2021 Economic Contribution Study of Missouri Agriculture and Forestry

November 2021

Funded By (see next page for Supporting Partners):

MASBDA
MISSOURI AGRICULTURAL AND SMALL BUSINESS DEVELOPMENT AUTHORITY

Prepared By:

Decision Innovation Solutions

Supporting Partners

The 2021 Economic Contribution Study of Missouri Agriculture and Forestry was comprehensive not just from an analysis standpoint but also in the form of a very diverse set of partners, which includes the following fine Missouri organizations:

Missouri Soybean Association

Missouri Corn Merchandising Council

Missouri Pork Producers Association

Missouri Cattlemen's Association

Missouri Farm Bureau

Missouri Forest Products Association

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Table 1, Acronyms

Acronym	Description
USDA	U.S. Department of Agriculture
USDA-NASS	U.S. Department of Agriculture – National Agricultural Statistics Service
USDA-ERS	U.S. Department of Agriculture – Economic Research Service

1 Executive Summary

The results of this economic contribution study indicate that although there have been challenging times in agriculture, forestry, and related industries, these industries remain a significant part of Missouri's economy, supporting more than 1 in every 10 jobs, on average, across the State of Missouri.

This study is based on a combination of the USDA 2017 Census of Agriculture, USDA/NASS datasets, and the IMPLAN modeling system and data (2019). This analysis is patterned after other Agriculture and Forestry Economic Contribution Studies completed by Decision Innovation Solutions (DIS) for the states of Alabama, Illinois, Iowa, Minnesota, and South Dakota.

Missouri is a largely rural state, ranking (by production quantity) in the top ten states for 14 commodities. The top five commodities produced on Missouri's more than 95,000 farms in 2020 is about 78% ($7.3 billion) of the total value of production from all agricultural commodities ($9.3 billion) in the state. Additional discussion related the size and scope of Missouri's agriculture and forestry industries, including industries beyond the basic production of commodities, can be found in Section 2 of this report.

Key Findings

In 2021, agriculture, forestry, and related industries in Missouri are estimated to contribute:

- **$34.9 billion** in value added
- **456,618** jobs
- **$93.7 billion** in output
- **$31.8 billion** in household income

Of the **$34.9 billion** in total value added and **456,618 jobs** derived from agriculture, forestry, and related economic activity:

- Crop production and related industries contributed:
  - **$5.4 billion** in value added
  - **81,095** jobs
- Livestock production and related industries contributed:
  - **$9.5 billion** in value added
  - **155,425** jobs
- Other agriculture industries contributed:
  - **$15.0 billion** in value added
  - **167,409** jobs
- Forestry and related industries contributed:
  - **$4.9 billion** in value added
  - **52,690** jobs

Missouri's counties are varied in their reliance on agriculture. In terms of jobs,

- **15** counties derive less than 10 percent from all agriculture, forestry, and related industries
- **18** counties (including the city of St. Louis) derive between 10 and 19 percent
- **35** counties derive between 20 and 29 percent
- **31** counties derive between 30 and 39 percent
- **16** counties derive more than 40 percent

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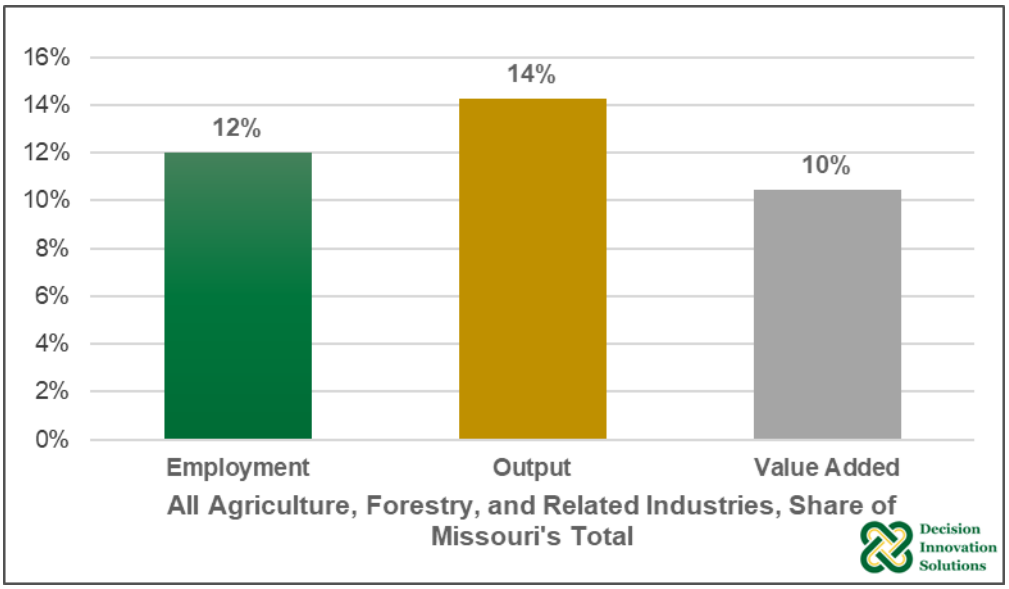

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2 Background

This Missouri Agriculture Economic Contribution Study quantifies agriculture, forestry and their related industries' contribution to the economy. This study relies heavily on the 2019 data from the IMPLAN modeling system, the USDA 2017 Census of Agriculture, and other USDA/NASS datasets. This study is patterned after similar studies completed by DIS for Iowa in 2009, 2014, and 2019, South Dakota in 2014, 2019 and 2021, Illinois in 2015 and 2019, Missouri in 2016 and 2021, Alabama in 2016, and Minnesota in 2020.

2.1 Missouri Agriculture

As of 2020, Missouri was ranked among the top five states in the nation for[1]:

Table 2, Missouri Agricultural Rankings Among States (Top 5 Rankings)

Category	Quantity	Ranking
Number of Farms	95,000	2nd
Hay Production	6.4 million tons	2nd
Beef Cows	2.04 million head	3rd
Rice Production	15.5 million cwt	4th
Goats	75,000 head	5th

The list above (Table 2) and the following rankings (Table 3) show Missouri's ability to be a leading producer of various crops and livestock: These rankings demonstrate the importance of Missouri to help feed, clothe, and fuel those beyond Missouri and the U.S. According to the same 2020 data above from the USDA National Statistics Service, Missouri is currently ranked among the top ten states for:

Table 3, Missouri Agricultural Rankings Among States (Rankings 6-10)

Category	Quantity	Ranking
Turkey Production	16 million head	6th
Soybean Production	290.5 million bushels	6th
Hogs Inventory	3.75 million head	6th
Cotton Production	684,000 bales	6th
Cattle & Calves	4.3 million head	6th
Hog Production	821,075 tons	7th
Broiler Production	292.1 million head	9th
Corn Production	560.9 million bushels	9th
Horses & Ponies	85,000 head	10th

Within the State of Missouri, crop production (grains and oilseeds) rank number 1 in value of sales followed by (2) cattle and calves, (3) poultry and eggs, (4) hogs and pigs, and (5) cotton. These and other commodity group rankings within Missouri are shown in Table 4.

[1] USDA-NASS, QuickStats, 2020

Table 4, Ranking of Market Value of Agricultural Products Sold in Missouri (2017)

Ranking of Market Value of Agricultural Products Sold in Missouri (2017)	
Item	**Rank by Sales**
Grains, oilseeds, dry beans, and dry peas	1
Cattle and calves	2
Poultry and eggs	3
Hogs and pigs	4
Cotton and cottonseed	5
Milk from cows	6
Other crops and hay	7
Nursery, greenhouse, floriculture, and sod	8
Vegetables, melons, potatoes, and sweet potatoes	9
Fruits, tree nuts, and berries	10
Sheep, goats, wool, mohair, and milk	11
Horses, ponies, mules, burros, and donkeys	12
Aquaculture	13
Other animals and other animal products	14
Cultivated Christmas trees and short rotation woody crops	15
Tobacco	16
Source: USDA (Census 2017)	

2.2 Missouri Farm Demographics

The Census of Agriculture defines a 'farm' as any operation that produces for sale at least $1,000 worth of agricultural commodities or would produce $1,000 worth of primary agricultural commodities for sale in a normal year. The definition is based on expected sales rather than ownership or various operating characteristics. In Figure 1 the number of farms in Missouri are grouped in two groups that reflect small farms, two groups that are mid-sized farms, and two groups that are larger farms. By these groupings, 86% of farms in Missouri are small farms, 9% are mid-sized farms, and 5% are large farms.

The two groupings of small farms (86% of farms) account for 11% of the value of ag products sold in Missouri. The two groups of mid-sized farms (9% of farms) account for 17% of ag products sold in Missouri. The two groups of large farms (5% of farms) account for 71% of ag products sold in Missouri.

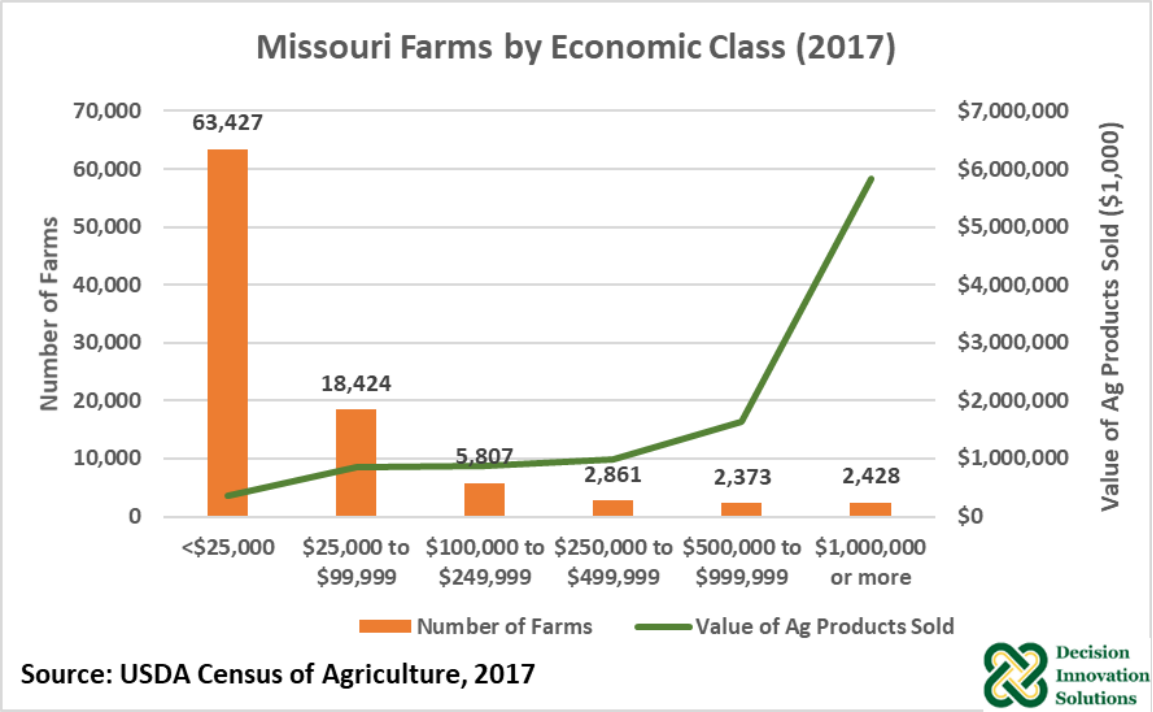


Figure 1, Missouri Farms by Economic Class (2017)

2.3 Missouri Cash Receipts

Cash receipts from agriculture in Missouri, for the most part, have fluctuated between $8 billion and $10 billion during the last decade (Figure 2). Receipts from soybeans (23%), cattle and calves (20%), corn (18%), hogs (9%), and broilers (8%) make up about 78% of total receipts from agriculture. While this fluctuates slightly year-to-year, depending on changes in prices and production, the overall contribution of these five commodities to Missouri agricultural revenues have been quite consistent (Figure 3).

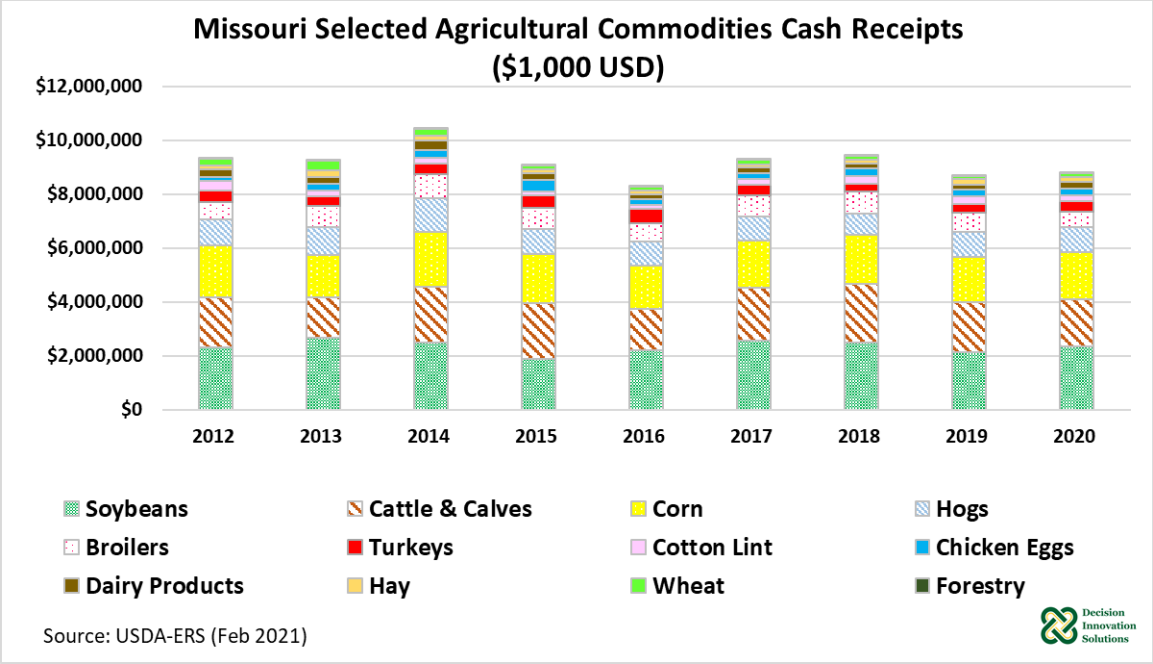


Figure 2, Cash Receipts from Selected Missouri Commodities ($1,000 USD)

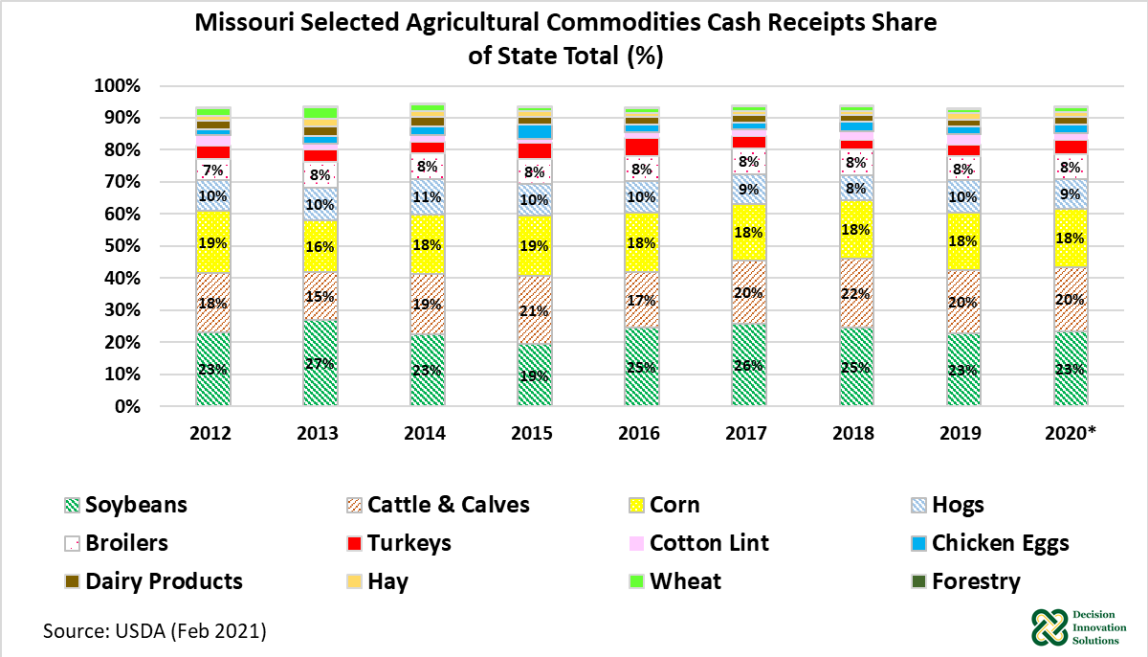


Figure 3, Cash Receipts Share of State Total (%) for Missouri Selected Commodities

In 2019, total cash receipts from agriculture in Missouri was $9.347 billion (Figure 4). Soybean sales were $2.1 billion, cattle and calves receipts were $1.9 billion, corn receipts were $1.7 billion, hog receipts were $926 million, and broilers receipts were $707 million. Other commodities with more than $100 million in receipts were: turkeys ($341 million), cotton ($294 million), eggs ($219 million), dairy products ($205 million), hay ($194 million), and wheat ($128 million).

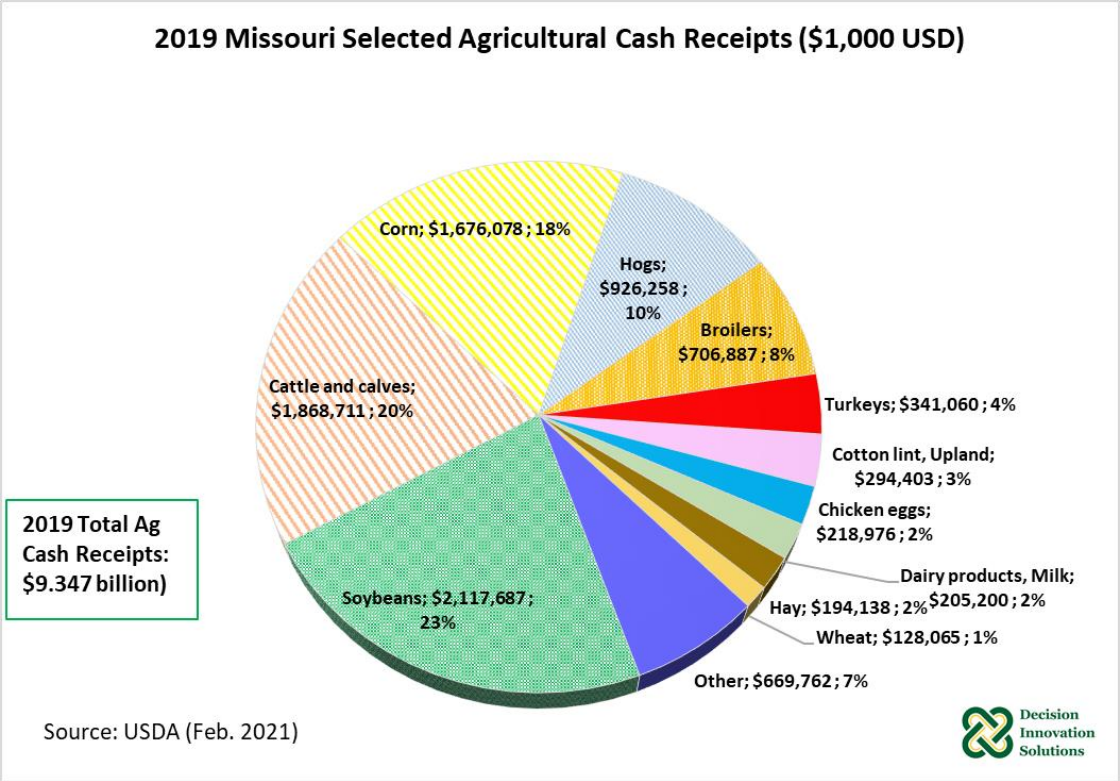


Figure 4, 2019 Missouri Selected Agricultural Cash Receipts ($1,000 USD)

2.4 Missouri Crop Background

Since 2002, acreage for the top 6 crops in Missouri has fluctuated between 12 million acres and 14 million acres. Soybeans and corn account for nearly two thirds of the acres. Hay is produced on 20 to 25% of crop acres. Cotton, sorghum, and wheat combined account for 6% to 8% of acres (Figure 5).

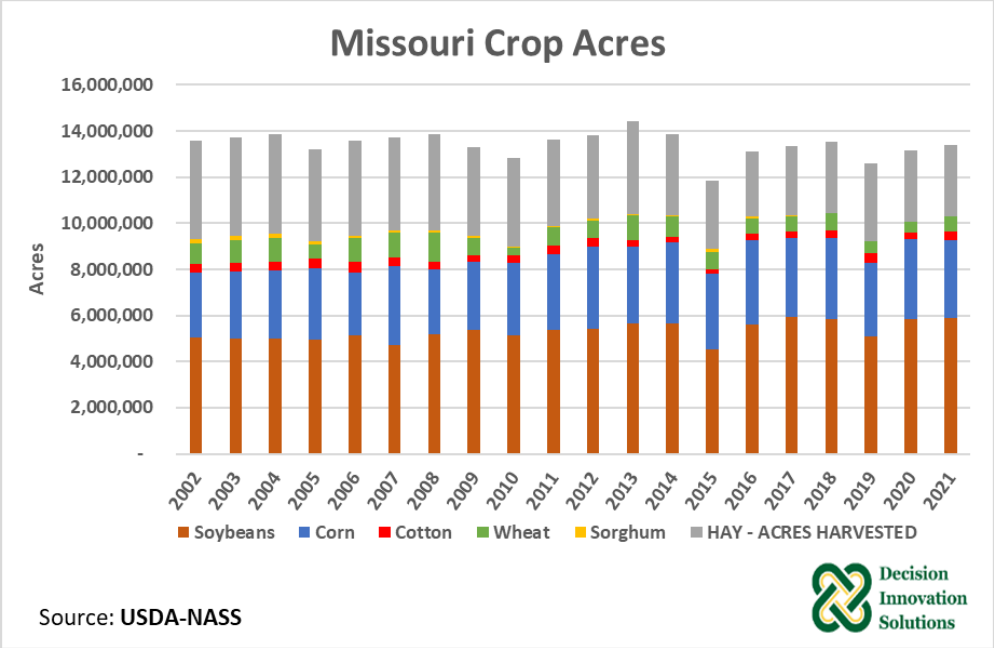


Figure 5, Missouri Crop Acres

Crop yields in Missouri continue to trend upward. The largest yield gains have been seen in corn and soybeans (Figure 6). Corn yield is increasing 2.4 bushels per acre per year which is 1.7% per year, and soybean yield is increasing 0.8 bushels per acre per year which is 1.8% per year. Figure 7 shows annual production estimates for these same crops.

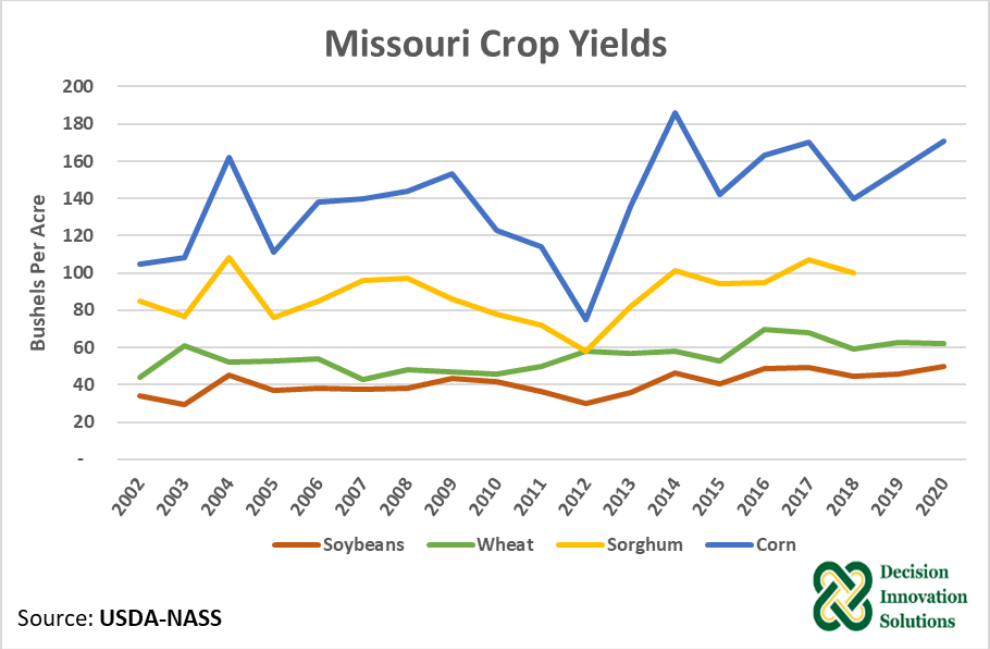


Figure 6, Missouri Crop Yields

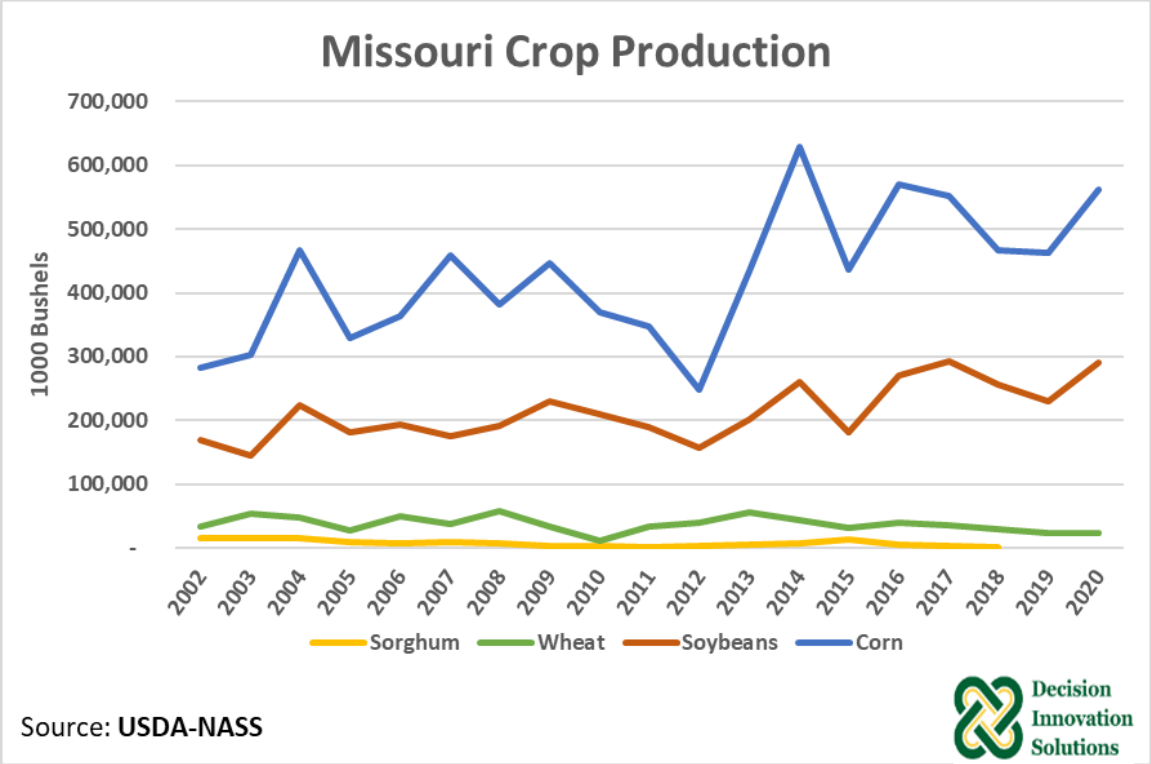


Figure 7, Missouri Crop Production (1,000 Bushels)

The value of Missouri crop production is dominated by the value of soybeans and corn. These two commodities now account for approximately 87% of all Missouri crop value (Figure 8).

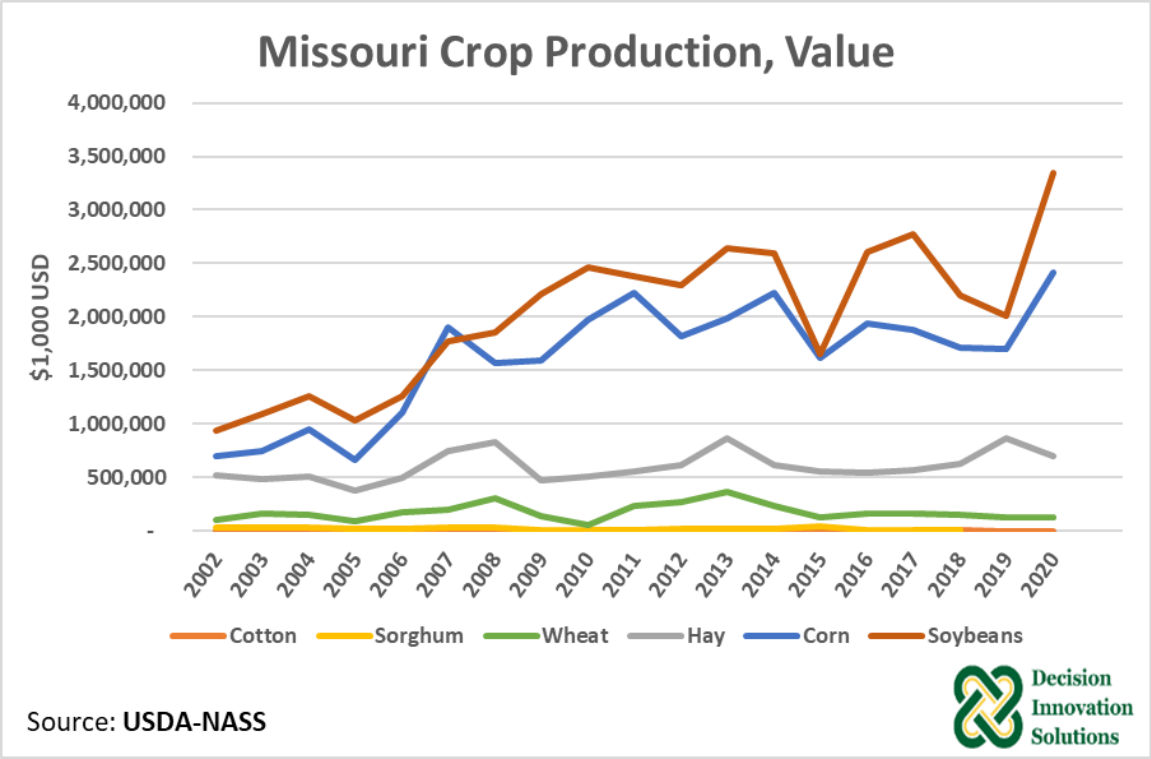


Figure 8, Missouri Crop Production, Value ($1,000)

2.5 Missouri Livestock and Poultry Background

2.5.1 Cattle

Cattle inventory in Missouri has generally been increasing since 2013. Missouri currently has 3.25 million head of cattle inventory (Figure 9). Roughly 2 million of that inventory is beef cows (Figure 10). Cattle on feed inventory in 2021 is nearly 50% greater than it was in 2015 (Figure 11). The Missouri calf crop in 2020 was 1.9 million head (Figure 12). In 2020, Missouri cattle production (measured in pounds) was estimated at 1.343 billion pounds, and it was valued at $1.669 billion (Figure 13). When compared with the previous year, both volume and value of cattle production in Missouri were down 7% and 11%, respectively.

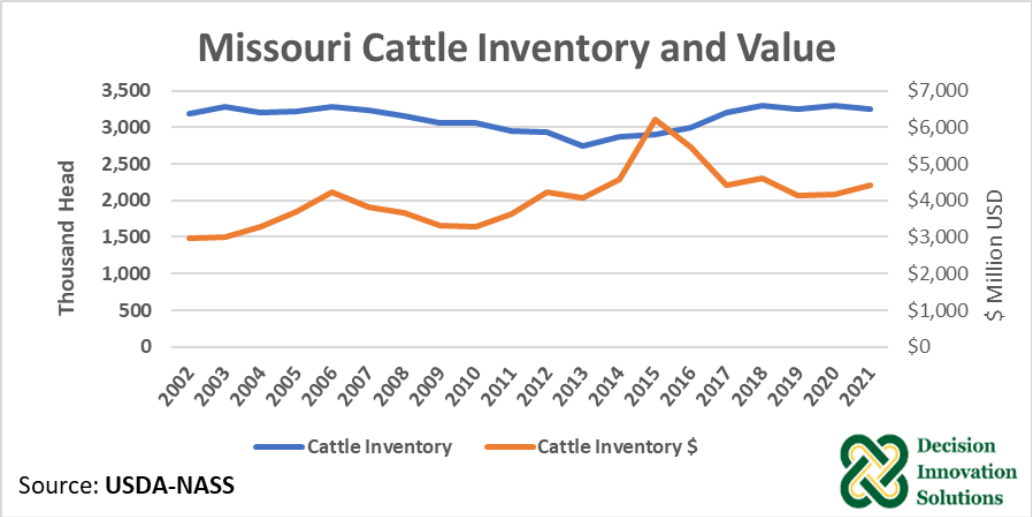


Figure 9, Missouri Cattle Inventory and Value

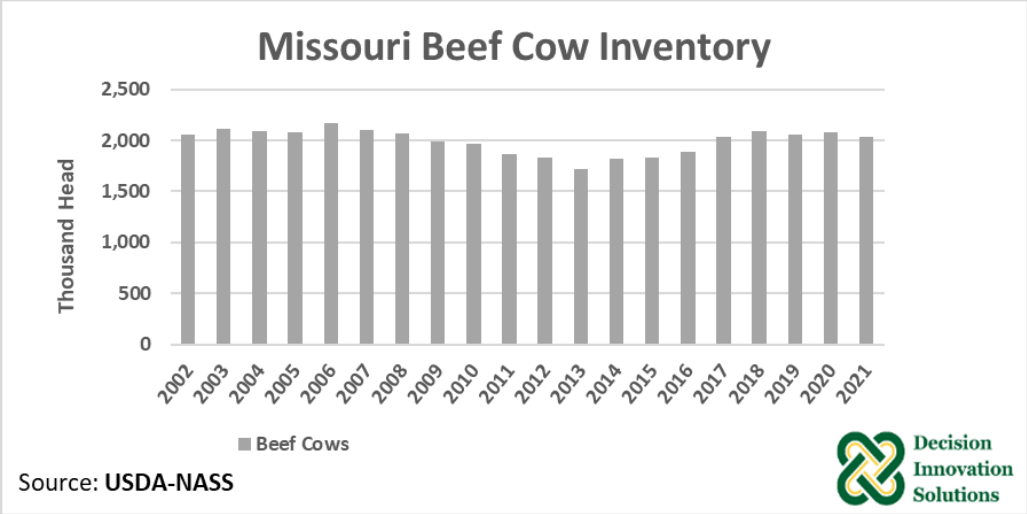


Figure 10, Missouri Beef Cow Inventory

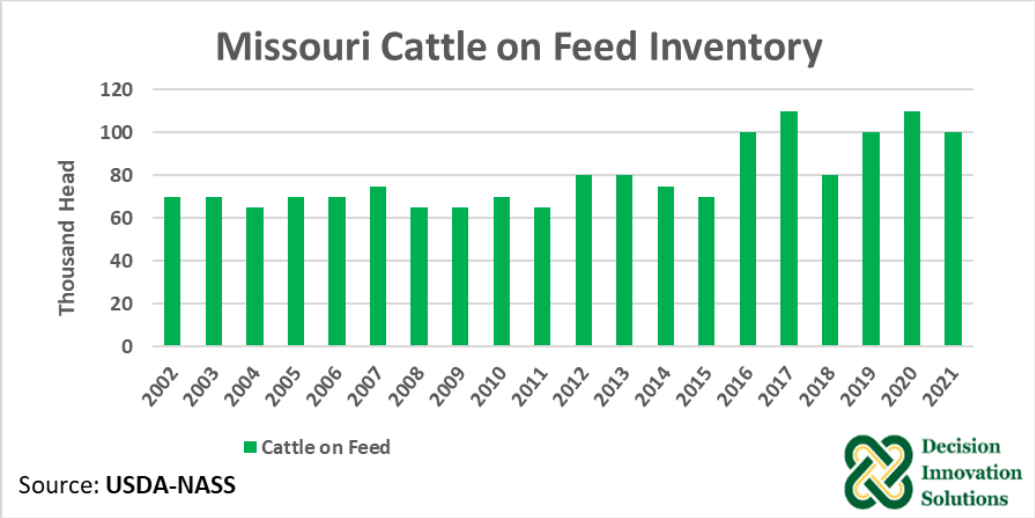


Figure 11, Missouri Cattle on Feed Inventory

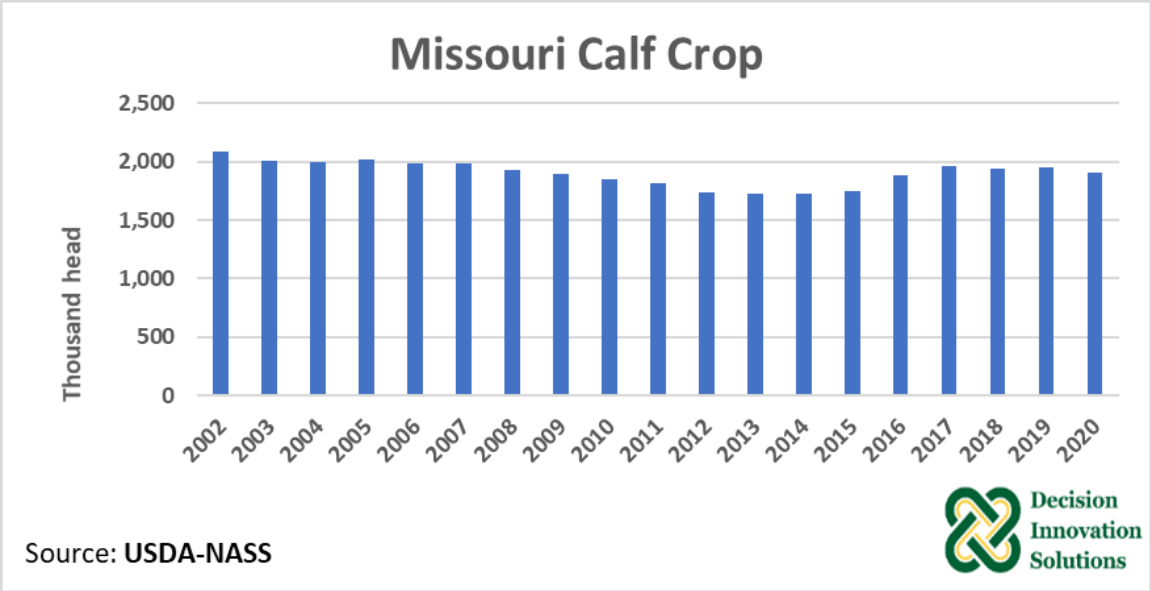


Figure 12, Missouri Calf Crop

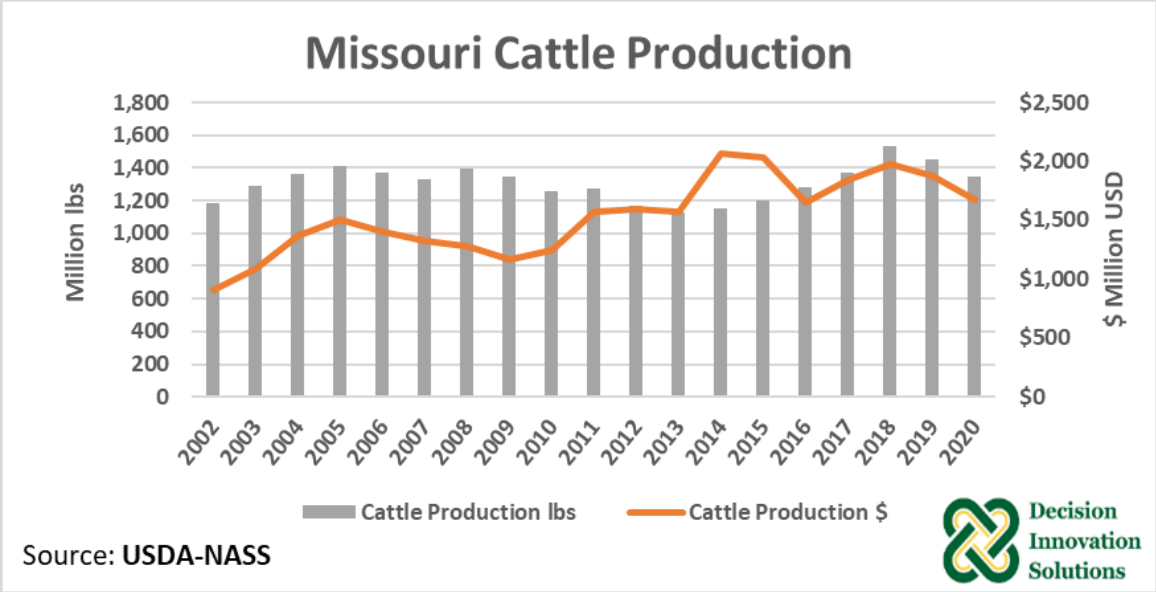


Figure 13, Missouri Cattle Production

As Figure 14 indicates in 2020 there were six counties[2] in Missouri with more than 40,000 head of beef cows. The top three counties were Polk with 54,000 head, followed by Lawrence with 50,000 head and Texas with 47,000 head.

