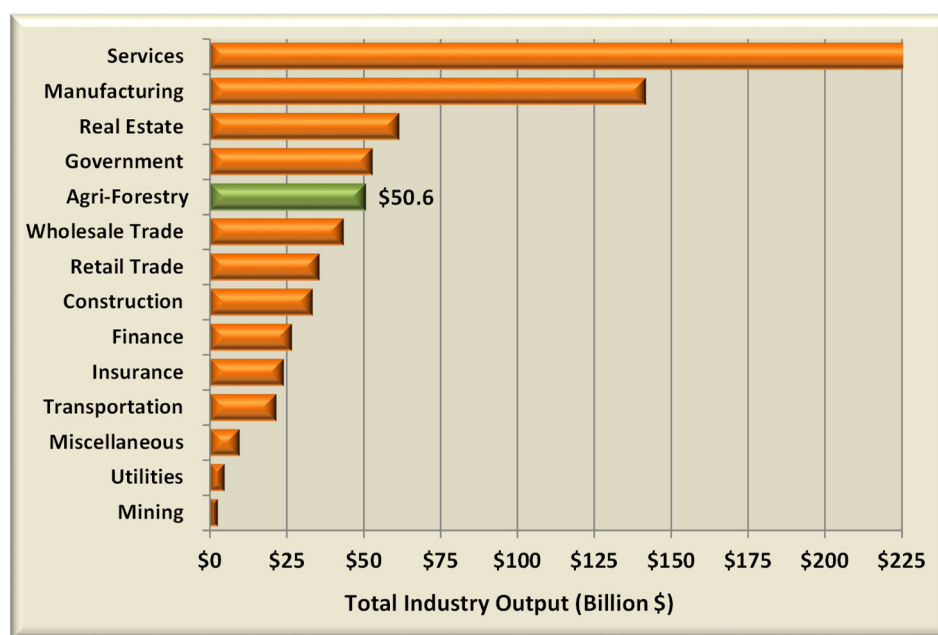


Figure 2. Direct Total Industry Output by Sector, Tennessee Total Economy, 2019.

(Source: IMPLAN Group, LLC, 2019)

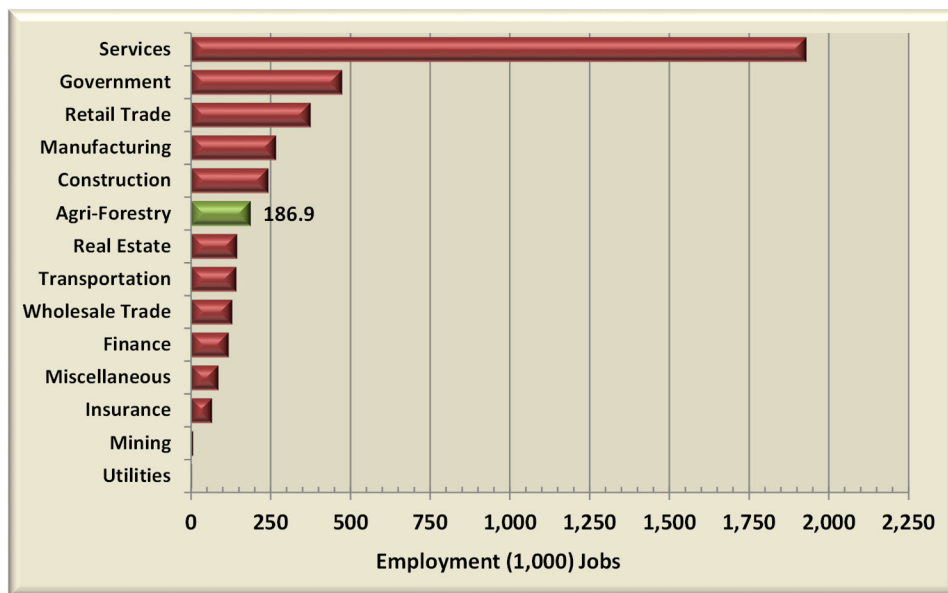


Figure 3. Direct Employment by Sector, Tennessee Total Economy, 2019.
 (Source: IMPLAN Group, LLC, 2019)

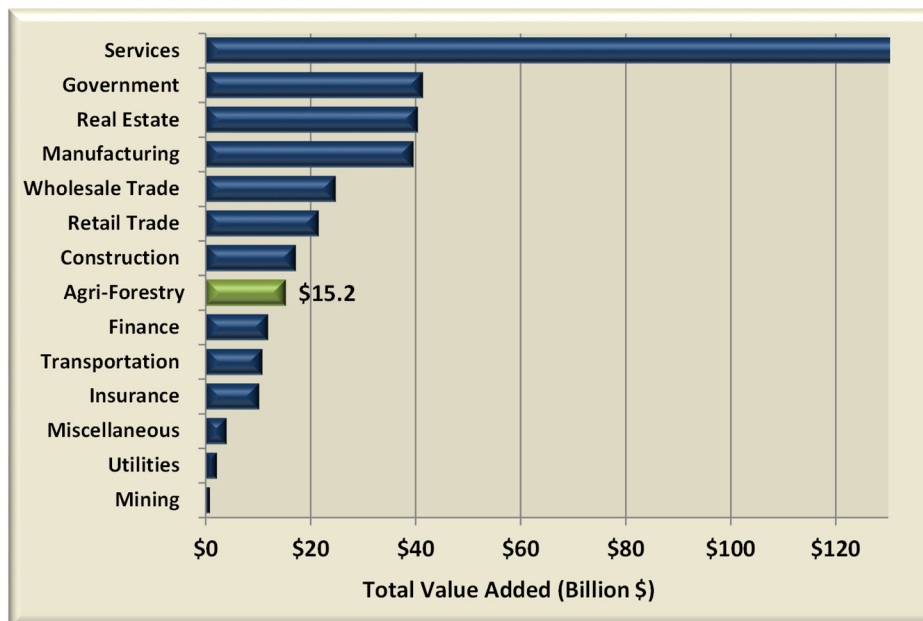


Figure 4. Direct Total Value Added by Sector, Tennessee Total Economy, 2019.
 (Source: IMPLAN Group, LLC, 2019)

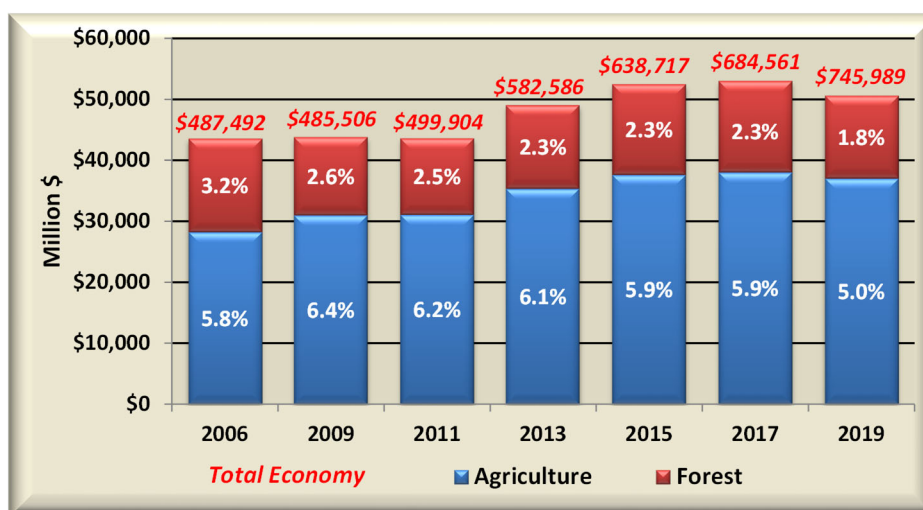


Figure 5. Nominal Change in Direct Output for Agriculture and Forestry as a Percentage of Tennessee's Total Economy

(Source: IMPLAN Group, LLC, 2006-2019)

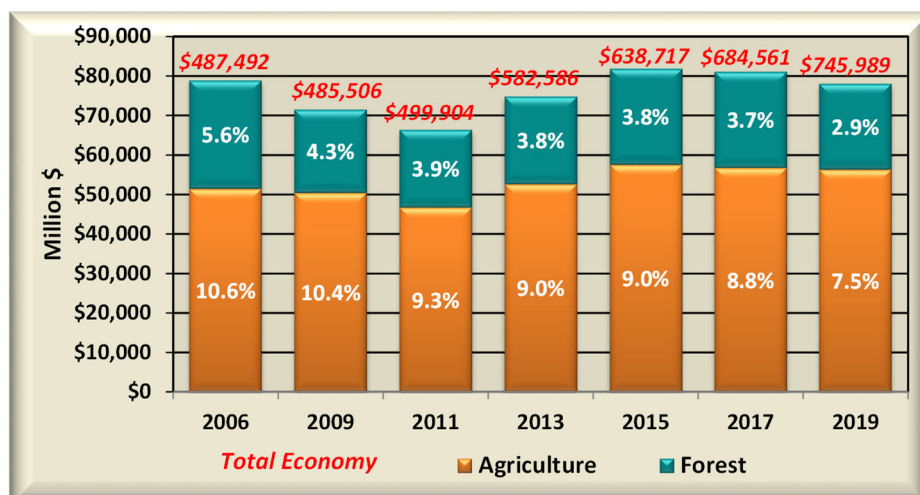


Figure 6. Nominal Change in Total Output (with Multiplier Effects) for Agriculture and Forestry as a Percentage of Tennessee's Total Economy

(Source: IMPLAN Group, LLC, 2006-2019)

Other study highlights:

- Compared to the 2017 Tennessee agri-forestry economic contributions report, the state's overall economy grew by a nominal value of \$61.4 billion but the agri-forestry industrial complex decreased by \$2.4 billion (Figure 4).
- Agriculture input supplying industries – agricultural machinery and chemical products – generated \$1.8 billion in cash receipts.
- Tennessee farmers earned the majority of their cash receipts from soybeans, beef cattle and calves, broilers, corn, miscellaneous crops, cotton, hay, dairy products, wheat, and tobacco.

- Tennessee's average annual sawtimber removals on timberland were estimated at close to 1.3 billion board feet, with the majority of the removals (84.6 percent) from private landowners. The predominant species removed from private owned lands were white and red oaks, yellow poplar, loblolly/shortleaf pines, and hickory.
- Estimated international exports for Tennessee's wood products and furniture and related products outside the United States totaled \$251.3 million. Wood products had the highest export value at \$160.3 million, followed by furniture and related products (\$91.0 million).
- Major importing countries of Tennessee's forestry products (NAICS 113) totaled \$47.9 million with the top five major markets consisting of Canada (\$24.7 million), China (\$6.8 million), Portugal (\$3.4 million), Mexico (\$3.2 million), and Viet Nam (\$2.4 million). The top five forest products exports are for oak lumber, wooden casks, ash lumber, non-coniferous lumber, and oak logs.
- Secondary agriculture manufacturing contributed a total of \$47.1 billion to the state's economy, of which 82.6 percent came from food (\$32.9 billion) and beverages (\$6.0 billion) manufacturing.
- In 2019, agriculture and forestry manufacturing shipped \$42.3 billion dollars of goods and over 80,000 Tennesseans were employed with a payroll of \$3.8 billion.
- Estimated international exports for Tennessee's farm products totaled close to \$1.5 billion. Major markets for Tennessee's exports of agricultural crop products included Viet Nam, Turkey, Pakistan, Indonesia, and Bangladesh; for agricultural livestock products, Mexico, Canada, Japan, Panama, and France.
- In 2019, Agriculture Risk Cover-County (ARC-CO) and Price Loss Coverage (PLC) payments to Tennessee producers were \$68.6 million and \$7.8 million, respectively. Corn represented the largest quantity of the total base acreages for all crops, followed by soybeans, cotton, wheat, and sorghum. For all covered crops, the counties with the largest base acreages were for Gibson, Dyer, and Obion in West Tennessee.

This analysis results presented in the "Tennessee Agricultural Economic Impact Results" were estimated using IMPLAN's most recent data set (2019) are IMPLAN-based pre-COVID results. IMPLAN (IMpact Analysis for PLANing), an input-output model, traces backward linked transactions conducted in the economy and attempts to quantify the economic interdependencies for a given point in time. Through these interdependencies, one can evaluate the indirect and induced economic contributions that economic activity has on the entire state economy. To account for double-counting for the economic contributions estimated, regional purchase coefficients are set to zero for the backward linked supply and service industries (see more detailed definitions and methodology discussion in the "Input-Output Analysis: Date and Methods Used" section).

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2019 Economic Contributions of Agriculture and Forestry in Tennessee

Introduction

This study provides measures of the economic contributions and importance of agricultural and forestry industrial complexes on Tennessee's economy in 2019.¹ An input-output model reflecting the state's 2019 economy is used to determine direct economic contributions on related input industries and economic contributions through resulting expenditures by households at the state level. The economic contributions are provided for four major metrics: total industry output (a measure of economic activity), employment, labor income, and value-added (gross regional product (GRP)). For the purpose of this analysis, agriculture² and forestry includes the production and processing of agricultural and forest products and the input suppliers of these products.

The structure of this document corresponds with the objectives of this analysis, which are to:

- Provide an overview of Tennessee's agriculture and forestry resources including crop and livestock cash receipts, Tennessee's rank in the United States based on the production of agricultural products, exports for both agricultural and forestry products, plus agricultural and forestry manufacturing statistics (pages 1-12).
- Compare state level changes in livestock and crop statistics for 2017 and 2019 including changes in livestock inventory, crop acreages, and prices (pages 12-16).
- Assess the economic contributions and importance of the agricultural and forestry industrial complex for the state with an input-output model (pages 16-36).
- Analyze agriculture and forestry's tax contributions to the state (pages 36-37).

Overview of Agriculture and Forestry in Tennessee

Agricultural Overview

In 2019, 69,700 Tennessee farms³ used 10.8 million acres (Figure 7),⁴ or 40.1 percent of the state's land base. For the five-year period from 2015 to 2019, the numbers of farms in the state decreased an average of 0.9 percent annually. For that same timeframe, the average farm size increased an average of 0.7 percent annually. In 2019, the average Tennessee farm size was 155 acres compared to 444 acres for the United States. Other southeastern states with similar average farm sizes as Tennessee include South Carolina at 195 acres, followed by North Carolina at 182 acres and Kentucky at 172. Arkansas, Mississippi, and Missouri have average farm sizes of 331, 301, and 290 acres, respectively. Approximately 62.6 percent of all Tennessee farms had sales in the \$1,000-\$9,999 range, 31.0 percent in the \$10,000-\$99,999 range, and 6.5 percent had sales of \$100,000 or more (USDA/NASS, 2020g).

¹This study continues the series of previous reports (English, Jensen, and Menard, 2001 and 2003; Menard, English, and Jensen, 2006, 2009, 2011, 2013, 2016, 2017, and 2019) where the economic contributions and importance of agricultural and forestry industrial complexes on Tennessee's economy were examined using 1997, 2000, 2003, 2006, 2009, 2011, 2013, 2015, 2017 IMPLAN data, respectively. For additional details on the previous studies and the IMPLAN version uses, see Appendix A.

²In this report, forestry and the production of forest products were incorporated into agriculture and agribusiness, respectively.

³Defined as an establishment with \$1,000 or more of agricultural products sold or would normally be sold during the year (USDA/ERS, 2019).

⁴Raster image is based on USDA/NASS's cropland data layer—a raster, geo-referenced, crop-specific land cover data layer with a ground resolution is 30 square meters. Map includes all row, specialty, and truck crops, plus fruit production.

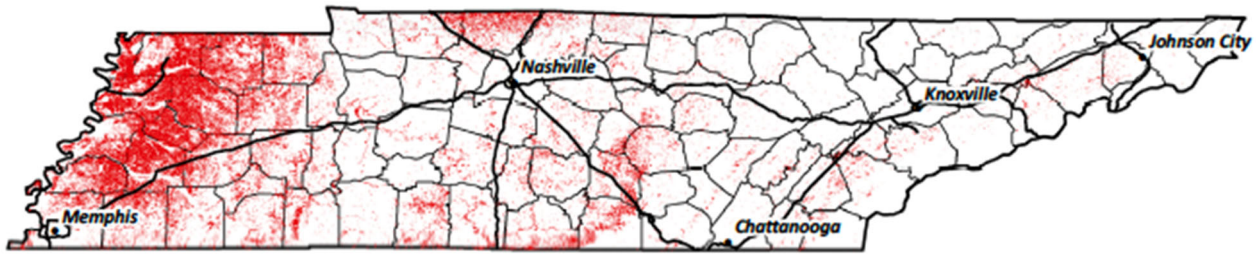


Figure 7. Location of Cropland in Tennessee, 2019

(Source: USDA/NASS, 2020f)

Cash receipts for all commodities in Tennessee totaled close to \$3.5 billion in 2019.⁵ Of that total, \$2.2 billion (63.2 percent) was from crops and \$1.3 billion (36.8 percent) was from all livestock and livestock products. Based on harvested acreage, Tennessee was ranked in the upper half of the nation for most major crops (Table 1). Approximately 37.4 percent of Tennessee's total harvested cropland acreage (roughly 4.7 million acres) was in hay (all types), followed by soybeans (29.1 percent), corn for grain (19.3 percent), cotton (8.6 percent), and wheat (4.6 percent). Among crops and for available data, soybeans had the largest cash receipts, followed by corn, cotton, hay, tobacco, and wheat. Tennessee's top crop counties based on planted acreage Obion County for corn, Haywood County for cotton, Gibson County for wheat, and Dyer County for soybeans (USDA/ERS, 2020b; USDA/NASS, 2020a, 2020b, 2020h).

Table 1. Crops Harvested, Acreage, Tennessee Ranking, and Cash Receipts, 2019

Crops	Harvested Acreage (Thousand Acres)	Tennessee Ranking	Leading State	Cash Receipts ^a (Thousand \$)	% of State Crop Total ^b
Hay (all types)	1,763	^c	Texas	\$153,010	7.1
Soybeans	1,370	17	Illinois	\$624,041	29.1
Corn for grain	910	18	Iowa	\$511,999	23.9
Cotton, lint	405	8	Texas	\$236,094	11.0
Winter wheat	215	20	Kansas	\$79,790	3.7
Corn for silage	40	28	Wisconsin	--	--
All tobacco	13.3	4	N. Carolina	\$85,167	4.0

^{a,b}For 2019, cash receipts for all commodities grown in Tennessee were \$3.5 billion (\$2.2 billion for crops).

^cFor 2019, Tennessee was ranked 10th for all hay; 33rd for alfalfa.

Source: USDA/ERS, 2020b; USDA/NASS, 2020a, 2020b, 2020h

Based on the number of head, broilers, chickens, cattle and calves, hogs, equine, and milk cows were the predominant livestock in the state (Table 2). According to the USDA's ERS for 2019, cash receipts from farm marketing for these livestock products totaled close to \$1.3 billion. Of that total, cattle and calves contributed 38.1 percent, broilers 35.8 percent, dairy products 8.3 percent, hogs 6.9 percent, and all chickens 4.7 percent. Tennessee is ranked 13th in the United States for the number of beef cows on farms, 16th for broilers, 11th for cattle and calves, 20th for hogs, 31st for milk cows, and 31st for all chickens. Tennessee's top cattle counties based on numbers are Greene for beef cattle and Monroe for dairy cattle (USDA/ERS, 2020b; USDA/NASS, 2019c, 2019h, 2020c, 2020d, 2020e, 2020h, 2020i, 2020j).

⁵Cash receipt sales may not reflect the total values of commodities produced and used. For instance, a vertically integrated agribusiness may use hay or corn it produced to feed its own livestock.

Table 2. Livestock Numbers, Tennessee Ranking, and Cash Receipts, 2019

Livestock	Inventory (Number)	Tennessee Ranking	Leading State	Production ^a	Cash Receipts ^b (Thousand \$)	% of State Livestock Total ^c
Broilers ^d	177,700,000	16	Georgia	941,800	\$457,715	35.8
All chickens ^e	2,601,000	31	Iowa		\$60,229 ^j	4.7
Cattle & calves ^f	1,800,000	11	Texas	585,786	\$487,665 ^k	38.1
Beef cows ^f	914,000	13	Texas		--	--
Hogs ^g	250,000	20	Iowa	160,384	\$88,792 ^k	6.9
Equine ^h	104,827	9 ⁱ	Texas	--	--	--
Milk cows ^f	32,000	31	California	551.0	\$105,924 ^l	8.3

^aThousand pounds for broilers, cattle and calves, and hogs; million pounds of milk for milk cows.

^{b,c}For 2019, cash receipts for all commodities were \$3.5 billion (\$1.3 billion for livestock & products)

^dPeriod December 1 previous year through November 30, 2019

^eDecember 1, 2018-2019; excludes commercial broilers

^fJanuary 1, 2019

^gDecember 1, 2019

^hIncludes horses, ponies, mules, burros, and donkeys

ⁱFor 2017, Tennessee was ranked 9th for horses and ponies and 2nd for mules, burros, and donkeys

^jIncludes eggs and farm chickens; excludes commercial broilers and turkeys

^kReceipts from marketings and sale of farm slaughter

^lMilk cash receipts from marketings

Source: USDA/ERS, 2020b; USDA/NASS, 2019c, 2019h, 2020c, 2020d, 2020e, 2020h, 2020i, 2020j

Tennessee's more significant agricultural commodities in terms of dollar value, along with their corresponding U.S. market share, are shown in Table 3. In descending order they were grain farming (barley, corn, oats, sorghum, and wheat); oilseed farming (primarily soybeans); poultry and egg production; beef cattle farming; cotton farming; greenhouse, nursery, and floriculture production; vegetable and melon farming; all other crop farming (primarily hay and seed); animal production, except cattle, poultry, and eggs; dairy cattle and milk production; tobacco farming; and fruit farming. Tobacco; cotton; greenhouse, nursery, and floriculture production; oilseeds; and poultry and egg production had the largest market share of U.S. production at 7.9 percent, 4.5 percent, 1.9 percent, 1.8 percent, and 1.3 percent, respectively.

Table 3. State Value of Agricultural Commodities and U.S. Market Share, 2019

Agricultural Industry	Total Industry Output	Market Share of U.S. Production
	(Million \$)	(Percent)
Grain farming	\$717.8	1.1
Oilseed farming	\$584.0	1.8
Poultry & egg production	\$537.1	1.3
Beef cattle farming	\$495.3	0.7
Cotton farming	\$327.3	4.5
Greenhouse, nursery, & floriculture production	\$312.6	1.9
Vegetable and melon farming	\$191.3	1.1
All other crop farming ^b	\$164.1	1.1
Animal production, except cattle/poultry/eggs ^c	\$150.1	0.5
Dairy cattle & milk production	\$106.9	0.3
Tobacco farming	\$77.7	7.9
Commercial hunting & trapping	\$18.0	1.3
Fruit farming	\$12.2	0.1
Tree nut farming	\$2.2	0.02

^aTotal Industry Output – annual value of production by industry (an economic activity measure).

^bPrimarily hay/seed farming.

^cPrimarily hogs, sheep & goats, aquaculture, equine, and apiculture.

Source: IMPLAN Group, LLC, 2019

Compared to 2017, total milk production in 2019 for the state declined by 20.5 percent from 693.0 million pounds to 551.0 million. For 2019, dairy products rank eighth in the state in terms of cash receipts (\$105.9 million) preceded by soybeans (\$624.0 million), beef cattle (\$487.7 million), corn (\$459.3 million), broilers (\$454.7 million), miscellaneous crops (\$394.7 million), cotton (\$231.1 million), and hay (\$153.0 million). From 2017 to 2019, an estimated nine thousand cows (from 41,000 to 32,000) exited the dairy industry in the state. Milk production per cow decreased from 17,325 to 17,219 pounds during that timeframe. Dairy products cash receipts of \$105.9 million is an 18.5 percent decline from 2017's value of \$130.0 million. The majority of the dairy industry in Tennessee is comprised of many small farms. Approximately 86.5 percent of the dairy farms in the state have less than 100 head. For the remaining 13.5 percent of the farms with greater than 100 head, 61.7 percent had dairy herd sizes of 100-199 head, 30.8 percent for 200-499 head, 6.0 percent for 500-999 head, and 1.5 percent for 1,000-2,499 head (USDA/ERS, 2020b; USDA/NASS, 2019e, 2020d).

Tennessee's 2019 agricultural commodity (foreign) exports totaled \$1.5 billion. Of that value, 86.4 percent was from plant products with the remaining value, 13.6 percent, from animal products. The value of the top ten commodities exported included soybeans at \$329.5 million, other plant products (includes sweeteners and products, other horticulture products, planting seeds, and other processed foods) at \$272.8 million, cotton at \$251.9 million, feeds and other feed grains at \$91.4 million, soybean meal at \$77.5 million, corn at \$76.1 million, tobacco at \$62.1 million, beef and veal at \$59.6 million, wheat at \$56.9 million, and broiler meat at \$52.2 million (USDA/ERS, 2020a).⁶ For 2019, Tennessee's exports of agricultural crop products (North American Industry Classification (NAICS) code 111 (oilseed & grain farming; vegetable & melon farming; fruit & tree nut farming; greenhouse, nursery, & floriculture production; and other crop farming)) totaled \$731.5 million with the top five major markets consisting of Vietnam (\$156.4 million), Turkey (107.4 million), Pakistan (\$90.7 million), Indonesia (\$63.4 million), and Bangladesh (\$52.6 million). For agricultural livestock products (NAICS code 112 (cattle ranching & farming; hog & pig farming; poultry & egg production; sheep & goat farming; aquaculture; and other animal production)), exports totaled \$11.5 million with Mexico (\$5.3 million),

⁶ State calculated export values are allocated based on the share of US farm cash receipts for those products (USDA/ERS, 2020a).

Canada (\$2.0 million), Japan (\$1.1 million), Panama (\$0.7 million) and France (\$0.5 million) the top five markets (USDOC/ITA, 2021).

Forest Overview

Roughly 52 percent of Tennessee is covered in forest (Figure 8).⁷ The forest cover is primarily hardwoods (89 percent of the forest composition) making the state one of the top three hardwood lumber producing states in the United States. There are over 120 tree species in Tennessee. White oak, red oak, hickory, yellow poplar, and maple are some of the more predominant hardwood species. For softwoods, loblolly pine, Virginia pine, red cedar, and shortleaf pine are major species. The dominant forest type in the state is oak-hickory, accounting for an estimated 9.9 million acres (Tennessee Forestry Association, 2017). Of the 13.9 million acres in forest, 83.2 percent is privately owned with Federal (10.0 percent) and state/local forests (6.8 percent) comprising the rest. It is estimated the state has an estimated 8.4 billion live trees with a volume of 32.3 billion cubic feet (USDA/FS, 2020).

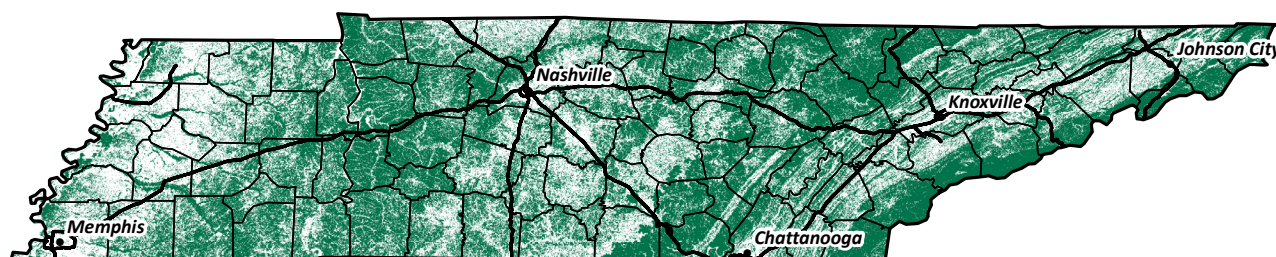


Figure 8. Location of Forest Land in Tennessee, 2019

(Source: USDA/NASS, 2020f)

For 2017, average annual sawtimber⁸ removals on timberland⁹ were estimated at over 1.3 billion board feet (Table 4). Of that value, the majority of the removals, 84.6 percent, were from private landowners (1.1 billion board feet), followed by other non-federal public (158.8 million board feet), state and local (40.3 million board feet) and federal (4.8 million board feet). The predominant species removed on federal lands were white and red oaks. For state and local, yellow poplar, white and red oaks, and sweetgum. White and red oaks and yellow poplar were primarily removed from other non-federal lands. For private owned lands, the predominant species removed were white and red oaks, yellow poplar, hickory, and loblolly/shortleaf pine (USDA Forest Service, 2021).

⁷ Raster image is based on USDA/NASS's cropland data layer—a raster, geo-referenced, crop-specific land cover data layer with a ground resolution is 30 square meters. Map includes all forest types (deciduous, evergreen, mixed, and woody wetlands).

⁸ Commercial tree species with at least a 12-foot sawlog or two noncontiguous saw logs 8 feet or longer and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches in diameter at breast height (d.b.h.); hardwoods must be at least 11.0 inches d.b.h. (USDA Forest Service, 2014).

⁹ Timberland is defined as forest land producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation (USDA Forest Service, 2014).

