



# Missouri Economic Research Brief

## Economic Contribution of Agribusiness

Missouri has a \$280 billion dollar economy and is the 3rd most economically diverse state in the nation. Manufacturing represents nearly 13 percent of gross state product followed by government, real estate, and health care. Agriculture represents about two percent of gross state product at \$5.2 billion.

Thirty percent of the Missouri population lives outside metropolitan areas in more rural parts of the state. There are 97,700 farms in Missouri—the second largest numbers of any state. Three percent of all Missouri workers are engaged in farming. Yet, in fifteen counties, one-fifth or more of workers are employed in farming. Agriculture (the production of crops, livestock, and timber) continues to be an important asset to the state and local economies.<sup>1</sup>

The Agribusiness sector, which includes farming and related agricultural product processing, distribution and services, directly contributed \$15.2 billion to the state economy—5.4 percent of Missouri’s gross domestic product (GDP).

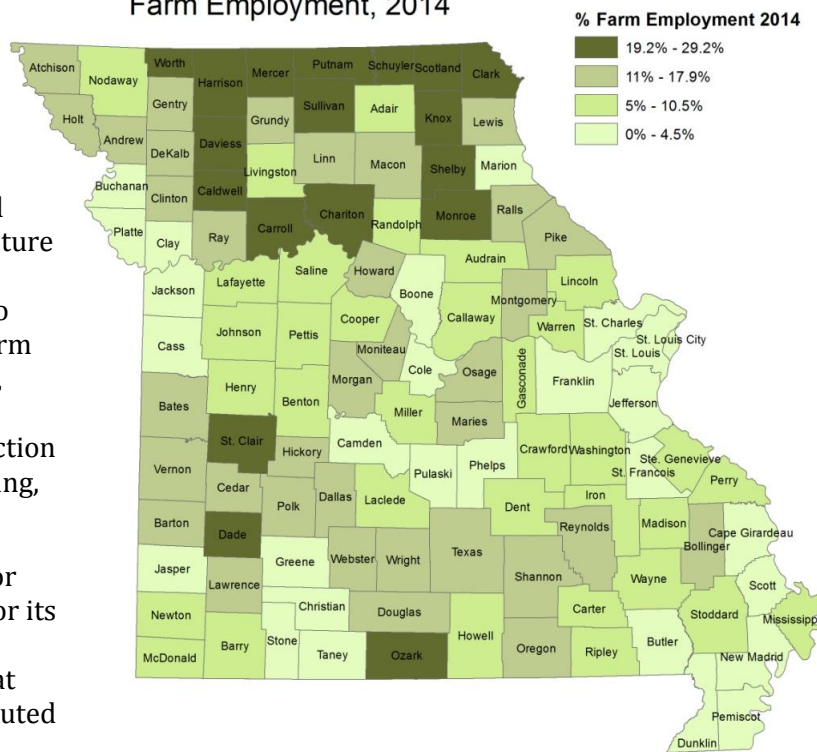


### What is Agribusiness?

In 1957, Professors Davis and Goldberg from Harvard University articulated something that many in agriculture already knew: the farmer is a businessperson and his product is part of a much larger value-added chain. To explain this larger framework, they introduced the term Agribusiness. Using the Leontief input-output system, these researchers showed the backward and forward linkages of agribusiness: inputs to agricultural production and the outputs of agricultural production to processing, distribution, finance, and consumption industries.

This conceptual framework represents one method for analyzing the economic contribution of agribusiness or its impact to national and state economies.<sup>2</sup> The USDA’s Economic Research Service, for example, reported that agriculture and agriculture-related industries contributed \$835 billion to the US economy—4.8 percent of gross domestic product.

County Share of Farm Employment, 2014



<sup>1</sup>See Appendix A: a review of the changing farm landscape.

<sup>2</sup>See Appendix B: a review of the input-output methodology.

Note: The terms agriculture and farming are used inter-changeably.

**Economic Contribution**

In 2014 Missouri had an estimated 100,400 agribusinesses (97,700 farms and 2,700 agriculture-related establishments) that directly employed 182,383 workers, paid \$6.4 billion in wages and contributed \$15.2 billion to state GDP. The ripple effect was an increase of \$9.6 billion in additional economic activity.

The total impact of agribusiness, including intermediate and induced effects, on the state economy was \$24.8 billion, which represents 8.9 percent of Missouri’s gross domestic product. Agricultural sectors and indirect industries employed 305,256 workers paying about \$12.1 billion in salaries.

**Impact of Agribusiness on the Missouri Economy**

	Direct	Indirect	Total
Employment	182,383	122,873	305,256
Labor Income	\$ 6.4 billion	\$ 5.7 billion	\$ 12.1 billion
GDP	\$ 15.2 billion	\$ 9.6 billion	\$ 24.8 billion

Source: IMPLAN version 3.0

Agricultural production or farming is critical but not as income-rich as the processing sector. A worker in farming earns on average \$17,600; workers in processing earn an average \$56,300 while workers in distribution and services sector earn an average \$50,000.

The state’s top agribusiness industry, by total GDP or value-add, is meat and poultry production. Several prominent meat and poultry producers have operations in the state including Tyson’s, Smithfield, Simmons, and Butterball. Other high value-add agribusiness industries are oilseed farming, breweries, and pet food manufacturing. Global companies Monsanto, Anheuser Busch and Nestle Purina are headquartered in St. Louis.