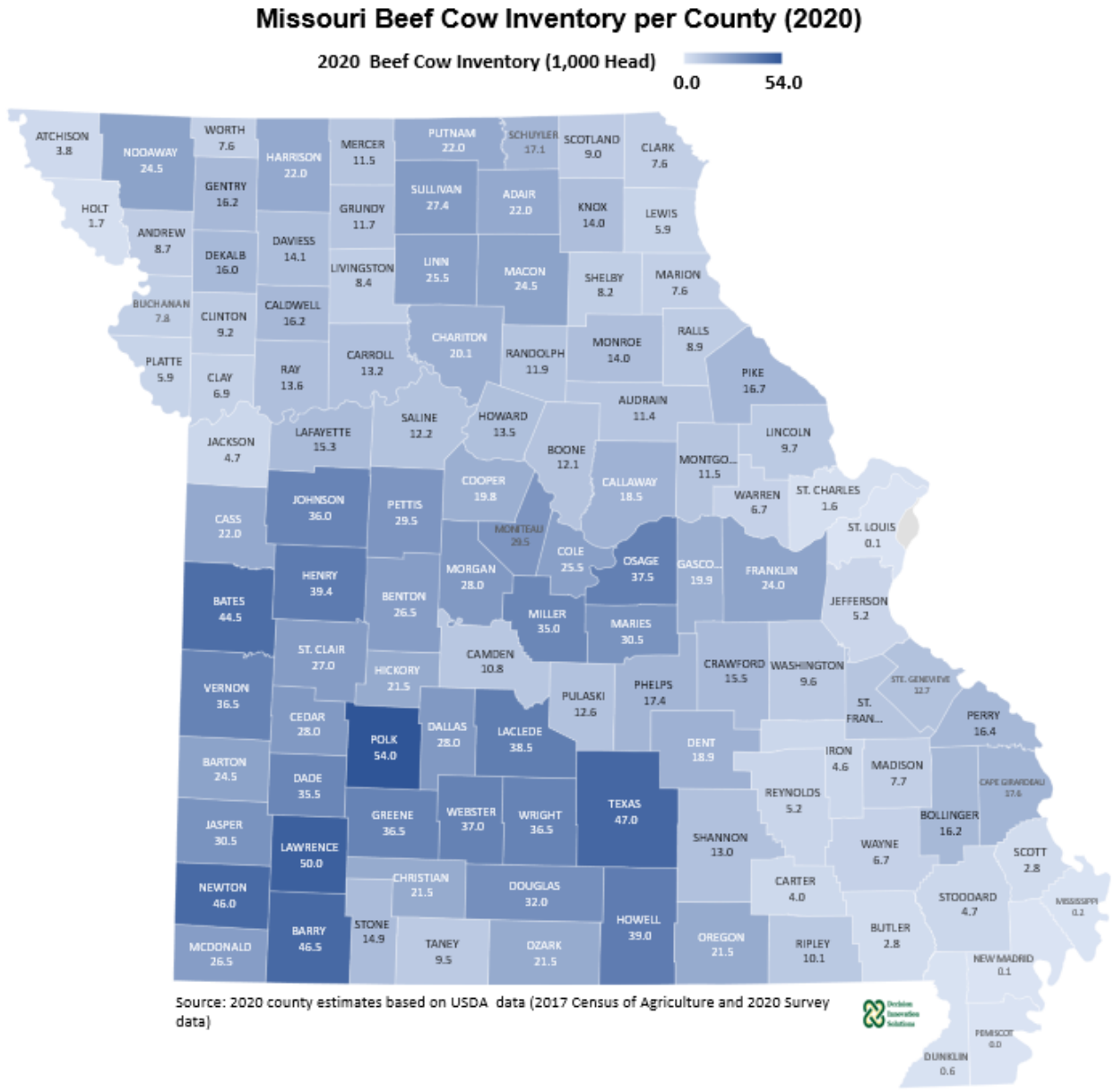


Figure 14, Missouri Beef Cow Inventory per County (2020)

[2] **A Note About 2020 Missouri County Data:** The USDA's Survey 2020 State level inventory data for hogs, broilers, and turkeys was distributed across counties based on the USDA's 2017 Census of Agriculture county's share of inventory for each of these species. For cattle data (beef cows and dairy cows), USDA's 2020 published county data was used. For counties without published inventory data, USDA summarizes and publishes their values in "Other Counties." Other Counties inventory was distributed among counties without reported data using their corresponding share of the 2017 inventory as published in the Census of Agriculture data. If a county did not have published data in 2017, "Operations by Size" data, published in the 2017 Census of Agriculture, was used as part of the estimation of such values.

2.5.2 Dairy

There were two counties with more than 5,000 dairy cows in Missouri in 2020. The county with the most dairy cows in Missouri was Barry County with 5,700 head. Eleven counties had between 2,100 and 4,600 dairy cows with another 16 counties that had between 1,000 and 1,700 dairy cows (Figure 15). State-wide there was an estimated decline of about 9.4% in dairy cow inventory from the 2017 census to 2020.

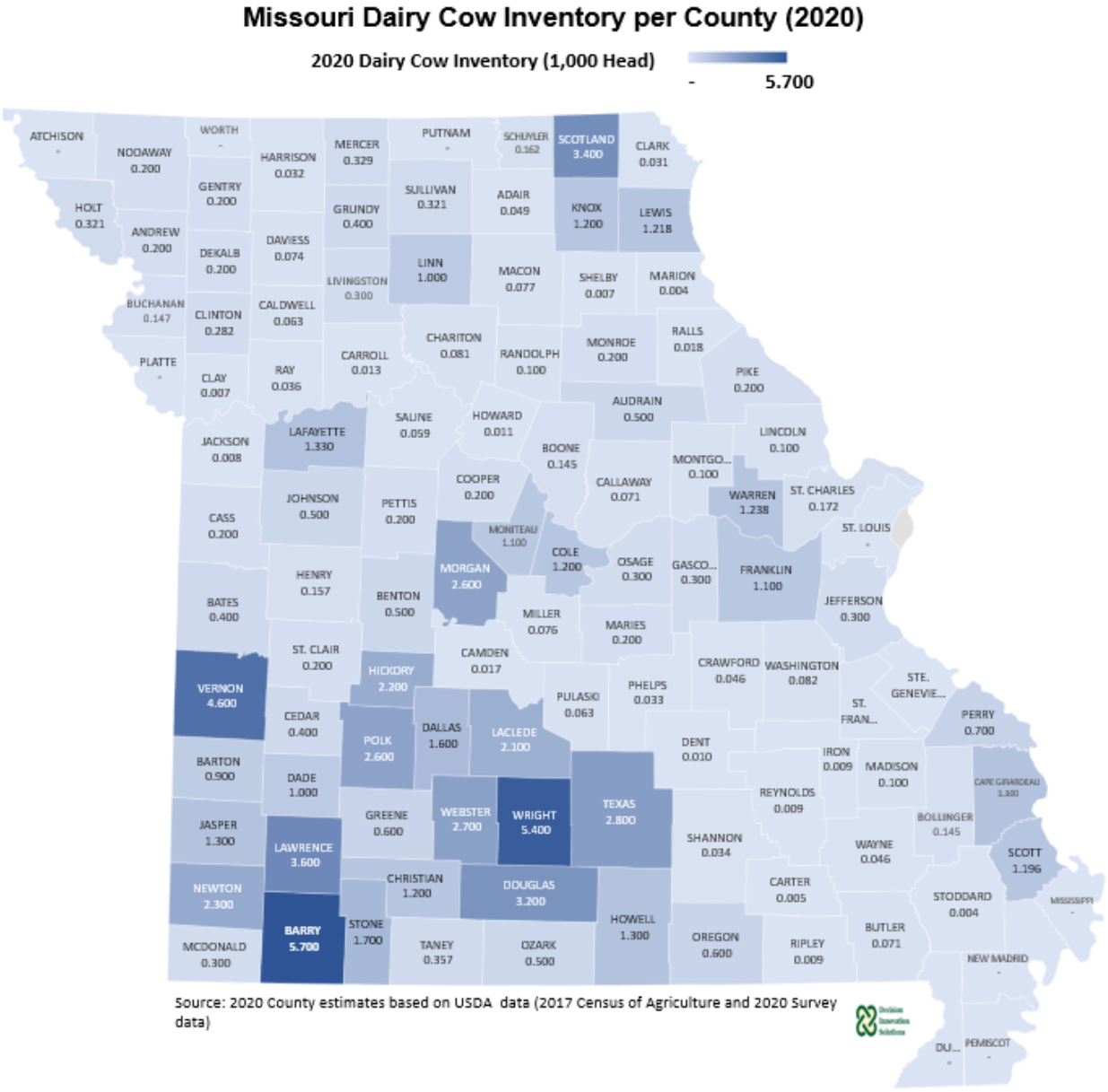


Figure 15, Missouri Dairy Cow Inventory Per County (2020)

The number of grade A dairy farms in Missouri has declined every year since 2000 (Figure 16). The number of Manufacturing Grade dairy farms declined every year except 2007-2009 and 2014 when temporary, small increases were seen.

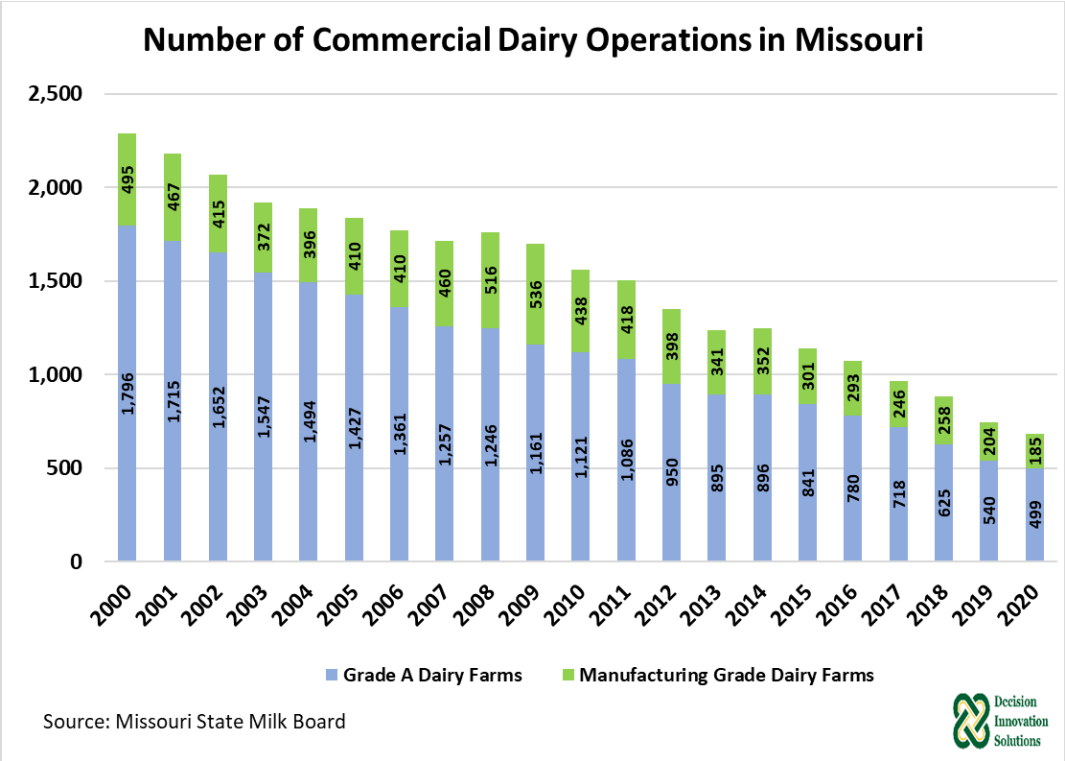


Figure 16, Missouri Commercial Dairy Farms, Grade A and Manufacturing Grade

Missouri's milk cow inventory has followed a downward trend since 2002 (see Figure 17). Inventories decreased from 140,000 head in 2002 to 75,000 head (down 46%). The share of Missouri dairy cow inventory to U.S. numbers fell from 1.5% in 2002 to 0.8% in 2021.

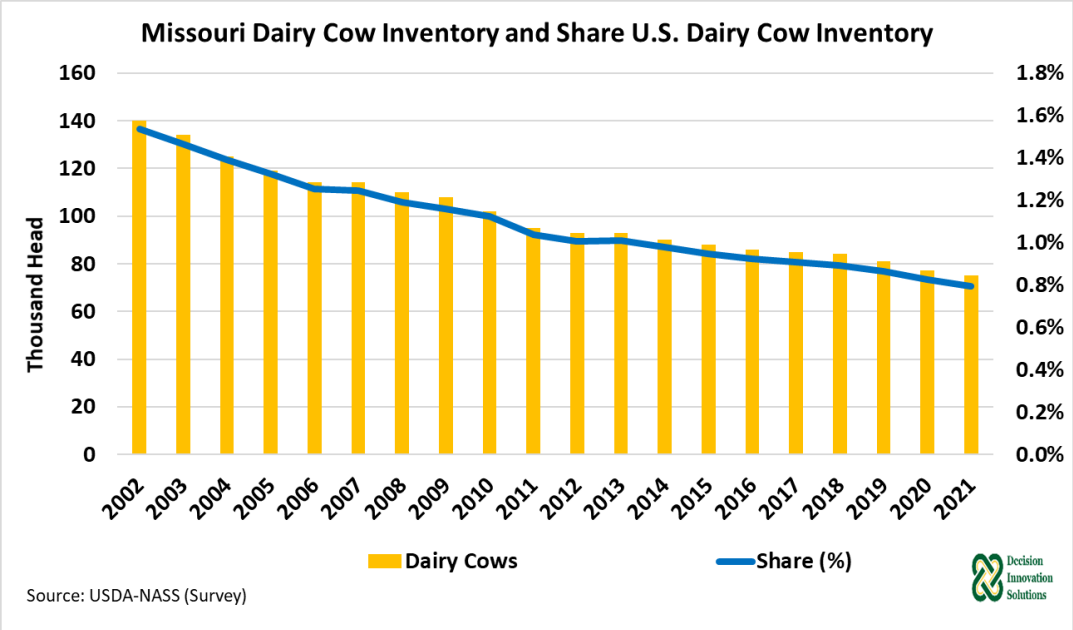


Figure 17, Missouri Dairy Cow Inventory

Missouri milk production has declined by about 46% from 2002 to 2021. The value of milk production has declined by approximately 20% since 2002 (see Figure 18).

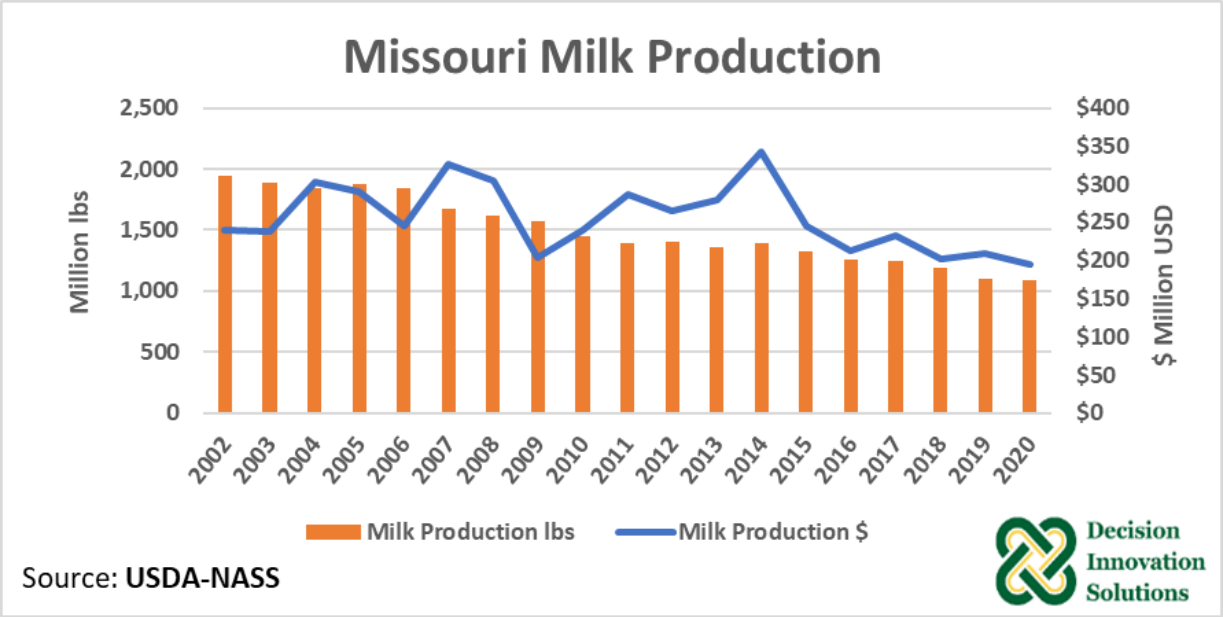


Figure 18, Missouri Milk Production

Missouri's milk production per cow per year reached its highest volume in 2005 at 16,026 pounds per cow. Since then, milk production per cow has declined and by 2020 the annual production per cow was estimated at 14,276 pounds, about the same milk volume produced per cow in 2002 (14,204 pounds per cow) (see Figure 19).

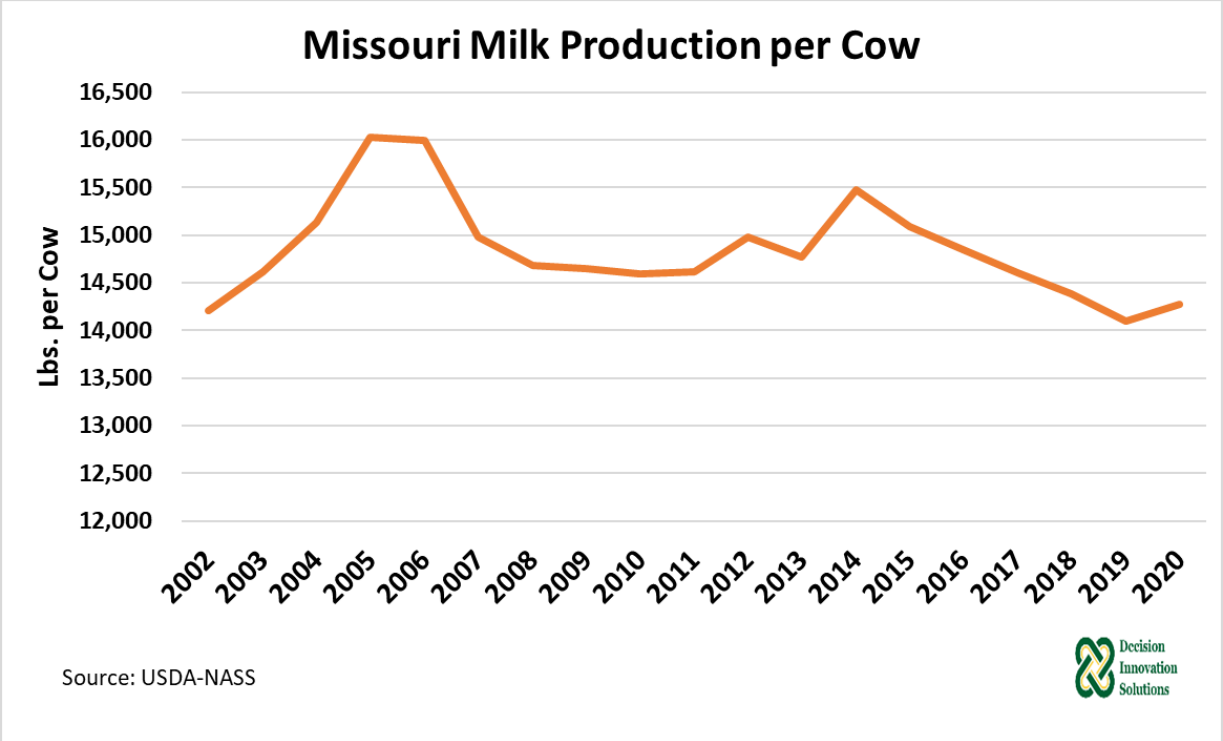


Figure 19, Missouri Milk Production Per Cow

2.5.3 Hogs

Based on Missouri 2020 county data, the county with the largest number of hogs was Sullivan County with 389,201 head (Figure 20**Error! Reference source not found.**). Knox County was in second place in terms of number of hogs with 291,828 head. In third place was Daviess County with 231,775 head. At the state level, 2020 hog inventory was up 19% from the 2017 census.

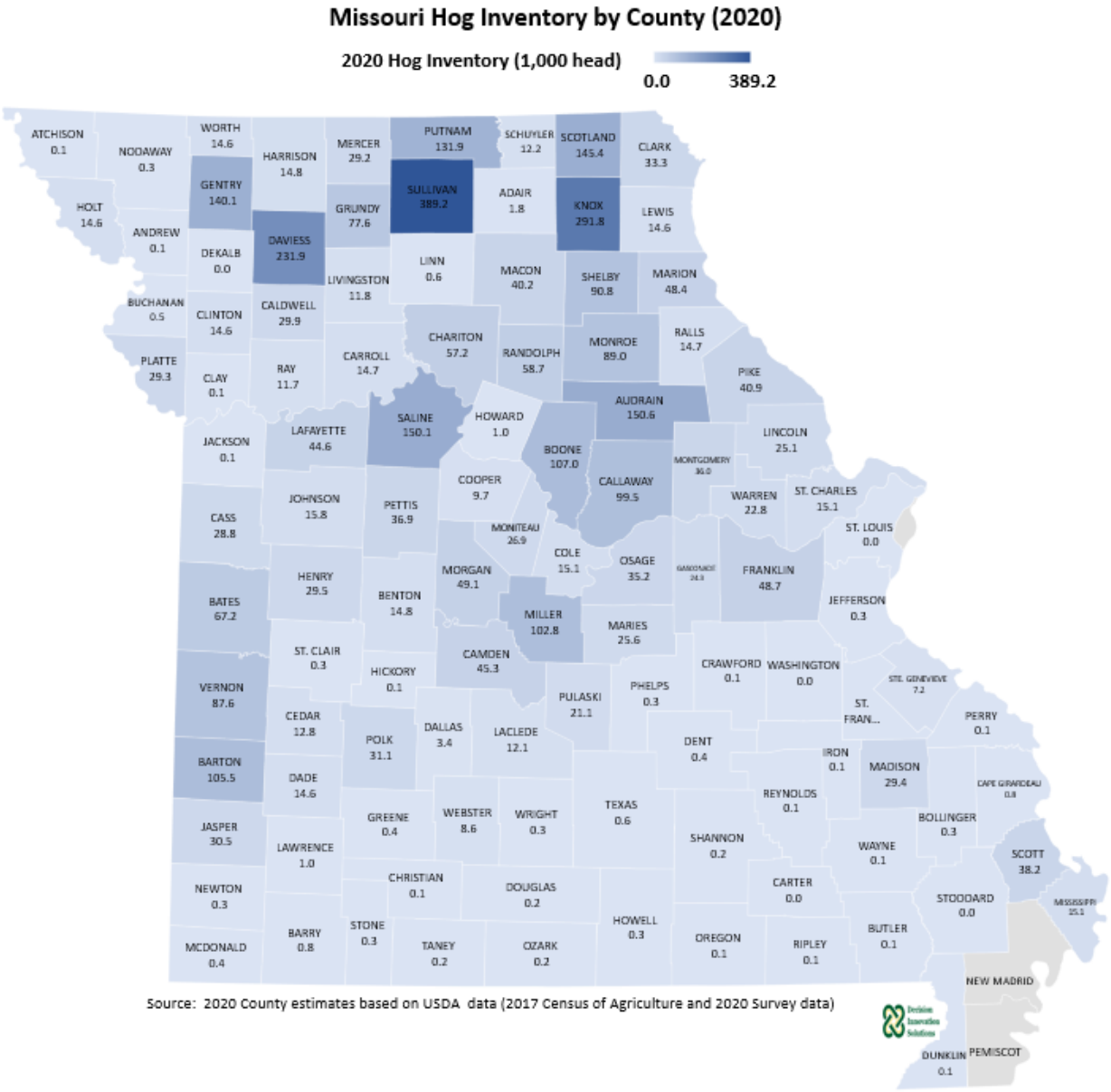


Figure 20, Missouri Hog Inventory by County (2020)

Missouri hog inventory is increasing over time. The inventory of market hogs is increasing slightly faster than the inventory of swine breeding stock (see Figure 21). The value of hog production in Missouri peaked in 2014 at slightly more than $1.1 billion and has declined to less than $800 million as the price of hogs has declined (see Figure 22).

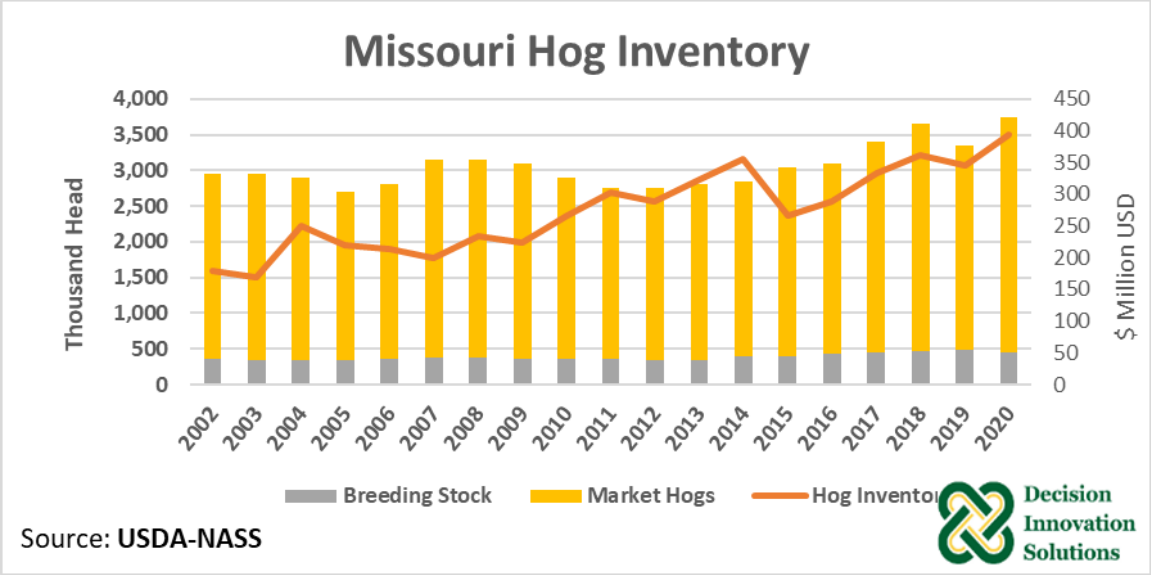


Figure 21, Missouri Hog Inventory

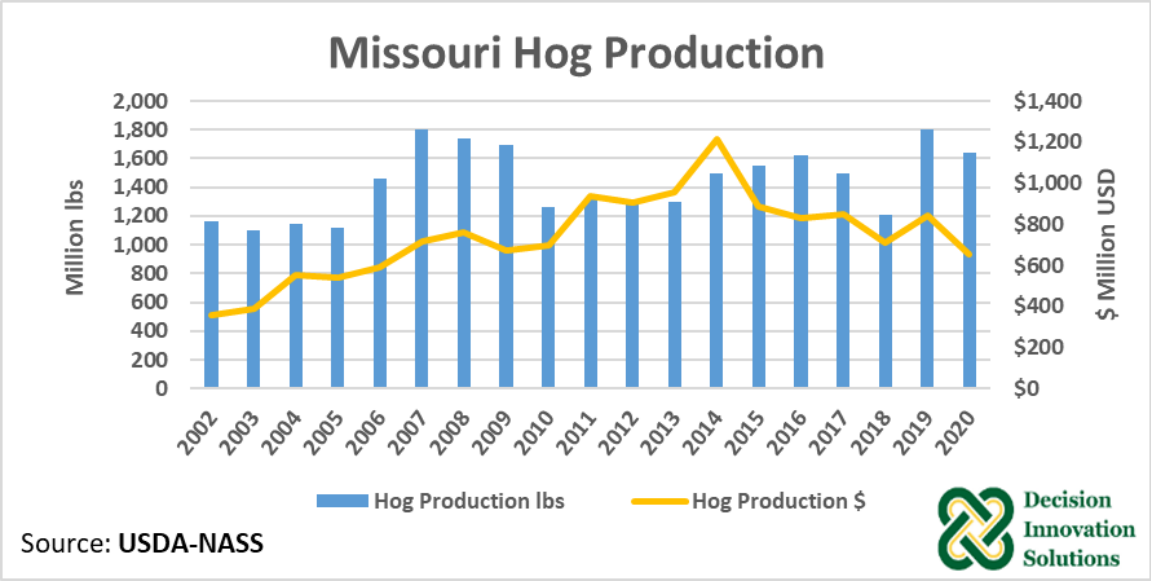


Figure 22, Missouri Hog Production

2.5.4 Poultry

2.5.4.1 Broilers

2020 data indicates Missouri had three counties with broiler inventory above 6 million head, with Barry County at the top with 12.622 million head. At the same time, McDonald and Newton Counties had 7.816 million head and 6.306 million head, respectively. The state also had five counties with inventories between 2.448 million head and 6.608 million head (see Figure 23).

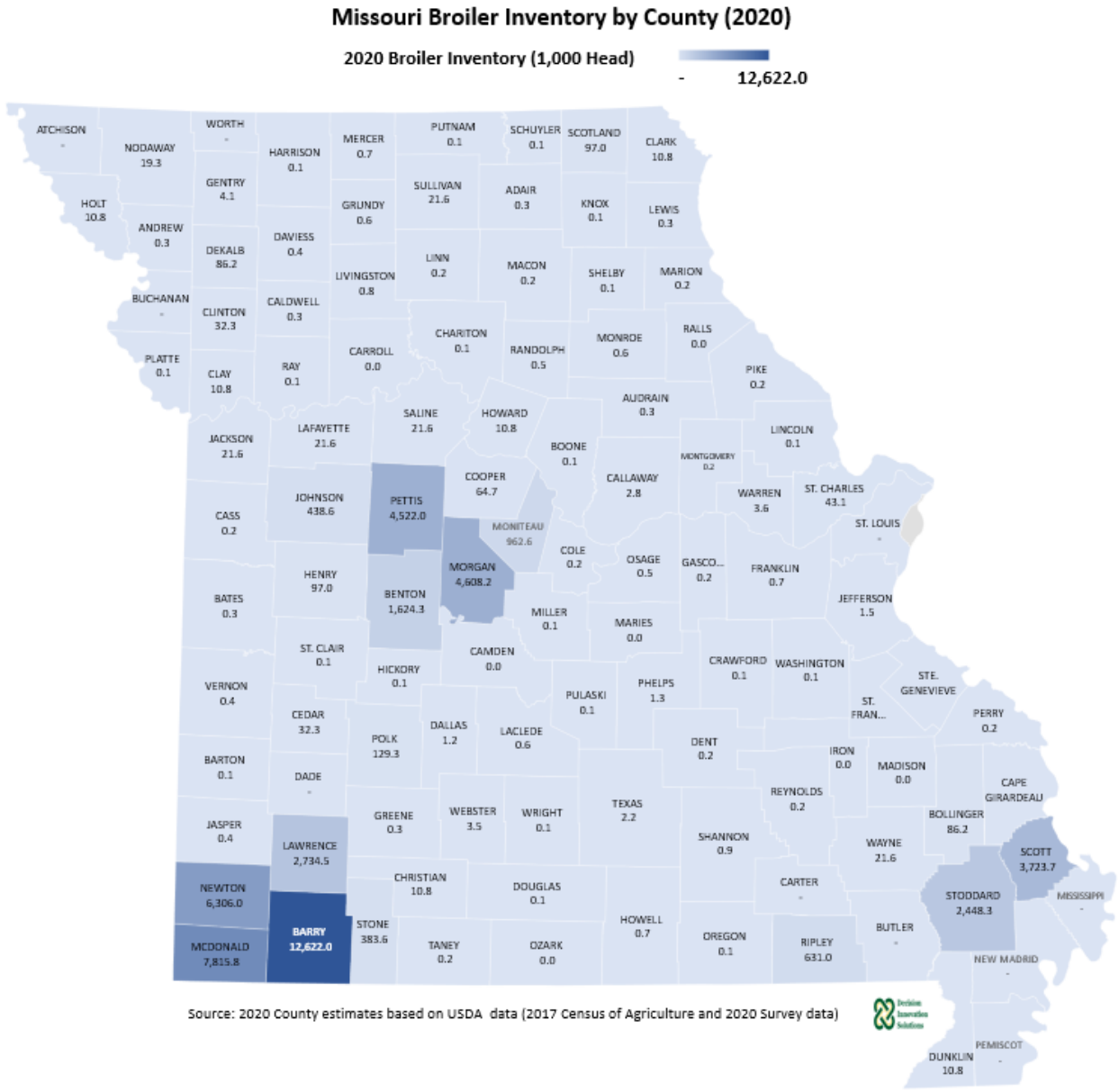


Figure 23, Missouri Broiler Farms by County (2017)

Broiler production in Missouri is increasing over time. The value of broiler production in Missouri peaked in 2014 and has declined moderately since then as the price of broiler meat has gone down (see Figure 24).

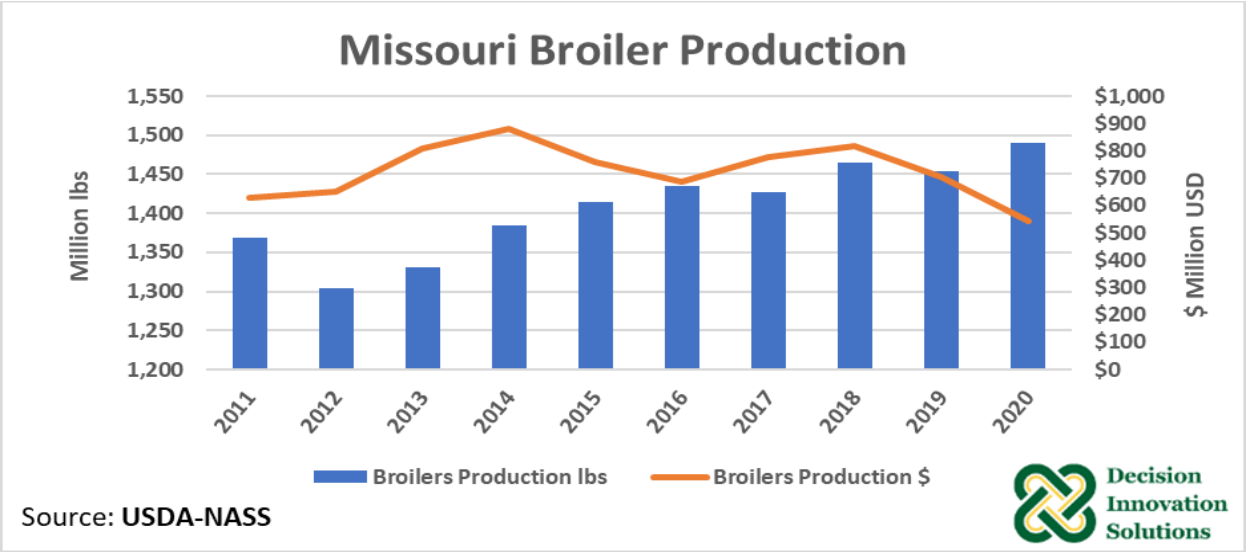


Figure 24, Missouri Broiler Production

Turkeys

2020 Missouri turkey inventory was mostly concentrated in the southwest portion of the state and in the central area of Missouri. Lawrence County had the largest turkey inventory with 1.268 million head followed by Morgan County with 935,148 head. Four counties in Missouri had more than 500,000 head but fewer than 850,000 head (see Figure 25).

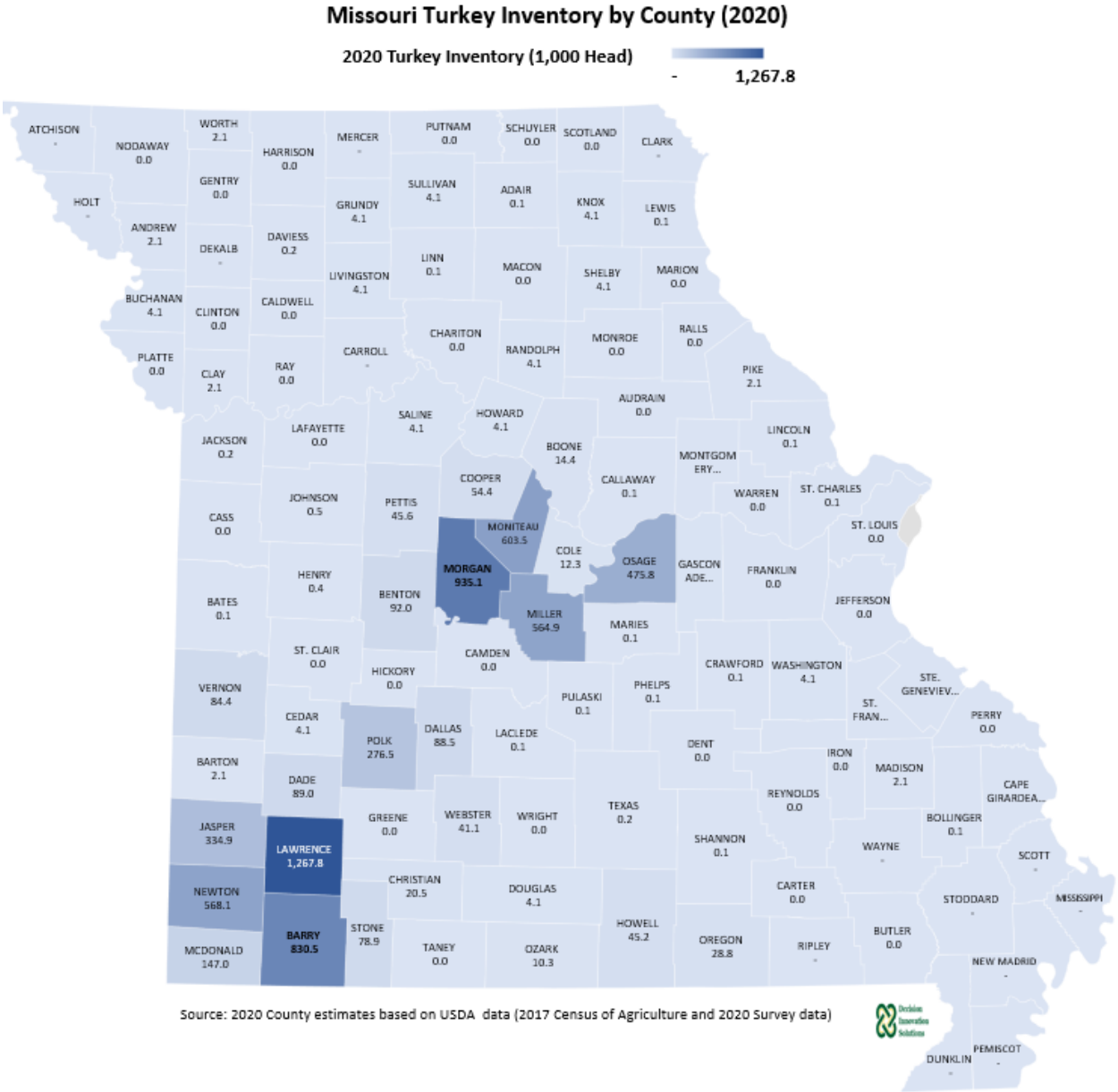


Figure 25, Missouri Turkey Inventory by County (2020)

The value of turkey production increased in Missouri from 2003 through 2016, then declined for two years before increasing again (see Figure 26). Turkey production in Missouri has been relatively stable since 2003 with approximately 600 million pounds of turkey meat being produced annually.

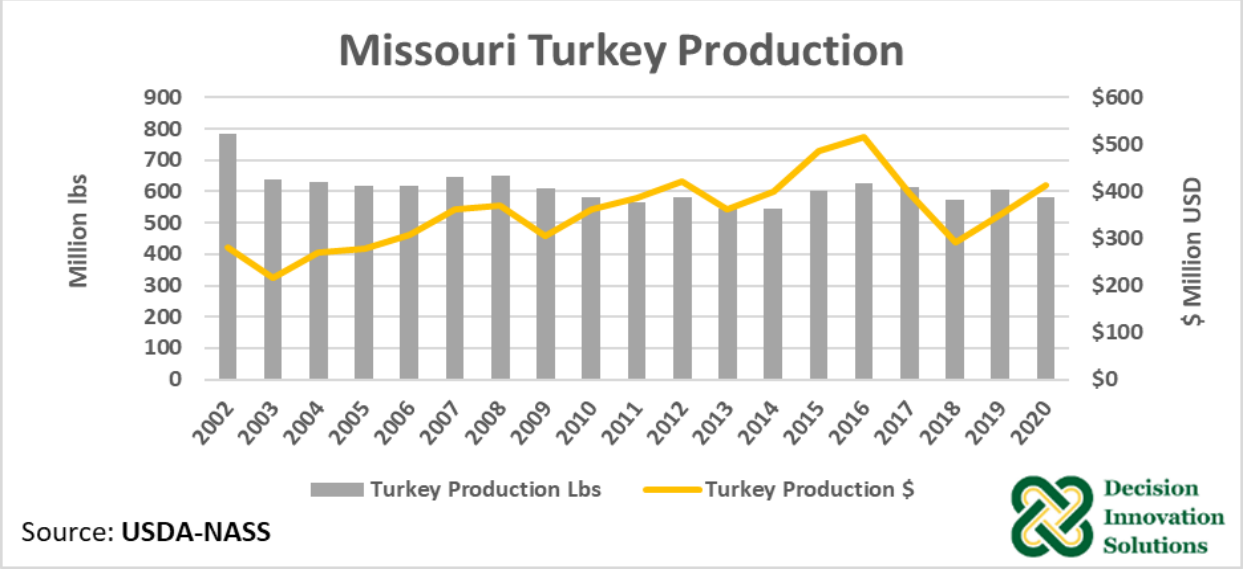


Figure 26, Missouri Turkey Production

2.5.5 Horses

The number of farms in Missouri that reported having equine inventory declined in 2012 and again in 2017. The equine inventory in Missouri reported by USDA has declined from nearly 140,000 head in 2007 to slightly more than 80,000 in 2017 (see Figure 27).