Table 4. Average Annual Removals of Sawtimber Trees by Species Group and Owner Class, 2017

Tree Species Group	Federal	State & Local	Private	Other ^a	Total ^b
Board Feet (International 1/4-inch rule)					
Loblolly & shortleaf pine		306,477 ^e	112,834,266 ^c	5,078,577 ^e	118,219,320 ^c
Other yellow pine		772,739 ^e	7,664,304 ^d	8,145,512 ^e	16,532,555 ^d
Eastern white & red pine	60,158 ^e		15,475,269 ^e	6,534,721 ^e	22,070,148 ^e
Eastern hemlock			1,056,562 ^e		1,056,562 ^e
Cypress				8,869,641 ^e	8,869,641 ^e
Other eastern softwoods			4,063,656 ^d	1,108,747 ^e	5,172,403 ^d
Select white oaks	1,695,381 ^e	4,027,379 ^e	201,526,037 ^c	23,546,614 ^d	230,795,411 ^c
Select red oaks		8,205,197 ^e	50,815,002 ^d	1,295,433 ^e	60,315,633 ^d
Other white oaks	1,576,846 ^e	2,710,971 ^e	86,487,129 ^d	9,297,802 ^e	100,072,749 ^c
Other red oaks	1,498,352 ^e	1,263,209 ^e	172,997,615 ^c	30,368,670 ^d	206,127,847 ^c
Hickory		1,605,986 ^e	105,356,902 ^c	7,087,920 ^d	114,050,808 ^c
Hard maple		282,860 ^e	17,632,795 ^d	2,011,964 ^e	19,927,619 ^d
Soft maple		703,061 ^e	9,405,633 ^d	3,661,835 ^e	13,770,530 ^d
Beech			6,555,951 ^d	2,239,768 ^e	8,795,719 ^d
Sweetgum		3,133,750 ^e	32,664,370 ^d	5,072,544 ^e	40,870,663 ^d
Tupelo & blackgum		945,447 ^e	6,651,598 ^d	714,607 ^e	8,311,651 ^d
Ash		1,055,155 ^e	35,311,889 ^d	1,387,718 ^e	37,754,761 ^d
Basswood			5,710,734 ^d	807,668 ^e	6,518,402 ^d
Yellow-poplar		15,377,065 ^e	199,811,155 ^c	24,948,909 ^d	240,137,129 ^c
Black walnut			10,425,756 ^d	1,827,578 ^e	12,253,334 ^d
Other eastern soft hardwoods			37,412,879 ^d	14,364,512 ^d	51,777,392 ^c
Other eastern hard hardwoods			1,274,946 ^d	447,906 ^e	1,722,853 ^d
Total	4,830,737^e	40,339,298^d	1,121,134,448^c	158,818,645^c	1,325,123,129^c

^aOther non-federal public; ^bTotals may not add due to rounding; ^cPercent sampling error ≤ 25 percent; ^dPercent sampling error > 25 percent and ≤ to 50 percent; ^ePercent sampling error > 50 percent

Source: USDA Forest Service, 2021

Tennessee's 2019 top twenty forest products export values ranked in descending order are listed in Table 5. Oak lumber, wooden casks, ash lumber, non-coniferous lumber, and oak logs comprise the top five (USDA/FAS, 2021). Exports of Tennessee's forest products (wood products (*NAICS code 321*) and furniture and related products (*NAICS code 337*)) outside the U.S. totaled \$251.3 million for this timeframe. Wood products had the highest export value at \$160.3 million, followed by furniture and related products at \$91.0 million. For 2019, Tennessee exports of forestry products (*NAICS code 113*) totaled \$47.9 million with the top five major markets consisting of Canada (\$24.7 million), China (\$6.8 million), Portugal (\$3.4 million), Mexico (\$3.2 million), and Viet Nam (\$2.4 million) (USDOC/ITA, 2021).

Table 5. Top 20 Value of Tennessee Forest Products Exports to the World, 2019

BICO- HS6 ^a	Forest Products	2015	2016	2017	2018	2019
				\$1,000		
440791	Oak lumber	87,934	112,936	127,117	119,932	83,732
441600	Wooden casks	44,911	34,566	27,588	26,475	20,474
440795	Ash lumber	18,898	18,362	22,530	20,318	12,337
440799	Non-coniferous lumber	30,040	31,554	32,141	25,496	10,203
440391	Oak logs	13,525	13,521	15,710	14,684	8,825
	Lengthwise sawn Yellow Poplar, > 6mm					
440797	thick	0	0	0	2,575	7,663
441012	Oriented strand board (OSB)	6,767	5,554	4,997	5,169	6,678
440399	Non-coniferous logs	9,311	7,141	19,150	13,384	6,329
	Builders' joinery & carpentry of wood,					
441899	Nesoi ^b	0	0	5,247	4,202	4,516
440929	Non-coniferous wood other	5,283	5,694	1,532	1,468	2,862
	Wood floor w/1 outer plywood slct ncfs					
441233	wood surface covered	0	0	0	82	2,093
441520	Wooden pallets	1,336	872	2,351	2,091	1,503
	Western red cedar logs/timber rough not					
440325	treated Cs ^b ≥ 15cm	0	0	0	189	1,483
441820	Doors, frames	1,889	2,272	1,221	1,021	990
440793	Maple (except Japanese) lumber	519	385	1,286	708	692
441299	Laminated panels	99	315	55	471	690
441700	Tools, broom handles	546	531	427	580	629
	Lengthwise sawn Yellow Cedar, > 6mm					
440719	thick rough Nesoi ^c	0	0	0	351	608
440794	Cherry lumber	969	1,390	3,076	2,683	591
441193	Fibreboard > .5 < .8 G/Cm	284	126	92	507	589
	Total	222,311	235,219	264,520	242,386	173,487
	World Total	245,603	261,740	289,811	256,912	176,801

^aBICO-HS6-six digit harmonized system report of bulk, intermediate, and consumer-oriented agricultural products

^bCs-Cross sectional

^cNesoi-Not elsewhere specified or included

Source: USDA FAS, 2021

Agriculture and Forestry Manufacturing Overview

Agriculture and forestry manufacturing industries for the state (Figures 9 through 18) included food (*NAICS code 311*), animal slaughtering and processing (*NAICS code 3116*), beverage and tobacco products (*NAICS code 312*), textile mills (*NAICS code 313*), textile product mills (*NAICS code 314*), apparel (*NAICS code 315*), leather and allied products (*NAICS code 316*), wood products (*NAICS code 321*), paper (*NAICS code 322*), and furniture and related products (*NAICS code 337*). For these industries in 2019, \$42.3 billion dollars of goods were shipped and over 80,000 Tennesseans were employed with a payroll of \$3.8 billion (Table 6). Food manufacturing shipped the largest value of goods at \$21.5 billion, followed by beverage and tobacco products manufacturing at \$8.3 billion, and paper manufacturing at \$5.6 billion. As a group, textile mills, including textile product mills and apparel, shipped close to \$1.9 billion. For the forest products group, which included wood products manufacturing, paper manufacturing, and furniture and related products, \$10.7 billion of goods were shipped. Tennessee's national market share for value of shipments for food manufacturing was 2.7 percent, beverage and tobacco products at 5.3 percent, textile mills at 4.0 percent, textile product mills at 2.3 percent, wood product manufacturing at 2.9 percent, paper manufacturing at 2.9 percent, and furniture and related

products at 2.7 percent. Of the value-added agri-forestry sectors, food manufacturing employed the largest share at 33,700. The forest products group (wood product manufacturing, paper manufacturing, and furniture and related products) employed close to 32,800. The textile mills and related products, including apparel, employed over 8,100 workers (U.S. Census Bureau, 2021; U.S. Department of Labor, 2020.).

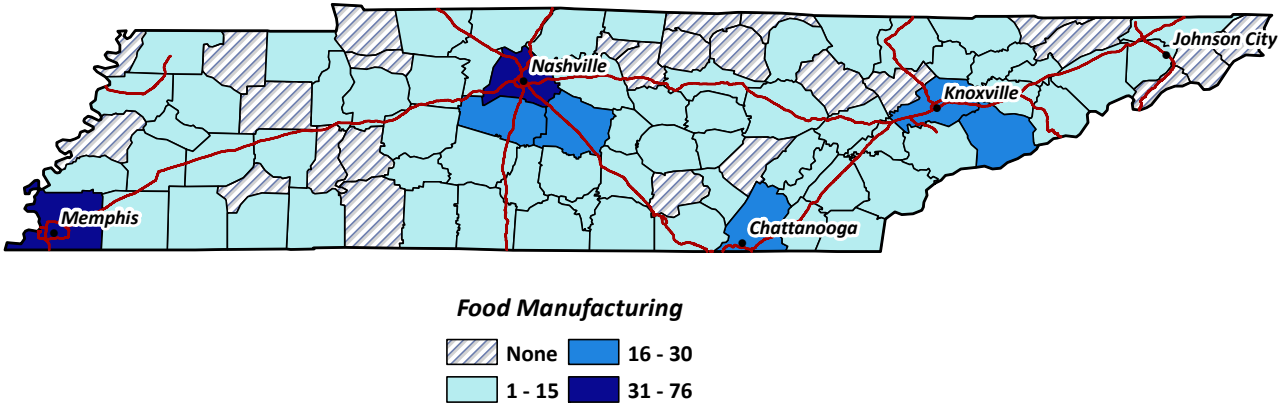


Figure 9. Number of Food Manufacturing Establishments in Tennessee, 2019.

(Source: U.S. Department of Labor, 2020)

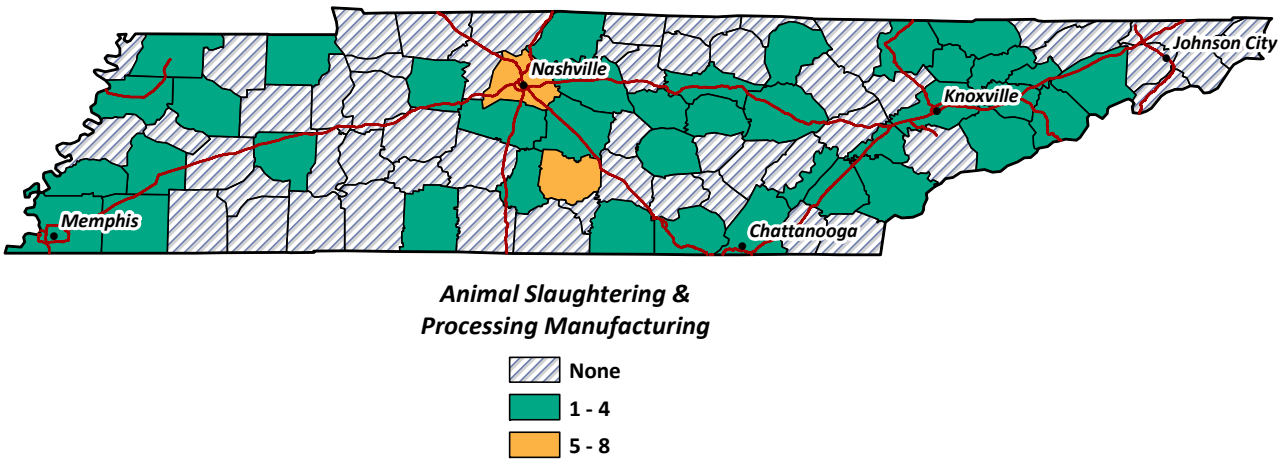


Figure 10. Number of Animal Slaughtering & Processing Establishments in Tennessee, 2019.

(Source: U.S. Department of Labor, 2020)

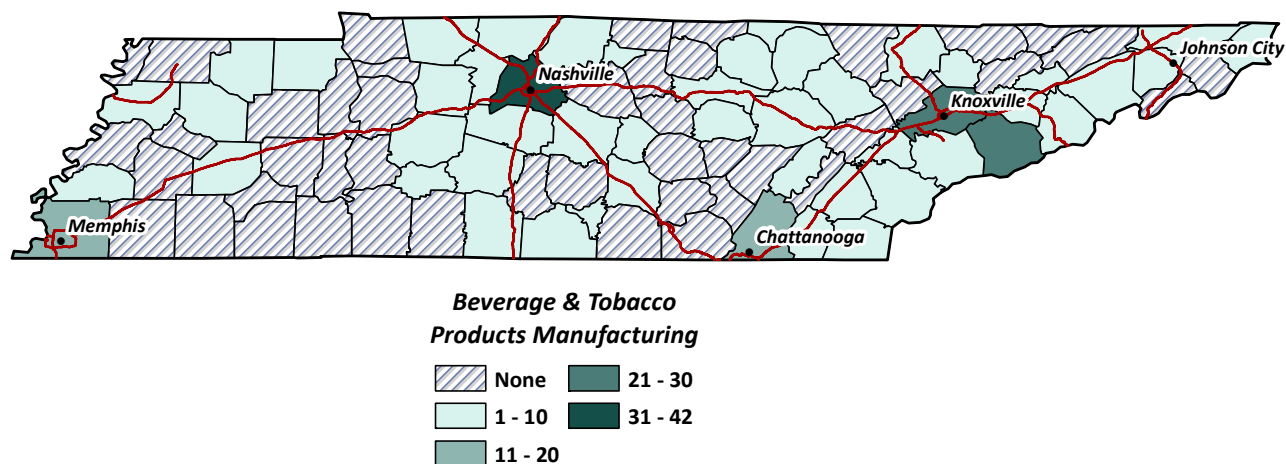


Figure 11. Number of Beverage and Tobacco Products Establishments in Tennessee, 2019.

(Source: U.S. Department of Labor, 2020)

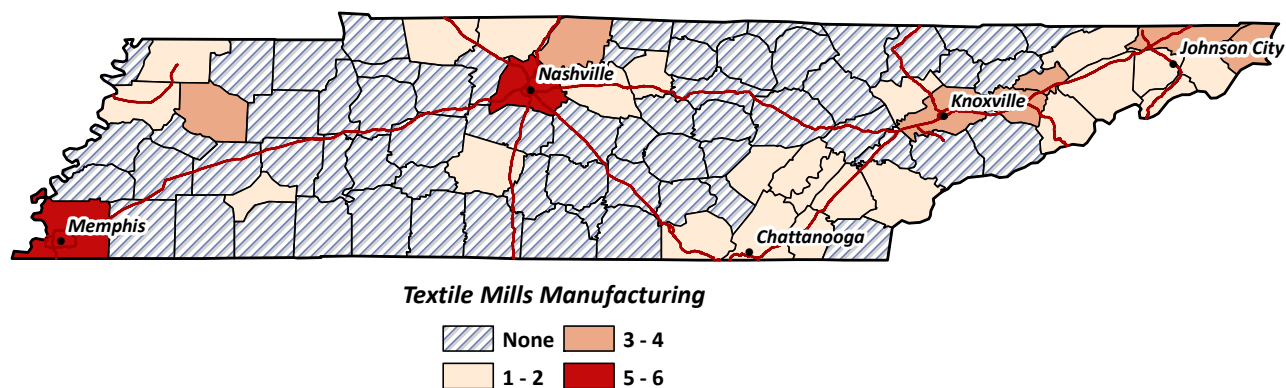


Figure 12. Number of Textile Mill Establishments in Tennessee, 2019.

(Source: U.S. Department of Labor, 2020)

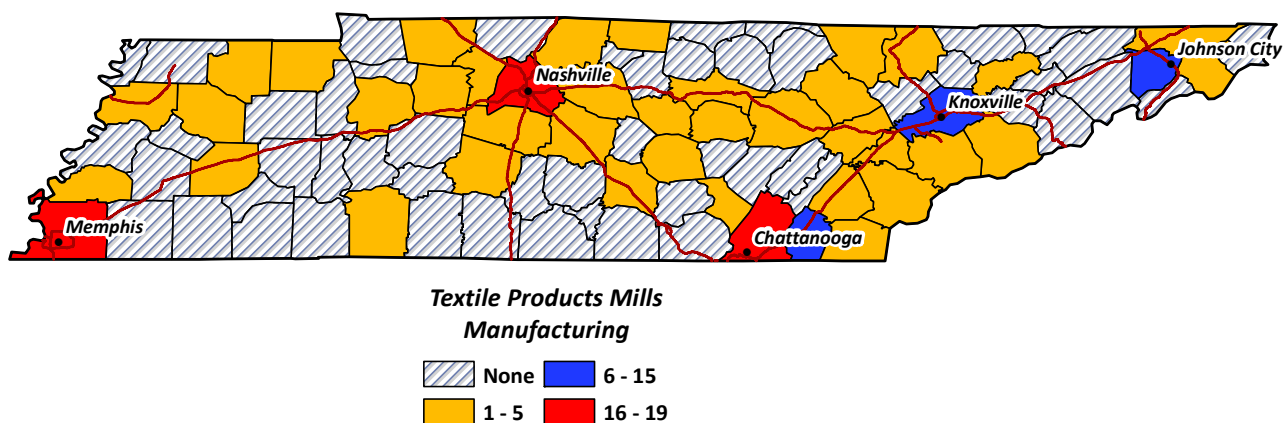
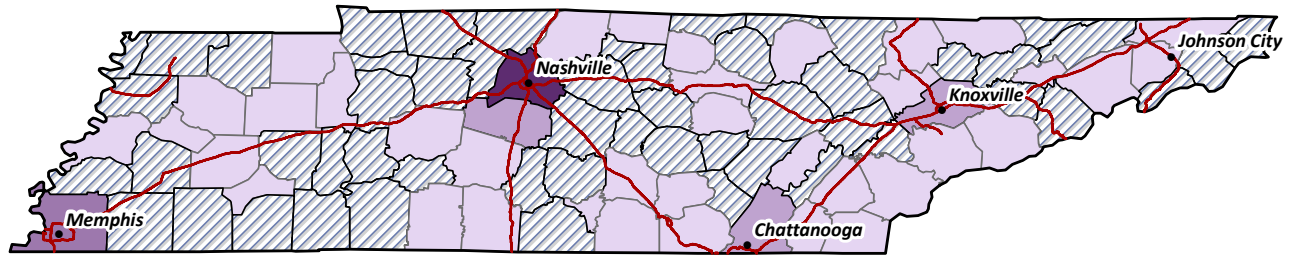


Figure 13. Number of Textile Product Mill Establishments in Tennessee, 2019.

(Source: U.S. Department of Labor, 2020)



Apparel Manufacturing

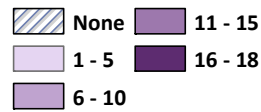
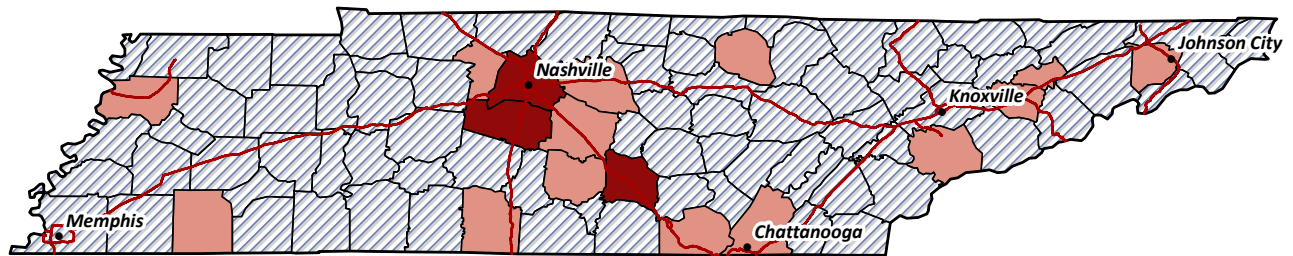


Figure 14. Number of Apparel Manufacturing Establishments in Tennessee, 2019.

(Source: U.S. Department of Labor, 2020)

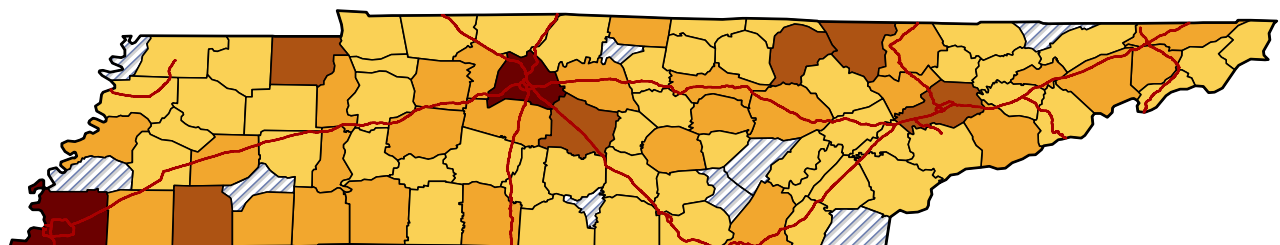


**Leather Allied Products
Manufacturing**



Figure 15. Number of Leather & Allied Product Establishments in Tennessee, 2019.

(Source: U.S. Department of Labor, 2020)



**Wood Products
Manufacturing**



Figure 16. Number of Wood Products Manufacturing Establishments in Tennessee, 2019.

(Source: U.S. Department of Labor, 2020)

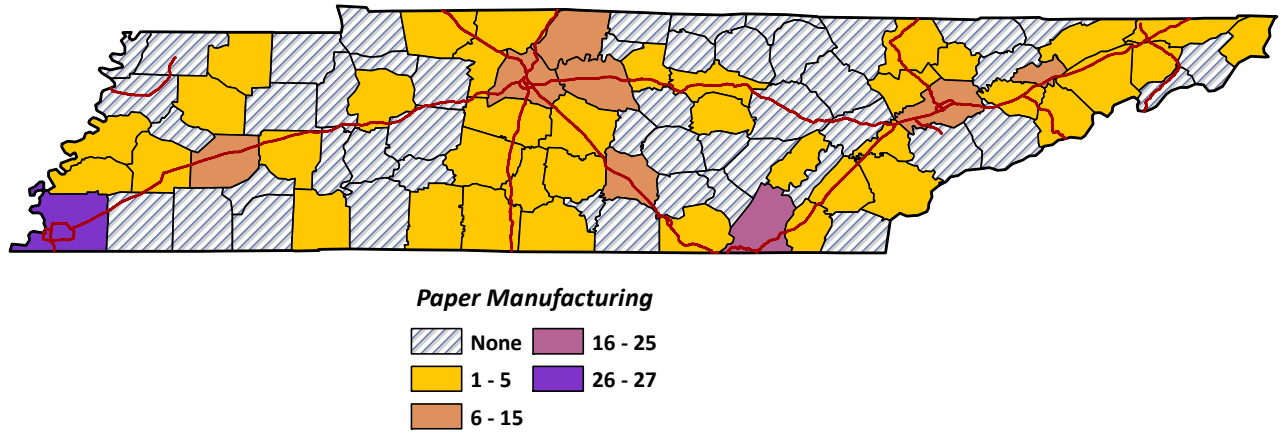


Figure 17. Number of Paper Manufacturing Establishments in Tennessee, 2019.
 (Source: U.S. Department of Labor, 2020)

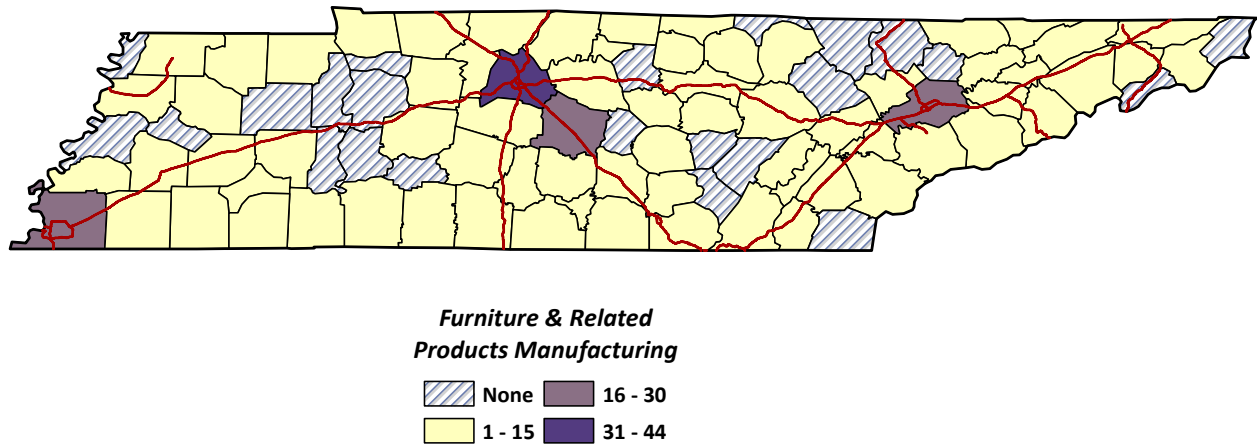


Figure 18. Number of Furniture & Related Products Establishments in Tennessee, 2019.
 (Source: U.S. Department of Labor, 2020)

Table 6. Agri-Forestry Manufacturing Statistics for Tennessee, 2019

Manufacturing Industry/NAICS Code	Employees	Annual Payroll	Establishments	Value of Shipments
	(Number)	(Thousand \$)	(Number)	(Thousand \$)
Food (311)	33,700	\$1,615,687	464	\$21,469,347
<i>Animal slaughtering/processing (3116)</i>	<i>10,805</i>	<i>\$377,496</i>	<i>74</i>	<i>\$3,578,311</i>
Beverage & tobacco products (312)	5,017	\$241,923	233	\$8,301,177
Textile mills (313)	3,019	\$150,946	70	\$1,088,302
Textile product mills (314)	2,386	\$91,504	150	\$533,909
Apparel (315)	2,699	\$74,965	106	\$239,628
Leather & allied products (316)	487	--	30	\$35,023
Wood products (321)	12,446	\$526,738	484	\$3,083,465
Paper (322)	10,107	\$672,892	190	\$5,563,096
Furniture & related products (337)	10,216	\$437,636	351	\$2,032,630
Total^a	80,077	\$3,812,291	2,078	\$42,346,577

^aValues for animal slaughtering and processing are imbedded in food manufacturing (311) values.

Source: U.S. Census Bureau, 2021; U.S. Department of Labor, 2020

State Level Changes in Livestock and Crops: 2017 to 2019

Comparing 2017 and 2019 statewide agricultural data revealed an increase in the numbers of hogs and broilers, while milk cows, chickens, eggs, and cattle and calves decreased. Prices decreased for all livestock products except for hogs. Many of the traditional row crops grown in the state experienced decreased planted acreage except for corn, cotton, and hay. Crop prices increased for corn, wheat, and tobacco; price decreases occurred for hay, soybeans, and cotton.

Livestock Changes in Inventory and Prices

Compared to 2017 production levels, the largest increases in livestock numbers were for hogs (6.4 percent) and broilers (3.6 percent). Milk cows experienced the largest decrease in numbers at -20.0 percent, followed by chickens at -12.0 percent, eggs (-8.5 percent), and cattle and calves (-1.6 percent) (Table 7). Prices for hogs increased 3.6 percent. Cattle and calves had the greatest price decrease at 17.5 percent, followed by broilers (-10.7 percent), eggs (-5.2 percent), and all chickens (-1.1 percent) (USDA/NASS 2018a, 2018b, 2019b, 2019c, 2019d, 2019f, 2020c, 2020e, 2020i, and 2020j).

Table 7. Comparison of Tennessee Livestock Numbers and Prices, 2017 and 2019^a

Commodity	Inventory		Change	Units	Price		Change	Units
	2017	2019			2017	2019		
	(1,000)		%	1,000	(dollars/unit)		%	
All cattle & calves ^b	1,830	1,800	-1.6	head	\$100.88	\$83.25	-17.5	100 lbs
All chickens	2,957	2,601	-12.0	no.	\$9.40	\$9.30	-1.1	head
Broilers	171,500	177,700	3.6	no.	\$0.54	\$0.49	-10.7	pound
Eggs	376,600	344,600	-8.5	no.	\$2.18	\$2.07	-5.2	dozen
Milk cows	40	32	-20.0	head	--	--	--	head
All hogs ^b	235	250	6.4	head	\$53.46	\$55.36	3.6	100 lbs

^aData in nominal values

^bLive weight adjustments made for changes in inventory and in shipments and receipts includes marketing and sales of farm slaughter.

Source: USDA/NASS 2018a, 2018b, 2019b, 2019c, 2019d, 2019f, 2020c, 2020e, 2020i, and 2020j

Crop Changes in Acres Planted and Prices

Comparing crop harvested acres for 2017 and 2019 for Tennessee's major crops, corn had the largest increase at 28.2 percent, followed by cotton (19.1 percent) and hay (5.9 percent). The remaining major crops decreased. The largest decrease was for tobacco at -37.0 percent, followed by wheat (-21.8 percent) and soybeans (-17.5 percent) (Table 8). Corn harvested acres increased from 710 to 910 thousand acres. Crop commodities experiencing higher prices for the timeframe examined include corn, wheat, and tobacco. The largest price decreases were for cotton and hay at 10.5 percent and 3.7 percent, respectively (USDA/NASS, 2018c, 2019a, 2020b, and 2020h).