In addition to those production and processing industries, supply chain industries that make a major contribution include agriculture-related wholesale trade and truck transportation, real estate, management of companies, and pesticide and other agrochemical manufacturing.

**Missouri  
Top Ten Agribusiness Industries**

Rank	Industry	GDP
1	Meat & Poultry Production	\$ 2,990,849,982
2	Wholesale Trade	\$ 2,363,075,934
3	Oilseed Farming	\$ 1,654,265,760
4	Breweries	\$ 1,245,067,902
5	Dog and cat food manufacturing	\$ 1,133,730,495
6	All other crop farming	\$ 867,487,157
7	Management of companies and enterprises	\$ 761,327,902
8	Real Estate	\$ 743,267,441
9	Truck Transportation	\$ 572,166,608
10	Pesticide and other agricultural manufacturing	\$ 534,938,463

Source: IMPLAN version 3.0

**Exports**

Agricultural exports are a significant part of Missouri’s trade as well as the demand side of agribusiness. Agriculture exports were 17 percent of total exports in 2014. Since 2007, agricultural exports have increased by 60 percent from \$1.5 billion to \$2.4 billion, while total exports increased by 4.9 percent.

In 2015, over \$2.2 billion in agriculture commodities were shipped through Missouri ports. The top three destinations were Mexico, Canada, and Japan.

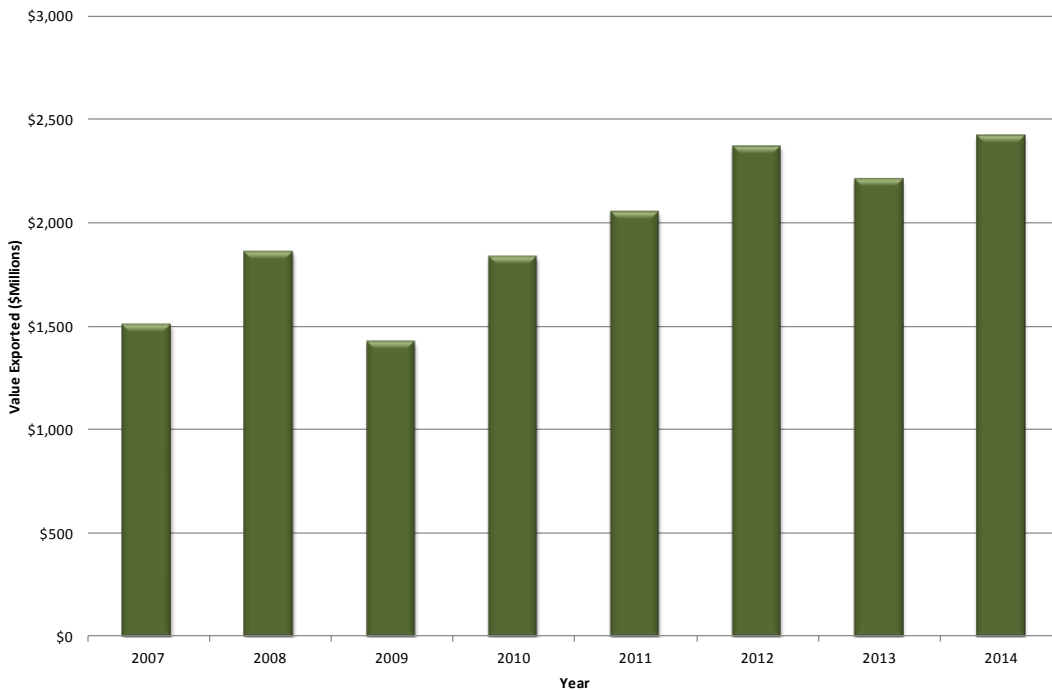
The largest sub-sector of agriculture exports were Food and Kindred Products, making up 66 percent of exports in the category in 2014 (\$1.6 billion). The second largest sub-sector was agricultural products, totaling \$443 million in 2014. Beverage and tobacco products were the third highest sub-sector with \$202.6 million exports.

**Farm Finances**

Farm incomes fluctuate based on a number of factors. Farm incomes, for example, dropped sharply in 1980, 2002, and 2012: all years in which the nation experienced a recession; these were also years when parts of the country suffered from severe drought conditions. USDA reports that Missouri farm incomes rebounded from \$1.8 million in 2012 to \$3.5 million in 2014.

Detailed analysis of agriculture supply and demand fundamentals, by the Kansas City Federal Reserve, shows that although crop production has soared since 2012, demand for commodities such as soybeans and corn has flattened. Surplus production, weak demand, and a strong dollar have put downward pressure on commodity prices. Depressed commodity prices have led to lower farm incomes and capital spending.