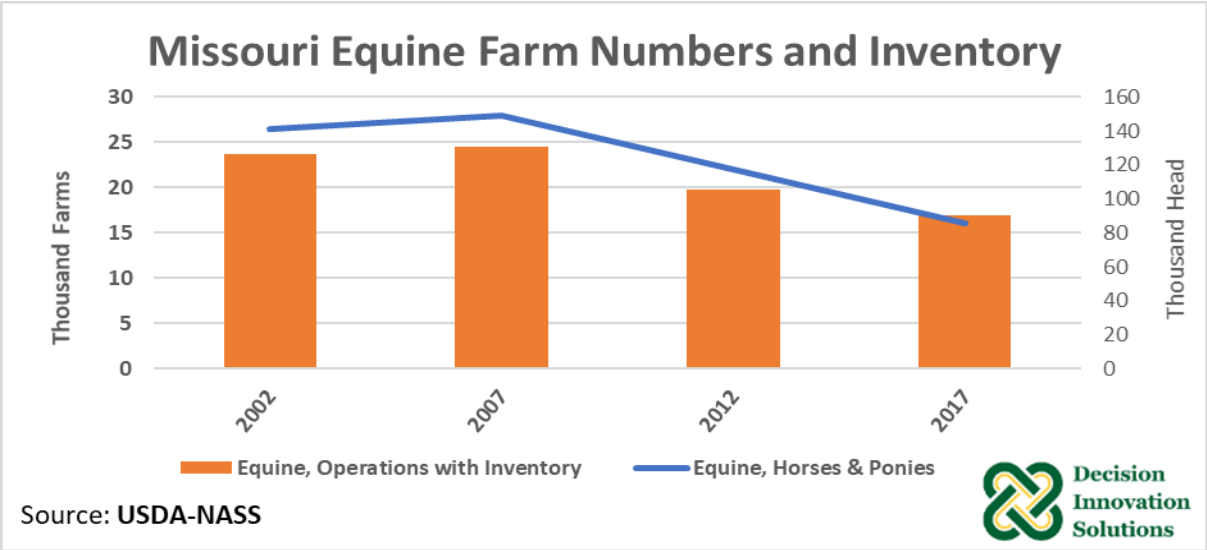


Figure 27, Missouri Equine Farm Numbers and Inventory

2.6 Missouri Livestock, Meat and Poultry Processing

There are 217 facilities in Missouri that either slaughter or process livestock, meat or poultry. Of these, 161 are federally inspected and 56 operate under state inspection (Figure 28).

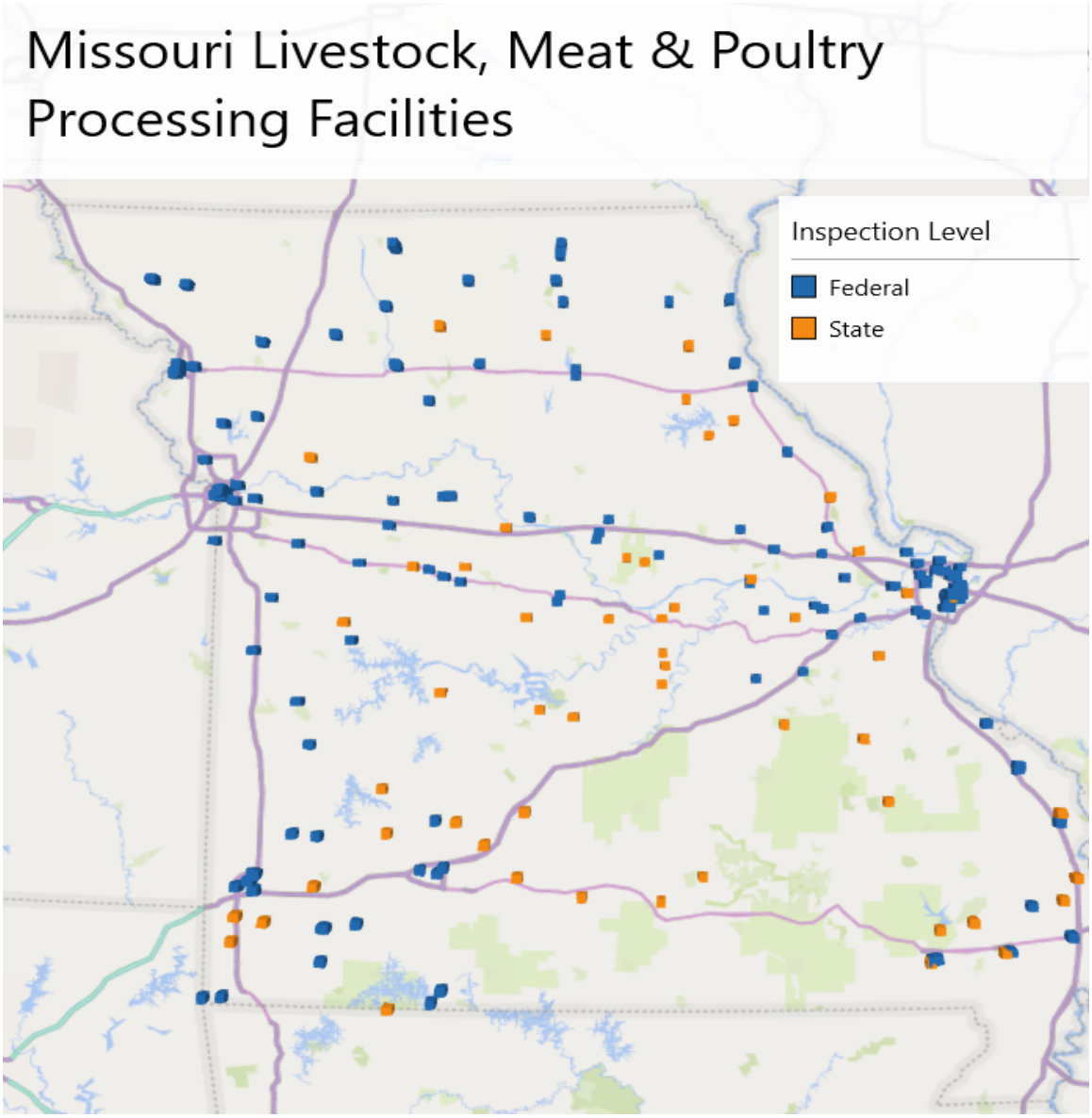


Figure 28, Missouri Federally Inspected Meat and Poultry Processing Plants

Across the state of Missouri, there are 5 beef-only slaughter facilities, 2 pork-only slaughter facilities, 9 chicken-only slaughter facilities, 2 turkey-only slaughter facilities, 2 poultry slaughter facilities, 90 multi-species (beef, hogs, lambs & sheep, and/or goats) slaughter facilities, and 107 facilities that do further processing of meat and/or poultry products (Figure 29).

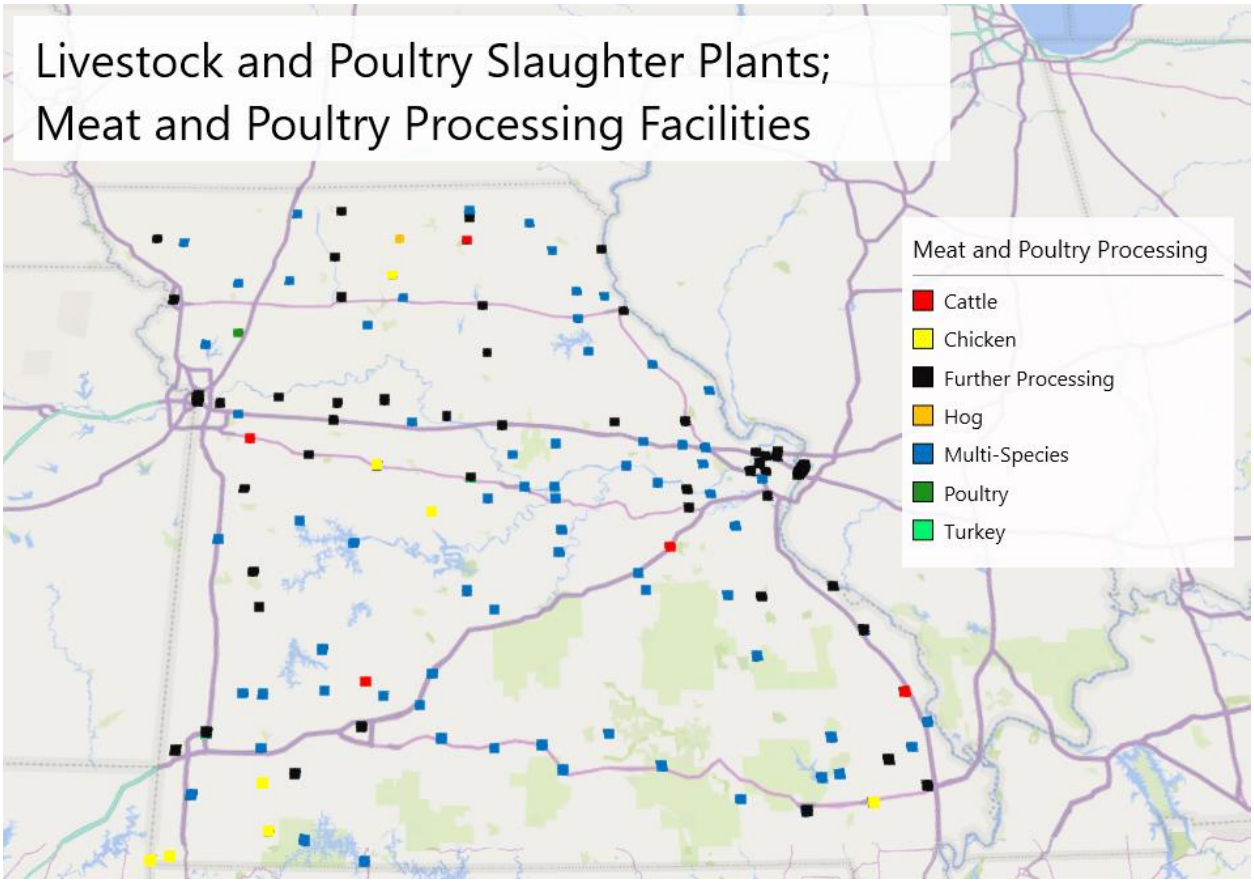


Figure 29, Livestock and Poultry Slaughter and Meat Processing Facilities[3] (by species)

[3] Plants designated as cattle, chicken, hogs and turkey are dedicated plants; those designated as Poultry may process more than one poultry species. All plants may do some processing. Those listed as "Further Processing" may process more than one species but do not slaughter.

Missouri has 465 grade A and 178 manufacturing grade dairy farms along with 36 grade A and manufacturing grade processing plants. Missouri also has several cheese and ice cream manufacturing facilities (see Figure 30).

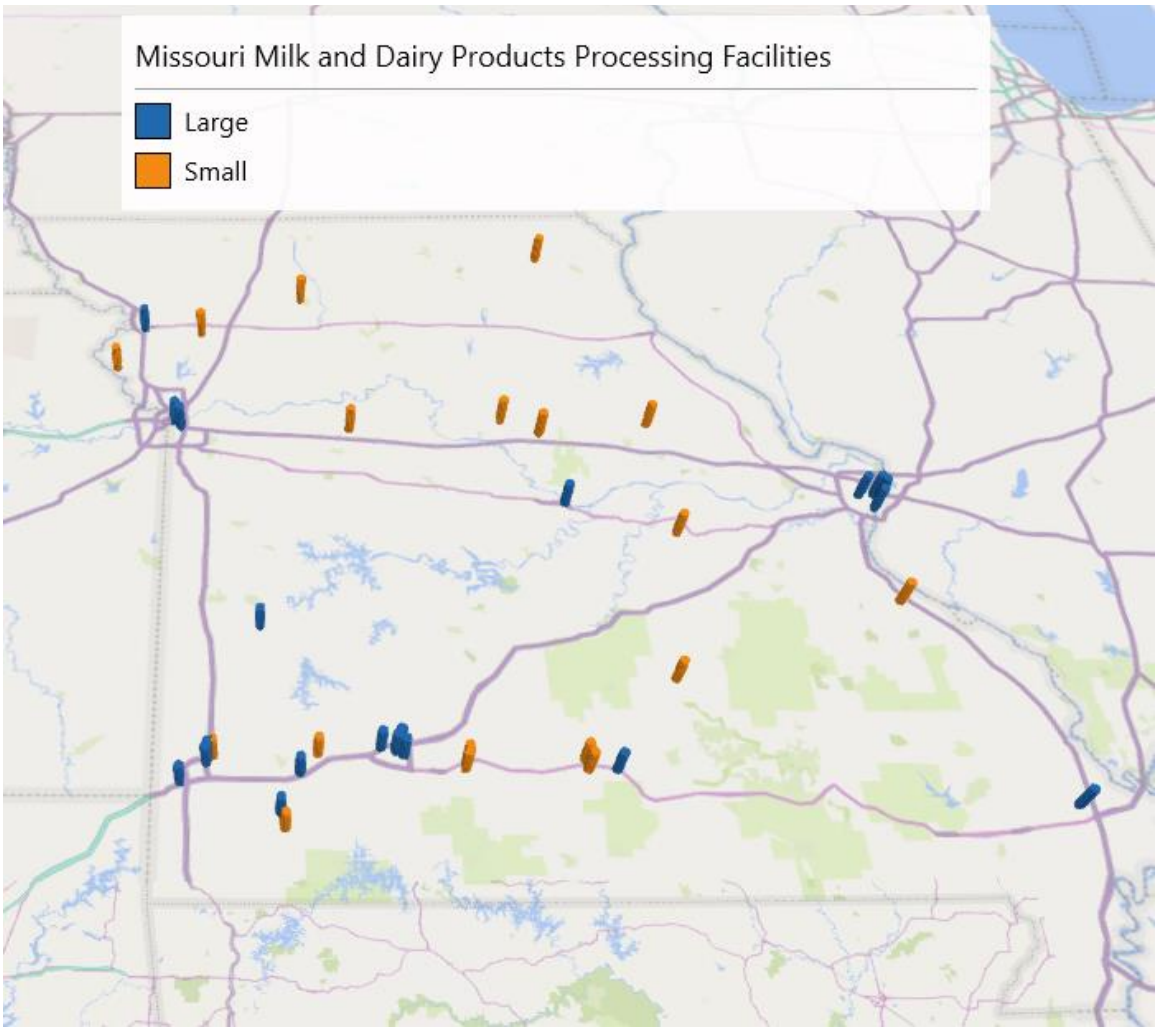


Figure 30, Missouri Milk and Dairy Product Processors

2.7 Grain Elevators, Feedmills and Grain Processors

There are 443 grain elevators and 338 feedmills in Missouri with 152 of the feedmills co-located with a grain elevator. There are 20 licensed petfood manufacturers in Missouri. There are 4 large oilseed processors in Missouri, fewer than five small processors, and several companies that further process soybean oil and other vegetable oils into a variety of food products. There are seven wheat milling operations in Missouri and one oat milling facility (see Figure 31).

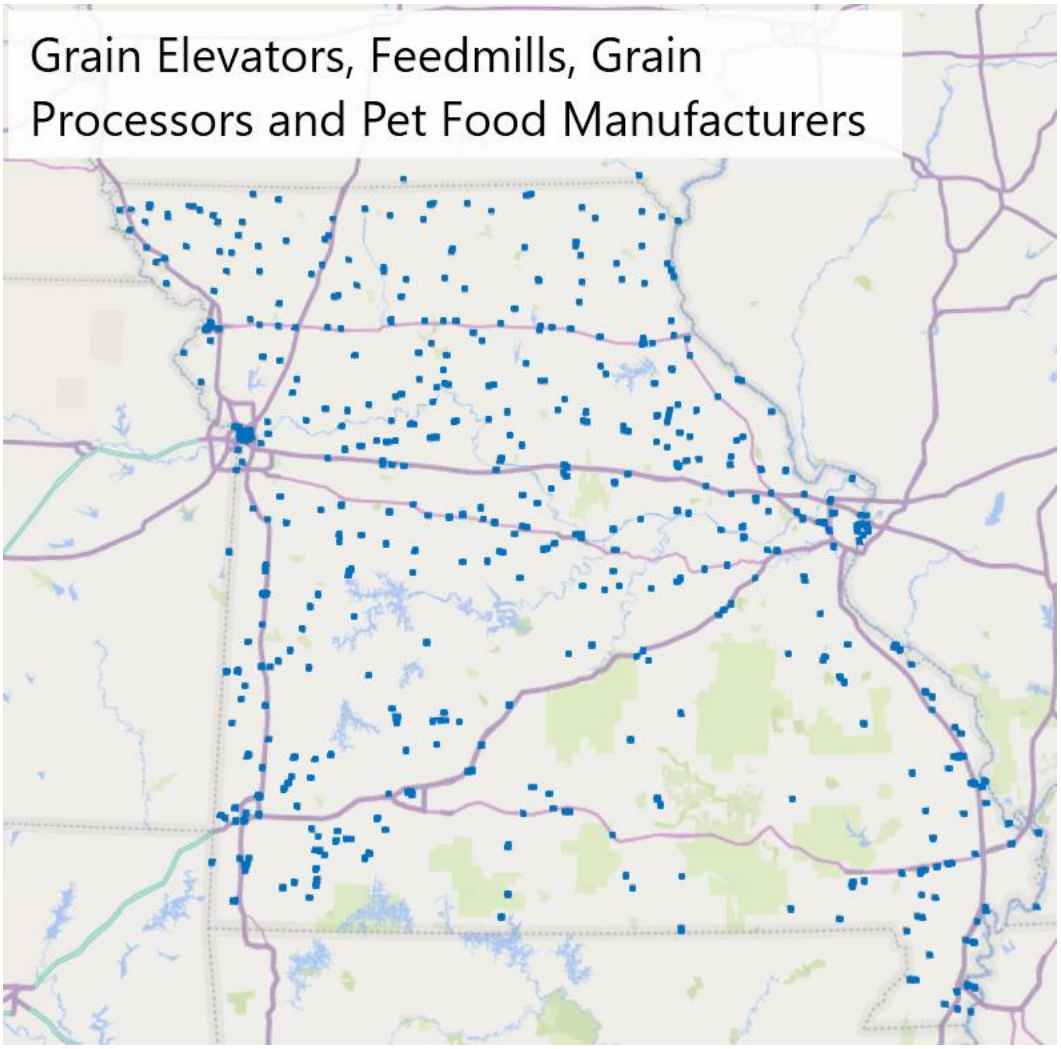


Figure 31, Missouri Grain Elevators, Feedmills, and Grain Processors

2.7.1 Missouri Ethanol and Biodiesel Production Capacity

Missouri's current annual ethanol production capacity is estimated at 315 million gallons distributed among 6 plants, with capacity ranging from 21 million gallons to 68 million gallons (Figure 32). Most of the plants are in the northern part of the state. Based on the annual capacity estimated, Missouri ethanol plants could process up to 112 million bushels of corn and produce an estimated 856,250 tons of distiller's grains.

Missouri annual biodiesel production capacity was estimated at 243 million gallons distributed among 7 plants, with capacity ranging from 5 million gallons to 56 million gallons (Figure 32). The western side of the state has the majority of the biodiesel production in Missouri.

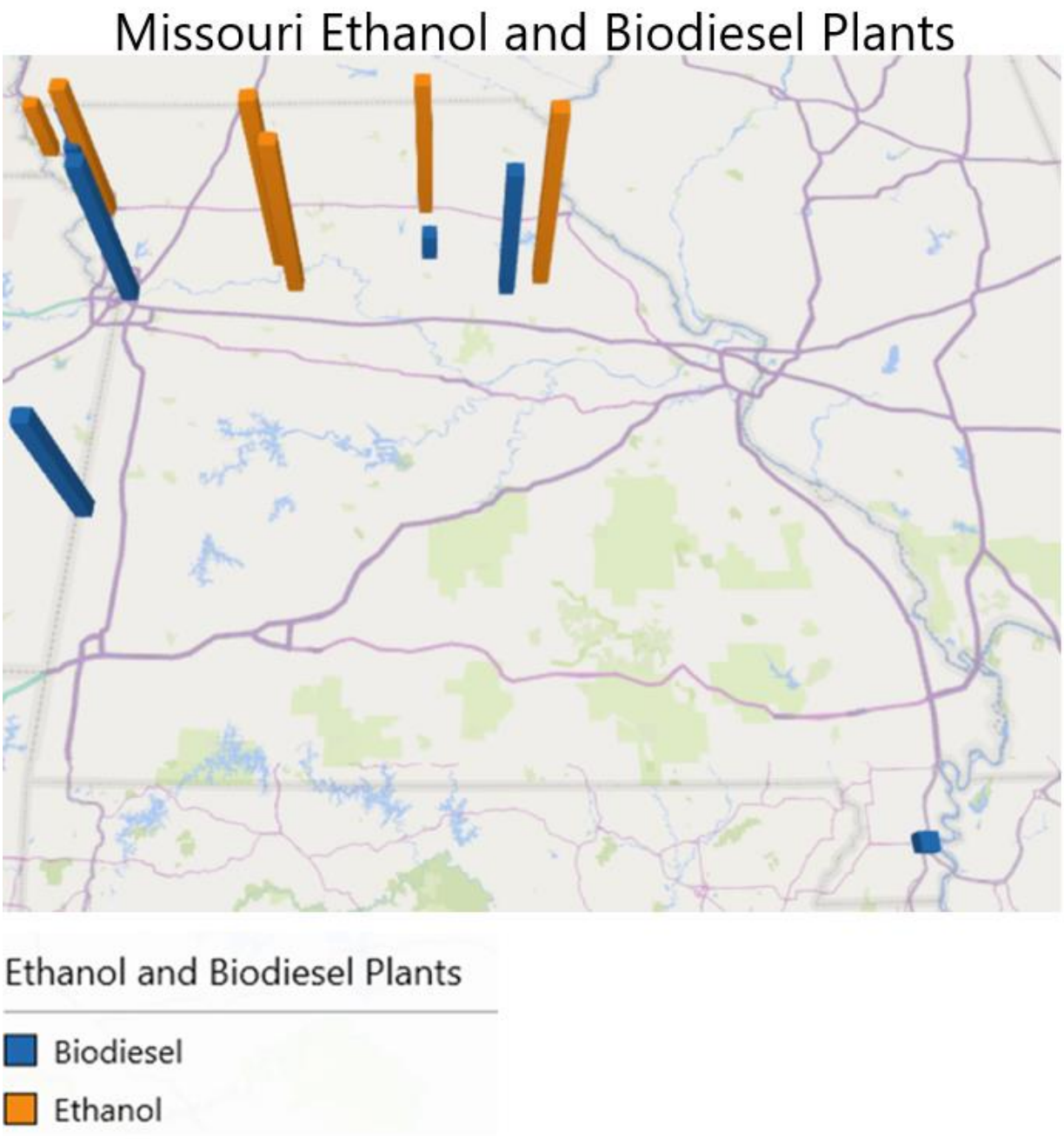


Figure 32, Missouri Ethanol and Biodiesel Plants

2.7.2 Missouri Ethanol and Biodiesel Production

Missouri produces significant volumes of both ethanol and biodiesel. National and state ethanol and biodiesel production has been supported by the Renewable Fuel Standard (RFS) Program. The RFS is a national program that has expanded the U.S. renewable fuels sector. The RFS was created under the Energy Policy Act of 2005 (EPAct) and later amended by the Energy Independence and Security Act of

2007 (EISA)[4]. The RFS was created to reduce greenhouse gas (GHG) emissions while reducing dependence on imported oil.

2.7.2.1 Ethanol

Data from the U.S. Energy Information Administration (EIA) and the U.S. Department of Agriculture (USDA) indicate that in 2019 Missouri produced 277 million gallons of ethanol and accounted for about 1.8% of U.S. total ethanol production (15.778 billion gallons), placing the state as the 13th largest ethanol producer in the U.S.

Since 2007, Missouri ethanol production has increased and has followed, for the most part, an upward trend. Missouri's production in 2019 was 1.7 times higher than the level in 2007 (161 million gallons) (see Figure 33). Despite the increase in ethanol production, Missouri's production share of U.S. ethanol production has declined (from about 2.5% in 2007 to about 1.8% in 2019) as other states have expanded their production as well.

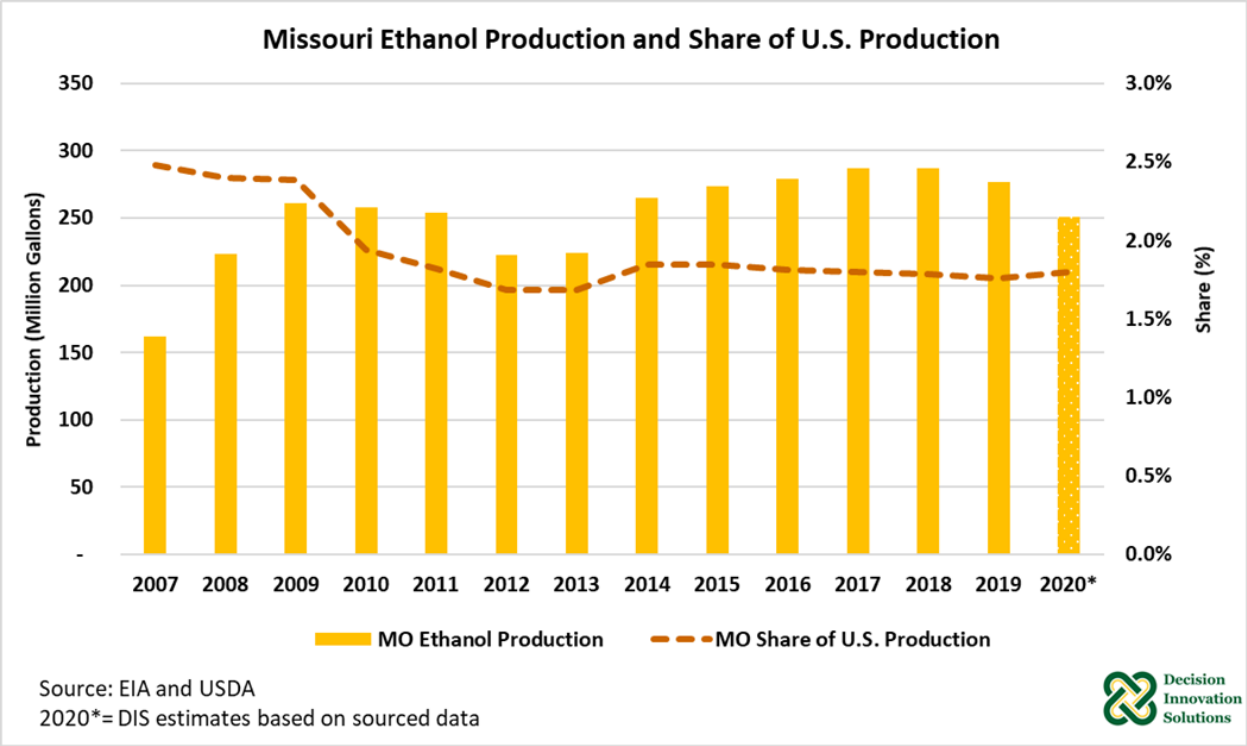


Figure 33, Missouri Ethanol Production and Share of U.S. Production

[4] Overview for the Renewable Fuel Standard (https://www.epa.gov/renewable-fuel-standard-program/overview-renewable-fuel-standard)

2.7.2.2 Biodiesel

Based on data from EIA, since 2016 Missouri is the third largest producer of biodiesel in the U.S. In 2019 Missouri produced 198 million gallons of biodiesel, representing about 11.5% of total U.S. biodiesel production (1.725 billion gallons). Missouri biodiesel production in 2019 was 5.3 times higher than in 2007 (37 million gallons). The share of Missouri biodiesel production has increased from 7.6% in 2007 to 11.5% in 2019. Biodiesel production in the state has fluctuated throughout this period but overall has followed an increasing trend (see Figure 34).

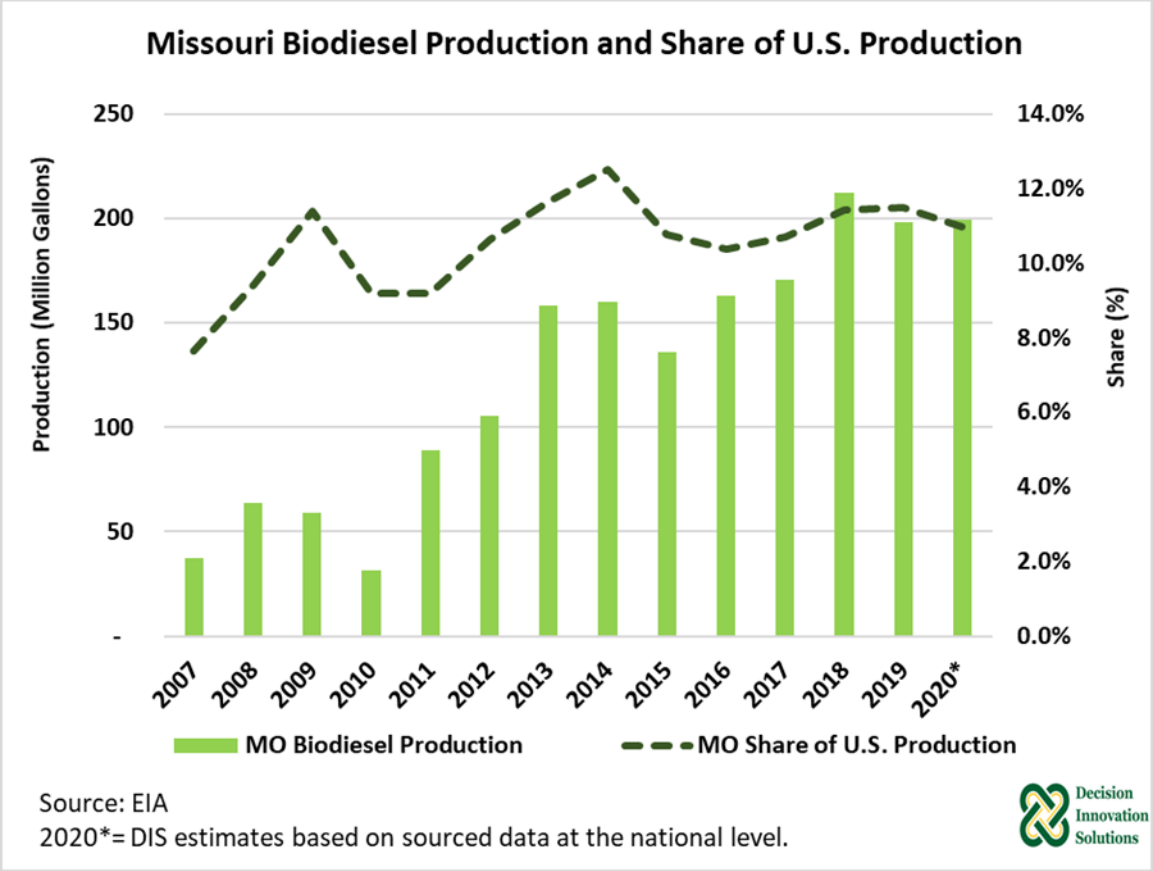


Figure 34, Missouri Biodiesel Production and Share of U.S. Production

2.7.2.3 Missouri Ethanol Gross Production Margin (Corn Crush Spread)

The Gross Production Margin (GPM) is a dollar value estimated as the difference between the combined sales value of ethanol and co-products (distillers dried grains with solubles (DDGs) and distillers corn oil (DCO)) that can be extracted per bushel of corn and the cost of corn. GPM is an important decision-making metric, as ethanol producers often use it to hedge the purchase price of corn and the sales of ethanol and co-products. GPM highlights the contribution of ethanol co-products to ethanol plant profitability. DDGs and DCO are valuable inputs in the livestock and biodiesel industries, respectively. This measure presents opportunities for speculators because the spread relationship between corn, ethanol, and co-products changes over time.

Missouri dry-mill ethanol plants' gross margins were calculated assuming ethanol yield of 2.80 gallons per bushel, 17 pounds of DDGs per bushel and 0.75 pounds of DCO per bushel of corn. Missouri price data (yellow corn, ethanol, DDGs (10% moisture), and DCO) was sourced from the Livestock Marketing Information Center (LMIC) (compiled from USDA).

Table 5 shows Missouri's ethanol GPM estimated for April's second week of 2017 to 2021. The second week of April in 2020 had the lowest Missouri's ethanol GPM among the periods compared, with the value of ethanol down 30.4% to $2.06/bushel compared with the cost of corn ($2.96/bushel) during that week. Ethanol prices were down with the decline in gasoline demand and therefore caused a decline in ethanol demand resulting from the COVID-19 pandemic. Adding the value of DDGs and DCO resulted in GPM of $1.05/bushel, hence the importance of ethanol co-product market on ethanol plant profitability. Ethanol demand began to improve as the initial shock of the pandemic subsided. By April 09, 2021, corn price was still above ethanol sales value by a margin of $0.44/bushel. With the added sales value of DDGs and DCO, ethanol GPM ended at $1.76/bushel up 67% from the previous year, but down 5% from April 05, 2019.

Note that Missouri's values per bushel and GPM were based on the average of Iowa and Nebraska prices for corn, ethanol, DDGs, and DCO.

Table 5, Missouri Weekly Ethanol, DDGs and DCO Sales Values per Bushel of Corn, Corn Cost, and Gross Production Margin in Mid-April 2017-2021

	04/14/17	04/13/18	04/05/19	04/10/20	04/09/21
MO Ethanol Price at the Plant ($/gal)	$1.55	$1.38	$1.35	$0.74	$1.86
Ethanol Yield (gal/bu)	2.8	2.8	2.8	2.8	2.8
Ethanol Value ($/bu)	$4.33	$3.85	$3.78	$2.06	$5.19
MO DDGs (10% moisture) ($/ton)	$98.48	$156.50	$151.75	$203.75	$211.25
DDGs Yield (lbs./bu)	17	17	17	17	17
DDGs Value ($/bu)	$0.84	$1.33	$1.29	$1.73	$1.80
MO DCO (*cents/lb*)	27.35	23.38	25.25	28.75	53.50
DCO Yield (lbs/bu)	0.75	0.75	0.75	0.75	0.75
DCO Value ($/bu)	$0.21	$0.18	$0.19	$0.22	$0.40
Combined Ethanol + DDGS+ DCO Values ($/bu)	$5.37	$5.36	$5.26	$4.01	$7.39
MO Yellow Corn Price at the Plant ($/bu)	$3.31	$3.58	$3.41	$2.96	$5.64
MO Ethanol Gross Production Margin (Corn Crush Value) ($/bu)	$2.06	$1.77	$1.85	$1.05	$1.76

Source: DIS estimates based USDA data compiled by LMIC

Ethanol Gross Margin ($/bu) = Combined Ethanol, DDGs, and DCO Sales Values per bushel of corn ($/bu) *minus* Corn Cost ($/bu)

DDGs= Distillers dried grains with solubles. DCO= Distillers corn oil

Missouri's values per bushel and GPM were based on the average of IA and NE prices for corn, ethanol, DDGs and DCO.

2.8 Missouri Breweries, Distilleries and Wineries

The brewery, distillery, vineyard and winery industries of Missouri continue to grow and provide avenues for adding value to Missouri commodities. According to the latest data from the U.S. Treasury[5], Missouri has 219 licensed and federally bonded[6] breweries in the state, 215 would be microbreweries and/or brewpubs, 3 are regional breweries and 1 is an international brewery.

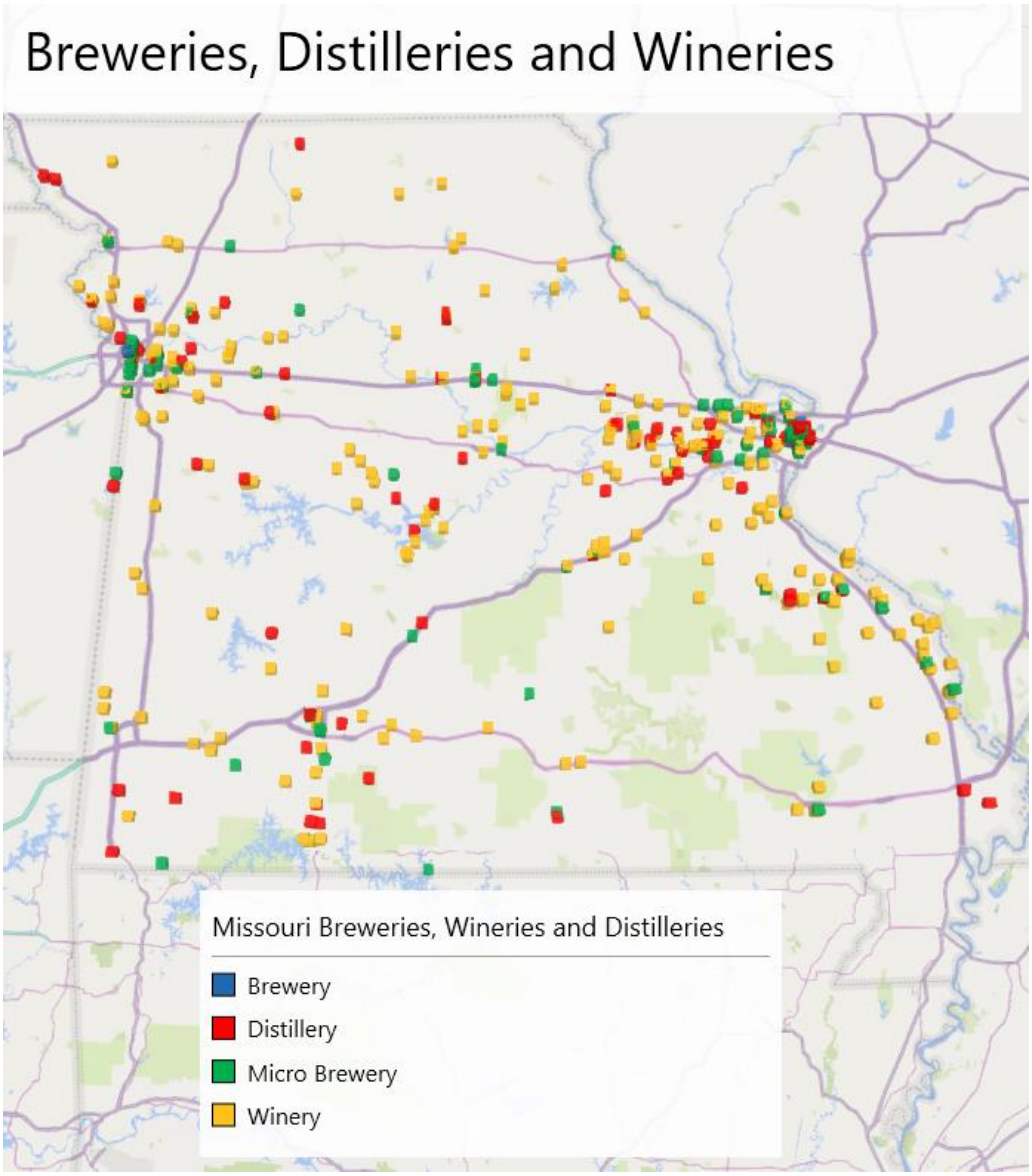


Figure 35, Missouri Breweries, Distilleries, and Wineries

According to the most recent Brewers Association data release (2020), Missouri ranks 20th in the country for the number of craft breweries. Missouri craft brewers produced 327,971 barrels of beer in

[5] https://www.ttb.gov/foia/list-of-permittees

[6] The federal brewer's bond is one of the two bonds a brewer is asked to obtain when opening a brewery. The other bond, which is not always mandatory, unlike this one, is a local brewer's bond in each state. Its amount and conditions may vary according to state regulations. https://www.craftbrewingbusiness.com/business-marketing/brewery-licensing-bonding-process-guidance/

2020[7]. Missouri has 308 licensed and bonded wineries[8] and about 400 vineyards producing 971,031 gallons of wine per year[9]. In addition, the most recent data from Alcohol and Tobacco Tax and Trade Bureau of the U.S. Department of Treasure reflects 94 active distilleries.,

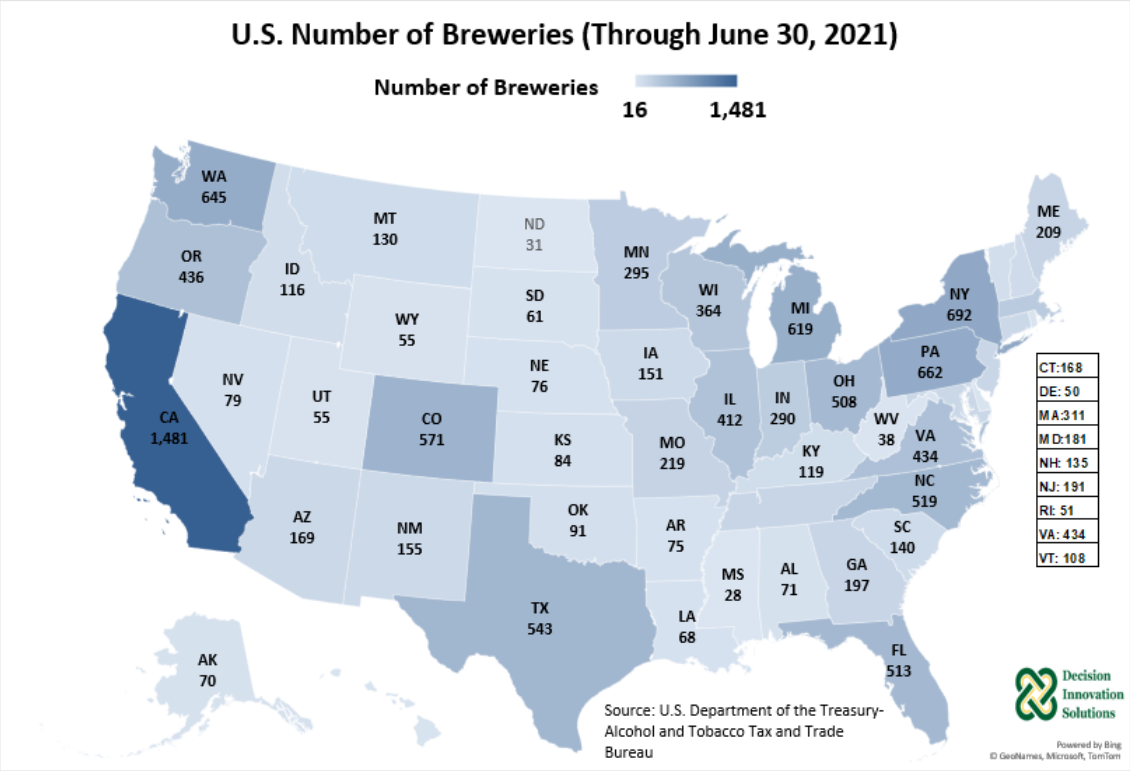


Figure 36, U.S. Number of Breweries (Through June 30, 2021)

[7] https://www.mocraftbeer.com/mo-craft-beer-facts.html
[8] https://www.ttb.gov/foia/list-of-permittees
[9] https://en.wikipedia.org/wiki/Missouri_wine

As shown in Figure 37, the number of breweries in Missouri has substantially increased since 1991. Since 2009 the increase in the number of breweries in the state has followed a continuous growing trend. Missouri's number of breweries by June 2021 was 4.7 times higher than the number of breweries in 2009 (47 breweries).