Table 8. Comparison of Tennessee Crop Acreages and Prices, 2017 and 2019^a

Commodity	Harvested Acres		Change	Price		Change	Units
	2017	2019		2017	2019 ^b		
	1,000 acres		%	\$/unit		%	
Hay, all	1,665	1,763	5.9	\$116.53	\$112.24	-3.7	ton
Corn	710	910	28.2	\$3.55	\$3.95	11.3	bushel
Soybeans	1,660	1,370	-17.5	\$9.70	\$9.05	-6.7	bushel
Cotton	340	405	19.1	\$0.68	\$0.61 ^c	-10.5	pound
Tobacco	21.1	13.3	-37.0	\$2.33	\$2.48	6.3	pound
Wheat	275	215	-21.8	\$4.60	\$5.45	18.5	bushel

^aData in Nominal Values

^bPreliminary

^cBased on marketings and monthly prices received from August 1 through December 31, 2019

Source: USDA/NASS, 2018c, 2019a, 2020b, and 2020h

Special Section: 2019 Base Acres for Tennessee

USDA's Farm Service Agency has two programs to help crop producers mitigate risk—Agriculture Risk Coverage-County (ARC-CO) and Price Loss Coverage (PLC). ARC-CO provides income support to producers and is tied to a county's base acres for covered commodities. When a county's crop revenue for the covered commodity is less than the ARC-CO guarantee, a commodity payment is issued. PLC authorizes program payments when the effective price of a covered commodity is less than the respective reference price for the commodity (USDA/FSA, 2021). For 2019 and Tennessee, PLC and ARC-CO payments were \$68.6 million and \$7.8 million, respectively. Table 9 details the state's 2019 base and planted acreages for selected crops. Corn represents the largest quantity of the total base acreages for all crops (2.8 million acres) at 936 thousand acres, followed by soybeans (781.3 thousand), cotton (613.3 thousand), wheat (414.2 thousand), and sorghum

Table 9. Base and Planted Crop Acres for Tennessee, 2019

Crop	Base Acres	Percent	Planted
Barley	2,408.8	0.1	^a
Canola	304.3	0.01	^a
Corn	935,963.2	33.4	970,000
Oats	3,716.4	0.1	^a
Peanuts	1,124.8	0.04	^a
Rice	2,803.8	0.1	^a
Cotton	613,330.9	21.9	410,000
Sorghum	49,664.7	1.8	^a
Soybeans	781,336.7	27.9	1,400,000
Sunflowers	152.0	0.01	^a
Wheat	414,178.1	14.8	280,000
Total	2,804,983.7	100.0	

^aNo Data

Source: USDA/FSA, 2021

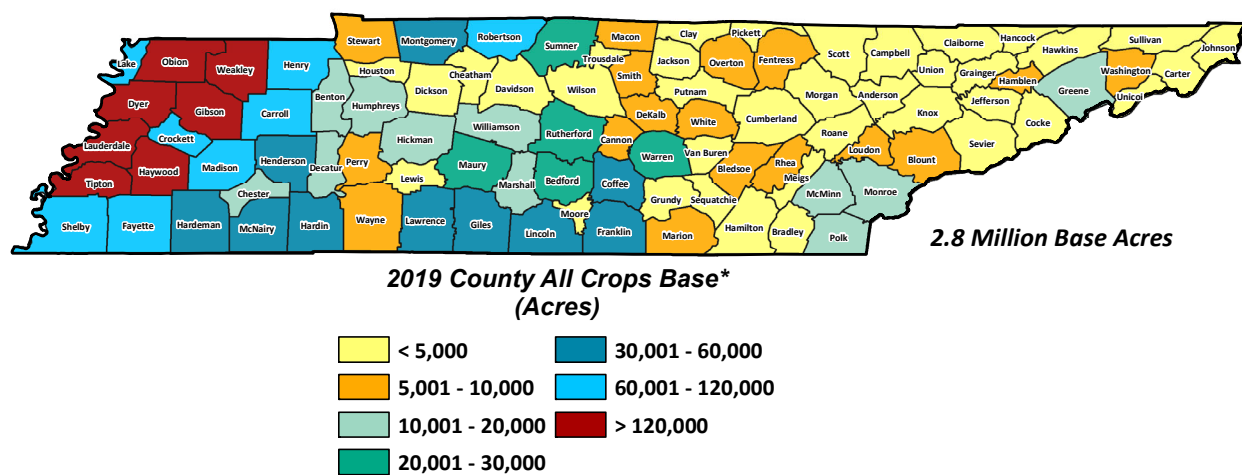
(50 thousand). For all covered crops for 2019, the counties with the largest base acreage were for Gibson, Dyer, and Obion in West Tennessee (Table 10). These counties also have the largest base acres for wheat and soybeans as well. Other West Tennessee counties having large base acreages include Weakley for corn; Haywood, Crockett, and Tipton for cotton; and Fayette and McNairy for sorghum. County level base acreages are indicated in Figures 19 through 24.

Table 10. Top Three Counties with Largest Base Acreage for Selected Crops, 2019

All Crops ^a	Corn	Cotton	Wheat	Soybeans	Sorghum
Gibson (239,219)	Obion (84,963)	Haywood (107,161)	Obion (40,052)	Dyer (90,071)	Dyer (5,281)
Dyer (216,915)	Weakley (77,445)	Crockett (76,844)	Gibson (35,379)	Obion (80,261)	Fayette (4,257)
Obion (214,539)	Gibson (66,249)	Tipton (61,527)	Dyer (33,145)	Gibson (64,754)	McNairy (3,706)

^aIncludes barley, canola, corn, oats, peanuts, rice, cotton, sorghum, soybeans, sunflowers, wheat, and unassigned generic

Source: USDA/FSA, 2021



*Includes Barley, Canola, Corn, Oats, Peanuts, Rice, Seed Cotton, Sorghum, Soybeans, Sunflowers, Wheat, and Unassigned Generic

Figure 19. County Level Base Acreage for All Crops in Tennessee, 2019.

(Source: USDA/FSA, 2021)

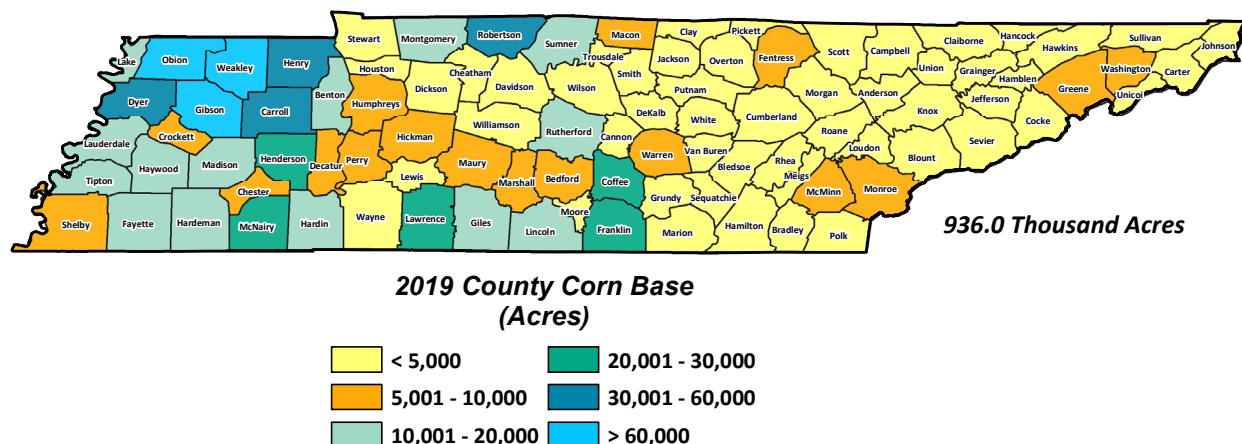


Figure 20. County Level Base Acreage for Corn in Tennessee, 2019.

(Source: USDA/FSA, 2021)

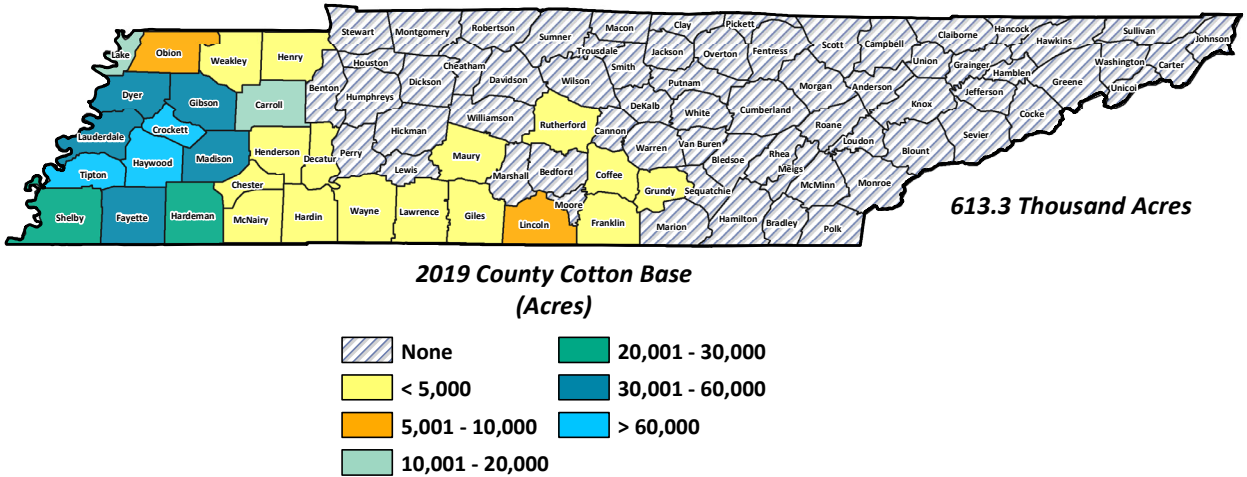


Figure 21. County Level Base Acreage for Cotton in Tennessee, 2019.

(Source: USDA/FSA, 2021)

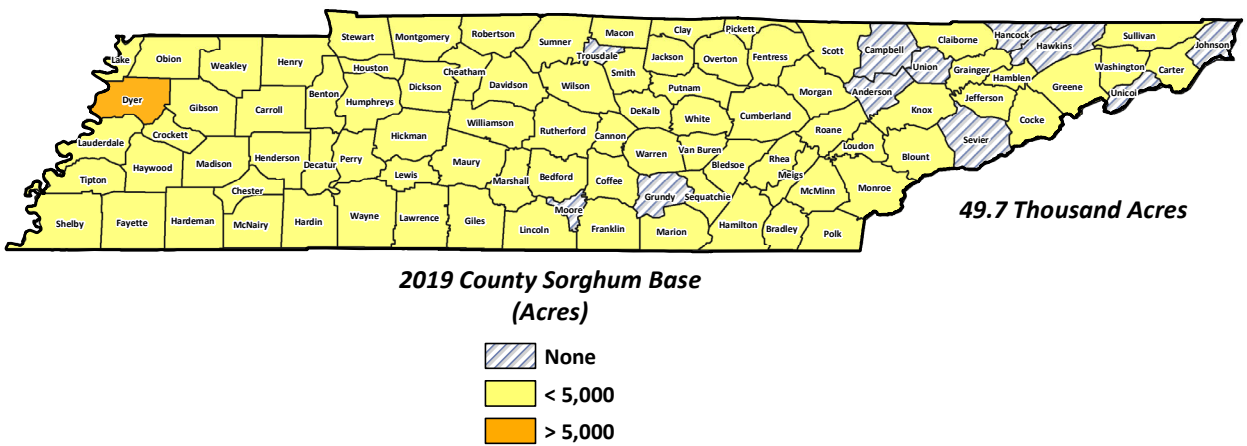


Figure 22. County Level Base Acreage for Sorghum in Tennessee, 2019.

(Source: USDA/FSA, 2021)

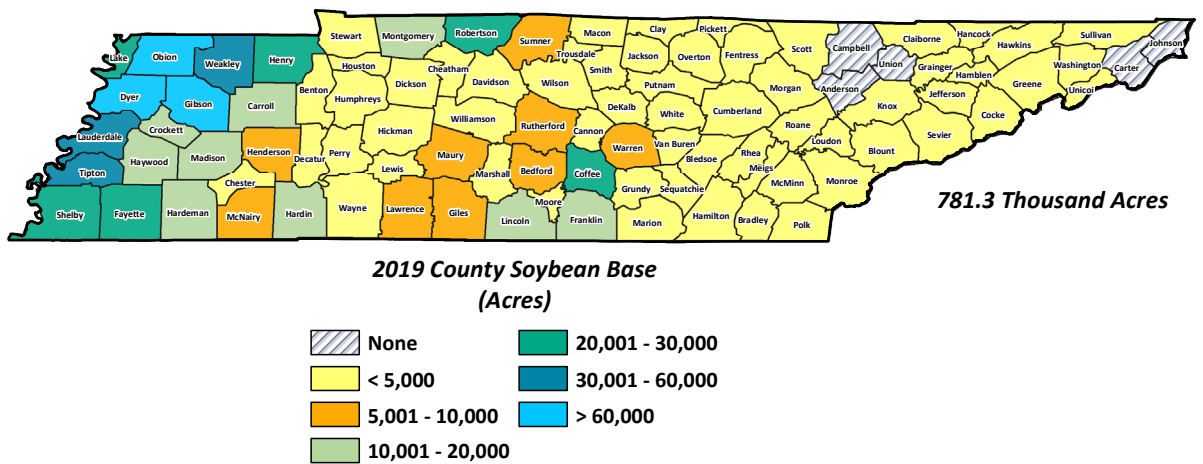


Figure 23. County Level Base Acreage for Soybeans in Tennessee, 2019.

(Source: USDA/FSA, 2021)

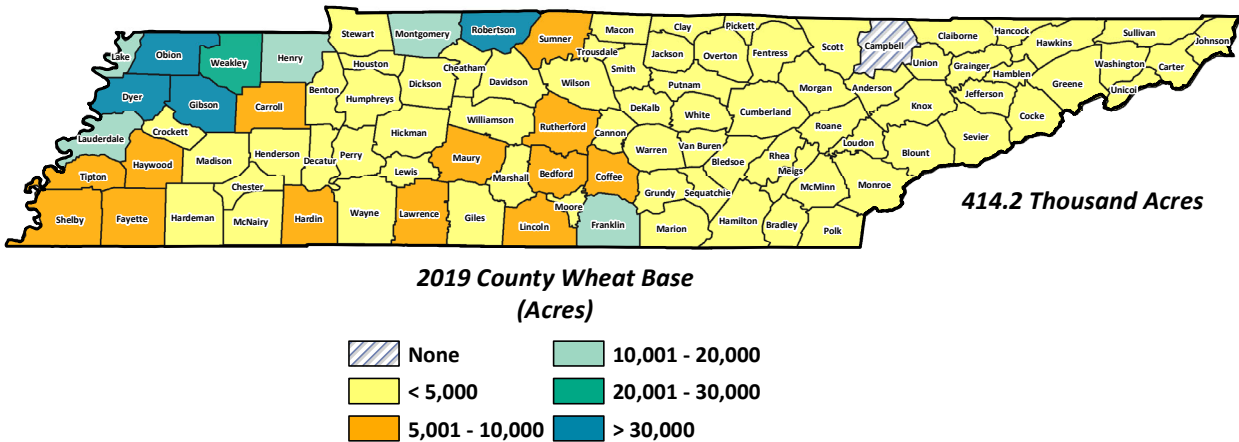


Figure 24. County Level Base Acreage for Wheat in Tennessee, 2019.

(Source: USDA/FSA, 2021)

Economic Contributions and Importance of Tennessee's Agricultural and Forestry Industrial Complex

The Tennessee Agri-Industry Model (TN-AIM) is based on the Impact Analysis for Planning (IMPLAN) model and its databases (Olson and Lindall, 1999) (see Appendix A for additional information on IMPLAN methodology). Expenditures by agriculture and forestry industries for goods and services, land, labor, capital equipment, and other materials enhance Tennessee's economy and the state's tax base. The economic benefits generated from these activities can be measured in terms of the number of jobs created and the amount of personal income accruing to residents. These impact measures can be further broken down into **direct**, plus **indirect** and **induced** (or *ripple*) effects. Total economic contributions attributable to increased business activity are computed as the sum of the direct, indirect, and induced effects. **Direct** effects are those attributable specifically to the industries expenditures in a region (i.e., agriculture/forestry input industries, commodity agriculture, logging, agriculture/forestry value-added industries). **Indirect** effects arise from the industries' expenditures on raw materials, supplies, and other operating expenses, which help to support jobs in other local businesses. **Induced**, or *ripple* effects, are created as the new income generated by the direct and indirect effects is spent and re-spent within the local economy. In this analysis only the **direct** and **total** (direct + indirect + induced) expenditures are shown.

Output from TN-AIM includes descriptive metrics of the economy including total industry output (a measure of economic activity), employment, labor income, and total value-added for 546 industries in the Tennessee economy (Appendix B). **Total industry output** is defined as the value of production by industry per year or a measure of overall economic activity by that industry. **Employment** represents total wage and salary employees, as well as self-employed jobs in a region, for both full-time and part-time workers. **Labor income** is defined as employee compensation (pay plus the value of certain benefits), and proprietary (owner-operator) income. **Total value added** is defined as all income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and excise and sales taxes collected by businesses from individuals.

In this report, Tennessee's agri-forestry industrial complex is defined to include the industries typically associated such as **Agriculture Inputs** (i.e., lime, fertilizer, chemicals, and machinery), commodity agriculture such as growing crops and the breeding of livestock (**Primary Agriculture**), and value-added sub-sectors such as food and beverage manufacturing, apparel and textiles and tobacco products (**Secondary Agriculture**). **Forestry Inputs** includes sawmill, woodworking, and paper machinery; timber tract operations; and commercial logging. **Primary Forestry** includes sawmills, wood preservation, along with pulp-, paper-, and

paperboard mills. Forestry products manufacturing comprises the **Secondary Forestry** designation used in the analyses.

Tennessee's Agricultural Economic Impact Results

Tennessee's economy was \$746.0 billion in output (economic activity) in 2019. The services industry was the largest sector of the economy at \$237.5 billion in economic activity and over 1.9 million jobs (Table 11).¹⁰ The agri-forestry industrial complex ranked fifth in terms of total industry output at \$50.6 billion. The state's value-added, or state gross regional product¹¹ (GRP), is estimated at \$382.1 billion with the agri-forestry industrial complex contributing \$15.2 billion towards the state's GDP. For every dollar of sales, the agri-forestry industrial complex contributed \$0.30 to the state's GDP, which is a little higher than manufacturing.

Table 11. Estimated Economic Indicators for Tennessee, 2019

Sector	TIO ^a	TVA ^b	Jobs	TVA/Job	TVA/TIO
	(Billion \$)		(1,000)		
Services	\$237.5	\$142.7	1,929.9	\$73,942	0.60
Manufacturing	\$141.7	\$39.5	267.2	\$147,829	0.28
Real Estate	\$61.6	\$40.4	145.3	\$278,045	0.66
Government	\$52.9	\$41.3	474.5	\$87,039	0.78
Agri-Forest Industry^c	\$50.6	\$15.2	186.9	\$81,327	0.30
Agriculture^c	\$37.0	\$10.7	147.0	\$72,789	0.29
Inputs	\$1.8	\$0.4	2.7	\$148,148	0.22
Primary Agriculture	\$4.0	\$1.2	79.9	\$15,019	0.30
Secondary Agriculture	\$31.2	\$9.1	64.4	\$141,304	0.29
Forestry^c	\$13.6	\$4.5	39.9	\$112,782	0.33
Inputs	\$0.3	\$0.2	3.2	\$55,000	0.61
Primary Forestry	\$3.5	\$1.2	5.5	\$218,182	0.34
Secondary Forestry	\$9.7	\$3.1	31.1	\$99,678	0.32
Wholesale Trade	\$43.5	\$24.7	130.4	\$189,417	0.57
Retail Trade	\$35.6	\$21.5	375.8	\$57,211	0.60
Construction	\$33.4	\$17.1	243.6	\$70,197	0.51
Finance	\$26.7	\$11.9	119.2	\$99,832	0.45
Insurance	\$24.0	\$10.2	67.0	\$152,239	0.43
Transportation	\$21.6	\$10.8	143.0	\$75,524	0.50
Miscellaneous	\$9.6	\$3.9	87.2	\$44,725	0.41
Utilities	\$4.8	\$2.1	4.1	\$512,195	0.44
Mining	\$2.6	\$0.8	7.7	\$103,896	0.31
Total^c	\$746.0	\$382.1	4,181.8		

^aTotal Industry Output – annual value of production by industry.

^bTotal Value Added – income to workers paid by employers; self-employed income; interest, rents, royalties, dividends, and profit payments; and production and import taxes.

^cTotal may not add due to rounding.

State Level Economic Impacts

Direct economic activity for total industry output (TIO), employment, labor income, and total value-added (TVA) for agriculture and forestry for the state are presented in Table 12. ***In 2019, agriculture and forestry related industries contributed a total of \$50.6 billion in direct economic activity to the state of Tennessee, or***

¹⁰Agricultural services (i.e., landscape/horticultural services (NAICS 561730) and veterinary services (NAICS 541940)) are excluded.

¹¹The state's gross regional product is measured by summing employee compensation, proprietor income, other property type income, and production and import taxes. It is analogous to Gross Domestic Product for the entire U.S.

6.8 percent of the state's economy. Direct employment in agriculture and forestry related industries was close to 187 thousand persons, or 4.5 percent of the workforce. Direct total value added was \$15.2 billion, with \$7.1 billion in labor income. Much of the industry output generated from agri-forestry industrial complex was generated through secondary or manufactured products. For agriculture, approximately 54.3 percent of the workforce was employed in primary agriculture (crop and livestock commodities), 43.8 percent in secondary agriculture (food and beverage, tobacco products, and textile manufacturing) and 1.8 percent in agricultural inputs (agricultural chemicals and machinery). For forestry, 78.2 percent of the forestry workforce was employed in secondary forestry (wood products manufacturing), 13.8 percent in primary forestry (pulp, paper, and paperboard mills; sawmills; and wood preservation), and 8.1 percent in forestry inputs (forestry machinery, timber tract production,¹² and commercial logging).

Table 12. Direct Economic Activity in Agriculture and Forestry for Tennessee, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
All Sectors^d	745,989	4,181,903	245,987	382,087
Agriculture & Forestry	50,595	186,871	7,136	15,156
Agriculture	37,026	147,017	4,524	10,661
Inputs	1,815	2,693	195	401
Primary Agriculture	3,957	79,887	-24	1,186
Secondary Agriculture	31,253	64,437	4,353	9,075
Forestry	13,569	39,854	2,612	4,495
Inputs	345	3,223	222	216
Primary Forestry	3,461	5,485	456	1,191
Secondary Forestry	9,763	31,146	1,934	3,087

^aTotal Industry Output—annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added—income to workers paid by employers; self-employed income; interest, rents, royalties, dividends, and profit payments; and production and import taxes.

^dIncludes non-agricultural and non-forestry (total economy).

Agricultural and Forestry Inputs:

The largest output value for agricultural inputs was from agricultural machinery followed by agricultural chemicals (Table 13). Approximately 63.1 percent of the total value for total industry output came from agricultural machinery. Agricultural machinery also had the largest employment, labor income, and total value added as well. For forestry inputs, commercial logging had the largest output value, employment, labor income, and total value added, followed by sawmill, woodworking, and paper machinery, and forestry, forest products, and timber tract production. A more detailed presentation of the total industry output from processing by sub-sector is shown in Appendixes C and D.

¹²Includes growing trees for reforestation; growing forest products such as gums, barks, balsam needles, rhizomes, fibers, and ginseng; and timber tracts for selling timber.

Table 13. Direct Economic Activity in Agricultural and Forestry Inputs, 2019

Sector	TIO ^a (Million \$)	Employment (Number)	Labor Income ^b (Million \$)	TVA ^c (Million \$)
Total Agriculture Inputs	1,815	2,693	195	401
Agricultural Machinery	1,146	2,112	126	223
Agricultural Chemicals	669	581	68	177
Total Forestry Inputs	345	3,223	222	216
Commercial Logging	274	2,789	191	182
Sawmills, Woodworking, & Paper Machinery	46	164	13	14
Forestry, Forest Products, & Timber Tract Operations	24	269	18	20

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

Primary and Secondary Agricultural Products:

The largest output value (18.1 percent) for the state for agriculture commodities from farm production was from grain farming (Table 14), followed by oilseed farming (primarily soybeans) (14.8 percent); poultry and egg production (13.6 percent); beef cattle farming (12.5 percent); cotton farming (8.3 percent); greenhouse, nursery, and floriculture production (7.9 percent); agriculture and forestry support activities (6.6 percent);¹³ vegetable and melon farming (4.8 percent); all other crop farming (4.1 percent); animal production, except cattle, poultry, and eggs (3.8 percent); dairy cattle and milk production (2.7 percent), and tobacco farming (2.0 percent). In terms of labor income, agriculture and forestry support activities had the largest value followed by greenhouse, nursery, and floriculture production; cotton farming; tobacco farming; poultry and egg production; and all other crop farming (primarily hay/seed farming). Many of state's more prominent agriculture commodities had negative labor incomes (because of large negative values or losses in proprietor income resulting from the decreases in commodity prices) with the largest for oilseed farming (primarily soybeans), followed by grain farming; beef cattle farming; animal production, except cattle, poultry, vegetable and melon farming; and dairy cattle and milk production. The largest total value added contributors included oilseed farming (primarily soybeans); agriculture and forestry support activities; beef cattle farming; greenhouse, nursery, and floriculture production; animal production, except cattle, poultry, and eggs; cotton farming; grain farming; poultry and egg production; and vegetable and melon farming.

¹³Includes support activities for crop production (i.e., cotton ginning; soil preparation, planting, and cultivating; crop harvesting; and farm management services), animal production (i.e., breeding services, pedigree record services boarding horses, dairy herd improvement activities, livestock spaying, and sheep dipping and shearing), and forestry (i.e., estimated timber, forest fire-fighting, forest pest control, and consulting on wood attributes and reforestation).

Table 14. State Level: Direct Economic Activity in Farm Production, 2019

Rank	Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
		(Million \$)	(Number)	(Million \$)	(Million \$)
	All Farm Production	3,957	79,887	-24	1,186
1	Grain farming	718	8,185	-52	61
2	Oilseed farming	584	3,509	-149	341
3	Poultry & egg production	537	2,342	2	48
4	Beef cattle farming	495	14,740	-36	130
5	Cotton farming	327	4,589	18	87
6	Greenhouse, nursery, & floriculture production	313	4,769	26	100
7	Agriculture & forestry support activities	260	7,627	222	195
8	Vegetable & melon farming	191	3,537	-25	43
9	All other crop farming	164	22,928	2	33
10	Animal production, except cattle/poultry/eggs	150	4,496	-30	98
11	Dairy cattle & milk production	107	542	-4	10
12	Tobacco farming	78	1,890	4	28
13	Commercial hunting & trapping	18	311	1	6
14	Fruit farming	12	350	-3	4
15	Tree nut farming	2	74	-1	1

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

Among secondary agricultural products, food manufacturing contributed the largest total industry output, followed by beverage manufacturing, tobacco products manufacturing, textile mills, textile product mills, apparel manufacturing, and leather and allied product manufacturing (Table 15). Approximately 69.1 percent of the total value of total industry output from processed agricultural products came from food manufacturing. In addition, food manufacturing employed the largest number of workers, had the largest amount of labor income, and contributed the largest amount in total value added when compared to other agriculture value added industries.

Table 15. Direct Economic Activity in Secondary Agricultural Products, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
Total Secondary Agriculture	31,253	64,437	4,353	9,075
Food Manufacturing	21,606	44,796	3,232	5,285
Beverage Manufacturing	3,922	6,561	407	1,137
Tobacco Products Manufacturing	3,271	1,098	102	1,873
Textile Mills	1,329	3,624	222	356
Textile Product Mills	533	2,806	130	174
Apparel Manufacturing	521	5,049	244	236
Leather & Allied Product Manufacturing	71	504	15	13

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

Primary and Secondary Forest Products:

The largest output value for primary forest products was from paper mills, followed by paperboard mills; sawmills; pulp mills; and wood preservation (Table 16). Approximately 38.8 percent and 33.7 percent of the total value of total industry output from primary forest products came from paper mills and paperboard mills, respectively. Paper mills, paperboard mills, and sawmills employed the largest numbers. Total value added was the largest for paper mills and paperboard mills.

Table 16. Direct Economic Activity in Primary Forest Products, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
Total Primary Forest Products	3,461	5,485	456	1,191
Paper Mills	1,341	1,503	172	518
Paperboard Mills	1,167	1,086	145	431
Sawmills	816	2,693	122	202
Pulp Mills	75	95	12	25
Wood Preservation	61	107	5	16

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

For secondary forest products, paper manufacturing had the largest output value, followed by furniture and related products manufacturing; other wood products; wood windows and doors and millwork; manufactured homes manufacturing; and veneer, plywood, and engineered wood product manufacturing (Table 17). The paper manufacturing sector was comprised of paperboard containers, paper bags and coated and treated paper, stationery products, and other converted paper products. Furniture and related products manufacturing was comprised of household and institutional, office, and other (mattress, blind and shades) furniture categories. The other wood products manufacturing category was comprised of wood containers and pallets, miscellaneous wood products, and kitchen cabinets and countertops.