**Missouri Agricultural Product Exports  
2007 -2014**



Source: WISER Trade Data

**Appendix A: Changing Farm Landscape**

**United States, 1900 - 2014**

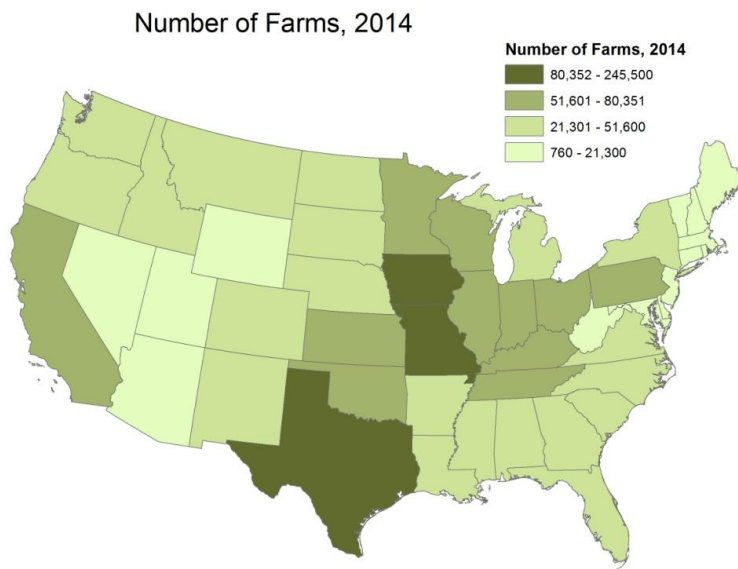
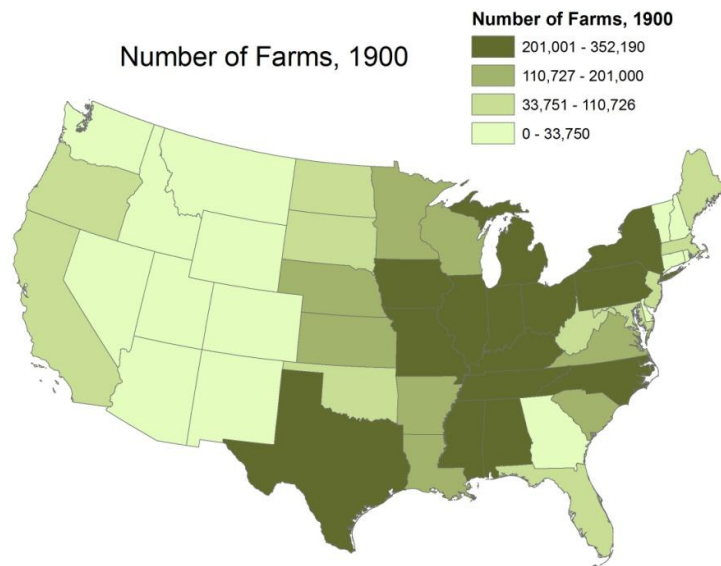
At the turn of the 20<sup>th</sup> Century, in 1900, the United States was very much a rural farm-based economy: 60 percent of the population lived in rural areas and 40 percent lived in urban areas. There were 5.7 million farms and 838.6 million acres of farmland. The average size of a farm was 146 acres. Agriculture—the production of crops, livestock, and timber—represented 17 percent of national income.

Thirty years later, the U.S. was more urban (56 percent) than rural (44 percent). The number of farms and farmland actually increased: 6.2 million farms and 986.8 million acres. Average family incomes had increased from \$769 to \$1,524. Gross domestic product was \$90 billion. The manufacturing share of GDP was 24 percent compared to agriculture’s 7 percent.

In 1960 less than a third of the U.S. population lived in rural areas. Farm population fell from 30 million in 1900 to 16 million in 1960. The number of farms had declined 55 percent: from 6.2 million to 4 million. Although there were fewer farms, there were 1.2 billion acres of farmland and average farm size was 297 acres. Agriculture’s share of the economy had tumbled to 2 percent. An economy less dependent on small-size farms seemed to have a positive impact on average family incomes which rose to \$6,691.

National Agriculture Statistics show that, in 2014, there were 2 million farms with 913 million acres of farmland. Average farm size was 438 acres. The increase in average farm size suggests a trend toward large corporate farms and away from the small farm. At the same time, the decline in farmland acreage suggests conversion of farmland to other uses including residential development.

Missouri has the second largest number of farms (97,700) after Texas (245,500). The average size of Missouri farms is 290 acres compared to 754 acres for neighboring Kansas farms and 921 acres for Nebraska farms. The average size of US farms tends to increase from East to West. The average size of Rhode Island farms, for example, is 53 acres while Wyoming farms average 2,598 acres.



**Missouri, 1900 - 2014**

Missouri has mirrored the national trend. In 1900, the state was 64 percent rural and 36 percent urban. It had the second largest number of farms in the country: 284,886; average farm size was 119 acres. Three cities had populations over 100,000: St. Louis, Kansas City and St. Joseph. Sixty years later, the state was 66 percent urban and 33 percent rural. It had three metropolitan areas with populations over 100,000: St. Louis, Kansas City, and Springfield. The state had fewer but larger farms: average farm size went up from 119 acres to 193 acres. Agriculture contributed about 4 percent to Missouri's gross state product.

