



*April 2024*

# Missouri Dairy Industry Revitalization Study

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## **Missouri Dairy Industry Revitalization Study**

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# Dairy Cow Inventory

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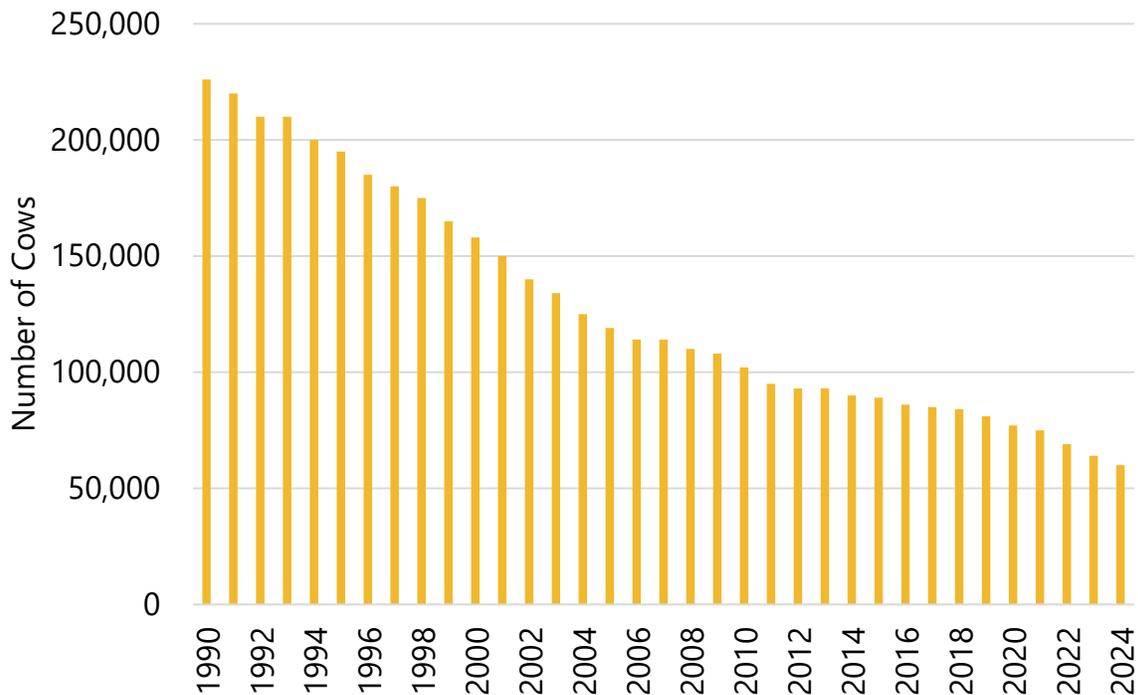
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# 1. Dairy Cow Inventory

## 1.1 Missouri Dairy Inventory

The Missouri dairy cow inventory has decreased substantially during the past three decades. Exhibit 1.1.1 presents the Missouri dairy inventory trend on January 1 of each year. In 1990, Missouri farms maintained 226,000 milk cows. During the 1990s and early 2000s, the state’s dairy cow inventory sharply declined. A period of slow decline occurred before accelerating again from 2019 to the present. On January 1, 2024, the state’s milk cow inventory had dropped to 60,000 milk cows.