Table 17. Direct Economic Activity in Secondary Forest Products, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
Total Secondary Forest Products	9,763	31,146	1,934	3,087
Paper Manufacturing	5,341	9,984	783	1,583
Furniture & Related Products Manufacturing	1,645	8,291	439	475
Other Wood Products Manufacturing	849	4,896	227	305
Wood Windows & Doors & Millwork	737	3,070	166	266
Manufactured Homes Manufacturing	704	3,303	218	287
Veneer, Plywood, & Engineered Wood Products Manufacturing	487	1,602	101	171

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

Estimated Total Economic Impacts of Agriculture and Forestry:

The estimated total economic impacts of agriculture and forestry included not only the direct impacts from the industry, but also the impacts the industry had on input supplying industries (indirect impacts) and on expenditures by households (induced impacts). The total economic impacts from agriculture and forestry included direct, indirect, and induced impacts. Table 18 includes values for total industry output, employment, labor income, and value added resulting from agriculture and forestry, including the indirect and induced impacts. Agriculture and forestry contributed an estimated value of \$78.0 billion to Tennessee's \$746.0 billion economy in 2019. A more detailed total impact presentation of output, employment, labor income, and value added by sub-sector is shown in Appendix D.

Table 18. Estimated Total Economic Impacts from Agriculture and Forestry, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
Agriculture & Forestry	78,042	342,658	15,970	29,477
Agriculture	56,304	257,076	10,677	20,630
Inputs	2,751	7,530	493	889
Primary Agriculture	6,493	101,121	667	2,465
Secondary Agriculture	47,061	148,425	9,517	17,276
Forestry	21,738	85,582	5,293	8,847
Inputs	654	5,768	338	397
Primary Forestry	5,679	16,916	1,153	2,328
Secondary Forestry	15,405	62,898	3,802	6,121

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

Agricultural and Forestry Inputs Total Impacts:

The largest values for the descriptive metrics calculated for total agricultural inputs was from agricultural machinery (Table 19). Agricultural machinery comprised 62.7 percent of the output value. Lawn and garden equipment manufacturing was the largest output contributor for total agricultural inputs. For total forestry inputs, commercial logging had the largest output value, employment, labor income, and total value

added, followed by sawmill, woodworking, and paper machinery, and forestry, forest products, and timber tract production.

Table 19. Estimated Total Economic Impacts from Agricultural and Forestry Inputs, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
Total Agriculture Inputs	2,751	7,530	493	889
Agricultural Machinery	1,724	5,111	312	524
Agricultural Chemicals	1,027	2,419	181	366
Total Forestry Inputs	654	5,768	338	397
Commercial Logging	523	4,904	284	327
Sawmills, Woodworking, & Paper Machinery	87	416	28	38
Forestry, Forest Products, & Timber Tract Operations	45	447	26	32

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

Primary and Secondary Agricultural Products Total Impacts:

Figures 25 through 30 depict the estimated direct, indirect, and induced impacts for Tennessee's top agricultural commodities from farm production (oilseeds; grains; vegetables and melons; greenhouse, nursery, and floriculture production; tobacco; cotton; all other crops (primarily hay/seeds); beef cattle; dairy cattle and milk production; poultry and egg production; and animal production, except cattle, poultry, and eggs). The top five indirect and induced sectors impacted based on output value are also listed. Using oilseed farming as an example, which has direct sales of \$805.3 million, the indirect economic impacts from input supplying industries are \$334.7 million (29.1 percent of total \$1.1 billion) and the induced impacts (expenditures by households are \$8.8 million (0.8 percent of total \$1.1 billion)). The top five sectors most impacted from the indirect impact (in descending order) included agriculture and forestry support activities, real estate, wholesale trade, nonresidential construction maintenance and repair, and truck transportation. Likewise, from household expenditures (induced impacts) the sectors most impacted (in descending order) based on output value included hospitals, real estate, owner-occupied dwellings, wholesale trade, and offices of physicians. For secondary agricultural products and for all indicators calculated (output, employment, labor income, and value added), food manufacturing contributed the greatest total economic impact values (Table 20). Beverage manufacturing was next except for total value added where tobacco products had the largest value.

Table 20. Estimated Total Economic Impacts from Secondary Agricultural Products, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
Total Secondary Agricultural Products	49,811	155,955	10,010	18,165
Food Manufacturing	32,888	104,965	6,964	11,103
Beverage Manufacturing	5,995	17,091	1,054	2,220
Tobacco Products	4,400	6,743	452	2,462
Textile Mills	1,888	6,527	400	648
Textile Product Mills	1,010	6,156	292	422
Apparel Manufacturing	753	6,145	322	378
Leather & Allied Product Manufacturing	128	797	33	44

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

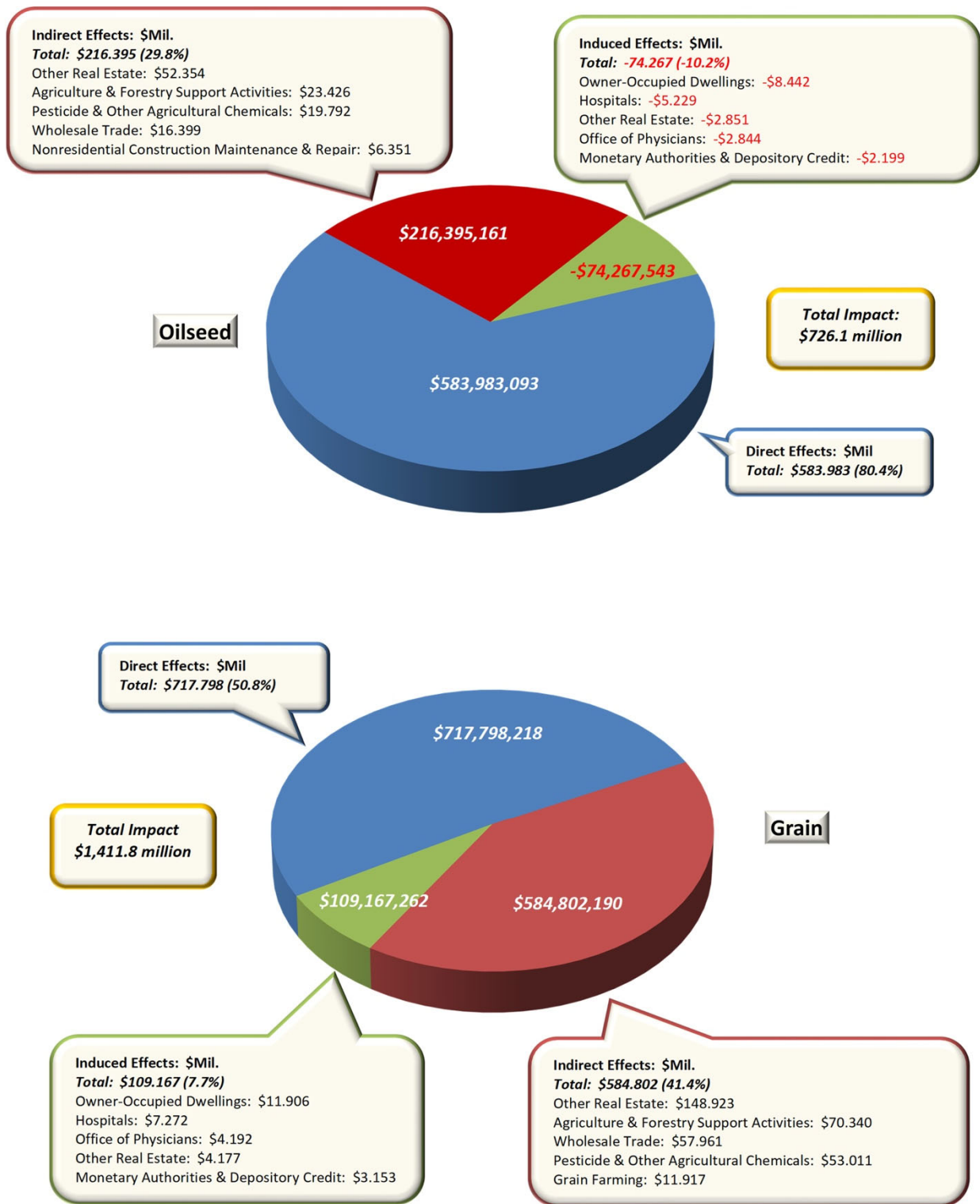


Figure 25. Estimated Direct, Indirect, and Induced Impacts for Oilseed Farming and Grain Farming.

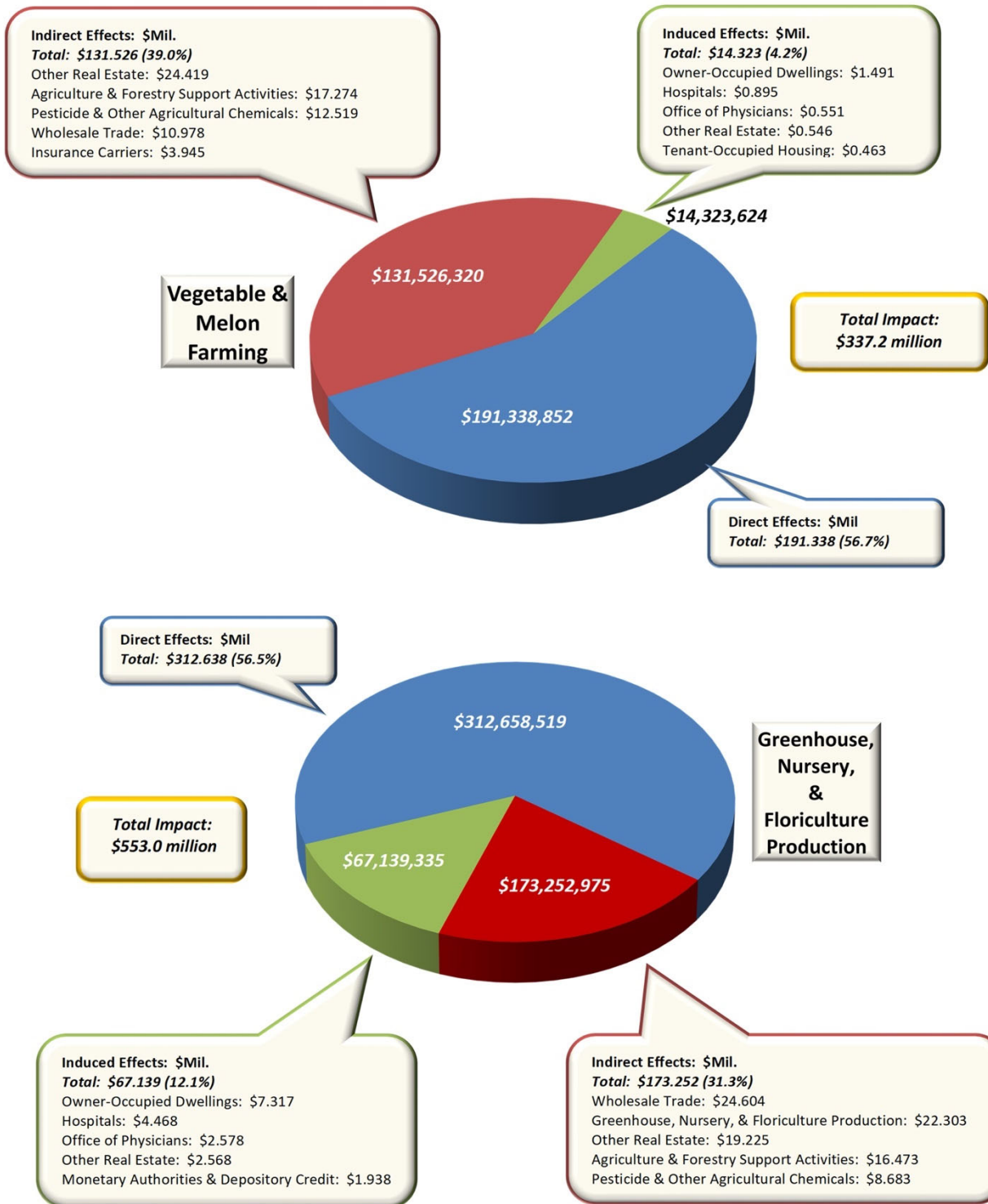


Figure 26. Estimated Direct, Indirect, and Induced Impacts for Vegetable & Melon Farming and Greenhouse, Nursery, & Floriculture Production.

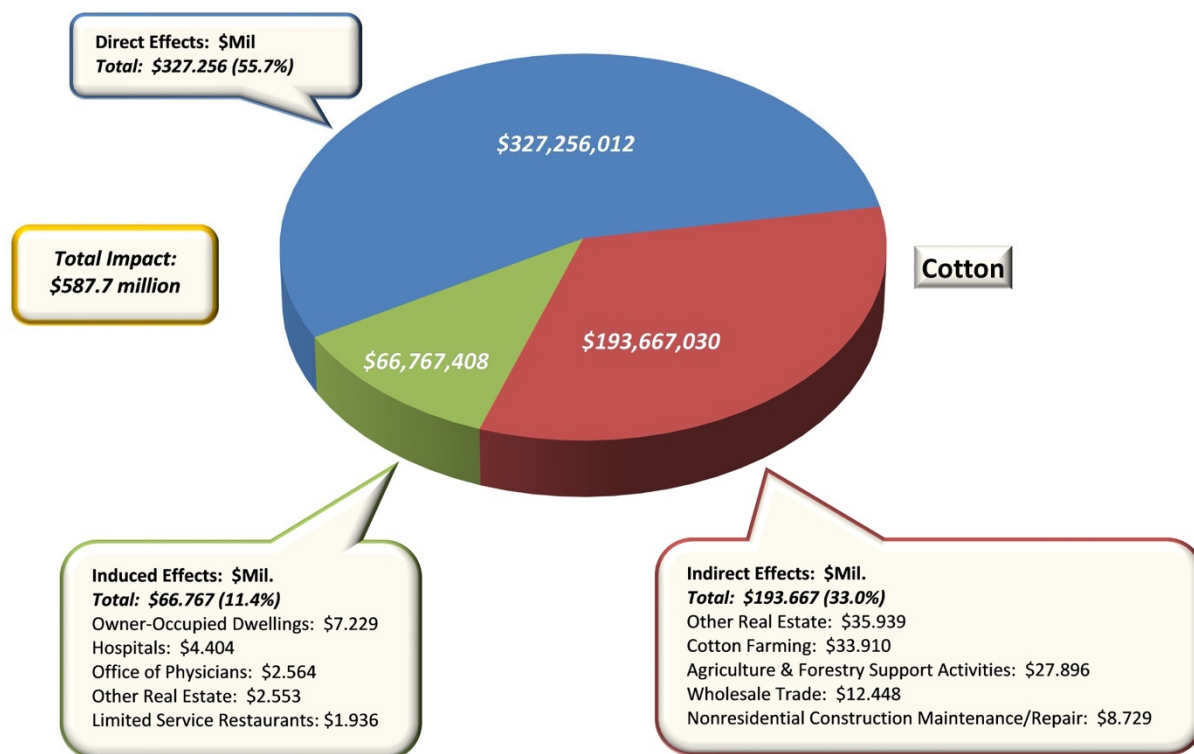
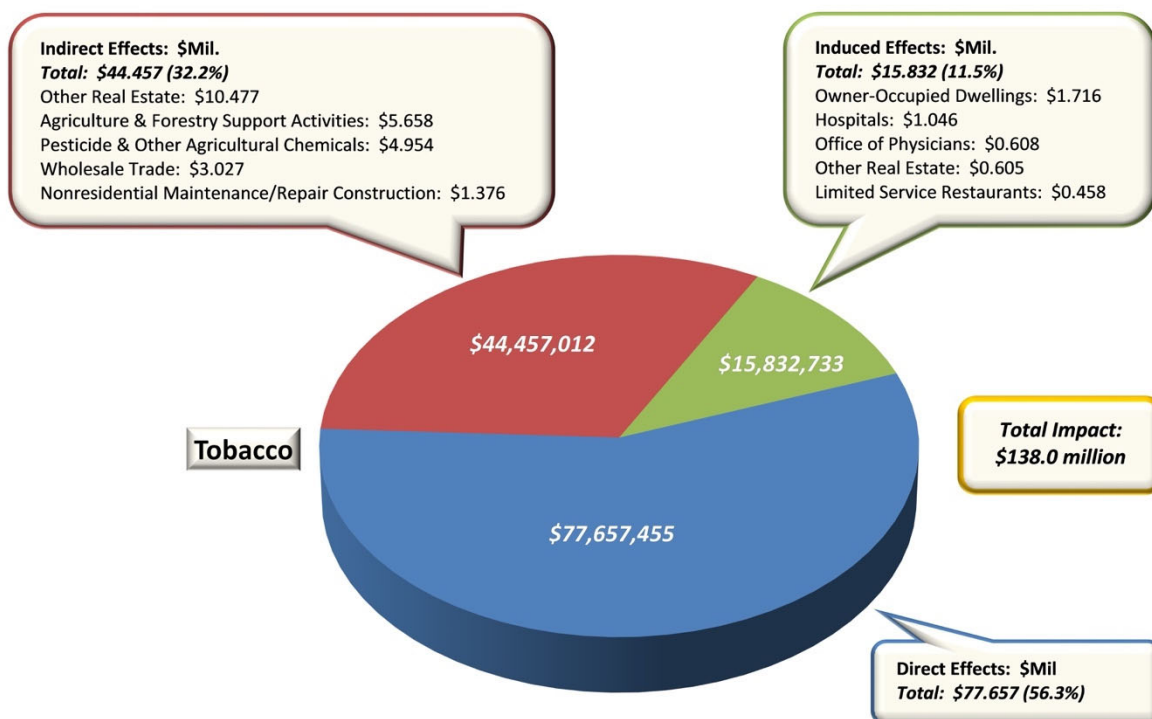


Figure 27. Estimated Direct, Indirect, and Induced Impacts for Tobacco Farming and Cotton Farming.

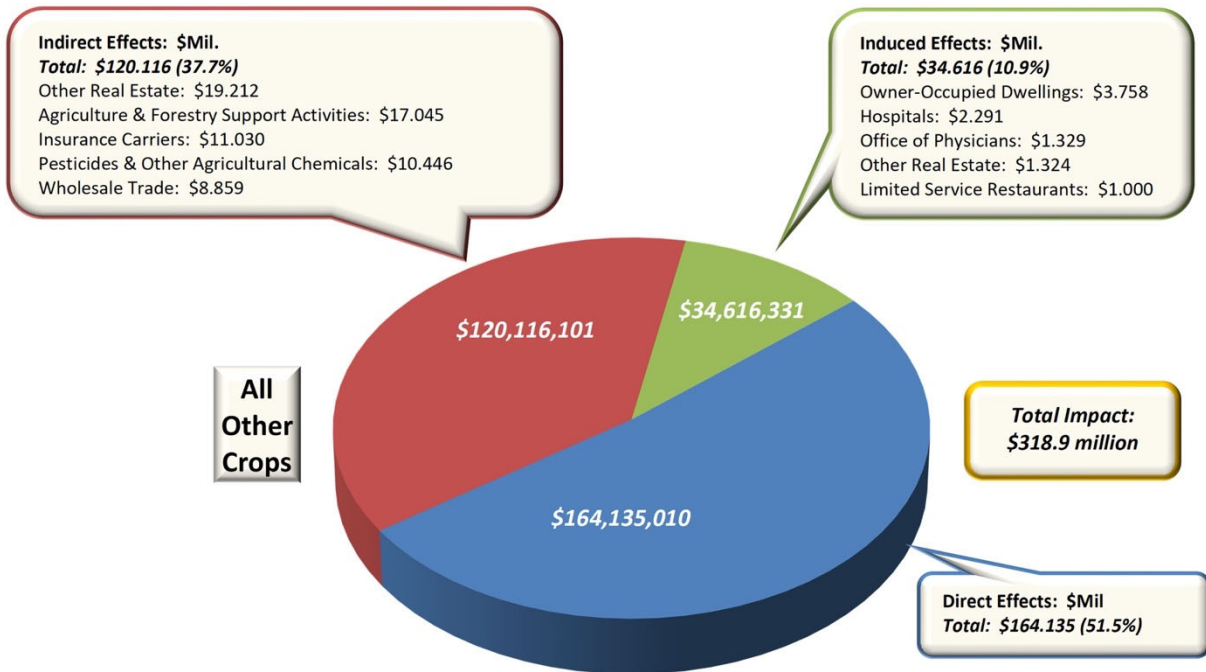


Figure 28. Estimated Direct, Indirect, and Induced Impacts for All Other Crop Farming.

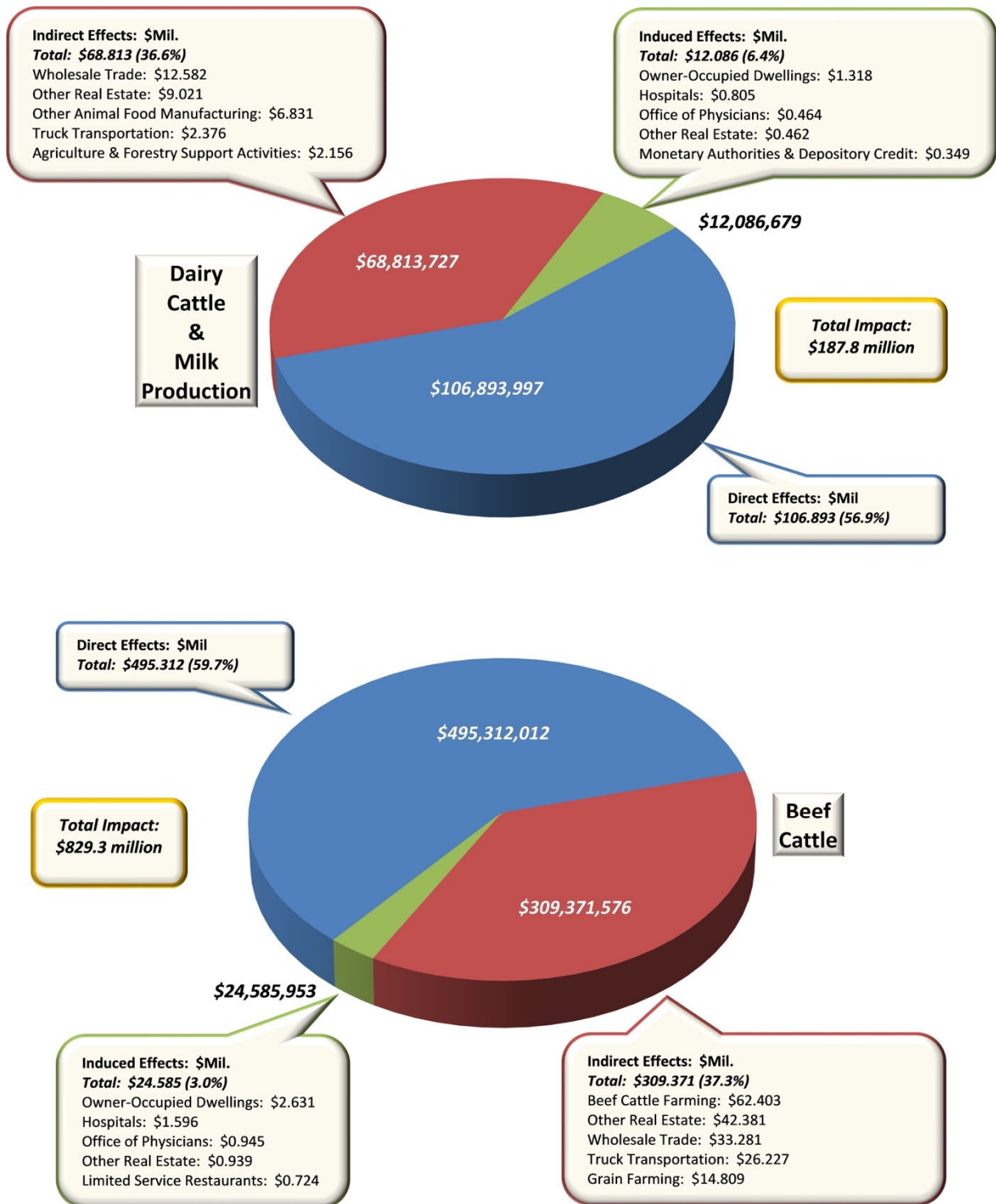


Figure 29. Estimated Direct, Indirect, and Induced Impacts for Dairy Cattle & Milk Production and Beef Cattle Farming.

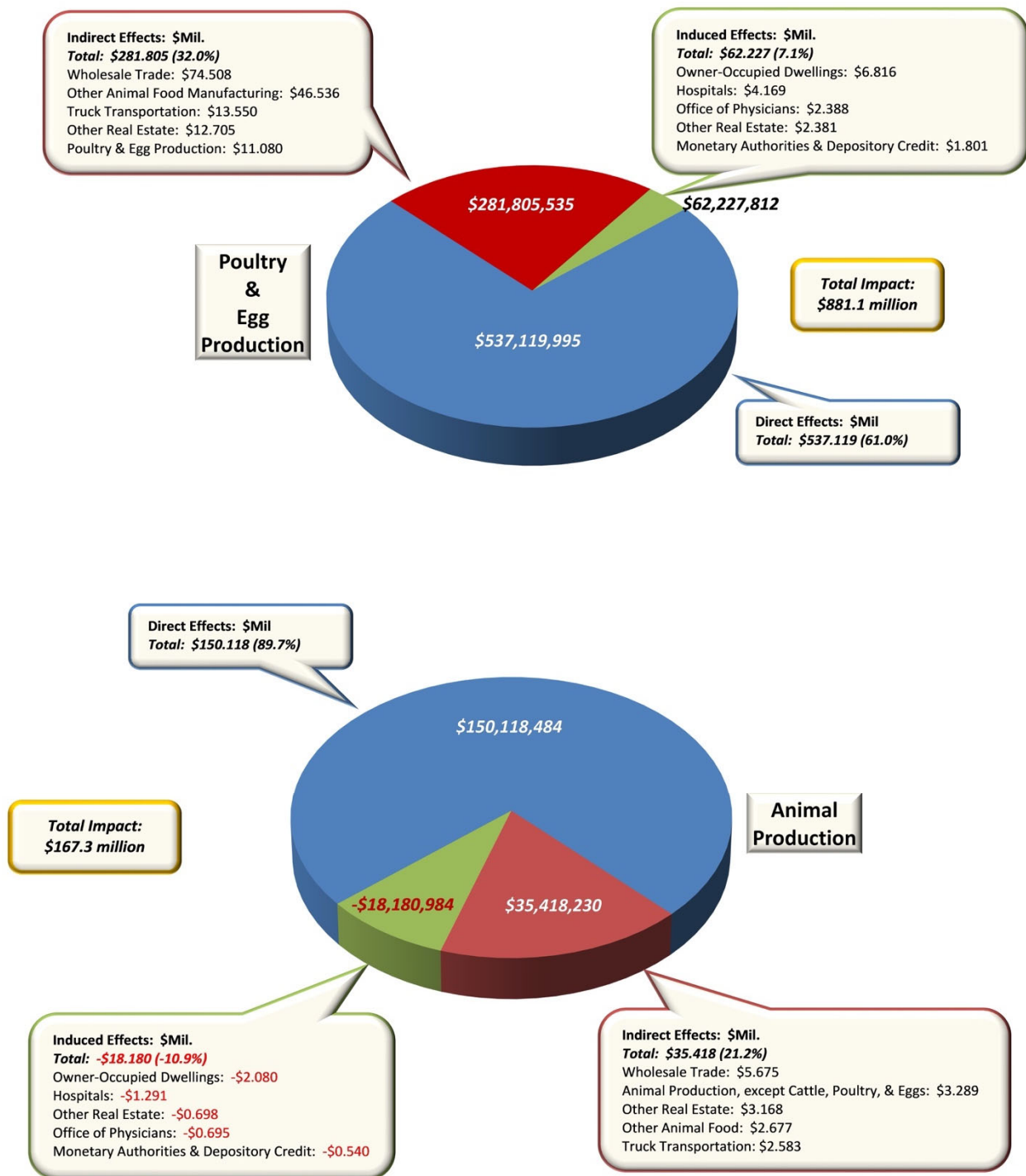


Figure 30. Estimated Direct, Indirect, and Induced Impacts for Poultry & Egg Production and Animal Production, except Cattle, Poultry, & Eggs.

Primary and Secondary Forest Products Total Impacts:

Figures 31 shows the estimated direct, indirect, and induced impacts for sawmills and commercial logging. The top five indirect and induced sectors based on output value are also listed. Paper mills contributed the largest values for all the indicators analyzed compared to the other primary forest products sectors (Table 21). After paper mills, paperboard mills, sawmills, and commercial logging had the largest values for all the indicators analyzed.

Table 21. Estimated Total Economic Impacts from Primary Forest Products, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
Total Primary Forest Products	6,333	22,684	1,492	2,725
Paper Mills	2,080	5,248	403	899
Paperboard Mills	1,909	4,864	375	809
Sawmills	1,454	6,097	326	532
Pulp Mills	128	366	29	51
Wood Preservation	108	340	19	38

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

For all indicators for secondary forest products, paper manufacturing, furniture and related product manufacturing, and other wood products manufacturing were the largest contributors (Table 22). Wood windows, doors, and millwork plus manufactured homes manufacturing also had large numbers of employees.

Table 22. Estimated Total Economic Impacts from Secondary Forest Products, 2019

Sector	TIO ^a	Employment	Labor Income ^b	TVA ^c
	(Million \$)	(Number)	(Million \$)	(Million \$)
Total Secondary Forest Products	15,405	62,898	3,802	6,121
Paper Manufacturing	7,937	24,399	1,638	2,982
Furniture & Related Products Manufacturing	2,865	15,201	846	1,132
Other Wood Products Manufacturing	1,440	8,262	425	624
Wood Windows & Doors & Millwork	1,208	5,750	323	517
Manufactured Homes Manufacturing	1,180	6,106	376	541
Veneer, Plywood, & Engineered Wood Products Manufacturing	775	3,180	195	325

^aTotal Industry Output – annual value of production by industry.