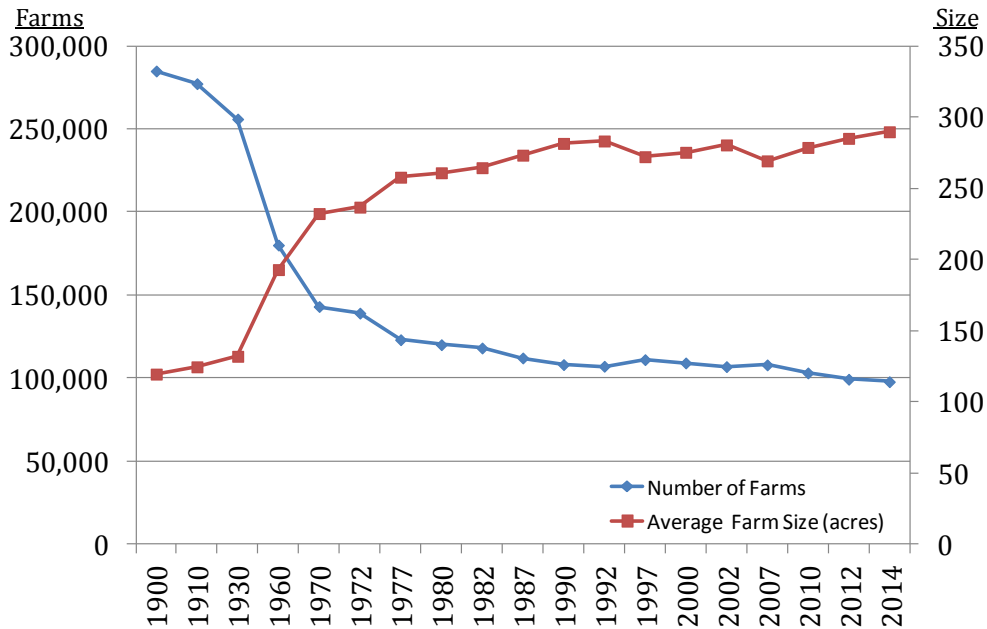
Data from the National Agriculture Statistics Survey show that in 2014, there were 97,700 farms in the state covering about 28 million acres. Average farm size was 290 acres. According to the most recent decennial census, the state is 70 percent urban and 30 percent rural; it is home to seven metropolitan areas: St. Louis, Kansas City, Springfield, Joplin, Columbia, Jefferson City, St. Joseph, and Cape Girardeau. Agriculture contributed 2 percent to Missouri's gross state product.

**Missouri's Contribution to U.S. Agriculture, 2012**

<u>Indicator</u>	<u>Rank</u>
Number of Farms	2 <sup>nd</sup>
Land in Farms	12 <sup>th</sup>
Average Farm Size	24 <sup>th</sup>
Hay Production (acres)	2 <sup>nd</sup>
Soybean Production (acres)	4 <sup>th</sup>
Turkey Production(number)	4 <sup>th</sup>
Cattle Production (number)	8 <sup>th</sup>
Broilers Production (number)	9 <sup>th</sup>
Total Value of Agricultural Products Sold	16 <sup>th</sup>

Source: National Agriculture Statistics Survey

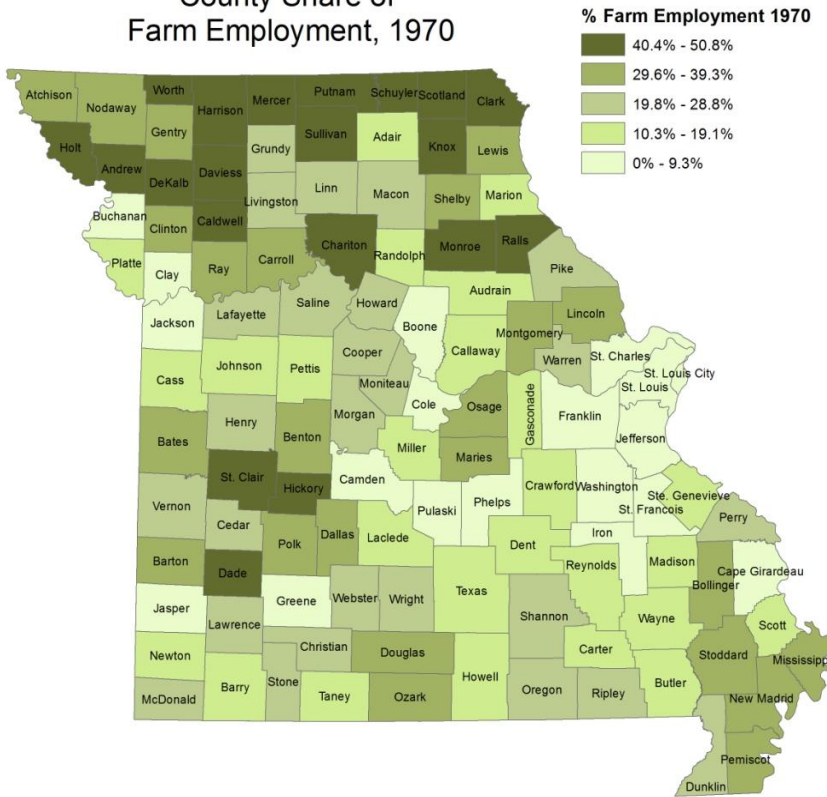
**Missouri Farms: Numbers Decline, Size Increases**