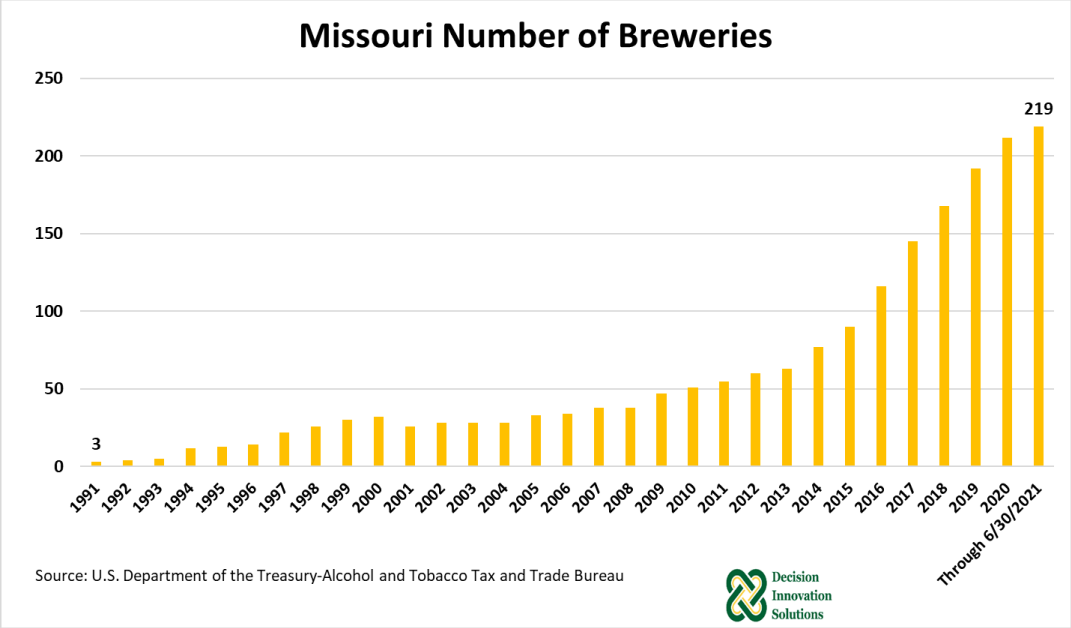


Figure 37, Missouri Number of Breweries

As reported by the U.S. Department of the Treasury- Alcohol and Tabacco Tax and Trade Bureau, as of June 2021 there were 16,153 bonded wine producers in the U.S. California has the most bonded wine producers than any state at 5,940. At a distant second and third places, in terms of number of bonded wine producers, are the states of Washington and Texas with 1,374 and 919 producers, respectively (see Figure 38).

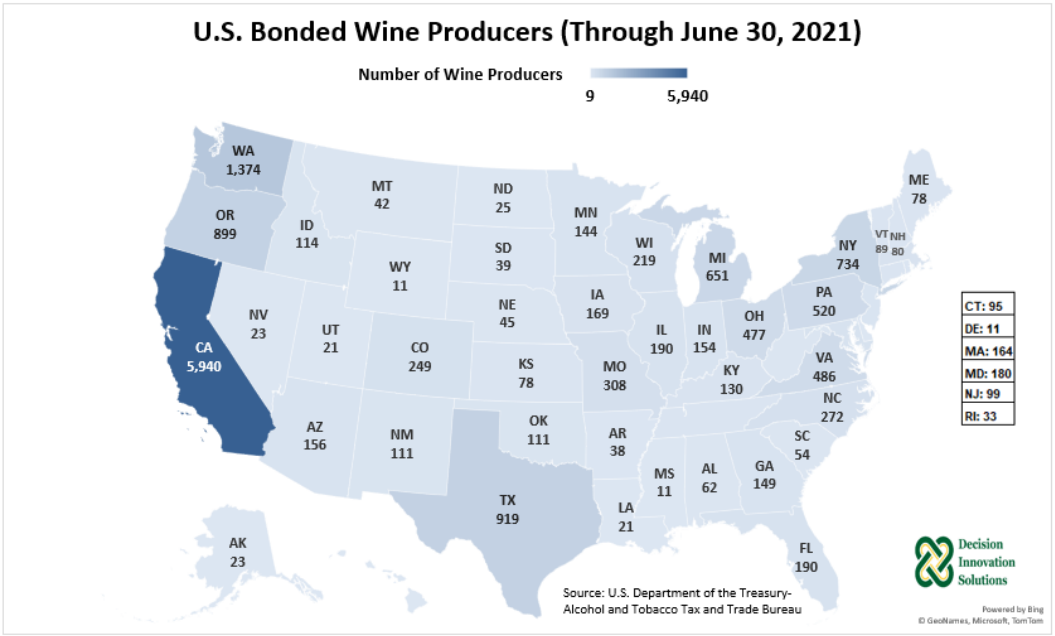


Figure 38, U.S. Bonded Wine Producers (through June 30, 2021)

The number of wine producers in Missouri was estimated at 308 in June 2021, which was up 50.2% from 2015 (122 producers). Overall, the number of wine producers has considerably expanded since1999, when the state had only with 48 wine producers (see Figure 39).

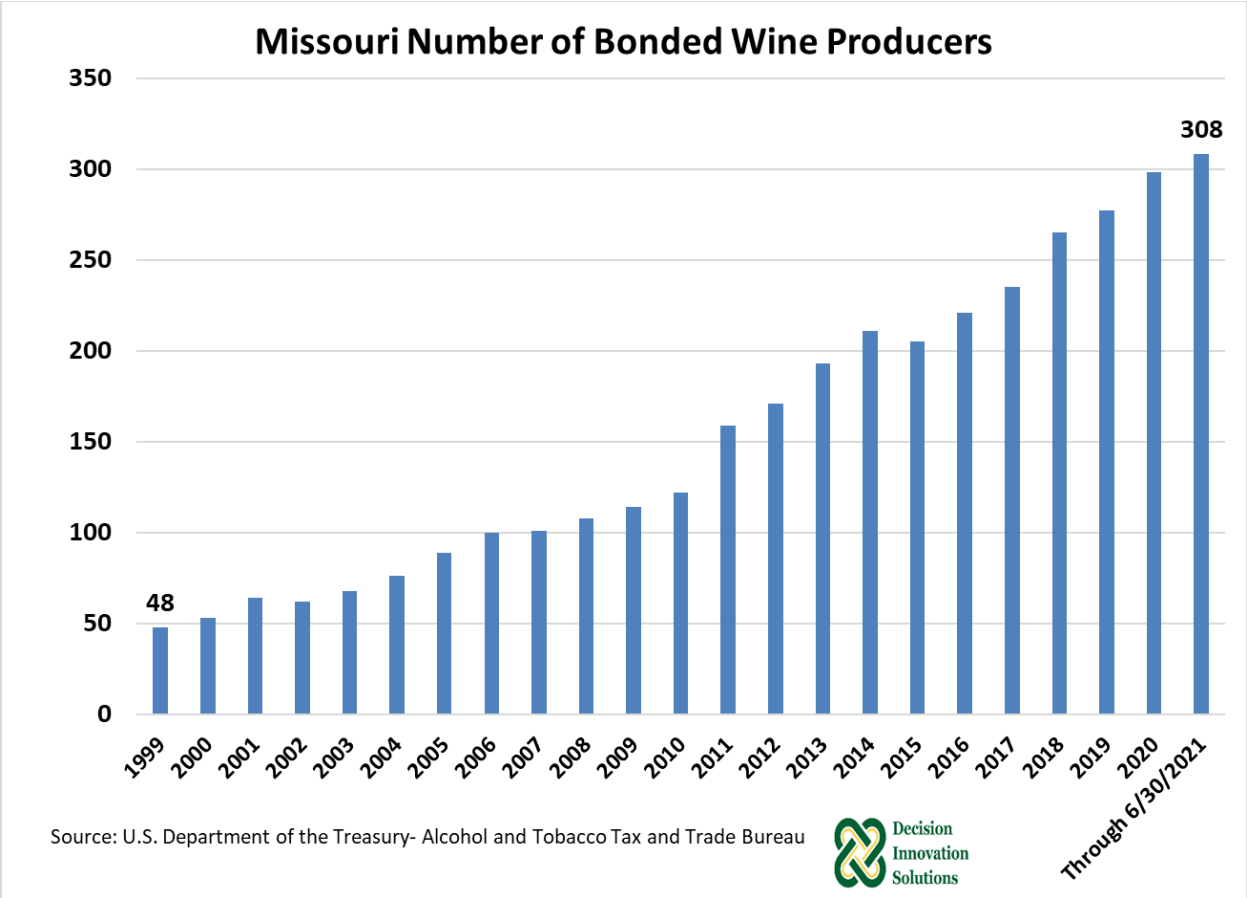


Figure 39, Missouri Number of Wine Producers

According to the Missouri Department of Public Safety, the excise tax collections from the sales of liquor, beer, and wine reached about $41 million in 2020, up from $39.7 year-over-year (see Figure 40). Missouri excise tax rates ranges from $2.00/gallon of liquor to $0.06/ gallon of beer sold. The excise tax for wine is equal to $0.42/gallon sold. About 67% of tax collected is from liquor, followed by tax collected from beer (18%) and the remainder is from sales of wine (15%). In terms of gallonage, the number one product sold in Missouri is beer, with 82% of total gallons sold. On average, from 2017 to 2020 the annual sales of beer were estimated at 124.4 million gallons, followed by 14.9 million gallons of wine. The annual volume of liquor sold in Missouri was 12.8 million gallons, on average, during the last four years (see Figure 41). Gallonage was estimated by applying the corresponding excise tax rate (as described above) to each type of alcoholic beverage.

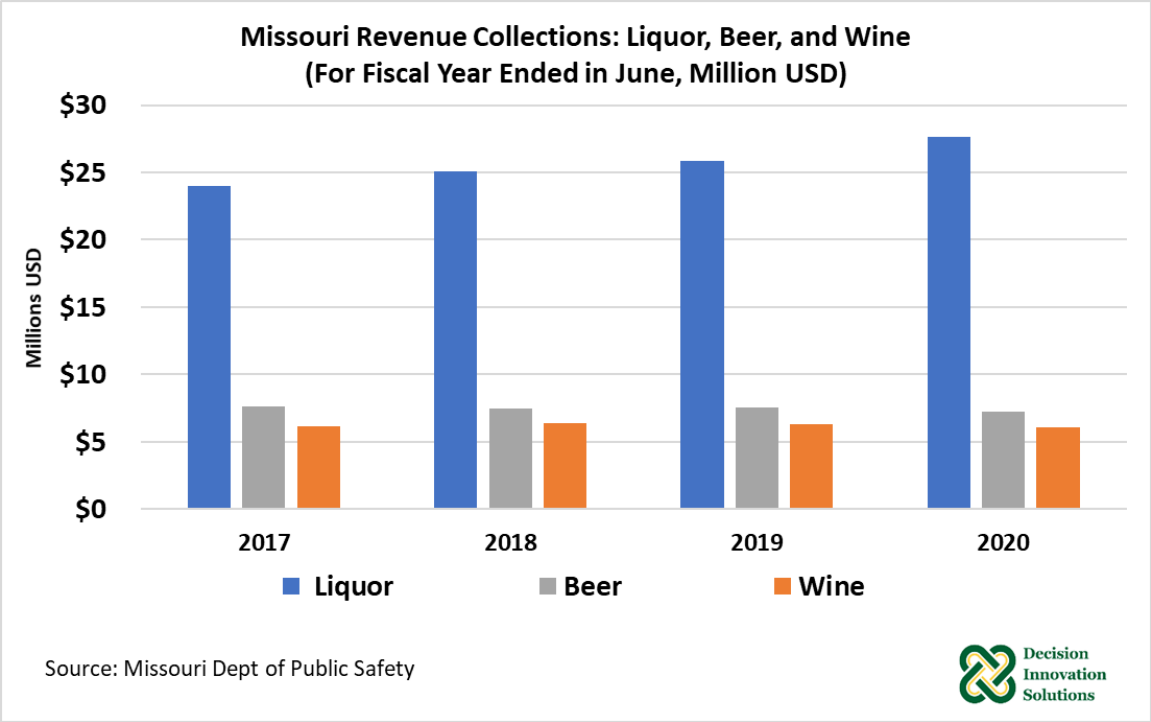


Figure 40, Missouri Revenue Collections: Liquor, Beer, and Wine (For Fiscal Year Ended in June, Million USD)

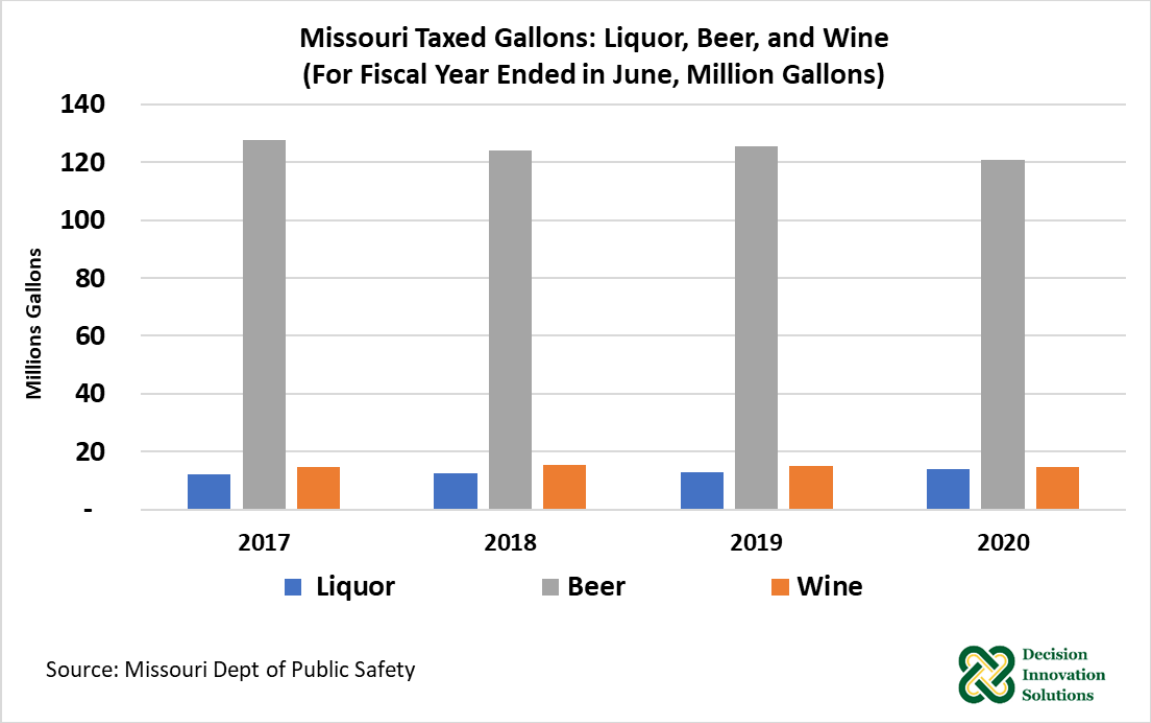


Figure 41, Missouri Taxed Gallons: Liquor, Beer, and Wine (For Fiscal Year Ended in June, Million Gallons)

2.9 Missouri Forestry Background

At the time of the first forest inventory in 1947, the area of forest land in Missouri was estimated to be 15.2 million acres (see Figure 42). Forest land area reached an all-time low in 1972 at 12.9 million acres. Since 1972 the area of forest land has steadily increased. Although the most recent survey shows a decrease of less than 1 percent, the area of forest land remains stable at 15.4 million acres.

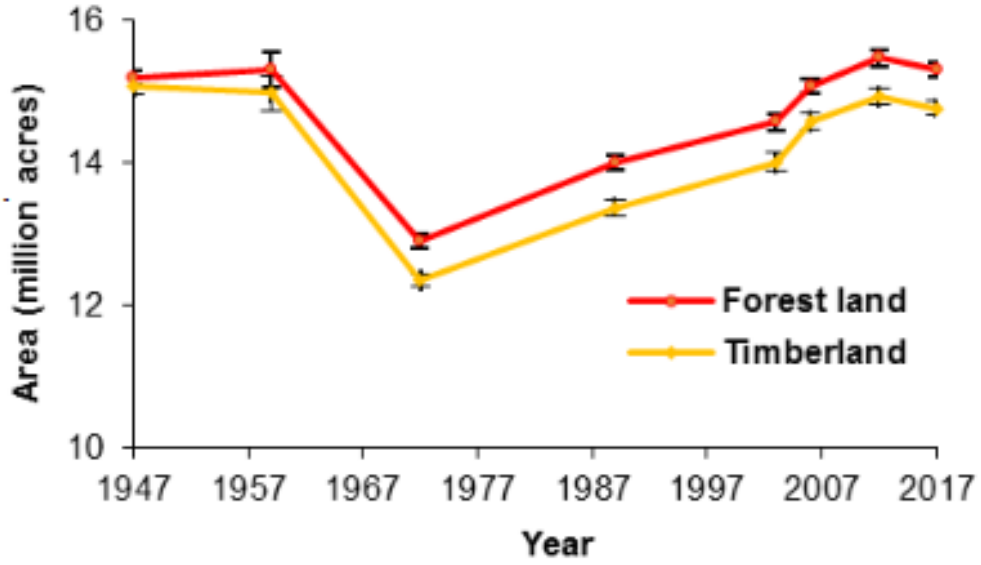


Figure 42, Area of forest land and Timberland in Missouri, 1947-2017

Timberland area is currently estimated at 14.8 million acres, or 96% of total forest land. Two percent of forest land is on public land that is reserved from timber production. One percent is considered unproductive (unable to produce ≥20 cubic feet per acre per year). For context, the total area of land in Missouri is 44.6 million acres, making 34 percent of the state forested[10].

Eighty percent of the forest land in Missouri is in the oak/hickory forest type. Nearly 8 million acres of that group is in the large diameter stand-size class. The other prominent forest-type groups in Missouri are elm/ash/cottonwood, oak/pine, eastern red cedar, and loblolly/shortleaf pine.

Forest land in Missouri is 82% privately owned (Figure 43). Twelve percent is federally owned with the bulk of that (10%) belonging to the Mark Twain National Forest. State and local government ownership accounts for the remaining 6%.

[10] https://www.fs.fed.us/nrs/pubs/ru/ru_fs146.pdf

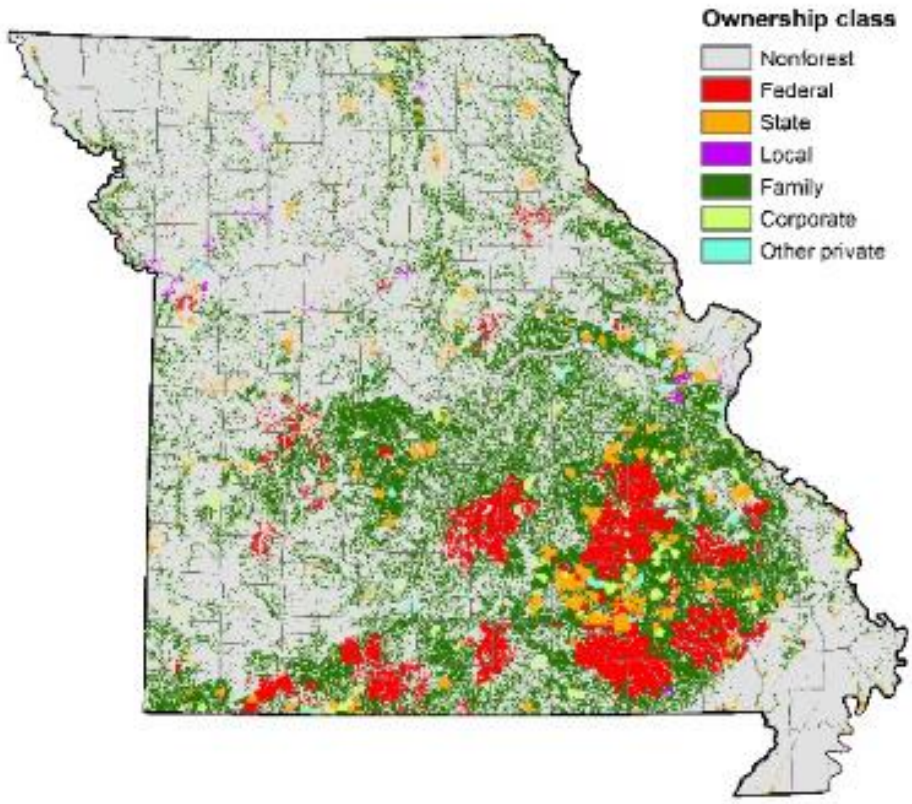


Figure 43, Forest Land Area by Ownership Class (2014)

The most numerous tree species in Missouri continues to be eastern red cedar (Table 6). The number of redcedar trees increased by 4 percent from 2012 to 2017. The number of white oak trees has decreased by 3 percent since 2012, but it continues to be the most voluminous species, and its volume increased by 1 percent. Overall net volume of trees increased on timberlands by 2.7% from 2012 to 2017. This was true for most individual species as well. Notable exceptions were northern red oak and scarlet oak which experienced decreases of 7.3% and 19.3%, respectively.

Table 6, Number of Trees, Net Growth, Mortality and Removals of Growing-stock Trees on Timberland, 2017

Number of Trees, Net Growth, Mortality and Removals of Growing-stock Trees on Timberland, 2017				
Specie	Trees (millions)	Net Growth (million ft3/yr	Mortality (million ft3/yr)	Removals (million ft3/yr)
White Oak	708.8	52.2	39.2	28.6
Black Oak	412.4	35.4	46.2	23.4
Post Oak	420.7	16.8	14	11.7
Northern Red Oak	106.2	15.7	8.7	7.4
Scarlet Oak	72.3	0.2	18.8	12.6
Shortleaf Pine	130.9	17.0	7.9	8.9
Eastern Redcedar	817.4	9.2	1.4	1.4
Black Walnut	112.5	19.5	2.5	10.4
Shagbark Hickory	193.7	11.0	2.4	3.0
American Sycamore	25.3	13.7	2.5	1.1
White Ash	185.2	0.5	5.3	0.8
Green Ash	88.3	4.6	1.2	3.3

3 Economic Contribution Methodology

The 2021 Economic Contribution Study of Missouri Agriculture and Forestry was completed with a combination of the 2019 Missouri IMPLAN dataset, data from the USDA 2017 Census of Agriculture and other USDA/National Agricultural Statistics Service (USDA/NASS) sources. The IMPLAN modeling system and Microsoft Excel were used for calculating and tabulating the results of this analysis. Results, shown as 2020 values throughout this report, are presented using these common economic modeling terms:

- **Sales (Output)**
  - The broadest measure of economic activity – sometimes referred to as "output"
- **Value Added**
  - Sales (output) minus the cost of inputs
- **Employment (Jobs)**
  - A measure of job positions without regard to whether they are full-time equivalents
- **Household Income**
  - Income from all sources that accrues to individuals as payment for personal employment (earnings or labor income), payment for ownership interests or capital provision (dividends, interest and rents), or as transfer payments (payments to individuals for which nothing is offered in return). Household Income makes up a portion of Value Added.

3.1 Defining Agriculture and Forestry

When completing an economic contribution study, there are generally questions as to what economic activity up and down the value chain should be included for a particular industry. Outlined below is the process used in this study for defining agriculture; the same guidelines have been applied to the forestry industry.

There is usually considerable discussion regarding the blurred lines between production agriculture, processing, and retail, and how agriculture should be defined. Agriculture can be defined as: 1) including only farm-level production, 2) including farm-level production, input manufacturing, and food processing, or 3) from the "farm to fork" perspective, which would also include distribution, restaurants, and retail.

To strike middle (and defensible) ground between including more than just farm level production and seeking to attribute excess economic activity to the agriculture industry, this analysis includes production agriculture plus the first round of value added to the process. For example, in addition to the production of livestock and poultry, we have also included the industries that process them (i.e., production, processing, slaughtering, and rendering). As mentioned, we have followed this same pattern of analyzing other agricultural industries (e.g., crops), forestry production and further processing (sawmills, etc.)

Using the above rationale as a guide, the IMPLAN models were created and analyzed using the recommended methodology for a Multi-Industry Contribution Analysis. The IMPLAN modeling system uses more than 20,000 industries and classifies them according to the North American Industry Classification System (NAICS) and groups them into 546 industries. There were 103 IMPLAN sectors identified for this analysis to represent agriculture, forestry, and related economic activities in the State of Missouri (see Appendix A, IMPLAN Aggregation Scheme).

3.2 Economic Impact Study versus Economic Contribution Study

The term “Economic Impact Study” implies a change has taken place within a local economy. The change in a local economy typically comes from one of the following sources:

- Entrance/departure of a new business or industry
- Expansion/contraction of an existing business or industry

While estimating a change (economic impact study) such as the entrance or departure of industry activity is a worthwhile endeavor in many instances, this is not how the contribution of the agriculture and forestry sectors in this analysis were estimated. This analysis is an effort to evaluate the structure of existing industries within an existing economy. As a result, shocking the economy to create or eliminate parts of the industry is not appropriate. For that reason, this study is called an “economic contribution analysis”; in other words, we are interested in understanding what Missouri agriculture currently contributes to the overall economy. This is a key difference from what is traditionally termed an “economic impact study”. With a contribution analysis, the sum of individual industry estimates will never differ from the total of what actually exists in a given study area.

4 Economic Contribution Study Results

4.1 State Level Results

The 103 IMPLAN sectors identified for this study were aggregated into four main categories to provide an overview of the economic contribution of these industries. These aggregated industries are:

- Crops
- Livestock
- Forestry
- Processing & Other Agriculture

Further details on the industries included in each of these categories are shown in the 'Detailed State Results' section of the report and also in Appendix A, IMPLAN Aggregation Scheme.

4.1.1 State Value Added

Total value added refers to the portion of total sales that actually created additional value from the economic activity in an area and/or industry and is an accurate indicator of the ability of an industry to improve economic prospects in a given area. Total value added for an industry represents the value of the industry's total sales minus the value of any inputs used in the production process from other industries. Key components of value added are employee compensation (hired labor) and proprietor's income (self-employed), which is collectively known as 'household income'.

Figure 44 shows Missouri's total value added broken out by industry. The agriculture and forestry industries and related economic activity contribute significantly to the Missouri economy with $34.9[11] billion in value added, which is 10% of the state's total. Of this amount, Crops contribute $5.4 billion (2%), Livestock $9.5 billion (3%), Other Agriculture $15.0 billion (5%), and Forestry 4.9 billion (1%).

The $34.9 billion in value added contributed by agriculture and forestry rank it as the 4th largest industry by this measure, behind just Services ($78.4 billion), Manufacturing ($71.5 billion), and Government ($56.8 billion). The agriculture and forestry industry is larger in terms of value added than industries such as Construction ($32.9 billion), Transportation ($9.1 billion), and Mining ($2.1 billion).

[11] Totals throughout the report may not sum due to rounding.

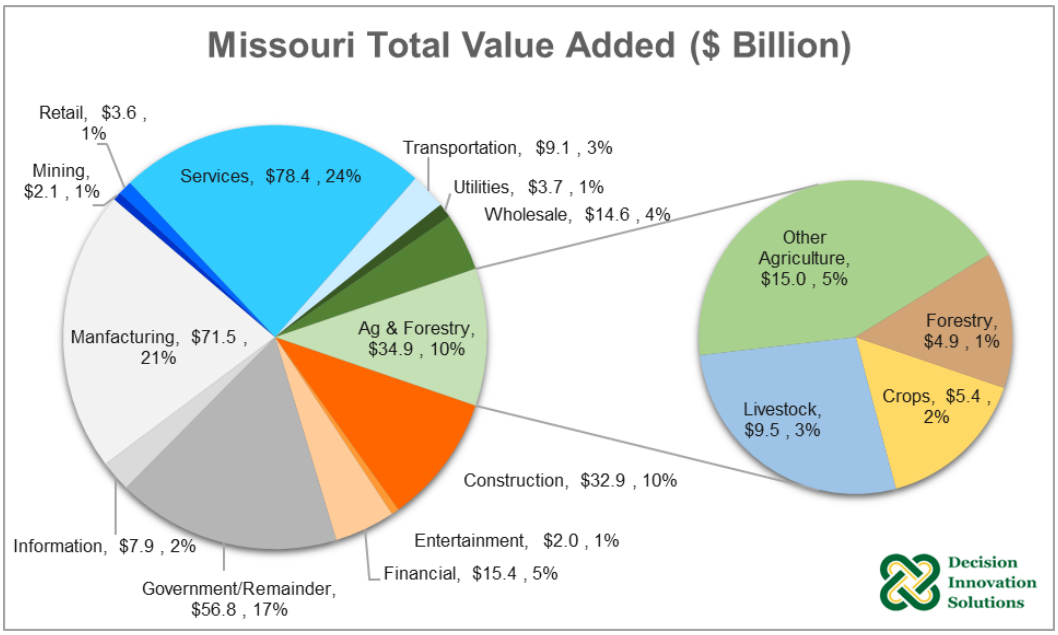


Figure 44, Missouri Value Added Summary

4.1.2 State Jobs

Job numbers represent an estimate of the number of positions (jobs) currently filled in an area or industry. The estimates provided here originate from the state level IMPLAN input-output model. Jobs include positions whether they are full or part-time, so care must be used in making comparisons. "Jobs" does not count positions that are unfilled.

The agriculture, forestry, and related industries in Missouri contribute a large number of jobs to the economy with more than 456,000 jobs, which is 12% of Missouri's total (Figure 45). Of this amount, 81,095 jobs come from Crops, 155,425 come from Livestock, 167,409 come from Other Agriculture, and 52,690 come from Forestry.

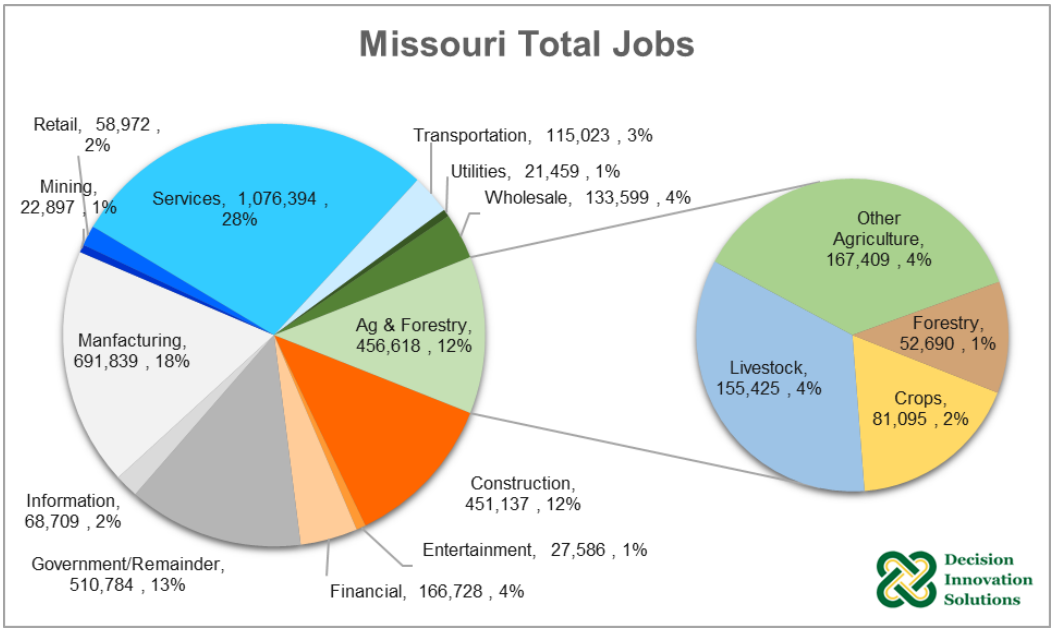


Figure 45, Missouri Jobs Summary

4.1.3 State Output

Total output (sales) refers to the total value of all production or sales of the identified industries within a study area. This is a total number that does not make deductions for the cost or origination of inputs that were used in the production process, which means that there is some double counting that occurs with this measure of economic activity.

The agriculture, forestry, and related industries contribute a significant amount to Missouri's economy in terms of output with a contribution of $93.7 billion, as shown in Figure 46. Only manufacturing ($186.6 billion) and services ($131.9 billion) contribute more in terms of output. Of the $93.7 billion contributed by agriculture and forestry, $15.6 billion comes from Crops, $29.7 billion from livestock, $37.3 billion from other agriculture, and $11.2 billion from Forestry.

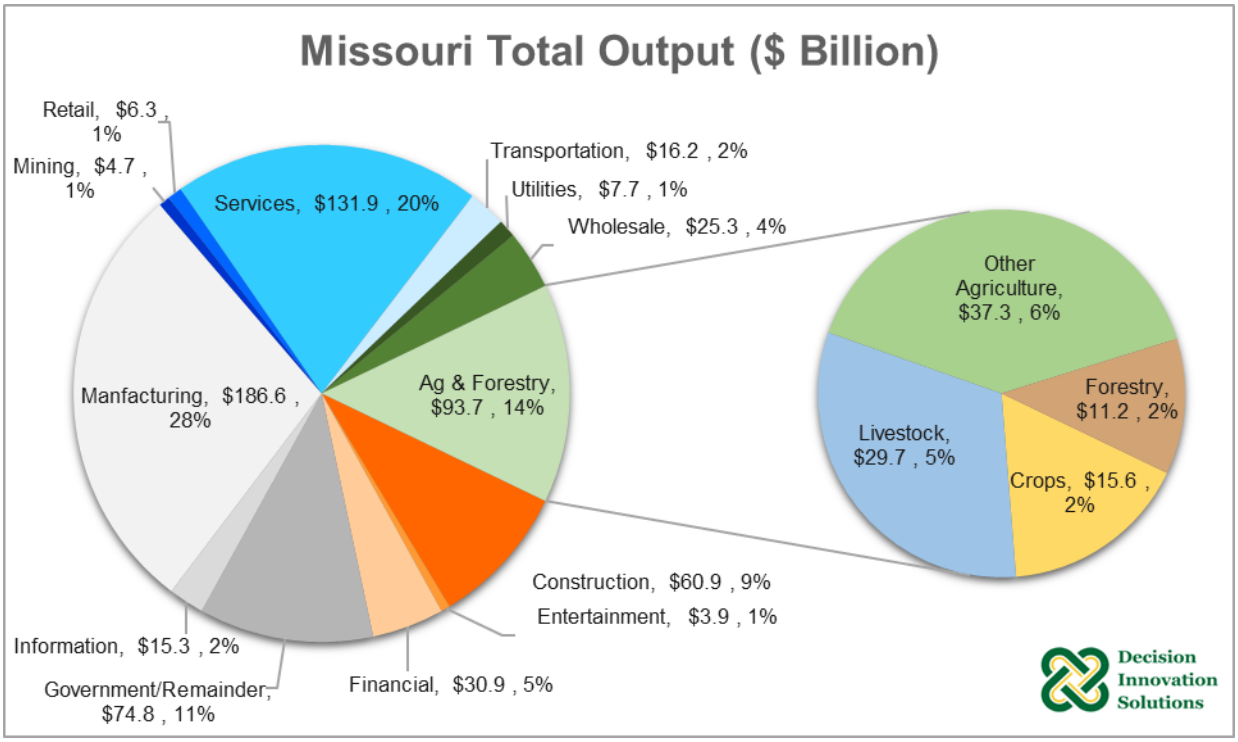


Figure 46, Missouri Output Summary

4.1.4 State Household Income

Household income is defined as income from all sources that accrues to individuals as payment for personal employment (earnings or labor income), payment for ownership interests or capital provision (dividends, interest, and rents), or as transfer payments (payments to individuals for which nothing is offered in return).

The agriculture, forestry, and related industries in Missouri contribute $31.8 billion in household income. Of this amount, $8.7 billion is contributed by Livestock, $4.5 billion by Crops, $4.7 billion by Forestry, and $13.8 billion by Other Agriculture (Figure 47).

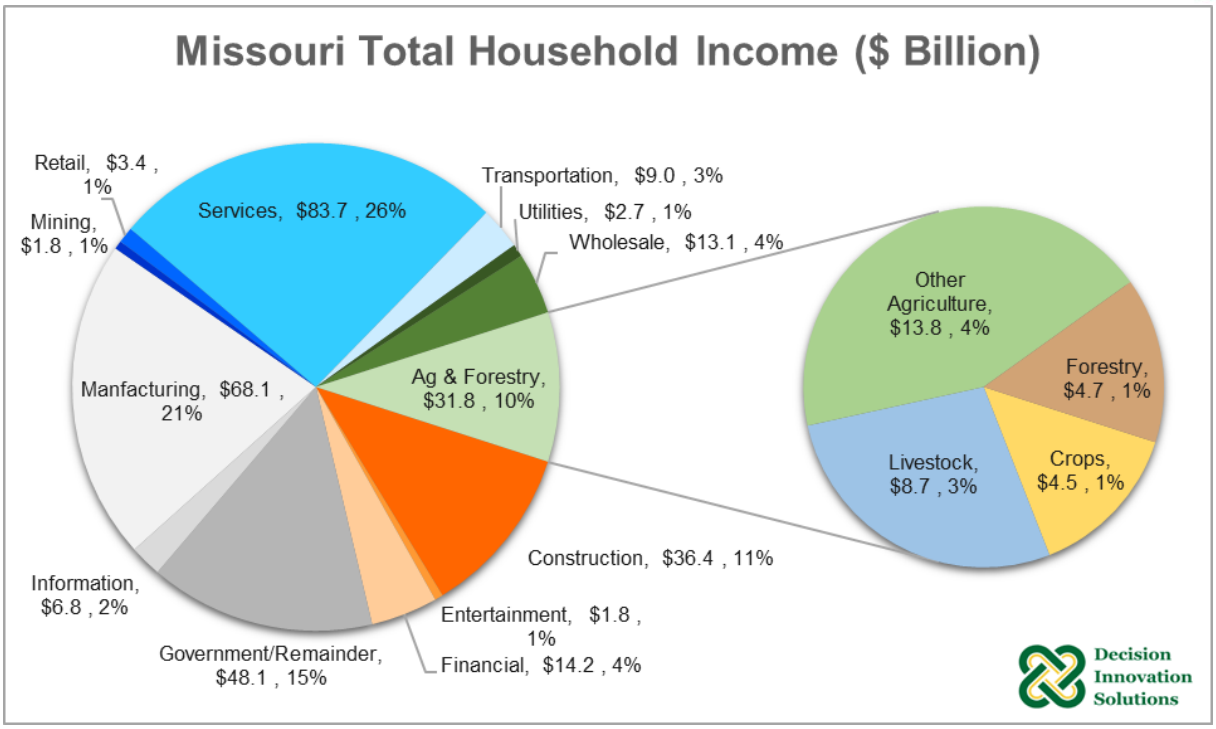


Figure 47, Missouri Household Income Summary

4.2 Detailed State Results

Section 4.1 showed the state level results by the four major categories: Crops, Livestock, Forestry and Other Agriculture. The following section shows the results by industry within each of the three major agriculture categories. This is done to show which specific industries are major contributors. Please note that goods and services used by the agriculture industry to operate (i.e., banking and insurance) are not specifically shown, but they are embedded as required inputs for the agriculture industry and related economic activities.

4.2.1 Crops

The Crops category includes industries such as grain and oilseed farming, as well as crop food processing industries. The total value added contribution to the Missouri economy from Crops was $5.4 billion (Figure 48). Of this amount, crop production makes up a majority of this contribution with a total of around $2.9 billion, while crop processing makes up the remaining amount of around $2.5 billion. This category includes activities such as flour milling, soybean processing, and breakfast cereal manufacturing. A total of 81,095 jobs are derived from industries in the crops category (Figure 49). Of this amount, 20,488 are derived from grain production, 14,321 from oilseed production, 19,324 from other crop production, and 27,052 from crop processing.