^bLabor Income – employment compensation (wage and salaries plus benefits) and proprietary income (payments received by self-employed individuals and unincorporated business owners).

^cTotal Value Added – income to workers paid by employers; self-employed income; interests, rents, royalties, dividends, and profit payments; and production and import taxes.

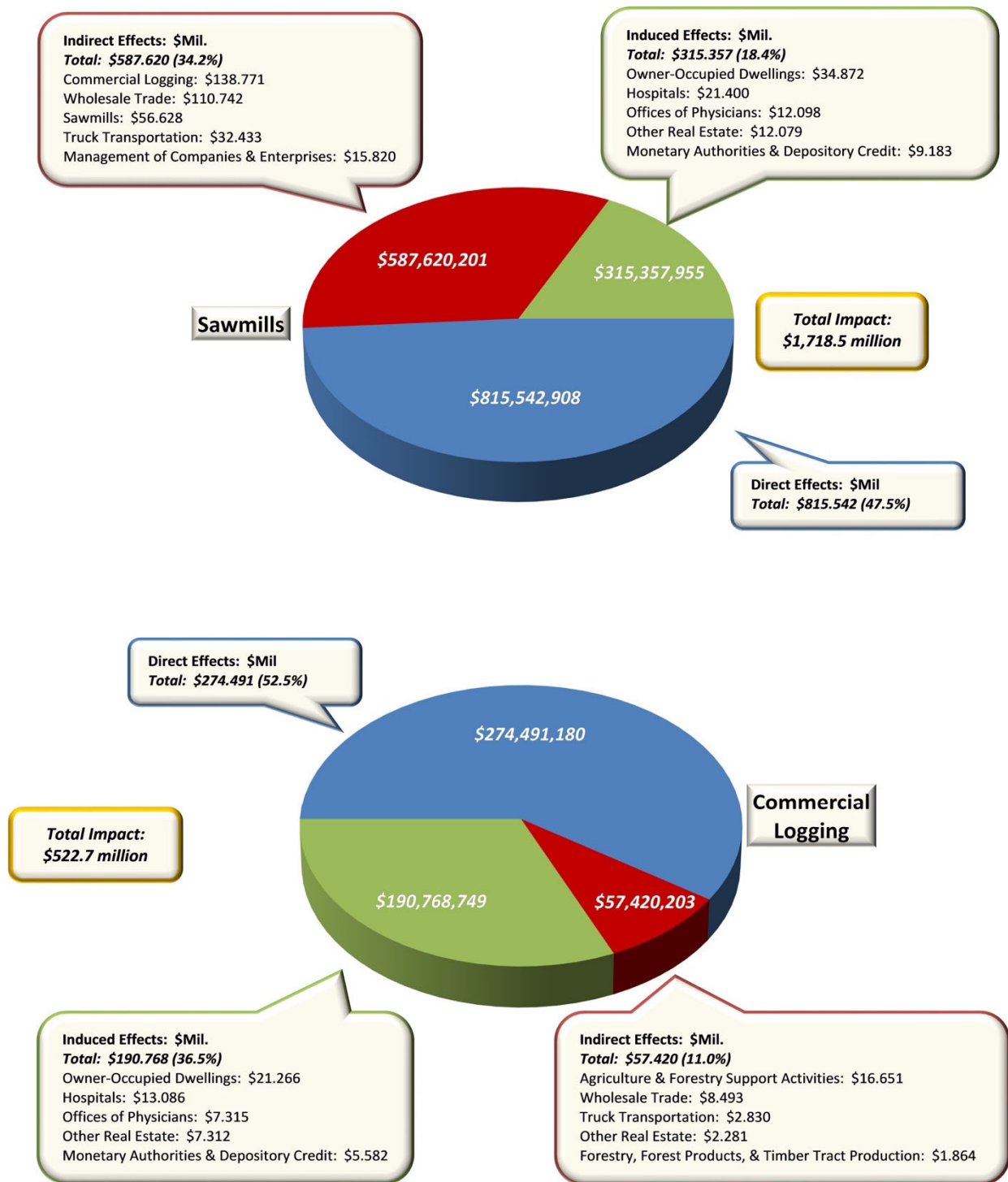


Figure 31. Estimated Direct, Indirect, and Induced Impacts for Sawmill and Commercial Logging.

The 2019 output and employment multipliers for primary agricultural and forestry activities ranged from 1.107 to 1.930 (highlighted in yellow) for total industrial output and 1.029 to 4.479 for employment (Table 23). For interpretation, if grain farming increased total industry output by \$1 million, the state's economy would increase by an estimated \$0.85 million overall, and for each job created in this same industry an estimated .63 additional jobs would be added in other industries. Paperboard mills that produce \$1 million of total industry output generated an additional \$0.42 million indirectly through the purchase of inputs and \$0.64 million in total economic activity (purchased inputs plus household spending) within the state.

Table 23. Output and Employment Multipliers for Selected Agriculture and Forestry Sectors, 2019

IMPLAN Sector	TIO ^a		Employment	
	Indirect	Indirect & Induced	Indirect	Indirect & Induced
Oilseed farming	1.324	1.190	1.514	1.371
Grain farming	1.712	1.850	1.549	1.626
Vegetable & melon farming	1.597	1.660	1.295	1.317
Fruit farming	1.472	1.456	1.204	1.200
Tree nut farming	1.451	1.424	1.170	1.165
Greenhouse, nursery, and floriculture	1.515	1.724	1.296	1.384
Tobacco farming	1.485	1.677	1.189	1.239
Cotton farming	1.568	1.769	1.422	1.514
All other crop farming	1.644	1.843	1.044	1.053
Dairy cattle & milk production	1.619	1.729	1.800	1.938
Beef cattle farming	1.611	1.658	1.242	1.253
Poultry & egg production	1.518	1.633	1.570	1.739
Animal production, except cattle/poultry/eggs	1.229	1.107 ^b	1.068	1.042 ^b
Commercial hunting & trapping	1.413	1.568	1.152	1.210
Agriculture & forestry support activities	1.150	1.930 ^b	1.029	1.200
Commercial logging	1.209	1.904	1.318	1.758
Sawmills	1.515	1.783	1.742	2.264
Wood preservation	1.536	1.747	2.392	3.169
Pulp mills	1.436	1.691	2.543	3.837
Paper mills	1.349	1.551	2.333	3.491
Paperboard mills	1.418	1.635	2.980	4.479 ^b
Forestry, forest products, & timber tracts	1.120	1.840	1.242	1.662

^aTotal Industry Output – annual value of production by industry.

^bDenoting the lowest or highest multipliers for total industrial output and employment.

Figures 32 through 37 compares each of Tennessee's 95 individual county's direct agriculture and forestry economic activity to that particular county's entire economy (all economic activity for the county). These values were based on each individual county's total industry output for those industries. In this analysis, primary agriculture included crop production and livestock breeding and feeding, whereas primary forestry included the management and logging of trees. All agriculture included primary agriculture, plus the input supplying industries and agriculture manufacturing. Likewise, all forestry included primary forestry, plus input supplying industries and forestry manufacturing. Clay County had the highest level of economic activity for primary agriculture at 15.0 percent, followed by Lake County at 14.6 percent (Table 24). For all agriculture, Moore County had the highest level at 64.8 percent, followed by Meigs County at 31.5 percent. For primary forestry, Grundy County followed by Macon County had the highest level of economic activity at 1.5 percent and 1.4 percent; for all forestry, Hardin County and Grainger County had the highest levels at 23.7 percent and

19.9 percent. For both primary agriculture and primary forestry combined, Clay County (15.8 percent for direct) and Moore County (65.5 percent for total) had the highest levels of economic activity.

Table 24. Tennessee Counties with the Highest Proportion of Economic Activity for Agriculture and Forestry, 2019

Rank	Agriculture		Forestry		Combined	
	Primary	All	Primary	All	Primary	All
1 st	Clay (15.0 %)	Moore (64.8%)	Grundy (1.5%)	Hardin (23.7%)	Clay (15.8%)	Moore (65.5%)
2 nd	Lake (14.6%)	Meigs (31.5%)	Macon (1.4%)	Grainger (19.9%)	Lake (14.7%)	Meigs (34.0%)

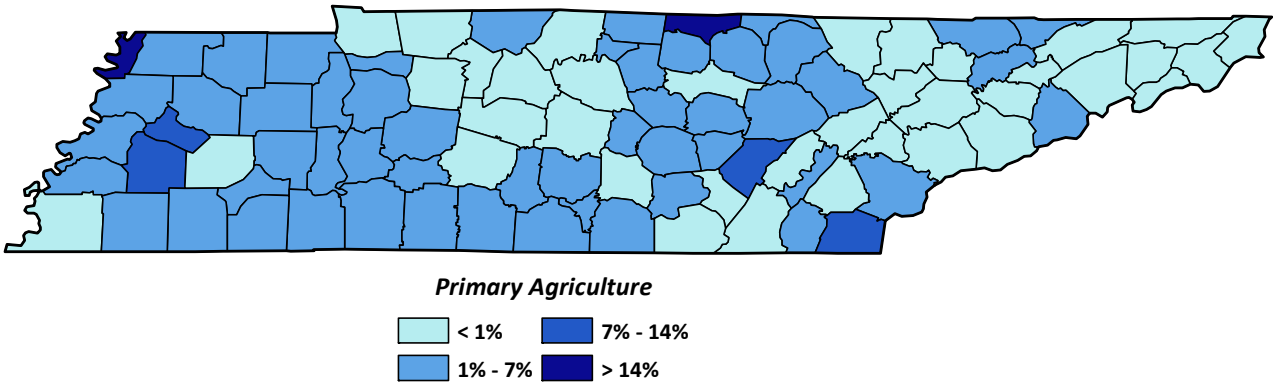


Figure 32. Percent of Direct Economic Activity from Primary Agriculture, 2019.
(Source: IMPLAN Group, LLC, 2019)

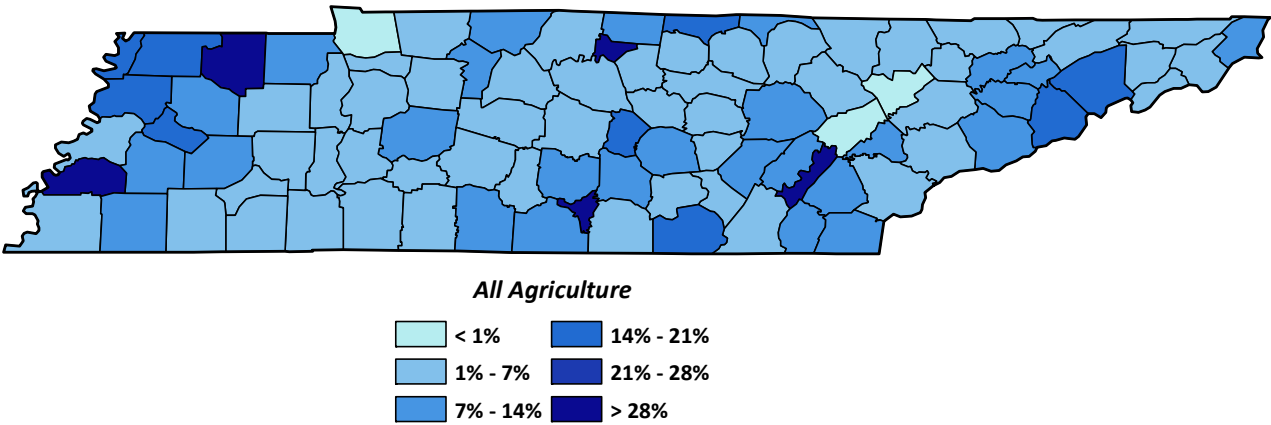


Figure 33. Percent of Direct Economic Activity from All Agriculture, 2019.
(Source: IMPLAN Group, LLC, 2019)

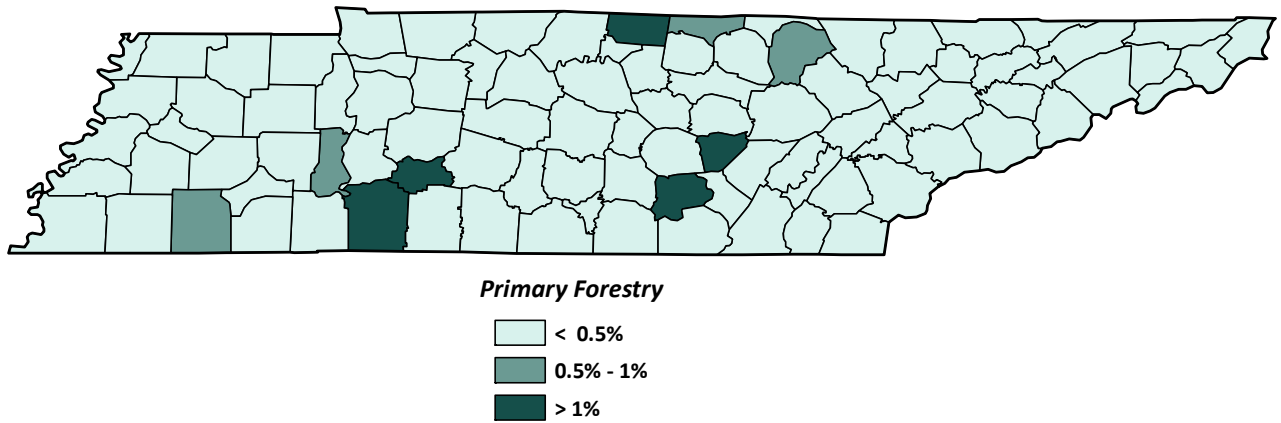


Figure 34. Percent of Direct Economic Activity from Primary Forestry, 2019.

(Source: IMPLAN Group, LLC, 2019)

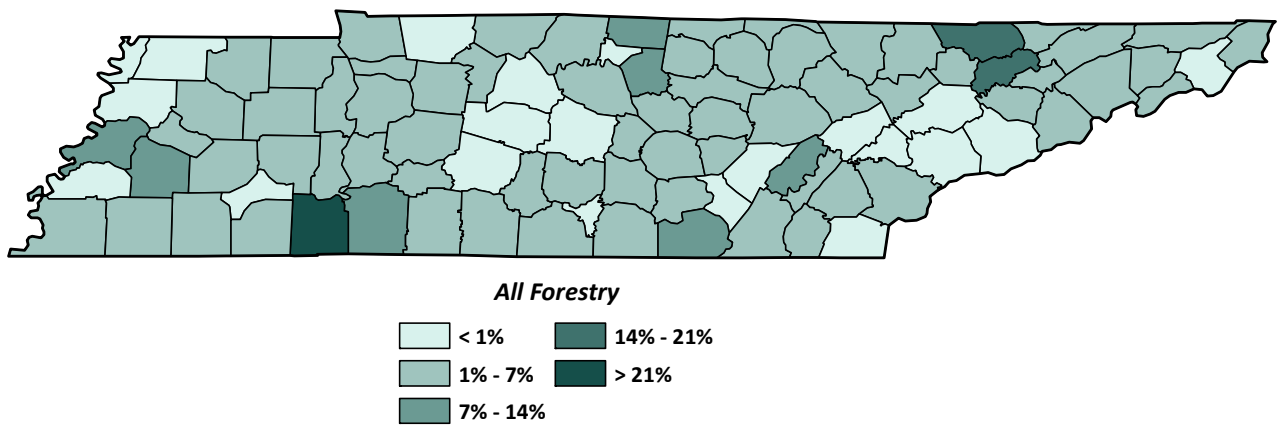


Figure 35. Percent of Direct Economic Activity from All Forestry, 2019.

(Source: IMPLAN Group, LLC, 2019)

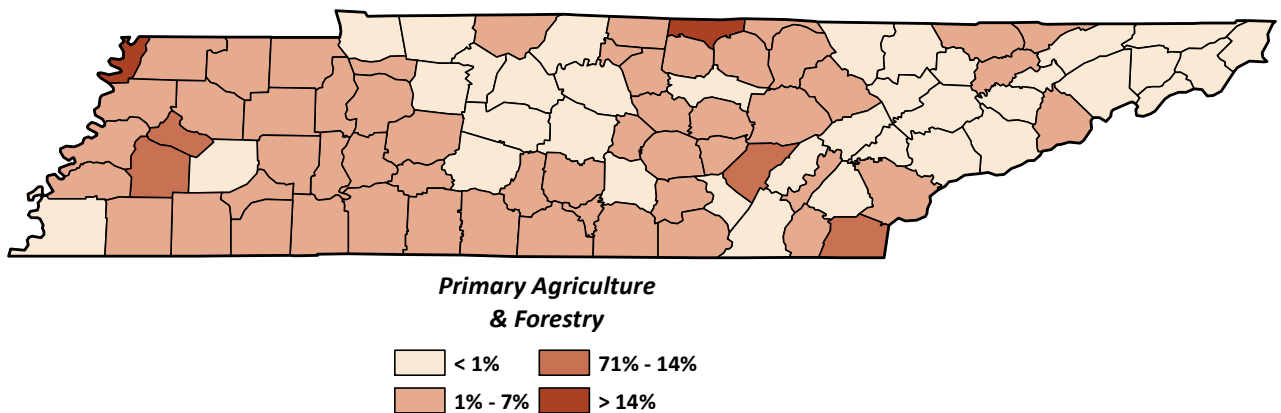


Figure 36. Percent of Direct Economic Activity from Primary Agriculture and Forestry, 2019.

(Source: IMPLAN Group, LLC, 2019)

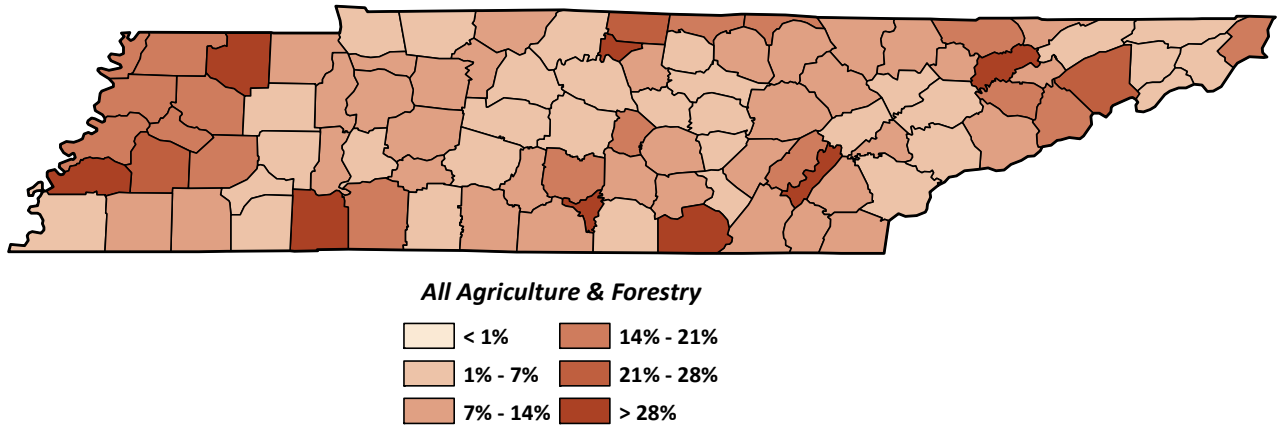


Figure 37. Percent of Direct Economic Activity from All Agriculture and Forestry, 2019.

(Source: IMPLAN Group, LLC, 2019)

Tax Impacts from Tennessee Agriculture and Forestry

Total tax collection revenues for Tennessee in fiscal year 2019 estimated at close to \$18.5 billion in the form of local and state taxes (TN Department of Revenue, 2021). Based on the IMPLAN data for Tennessee in 2019, tax impacts at the state and local level as a result of direct and multiplier effects for agriculture and forestry (includes the production and processing of agricultural and forest products and the input suppliers of these products) are estimated at \$2.1 billion (Table 25). An additional \$3.6 billion is generated for the federal government. Agriculture tax revenues are estimated at \$1.6 billion for state/local and \$2.5 billion for federal; for forestry, \$0.5 billion in tax revenues are generated for state/local and \$1.1 billion in federal. For state/local tax revenues, taxes on imports and production for both agriculture and forestry have the largest value; for federal tax revenues, personal (household) taxes have the largest value.

Table 25. Estimated State/Local and Federal Tax Revenues from Tennessee Agriculture and Forestry, 2019

	State & Local Revenues	Federal Revenues
	(Million \$)	
Agriculture^a		
Production & import taxes ^b	\$1,341.8	\$214.7
Corporate profits taxes ^c	\$157.3	\$281.8
Personal (household) taxes ^d	\$58.1	\$2,000.5
Total	\$1,557.2	\$2,497.0
Forestry^a		
Production & import taxes ^b	\$458.2	\$73.3
Corporate profits taxes ^c	\$28.8	\$100.0
Personal (household) taxes ^d	\$55.8	\$973.5
Total	\$542.8	\$1,146.8
Agriculture & Forestry Total	\$2,100.0	\$3,643.8

^aIncludes the production and processing of agricultural and forest products and the input suppliers of these products.

^bFor state/local, sales taxes, property taxes, motor vehicle licenses taxes, severance taxes, other taxes, and state/local non-taxes; for federal, excise taxes, custom duty taxes, and non-taxes.

^cFor state/local, includes dividends and corporate profits tax; for federal, corporate profit tax only.

^dFor state/local, income taxes, non-taxes (fines & fees), motor vehicle license taxes, property taxes, and other taxes (fishing/hunting); for federal, income taxes.

Source: Minnesota IMPLAN Group, 2012; IMPLAN Group, LLC, 2019

Summary and Conclusion

The agri-forestry industrial complex included the primary industries typically associated with agriculture and forest operations such as crop production, livestock breeding and feeding, and the management and logging of trees. Also included in the industrial complex are the input supplying industries and value-added subsectors, which included food and beverage manufacturing, apparel and textiles, and forestry products manufacturing. In 2019, the agri-forestry industrial complex contributed \$78.0 billion to the Tennessee economy, which was 10.5 percent of the economic activity conducted in the state, and employed an estimated 342,600 individuals, or 8.2 percent of the total number of workers. Agriculture, a subset of the agri-forestry industrial complex, includes farming and related industries, as well as value-added food and fiber production, processing and manufacturing accounted for 7.5 percent of the state's economy and generated \$56.3 billion in output. Agriculture employed 257,000 Tennesseans, with 101,121 (both full- and part-time) in agricultural production. Forestry included the management and logging of forests; primary forestry products such as sawmills, pulp-, paper-, and paperboard mills, and wood preservation, plus forestry products manufacturing (secondary forestry products). Forestry accounted for 2.9 percent of the state's economy, employed over 85,500 Tennesseans, and generated \$21.7 billion in output.

When comparing a county's direct (without multiplier effects) agriculture and forestry economic activity to its total economic activity (all industries) for each of Tennessee's 95 counties, Clay County had the highest share of economic activity for commodity agriculture (crop and livestock breeding and feeding) at 15.0 percent. For all agriculture (includes direct agriculture, plus agricultural input supplying and agriculture-based manufacturing sectors), Moore County had the highest share of economic activity at 64.8 percent). For direct forestry (i.e., the management and logging of forests), Grundy County had the highest level of direct economic activity at 1.5 percent). For all forestry (includes direct forestry, plus input supplying industries and forestry manufacturing), Hardin County had the highest share at 23.7 percent). Combining both agriculture and forestry, Moore and Meigs Counties had the largest shares of local economic activity at 65.5 percent and 34.0 percent, respectively.

Comparing 2017 and 2019 statewide agricultural data revealed a decrease in the numbers of cattle and calves, other chickens (excludes broilers), eggs, and milk cows, while the numbers of broilers and hogs increased. Prices increased for hogs but decreased for cattle and calves, broilers, eggs, and other chickens (Table 7). Many of the traditional row crops grown in the state experienced decreased planted acreage except for corn and cotton. Crop prices increased for corn, tobacco, and wheat with the remaining crops grown experiencing price decreases (Table 8).

Comparing 2019 major industry sectors to previous studies using 2006, 2009, 2011, 2013, 2015, and 2017 IMPLAN data, direct economic activity for agriculture increased an average of 4.8 percent, whereas economic activity for forestry declined 1.6 percent in nominal terms. Most other major industrial sectors had increases in economic activity for this timeframe with services having the largest average increase at 14.4 percent, followed by mining (11.9 percent), wholesale trade (11.8 percent), government (10.3 percent), construction (8.8 percent), retail trade (4.9 percent), and manufacturing (3.6 percent). For workers or jobs in agriculture and forestry, forestry had the largest average decrease at 5.8 percent with agriculture having a 1.3 percent decrease. For workers or jobs in other industries, the largest average increase was for mining at 7.6 percent, followed by services (5.7 percent), construction (2.2 percent), and government (2.2 percent). The largest average decrease was for wholesale trade at 1.4 percent, followed by retail trade (1.3 percent), and manufacturing (0.8 percent).

Literature Cited

- English, B., K. Jensen, and J. Menard. 2001. "Economic Impacts of Agriculture and Forestry in Tennessee, 1997." Research Series 04-01. Available at <https://web.utk.edu/~aimag/pubs/rs0401intro.pdf>.
- English, B., K. Jensen, and J. Menard. 2003. "Economic Impacts of Agriculture and Forestry in Tennessee, 2000." Research Series 02-03. Available at <https://web.utk.edu/~aimag/pubs/Annual%20Report%202000.pdf>.
- IMPLAN Group LLC, IMPLAN System (2019 data and V. 3 software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078. Available at <http://www.implan.com/>.
- IMPLAN Group LLC, IMPLAN System. 2021. "IMPLAN Sectoring & NAICS Correspondences." (2019 data and V. 3 software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078. Available at <https://implanhelp.zendesk.com/hc/en-us/articles/115009674428>.
- Leontief, Wassily. 1936. "Quantitative Input and Output Relations in the Economic System of the United States." *Review of Economics and Statistics* 18(3):105-125.
- Lindall, S., D. Olson, and G. Alward. 2006. "Deriving Multi-Regional Models Using the IMPLAN National Trade Flows Model". *The Journal of Regional Analysis & Policy* 36(1):76-83.
- Menard, J., B. English, and K. Jensen. 2006. "Economic Impacts of Agriculture and Forestry in Tennessee, 2003." Available at <https://ag.tennessee.edu/arec/Documents/AIMAGPubs/EconomicContributionandImpactStudies/AgricultureandForestry/EconImpAgandForTN%202003wAppBandC.pdf>.
- Menard, J., B. English, and K. Jensen. 2009. "Economic Impacts of Agriculture and Forestry in Tennessee, 2006." Available at <https://ag.tennessee.edu/arec/Documents/AIMAGPubs/EconomicContributionandImpactStudies/AgricultureandForestry/EconImpofAgandForTN2006wAppBandC.pdf>.
- Menard, J., B. English, and K. Jensen. 2011. "Economic Impacts of Agriculture and Forestry in Tennessee, 2009." Available at <https://ag.tennessee.edu/arec/Documents/AIMAGPubs/EconomicContributionandImpactStudies/AgricultureandForestry/EconimpactsofAgandForinTN2009.pdf>.
- Menard, J., B. English, and K. Jensen. 2013. "Economic Impacts of Agriculture and Forestry in Tennessee, 2011." Available at <https://ag.tennessee.edu/arec/Documents/AIMAGPubs/EconomicContributionandImpactStudies/AgricultureandForestry/EconimpactsofAgandForinTN2011.pdf>.
- Menard, J., B. English, and K. Jensen. 2016. "Economic Contributions of Agriculture and Forestry in Tennessee, 2013." Available at <https://ag.tennessee.edu/arec/Documents/AIMAGPubs/EconomicContributionandImpactStudies/AgricultureandForestry/EconControfAgandForinTN2013.pdf>.
- Menard, J., B. English, and K. Jensen. 2017. "Economic Contributions of Agriculture and Forestry in Tennessee, 2015." Available at <https://ag.tennessee.edu/arec/Documents/AIMAGPubs/EconomicContributionandImpactStudies/AgricultureandForestry/EconControfAgandForinTN2015.pdf>.
- Menard, J., B. English, and K. Jensen. 2019. "Economic Contributions of Agriculture and Forestry in Tennessee, 2017." Available at <https://ag.tennessee.edu/arec/Documents/publications/FullRpt2017.pdf>.