Source: National Agriculture Statistics Survey



County Share of Farm Employment, 1970

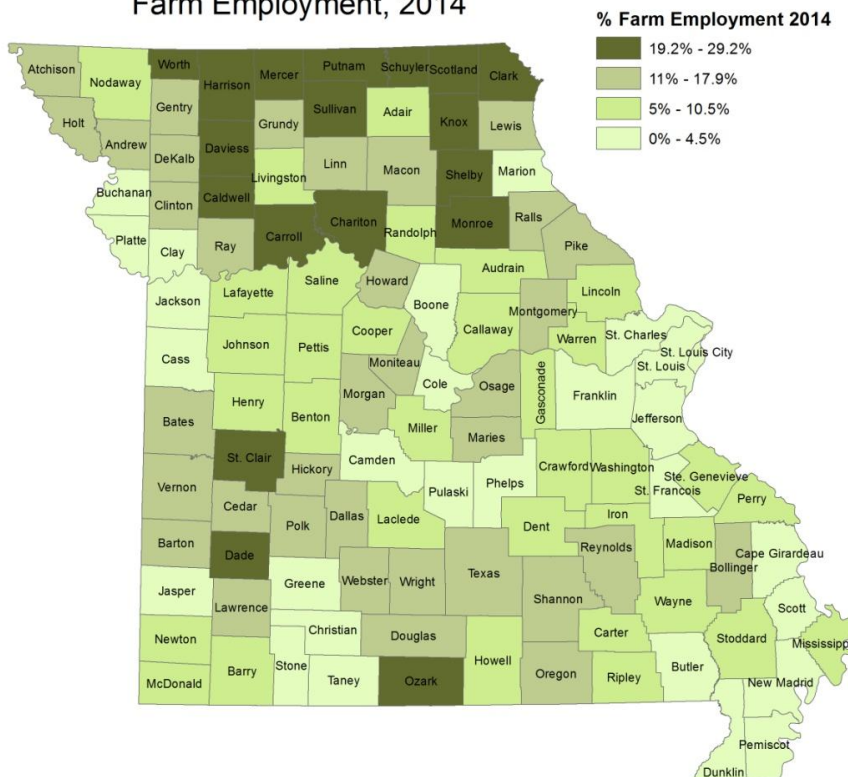


In 1970 Missouri had 143,000 farms and 163,000 farm workers. Farm employment varied by county: from 50 percent in Knox County to one percent in Pulaski County and nearly zero in St. Louis County.

Out of 115 counties, 36 were farm-dependent with a third or more of county workers engaged in farming. Many of the most farm-dependent counties were located in the northern part of the state, along the border with Iowa.

Forty-four years later, there were 97,700 farms and 96,803 farm workers. Average county share of farm employment fell from 24 percent in 1970 to 11 percent in 2014. In eighteen counties, however, farming represented 20 percent or more of the workforce. Mercer County, located in the northern part of the state had the largest share of farm employment, 29 percent.

County Share of Farm Employment, 2014



In 2014, the most farm-dependent counties are still along the Missouri-Iowa border: the same seven as in 1970.

Measured in 2014 dollars, the state's 1970 average per capita income was \$14,120. In the most farm-dependent counties, it was \$14,048. Today, the state's average per capita income is \$41,639. In its most farm dependent counties, it is \$39,118. Chariton County, in the north central part of the state, was 45 percent farm dependent and the county's per capita income was \$18,127 in 1970. Chariton remains a farm dependent county with 22 percent of its workers engaged in farming. Per capita income is \$50,221. Average farm size in Chariton County is 363 acres up from 269 acres in 1970

Agribusiness— which includes farming and agriculture-related manufacturing, distribution and services industries— represents 5 percent of total Missouri employment: 182,383 workers.

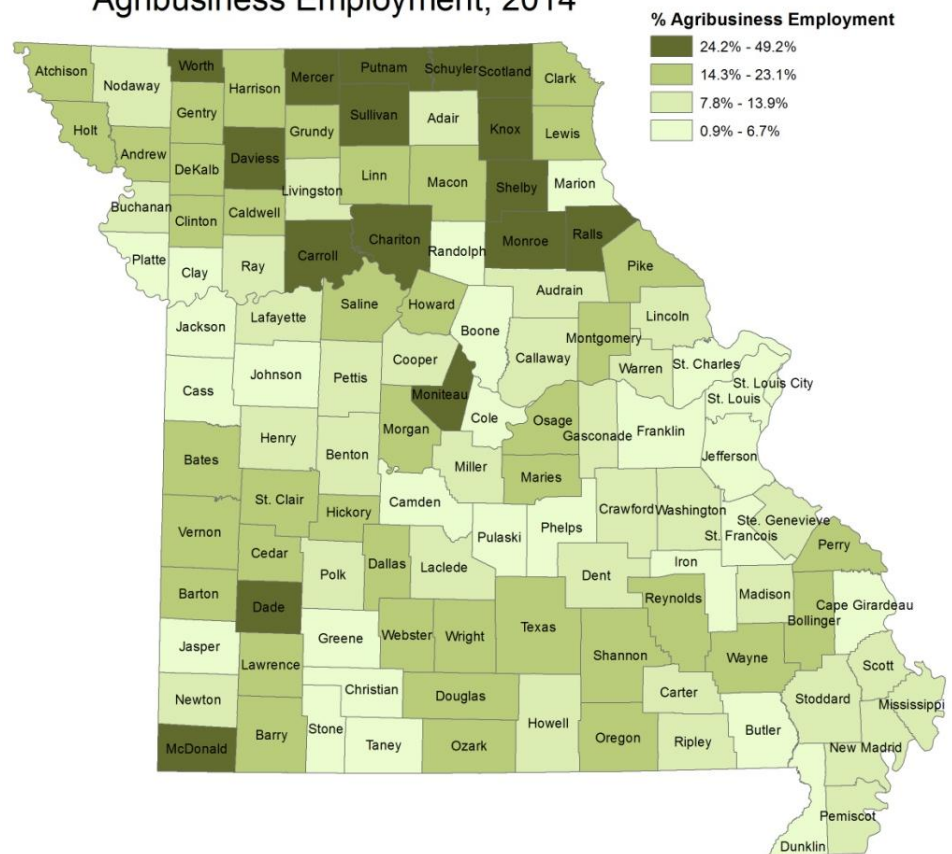
Farming accounts for 53 percent of all agribusiness workers in the state: 96,840. The U.S. Bureau of Economic Analysis defines a farm worker as a sole proprietor, partner or hired laborer.