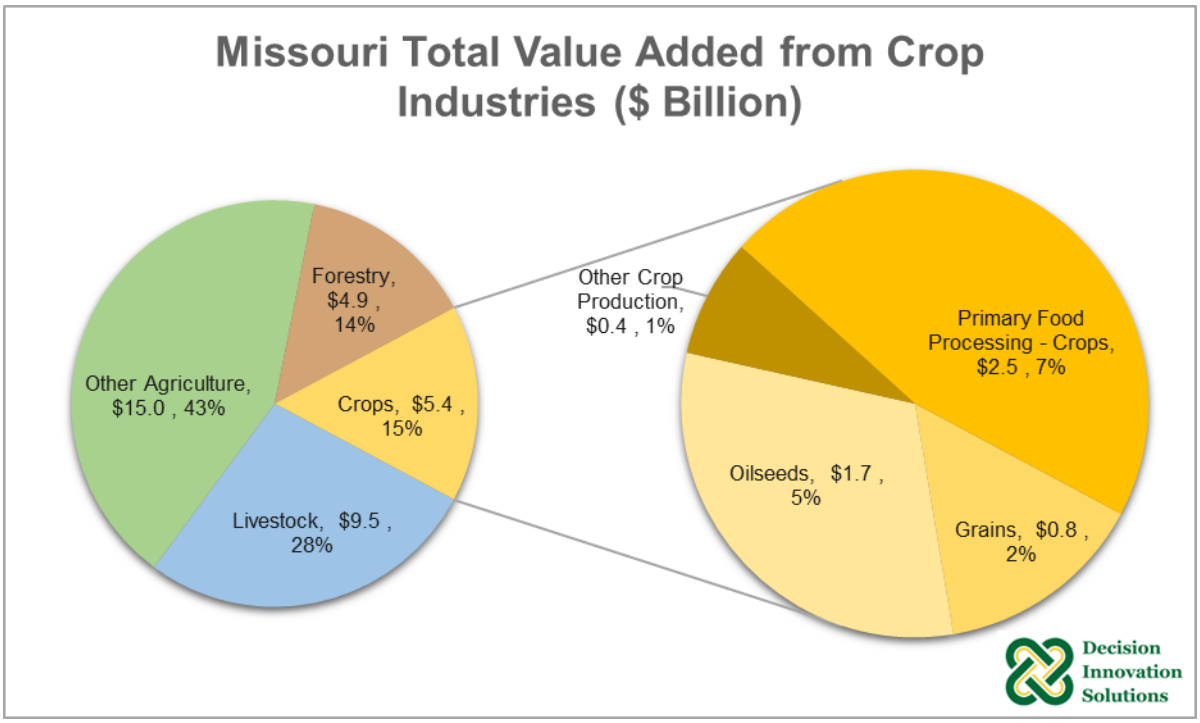


Figure 48, Economic Contribution of Missouri's Crop Industries - Value Added

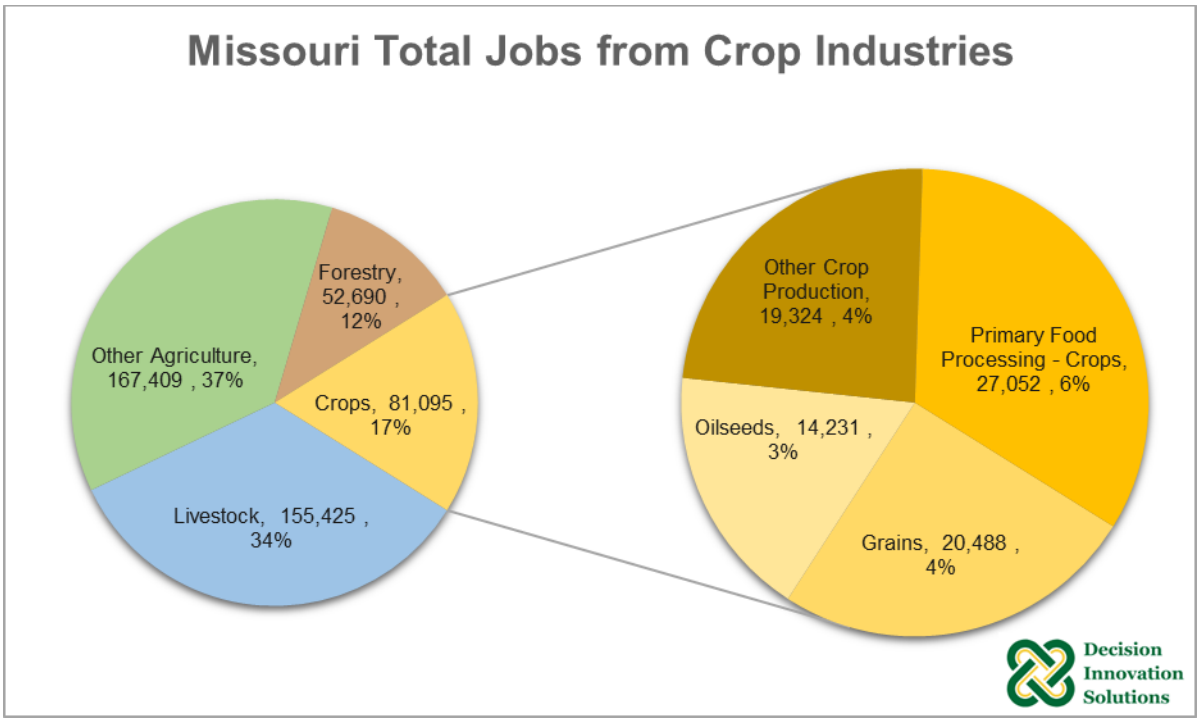


Figure 49, Economic Contribution of Missouri's Crop Industries - Jobs

4.2.2 Livestock

The Livestock category includes industries such as beef cattle production, hog production, dairy cattle, poultry production (layers (egg production), broilers and turkeys), meat/poultry processing rendering, and more. The total value added contribution to the Missouri economy from these industries was $9.5

billion (Figure 50). The largest subcategory is meat processing with $5.9 billion in value added, which demonstrates the importance of processing to the value chain.

Livestock production and related economic activity also accounted for 155,425 jobs in Missouri (Figure 51). Of this amount, nearly 100,000 jobs are from meat processing, 22,257 from dairy processing, 16,405 from cattle production, 10,328 from hogs and other livestock, 6,060 from poultry, and 428 from dairy farms.

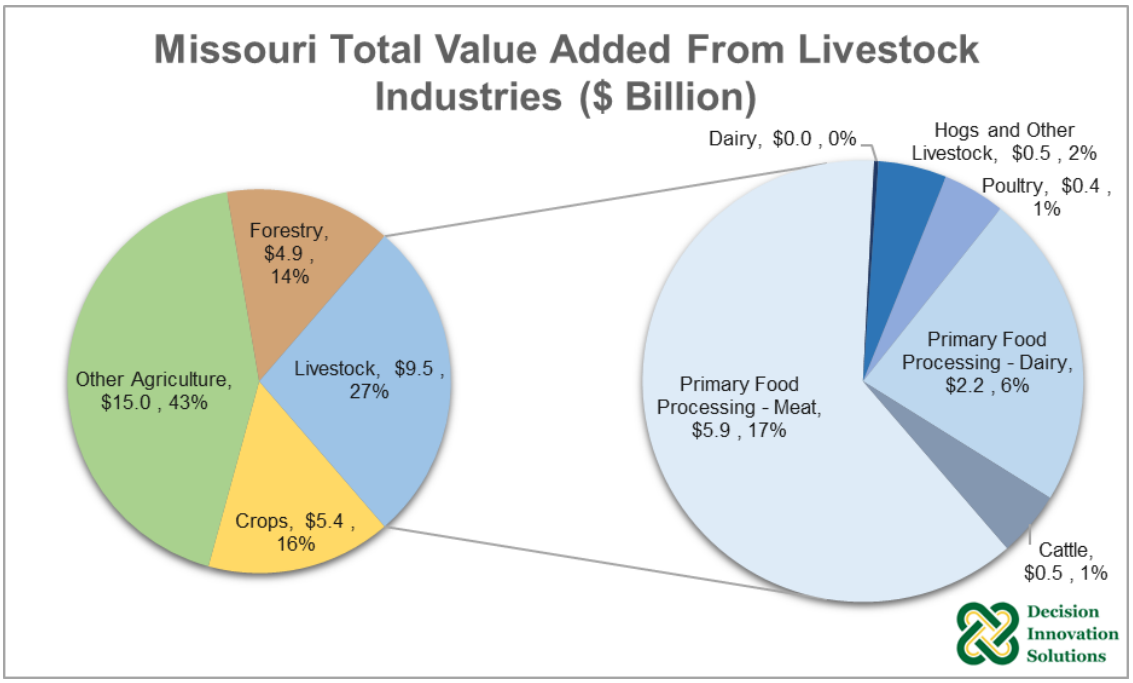


Figure 50, Economic Contribution of Missouri's Livestock Industries - Value Added

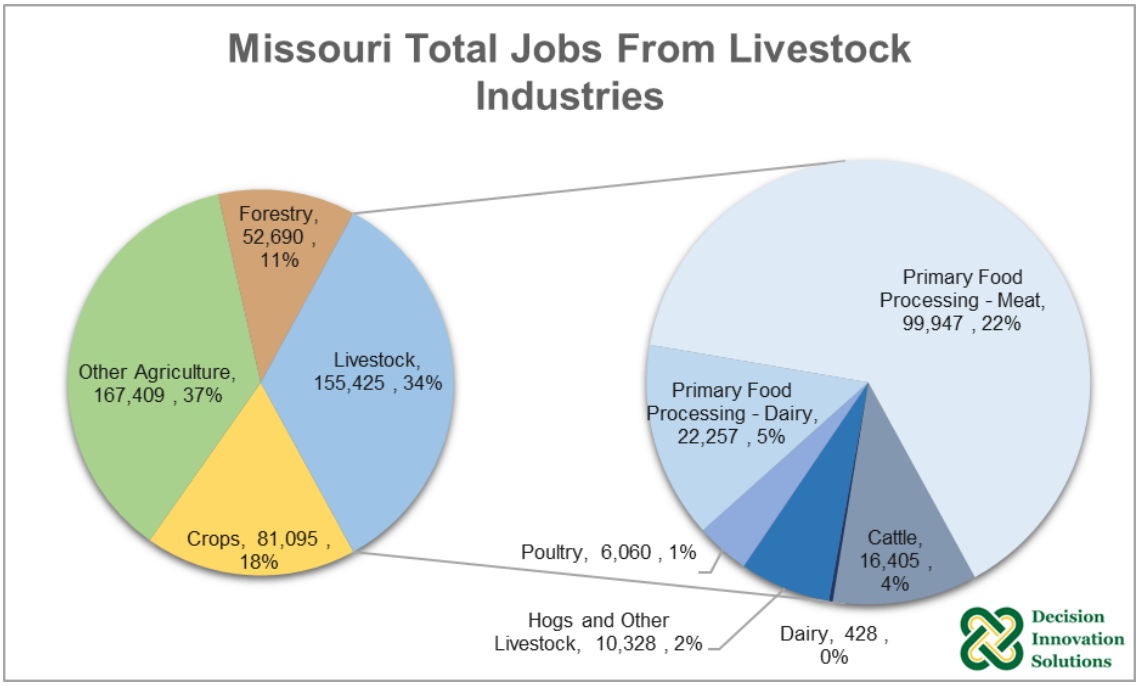


Figure 51, Economic Contribution of Missouri's Livestock Industries - Jobs

4.2.3 Other Agriculture

The Other Agriculture category includes industries such as animal feed production, farm machinery and equipment manufacturing, ethanol production, dog and cat food manufacturing, veterinary services, many food manufacturing industries and more. These other agricultural industries contributed a total of $15.0 billion in value added to Missouri's economy, as shown in Figure 52.

The industries in the Other Agriculture category also accounted for 167,409 jobs (Figure 53). Other Food Processing contributed the most with 73,447 jobs, followed by agriculture chemical and fertilizer manufacturing with 37,409 jobs and animal and pet food manufacturing with 37,078. Agriculture support rounds out the category with a contribution of 19,475 jobs.

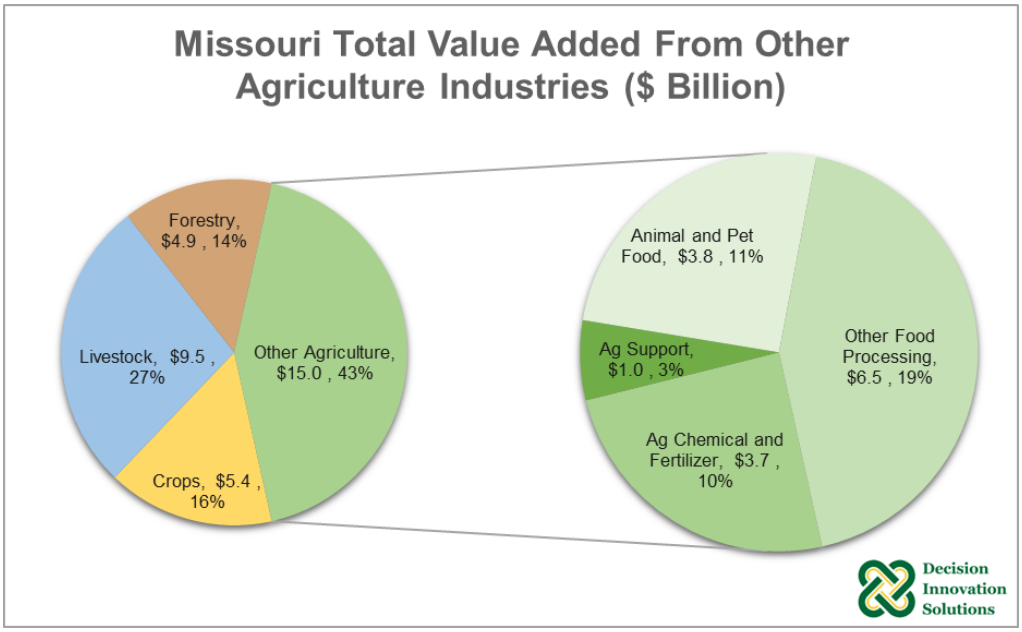


Figure 52, Economic Contribution of Missouri's Other Agriculture Industries - Value Added

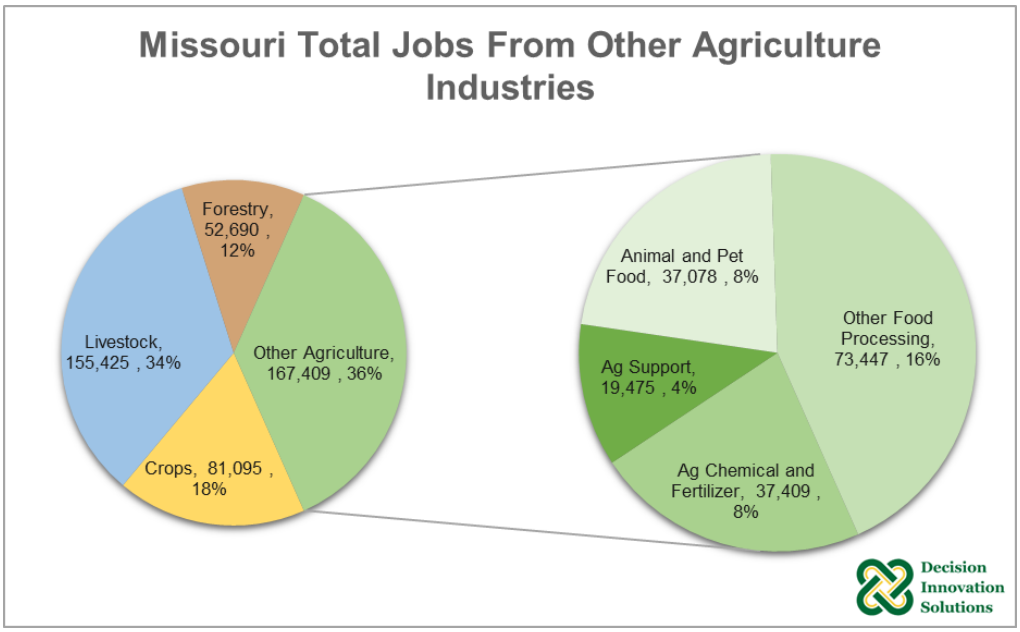


Figure 53, Economic Contribution of Missouri's Other Agriculture Industries - Jobs

4.3 County Level Results

The results presented so far in this report have been focused on the state level; however similar analyses have been performed for all of Missouri's 114 counties and the independent city of St. Louis. As one would expect, the contribution of agriculture varies widely, not just in terms of total contribution, but the degree to which some counties are more or less reliant upon agriculture in terms of the four primary measures of economic activity (value added, jobs, output, and household income). While there is variation across counties, a county that is very reliant upon agriculture in terms of value added is also more likely to be reliant upon agriculture in terms of jobs, output, and household income.

4.3.1 County Value Added

Figure 54 shows the ten counties with the greatest value-added contributions from agriculture, forestry, and related industries. The City of St. Louis has the largest value added contribution of $4.7 billion. Jackson, St. Louis, and Jasper counties all have value added contributions of more than $2 billion.

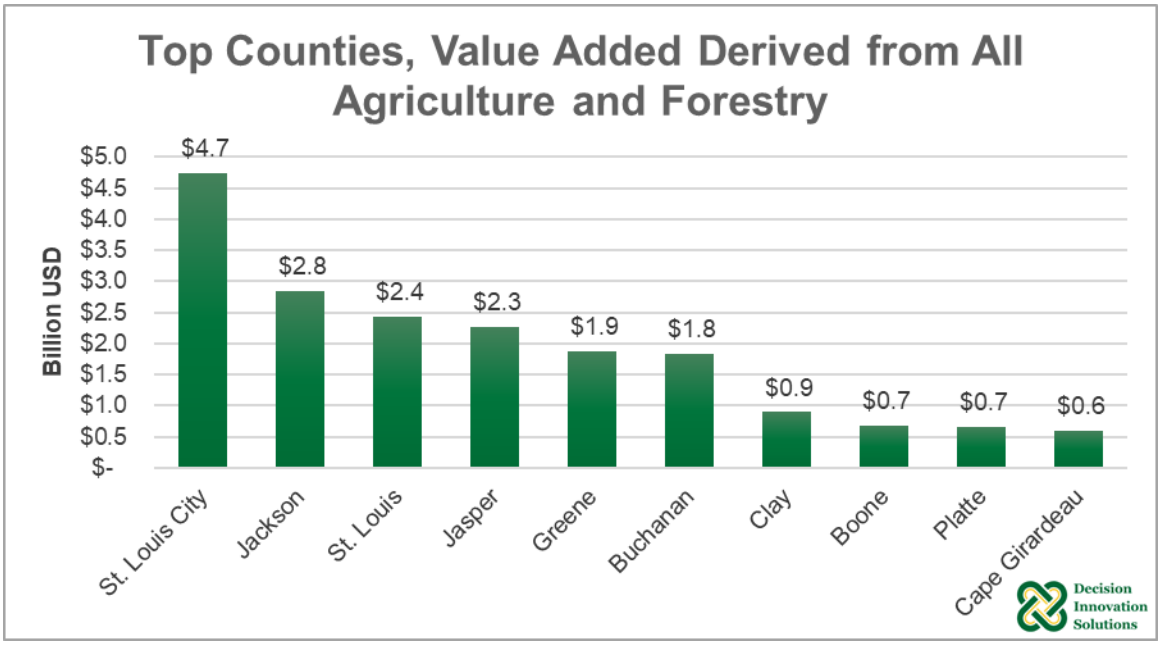


Figure 54, Top 10 Counties, Value Added from Agriculture and Forestry

The counties that derive the largest share of their total value added from agriculture, forestry, and related industries include Sullivan, McDonald, Ralls, and New Madrid. All of these counties derive a majority of their total value added from agriculture and forestry, as shown in Figure 55 below.

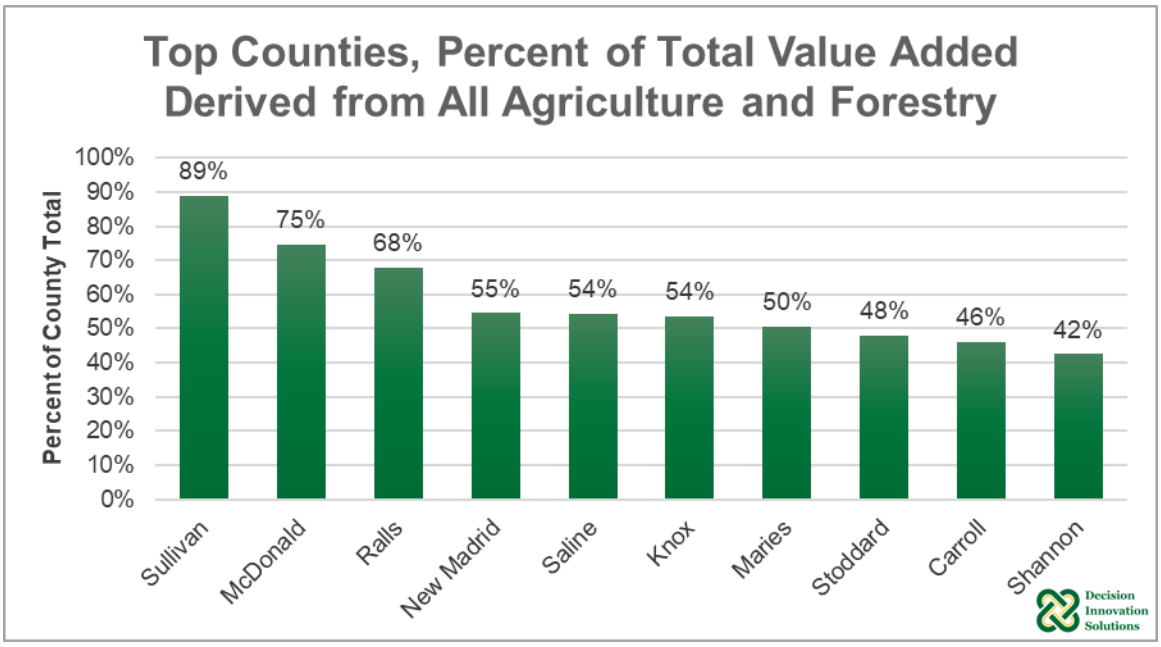


Figure 55, Top 10 Counties, Percent of Total Value Added from Agriculture and Forestry

Figure 56 shows the number of counties that derive certain ranges of shares of value added from agriculture and forestry economic activity. A total of 14 counties derives at least 40% of their total value added from agriculture, forestry, and related industries, while 66 counties derive at least 20%.

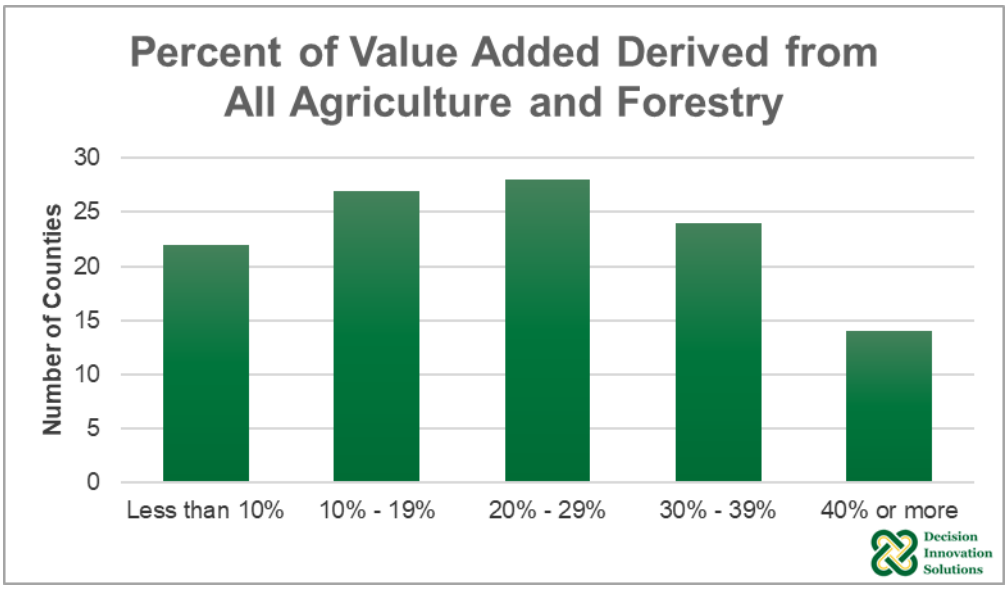


Figure 56, Percent of Value Added Derived from Agriculture and Forestry

Figure 57 shows the amount of value added derived from agriculture, forestry, and related industries for each of Missouri's counties. The percent of each county's total value added that is derived from agriculture, forestry, and related industries is shown in Figure 58. See section 8.1 for detailed value-added maps for crops, livestock, other agriculture, and forestry.

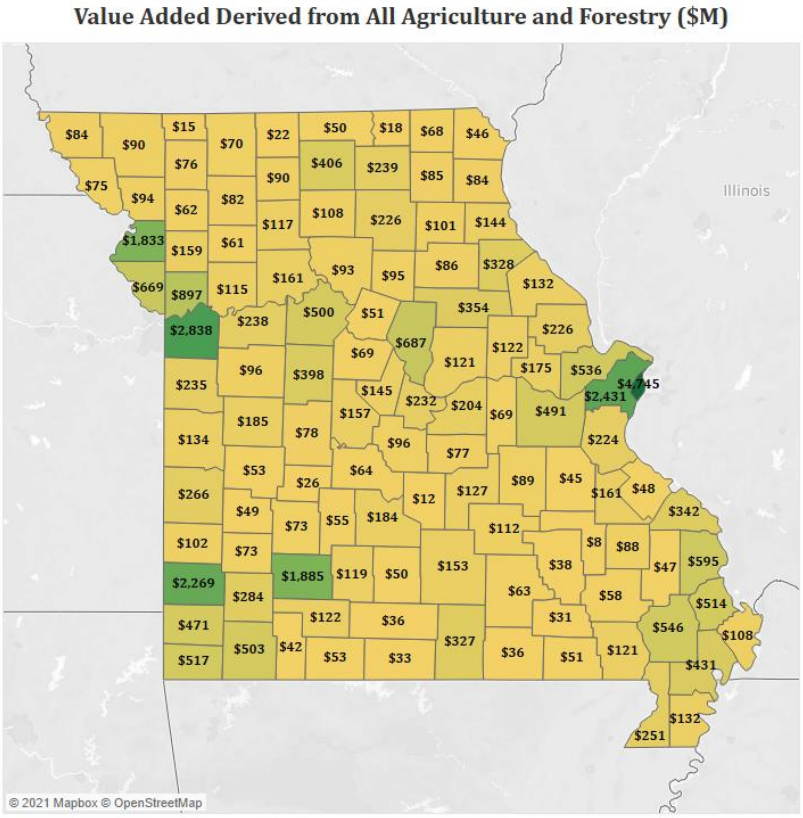


Figure 57, Value Added Derived from All Agriculture and Forestry (by County) ($M)

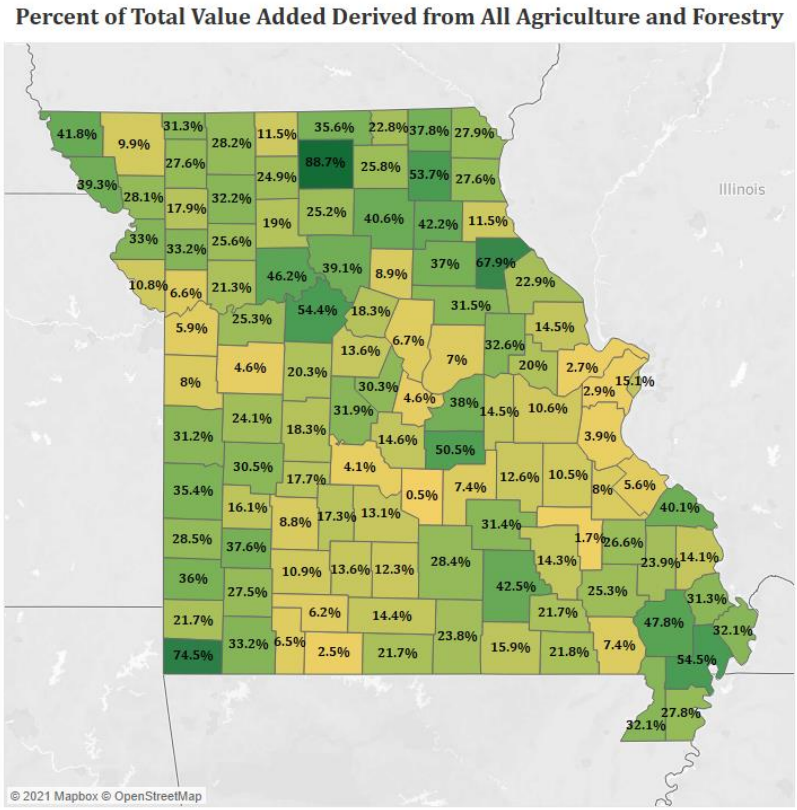


Figure 58, Percent of Total Value Added Derived from All Agriculture and Forestry (by County)

4.3.2 County Jobs

Figure 59 shows the ten counties with the greatest number of jobs within agriculture, forestry, and related industries. The City of St. Louis derives the greatest number of jobs from these industries with 28,835. Jackson, St. Louis, Jasper, Greene, and Buchanan counties all derive more than 20,000 jobs from agriculture and forestry.

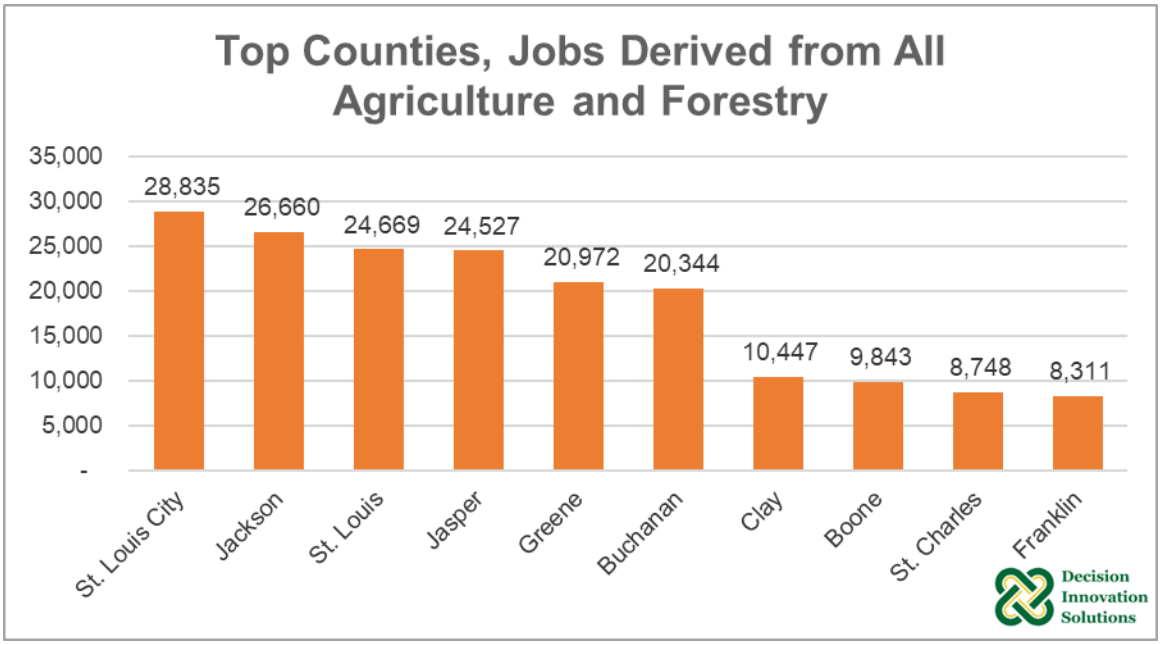


Figure 59, Top 10 Counties, Jobs from Agriculture and Forestry

Sullivan County is the most reliant on agriculture, forestry, and related industries in terms of jobs, with nearly 90% of the county's jobs being derived from these industries (Figure 60). The top 10 counties all derive more than 45% of their total jobs from agriculture, forestry, and related industries.

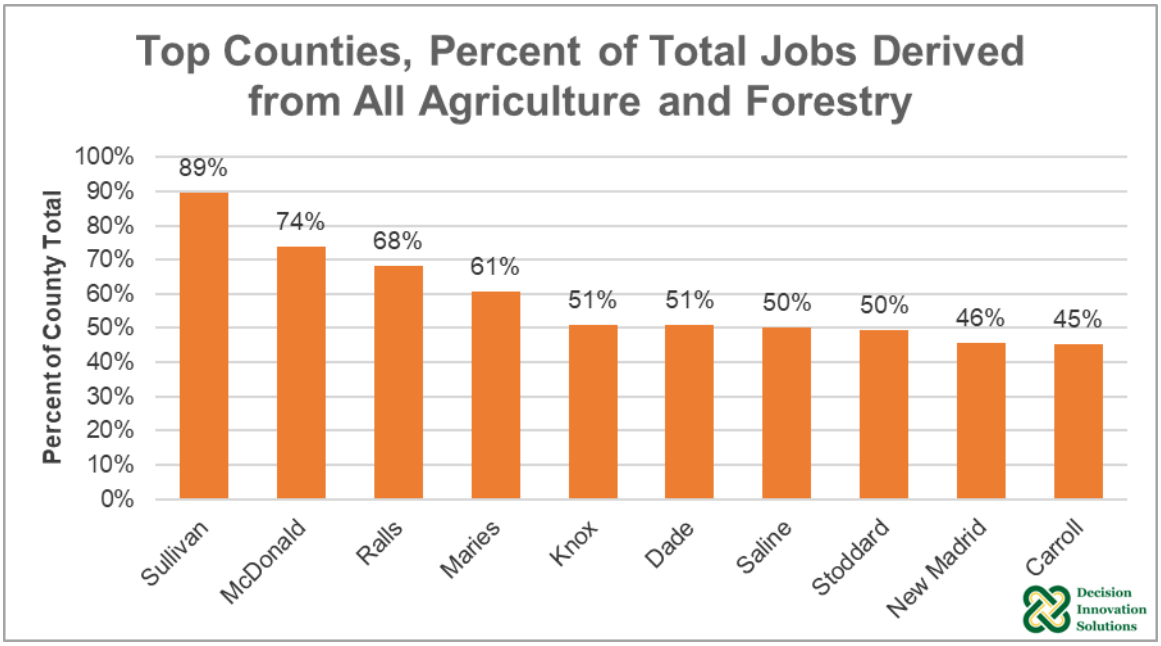


Figure 60, Top 10 Counties, Percent of Total Jobs from Agriculture and Forestry

Figure 61 summarizes a more complete picture of the presence of agriculture, forestry, and related industries in Missouri at the county level. As shown, there are 82 counties that derive more than 20% of their local jobs from agriculture, forestry, and related industries. At the state level, 12% of jobs are derived from these industries.

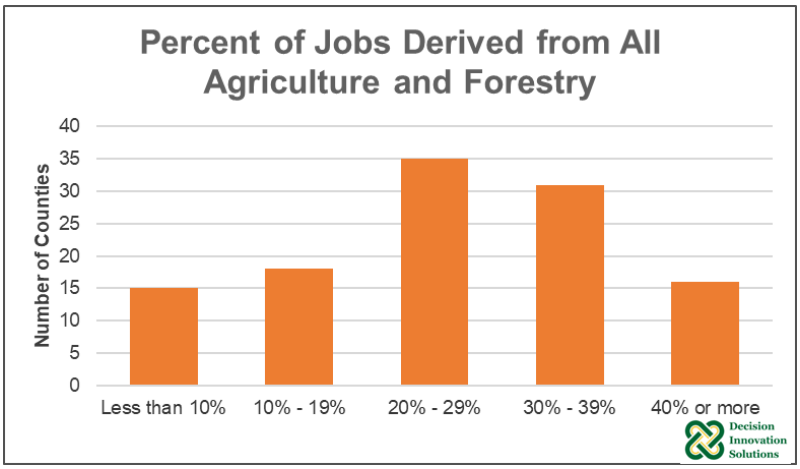


Figure 61, Percent of Jobs from Agriculture and Forestry

Figure 62 shows the total number of jobs derived from agriculture, forestry, and related industries for each of Missouri's counties. On a percentage basis, the total jobs derived from these industries for each of Missouri's counties are shown in Figure 63. See section 8.2 for detailed county jobs maps for crops, livestock, other agriculture, and forestry.

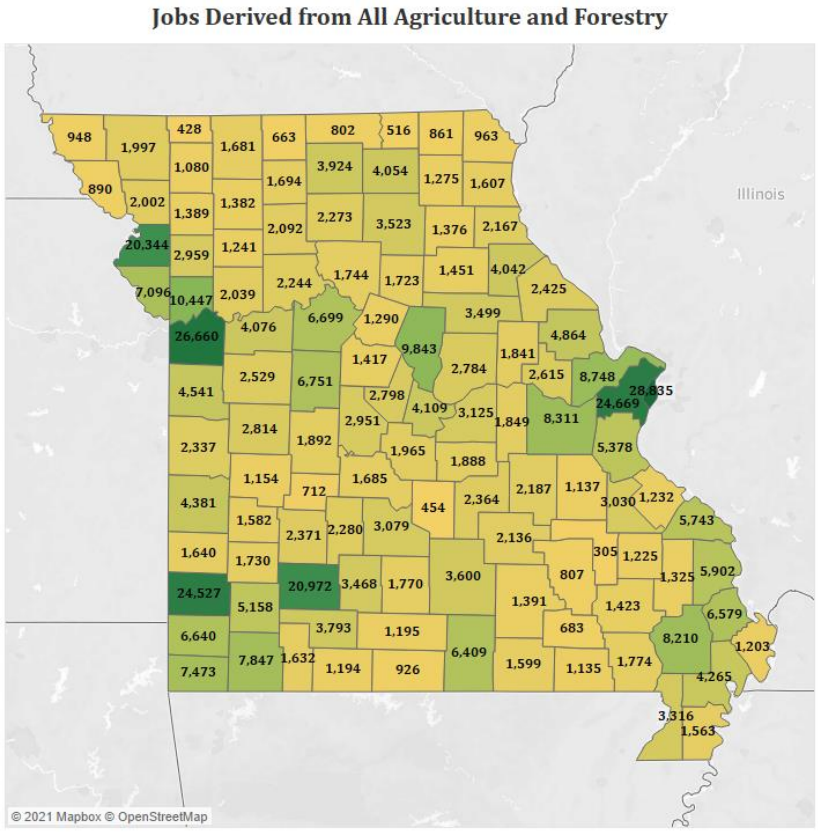


Figure 62, Jobs Derived from All Agriculture and Forestry (by County)

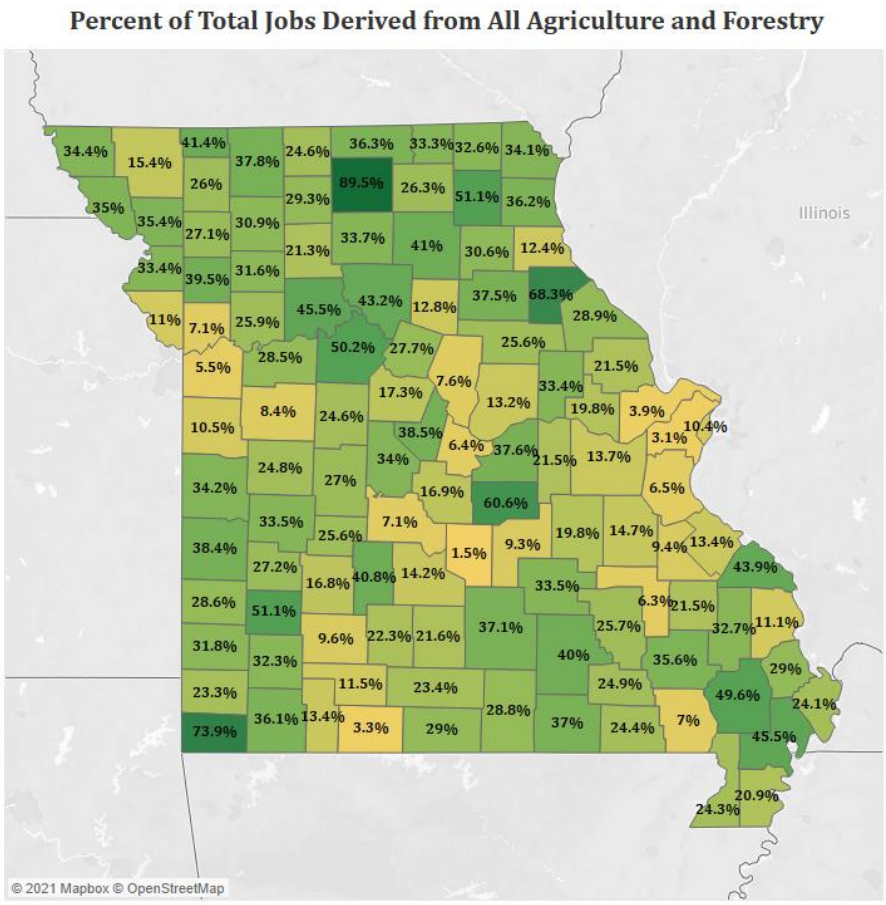


Figure 63, Percent of Total Jobs Derived from All Agriculture and Forestry (by County)

4.3.3 County Output

Figure 64 shows the top 10 counties in terms of output from agriculture, forestry, and related industries. The City of St. Louis has the highest output contribution from these industries with $11.1 billion.

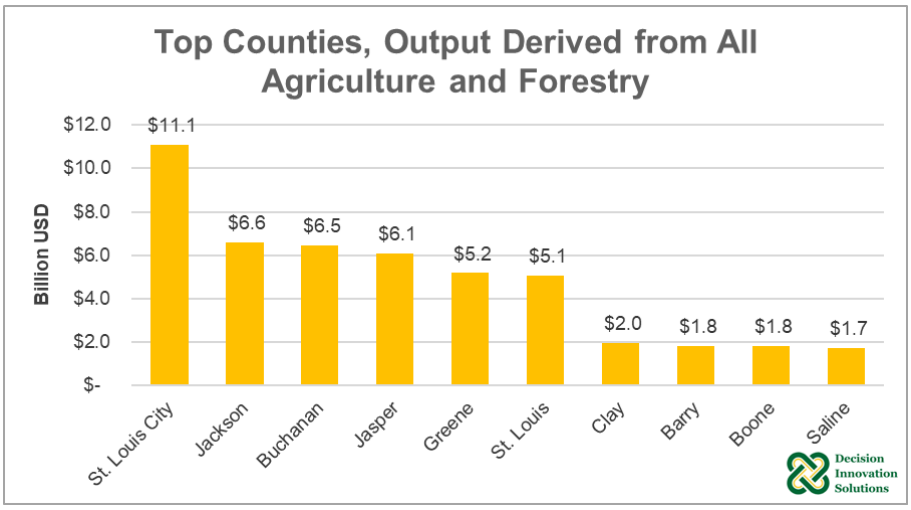


Figure 64, Top 10 Counties, Output from Agriculture and Forestry

Figure 65 shows the counties that most heavily rely on agriculture, forestry, and related industries. As a portion of their county output, Sullivan, Ralls, and McDonald counties all derive more than 80% of their output from agriculture and forestry, while all counties in the top 10 derive at least a majority of their output from these industries.