**Exhibit 1.1.1 — Missouri Milk Cow Inventory, January 1 Inventory, 1990 to 2024**

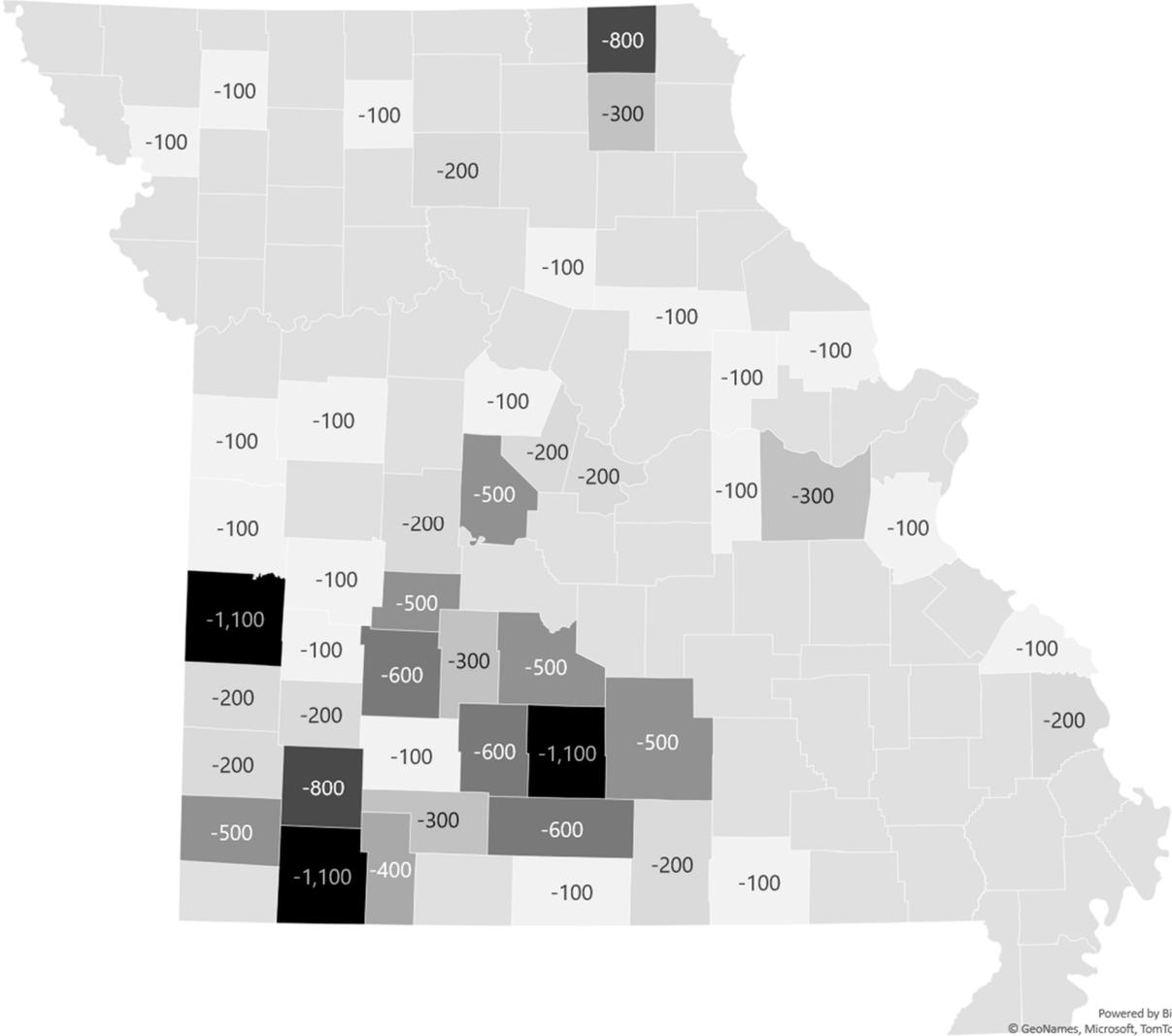


Source: USDA, National Agricultural Statistics Service



Inventory changes have been most significant in the traditionally strong dairy areas of south-central and southwest Missouri. Exhibit 1.2.2 illustrates the change in Missouri milk cow inventory by county according to the USDA. Between 2019 and 2023, Missouri counties that decreased milk cow inventories the most were Barry, Wright, and Vernon counties (each with an 1,100-cow reduction). Missouri lost a total of 16,000 milk cows between 2019 and 2023. No Missouri counties reported an inventory increase over this period.

**Exhibit 1.2.2 — Loss in Milk Cow Inventory by County from 2019 to 2023**



Source: USDA, National Agricultural Statistics Service

### 1.3 Share of U.S. Inventory and Ranking

On January 1, 2024, Missouri's dairy herd represented 0.6 percent of the total U.S. milk cow inventory. Exhibit 1.3.1 lists dairy cow inventory data for Missouri and its surrounding states, and it also reports each state's milk cow inventory as a share of U.S. inventory. Missouri and its surrounding states collectively represented 7.7 percent of the U.S. dairy herd on January 1, 2024.