Employment in agriculture-related manufacturing accounts for nearly 30 percent of the agribusiness workforce: 53,770. Another 17 percent comes from agriculture-related distribution and services: 31,773.

As shown in the adjacent map, sixteen Missouri counties have a quarter or more of all workers employed in agribusiness.

Sullivan and McDonald counties, located in the northern and southwestern parts of the state, have a large workforce engaged in agribusiness. The breakout in Sullivan County is 20 percent farming and 29 percent agriculture-related industries; in McDonald County it is 9 percent farming and 27 percent agriculture-related industries. These counties serve a number of prominent meat and poultry producers.

### County Share of Agribusiness Employment, 2014



Meat and poultry production is the state’s number one value-added agribusiness industry. The Poultry Federation released a 2015 report on the economic importance of poultry production (chickens and turkeys) to Missouri. Missouri is the fifth largest producer of turkeys in the US— measured by pounds produced.

Unlike poultry and hog production, oilseed farming or breweries, dairy production plays a smaller but key role in the state’s agribusiness economy. University of Missouri Extension staff studied the dairy production and processing complex. Employment in this complex tends to be in the southern part of the state, with a heavy presence in Webster, Wright and Texas counties.

**Appendix B:  
Economic Contribution Methodology**

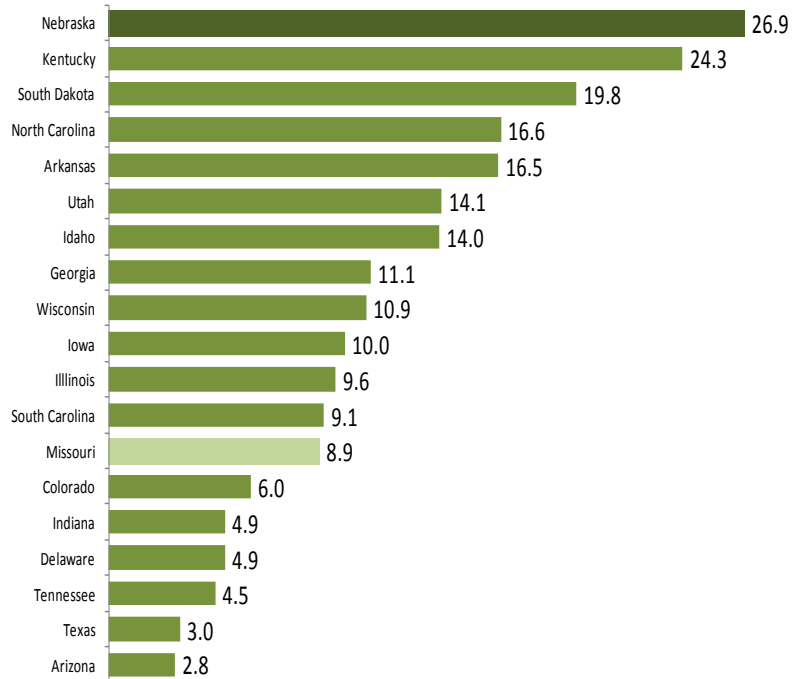
One popular tool for measuring the economic impact of agriculture and agriculture-related industries is the nationally recognized IMPLAN software. IMPLAN is an input-output model that assesses the effects of a change on the economy. Most commonly, the model allows analysts to track the direct, intermediate, and induced effects of changes in jobs, incomes, and value-added due to the entry of a new business or loss of an existing business. Analysts may also use IMPLAN to estimate the economic contribution an existing industry makes to the local economy.

Agricultural economists at state universities have conducted analyses on the economic contribution of agriculture and agriculture-related industries to the state economy. State agencies, private consultants, and industry groups have also conducted similar studies. Common to all these groups is their use of IMPLAN. Generally, all groups agree that agribusiness includes these three components: production, processing and distribution. Not all agree on what industries constitute each component and what components should be added, included, or excluded.

In this study, IMPLAN version 3.0 Missouri state model was used. All values were reported in 2014 dollars. A conservative approach was followed to avoid problems of over-estimation. Using the component method, industry employment for each component of agribusiness was introduced into the model as though it were a new entrant. Direct employment figures— based on BEA and BLS data— were inputted and the model was allowed to generate corresponding income and value-add amounts.