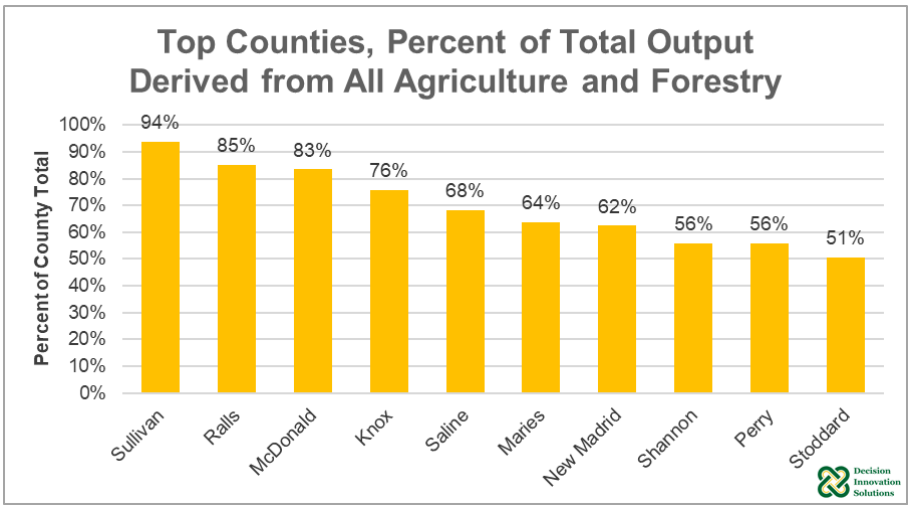


Figure 65, Top 10 Counties, Percent of Total Output from Agriculture and Forestry

Figure 66 shows the amount of output derived from agriculture, forestry, and related industries for each of Missouri's counties. The percent of each county's total output that is derived from agriculture, forestry, and related industries is shown in Figure 67.

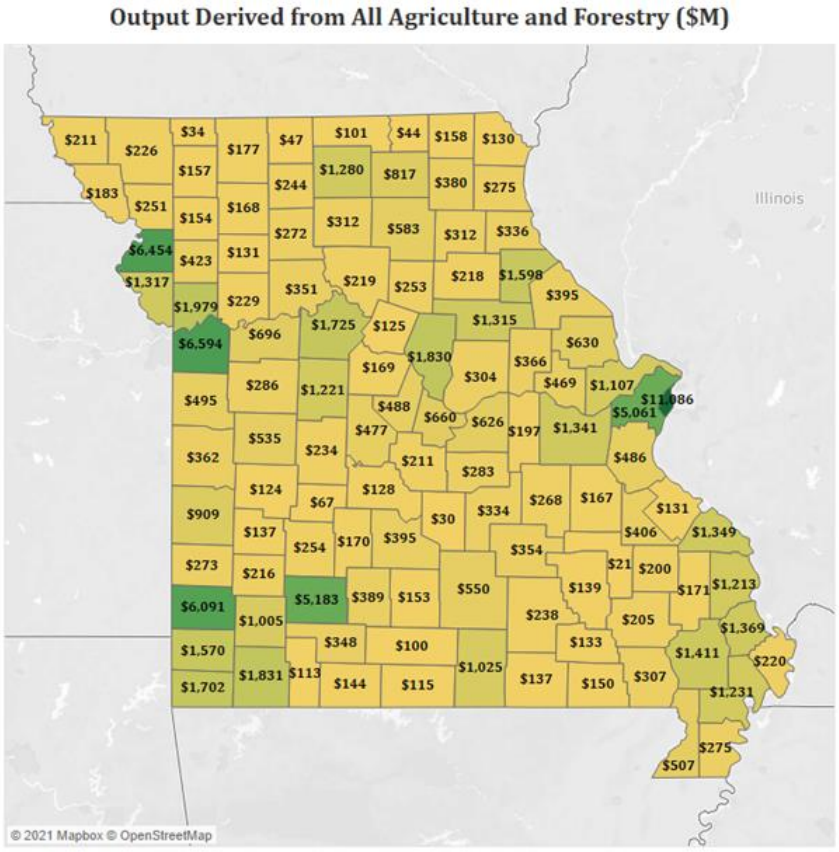


Figure 66, Output from Agriculture and Forestry (by County) ($M)

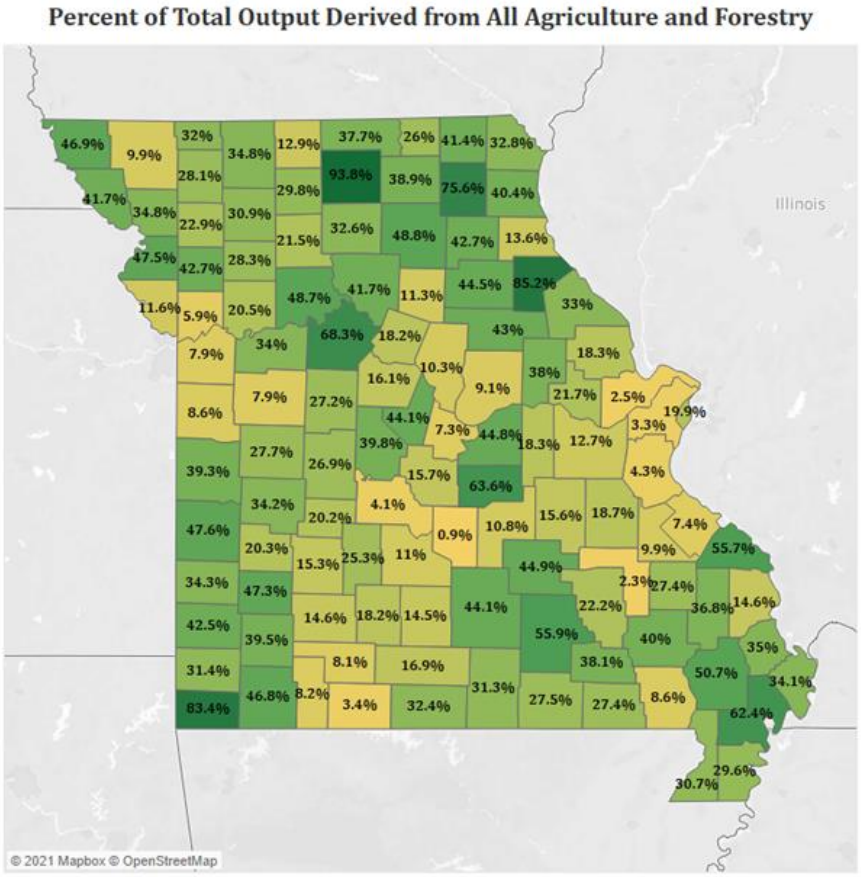


Figure 67, Percent of Total Output from Agriculture and Forestry (by County)

4.3.4 County Household Income

Figure 68 details the top 10 counties in terms of household income derived from agriculture, forestry, and related industries. The City of St. Louis and Jasper, St. Louis, and Jackson counties all have a household income contribution of more than $2 billion from these industries. All counties in the top 10 had a household income contribution of more than $600 million.

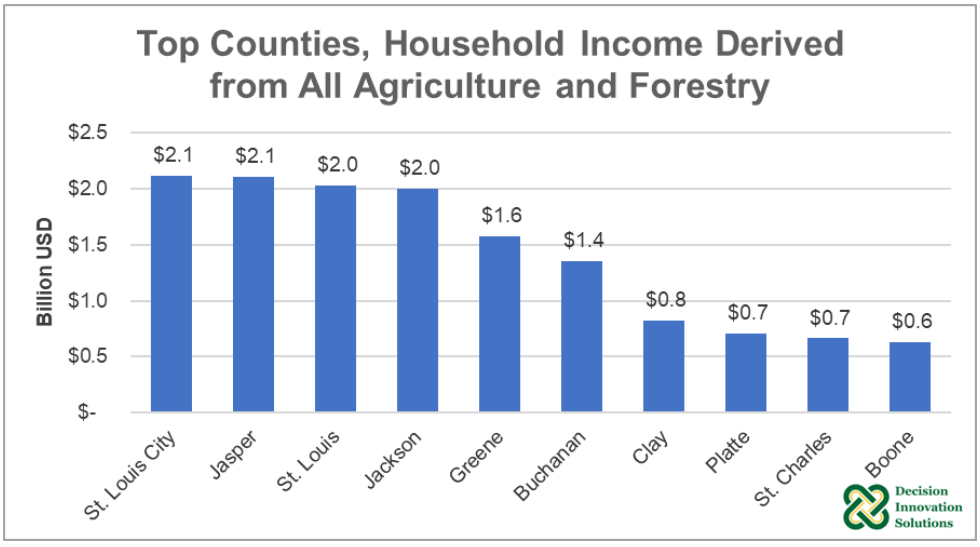


Figure 68, Top 10 Counties, Household Income from Agriculture and Forestry

Figure 69 depicts the ten counties that derive the greatest share of their household income from agriculture, forestry, and related industries. Sullivan (90%), McDonald (71%), Ralls (65%), Saline (52%), and New Madrid (50%) counties all derive a majority of their household income from agriculture and forestry, while the remaining counties in the top 10 all derive at least 40% from these industries.

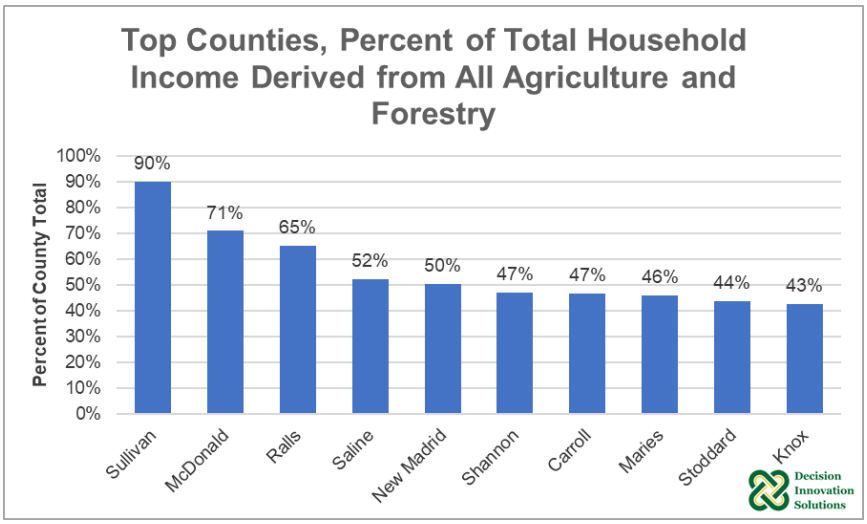


Figure 69, Top 10 Counties, Percent of Total Household Income from Agriculture and Forestry

Figure 70 shows the amount of household income derived from agriculture, forestry, and related industries for each of Missouri's counties. The percent of each county's total household income that is derived from agriculture, forestry, and related industries is shown in Figure 71.

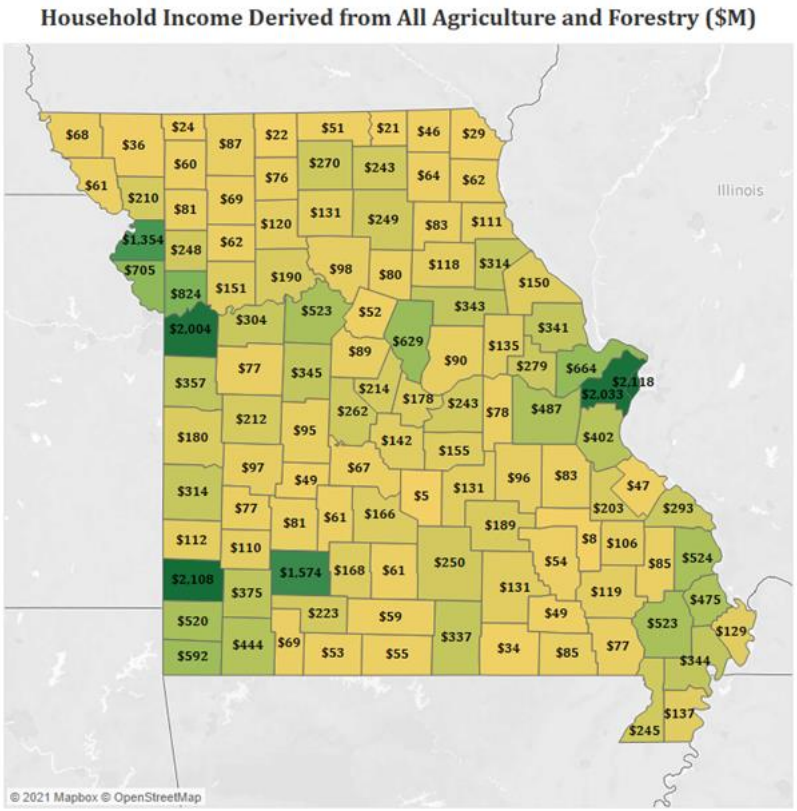


Figure 70, Household Income from Agriculture and Forestry (by County) ($M)

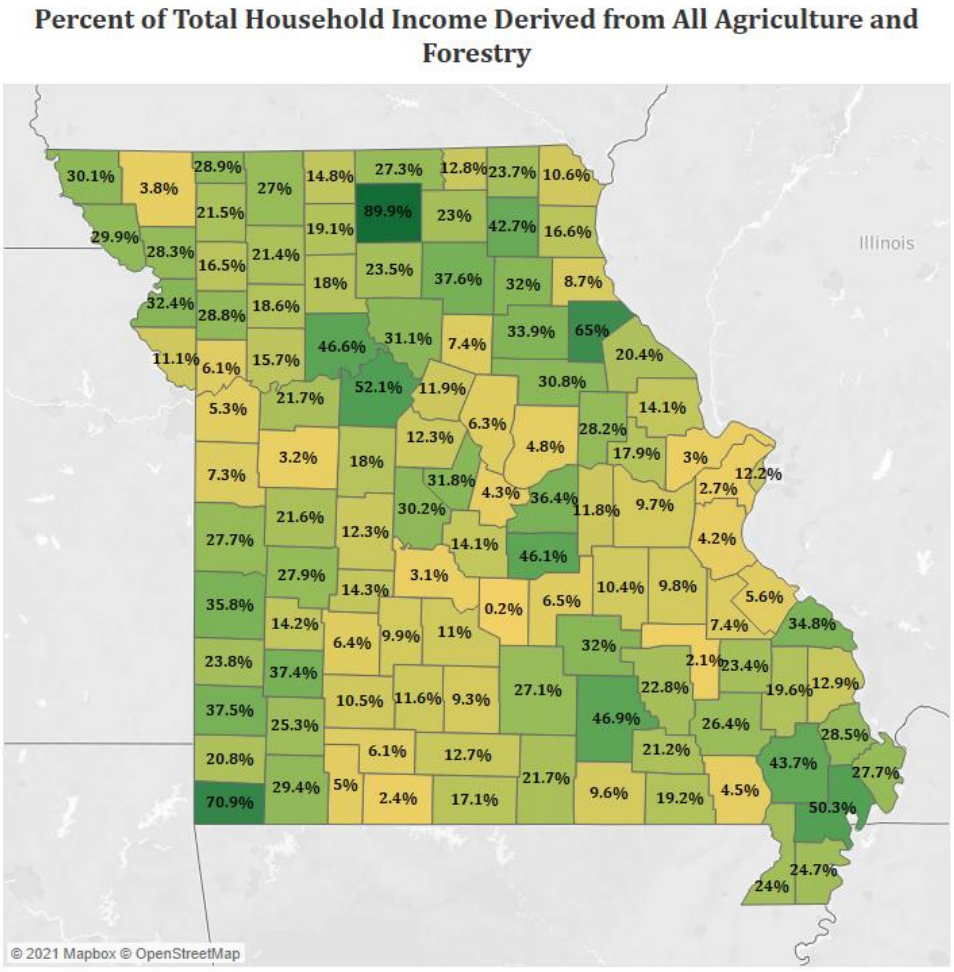


Figure 71, Percent of Total Household Income from Agriculture and Forestry (by County)

4.4 Congressional District Results

The results of this study also show the importance of agriculture, forestry, and related industries for each of Missouri's eight federal congressional districts.

4.4.1 Congressional District Value Added

Total value added contributed by agriculture, forestry, and related industries ranges from $1.8 billion in the 2nd Congressional District to $7.2 billion in the 6th (Figure 72). As a percent of the district's total, value added contribution ranges from 3.5% in the 2nd Congressional District to 20.2% in the 8th (Figure 73). For detailed value-added maps at the congressional district level for crops, livestock, other agriculture, and forestry, see Section 8.3.

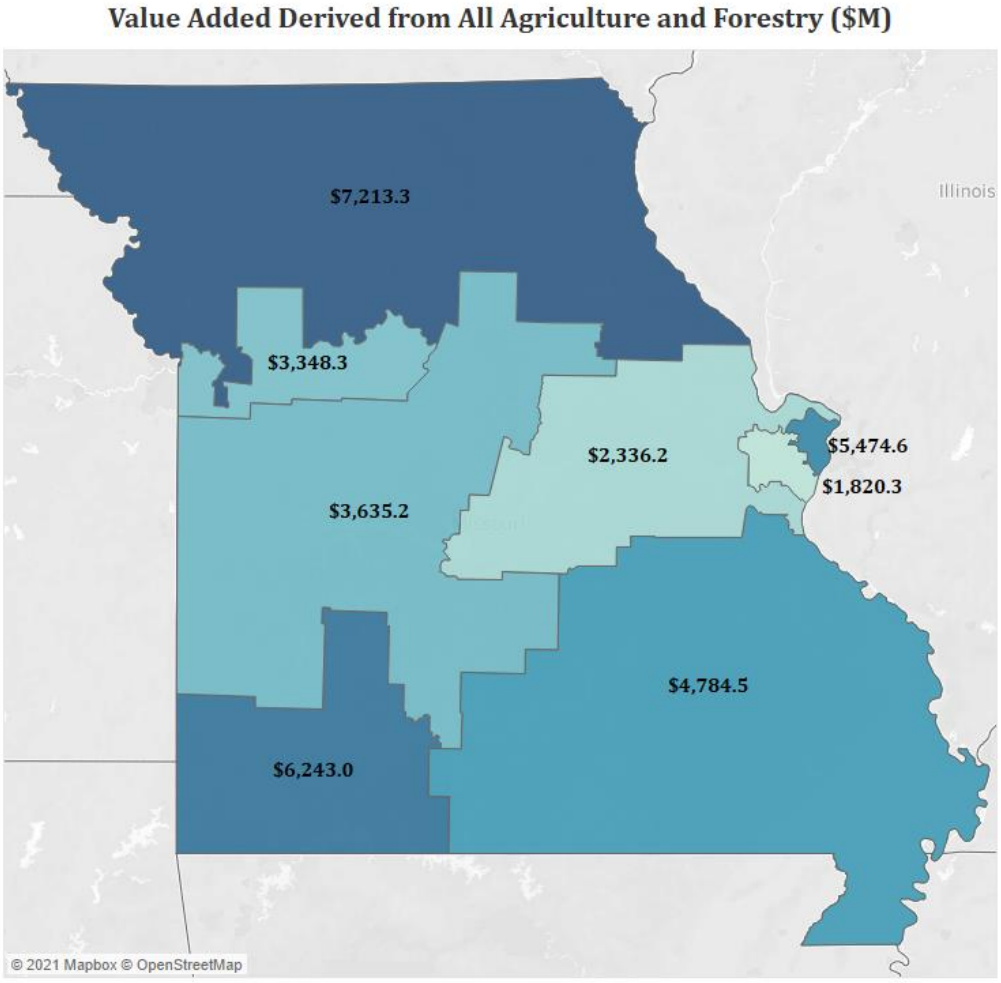


Figure 72, Value Added Derived from All Agriculture and Forestry (by Congressional District) ($M)

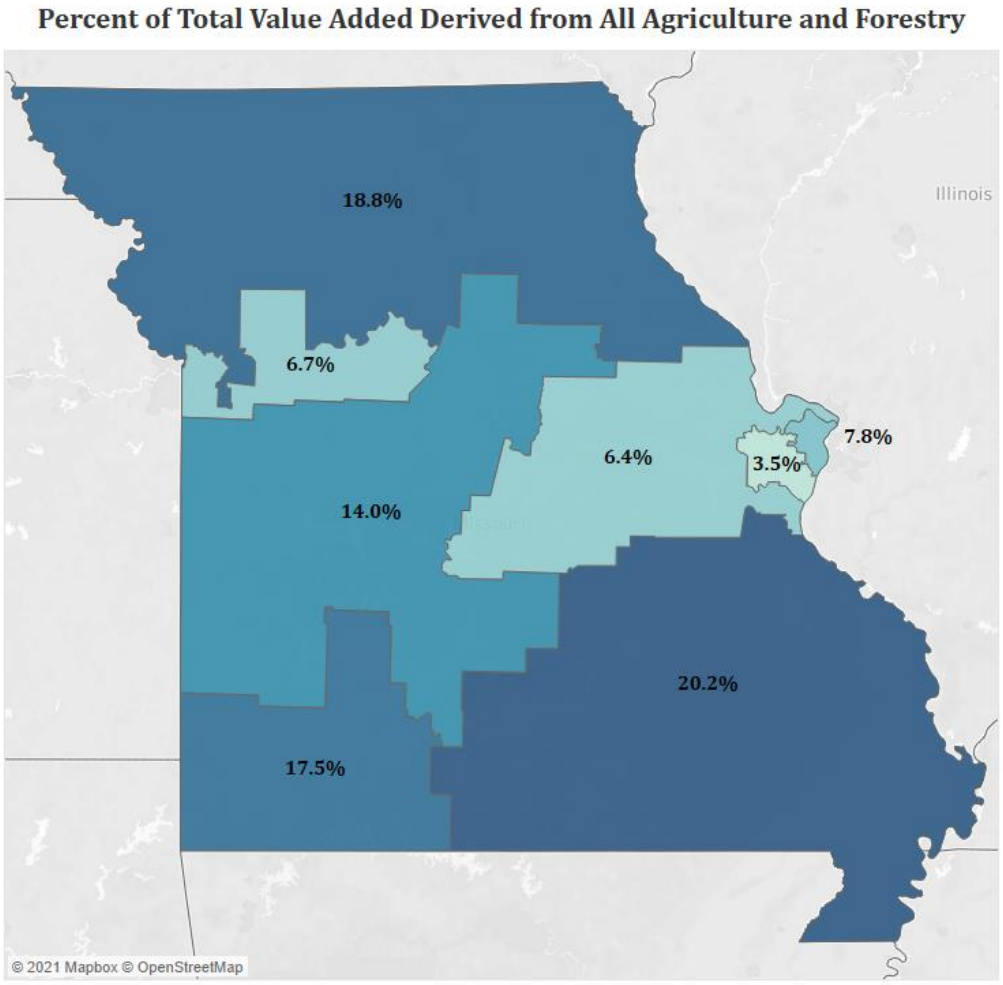


Figure 73, Percent of Total Value Added Derived from All Agriculture and Forestry (by Congressional District)

4.4.2 Congressional District Jobs

Half of Missouri's eight congressional districts derive more than 15% of their total jobs from agriculture, forestry, and related industries, while the other half all derive less than 10% (Figure 75). Figure 74 shows the total jobs contribution from these aggregated industries in each district. The 2nd Congressional District is again the lowest with a jobs contribution of 19,287. The 6th Congressional District has the greatest jobs contribution with 96,297. See Section 8.4 for detailed congressional district jobs maps for crops, livestock, other agriculture, and forestry.

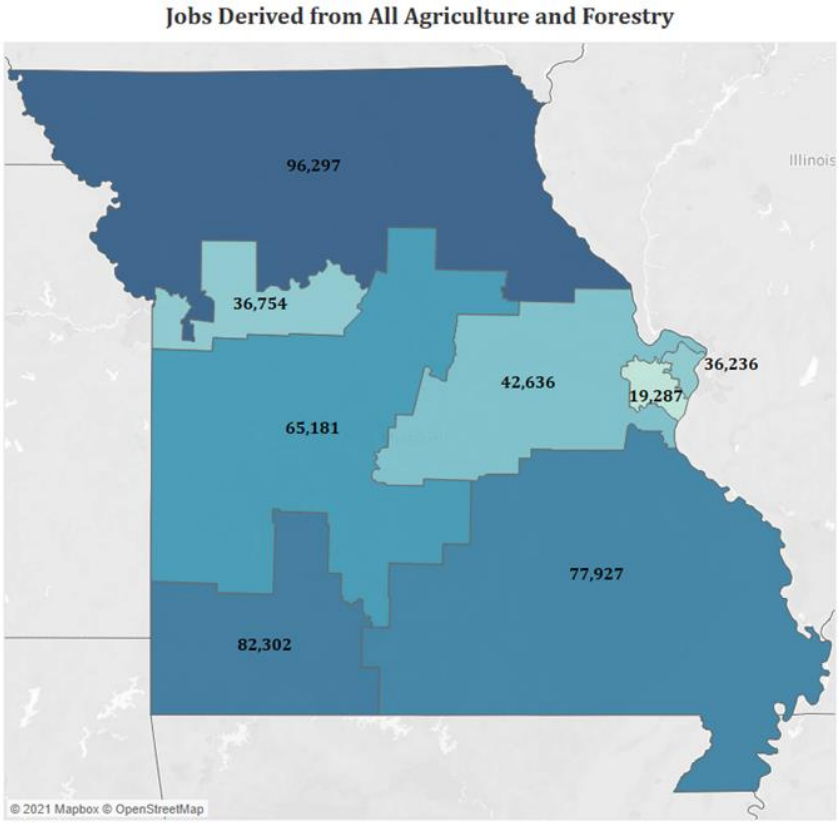


Figure 74, Jobs Derived from All Agriculture and Forestry (by Congressional District)

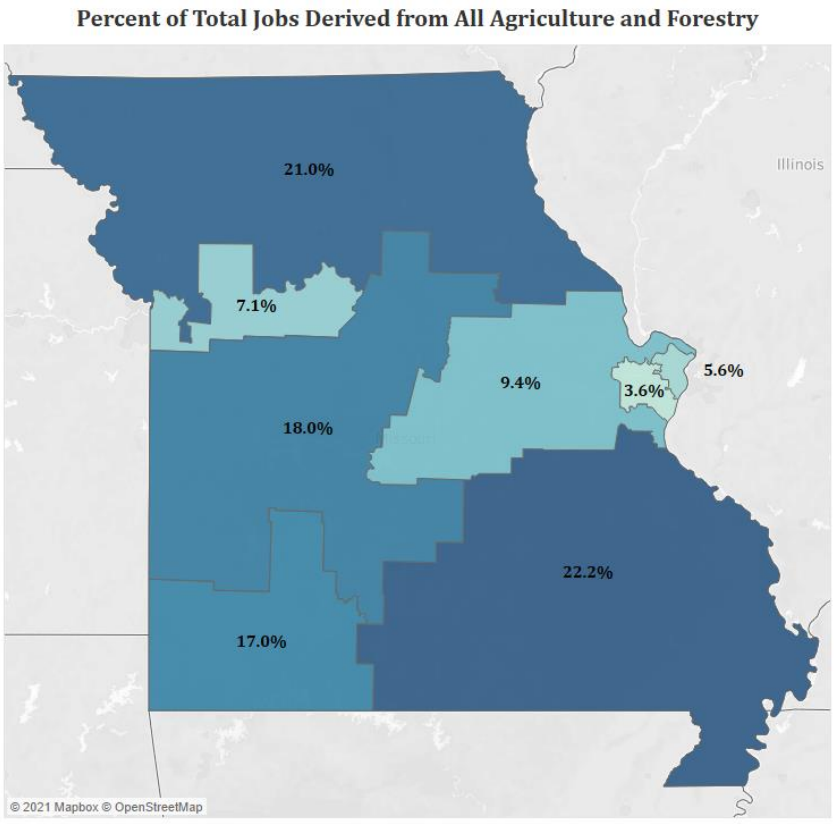


Figure 75, Percent of Total Jobs Derived from All Agriculture and Forestry (by Congressional District)

5 Looking Ahead

5.1 COVID-19

Like all other states in the United States, the COVID-19 pandemic has impacted Missouri; agriculture, agri-food and forestry industries were not spared. For example, during the height of the pandemic, large meat processing plants in Missouri were impacted because of COVID-19, causing disruptions in supply chains. Many pork producers struggled to market their hogs, and some were forced to euthanize hogs that could not be harvested. Despite being nearly two years into the beginnings of the pandemic, there remains a great deal of economic uncertainty. Some possible risk-mitigation strategies for strengthening agriculture, agri-food and forestry include in the State of Missouri:

- Insulating the food chain from interruptions by creating more redundancy on the supply side
- Increased support for local processing alternatives to large plants
- Assessing agri-food product markets to build redundancy on the demand side
- Expansion of rural broadband, enabling some farm-based workers to work remotely

5.2 Labor Availability

As the effects of the pandemic persist, labor issues, particularly with regard to labor availability, continue to intensify. Some of the leading causes of limited access to labor include:

- Many aspects of agriculture cannot be done remotely, and many functions are sensitive to timing (i.e., cows need milked at certain times of day). Providing an option to employees to work remote or a flexible schedule is not a practical option.
- Willingness to work in closely confined working conditions, such as in packing plants, is a challenge due to the transmissibility of viruses such as COVID-19.
- While some of the labor issues in agriculture and related industries can be alleviated through automation, there are some jobs that are difficult to automate.
- With regard to production agriculture, many legal agricultural workers (i.e., H2A) went back to their native country in the early stages of the pandemic. Travel restrictions and/or evolving economic conditions on many countries are making it difficult for Missouri agriculture regain this element of the pre-pandemic workforce.
- With the Missouri unemployment rate essentially at “full employment” the labor pool is extremely tight[12].
- Reduced U.S. labor force participation rate substantially decreased with the pandemic and its recovery is very anemic[13]. A few reasons for this include:
    - Early retirements
    - Automation
    - Drug addiction
    - Childcare

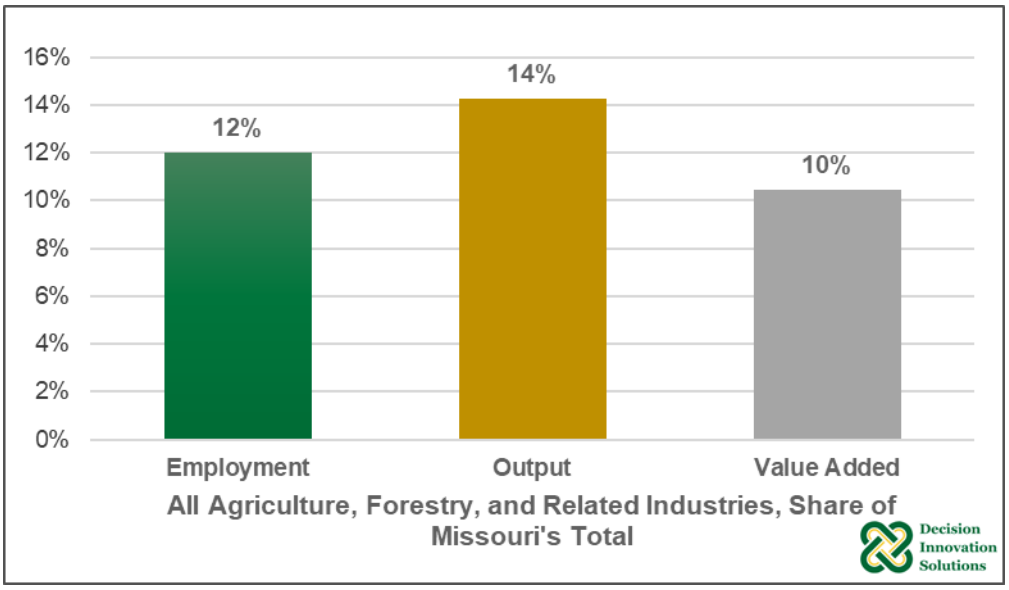
[12] https://meric.mo.gov/missouri-monthly-jobs-report
[13] https://www.bloomberg.com/news/features/2021-08-05/why-is-u-s-labor-force-shrinking-retirement-boom-opioid-crisis-child-care

6 Conclusions

The agriculture, agri-food, forestry, and related industries in Missouri have a significant impact on Missouri's economy. These industries are important to Missouri, with about 12% of the jobs, 14% of output and 10% of value added being derived from the studied industries.

In addition to having an impact on the state as a whole, agriculture, agri-food, forestry, and related industries impact each county in the state. For example, the percentage of jobs derived from impacted industries in Missouri's counties range from 2%-89%. Counties located in the metropolitan parts of Missouri are composed of large numbers of jobs and value-added activity that is supported by impacted industries in those counties. While the actual number of jobs attributed to agriculture, forestry and related industries can be substantially higher in more urban counties than their rural counterparts, the share of the total jobs derived from agriculture, forestry and related industries tends to be lower in urban than in rural counties.

The studied industries have faced some significant challenges recently. These challenges have been related to market and logistics disruptions, as well as with the lingering effects of COVID-19. However, the response and willingness to adapt shows the resilience and long-term sustainability of these sectors. Missouri's agriculture, forestry, and related industries are very diverse which can be seen in the many supporting partners that commissioned this study. Using this diverse group of perspectives, many issues facing these industries can be addressed with future collaboration and analyses.



7 Appendix A, IMPLAN Aggregation Scheme

7.1 All Industries Aggregation Scheme

IMPLAN Code	IMPLAN Description	Aggregation Name
1	Oilseed farming	Crops
2	Grain farming	Crops
3	Vegetable and melon farming	Crops
4	Fruit farming	Crops
5	Tree nut farming	Crops
6	Greenhouse, nursery, and floriculture production	Crops
7	Tobacco farming	Crops
8	Cotton farming	Crops
9	Sugarcane and sugar beet farming	Crops
10	All other crop farming	Crops
11	Beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming	Livestock
12	Dairy cattle and milk production	Livestock
13	Poultry and egg production	Livestock
14	Animal production, except cattle and poultry and eggs	Livestock
15	Forestry, forest products, and timber tract production	Forestry
16	Commercial logging	Forestry
17	Commercial fishing	Livestock
18	Commercial hunting and trapping	Livestock
19	Support activities for agriculture and forestry	Other Ag
20	Oil and gas extraction	Mining
21	Coal mining	Mining
22	Copper, nickel, lead, and zinc mining	Mining
23	Iron ore mining	Mining
24	Gold ore mining	Mining
25	Silver ore mining	Mining
26	Uranium-radium-vanadium ore mining	Mining
27	Other metal ore mining	Mining
28	Stone mining and quarrying	Mining
29	Sand and gravel mining	Mining
30	Other clay, ceramic, refractory minerals mining	Mining
31	Potash, soda, and borate mineral mining	Other Ag
32	Phosphate rock mining	Other Ag
33	Other chemical and fertilizer mineral mining	Other Ag
34	Other nonmetallic minerals	Mining
35	Drilling oil and gas wells	Mining
36	Support activities for oil and gas operations	Mining
37	Metal mining services	Mining
38	Other nonmetallic minerals services	Mining
39	Electric power generation - Hydroelectric	Utilities
40	Electric power generation - Fossil fuel	Utilities
41	Electric power generation - Nuclear	Utilities
42	Electric power generation - Solar	Utilities
43	Electric power generation - Wind	Utilities
44	Electric power generation - Geothermal	Utilities
45	Electric power generation - Biomass	Utilities
46	Electric power generation - All other	Utilities
47	Electric power transmission and distribution	Utilities
48	Natural gas distribution	Utilities
49	Water, sewage and other systems	Utilities
50	Construction of new health care structures	Construction
51	Construction of new manufacturing structures	Construction
52	Construction of new power and communication structures	Construction
53	Construction of new educational and vocational structures	Construction
54	Construction of new highways and streets	Construction
55	Construction of new commercial structures, including farm structures	Construction
56	Construction of other new nonresidential structures	Construction
57	Construction of new single-family residential structures	Construction
58	Construction of new multifamily residential structures	Construction
59	Construction of other new residential structures	Construction
60	Maintenance and repair construction of nonresidential structures	Construction

IMPLAN Code	IMPLAN Description	Aggregation Name
61	Maintenance and repair construction of residential structures	Construction
62	Maintenance and repair construction of highways, streets, bridges, and tunnels	Construction
63	Dog and cat food manufacturing	Other Ag
64	Other animal food manufacturing	Other Ag
65	Flour milling	Crops
66	Rice milling	Crops
67	Malt manufacturing	Crops
68	Wet corn milling	Crops
69	Soybean and other oilseed processing	Crops
70	Fats and oils refining and blending	Other Ag
71	Breakfast cereal manufacturing	Crops
72	Beet sugar manufacturing	Crops
73	Sugar cane mills and refining	Crops
74	Nonchocolate confectionery manufacturing	Other Ag
75	Chocolate and confectionery manufacturing from cacao beans	Other Ag
76	Confectionery manufacturing from purchased chocolate	Other Ag
77	Frozen fruits, juices and vegetables manufacturing	Other Ag
78	Frozen specialties manufacturing	Other Ag
79	Canned fruits and vegetables manufacturing	Crops
80	Canned specialties	Crops
81	Dehydrated food products manufacturing	Other Ag
82	Cheese manufacturing	Livestock
83	Dry, condensed, and evaporated dairy product manufacturing	Livestock
84	Fluid milk manufacturing	Livestock
85	Creamery butter manufacturing	Livestock
86	Ice cream and frozen dessert manufacturing	Livestock
87	Frozen cakes and other pastries manufacturing	Other Ag
88	Poultry processing	Livestock
89	Animal, except poultry, slaughtering	Livestock
90	Meat processed from carcasses	Livestock
91	Rendering and meat byproduct processing	Livestock
92	Seafood product preparation and packaging	Livestock
93	Bread and bakery product, except frozen, manufacturing	Other Ag
94	Cookie and cracker manufacturing	Other Ag
95	Dry pasta, mixes, and dough manufacturing	Other Ag
96	Tortilla manufacturing	Other Ag
97	Roasted nuts and peanut butter manufacturing	Other Ag
98	Other snack food manufacturing	Other Ag
99	Coffee and tea manufacturing	Other Ag
100	Flavoring syrup and concentrate manufacturing	Other Ag
101	Mayonnaise, dressing, and sauce manufacturing	Other Ag
102	Spice and extract manufacturing	Other Ag
103	All other food manufacturing	Other Ag
104	Bottled and canned soft drinks & water	Other Ag
105	Manufactured ice	Other Ag
106	Breweries	Other Ag
107	Wineries	Other Ag
108	Distilleries	Other Ag
109	Tobacco product manufacturing	Other Ag
110	Fiber, yarn, and thread mills	Manfacturing
111	Broadwoven fabric mills	Manfacturing
112	Narrow fabric mills and schiffli machine embroidery	Manfacturing
113	Nonwoven fabric mills	Manfacturing
114	Knit fabric mills	Manfacturing
115	Textile and fabric finishing mills	Manfacturing
116	Fabric coating mills	Manfacturing
117	Carpet and rug mills	Manfacturing
118	Curtain and linen mills	Manfacturing
119	Textile bag and canvas mills	Manfacturing
120	Rope, cordage, twine, tire cord and tire fabric mills	Manfacturing
121	Other textile product mills	Manfacturing
122	Hosiery and sock mills	Manfacturing
123	Other apparel knitting mills	Manfacturing
124	Cut and sew apparel contractors	Manfacturing
125	Men's and boys' cut and sew apparel manufacturing	Manfacturing
126	Women's and girls' cut and sew apparel manufacturing	Manfacturing
127	Other cut and sew apparel manufacturing	Manfacturing
128	Apparel accessories and other apparel manufacturing	Manfacturing
129	Leather and hide tanning and finishing	Manfacturing
130	Footwear manufacturing	Manfacturing

IMPLAN Code	IMPLAN Description	Aggregation Name
131	Other leather and allied product manufacturing	Manfacturing
132	Sawmills	Forestry
133	Wood preservation	Forestry
134	Veneer and plywood manufacturing	Forestry
135	Engineered wood member and truss manufacturing	Forestry
136	Reconstituted wood product manufacturing	Forestry
137	Wood windows and door manufacturing	Forestry
138	Cut stock, resawing lumber, and planing	Forestry
139	Other millwork, including flooring	Forestry
140	Wood container and pallet manufacturing	Forestry
141	Manufactured home (mobile home) manufacturing	Manfacturing
142	Prefabricated wood building manufacturing	Forestry
143	All other miscellaneous wood product manufacturing	Forestry
144	Pulp mills	Forestry
145	Paper mills	Forestry
146	Paperboard mills	Forestry
147	Paperboard container manufacturing	Forestry
148	Paper bag and coated and treated paper manufacturing	Forestry
149	Stationery product manufacturing	Forestry
150	Sanitary paper product manufacturing	Forestry
151	All other converted paper product manufacturing	Forestry
152	Printing	Services
153	Support activities for printing	Services
154	Petroleum refineries	Manfacturing
155	Asphalt paving mixture and block manufacturing	Manfacturing
156	Asphalt shingle and coating materials manufacturing	Manfacturing
157	Petroleum lubricating oil and grease manufacturing	Manfacturing
158	All other petroleum and coal products manufacturing	Manfacturing
159	Petrochemical manufacturing	Manfacturing
160	Industrial gas manufacturing	Manfacturing
161	Synthetic dye and pigment manufacturing	Manfacturing
162	Other basic inorganic chemical manufacturing	Manfacturing
163	Other basic organic chemical manufacturing	Other Ag
164	Plastics material and resin manufacturing	Manfacturing
165	Synthetic rubber manufacturing	Manfacturing
166	Artificial and synthetic fibers and filaments manufacturing	Manfacturing
167	Nitrogenous fertilizer manufacturing	Other Ag
168	Phosphatic fertilizer manufacturing	Other Ag
169	Fertilizer mixing	Other Ag
170	Pesticide and other agricultural chemical manufacturing	Other Ag
171	Medicinal and botanical manufacturing	Manfacturing
172	Pharmaceutical preparation manufacturing	Manfacturing
173	In-vitro diagnostic substance manufacturing	Manfacturing
174	Biological product (except diagnostic) manufacturing	Manfacturing
175	Paint and coating manufacturing	Manfacturing
176	Adhesive manufacturing	Manfacturing
177	Soap and other detergent manufacturing	Manfacturing
178	Polish and other sanitation good manufacturing	Manfacturing
179	Surface active agent manufacturing	Manfacturing
180	Toilet preparation manufacturing	Manfacturing
181	Printing ink manufacturing	Manfacturing
182	Explosives manufacturing	Manfacturing
183	Custom compounding of purchased resins	Manfacturing
184	Photographic film and chemical manufacturing	Manfacturing
185	Other miscellaneous chemical product manufacturing	Manfacturing
186	Plastics packaging materials and unlaminated film and sheet manufacturing	Manfacturing
187	Unlaminated plastics profile shape manufacturing	Manfacturing
188	Plastics pipe and pipe fitting manufacturing	Manfacturing
189	Laminated plastics plate, sheet (except packaging), and shape manufacturing	Manfacturing
190	Polystyrene foam product manufacturing	Manfacturing
191	Urethane and other foam product (except polystyrene) manufacturing	Manfacturing
192	Plastics bottle manufacturing	Manfacturing
193	Other plastics product manufacturing	Manfacturing
194	Tire manufacturing	Manfacturing
195	Rubber and plastics hoses and belting manufacturing	Manfacturing
196	Other rubber product manufacturing	Manfacturing
197	Pottery, ceramics, and plumbing fixture manufacturing	Manfacturing
198	Brick, tile, and other structural clay product manufacturing	Manfacturing
199	Flat glass manufacturing	Manfacturing
200	Other pressed and blown glass and glassware manufacturing	Manfacturing