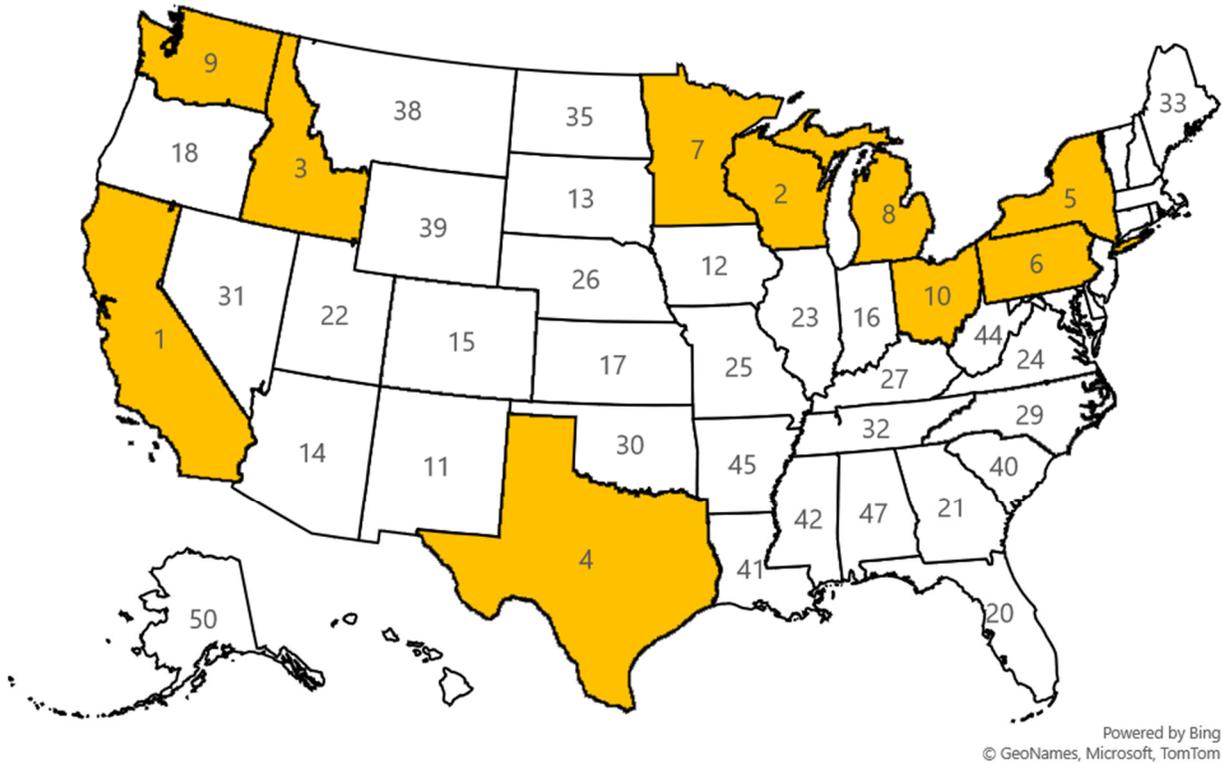
**Exhibit 1.3.1 — Milk Cow Inventory in Missouri and Surrounding States, January 1, 2024**

State	Inventory	% of U.S. Inventory
Iowa	240,000	2.6%
Kansas	176,000	1.9%
Illinois	79,000	0.8%
Missouri	60,000	0.6%
Nebraska	53,000	0.6%
Kentucky	43,000	0.5%
Oklahoma	38,000	0.4%
Tennessee	25,000	0.3%
Arkansas	3,000	0.0%

Source: USDA, National Agricultural Statistics Service

Exhibit 1.3.2 illustrates each state's rank for milk cow inventory on January 1, 2024, and it highlights states ranked in the top 10 for milk cow inventory. The top 10 states are concentrated in the West, Great Lakes, mid-Atlantic and South regions. Missouri ranked as No. 25 for milk cow inventory. Of the states that neighbor Missouri, Iowa and Kansas had the highest rankings – No. 12 and No. 17, respectively – for dairy cow inventory on January 1, 2024.