- Minnesota IMPLAN Group, Inc. 2012. "Tax Impact Report – Generation and Interpretation of IMPLAN's Tax Impact Report." IMPLAN System (data and software), 502 2nd Street, Suite 301, Hudson, WI 54016. Available at <https://implanhelp.zendesk.com/hc/en-us/articles/115009674528-Generation-and-Interpretation-of-IMPLAN-s-Tax-Impact-Report>.
- Olson, D. and S. Lindall. 1999. "IMPLAN Professional Software, Analysis, and Data Guide." Minnesota IMPLAN Group, Inc., 502 2nd Street, Suite 301, Hudson, WI 54016. Available at <http://www.implan.com/>.
- Pyatt, G., and J. Round. 1985. "Social Accounting Matrices, A Basis for Planning." The World Bank, Washington, D.C.
- Steinback, S. 2004. "Using Ready-Made Regional Input-Output Models to Estimate Backward-Linkage Effects of Exogenous Output Shocks." *Review of Regional Studies* 34(1): 57-71.
- Stone, R. 1961. *Input-Output and National Accounts*. Paris Organisation for European Economic Co-operation.
- Tennessee Department of Revenue. 2021. "Collections Spreadsheets by Fiscal Year". Statistics and Collections. Available at <https://www.tn.gov/revenue/tax-resources/statistics-and-collections/collections-spreadsheets-by-fiscal-year.html>.
- Tennessee Forestry Association. 2017. "2013 Tennessee Forest Facts." Publications and Resources. Available at <https://www.tnforestry.com/forest-facts>.
- U.S. Census Bureau. 2002. North American Industry Classification System (NAICS). Available at <http://www.census.gov/eos/www/naics/>.
- U.S. Census Bureau. 2007. North American Industry Classification System (NAICS). Available at <http://www.census.gov/eos/www/naics/>.
- U.S. Census Bureau. 2012. North American Industry Classification System (NAICS). Available at <http://www.census.gov/eos/www/naics/>.
- U.S. Census Bureau. 2017. North American Industry Classification System (NAICS). Available at <http://www.census.gov/eos/www/naics/>.
- U.S. Census Bureau. 2021. 2018-2019 Annual Survey of Manufacturers: Tables. Geographic Area Statistics. "Summary Statistics for Industry Groups and Industries in the U.S. and States: 2019 and 2018. Available at <https://www.census.gov/data/tables/time-series/econ/asm/2018-2019-asm.html>.
- U.S. Department of Agriculture, Economic Research Service (ERS). 2019. "Glossary – Farm." Farm Household Well-being. Available at <https://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/glossary.aspx>.
- U.S. Department of Agriculture, Economic Research Service (ERS). 2020a. "State Export Data." Available at <https://www.ers.usda.gov/data-products/state-export-data/>.

- U.S. Department of Agriculture, Economic Research Service (ERS). 2020b. Data Files: U.S. and State-Level Farm Income and Wealth Statistics. "Annual Cash Receipts by Commodity, US and States, 2008-2019F." Available at <https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics/>.
- U.S. Department of Agriculture, Farm Service Agency. 2021. ARC/PLC Program. Available at https://www.fsa.usda.gov/programs-and-services/arcplc_program/index.
- U.S. Department of Agriculture, Foreign Agricultural Service. 2021. Global Agricultural Trade System. Available at <https://apps.fas.usda.gov/gats/ExpressQuery1.aspx>.
- U.S. Department of Agriculture, Forest Service, 2014. "Forest Inventory and Analysis Glossary." Available at <https://www.nrs.fs.fed.us/fia/data-tools/state-reports/glossary/default.asp>.
- U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis. 2020. "Forests of Tennessee, 2017." Available at https://public.tableau.com/views/FIA_OneClick_V1_2/Factsheet?%3AshowVizHome=no.
- U.S. Department of Agriculture, Forest Service, Forest Inventory and Analysis Program. 2021. Forest Inventory EVALIDator web-application Version 1.8.0.01 St. Paul, MN: USDA Forest Service, Northern Research Station. Available at <http://apps.fs.usda.gov/Evalidator/evalidator.jsp>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2018a. "Cattle." Released January 31, 2018. Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/h702q636h/c534fr214/z316q364w/Catt-01-31-2018.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2018b. "Quarterly Hogs and Pigs." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/rj430453j/bc386p647/rf55zc904/hgpg1218.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2018c. "Agricultural Statistics 2018." Available at https://downloads.usda.library.cornell.edu/usda-esmis/files/j3860694x/2z10wz00c/9019s972q/Ag_Stats_2018.pdf.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2019a. "Agricultural Statistics 2019." Available at https://downloads.usda.library.cornell.edu/usda-esmis/files/j3860694x/ft849j281/vx022816w/Ag_Stats_2019_Complete_Publication.pdf.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2019b. "Cattle." Released February 28, 2019. Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/h702q636h/765377121/bc386r54d/catl0219.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 2019c. "Chicken and Eggs 2018 Summary." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/1v53jw96n/m326m852c/dz010x51j/ckegan19.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2019d. "Meat Animals Production, Disposition, and Income 2018 Summary." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/02870v85d/70795j27s/xs55mn77c/meatan19.pdf>.

- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2019e. "Milk Production, Disposition, and Income, 2018 Summary." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/4b29b5974/qb98mq82c/c247f2732/mlkpdi19.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 2019f. "Poultry – Production and Value 2018 Summary." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/m039k491c/h989rc35c/pk02cm100/plva0519.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2019g. "Tennessee State and County Data." 2017 Census of Agriculture Report. Volume 1, Geographic Area Series, Part 42. Available at https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/Tennessee/.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2020a. "Agricultural Statistics 2020." Available at https://www.nass.usda.gov/Publications/Ag_Statistics/2020/Ag%20Stats%202020_Complete%20Publication.pdf.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2020b. "Crop Production 2019 Summary." Available at https://www.nass.usda.gov/Publications/Todays_Reports/reports/cropan20.pdf.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2020c. "Meat Animals Production, Disposition, and Income, 2019 Summary." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/02870v85d/6m3127982/x920gh39g/meatan20.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2020d. "Milk Production, Disposition, and Income, 2019 Summary." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/4b29b5974/5h73qf66r/hd76sk303/mlkpdi20.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2020e. "Quarterly Hogs and Pigs." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/rj430453j/7d279j76f/g445d5751/hgpg1220.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2020f. CropScape 2020 Cropland Data Layer. Available at <https://nassgeodata.gmu.edu/CropScape/>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2020g. Farms and Land in Farms 2019 Summary. Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/5712m6524/k0698r168/2b88qx13z/fnlo0220.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistical Service (NASS). 2020h. Quick Stats Lite. https://www.nass.usda.gov/Quick_Stats/Lite/index.php.
- U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 2020i. "Chicken and Eggs 2019 Summary." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/1v53jw96n/zs25xt30s/9p290t89h/ckegan20.pdf>.
- U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). 2020j. "Poultry – Production and Value 2019 Summary." Available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/m039k491c/jq086502q/rn301m63j/plva0420.pdf>.

U.S. Department of Commerce (DOC), International Trade Administration (ITA). 2021. "TradeStats Express™ Home." Global Patterns of a State's Exports, Office of Trade and Economic Analysis, Industry and Analysis. Available at <http://tse.export.gov/TSE/TSEOptions.aspx?ReportID=100&Referrer=TSEReports.aspx&DataSource=SED>.

U.S. Department of Labor. 2020. Quarterly Census of Employment and Wages. QCEW Data Files. 2019 Annual Averages by Industry. Available at <https://www.bls.gov/cew/downloadable-data-files.htm>.

Appendix A: IMPLAN Methodology

The Tennessee Agri-Industry Model (TN-AIM) is based on the Impact Analysis for Planning (IMPLAN) model and its databases (Olson and Lindall, 1999). IMPLAN (Version 3.0) utilizes a National Trade Flows Model (NTFM) (doubly-constrained gravity model) to estimate a new set of regional purchase coefficients and other trade data that estimates local purchases based on a region's characteristics (Lindall, Olson, and Alward, 2006). Not only does the model describe a regional economy, it can be used for predictive purposes by providing multiplier-based estimates.

Multipliers measure the response of the economy to a change in production or demand. Multiplier analysis generally focuses on the impacts of exogenous changes on: a) output of the sectors in the economy, b) resulting changes in income earned by households and c) resulting change in employment (in physical terms) that is expected to be generated. The concept of multipliers rests on the difference between the initial impact of an exogenous change (final demand) and the total impacts of a change. **Direct** impacts measure the response of a given industry given a change in final demand for that same industry. **Indirect** impacts represent the response by all local industries that occur as a result of a change in final demand for a specific industry. **Induced** impacts represent the response by all local industries caused by increased (decreased) expenditures of new household income and inter-institutional transfers generated (lost) from the direct and indirect impacts of the change in final demand for a specific industry.

This study uses Type I and Type SAM (Social Accounting Matrix) multipliers. Type I multipliers, used to estimate the indirect impacts, are calculated by dividing direct plus indirect impacts by the direct impacts. Type SAM multipliers are used to estimate the induced impacts and are calculated as (direct + indirect + induced impacts)/direct impacts. As argued by the current developer of IMPLAN, the Type SAM multipliers consider the expenditures resulting from increased incomes of households as well as inter-institutional transfers resulting from the economic activity. Therefore, Type SAM multipliers assume that as final demand changes, incomes also increase. As consumers and institutions increase expenditures this leads to increased demands from local industries. To prevent double-counting the economic contributions estimated, regional purchase coefficients¹⁴ (RPC) are set to zero for the backward linked supply and service industries.¹⁵ To account for double-counting in agriculture (inputs, primary agriculture (*agriculture commodities*), and secondary agriculture), sectors comprising the input sector (see Table B.1.) for the state are aggregated with the RPC set to zero for the primary agriculture analysis; for secondary agriculture, both agricultural inputs and primary agriculture aggregated sectors are set to zero. This same methodology is used for the forest analysis.

Input-output model results from previous studies (English, Jensen, and Menard, 2001 and 2003) in this series were based on the Standard Industrial Classification (SIC) system as defined by the United States Census Bureau. Beginning in 2006 (Menard, English, and Jensen), results are based on the North American Industrial Classification System (NAICS) (Census NAICS, 2002, 2007, 2012, 2017). The reader should not compare industry sector level results from the previous studies using the SIC system with the results from this most recent study using NAICS. For readers who are interested in time series data, this creates a problem since many industries are grouped in different or entirely new categories. Plus, changes in input-output modeling and data sources are additional reasons the reader should be wary with respect to evaluating changes in impacts over time.

IMPLAN uses a macro-regional social accounting system and generates a set of balanced economic/social accounts and multipliers.¹⁶ The social accounting system is an extension of input-output analysis.¹⁷ Input-output analysis can provide important and timely information on the interrelationships in a regional economy

¹⁴IMPLAN's regional purchase coefficient (RPC) represents how much of each commodity purchasing industries and institutions buy from regional sources. For example, a RPC of .55 for a given commodity means that for each \$1 of local need, 55 percent of the commodity is purchased locally.

¹⁵Hence, the analysis provided in this document belongs in the category of contribution analysis. For more details, see Steinback, 2004.

¹⁶While IMPLAN provides a macro-based SAM it does not account for income distribution by functional class as would a SAM defined traditionally in the approach laid out by Stone (1961).

¹⁷Input-output (I-O) analysis, also known as inter-industry analysis, is the name given to an analytical work conducted by Wassily Leontief (1936) in the late 1930's. The fundamental purpose of the I-O framework is to analyze the interdependence of industries in an economy through market-based transactions.

and the impacts of changes on that economy. Input-output analysis has been expanded beyond market-based transaction accounting to include non-market financial flows by using a social accounting matrix or SAM framework (Pyatt and Round, 1985). The model describes the transfer of money between industries and institutions and contains both market-based transactions and non-market financial flows, such as inter-institutional transfers (see Figure A.1). The 'Make' and 'Use' components of the SAM include the commodities made and used by industries. Factors represent the value-added by industries, including wages and compensation to workers, interest, profits, and indirect business taxes. Capital includes expenditures made by industries and institutions to obtain equipment and construction. The SAM takes into account corporate profits as 'Enterprises'. The SAM also accounts for non-industrial financial flows, including factor exports and imports, institution exports, factor distribution, and inter-institutional transfers. Factor exports include payments reimbursed from outside the region for exports less the payments for imports. Institutional exports would include situations such as jobs commuting outside the region. Factor distributions are payments from the factor sectors to institutions, such as households or governments. Inter-institutional transfers include payments between institutions, such as federal government grants to state governments, welfare, social security payments, and taxes paid to governments.

	Industry	Commodity	Factors	Institutions	Enterprises	Capital	Trade	Total
Industry		<i>Make</i>					<i>Exports</i>	Total Industry Income
Commodity	<i>Use</i>			<i>Consumption</i>		<i>Consumption</i>		Total Commodity Income
Factors	<i>Value Added</i>						<i>Exports</i>	Total Factor Income
Institutions		<i>Sales</i>	<i>Transfers</i>	<i>Transfers</i>	<i>Transfers</i>		<i>Exports</i>	Total Institutional Income
Enterprises								Total Enterprise Income
Capital						<i>Transfers</i>	<i>Exports</i>	Total Capital Income
Trade	<i>Imports</i>		<i>Factor Trade</i>	<i>Imports</i>		<i>Transfers</i>	<i>Exports</i>	Total Trade Income
Total	Total Industry Outlay	Total Commodity Outlay	Total Factor Outlay	Total Institution Outlay	Total Enterprise Outlay	Total Capital Outlay	Total Trade Exports	

Figure A.1. Social Accounting Matrix Framework.

Source: Olson and Lindall, 1999.

**Appendix B: IMPLAN/NAICS Sector Bridge with Agri-Forestry
Industrial Complex Identification**

Table B. 1. IMPLAN 546 Industry Sector Descriptions, NAICS, and Agri-Forestry Aggregation Designation

Sector	Description	2017 NAICS	Agri-Forestry ^a
1	Oilseed farming	111110, 111120, 111191	Primary Ag
2	Grain farming	111130, 111140, 111150, 111160, 111191, 111199	Primary Ag
3	Vegetable & melon farming	111211, 111219	Primary Ag
4	Fruit farming	111310, 111320, 111331, 111332, 111333, 111334, 111336, 111339	Primary Ag
5	Tree nut farming	111335, 111336	Primary Ag
6	Greenhouse, nursery, & floriculture production	111411, 111419, 111421, 111422	Primary Ag
7	Tobacco farming	111910	Primary Ag
8	Cotton farming	111920	Primary Ag
9	Sugarcane & sugar beet farming	111930, 111991	Primary Ag
10	All other crop farming	111940, 111992, 111998	Primary Ag
11	Beef cattle ranching & farming, including feedlots & dual-purpose ranching & farming	112111, 112112	Primary Ag
12	Dairy cattle & milk production	112120	Primary Ag
13	Poultry & egg production	112310, 112320, 112330, 112340, 112390	Primary Ag
14	Animal production, except cattle & poultry & eggs	112210, 112410, 112420, 112511, 112512, 112519, 112910, 112920, 112930, 112990	Primary Ag
15	Forestry, forest products, & timber tract production	113110, 113210	For Inputs
16	Commercial logging	113310	For Inputs
17	Commercial fishing	114111, 114112, 114119	Primary Ag
18	Commercial hunting & trapping	114210	Primary Ag
19	Support activities for agriculture & forestry	115111, 115112, 115113, 115114, 115115, 115116, 115210, 115310	Primary Ag
20	Oil & gas extraction	211120, 211130	Mining
21	Coal mining	212111, 212112, 212113	Mining
22	Copper, nickel, lead, & zinc mining	212230	Mining
23	Iron ore mining	212210	Mining
24	Gold ore mining	212221	Mining
25	Silver ore mining	212222	Mining
26	Uranium-radium-vanadium ore mining	212291	Mining
27	Other metal ore mining	212299	Mining
28	Stone mining & quarrying	212311, 212312, 212313, 212319	Mining
29	Sand & gravel mining	212321, 212322, 212324	Mining
30	Other clay, ceramic, refractory minerals mining	212325	Mining
31	Potash, soda, & borate mineral mining	212391	Mining
32	Phosphate rock mining	212392	Mining
33	Other chemical & fertilizer mineral mining	212393	Mining
34	Other nonmetallic minerals	212399	Mining
35	Drilling oil & gas wells	213111	Mining
36	Support activities for oil & gas operations	213112	Mining
37	Metal mining services	213114	Services
38	Other nonmetallic minerals services	213113, 213115	Services
39	Electric power generation - Hydroelectric	221111	Utilities
40	Electric power generation - Fossil fuel	221112	Utilities
41	Electric power generation - Nuclear	221113	Utilities
42	Electric power generation - Solar	221114	Utilities
43	Electric power generation - Wind	221115	Utilities
44	Electric power generation - Geothermal	221116	Utilities
45	Electric power generation - Biomass	221117	Utilities

Sector	Description	2017 NAICS	Agri-Forestry ^a
46	Electric power generation - All other	221118	Utilities
47	Electric power transmission & distribution	221121, 221122	Utilities
48	Natural gas distribution	221210	Utilities
49	Water, sewage & other systems	221310, 221320, 221330	Utilities
50	Construction of new health care structures	23	Construction
51	Construction of new manuf. structures	23	Construction
52	Construction of new power & communication structures	23	Construction
53	Construction of new educational & vocational structures	23	Construction
54	Construction of new highways & streets	23	Construction
55	Construction of new commercial structures, including farm structures	23	Construction
56	Construction of other new nonresidential structures	23	Construction
57	Construction of new single-family residential structures	23	Construction
58	Construction of new multifamily residential structures	23	Construction
59	Construction of other new residential structures	23	Construction
60	Maintenance & repair construction of nonresidential structures	23	Construction
61	Maintenance & repair construction of residential structures	23	Construction
62	Maintenance & repair construction of highways, streets, bridges, & tunnels	23	Construction
63	Dog & cat food manuf.	311111	Secondary Ag
64	Other animal food manuf.	311119	Secondary Ag
65	Flour milling	311211	Secondary Ag
66	Rice milling	311212	Secondary Ag
67	Malt manuf.	311213	Secondary Ag
68	Wet corn milling	311221	Secondary Ag
69	Soybean & other oilseed processing	311224	Secondary Ag
70	Fats & oils refining & blending	311225	Secondary Ag
71	Breakfast cereal manuf.	311230	Secondary Ag
72	Beet sugar manuf.	311313	Secondary Ag
73	Sugar cane mills & refining	311314	Secondary Ag
74	Nonchocolate confectionery manuf.	311340	Secondary Ag
75	Chocolate & confectionery manuf. from cacao beans	311351	Secondary Ag
76	Confectionery manuf. from purchased chocolate	311352	Secondary Ag
77	Frozen fruits, juices & vegetables manuf.	311411	Secondary Ag
78	Frozen specialties manuf.	311412	Secondary Ag
79	Canned fruits & vegetables manuf.	311421	Secondary Ag
80	Canned specialties	311422	Secondary Ag
81	Dehydrated food products manuf.	311423	Secondary Ag
82	Cheese manuf.	311513	Secondary Ag
83	Dry, condensed, & evaporated dairy product manuf.	311514	Secondary Ag
84	Fluid milk manuf.	311511	Secondary Ag
85	Creamery butter manuf.	311512	Secondary Ag
86	Ice cream & frozen dessert manuf.	311520	Secondary Ag
87	Frozen cakes & other pastries manuf.	311813	Secondary Ag

Sector	Description	2017 NAICS	Agri-Forestry ^a
88	Poultry processing	311615	Secondary Ag
89	Animal, except poultry, slaughtering	311611	Secondary Ag
90	Meat processed from carcasses	311612	Secondary Ag
91	Rendering & meat byproduct processing	311613	Secondary Ag
92	Seafood product preparation & packaging	311710	Secondary Ag
93	Bread & bakery product, except frozen, manuf.	311811, 311812	Secondary Ag
94	Cookie & cracker manuf.	311821	Secondary Ag
95	Dry pasta, mixes, & dough manuf.	311824	Secondary Ag
96	Tortilla manuf.	311830	Secondary Ag
97	Roasted nuts & peanut butter manuf.	311911	Secondary Ag
98	Other snack food manuf.	311919	Secondary Ag
99	Coffee & tea manuf.	311920	Secondary Ag
100	Flavoring syrup & concentrate manuf.	311930	Secondary Ag
101	Mayonnaise, dressing, & sauce manuf.	311941	Secondary Ag
102	Spice & extract manuf.	311942	Secondary Ag
103	All other food manuf.	311991, 311999	Secondary Ag
104	Bottled & canned soft drinks & water	312111, 312112	Secondary Ag
105	Manufactured ice	312113	Manuf
106	Breweries	312120	Secondary Ag
107	Wineries	312130	Secondary Ag
108	Distilleries	312140	Secondary Ag
109	Tobacco product manuf.	312230	Secondary Ag
110	Fiber, yarn, & thread mills	313110	Secondary Ag
111	Broadwoven fabric mills	313210	Secondary Ag
112	Narrow fabric mills & schiffli machine embroidery	313220	Secondary Ag
113	Nonwoven fabric mills	313230	Secondary Ag
114	Knit fabric mills	313240	Secondary Ag
115	Textile & fabric finishing mills	313310	Secondary Ag
116	Fabric coating mills	313320	Secondary Ag
117	Carpet & rug mills	314110	Secondary Ag
118	Curtain & linen mills	314120	Secondary Ag
119	Textile bag & canvas mills	314910	Secondary Ag
120	Rope, cordage, twine, tire cord & tire fabric mills	314994	Secondary Ag
121	Other textile product mills	314999	Secondary Ag
122	Hosiery & sock mills	315110	Secondary Ag
123	Other apparel knitting mills	315190	Secondary Ag
124	Cut & sew apparel contractors	315210	Secondary Ag
125	Men's & boys' cut & sew apparel manuf.	315220	Secondary Ag
126	Women's & girls' cut & sew apparel manuf.	315240	Secondary Ag
127	Other cut & sew apparel manuf.	315280	Secondary Ag
128	Apparel accessories & other apparel manuf.	315990	Secondary Ag
129	Leather & hide tanning & finishing	316110	Secondary Ag
130	Footwear manuf.	316210	Secondary Ag
131	Other leather & allied product manuf.	316992, 316998	Secondary Ag
132	Sawmills	321113	Primary For
133	Wood preservation	321114	Primary For
134	Veneer & plywood manuf.	321211, 321212	Secondary For
135	Engineered wood member & truss manuf.	321213, 321214	Secondary For
136	Reconstituted wood product manuf.	321219	Secondary For
137	Wood windows & door manuf.	321911	Secondary For

Sector	Description	2017 NAICS	Agri-Forestry ^a
138	Cut stock, resawing lumber, & planing	321912	Secondary For
139	Other millwork, including flooring	321918	Secondary For
140	Wood container & pallet manuf.	321920	Secondary For
141	Manufactured home (mobile home) manuf.	321991	Secondary For
142	Prefabricated wood building manuf.	321992	Secondary For
143	All other miscellaneous wood product manuf.	321999	Secondary For
144	Pulp mills	322110	Primary For
145	Paper mills	322121, 322122	Primary For
146	Paperboard mills	322130	Primary For
147	Paperboard container manuf.	322211, 322212, 322219	Secondary For
148	Paper bag & coated & treated paper manuf.	322220	Secondary For
149	Stationery product manuf.	322230	Secondary For
150	Sanitary paper product manuf.	322291	Secondary For
151	All other converted paper product manuf.	322299	Secondary For
152	Printing	323111, 323113, 323117	Manuf
153	Support activities for printing	323120	Manuf
154	Petroleum refineries	324110	Manuf
155	Asphalt paving mixture & block manuf.	324121	Manuf
156	Asphalt shingle & coating materials manuf.	324122	Manuf
157	Petroleum lubricating oil & grease manuf.	324191	Manuf
158	All other petroleum & coal products manuf.	324199	Manuf
159	Petrochemical manuf.	325110	Manuf
160	Industrial gas manuf.	325120	Manuf
161	Synthetic dye & pigment manuf.	325130	Manuf
162	Other basic inorganic chemical manuf.	325180	Manuf
163	Other basic organic chemical manuf.	325193, 325194, 325199	Manuf
164	Plastics material & resin manuf.	325211	Manuf
165	Synthetic rubber manuf.	325212	Manuf
166	Artificial & synthetic fibers & filaments manuf.	325220	Manuf
167	Nitrogenous fertilizer manuf.	325311	Ag Inputs
168	Phosphatic fertilizer manuf.	325312	Ag Inputs
169	Fertilizer mixing	325314	Ag Inputs
170	Pesticide & other agricultural chemical manuf.	325320	Ag Inputs
171	Medicinal & botanical manuf.	325411	Manuf
172	Pharmaceutical preparation manuf.	325412	Manuf
173	In-vitro diagnostic substance manuf.	325413	Manuf
174	Biological product (except diagnostic) manuf.	325414	Manuf
175	Paint & coating manuf.	325510	Manuf
176	Adhesive manuf.	325520	Manuf
177	Soap & other detergent manuf.	325611	Manuf
178	Polish & other sanitation good manuf.	325612	Manuf
179	Surface active agent manuf.	325613	Manuf
180	Toilet preparation manuf.	325620	Manuf
181	Printing ink manuf.	325910	Manuf
182	Explosives manuf.	325920	Manuf
183	Custom compounding of purchased resins	325991	Manuf
184	Photographic film & chemical manuf.	325992	Manuf

Sector	Description	2017 NAICS	Agri-Forestry ^a
185	Other miscellaneous chemical product manuf.	325998	Manuf
186	Plastics packaging materials & unlaminated film & sheet manuf.	326111, 326112, 326113	Manuf
187	Unlaminated plastics profile shape manuf.	326121	Manuf
188	Plastics pipe & pipe fitting manuf.	326122	Manuf
189	Laminated plastics plate, sheet (except packaging), & shape manuf.	326130	Manuf
190	Polystyrene foam product manuf.	326140	Manuf
191	Urethane & other foam product (except polystyrene) manuf.	326150	Manuf
192	Plastics bottle manuf.	326160	Manuf
193	Other plastics product manuf.	326191, 326199	Manuf
194	Tire manuf.	326211, 326212	Manuf
195	Rubber & plastics hoses & belting manuf.	326220	Manuf
196	Other rubber product manuf.	326291, 326299	Manuf
197	Pottery, ceramics, & plumbing fixture manuf.	327110	Manuf
198	Brick, tile, & other structural clay product manuf.	327120	Manuf
199	Flat glass manuf.	327211	Manuf
200	Other pressed & blown glass & glassware manuf.	327212	Manuf
201	Glass container manuf.	327213	Manuf
202	Glass product manuf. made of purchased glass	327215	Manuf
203	Cement manuf.	327310	Manuf
204	Ready-mix concrete manuf.	327320	Manuf
205	Concrete block & brick manuf.	327331	Manuf
206	Concrete pipe manuf.	327332	Manuf
207	Other concrete product manuf.	327390	Manuf
208	Lime manuf.	327410	Ag Inputs
209	Gypsum product manuf.	327420	Manuf
210	Abrasive product manuf.	327910	Manuf
211	Cut stone & stone product manuf.	327991	Manuf
212	Ground or treated mineral & earth manuf.	327992	Manuf
213	Mineral wool manuf.	327993	Manuf
214	Miscellaneous nonmetallic mineral products manuf.	327999	Manuf
215	Iron & steel mills & ferroalloy manuf.	331110	Manuf
216	Iron, steel pipe & tube manuf. from purchased steel	331210	Manuf
217	Rolled steel shape manuf.	331221	Manuf
218	Steel wire drawing	331222	Manuf
219	Alumina refining & primary aluminum production	331313	Manuf
220	Secondary smelting & alloying of aluminum	331314	Manuf
221	Aluminum sheet, plate, & foil manuf.	331315	Manuf
222	Other aluminum rolling, drawing & extruding	331318	Manuf
223	Nonferrous metal (exc. aluminum) smelting & refining	331410	Manuf
224	Copper rolling, drawing, extruding & alloying	331420	Manuf

Sector	Description	2017 NAICS	Agri-Forestry ^a
225	Nonferrous metal, except copper & aluminum, shaping	331491	Manuf
226	Secondary processing of other nonferrous metals	331492	Manuf
227	Ferrous metal foundries	331511, 331512, 331513	Manuf
228	Nonferrous metal foundries	331523, 331524, 331529	Manuf
229	Custom roll forming	332114	Manuf
230	Crown & closure manuf. & metal stamping	332119	Manuf
231	Iron & steel forging	332111, 332117	Manuf
232	Nonferrous forging	332112, 332117	Manuf
233	Cutlery, utensil, pot, & pan manuf.	332215	Manuf
234	hand tool manuf.	332216	Manuf
235	Prefabricated metal buildings & components manuf.	332311	Manuf
236	Fabricated structural metal manuf.	332312	Manuf
237	Plate work manuf.	332313	Manuf
238	Metal window & door manuf.	332321	Manuf
239	Sheet metal work manuf.	332322	Manuf
240	Ornamental & architectural metal work manuf.	332323	Manuf
241	Power boiler & heat exchanger manuf.	332410	Manuf
242	Metal tank (heavy gauge) manuf.	332420	Manuf
243	Metal cans manuf.	332431	Manuf
244	Metal barrels, drums & pails manuf.	332439	Manuf
245	Hardware manuf.	332510	Manuf
246	Spring & wire product manuf.	332613, 332618	Manuf
247	Machine shops	332710	Manuf
248	Turned product & screw, nut, & bolt manuf.	332721, 332722	Manuf
249	Metal heat treating	332811	Manuf
250	Metal coating & nonprecious engraving	332812	Manuf
251	Electroplating, anodizing, & coloring metal	332813	Manuf
252	Valve & fittings, other than plumbing, manuf.	332911, 332912, 332919	Manuf
253	Plumbing fixture fitting & trim manuf.	332913	Manuf
254	Ball & roller bearing manuf.	332991	Manuf
255	Small arms ammunition manuf.	332992	Manuf
256	Ammunition, except for small arms, manuf.	332993	Manuf
257	Small arms, ordnance, & accessories manuf.	332994	Manuf
258	Fabricated pipe & pipe fitting manuf.	332996	Manuf
259	Other fabricated metal manuf.	332999	Manuf
260	Farm machinery & equipment manuf.	333111	Ag Inputs
261	Lawn & garden equipment manuf.	333112	Ag Inputs
262	Construction machinery manuf.	333120	Manuf
263	Mining machinery & equipment manuf.	333131	Manuf
264	Oil & gas field machinery & equipment manuf.	333132	Manuf
265	Semiconductor machinery manuf.	333242	Manuf
266	Food product machinery manuf.	333241	Manuf
267	Sawmill, woodworking, & paper machinery	333243	Primary For
268	Printing machinery & equipment manuf.	333244	Manuf