For purposes of comparison, a sample of studies, completed in the last five to ten years, were reviewed. The graphic shows the agribusiness share of each state’s gross state product. This share represents the direct and indirect contribution of agribusiness. Nebraska, for example, had the highest agribusiness share of a state economy, 27 percent. Missouri’s total contribution or impact on gross state product was 8.9 percent. Among neighboring states, researchers reported a 16.5 percent share for Arkansas, 10 percent for Iowa, and 9.6 percent for Illinois.

**Agribusiness Share of State GDP**



**Terminology**

***Direct Effects:*** the initial change in a local economy. For example, a cheese plant opens hiring 150 employees in a county which causes a ripple effect or spillover across the local economy resulting in increased jobs, wages, and value-added.

***Intermediate Effects:*** these are the inter-industry transactions that increase demand. The cheese plant, for example, may locally purchase equipment and supplies.

***Induced Effects:*** changes in local household spending that are due to the increased activity in the local economy. New employees of the cheese plant now have more disposable income; workers at the supplying industries may also see increases in their spending power.

***Indirect Effects:*** also known as spillover-effects, it is a general term for intermediate plus induced effects.

***Value-Added:*** similar to gross domestic product. It is net revenue: industry sales minus production costs.

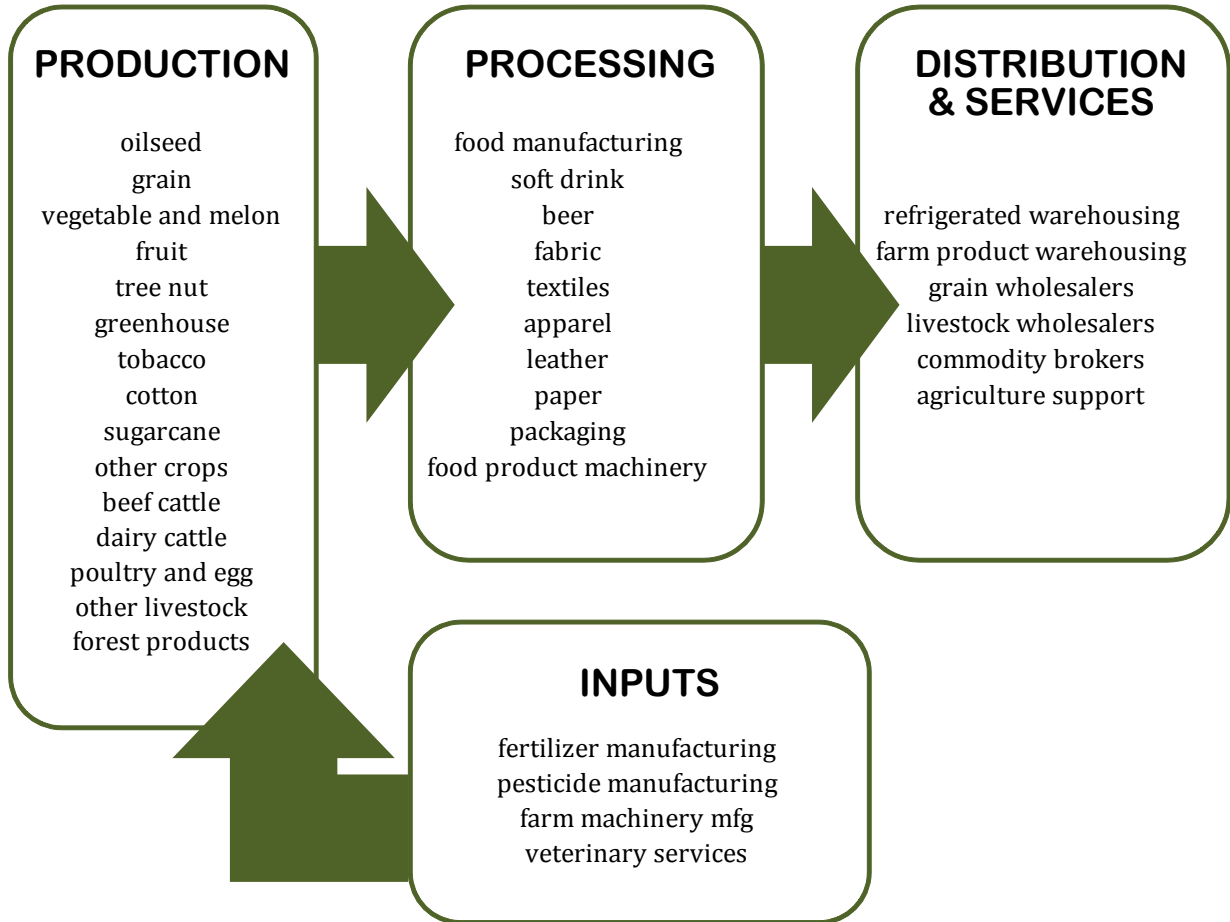


# AGRIBUSINESS

County	Farm Employment	Ag-Related Employment	Agribusiness Employment	Agribusiness % Total Employment
Adair	790	491	1,281	8.7%
Andrew	812	111	923	14.4%
Atchison	400	139	539	17.5%
Audrain	963	796	1,759	12.4%
Barry	1,402	2,058	3,460	16.5%
Barton	896	211	1,107	17.6%
Bates	1,169	142	1,311	17.0%
Benton	773	47	820	10.9%
Bollinger	753	134	887	18.5%
Boone	1,103	1,248	2,351	2.0%
Buchanan	683	5,327	6,010	10.5%
Butler	538	172	710	2.8%
Caldwell	968	29	997	21.1%
Callaway	1,338	291	1,629	8.0%
Camden	518	88	606	2.3%
Cape Girardeau	1,101	2,148	3,249	6.0%
Carrroll	1,085	192	1,277	25.8%
Carter	195	32	227	8.8%
Cass	1,505	343	1,848	4.7%
Cedar	787	136	923	14.4%
Chariton	1,021	188	1,209	25.8%
Christian	1,132	357	1,489	4.7%
Clark	670	93	763	22.3%
Clay	541	1,377	1,918	1.5%
Clinton	734	201	935	14.6%
Cole	1,004	426	1,430	2.2%
Cooper	897	76	973	11.4%
Crawford	675	229	904	8.0%
Dade	736	398	1,134	32.1%
Dallas	1,154	94	1,248	18.0%
Daviess	1,154	51	1,205	28.3%
DeKalb	824	189	1,013	20.0%
Dent	652	56	708	10.6%
Douglas	945	67	1,012	14.3%