**Exhibit 1.3.2 — Milk Cow Inventory, January 1, 2024, Rankings by State and Top 10 States Highlighted**



Source: USDA, National Agricultural Statistics Service



# Dairy Farms

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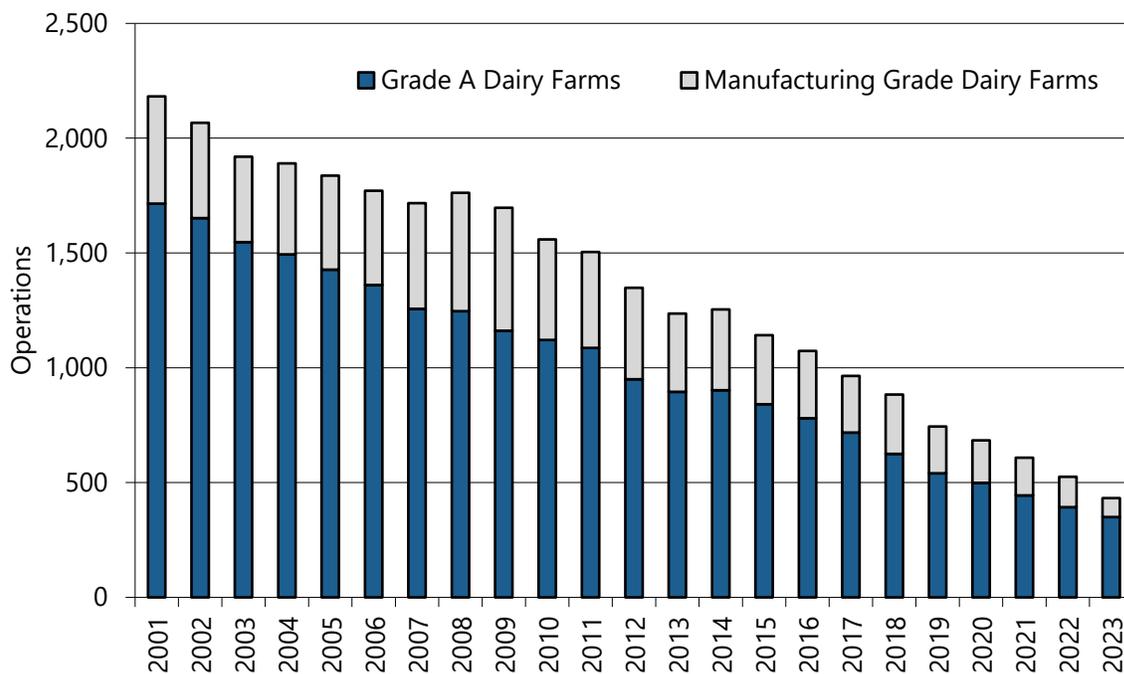
## 2. Dairy Farms

### 2.1 Number of Farms

In Missouri, commercial dairy farms either sell permitted “Grade A” milk or “manufacturing grade” milk. Grade A milk refers to milk produced under conditions to meet fluid milk consumption standards. Manufacturing grade milk refers to milk that does not meet the conditions for fluid milk consumption and can be used in cheese, butter and nonfat dry milk.

In December 2023, 432 permitted dairy farms operated in Missouri. Of these, 350 were Grade A dairy farms, and 82 were manufacturing-grade dairy farms, mostly Amish operations and some goat or sheep dairies. See Exhibit 2.1.1. Over the past ten years, Missouri commercial dairies decreased by 66 percent.

**Exhibit 2.1.1 — Missouri Commercial Dairy Operations**



Source: Missouri State Milk Board



## 2.2 Farm and Herd Characteristics

For Missouri, the 2022 U.S. Census of Agriculture reported that 549 farms operated in the dairy cattle and milk production industry, designated by the North American Industry Classification System code 11212. Exhibit 2.2.1 summarizes some characteristics of the Missouri farms in this industry. In 2022, these farms maintained 202,491 acres, and they harvested 86,399 acres of cropland. On average, the market value of land and building assets per farm was about \$1.7 million, and the machinery and equipment market value per farm was about \$192,000.

**Exhibit 2.2.1 — Characteristics of Missouri Dairy Cattle and Milk Production Farms by NAICS Classification System (11212), 2022**

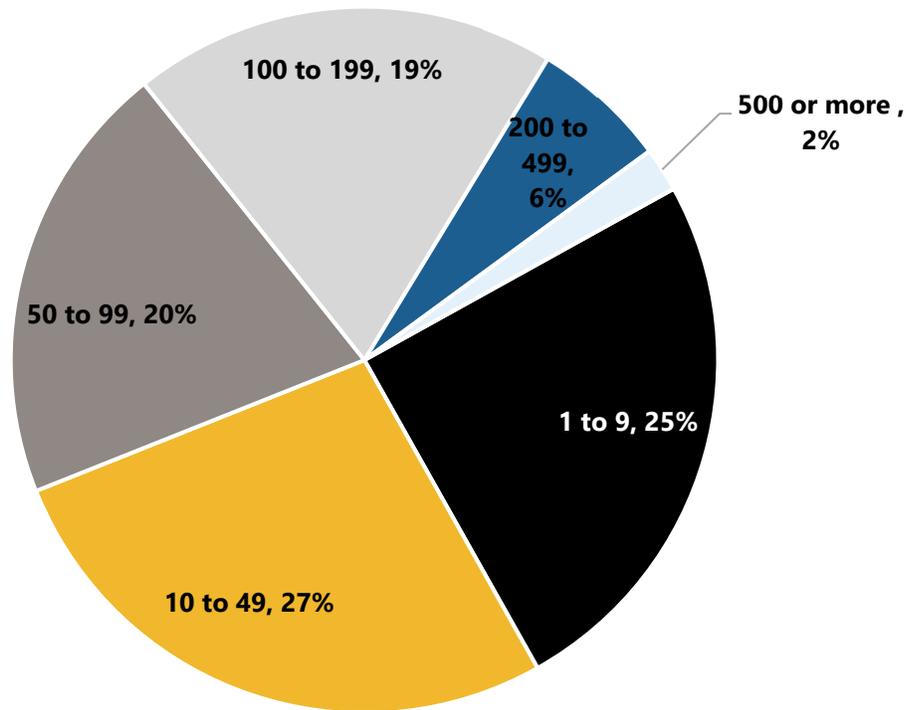
	Total	Units
Farms	549	farms
Land in farms	202,491	acres
Harvested cropland	86,399	acres
Estimated average market value of land and buildings per farm	\$1,681,821	dollars
Estimated average market value of machinery and equipment per farm	\$192,514	dollars
Market value of agricultural products sold, total sales	\$504,892	dollars