Sector	Description	2017 NAICS	Agri-Forestry ^a
269	All other industrial machinery manuf.	333249	Manuf
270	Optical instrument & lens manuf.	333314	Manuf
271	Photographic & photocopying equipment manuf.	333316	Manuf
272	Other commercial service industry machinery manuf.	333318	Manuf
273	Air purification & ventilation equipment manuf.	333413	Manuf
274	Heating equipment (except warm air furnaces) manuf.	333414	Manuf
275	Air conditioning, refrigeration, & warm air heating equipment manuf.	333415	Manuf
276	Industrial mold manuf.	333511	Manuf
277	Special tool, die, jig, & fixture manuf.	333514	Manuf
278	Cutting tool & machine tool accessory manuf.	333515	Manuf
279	Machine tool manuf.	333517	Manuf
280	Rolling mill & other metalworking machinery manuf.	333519	Manuf
281	Turbine & turbine generator set units manuf.	333611	Manuf
282	Speed changer, industrial high-speed drive, & gear manuf.	333612	Manuf
283	Mechanical power transmission equipment manuf.	333613	Manuf
284	Other engine equipment manuf.	333618	Manuf
285	Pump & pumping equipment manuf.	333914	Manuf
286	Air & gas compressor manuf.	333912	Manuf
287	Elevator & moving stairway manuf.	333921	Manuf
288	Conveyor & conveying equipment manuf.	333922	Manuf
289	Overhead cranes, hoists, & monorail systems manuf.	333923	Manuf
290	Industrial truck, trailer, & stacker manuf.	333924	Manuf
291	Power-driven hand tool manuf.	333991	Manuf
292	Welding & soldering equipment manuf.	333992	Manuf
293	Packaging machinery manuf.	333993	Manuf
294	Industrial process furnace & oven manuf.	333994	Manuf
295	Fluid power cylinder & actuator manuf.	333995	Manuf
296	Fluid power pump & motor manuf.	333996	Manuf
297	Scales, balances, & miscellaneous general purpose machinery manuf.	333997, 333999	Manuf
298	Electronic computer manuf.	334111	Manuf
299	Computer storage device manuf.	334112	Manuf
300	Computer terminals & other computer peripheral equipment manuf.	334118	Manuf
301	Telephone apparatus manuf.	334210	Manuf
302	Broadcast & wireless communications equipment manuf.	334220	Manuf
303	Other communications equipment manuf.	334290	Manuf
304	Audio & video equipment manuf.	334310	Manuf
305	Printed circuit assembly (electronic assembly) manuf.	334418	Manuf
306	Bare printed circuit board manuf.	334412	Manuf

Sector	Description	2017 NAICS	Agri-Forestry ^a
307	Semiconductor & related device manuf.	334413	Manuf
308	Capacitor, resistor, coil, transformer, & other inductor manuf.	334416	Manuf
309	Electronic connector manuf.	334417	Manuf
310	Other electronic component manuf.	334419	Manuf
311	Electromedical & electrotherapeutic apparatus manuf.	334510	Manuf
312	Search, detection, & navigation instruments manuf.	334511	Manuf
313	Automatic environmental control manuf.	334512	Manuf
314	Industrial process variable instruments manuf.	334513	Manuf
315	Totalizing fluid meter & counting device manuf.	334514	Manuf
316	Electricity & signal testing instruments manuf.	334515	Manuf
317	Analytical laboratory instrument manuf.	334516	Manuf
318	Irradiation apparatus manuf.	334517	Manuf
319	Watch, clock, & other measuring & controlling device manuf.	334519	Manuf
320	Blank magnetic & optical recording media manuf.	334613	Manuf
321	Software & other prerecorded & record reproducing	334614	Manuf
322	Electric lamp bulb & part manuf.	335110	Manuf
323	Lighting fixture manuf.	335121, 335122, 335129	Manuf
324	Small electrical appliance manuf.	335210	Manuf
325	Household cooking appliance manuf.	335220	Manuf
326	Household refrigerator & home freezer manuf.	335220	Manuf
327	Household laundry equipment manuf.	335220	Manuf
328	Other major household appliance manuf.	335220	Manuf
329	Power, distribution, & specialty transformer manuf.	335311	Manuf
330	Motor & generator manuf.	335312	Manuf
331	Switchgear & switchboard apparatus manuf.	335313	Manuf
332	Relay & industrial control manuf.	335314	Manuf
333	Storage battery manuf.	335911	Manuf
334	Primary battery manuf.	335912	Manuf
335	Fiber optic cable manuf.	335921	Manuf
336	Other communication & energy wire manuf.	335929	Manuf
337	Wiring device manuf.	335931, 335932	Manuf
338	Carbon & graphite product manuf.	335991	Manuf
339	All other miscellaneous electrical equipment & component manuf.	335999	Manuf
340	Automobile manuf.	336111	Manuf
341	Light truck & utility vehicle manuf.	336112	Manuf
342	Heavy duty truck manuf.	336120	Manuf
343	Motor vehicle body manuf.	336211	Manuf
344	Truck trailer manuf.	336212	Manuf
345	Motor home manuf.	336213	Manuf
346	Travel trailer & camper manuf.	336214	Manuf

Sector	Description	2017 NAICS	Agri-Forestry ^a
347	Motor vehicle gasoline engine & engine parts manuf.	336310	Manuf
348	Motor vehicle electrical & electronic equipment manuf.	336320	Manuf
349	Motor vehicle transmission & power train parts manuf.	336350	Manuf
350	Motor vehicle seating & interior trim manuf.	336360	Manuf
351	Motor vehicle metal stamping	336370	Manuf
352	Other motor vehicle parts manuf.	336390	Manuf
353	Motor vehicle steering, suspension component (except spring), & brake systems manuf.	336330, 336340	Manuf
354	Aircraft manuf.	336411	Manuf
355	Aircraft engine & engine parts manuf.	336412	Manuf
356	Other aircraft parts & auxiliary equipment manuf.	336413	Manuf
357	Guided missile & space vehicle manuf.	336414	Manuf
358	Propulsion units & parts for space vehicles & guided missiles manuf.	336415, 336419	Manuf
359	Railroad rolling stock manuf.	336510	Manuf
360	Ship building & repairing	336611	Manuf
361	Boat building	336612	Manuf
362	Motorcycle, bicycle, & parts manuf.	336991	Manuf
363	Military armored vehicle, tank, & tank component manuf.	336992	Manuf
364	All other transportation equipment manuf.	336999	Manuf
365	Wood kitchen cabinet & countertop manuf.	337110	Secondary For
366	Upholstered household furniture manuf.	337121	Secondary For
367	Nonupholstered wood household furniture manuf.	337122	Secondary For
368	Other household nonupholstered furniture manuf.	337124, 337125	Secondary For
369	Institutional furniture manuf.	337127	Secondary For
370	Wood office furniture manuf.	337211	Secondary For
371	Custom architectural woodwork & millwork	337212	Secondary For
372	Office furniture, except wood, manuf.	337214	Manuf
373	Showcase, partition, shelving, & locker manuf.	337215	Secondary For
374	Mattress manuf.	337910	Secondary For
375	Blind & shade manuf.	337920	Secondary For
376	Surgical & medical instrument manuf.	339112	Manuf
377	Surgical appliance & supplies manuf.	339113	Manuf
378	Dental equipment & supplies manuf.	339114	Manuf
379	Ophthalmic goods manuf.	339115	Manuf
380	Dental laboratories	339116	Manuf
381	Jewelry & silverware manuf.	339910	Manuf
382	Sporting & athletic goods manuf.	339920	Manuf
383	Doll, toy, & game manuf.	339930	Manuf
384	Office supplies (except paper) manuf.	339940	Manuf
385	Sign manuf.	339950	Manuf
386	Gasket, packing, & sealing device manuf.	339991	Manuf
387	Musical instrument manuf.	339992	Manuf

Sector	Description	2017 NAICS	Agri-Forestry ^a
388	Fasteners, buttons, needles, & pins manuf.	339993	Manuf
389	Broom, brush, & mop manuf.	339994	Manuf
390	Burial casket manuf.	339995	Manuf
391	All other miscellaneous manuf.	339999	Manuf
392	Wholesale - Motor vehicle & motor vehicle parts & supplies	423110, 423120, 423130, 423140	Wholesale Trade
393	Wholesale - Professional & commercial equipment & supplies	423410, 423420, 423430, 423440, 423450, 423460, 423490	Wholesale Trade
394	Wholesale - Household appliances & electrical & electronic goods	423610, 423620, 423690	Wholesale Trade
395	Wholesale - Machinery, equipment, & supplies	423810, 423820, 423830, 423840, 423850, 423860	Wholesale Trade
396	Wholesale - Other durable goods merchant wholesalers	423210, 423220, 423310, 423320, 423330, 423390, 423510, 423520, 423710, 423720, 423730, 423740, 423910, 423920, 423930, 423940, 423990	Wholesale Trade
397	Wholesale - Drugs & druggists' sundries	424210	Wholesale Trade
398	Wholesale - Grocery & related product wholesalers	424410, 424420, 424430, 424440, 424450, 424460, 424470, 424480, 424490	Wholesale Trade
399	Wholesale - Petroleum & petroleum products	424710, 424720	Wholesale Trade
400	Wholesale - Other nondurable goods merchant wholesalers	424110, 424120, 424130, 424310, 424320, 424330, 424340, 424510, 424520, 424590, 424610, 424690, 424810, 424820, 424910, 424920, 424930, 424940, 424950, 424990	Wholesale Trade
401	Wholesale - Wholesale electronic markets & agents & brokers	425110, 425120	Wholesale Trade
402	Retail - Motor vehicle & parts dealers	441110, 441120, 441210, 441222, 441228, 441310, 441320	Retail Trade
403	Retail - Furniture & home furnishings stores	442110, 442210, 442291, 442299	Retail Trade
404	Retail - Electronics & appliance stores	443141, 443142	Retail Trade
405	Retail - Building material & garden equipment & supplies stores	444110, 444120, 444130, 444190, 444210, 444220	Retail Trade
406	Retail - Food & beverage stores	445110, 445120, 445210, 445220, 445230, 445291, 445292, 445299, 445310	Retail Trade
407	Retail - Health & personal care stores	446110, 446120, 446130, 446191, 446199	Retail Trade
408	Retail - Gasoline stores	447110, 447190	Retail Trade
409	Retail - Clothing & clothing accessories stores	448110, 448120, 448130, 448140, 448150, 448190, 448210, 448310, 448320	Retail Trade
410	Retail - Sporting goods, hobby, musical instrument & book stores	451110, 451120, 451130, 451140, 451211, 451212	Retail Trade
411	Retail - General merchandise stores	452210, 452311, 452319	Retail Trade
412	Retail - Miscellaneous store retailers	453110, 453210, 453220, 453310, 453910, 453920, 453930, 453991, 453998	Retail Trade
413	Retail - Nonstore retailers	454110, 454210, 454310, 454390	Retail Trade
414	Air transportation	481111, 481112, 481211, 481212, 481219	Transportation
415	Rail transportation	482111, 482112	Transportation
416	Water transportation	483111, 483112, 483113, 483114, 483211, 483212	Transportation
417	Truck transportation	484110, 484121, 484122, 484210, 484220, 484230	Transportation
418	Transit & ground passenger transportation	485111, 485112, 485113, 485119, 485210, 485310, 485320, 485410, 485510, 485991, 485999	Transportation
419	Pipeline transportation	486110, 486210, 486910, 486990	Transportation
420	Scenic & sightseeing transportation & support activities for transportation	487110, 487210, 487990, 488111, 488119, 488190, 488210, 488310, 488320, 488330, 488390, 488410, 488490, 488510, 488991, 488999	Transportation
421	Couriers & messengers	492110, 492210	Services
422	Warehousing & storage	493110, 493120, 493130, 493190	Services
423	Newspaper publishers	511110	Services
424	Periodical publishers	511120	Services

Sector	Description	2017 NAICS	Agri-Forestry ^a
425	Book publishers	511130	Services
426	Directory, mailing list, & other publishers	511140, 511199	Services
427	Greeting card publishing	511191	Services
428	Software publishers	511210	Services
429	Motion picture & video industries	512110, 512120, 512131, 512132, 512191, 512199	Services
430	Sound recording industries	512230, 512240, 512250, 512290	Services
431	Radio & television broadcasting	515111, 515112, 515120	Services
432	Cable & other subscription programming	515210	Services
433	Wired telecommunications carriers	517311	Services
434	Wireless telecommunications carriers (except satellite)	517312	Services
435	Satellite, telecommunications resellers, & all other telecommunications	517410, 517911, 517919	Services
436	Data processing, hosting, & related services	518210	Services
437	News syndicates, libraries, archives & all other information services	519110, 519120, 519190	Services
438	Internet publishing & broadcasting & web search portals	519130	Services
439	Nondepository credit intermediation & related activities	522210, 522220, 522291, 522292, 522293, 522294, 522298, 522310, 522320, 522390	Finance
440	Securities & commodity contracts intermediation & brokerage	523110, 523120, 523130, 523140, 523210	Finance
441	Monetary authorities & depository credit intermediation	521110, 522110, 522120, 522130, 522190	Finance
442	Other financial investment activities	523910, 523920, 523930, 523991, 523999	Finance
443	Direct life insurance carriers	524113	Insurance
444	Insurance carriers, except direct life	524114, 524126, 524127, 524128, 524130	Insurance
445	Insurance agencies, brokerages, & related activities	524210, 524291, 524292, 524298	Insurance
446	Funds, trusts, & other financial vehicles	525110, 525120, 525190, 525910, 525920, 525990	Finance
447	Other real estate	531120, 531130, 531190, 531210, 531311, 531312, 531320, 531390	Real Estate
448	Tenant-occupied housing	531110	Real Estate
449	Owner-occupied dwellings	n/a	Real Estate
450	Automotive equipment rental & leasing	532111, 532112, 532120	Services
451	General & consumer goods rental except video tapes & discs	532210, 532281, 532283, 532284, 532289, 532310	Services
452	Video tape & disc rental	532282	Services
453	Commercial & industrial machinery & equipment rental & leasing	532411, 532412, 532420, 532490	Services
454	Lessors of nonfinancial intangible assets	533110	Services
455	Legal services	541110, 541191, 541199	Services
456	Accounting, tax preparation, bookkeeping, & payroll services	541211, 541213, 541214, 541219	Services
457	Architectural, engineering, & related services	541310, 541320, 541330, 541340, 541350, 541360, 541370, 541380	Services
458	Specialized design services	541410, 541420, 541430, 541490	Services
459	Custom computer programming services	541511	Services
460	Computer systems design services	541512	Services
461	Other computer related services, including facilities management	541513, 541519	Services

Sector	Description	2017 NAICS	Agri-Forestry ^a
462	Management consulting services	541611, 541612, 541613, 541614, 541618	Services
463	Environmental & other technical consulting services	541620, 541690	Services
464	Scientific research & development services	541713, 541714, 541715, 541720	Services
465	Advertising, public relations, & related services	541810, 541820, 541830, 541840, 541850, 541860, 541870, 541890	Services
466	Photographic services	541921, 541922	Services
467	Veterinary services	541940	Services
468	Marketing research & all other miscellaneous professional, scientific, & technical services	541910, 541930, 541990	Services
469	Management of companies & enterprises	551111, 551112, 551114	Services
470	Office administrative services	561110	Services
471	Facilities support services	561210	Services
472	Employment services	561311, 561312, 561320, 561330	Services
473	Business support services	561410, 561421, 561422, 561431, 561439, 561440, 561450, 561491, 561492, 561499	Services
474	Travel arrangement & reservation services	561510, 561520, 561591, 561599	Services
475	Investigation & security services	561611, 561612, 561613, 561621, 561622	Services
476	Services to buildings	561710, 561720, 561740, 561790	Services
477	Landscape & horticultural services	561730	Services
478	Other support services	561910, 561920, 561990	Services
479	Waste management & remediation services	562111, 562112, 562119, 562211, 562212, 562213, 562219, 562910, 562920, 562991, 562998	Services
480	Elementary & secondary schools	611110	Government
481	Junior colleges, colleges, universities, & professional schools	611210, 611310	Government
482	Other educational services	611410, 611420, 611430, 611511, 611512, 611513, 611519, 611610, 611620, 611630, 611691, 611692, 611699, 611710	Services
483	Offices of physicians	621111, 621112	Services
484	Offices of dentists	621210	Services
485	Offices of other health practitioners	621310, 621320, 621330, 621340, 621391, 621399	Services
486	Outpatient care centers	621410, 621420, 621491, 621492, 621493, 621498	Services
487	Medical & diagnostic laboratories	621511, 621512	Services
488	Home health care services	621610	Services
489	Other ambulatory health care services	621910, 621991, 621999	Services
490	Hospitals	622110, 622210, 622310	Services
491	Nursing & community care facilities	623110, 623311, 623312	Services
492	Residential mental retardation, mental health, substance abuse & other facilities	623210, 623220, 623990	Services
493	Individual & family services	624110, 624120, 624190	Services
494	Child day care services	624410	Services
495	Community food, housing, & other relief services, including rehabilitation services	624210, 624221, 624229, 624230, 624310	Services
496	Performing arts companies	711110, 711120, 711130, 711190	Services
497	Commercial Sports Except Racing	711211, 711219	Services
498	Racing & Track Operation	711212	Services
499	Independent artists, writers, & performers	711510	Services
500	Promoters of performing arts & sports & agents for public figures	711310, 711320, 711410	Services
501	Museums, historical sites, zoos, & parks	712110, 712120, 712130, 712190	Services
502	Amusement parks & arcades	713110, 713120,	Services

Sector	Description	2017 NAICS	Agri-Forestry ^a
503	Gambling industries (except casino hotels)	713210, 713290	Services
504	Other amusement & recreation industries	713910, 713920, 713930, 713990	Services
505	Fitness & recreational sports centers	713940	Services
506	Bowling centers	713950	Services
507	Hotels & motels, including casino hotels	721110, 721120	Services
508	Other accommodations	721191, 721199, 721211, 721214, 721310	Services
509	Full-service restaurants	722511	Services
510	Limited-service restaurants	722513	Services
511	All other food & drinking places	722310, 722320, 722330, 722410, 722514, 722515	Services
512	Automotive repair & maintenance, except car washes	811111, 811112, 811113, 811118, 811121, 811122, 811191, 811198	Services
513	Car washes	811192	Services
514	Electronic & precision equipment repair & maintenance	811211, 811212, 811213, 811219	Services
515	Commercial & industrial machinery & equipment repair & maintenance	811310	Services
516	Personal & household goods repair & maintenance	811411, 811412, 811420, 811430, 811490	Services
517	Personal care services	812111, 812112, 812113, 812191, 812199	Services
518	Death care services	812210, 812220,	Services
519	Dry-cleaning & laundry services	812310, 812320, 812331, 812332	Services
520	Other personal services	812910, 812921, 812922, 812930, 812990	Services
521	Religious organizations	813110	Miscellaneous
522	Grantmaking, giving, & social advocacy organizations	813211, 813212, 813219, 813311, 813312, 813319	Miscellaneous
523	Business & professional associations	813910, 813920	Miscellaneous
524	Labor & civic organizations	813410, 813930, 813940, 813990	Miscellaneous
525	Private households	814110	Services
526	Postal service	491110	Government
527	Federal electric utilities	92	Government
528	Other federal government enterprises	92	Government
529	State government passenger transit	92	Government
530	State government electric utilities	92	Government
531	Other state government enterprises	92	Government
532	Local government passenger transit	92	Government
533	Local government electric utilities	92	Government
534	Other local government enterprises	92	Government
535	* Not an industry (Used & secondhand goods) ^b	n/a	Miscellaneous
536	* Not an industry (Scrap) ^c	n/a	Miscellaneous
537	* Not an industry (Rest of world adjustment) ^d	n/a	Miscellaneous
538	* Not an industry (Noncomparable foreign imports) ^e	n/a	Miscellaneous
539	* Employment & payroll of state govt, education	92	Government
540	* Employment & payroll of state govt, hospitals & health services	92	Government
541	* Employment & payroll of state govt, other services	92	Government
542	* Employment & payroll of local govt, education	92	Government
543	* Employment & payroll of local govt, hospitals & health services	92	Government
544	* Employment & payroll of local govt, other services	92	Government

Sector	Description	2017 NAICS	Agri-Forestry ^a
545	* Employment & payroll of federal govt, military	92	Government
546	* Employment & payroll of federal govt, non-military	92	Government

^aIdentification of North American Industry Classification System (NAICS) sector included in the Agri-Forestry industrial complex

^bGoods (commodities) previously used and then resold.

^cCommodities cast off as part of a production process and then resold as scrap.

^dNet foreign flows of factor income.

^eGoods not available in the nation.

Source: IMPLAN Group, LLC, 2021

Appendix C: Total Industry Output, Employment, Labor Income, and Total Value-Added by Agriculture and Forestry Sectors for Tennessee, 2019

Table C.1. Direct Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO	Employment	Labor Income	TVA
	(million \$)	(number)	(million \$)	(million \$)
<i>Agricultural Inputs</i>				
<u>Agricultural Chemicals</u>				
Nitrogenous fertilizer	11	10	1	2
Phosphatic fertilizer	12	13	1	3
Fertilizer mixing	24	46	3	5
Pesticide & other agricultural chemical	553	369	53	143
Lime	68	143	10	24
<i>Total --</i>	<i>669</i>	<i>581</i>	<i>68</i>	<i>177</i>
<u>Agricultural Machinery</u>				
Farm machinery & equipment	216	410	30	50
Lawn & garden equipment	931	1,702	97	173
<i>Total --</i>	<i>1,146</i>	<i>2,112</i>	<i>126</i>	<i>223</i>
<i>Agricultural Inputs Total --</i>	<i>1,815</i>	<i>2,693</i>	<i>195</i>	<i>401</i>
<i>Primary Agriculture</i>				
Oilseed farming	584	3,509	-149	341
Grain farming	718	8,185	-52	61
Vegetable & melon farming	191	3,537	-25	43
Fruit farming	12	350	-3	4
Tree nut farming	2	74	-1	1
Greenhouse, nursery, & floriculture production	313	4,769	26	100
Tobacco farming	78	1,890	4	28
Cotton farming	327	4,589	18	87
Sugarcane & sugar beet farming	0	0	0	0
All other crop farming	164	22,928	2	33
Beef cattle farming	495	14,740	-36	130
Dairy cattle & milk production	107	542	-4	10
Poultry & egg production	537	2,342	2	48
Animal production, except cattle & poultry & eggs	150	4,496	-30	98
Commercial fishing	0	0	0	0
Commercial hunting & trapping	18	311	1	6
Support activities for agriculture & forestry	260	7,627	222	195
<i>Primary Agriculture Total --</i>	<i>3,957</i>	<i>79,887</i>	<i>-24</i>	<i>1,186</i>
<i>Secondary Agriculture</i>				
<u>Foods</u>				
Dog & cat food	446	351	73	202
Other animal food	348	330	30	59
<i>Total --</i>	<i>794</i>	<i>681</i>	<i>103</i>	<i>260</i>
<u>Grain & Oilseed Milling</u>				
Flour milling	428	420	42	77
Rice milling	431	593	67	109
Malt	0	0	0	0
Wet corn milling	418	241	43	83
Soybean & other oilseed processing	2,739	616	70	335
Fats & oils refining & blending	338	226	23	43
Breakfast cereal	185	194	29	70
<i>Total --</i>	<i>4,539</i>	<i>2,289</i>	<i>276</i>	<i>716</i>

Table C.1. Direct Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO	Employment	Labor Income	TVA
	(million \$)	(number)	(million \$)	(million \$)
<u>Sugar & Confectionary Products</u>				
Beet sugar	0	0	0	0
Sugar cane mills & refining	70	71	6	14
Nonchocolate confectionery	613	1,341	113	164
Chocolate & confectionery (from cacao beans)	34	79	3	4
Confectionery (from purchased chocolate)	574	1,565	123	170
<i>Total --</i>	<i>1,290</i>	<i>3,055</i>	<i>245</i>	<i>352</i>
<u>Fruit & Vegetable Preserving & Specialty Foods</u>				
Frozen fruits, juices & vegetables	180	336	28	59
Frozen specialties	756	2,025	167	233
Canned fruits & vegetables	814	1,245	162	312
Canned specialties	28	34	3	7
Dehydrated food products	1	3	0 ^b	0 ^b
<i>Total --</i>	<i>1,779</i>	<i>3,644</i>	<i>359</i>	<i>611</i>
<u>Dairy Products</u>				
Cheese	1,108	1,255	85	122
Dry, condensed, & evaporated dairy product	754	633	61	147
Fluid milk	560	790	69	112
Creamery butter	0	0	0	0
Ice cream & frozen dessert	208	538	38	52
<i>Total --</i>	<i>2,629</i>	<i>3,216</i>	<i>253</i>	<i>433</i>
<u>Animal Slaughtering & Processing</u>				
Poultry processing	2,478	8,300	480	586
Animal, except poultry, slaughtering	1,027	1,652	120	147
Meat processed from carcasses	1,025	2,148	160	159
Rendering & meat byproduct processing	114	278	23	24
<i>Total --</i>	<i>4,645</i>	<i>12,379</i>	<i>783</i>	<i>916</i>
<u>Seafood product Preparation & Packaging</u>				
	23	59	2	3
<u>Bakeries & Tortillas</u>				
Bread & bakery product, except frozen	1,023	6,703	324	458
Frozen cakes & other pastries	322	3,425	130	186
Cookie & cracker	1,092	2,868	254	373
Dry pasta, mixes, & dough	249	456	35	76
Tortilla	30	121	9	11
<i>Total --</i>	<i>2,716</i>	<i>13,573</i>	<i>752</i>	<i>1,103</i>
<u>Other Foods</u>				
Roasted nuts & peanut butter	138	288	21	37
Other snack food	1,342	2,453	203	447
Coffee & tea	773	1,169	90	169
Flavoring syrup & concentrate	19	13	1	7
Mayonnaise, dressing, & sauce	403	708	56	104
Spice & extract	25	44	3	5
All other food	491	1,226	86	123
<i>Total --</i>	<i>3,191</i>	<i>5,900</i>	<i>459</i>	<i>891</i>

Table C.1. Direct Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO	Employment	Labor Income	TVA
	(million \$)	(number)	(million \$)	(million \$)
<u>Beverages</u>				
Bottled & canned soft drinks & water	1,891	3,236	230	404
Breweries	304	945	31	76
Wineries	145	532	17	30
Distilleries	1,581	1,848	129	627
<i>Total --</i>	<i>3,922</i>	<i>6,561</i>	<i>407</i>	<i>1,137</i>
<u>Tobacco Products</u>	3,271	1,098	102	1,873
<u>Textile Mills</u>				
Fiber, yarn, & thread mills	471	1,373	72	106
Broadwoven fabric mills	26	86	6	9
Narrow fabric mills & schiffli machine embroidery	5	26	1	1
Nonwoven fabric mills	437	895	70	138
Knit fabric mills	19	84	5	6
Textile & fabric finishing mills	197	707	37	50
Fabric coating mills	175	452	32	45
<i>Total --</i>	<i>1,329</i>	<i>3,624</i>	<i>222</i>	<i>356</i>
<u>Textile Products Mills</u>				
Carpet & rug mills	39	107	6	10
Curtain & linen mills	28	153	6	8
Textile bag & canvas mills	125	756	36	44
Rope, cordage, twine, tire cord & tire fabric mills	179	705	38	59
Other textile product mills	162	1,085	44	54
<i>Total --</i>	<i>533</i>	<i>2,806</i>	<i>130</i>	<i>174</i>
<u>Apparel</u>				
Hosiery & sock mills	64	710	28	29
Other apparel knitting mills	11	132	3	4
Cut & sew apparel contractors	113	1,251	65	62
Men's & boy's cut & sew apparel	267	2,433	128	120
Women's & girl's cut & sew apparel	22	141	5	5
Other cut & sew apparel	27	230	9	9
Apparel accessories & other apparel	18	152	6	7
<i>Total --</i>	<i>521</i>	<i>5,049</i>	<i>244</i>	<i>236</i>
<u>Leather & Allied Products</u>				
Leather & hide tanning & finishing	30	119	4	3
Footwear	26	242	6	6
Other leather & allied product	15	143	5	5
<i>Total --</i>	<i>71</i>	<i>504</i>	<i>15</i>	<i>13</i>
Secondary Agriculture Total --	31,253	64,437	4,353	9,075
Agriculture Total --	37,026	147,017	4,524	10,661
<u>Forestry Inputs</u>				
<u>Sawmill, Woodworking, & Paper Machinery</u>	46	164	13	14
<u>Timber</u>				
Forestry, forest products, & timber tract production	24	269	18	20
Commercial logging	274	2,789	191	182