IMPLAN Code	IMPLAN Description	Aggregation Name
201	Glass container manufacturing	Manfacturing
202	Glass product manufacturing made of purchased glass	Manfacturing
203	Cement manufacturing	Manfacturing
204	Ready-mix concrete manufacturing	Manfacturing
205	Concrete block and brick manufacturing	Manfacturing
206	Concrete pipe manufacturing	Manfacturing
207	Other concrete product manufacturing	Manfacturing
208	Lime manufacturing	Manfacturing
209	Gypsum product manufacturing	Manfacturing
210	Abrasive product manufacturing	Manfacturing
211	Cut stone and stone product manufacturing	Manfacturing
212	Ground or treated mineral and earth manufacturing	Manfacturing
213	Mineral wool manufacturing	Manfacturing
214	Miscellaneous nonmetallic mineral products manufacturing	Manfacturing
215	Iron and steel mills and ferroalloy manufacturing	Manfacturing
216	Iron, steel pipe and tube manufacturing from purchased steel	Manfacturing
217	Rolled steel shape manufacturing	Manfacturing
218	Steel wire drawing	Manfacturing
219	Alumina refining and primary aluminum production	Manfacturing
220	Secondary smelting and alloying of aluminum	Manfacturing
221	Aluminum sheet, plate, and foil manufacturing	Manfacturing
222	Other aluminum rolling, drawing and extruding	Manfacturing
223	Nonferrous metal (exc aluminum) smelting and refining	Manfacturing
224	Copper rolling, drawing, extruding and alloying	Manfacturing
225	Nonferrous metal, except copper and aluminum, shaping	Manfacturing
226	Secondary processing of other nonferrous metals	Manfacturing
227	Ferrous metal foundries	Manfacturing
228	Nonferrous metal foundries	Manfacturing
229	Custom roll forming	Manfacturing
230	Crown and closure manufacturing and metal stamping	Manfacturing
231	Iron and steel forging	Manfacturing
232	Nonferrous forging	Manfacturing
233	Cutlery, utensil, pot, and pan manufacturing	Manfacturing
234	Handtool manufacturing	Manfacturing
235	Prefabricated metal buildings and components manufacturing	Manfacturing
236	Fabricated structural metal manufacturing	Manfacturing
237	Plate work manufacturing	Manfacturing
238	Metal window and door manufacturing	Manfacturing
239	Sheet metal work manufacturing	Manfacturing
240	Ornamental and architectural metal work manufacturing	Manfacturing
241	Power boiler and heat exchanger manufacturing	Manfacturing
242	Metal tank (heavy gauge) manufacturing	Manfacturing
243	Metal cans manufacturing	Manfacturing
244	Metal barrels, drums and pails manufacturing	Manfacturing
245	Hardware manufacturing	Manfacturing
246	Spring and wire product manufacturing	Manfacturing
247	Machine shops	Manfacturing
248	Turned product and screw, nut, and bolt manufacturing	Manfacturing
249	Metal heat treating	Manfacturing
250	Metal coating and nonprecious engraving	Manfacturing
251	Electroplating, anodizing, and coloring metal	Manfacturing
252	Valve and fittings, other than plumbing, manufacturing	Manfacturing
253	Plumbing fixture fitting and trim manufacturing	Manfacturing
254	Ball and roller bearing manufacturing	Manfacturing
255	Small arms ammunition manufacturing	Manfacturing
256	Ammunition, except for small arms, manufacturing	Manfacturing
257	Small arms, ordnance, and accessories manufacturing	Manfacturing
258	Fabricated pipe and pipe fitting manufacturing	Manfacturing
259	Other fabricated metal manufacturing	Manfacturing
260	Farm machinery and equipment manufacturing	Other Ag
261	Lawn and garden equipment manufacturing	Other Ag
262	Construction machinery manufacturing	Manfacturing
263	Mining machinery and equipment manufacturing	Manfacturing
264	Oil and gas field machinery and equipment manufacturing	Manfacturing
265	Semiconductor machinery manufacturing	Manfacturing
266	Food product machinery manufacturing	Other Ag
267	Sawmill, woodworking, and paper machinery	Forestry
268	Printing machinery and equipment manufacturing	Manfacturing
269	All other industrial machinery manufacturing	Manfacturing
270	Optical instrument and lens manufacturing	Manfacturing

IMPLAN Code	IMPLAN Description	Aggregation Name
271	Photographic and photocopying equipment manufacturing	Manfacturing
272	Other commercial service industry machinery manufacturing	Manfacturing
273	Air purification and ventilation equipment manufacturing	Manfacturing
274	Heating equipment (except warm air furnaces) manufacturing	Manfacturing
275	Air conditioning, refrigeration, and warm air heating equipment manufacturing	Manfacturing
276	Industrial mold manufacturing	Manfacturing
277	Special tool, die, jig, and fixture manufacturing	Manfacturing
278	Cutting tool and machine tool accessory manufacturing	Manfacturing
279	Machine tool manufacturing	Manfacturing
280	Rolling mill and other metalworking machinery manufacturing	Manfacturing
281	Turbine and turbine generator set units manufacturing	Manfacturing
282	Speed changer, industrial high-speed drive, and gear manufacturing	Manfacturing
283	Mechanical power transmission equipment manufacturing	Manfacturing
284	Other engine equipment manufacturing	Manfacturing
285	Pump and pumping equipment manufacturing	Manfacturing
286	Air and gas compressor manufacturing	Manfacturing
287	Elevator and moving stairway manufacturing	Manfacturing
288	Conveyor and conveying equipment manufacturing	Manfacturing
289	Overhead cranes, hoists, and monorail systems manufacturing	Manfacturing
290	Industrial truck, trailer, and stacker manufacturing	Manfacturing
291	Power-driven handtool manufacturing	Manfacturing
292	Welding and soldering equipment manufacturing	Manfacturing
293	Packaging machinery manufacturing	Manfacturing
294	Industrial process furnace and oven manufacturing	Manfacturing
295	Fluid power cylinder and actuator manufacturing	Manfacturing
296	Fluid power pump and motor manufacturing	Manfacturing
297	Scales, balances, and miscellaneous general purpose machinery manufacturing	Manfacturing
298	Electronic computer manufacturing	Manfacturing
299	Computer storage device manufacturing	Manfacturing
300	Computer terminals and other computer peripheral equipment manufacturing	Manfacturing
301	Telephone apparatus manufacturing	Manfacturing
302	Broadcast and wireless communications equipment manufacturing	Manfacturing
303	Other communications equipment manufacturing	Manfacturing
304	Audio and video equipment manufacturing	Manfacturing
305	Printed circuit assembly (electronic assembly) manufacturing	Manfacturing
306	Bare printed circuit board manufacturing	Manfacturing
307	Semiconductor and related device manufacturing	Manfacturing
308	Capacitor, resistor, coil, transformer, and other inductor manufacturing	Manfacturing
309	Electronic connector manufacturing	Manfacturing
310	Other electronic component manufacturing	Manfacturing
311	Electromedical and electrotherapeutic apparatus manufacturing	Manfacturing
312	Search, detection, and navigation instruments manufacturing	Manfacturing
313	Automatic environmental control manufacturing	Manfacturing
314	Industrial process variable instruments manufacturing	Manfacturing
315	Totalizing fluid meter and counting device manufacturing	Manfacturing
316	Electricity and signal testing instruments manufacturing	Manfacturing
317	Analytical laboratory instrument manufacturing	Manfacturing
318	Irradiation apparatus manufacturing	Manfacturing
319	Watch, clock, and other measuring and controlling device manufacturing	Manfacturing
320	Blank magnetic and optical recording media manufacturing	Manfacturing
321	Software and other prerecorded and record reproducing	Manfacturing
322	Electric lamp bulb and part manufacturing	Manfacturing
323	Lighting fixture manufacturing	Manfacturing
324	Small electrical appliance manufacturing	Manfacturing
325	Household cooking appliance manufacturing	Manfacturing
326	Household refrigerator and home freezer manufacturing	Manfacturing
327	Household laundry equipment manufacturing	Manfacturing
328	Other major household appliance manufacturing	Manfacturing
329	Power, distribution, and specialty transformer manufacturing	Manfacturing
330	Motor and generator manufacturing	Manfacturing
331	Switchgear and switchboard apparatus manufacturing	Manfacturing
332	Relay and industrial control manufacturing	Manfacturing
333	Storage battery manufacturing	Manfacturing
334	Primary battery manufacturing	Manfacturing
335	Fiber optic cable manufacturing	Manfacturing
336	Other communication and energy wire manufacturing	Manfacturing
337	Wiring device manufacturing	Manfacturing
338	Carbon and graphite product manufacturing	Manfacturing
339	All other miscellaneous electrical equipment and component manufacturing	Manfacturing
340	Automobile manufacturing	Manfacturing

IMPLAN Code	IMPLAN Description	Aggregation Name
341	Light truck and utility vehicle manufacturing	Manfacturing
342	Heavy duty truck manufacturing	Manfacturing
343	Motor vehicle body manufacturing	Manfacturing
344	Truck trailer manufacturing	Manfacturing
345	Motor home manufacturing	Manfacturing
346	Travel trailer and camper manufacturing	Manfacturing
347	Motor vehicle gasoline engine and engine parts manufacturing	Manfacturing
348	Motor vehicle electrical and electronic equipment manufacturing	Manfacturing
349	Motor vehicle transmission and power train parts manufacturing	Manfacturing
350	Motor vehicle seating and interior trim manufacturing	Manfacturing
351	Motor vehicle metal stamping	Manfacturing
352	Other motor vehicle parts manufacturing	Manfacturing
353	Motor vehicle steering, suspension component (except spring), and brake systems manufacturin	Manfacturing
354	Aircraft manufacturing	Manfacturing
355	Aircraft engine and engine parts manufacturing	Manfacturing
356	Other aircraft parts and auxiliary equipment manufacturing	Manfacturing
357	Guided missile and space vehicle manufacturing	Manfacturing
358	Propulsion units and parts for space vehicles and guided missiles manufacturing	Manfacturing
359	Railroad rolling stock manufacturing	Manfacturing
360	Ship building and repairing	Manfacturing
361	Boat building	Manfacturing
362	Motorcycle, bicycle, and parts manufacturing	Manfacturing
363	Military armored vehicle, tank, and tank component manufacturing	Manfacturing
364	All other transportation equipment manufacturing	Manfacturing
365	Wood kitchen cabinet and countertop manufacturing	Forestry
366	Upholstered household furniture manufacturing	Manfacturing
367	Nonupholstered wood household furniture manufacturing	Forestry
368	Other household nonupholstered furniture manufacturing	Manfacturing
369	Institutional furniture manufacturing	Manfacturing
370	Wood office furniture manufacturing	Forestry
371	Custom architectural woodwork and millwork	Forestry
372	Office furniture, except wood, manufacturing	Manfacturing
373	Showcase, partition, shelving, and locker manufacturing	Manfacturing
374	Mattress manufacturing	Manfacturing
375	Blind and shade manufacturing	Manfacturing
376	Surgical and medical instrument manufacturing	Manfacturing
377	Surgical appliance and supplies manufacturing	Manfacturing
378	Dental equipment and supplies manufacturing	Manfacturing
379	Ophthalmic goods manufacturing	Manfacturing
380	Dental laboratories	Manfacturing
381	Jewelry and silverware manufacturing	Manfacturing
382	Sporting and athletic goods manufacturing	Manfacturing
383	Doll, toy, and game manufacturing	Manfacturing
384	Office supplies (except paper) manufacturing	Manfacturing
385	Sign manufacturing	Manfacturing
386	Gasket, packing, and sealing device manufacturing	Manfacturing
387	Musical instrument manufacturing	Manfacturing
388	Fasteners, buttons, needles, and pins manufacturing	Manfacturing
389	Broom, brush, and mop manufacturing	Manfacturing
390	Burial casket manufacturing	Manfacturing
391	All other miscellaneous manufacturing	Manfacturing
392	Wholesale - Motor vehicle and motor vehicle parts and supplies	Wholesale
393	Wholesale - Professional and commercial equipment and supplies	Wholesale
394	Wholesale - Household appliances and electrical and electronic goods	Wholesale
395	Wholesale - Machinery, equipment, and supplies	Wholesale
396	Wholesale - Other durable goods merchant wholesalers	Wholesale
397	Wholesale - Drugs and druggists' sundries	Wholesale
398	Wholesale - Grocery and related product wholesalers	Wholesale
399	Wholesale - Petroleum and petroleum products	Wholesale
400	Wholesale - Other nondurable goods merchant wholesalers	Wholesale
401	Wholesale - Wholesale electronic markets and agents and brokers	Wholesale
402	Retail - Motor vehicle and parts dealers	Retail
403	Retail - Furniture and home furnishings stores	Retail
404	Retail - Electronics and appliance stores	Retail
405	Retail - Building material and garden equipment and supplies stores	Retail
406	Retail - Food and beverage stores	Retail
407	Retail - Health and personal care stores	Retail
408	Retail - Gasoline stores	Retail
409	Retail - Clothing and clothing accessories stores	Retail
410	Retail - Sporting goods, hobby, musical instrument and book stores	Retail

IMPLAN Code	IMPLAN Description	Aggregation Name
411	Retail - General merchandise stores	Retail
412	Retail - Miscellaneous store retailers	Retail
413	Retail - Nonstore retailers	Retail
414	Air transportation	Transportation
415	Rail transportation	Transportation
416	Water transportation	Transportation
417	Truck transportation	Transportation
418	Transit and ground passenger transportation	Transportation
419	Pipeline transportation	Transportation
420	Scenic and sightseeing transportation and support activities for transportation	Transportation
421	Couriers and messengers	Transportation
422	Warehousing and storage	Services
423	Newspaper publishers	Information
424	Periodical publishers	Information
425	Book publishers	Information
426	Directory, mailing list, and other publishers	Information
427	Greeting card publishing	Information
428	Software publishers	Information
429	Motion picture and video industries	Entertainment
430	Sound recording industries	Entertainment
431	Radio and television broadcasting	Entertainment
432	Cable and other subscription programming	Entertainment
433	Wired telecommunications carriers	Information
434	Wireless telecommunications carriers (except satellite)	Information
435	Satellite, telecommunications resellers, and all other telecommunications	Information
436	Data processing, hosting, and related services	Information
437	News syndicates, libraries, archives and all other information services	Information
438	Internet publishing and broadcasting and web search portals	Information
439	Nondepository credit intermediation and related activities	Financial
440	Securities and commodity contracts intermediation and brokerage	Financial
441	Monetary authorities and depository credit intermediation	Financial
442	Other financial investment activities	Financial
443	Direct life insurance carriers	Financial
444	Insurance carriers, except direct life	Financial
445	Insurance agencies, brokerages, and related activities	Financial
446	Funds, trusts, and other financial vehicles	Financial
447	Other real estate	Financial
448	Tenant-occupied housing	Government/Remainder
449	Owner-occupied dwellings	Government/Remainder
450	Automotive equipment rental and leasing	Services
451	General and consumer goods rental except video tapes and discs	Services
452	Video tape and disc rental	Entertainment
453	Commercial and industrial machinery and equipment rental and leasing	Services
454	Lessors of nonfinancial intangible assets	Services
455	Legal services	Services
456	Accounting, tax preparation, bookkeeping, and payroll services	Services
457	Architectural, engineering, and related services	Services
458	Specialized design services	Services
459	Custom computer programming services	Services
460	Computer systems design services	Services
461	Other computer related services, including facilities management	Services
462	Management consulting services	Services
463	Environmental and other technical consulting services	Services
464	Scientific research and development services	Services
465	Advertising, public relations, and related services	Services
466	Photographic services	Services
467	Veterinary services	Other Ag
468	Marketing research and all other miscellaneous professional, scientific, and technical services	Services
469	Management of companies and enterprises	Services
470	Office administrative services	Services
471	Facilities support services	Services
472	Employment services	Services
473	Business support services	Services
474	Travel arrangement and reservation services	Services
475	Investigation and security services	Services
476	Services to buildings	Services
477	Landscape and horticultural services	Other Ag
478	Other support services	Services
479	Waste management and remediation services	Services
480	Elementary and secondary schools	Services

IMPLAN Code	IMPLAN Description	Aggregation Name
481	Junior colleges, colleges, universities, and professional schools	Services
482	Other educational services	Services
483	Offices of physicians	Services
484	Offices of dentists	Services
485	Offices of other health practitioners	Services
486	Outpatient care centers	Services
487	Medical and diagnostic laboratories	Services
488	Home health care services	Services
489	Other ambulatory health care services	Services
490	Hospitals	Services
491	Nursing and community care facilities	Services
492	Residential mental retardation, mental health, substance abuse and other facilities	Services
493	Individual and family services	Services
494	Child day care services	Services
495	Community food, housing, and other relief services, including rehabilitation services	Services
496	Performing arts companies	Entertainment
497	Commercial Sports Except Racing	Entertainment
498	Racing and Track Operation	Entertainment
499	Independent artists, writers, and performers	Entertainment
500	Promoters of performing arts and sports and agents for public figures	Entertainment
501	Museums, historical sites, zoos, and parks	Entertainment
502	Amusement parks and arcades	Entertainment
503	Gambling industries (except casino hotels)	Entertainment
504	Other amusement and recreation industries	Entertainment
505	Fitness and recreational sports centers	Entertainment
506	Bowling centers	Entertainment
507	Hotels and motels, including casino hotels	Services
508	Other accommodations	Services
509	Full-service restaurants	Services
510	Limited-service restaurants	Services
511	All other food and drinking places	Services
512	Automotive repair and maintenance, except car washes	Services
513	Car washes	Services
514	Electronic and precision equipment repair and maintenance	Services
515	Commercial and industrial machinery and equipment repair and maintenance	Services
516	Personal and household goods repair and maintenance	Services
517	Personal care services	Services
518	Death care services	Services
519	Dry-cleaning and laundry services	Services
520	Other personal services	Services
521	Religious organizations	Services
522	Grantmaking, giving, and social advocacy organizations	Services
523	Business and professional associations	Services
524	Labor and civic organizations	Services
525	Private households	Services
526	Postal service	Government/Remainder
527	Federal electric utilities	Government/Remainder
528	Other federal government enterprises	Government/Remainder
529	State government passenger transit	Government/Remainder
530	State government electric utilities	Government/Remainder
531	Other state government enterprises	Government/Remainder
532	Local government passenger transit	Government/Remainder
533	Local government electric utilities	Government/Remainder
534	Other local government enterprises	Government/Remainder
535	* Not an industry (Used and secondhand goods)	Services
536	* Not an industry (Scrap)	Government/Remainder
537	* Not an industry (Rest of world adjustment)	Government/Remainder
538	* Not an industry (Noncomparable foreign imports)	Government/Remainder
539	* Employment and payroll of state govt, education	Government/Remainder
540	* Employment and payroll of state govt, non-education	Government/Remainder
541	* Employment and payroll of local govt, education	Government/Remainder
542	* Employment and payroll of local govt, non-education	Government/Remainder
543	* Employment and payroll of federal govt, military	Government/Remainder
544	* Employment and payroll of federal govt, non-military	Government/Remainder

7.2 Detailed Agriculture and Forestry Aggregation Scheme

IMPLAN Code	IMPLAN Description	Aggregation Name
1	Oilseed farming	Oilseeds
2	Grain farming	Grains
3	Vegetable and melon farming	Other Crop Production
4	Fruit farming	Other Crop Production
5	Tree nut farming	Other Crop Production
6	Greenhouse, nursery, and floriculture production	Other Crop Production
7	Tobacco farming	Other Crop Production
8	Cotton farming	Other Crop Production
9	Sugarcane and sugar beet farming	Other Crop Production
10	All other crop farming	Other Crop Production
11	Beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming	Cattle
12	Dairy cattle and milk production	Dairy
13	Poultry and egg production	Poultry
14	Animal production, except cattle and poultry and eggs	Hogs and Other Livestock
15	Forestry, forest products, and timber tract production	Forestry
16	Commercial logging	Forestry
17	Commercial fishing	Hogs and Other Livestock
18	Commercial hunting and trapping	Hogs and Other Livestock
19	Support activities for agriculture and forestry	Ag Support
31	Potash, soda, and borate mineral mining	Ag Chemical and Fertilizer
32	Phosphate rock mining	Ag Chemical and Fertilizer
33	Other chemical and fertilizer mineral mining	Ag Chemical and Fertilizer
63	Dog and cat food manufacturing	Animal and Pet Food
64	Other animal food manufacturing	Animal and Pet Food
65	Flour milling	Primary Food Processing - Crops
66	Rice milling	Primary Food Processing - Crops
67	Malt manufacturing	Primary Food Processing - Crops
68	Wet corn milling	Primary Food Processing - Crops
69	Soybean and other oilseed processing	Primary Food Processing - Crops
70	Fats and oils refining and blending	Other Food Processing
71	Breakfast cereal manufacturing	Primary Food Processing - Crops
72	Beet sugar manufacturing	Primary Food Processing - Crops
73	Sugar cane mills and refining	Primary Food Processing - Crops
74	Nonchocolate confectionery manufacturing	Other Food Processing
75	Chocolate and confectionery manufacturing from cacao beans	Other Food Processing
76	Confectionery manufacturing from purchased chocolate	Other Food Processing
77	Frozen fruits, juices and vegetables manufacturing	Other Food Processing
78	Frozen specialties manufacturing	Other Food Processing
79	Canned fruits and vegetables manufacturing	Primary Food Processing - Crops
80	Canned specialties	Primary Food Processing - Crops
81	Dehydrated food products manufacturing	Other Food Processing
82	Cheese manufacturing	Primary Food Processing - Dairy
83	Dry, condensed, and evaporated dairy product manufacturing	Primary Food Processing - Dairy
84	Fluid milk manufacturing	Primary Food Processing - Dairy
85	Creamery butter manufacturing	Primary Food Processing - Dairy
86	Ice cream and frozen dessert manufacturing	Primary Food Processing - Dairy
87	Frozen cakes and other pastries manufacturing	Other Food Processing
88	Poultry processing	Primary Food Processing - Meat
89	Animal, except poultry, slaughtering	Primary Food Processing - Meat
90	Meat processed from carcasses	Primary Food Processing - Meat
91	Rendering and meat byproduct processing	Primary Food Processing - Meat
92	Seafood product preparation and packaging	Primary Food Processing - Meat
93	Bread and bakery product, except frozen, manufacturing	Other Food Processing
94	Cookie and cracker manufacturing	Other Food Processing
95	Dry pasta, mixes, and dough manufacturing	Other Food Processing
96	Tortilla manufacturing	Other Food Processing
97	Roasted nuts and peanut butter manufacturing	Other Food Processing
98	Other snack food manufacturing	Other Food Processing
99	Coffee and tea manufacturing	Other Food Processing
100	Flavoring syrup and concentrate manufacturing	Other Food Processing

IMPLAN Code	IMPLAN Description	Aggregation Name
101	Mayonnaise, dressing, and sauce manufacturing	Other Food Processing
102	Spice and extract manufacturing	Other Food Processing
103	All other food manufacturing	Other Food Processing
104	Bottled and canned soft drinks & water	Other Food Processing
105	Manufactured ice	Other Food Processing
106	Breweries	Other Food Processing
107	Wineries	Other Food Processing
108	Distilleries	Other Food Processing
109	Tobacco product manufacturing	Other Food Processing
132	Sawmills	Forestry
133	Wood preservation	Forestry
134	Veneer and plywood manufacturing	Forestry
135	Engineered wood member and truss manufacturing	Forestry
136	Reconstituted wood product manufacturing	Forestry
137	Wood windows and door manufacturing	Forestry
138	Cut stock, resawing lumber, and planing	Forestry
139	Other millwork, including flooring	Forestry
140	Wood container and pallet manufacturing	Forestry
142	Prefabricated wood building manufacturing	Forestry
143	All other miscellaneous wood product manufacturing	Forestry
144	Pulp mills	Forestry
145	Paper mills	Forestry
146	Paperboard mills	Forestry
147	Paperboard container manufacturing	Forestry
148	Paper bag and coated and treated paper manufacturing	Forestry
149	Stationery product manufacturing	Forestry
150	Sanitary paper product manufacturing	Forestry
151	All other converted paper product manufacturing	Forestry
163	Other basic organic chemical manufacturing	Ag Chemical and Fertilizer
167	Nitrogenous fertilizer manufacturing	Ag Chemical and Fertilizer
168	Phosphatic fertilizer manufacturing	Ag Chemical and Fertilizer
169	Fertilizer mixing	Ag Chemical and Fertilizer
170	Pesticide and other agricultural chemical manufacturing	Ag Chemical and Fertilizer
260	Farm machinery and equipment manufacturing	Ag Support
261	Lawn and garden equipment manufacturing	Ag Support
266	Food product machinery manufacturing	Ag Support
267	Sawmill, woodworking, and paper machinery	Forestry
365	Wood kitchen cabinet and countertop manufacturing	Forestry
367	Nonupholstered wood household furniture manufacturing	Forestry
370	Wood office furniture manufacturing	Forestry
371	Custom architectural woodwork and millwork	Forestry
467	Veterinary services	Ag Support
477	Landscape and horticultural services	Ag Support

8 Appendix B, Detailed County and Congressional District Level Results

8.1 County Value Added

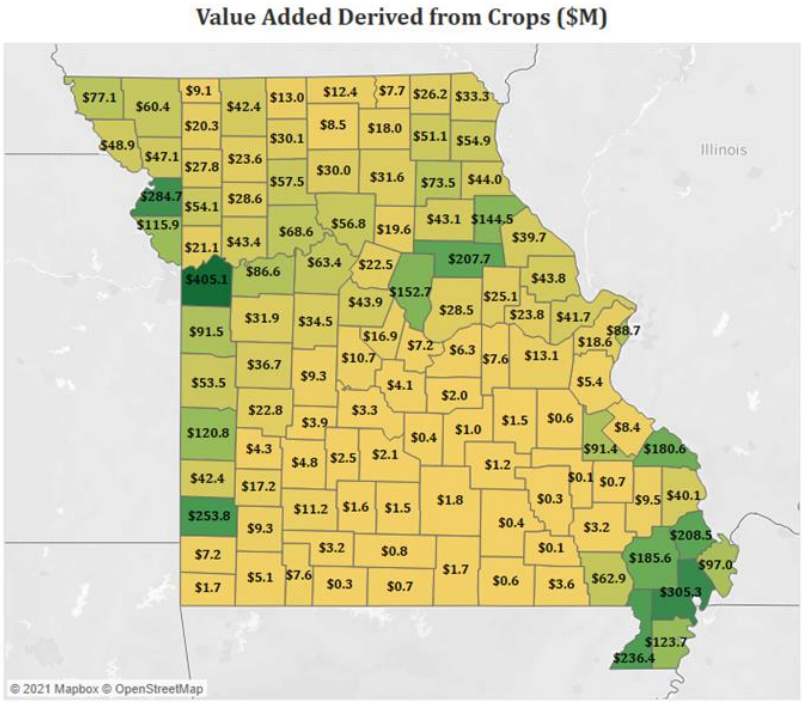


Figure 76, Value Added Derived from Crops (by County)

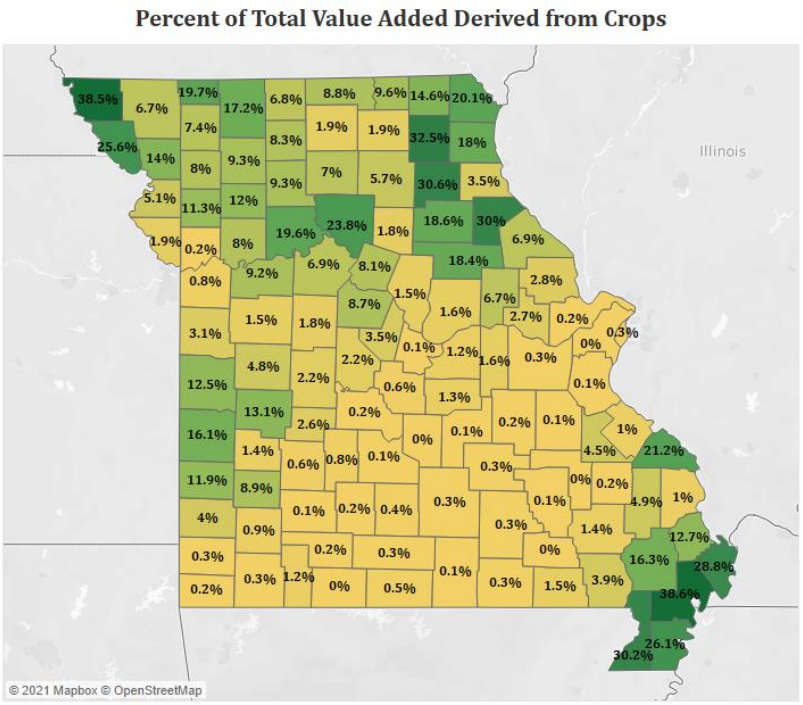


Figure 77, Value Added Derived from Crops, Percent of Total (by County)

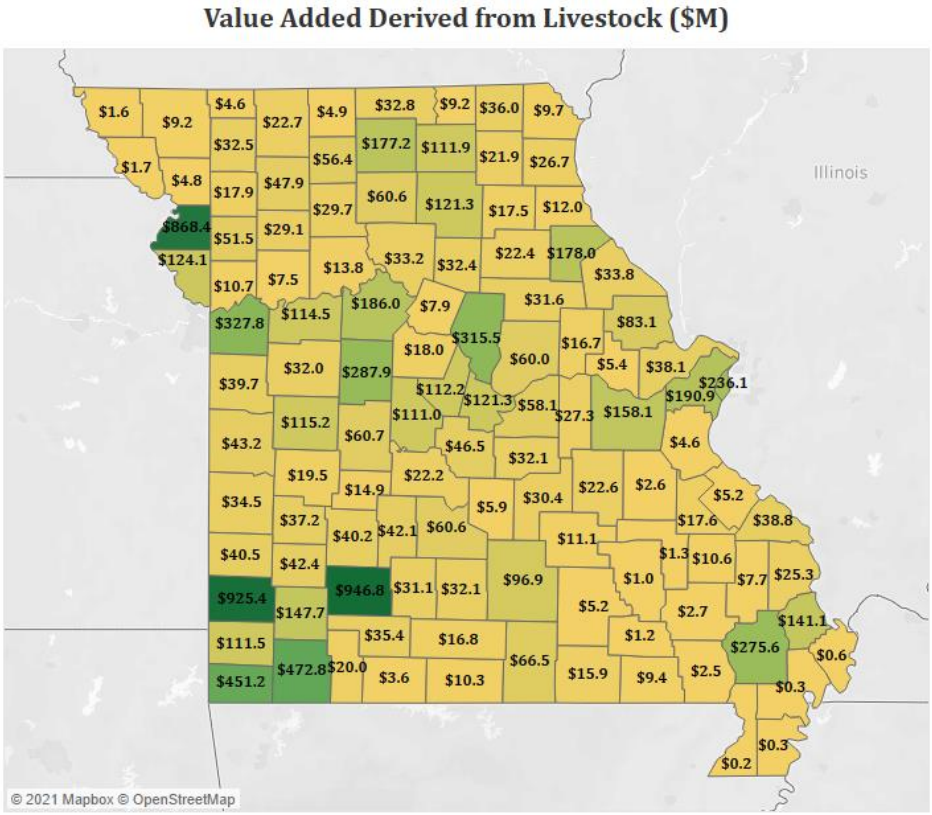


Figure 78, Value Added Derived from Livestock (by County)

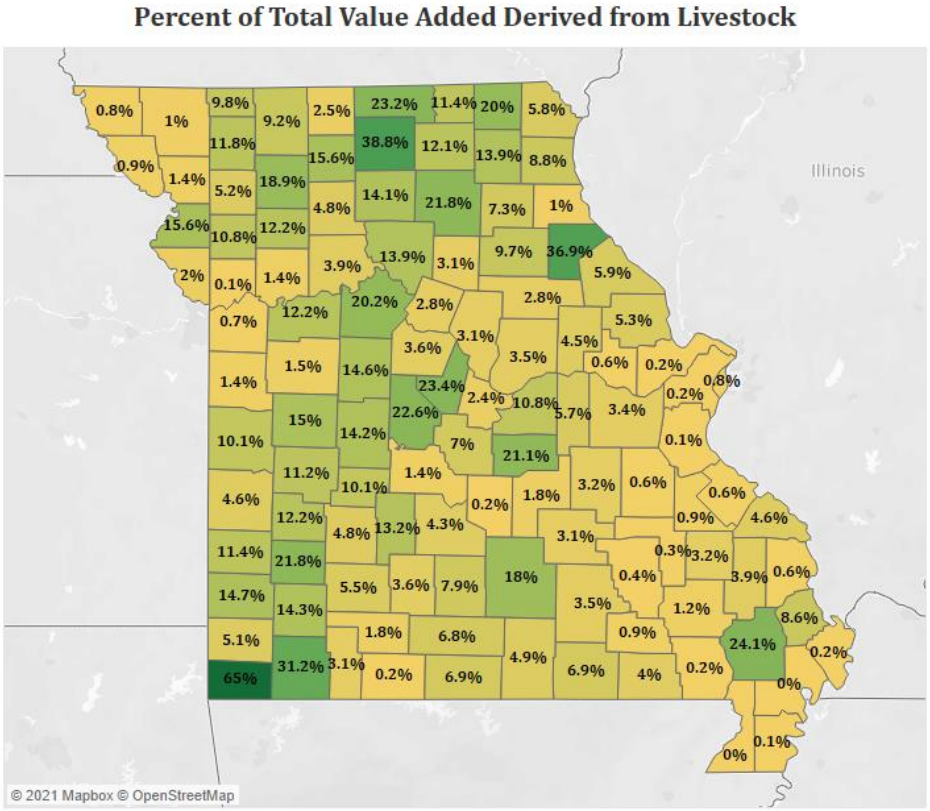


Figure 79, Value Added Derived from Livestock, Percent of Total (by County)

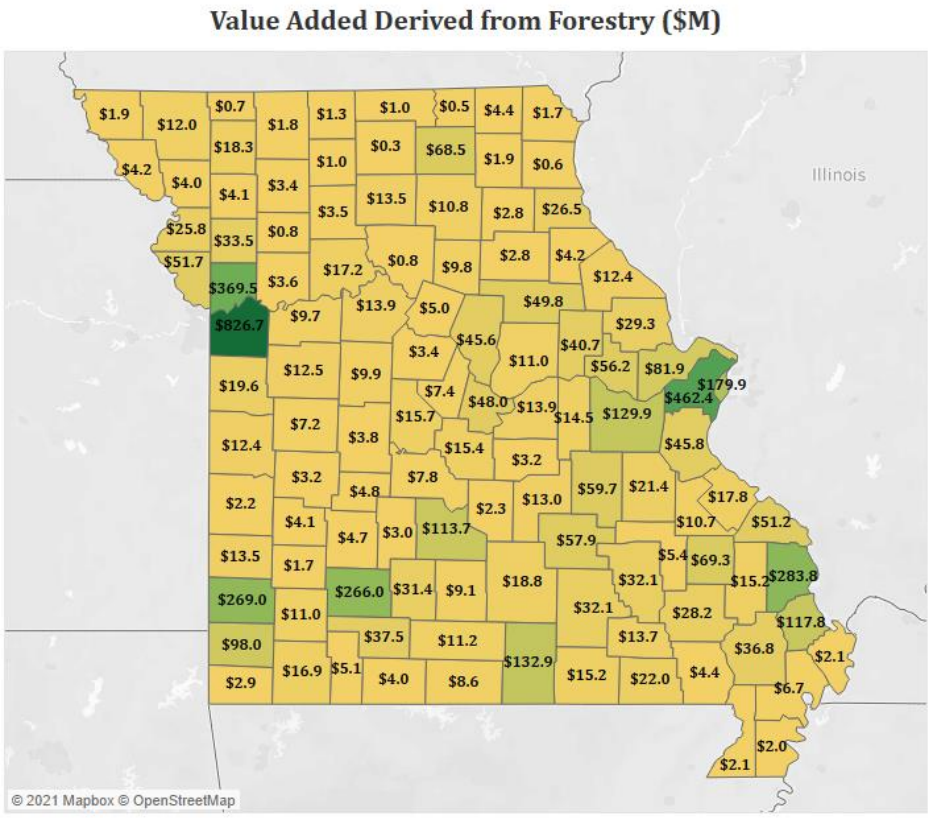


Figure 80, Value Added Derived from Forestry (by County)

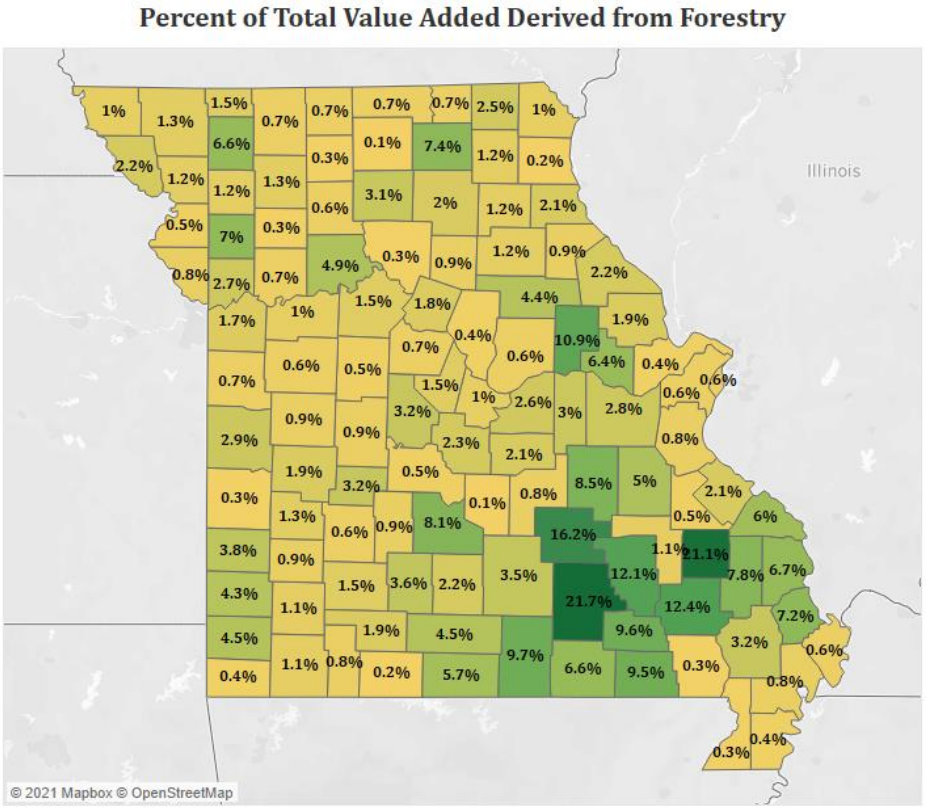


Figure 81, Value Added Derived from Forestry, Percent of Total (by County)

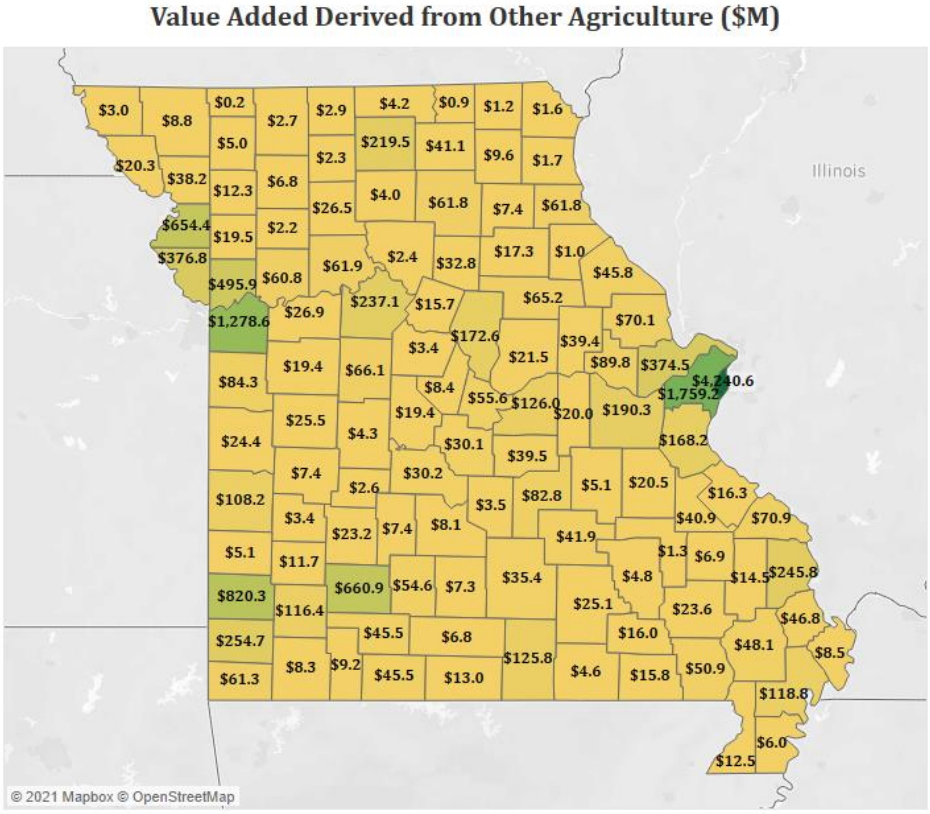


Figure 82, Value Added Derived from Other Agriculture (by County)