Dunklin	447	338	785	5.8%
Franklin	1,762	1,318	3,080	5.9%
Gasconade	803	377	1,180	13.9%
Gentry	716	120	836	20.9%
Greene	1,683	3,784	5,467	2.6%
Grundy	657	390	1,047	18.6%
Harrison	992	91	1,083	23.1%
Henry	874	552	1,426	12.8%
Hickory	486	43	529	18.5%
Holt	369	135	504	19.0%
Howard	708	94	802	17.1%
Howell	1,484	369	1,853	8.4%
Iron	268	3	271	5.4%
Jackson	711	4,696	5,407	1.2%
Jasper	1,317	3,663	4,980	6.7%
Jefferson	674	902	1,576	2.1%
Johnson	1,598	183	1,781	6.1%
Knox	671	212	883	35.0%
Laclede	1,341	557	1,898	10.4%
Lafayette	1,142	554	1,696	12.4%
Lawrence	1,933	666	2,599	19.2%
Lewis	723	78	801	18.2%
Lincoln	1,122	416	1,538	8.2%
Linn	978	80	1,058	16.0%

County	Farm Employment	Ag-Related Employment	Agribusiness Employment	Agribusiness % Total Employment
Livingston	786	302	1,088	12.0%
McDonald	921	2,788	3,709	35.5%
Macon	1,211	360	1,571	19.3%
Madison	351	116	467	8.6%
Maries	802	54	856	17.6%
Marion	724	149	873	4.8%
Mercer	565	12	577	29.8%
Miller	965	135	1,100	10.9%
Mississippi	292	285	577	10.4%
Moniteau	1,078	651	1,729	24.6%
Monroe	986	93	1,079	24.2%
Montgomery	750	188	938	17.3%
Morgan	913	103	1,016	14.7%
New Madrid	415	562	977	10.5%
Newton	1,616	984	2,600	9.7%
Nodaway	1,134	264	1,398	11.6%
Oregon	747	73	820	16.8%
Osage	1,065	324	1,389	20.9%
Ozark	631	107	738	22.4%
Pemiscot	325	279	604	7.8%
Perry	910	1,277	2,187	16.2%
Pettis	1,286	1,668	2,954	11.6%
Phelps	724	293	1,017	4.4%
Pike	952	328	1,280	14.8%
Platte	558	790	1,348	2.5%
Polk	1,480	140	1,620	12.9%
Pulaski	501	81	582	2.1%
Putnam	703	69	772	30.1%
Ralls	690	922	1,612	31.6%
Randolph	770	72	842	6.3%
Ray	1,096	61	1,157	12.0%
Reynolds	355	93	448	14.3%
Ripley	428	65	493	9.8%
St. Charles	539	1,042	1,581	0.9%
St. Clair	695	40	735	21.7%
Ste. Genevieve	600	274	874	11.2%
St. Francois	629	651	1,280	4.2%
St. Louis	253	6,778	7,031	0.9%
Saline	935	1,809	2,744	22.3%
Schuyler	509	18	527	29.5%
Scotland	642	69	711	27.2%
Scott	524	1,337	1,861	9.1%
Shannon	443	35	478	14.7%
Shelby	686	109	795	24.6%
Stoddard	1,005	1,019	2,024	13.5%
Stone	576	41	617	4.2%
Sullivan	789	1,164	1,953	49.2%
Taney	398	107	505	1.6%
Texas	1,233	248	1,481	16.3%
Vernon	1,385	558	1,943	17.9%
Warren	568	496	1,064	10.1%
Washington	513	110	623	8.7%
Wayne	393	222	615	14.7%
Webster	1,790	147	1,937	16.2%
Worth	379	4	383	26.0%
Wright	1,212	334	1,546	22.8%
St. Louis City	-	6,187	6,187	2.2%
Unassigned	-	220	220	-

**AGRIBUSINESS SECTOR COMPONENT INDUSTRIES**



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## Changing Farm Landscape

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### Note\*\*

*This workforce solution was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.*