Table C.1. Direct Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO	Employment	Labor Income	TVA
	(million \$)	(number)	(million \$)	(million \$)
Total --	299	3,059	210	202
Forestry Inputs Total --	345	3,223	222	216
Primary Forestry				
Sawmills	816	2,693	122	202
Wood preservation	62	107	5	16
Pulp mills	75	95	12	25
Paper mills	1,341	1,503	172	518
Paperboard Mills	1,167	1,086	145	431
Primary Forestry Total --	3,461	5,485	456	1,191
Secondary Forestry				
<u>Veneer, Plywood, & Engineered Wood Products</u>				
Veneer & plywood	28	106	4	6
Engineered wood member & truss	341	1,287	80	124
Reconstituted wood product	118	210	17	41
Total --	487	1,602	101	171
<u>Wood Windows & Doors & Millwork</u>				
Wood windows & door	334	1,377	87	124
Cut stock, resawing lumber, & planning	100	385	18	36
Other millwork, including flooring	303	1,308	61	105
Total --	737	3,070	166	266
<u>Wood Containers & Pallets</u>	466	2,534	114	165
<u>Manufactured Homes (Mobile Homes)</u>				
Manufactured home (mobile home)	594	2,834	187	241
Prefabricated wood building	110	468	31	46
Total --	704	3,303	218	287
<u>All Other Miscellaneous Wood Products</u>	120	557	24	39
<u>Paperboard Containers</u>	3,089	5,781	460	826
<u>Paper Bags & Coated & Treated Paper</u>	966	1,876	130	299
<u>Stationery Products</u>	544	1,144	103	173
<u>Other Converted Paper Products</u>				
Sanitary paper product	549	573	55	225
All other converted paper product	194	610	35	59
Total --	743	1,183	90	284
<u>Wood Kitchen Cabinets & Countertops</u>	263	1,804	90	101
<u>Household & Institutional Furniture</u>				
Upholstered household furniture	762	4,257	214	224
Nonupholstered wood household furniture	80	556	24	26
Other household nonupholstered furniture	76	242	18	21
Institutional furniture	119	635	34	35

Table C.1. Direct Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO	Employment	Labor Income	TVA
	(million \$)	(number)	(million \$)	(million \$)
<i>Total --</i>	<i>1,037</i>	<i>5,691</i>	<i>290</i>	<i>306</i>
<u>Office Furniture</u>				
Wood office furniture	21	101	5	5
Custom architectural woodwork & millwork	68	408	23	22
Showcase, partition, shelving, & locker	286	1,332	83	95
<i>Total --</i>	<i>374</i>	<i>1,841</i>	<i>111</i>	<i>122</i>
<u>Other Furniture Related Products</u>				
Mattress	221	690	35	44
Blind & shade	13	70	3	3
<i>Total --</i>	<i>234</i>	<i>760</i>	<i>38</i>	<i>47</i>
<i>Secondary Forestry Total --</i>	<i>9,763</i>	<i>31,146</i>	<i>1,934</i>	<i>3,087</i>
<i>Forestry Total --</i>	<i>13,569</i>	<i>39,854</i>	<i>2,612</i>	<i>4,495</i>
<i>Agriculture & Forestry Total --</i>	<i>50,595</i>	<i>186,871</i>	<i>7,136</i>	<i>15,156</i>
 <i>Construction --</i>	 <i>33,367</i>	 <i>243,562</i>	 <i>16,131</i>	 <i>17,149</i>
<i>Finance --</i>	<i>26,662</i>	<i>119,243</i>	<i>8,059</i>	<i>11,855</i>
<i>Government --</i>	<i>52,897</i>	<i>474,538</i>	<i>31,480</i>	<i>41,328</i>
<i>Insurance --</i>	<i>23,973</i>	<i>66,987</i>	<i>5,334</i>	<i>10,178</i>
<i>Manufacturing --</i>	<i>141,736</i>	<i>267,155</i>	<i>21,392</i>	<i>39,538</i>
<i>Mining --</i>	<i>2,570</i>	<i>7,691</i>	<i>298</i>	<i>786</i>
<i>Miscellaneous --</i>	<i>9,648</i>	<i>87,232</i>	<i>3,919</i>	<i>3,949</i>
<i>Real Estate --</i>	<i>61,590</i>	<i>145,323</i>	<i>4,876</i>	<i>40,357</i>
<i>Retail Trade --</i>	<i>35,617</i>	<i>375,838</i>	<i>13,847</i>	<i>21,493</i>
<i>Services --</i>	<i>237,454</i>	<i>1,929,940</i>	<i>113,142</i>	<i>142,668</i>
<i>Transportation --</i>	<i>21,635</i>	<i>142,958</i>	<i>8,404</i>	<i>10,757</i>
<i>Utilities --</i>	<i>4,760</i>	<i>4,140</i>	<i>443</i>	<i>2,142</i>
<i>Wholesale Trade --</i>	<i>43,486</i>	<i>130,426</i>	<i>11,524</i>	<i>24,732</i>
<i>Total Economy --</i>	<i>745,989</i>	<i>4,181,903</i>	<i>245,987</i>	<i>382,087</i>

^aTotals may not add due to rounding.^bValues of zero are nonzero values less than 1.

**Appendix D. Total Impacts from the Agriculture and Forestry Sectors, Tennessee,
2019**

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
<i>Agricultural Inputs</i>																
<u>Agricultural Chemicals</u>																
Nitrogenous fertilizer	1.53	17	1.74	20	3.42	35	4.93	50	2.75	3	3.56	4	2.23	5	2.79	7
Phosphatic fertilizer	1.41	17	1.62	19	2.68	35	3.88	51	2.08	3	2.70	4	1.93	5	2.45	7
Fertilizer mixing	1.38	34	1.58	38	1.95	90	2.62	120	2.08	5	2.70	7	1.94	10	2.46	13
Pesticide & other ag chemicals	1.32	733	1.50	828	3.25	1,197	4.90	1,806	2.05	109	2.66	141	1.63	232	2.01	287
Lime	1.53	104	1.78	121	1.97	282	2.74	391	1.89	20	2.45	25	1.72	42	2.13	51
<i>Total --</i>		905		1,027		1,639		2,419		140		181		295		366
<u>Agricultural Machinery</u>																
Farm machinery & equipment	1.37	297	1.60	345	1.92	790	2.67	1,097	1.85	55	2.40	71	1.79	89	2.35	117
Lawn & garden equipment	1.31	1,218	1.48	1,380	1.75	2,979	2.36	4,014	1.92	186	2.49	241	1.80	313	2.34	407
<i>Total --</i>		1,515		1,724		3,768		5,111		241		312		402		524
<i>Agricultural Inputs Total --</i>		2,420		2,751		5,407		7,530		380		493		697		889
<i>Primary Agriculture</i>																
Oilseed farming	1.32	773	1.19	695	1.51	5,313	1.37	4,810	0.00	0	0.00	0	1.29	438	1.15	393
Grain farming	1.71	1,229	1.85	1,328	1.55	12,676	1.63	13,313	0.00	0	0.00	0	5.23	321	6.17	379
Vegetable & melon farming	1.60	306	1.66	318	1.30	4,581	1.32	4,657	0.00	0	0.00	0	2.37	103	2.53	110
Fruit farming	1.47	18	1.46	18	1.20	421	1.20	420	0.00	0	0.00	0	1.90	7	1.87	7
Tree nut farming	1.45	3	1.42	3	1.17	87	1.16	87	0.00	0	0.00	0	1.83	1	1.78	1
Greenhouse, nursery, & floriculture production	1.51	474	1.72	539	1.30	6,179	1.38	6,598	2.86	76	3.71	98	1.82	181	2.20	219
Tobacco farming	1.48	115	1.68	130	1.19	2,246	1.24	2,342	3.87	17	5.01	22	1.70	47	2.01	56
Cotton farming	1.57	513	1.77	579	1.42	6,524	1.51	6,945	4.19	76	5.42	98	2.04	177	2.47	215
Sugarcane & sugar beet farming	1.00	0	1.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
All other crop farming	1.64	270	1.84	303	1.04	23,943	1.05	24,152	23.25	38	30.10	49	2.64	88	3.21	107
Beef cattle farming	1.61	798	1.66	821	1.24	18,311	1.25	18,462	0.00	0	0.00	0	2.00	260	2.10	274
Dairy cattle & milk production	1.62	173	1.73	185	1.80	976	1.94	1,051	0.00	0	0.00	0	3.99	41	4.65	48
Poultry & egg production	1.52	815	1.63	877	1.57	3,676	1.74	4,072	40.05	71	51.90	92	3.51	170	4.25	206
Commercial fishing	1.23	184	1.11	166	1.07	4,803	1.04	4,684	0.00	0	0.00	0	1.18	115	1.07	104
Animal production, except cattle, poultry, & eggs	1.32	773	1.19	695	1.51	5,313	1.37	4,810	0.00	0	0.00	0	1.29	438	1.15	393
Commercial hunting & trapping	1.41	25	1.57	28	1.15	358	1.21	376	5.66	3	7.33	4	1.67	10	1.94	11

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
Support activities for ag & forestry	1.15	299	1.93	503	1.03	7,845	1.20	9,151	1.05	234	1.37	303	1.11	216	1.71	334
Primary Agriculture Total --		5,996		6,493		97,938		101,121		514		667		2,176		2,465
Secondary Agriculture																
<u>Foods</u>																
Dog & cat food	1.23	549	1.43	637	2.16	758	3.76	1,321	1.39	102	1.80	132	1.21	245	1.47	296
Other animal food	1.34	465	1.49	519	2.40	791	3.44	1,136	2.10	62	2.73	81	1.86	109	2.39	141
Total --		1,014		1,156		1,549		2,456		164		212		354		436
<u>Grain & Oilseed Milling</u>																
Flour milling	1.39	594	1.58	678	2.91	1,220	4.18	1,756	2.30	97	2.99	126	2.07	159	2.70	208
Rice milling	1.14	489	1.31	563	1.45	860	2.25	1,335	1.27	86	1.65	111	1.27	138	1.67	181
Malt	1.00	0	1.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
Wet corn milling	1.32	550	1.50	627	3.83	922	5.86	1,411	2.03	88	2.63	114	1.80	149	2.34	194
Soybean & other oilseed processing	1.24	3,387	1.32	3,616	5.57	3,427	7.94	4,889	3.75	264	4.86	342	1.86	622	2.26	755
Fats & oils refining & blending	1.38	467	1.53	516	3.11	704	4.50	1,018	2.46	57	3.19	73	2.22	94	2.89	123
Breakfast cereal	1.32	244	1.53	284	2.16	419	3.48	675	1.56	46	2.03	60	1.36	95	1.69	118
Total --		5,731		6,284		7,554		11,083		637		826		1,258		1,580
<u>Sugar & Confectionary Products</u>																
Beet sugar	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
Sugar cane mills & refining	1.35	95	1.53	107	2.77	197	3.87	275	2.51	14	3.25	18	1.94	27	2.46	34
Nonchocolate confectionery	1.43	876	1.71	1,048	1.88	2,517	2.69	3,613	1.75	198	2.26	257	1.77	290	2.38	390
Chocolate & confectionery from cacao beans	1.46	49	1.68	57	1.97	154	2.56	201	2.78	8	3.61	11	2.81	12	3.79	16
Confectionery from purchased chocolate	1.37	788	1.67	956	1.61	2,521	2.30	3,591	1.57	193	2.04	251	1.61	274	2.18	371
Total --		1,809		2,167		5,389		7,680		414		536		602		811
<u>Fruit & Vegetable Preserving & Specialty Foods</u>																
Frozen fruits, juices & vegetables	1.43	257	1.69	304	2.08	699	2.97	999	1.94	54	2.52	70	1.64	97	2.10	124

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
Frozen specialties	1.28	970	1.55	1,172	1.45	2,929	2.08	4,217	1.40	233	1.81	302	1.41	328	1.91	445
Canned fruits & vegetables	1.30	1,055	1.55	1,265	1.91	2,376	2.99	3,718	1.50	242	1.94	314	1.38	430	1.77	552
Canned specialties	1.19	33	1.33	37	1.66	57	2.39	82	1.57	4	2.04	6	1.37	9	1.71	11
Dehydrated food products	1.28	2	1.47	2	1.50	5	2.01	7	1.65	0	2.14	0	1.52	1	1.97	1
<i>Total --</i>		2,317		2,780		6,066		9,022		534		692		864		1,133
<u>Dairy Products</u>																
Cheese	1.27	1,403	1.41	1,564	2.15	2,695	2.96	3,719	2.17	185	2.81	240	2.13	261	2.89	354
Dry, condensed, & evaporated dairy products	1.33	1,006	1.50	1,128	2.81	1,783	4.04	2,561	2.32	141	3.01	182	1.80	264	2.28	335
Fluid milk	1.30	729	1.50	839	2.07	1,637	2.96	2,338	1.83	127	2.38	164	1.73	195	2.30	259
Creamery butter	1.00	0	1.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
Ice cream & frozen dessert	1.37	285	1.63	339	1.61	868	2.25	1,211	1.64	62	2.12	80	1.68	87	2.29	118
<i>Total --</i>		3,424		3,870		6,982		9,828		514		667		807		1,066
<u>Animal Slaughtering & Processing</u>																
Poultry processing	1.27	3,149	1.52	3,760	1.39	11,576	1.86	15,477	1.47	705	1.91	914	1.52	893	2.13	1,248
Animal, except poultry, slaughtering	1.25	1,285	1.43	1,473	1.90	3,147	2.63	4,344	1.79	216	2.33	280	1.91	281	2.65	390
Meat processed from carcasses	1.28	1,317	1.50	1,534	1.59	3,413	2.23	4,800	1.56	251	2.03	325	1.85	293	2.64	419
Rendering & meat byproduct processing	1.57	179	1.93	220	2.35	654	3.29	913	2.04	47	2.65	61	2.34	56	3.32	80
<i>Total --</i>		5,931		6,987		18,789		25,535		1,218		1,580		1,523		2,138
<u>Seafood Product Prep & Packaging</u>																
	1.28	29	1.46	33	1.60	94	2.02	119	2.20	5	2.86	6	2.26	6	3.10	8
<u>Bakeries & Tortillas</u>																
Frozen cakes & other pastries	1.27	407	1.69	545	1.11	3,804	1.37	4,681	1.22	158	1.58	205	1.22	227	1.65	307
Bread & bakery product, except frozen	1.36	1,392	1.74	1,780	1.25	8,357	1.62	10,831	1.38	447	1.79	579	1.38	634	1.88	859
Cookies & crackers	1.40	1,524	1.71	1,868	1.67	4,802	2.44	6,997	1.56	396	2.03	514	1.54	576	2.08	776

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
Dry pasta, mixes, & dough	1.45	361	1.69	421	2.04	931	2.89	1,316	1.98	69	2.57	90	1.66	126	2.13	161
Tortilla	1.47	45	1.84	56	1.45	175	2.04	246	1.45	13	1.88	17	1.56	17	2.16	23
<i>Total --</i>		3,729		4,669		18,069		24,071		1,084		1,405		1,579		2,126
<u>Other Foods</u>																
Roasted nuts & peanut butter	1.36	187	1.59	219	1.86	535	2.58	742	1.81	37	2.35	48	1.66	61	2.18	80
Other snack food	1.31	1,763	1.53	2,051	1.72	4,209	2.46	6,046	1.64	332	2.12	430	1.44	646	1.82	813
Coffee & tea	1.33	1,029	1.54	1,187	2.15	2,511	3.02	3,525	2.03	183	2.63	237	1.78	301	2.33	394
Flavoring syrup & concentrate	1.39	26	1.53	29	3.18	41	4.52	58	2.75	3	3.56	4	1.46	10	1.70	11
Mayonnaise, dressing, & sauce	1.32	531	1.51	610	1.71	1,209	2.42	1,714	1.64	91	2.13	118	1.54	159	1.98	205
Spice & extract	1.38	35	1.59	40	2.06	90	2.84	124	2.08	6	2.69	8	1.98	10	2.63	13
All other food	1.38	677	1.64	806	1.74	2,138	2.42	2,963	1.73	149	2.24	193	1.74	214	2.35	289
<i>Total --</i>		4,247		4,943		10,733		15,172		802		1,039		1,400		1,804
<u>Beverages</u>																
Bottled & canned soft drinks & water	1.36	2,573	1.56	2,947	1.94	6,278	2.68	8,661	1.87	431	2.43	558	1.81	731	2.35	948
Breweries	1.40	426	1.59	484	1.52	1,439	1.91	1,805	2.11	66	2.73	86	1.75	133	2.19	166
Wineries	1.42	207	1.65	240	1.56	832	1.95	1,039	2.18	37	2.82	49	2.08	62	2.72	81
Distilleries	1.32	2,082	1.47	2,324	2.19	4,042	3.02	5,586	2.16	279	2.81	362	1.41	884	1.63	1,025
<i>Total --</i>		5,290		5,995		12,591		17,091		814		1,054		1,810		2,220
<u>Tobacco Products</u>	1.25	4,097	1.34	4,400	4.39	4,815	6.14	6,743	3.42	349	4.43	452	1.22	2,287	1.31	2,462
<u>Textile Mills</u>																
Fiber, yarn, & thread mills	1.18	556	1.35	638	1.21	1,666	1.59	2,187	1.31	94	1.70	122	1.34	143	1.79	190
Broadwoven fabric mills	1.20	32	1.44	38	1.27	109	1.74	149	1.29	7	1.67	9	1.28	12	1.67	15
Narrow fabric mills & schiffli machine embroidery	1.22	6	1.54	7	1.17	31	1.52	40	1.24	2	1.60	2	1.33	2	1.88	3
Nonwoven fabric mills	1.20	523	1.38	604	1.37	1,231	1.95	1,750	1.34	94	1.74	122	1.29	177	1.63	225
Knit fabric mills	1.27	25	1.56	30	1.31	110	1.73	145	1.36	6	1.76	8	1.41	9	1.92	12

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
Textile & fabric finishing mills	1.32	260	1.58	310	1.44	1,015	1.89	1,339	1.58	58	2.05	76	1.65	82	2.25	111
Fabric coating mills	1.26	221	1.49	261	1.46	659	2.03	917	1.47	47	1.91	61	1.50	67	2.03	91
<i>Total --</i>		1,621		1,888		4,821		6,527		309		400		492		648
<u>Textile Product Mills</u>																
Carpet & rug mills	1.18	46	1.35	53	1.29	138	1.68	180	1.36	8	1.76	10	1.32	13	1.70	17
Curtain & linen mills	1.29	36	1.55	43	1.25	192	1.56	239	1.46	8	1.89	11	1.53	12	2.10	16
Textile bag & canvas mills	1.30	163	1.64	205	1.33	1,007	1.69	1,275	1.35	49	1.74	63	1.43	63	1.99	87
Rope, cordage, twine, tire cord & tire fabric mills	1.35	242	1.63	291	1.55	1,095	2.00	1,409	1.48	57	1.92	74	1.52	89	2.00	118
Other textile product mills	1.45	233	1.80	291	1.43	1,554	1.77	1,921	1.50	66	1.94	86	1.66	89	2.29	123
Hosiery & sock mills	1.26	81	1.72	110	1.10	783	1.37	972	1.20	34	1.56	44	1.29	38	1.88	55
Other apparel knitting mills	1.18	13	1.47	16	1.06	140	1.22	160	1.21	4	1.56	5	1.24	5	1.69	7
<i>Total --</i>		814		1,010		4,909		6,156		225		292		308		422
<u>Apparel</u>																
Cut & sew apparel contractors	1.18	132	1.74	196	1.09	1,365	1.42	1,771	1.12	73	1.45	95	1.18	73	1.77	110
Men's & boy's cut & sew apparel	1.18	315	1.66	442	1.13	2,743	1.46	3,552	1.14	146	1.48	190	1.22	147	1.83	221
Women's & girl's cut & sew apparel	1.33	29	1.63	35	1.36	191	1.65	232	1.63	7	2.11	10	1.79	9	2.53	13
Other cut & sew apparel	1.38	38	1.80	49	1.27	293	1.59	365	1.44	13	1.87	17	1.65	15	2.40	21
Apparel accessories & other apparel	1.28	23	1.67	30	1.19	181	1.48	225	1.29	8	1.68	10	1.43	9	2.05	13
<i>Total --</i>		538		753		4,773		6,145		248		322		253		378
<u>Leather & Allied Products</u>																
Leather & hide tanning & finishing	1.41	42	1.63	49	1.41	169	1.76	211	1.86	8	2.42	10	2.92	8	4.26	12
Footwear	1.57	41	1.93	50	1.28	309	1.52	368	1.83	11	2.38	14	2.37	14	3.29	19
Other leather & allied products	1.50	22	1.92	29	1.25	178	1.53	218	1.53	7	1.98	9	1.84	9	2.61	12
<i>Total --</i>		105		128		656		797		25		33		31		44
Secondary Agriculture Total --		40,697		47,061		107,788		148,425		7,342		9,517		13,575		17,276
Agriculture Total --		49,112		56,304		211,132		257,076		8,236		10,677		16,449		20,630

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
Forestry Inputs																
<u>Sawmill, woodworking, & paper machinery</u>	1.48	68	1.90	87	1.80	294	2.54	416	1.74	22	2.25	28	1.87	27	2.64	38
<u>Timber</u>																
Forestry, forest products, & timber tract production	1.12	27	1.84	45	1.24	334	1.66	447	1.10	20	1.43	26	1.10	22	1.62	32
Commercial logging	1.21	332	1.90	523	1.32	3,677	1.76	4,904	1.14	219	1.48	284	1.19	216	1.80	327
<i>Total --</i>		359		568		4,011		5,352		239		310		238		359
Forestry Inputs Total --		427		654		4,306		5,768		261		338		265		397
Primary Forestry																
Sawmills	1.51	1,235	1.78	1,454	1.74	4,692	2.26	6,097	2.07	252	2.68	326	2.00	405	2.63	532
Wood preservation	1.54	95	1.75	108	2.39	257	3.17	340	2.78	15	3.61	19	1.98	31	2.46	38
<u>Pulp mills</u>	1.44	108	1.69	128	2.54	242	3.84	366	1.76	22	2.29	29	1.62	40	2.08	51
Paper mills	1.35	1,809	1.55	2,080	2.33	3,508	3.49	5,248	1.81	311	2.35	403	1.43	741	1.74	899
Paperboard Mills	1.42	1,655	1.64	1,909	2.98	3,236	4.48	4,864	2.00	289	2.59	375	1.53	661	1.87	809
Primary Forestry Total --		4,903		5,679		11,936		16,916		889		1,153		1,878		2,328
Secondary Forestry																
<u>Veneer, Plywood, & Engineered Wood Products</u>																
Veneer & plywood	1.30	37	1.50	42	1.36	143	1.70	180	1.66	7	2.15	8	1.64	11	2.16	14
Engineered wood member & truss	1.35	459	1.65	561	1.45	1,861	1.96	2,518	1.48	118	1.92	153	1.48	184	1.96	243
Reconstituted wood products	1.26	149	1.45	171	1.61	338	2.29	482	1.52	26	1.97	33	1.35	55	1.67	68
<i>Total --</i>		644		775		2,342		3,180		150		195		249		325
<u>Wood Windows & Doors & Millwork</u>																
Wood windows & door	1.39	464	1.72	576	1.48	2,032	2.00	2,748	1.48	128	1.92	166	1.51	188	2.03	253
Cut stock, resawing lumber, & planing	1.24	124	1.47	147	1.32	507	1.70	654	1.43	26	1.86	34	1.33	48	1.70	62

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
Other millworks, including floors	1.33	403	1.60	485	1.39	1,822	1.80	2,348	1.54	94	1.99	122	1.48	155	1.93	203
<i>Total --</i>		992		1,208		4,361		5,750		249		323		392		517
<u>Wood Containers & Pallets</u>	1.35	628	1.66	772	1.31	3,312	1.67	4,242	1.46	167	1.90	216	1.49	247	2.00	331
<u>Manufactured Homes (Mobile Homes)</u>																
Manufactured homes (mobile homes)	1.32	782	1.68	996	1.35	3,826	1.83	5,200	1.32	246	1.71	319	1.37	331	1.89	455
Prefabricated wood buildings	1.33	146	1.68	184	1.41	662	1.93	905	1.39	44	1.80	57	1.40	64	1.88	86
<i>Total --</i>		928		1,180		4,488		6,106		290		376		395		541
<u>All Other Miscellaneous Wood Products</u>	1.44	172	1.74	209	1.50	837	1.92	1,070	1.75	42	2.27	54	1.69	65	2.23	86
<u>Paperboard Containers</u>	1.29	3,980	1.50	4,630	1.79	10,324	2.51	14,499	1.63	748	2.11	970	1.56	1,287	2.01	1,665
<u>Paper Bags & Coated & Treated Paper</u>	1.25	1,202	1.43	1,378	1.56	2,928	2.16	4,056	1.55	202	2.01	262	1.39	415	1.73	517
<u>Stationery Products</u>	1.31	712	1.56	848	1.70	1,946	2.47	2,823	1.52	157	1.98	203	1.48	257	1.94	336
<u>Other Converted Paper Products</u>																
Sanitary paper products	1.24	680	1.39	763	2.05	1,176	2.99	1,713	1.75	96	2.27	125	1.29	291	1.51	339
All other converted paper products	1.37	265	1.64	317	1.59	973	2.14	1,308	1.69	60	2.19	78	1.60	95	2.11	125
<i>Total --</i>		945		1,081		2,148		3,021		156		203		386		465
<u>Wood Kitchen Cabinets & Countertops</u>	1.35	355	1.74	459	1.27	2,284	1.63	2,949	1.33	119	1.72	154	1.45	147	2.04	207
<u>Household & Institutional Furniture</u>																

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
Upholstered household furniture	1.40	1,065	1.76	1,342	1.35	5,759	1.77	7,533	1.48	318	1.92	412	1.70	382	2.42	542
Nonupholstered wood household furniture	1.38	109	1.74	139	1.27	705	1.60	892	1.41	34	1.82	43	1.58	41	2.24	58
Other household nonupholstered furniture	1.41	107	1.74	132	1.66	403	2.32	563	1.55	29	2.01	37	1.72	37	2.40	51
Institutional furniture	1.40	168	1.76	210	1.40	887	1.83	1,160	1.46	49	1.89	63	1.68	59	2.39	83
<i>Total --</i>		1,450		1,823		7,754		10,148		429		556		518		734
<u>Office Furniture</u>																
Wood office furniture	1.45	30	1.77	37	1.49	151	1.91	193	1.67	8	2.16	10	1.92	10	2.66	14
Custom architectural woodwork & millwork	1.35	92	1.74	118	1.31	534	1.73	707	1.32	31	1.72	40	1.55	33	2.27	49
Showcase, partition, shelving, & locker	1.31	375	1.65	470	1.32	1,757	1.78	2,369	1.33	110	1.72	142	1.45	138	2.03	193
<i>Total --</i>		497		625		2,442		3,268		148		192		181		256
<u>Other Furniture Related Products</u>																
Mattresses	1.50	331	1.78	392	1.83	1,259	2.40	1,653	2.04	70	2.64	91	2.21	97	3.02	132
Blind & shades	1.51	20	1.85	25	1.47	102	1.89	132	1.70	5	2.20	7	2.09	7	2.92	9
<i>Total --</i>		351		417		1,362		1,785		76		98		103		142
Secondary Forestry Total --		12,855		15,405		46,529		62,898		2,932		3,802		4,641		6,121
Forestry Total --		18,185		21,738		62,770		85,582		4,081		5,293		6,783		8,847
Agriculture & Forestry Total --		67,297		78,042		273,903		342,658		12,318		15,970		23,232		29,477
<hr/>																
Construction --		47,078		64,879		316,402		430,805		20,432		26,510		24,292		34,630
Finance --		42,427		54,166		214,535		289,897		13,496		17,500		19,773		26,591
Government --		59,606		88,581		500,796		686,734		33,328		43,206		44,454		61,235
Insurance --		47,878		58,364		162,885		230,196		12,057		15,633		20,287		26,377
Manufacturing --		190,532		222,054		486,994		689,327		36,198		46,947		62,763		81,069
Mining --		4,149		4,928		15,528		20,531		896		1,161		1,643		2,096
Miscellaneous --		16,023		21,196		126,006		159,214		5,948		7,712		7,085		10,089

Table D.1. Total Impacts from Agriculture and Forestry^a, Tennessee, 2019

Sector	TIO (million \$)				Employment (number)				Labor Income (million \$)				TVA (million \$)			
	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total	Type I	Indirect	Type Sam	Total
<i>Real Estate --</i>		87,664		99,099		252,844		310,929		10,372		13,458		53,163		59,805
<i>Retail Trade --</i>		51,975		68,899		476,471		585,151		19,447		25,221		29,814		39,642
<i>Services --</i>		334,316		462,242		2,528,818		3,350,430		146,977		190,627		193,451		267,745
<i>Transportation --</i>		32,601		43,317		209,622		278,439		12,314		15,970		16,674		22,897
<i>Utilities --</i>		5,887		6,529		7,223		11,346		738		957		2,665		3,038
<i>Wholesale Trade --</i>		64,210		81,131		258,821		367,448		19,453		25,224		35,958		45,785

^aTotals may not add due to rounding.^bValues of zero are nonzero values less than 1.^cNegative values.



RR 21-004-A

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