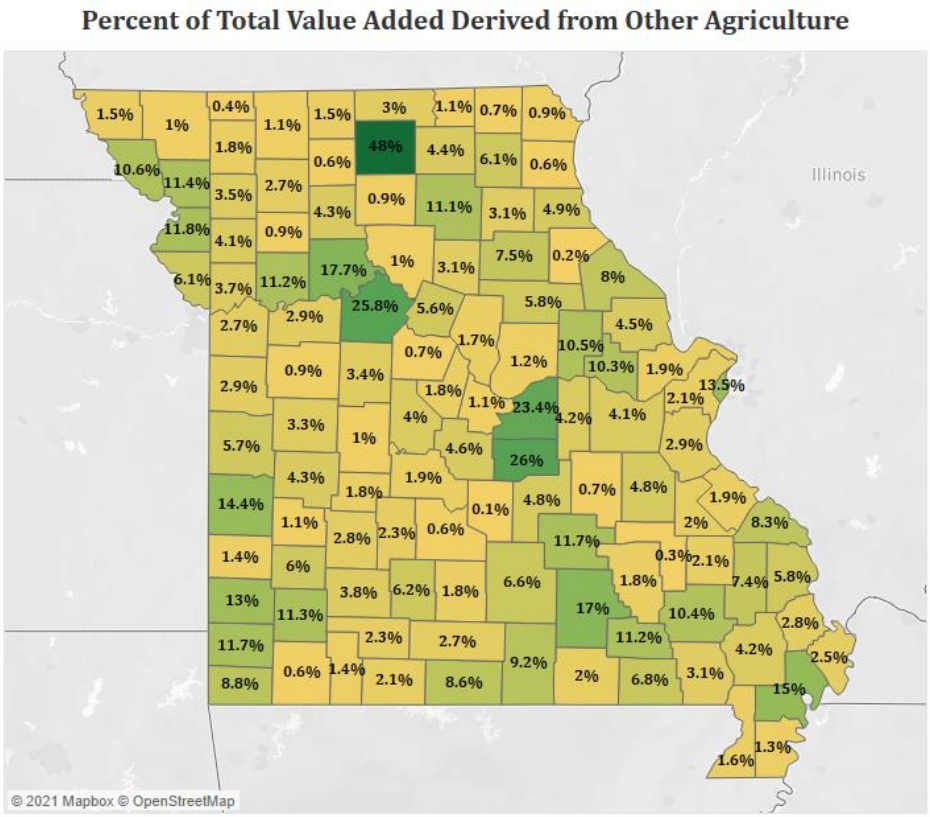


Figure 83, Value Added Derived from Other Agriculture, Percent of Total (by County)

8.2 County Jobs

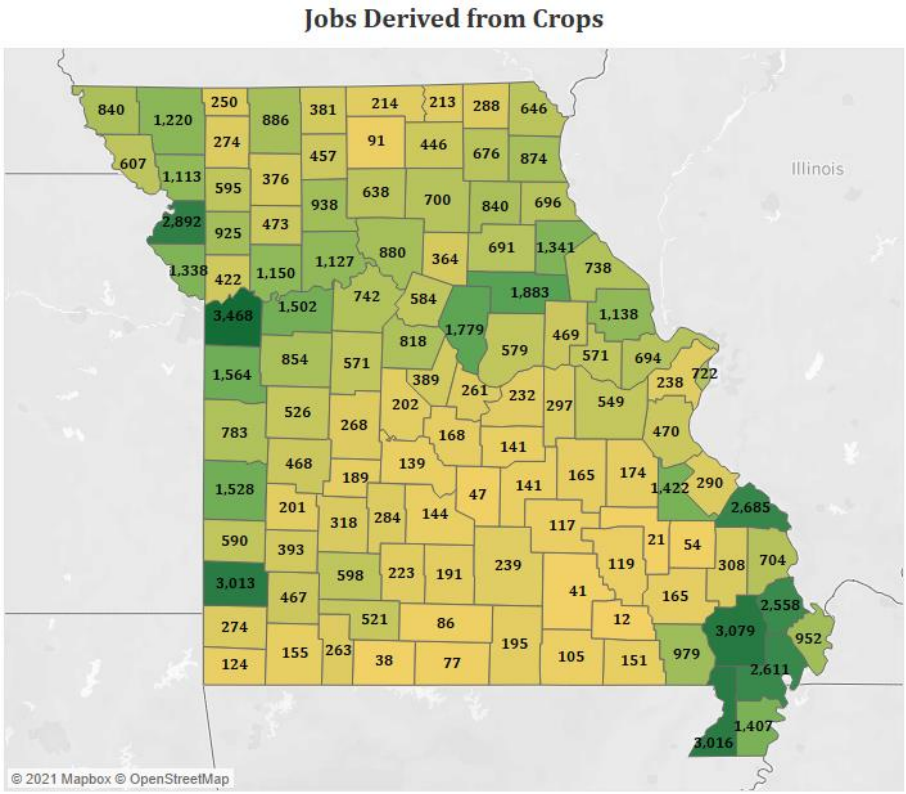


Figure 84, Jobs Derived from Crops (by County)

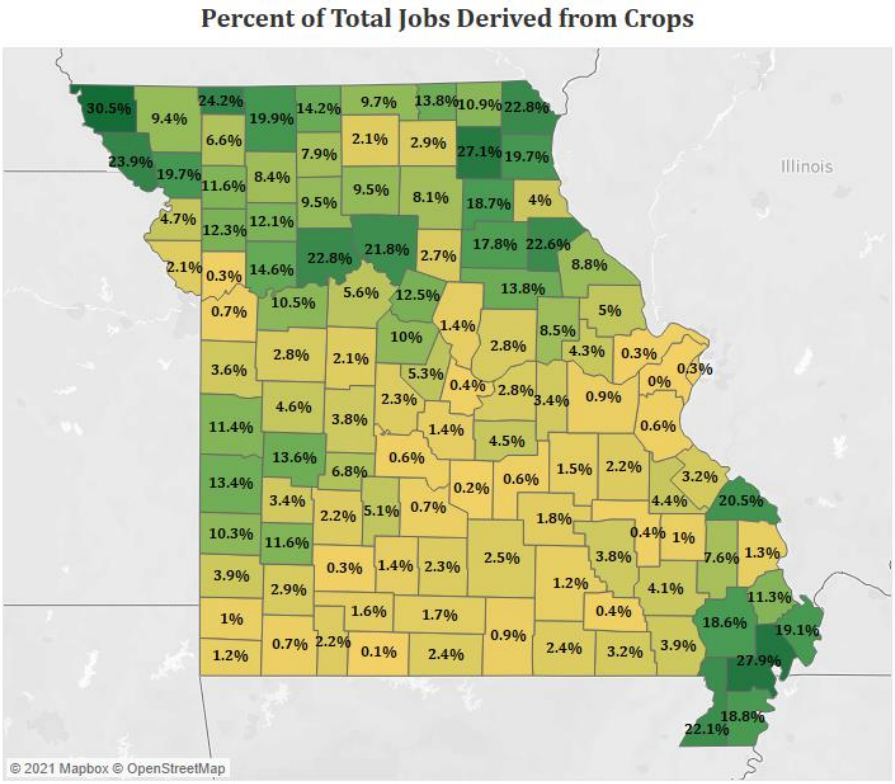


Figure 85, Jobs Derived from Crops, Percent of Total (by County)

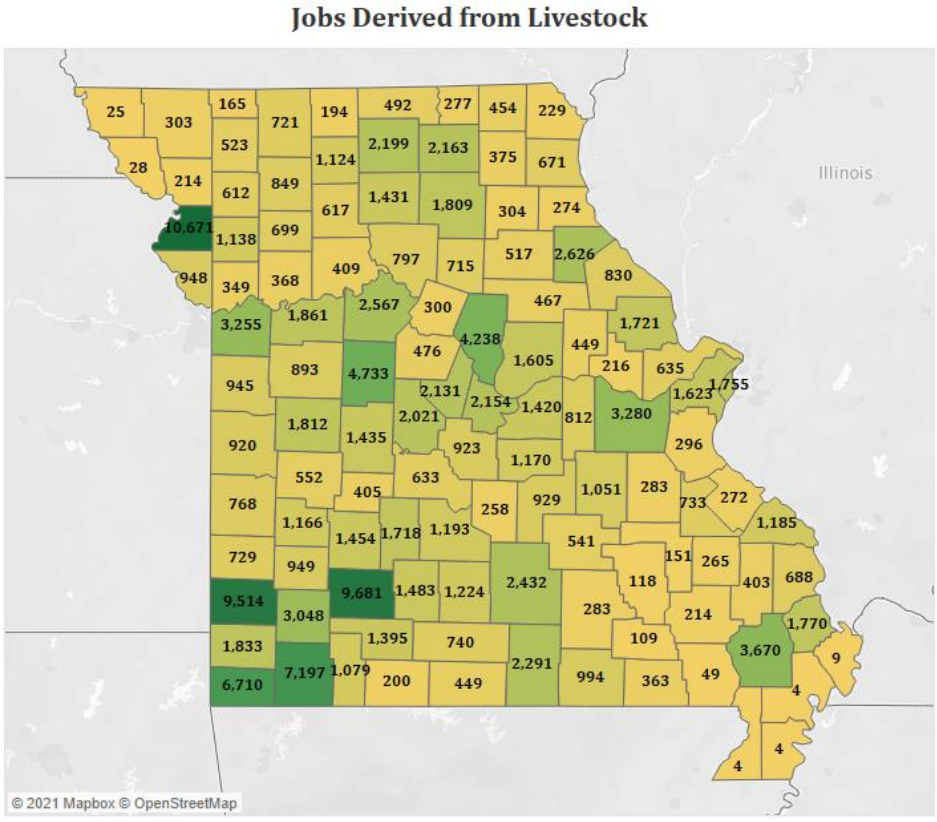


Figure 86, Jobs Derived from Livestock (by County)

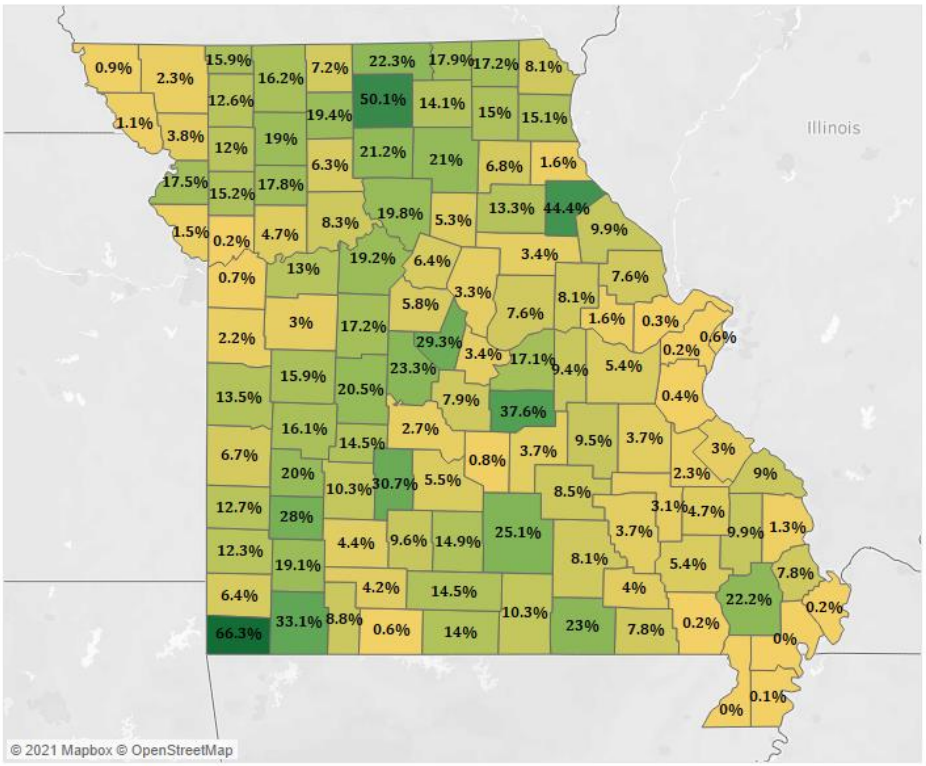


Figure 87, Jobs Derived from Livestock, Percent of Total (by County)

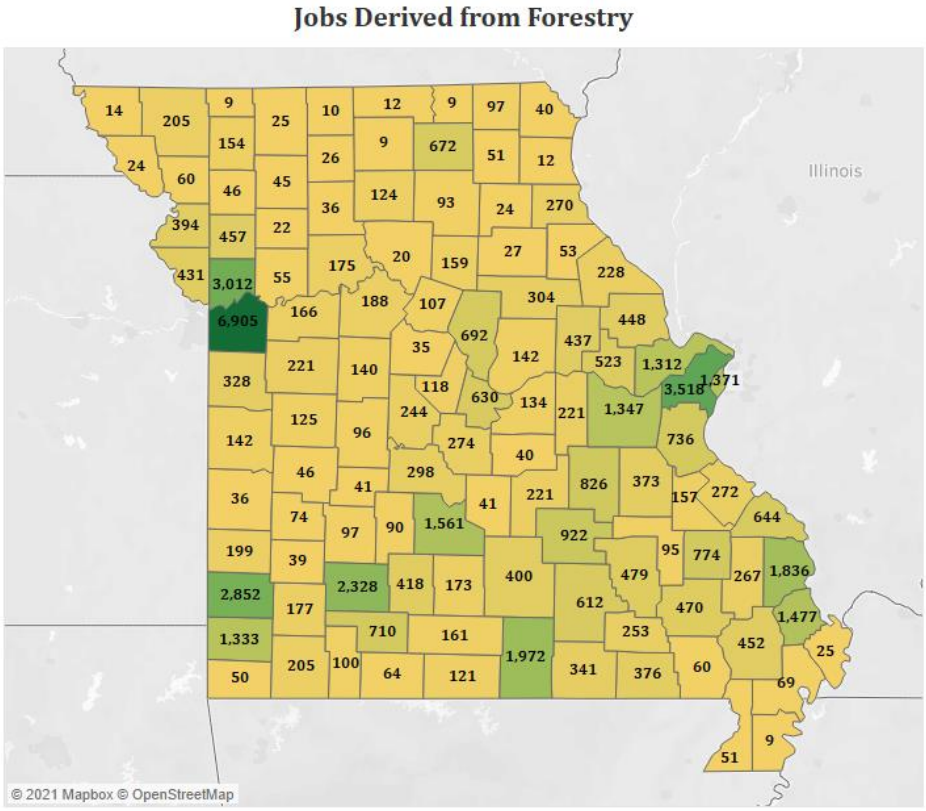


Figure 88, Jobs Derived from Forestry (by County)

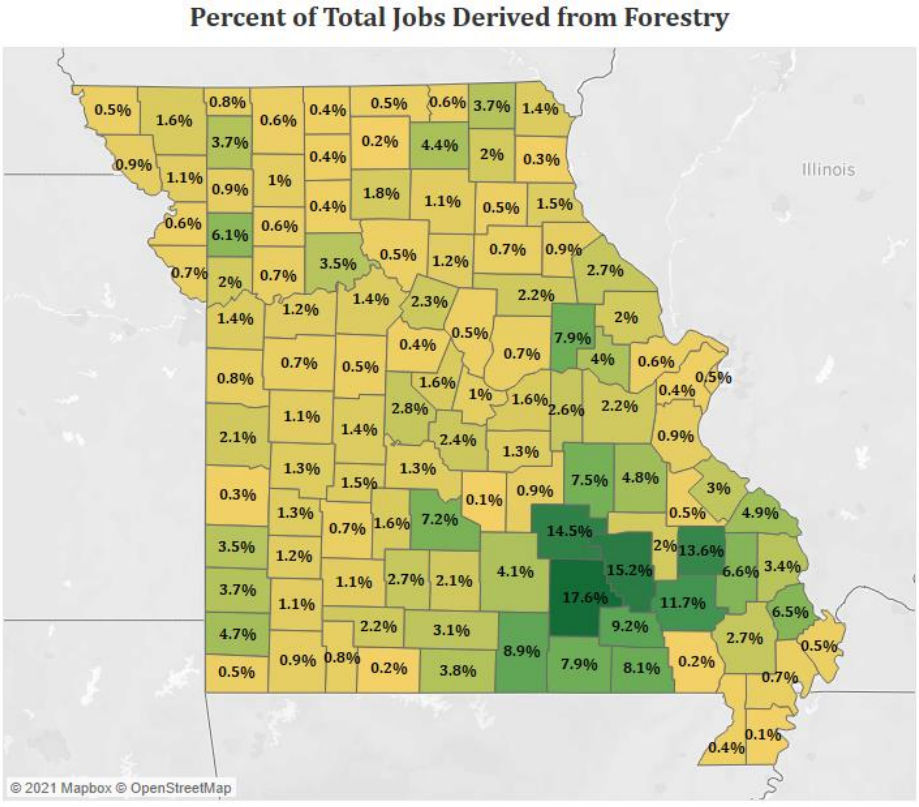


Figure 89, Jobs Derived from Forestry, Percent of Total (by County)

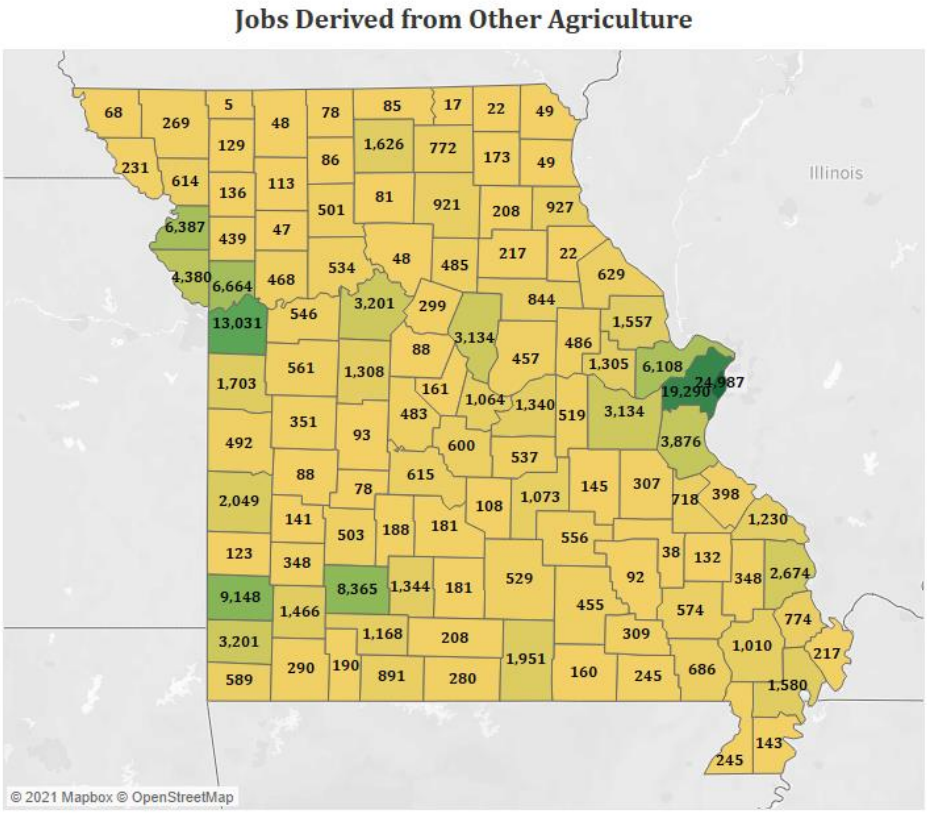


Figure 90, Jobs Derived from Other Agriculture (by County)

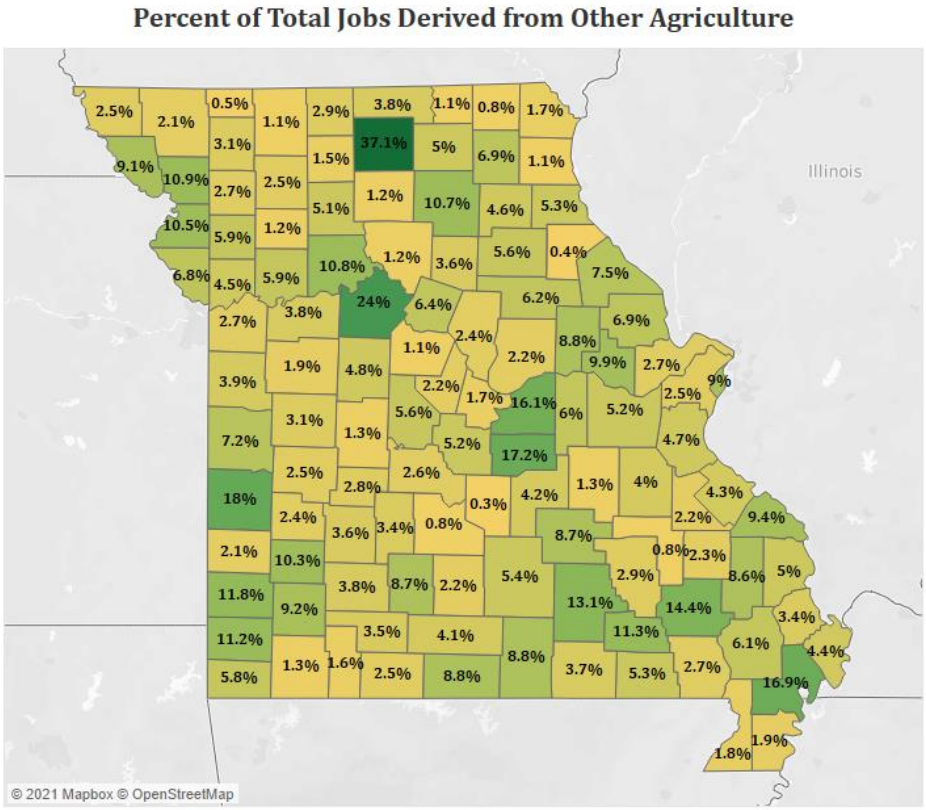


Figure 91, Jobs Derived from Other Agriculture, Percent of Total (by County)

8.3 Congressional District Value Added

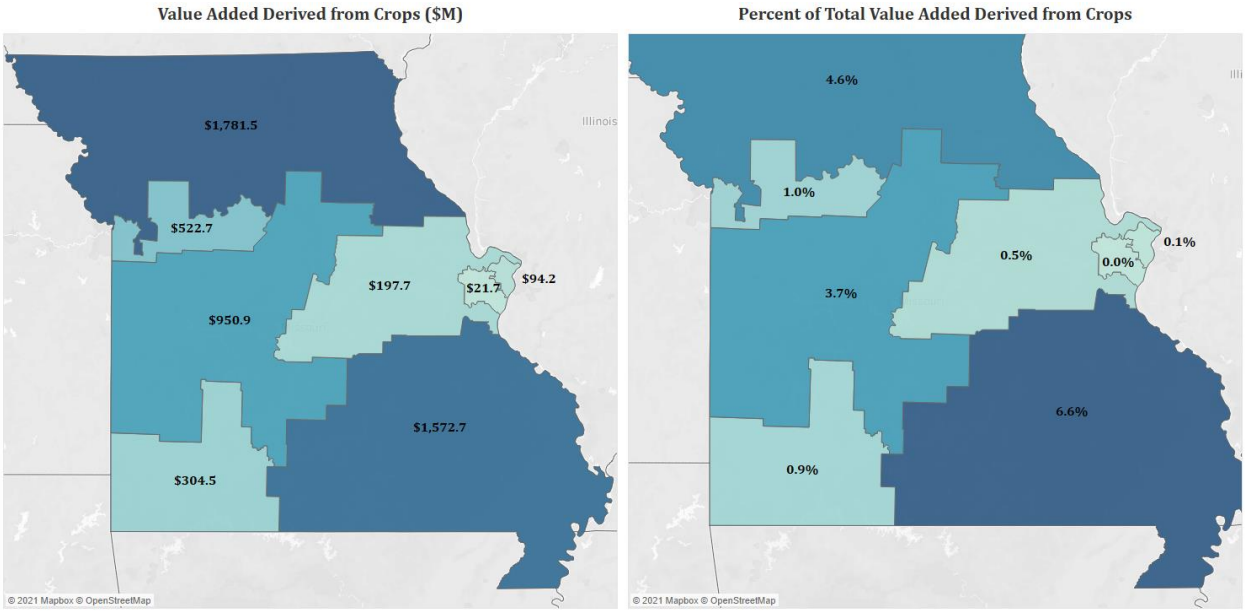


Figure 92, Value Added and Percent of Total Derived from Crops (by Congressional District)

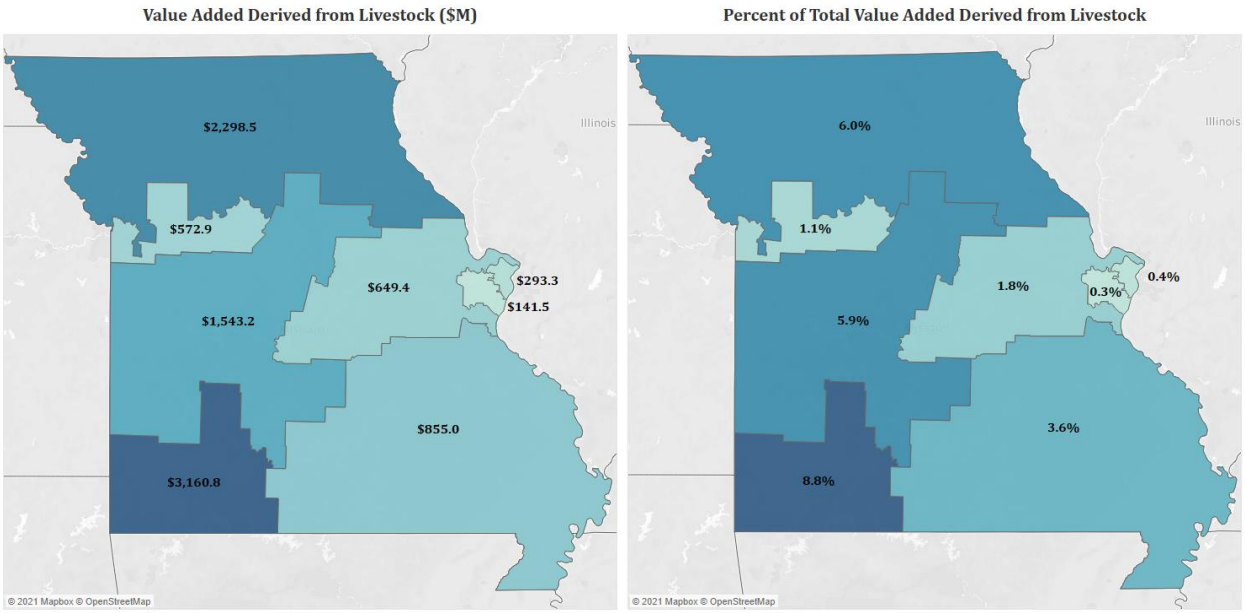


Figure 93, Value Added and Percent of Total Derived from Livestock (by Congressional District)

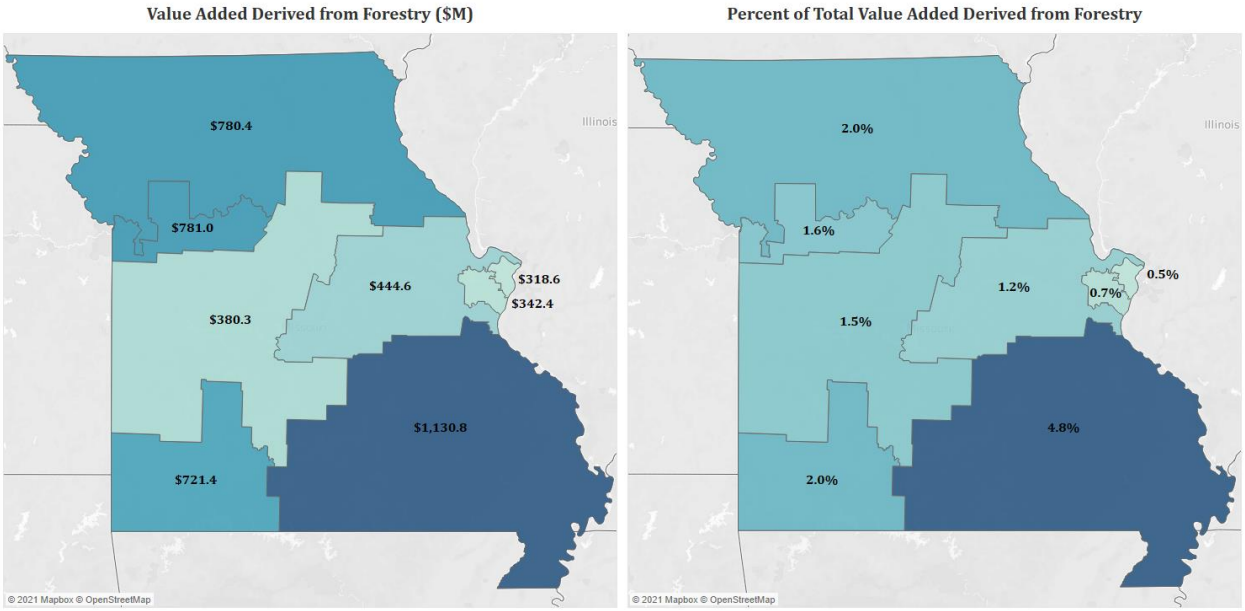


Figure 94, Value Added and Percent of Total Derived from Forestry (by Congressional District)

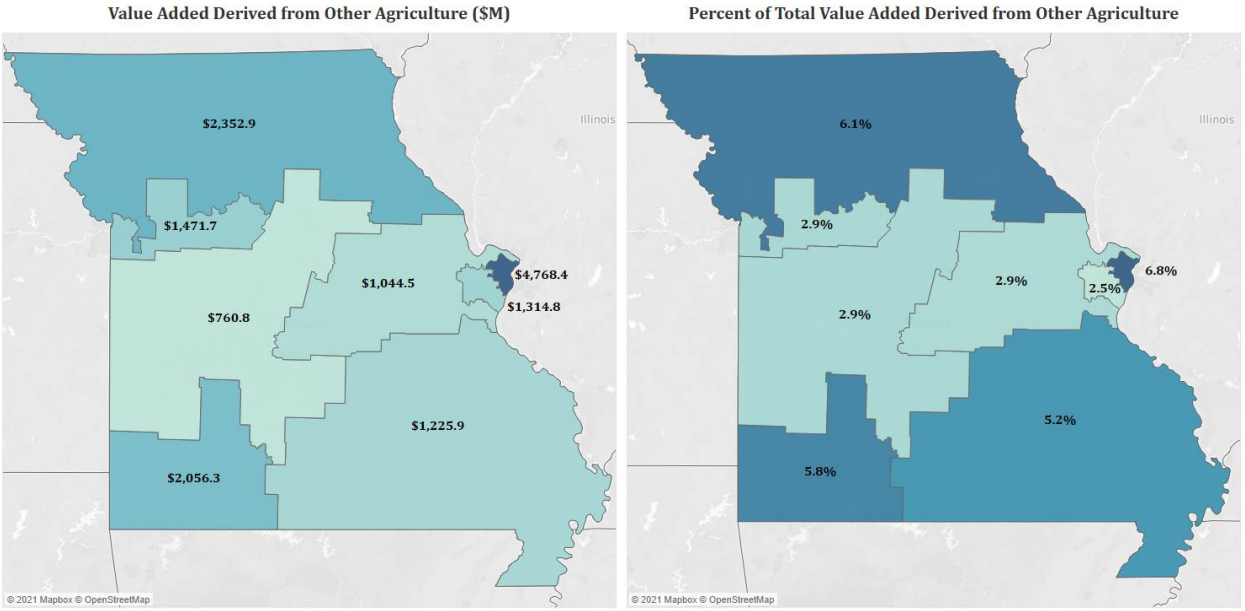


Figure 95, Value Added and Percent of Total Derived from Other Agriculture (by Congressional District)

8.4 Congressional District Jobs

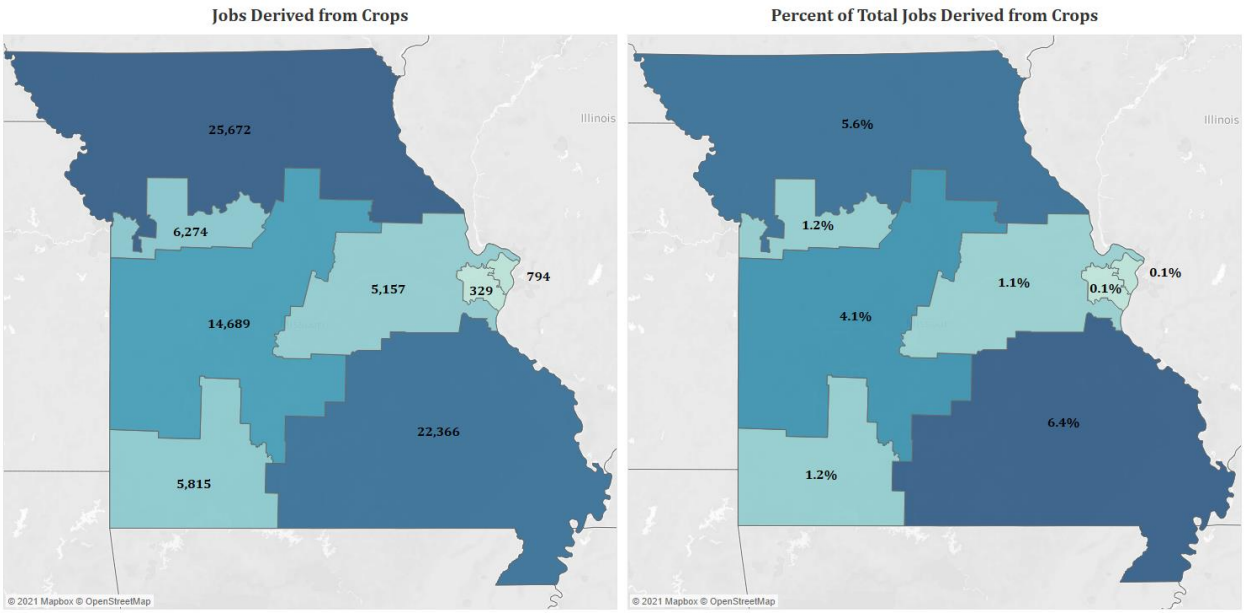


Figure 96, Jobs and Percent of Total Derived from Crops (by Congressional District)

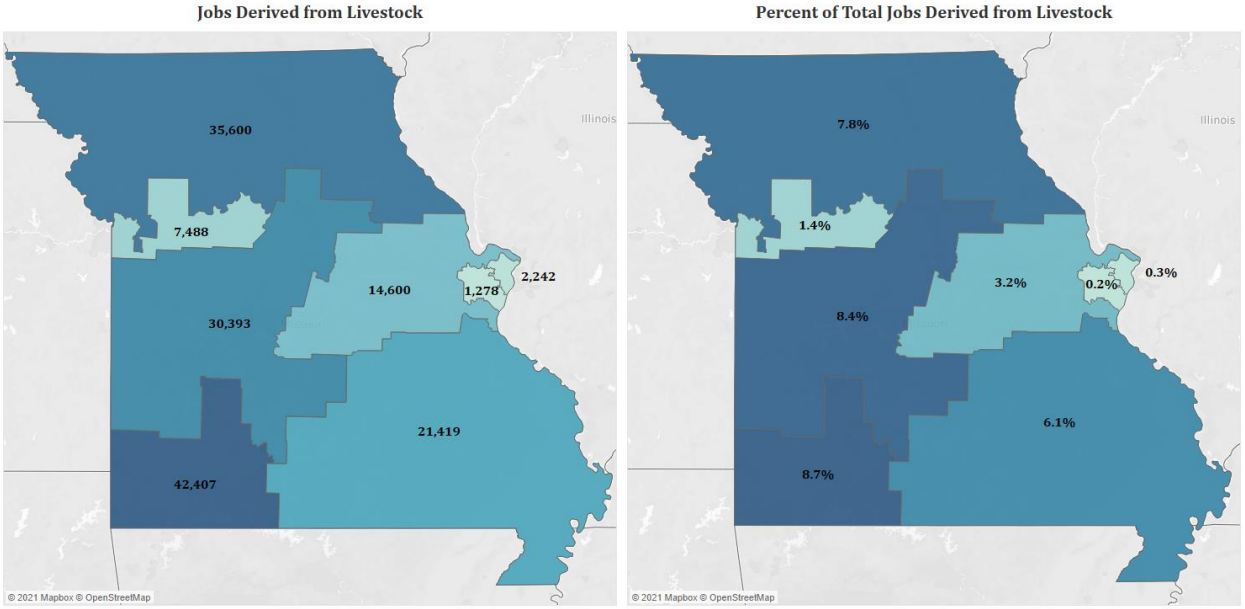


Figure 97, Jobs and Percent of Total Derived from Livestock (by Congressional District)

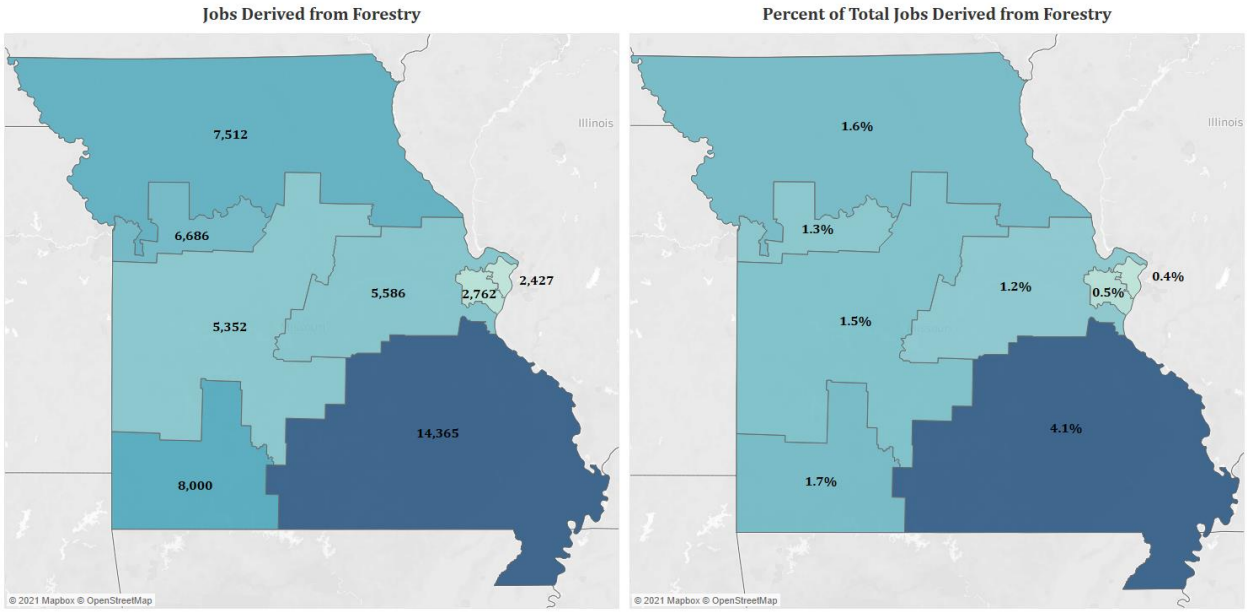


Figure 98, Jobs and Percent of Total Derived from Forestry (by Congressional District)

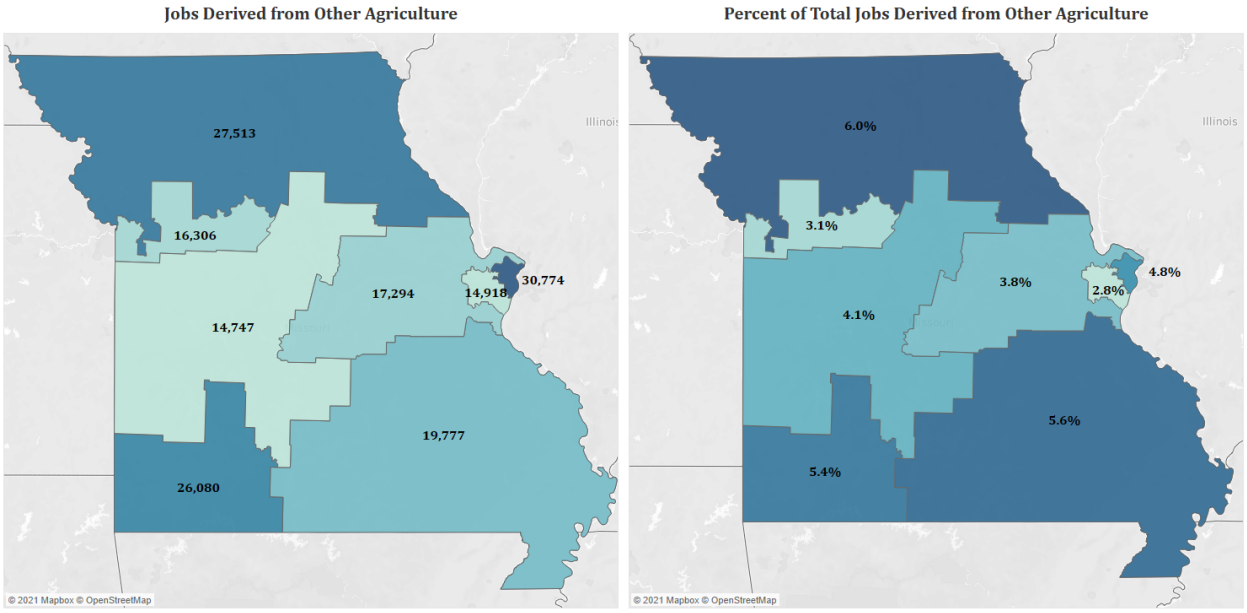


Figure 99, Jobs and Percent of Total Derived from Other Agriculture