Source: Derived from USDA, National Agricultural Statistics Service, Census of Agriculture



Of the Missouri farms included in the dairy cattle and milk production NAICS category, the census found that 47 percent had operations with 10 to 99 milk cows. Exhibit 2.2.2 illustrates the distribution of Missouri dairy cattle and milk production farms by their milk cow inventory. Based on this data, 28 percent of farms had at least 100 milk cows, and 25 percent of farms had fewer than 10 milk cows. Most farms with one to nine cows are Amish operations, family operations producing milk for home consumption or operations with nurse cows for bottle calves.

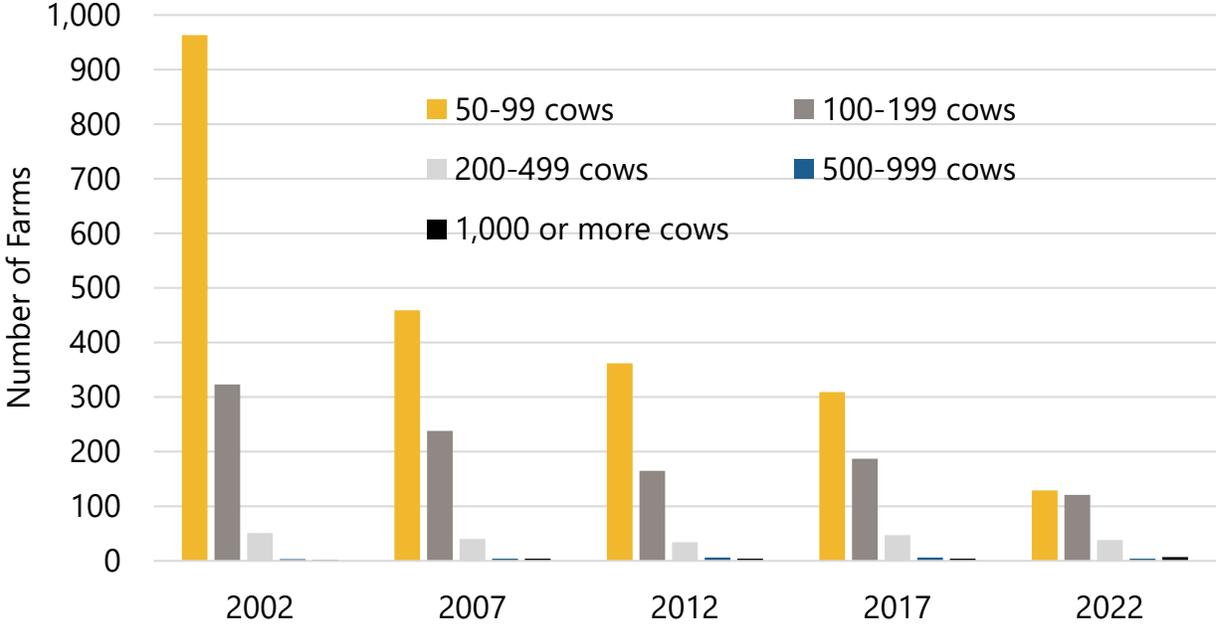
**Exhibit 2.2.2 — Milk Cow Inventory Distribution of Missouri Dairy Cattle and Milk Production Farms by NAICS Classification System (Code 11212), 2022**



Source: USDA, National Agricultural Statistics Service, Census of Agriculture

Exhibit 2.2.3 illustrates changes in Missouri dairy farm herd size distribution from 2002 to 2022. In all years observed, Missouri herds were predominantly 50- to 99-cow operations. However, the differences in number of farms with 50 to 99 cows and other herd size categories have narrowed. In 2022, Missouri recorded 129 farms with 50 to 99 cows, 121 farms with 100 to 199 cows, 38 farms with 200 to 499 cows, 4 farms with 500 to 999 cows and 7 farms with more than 1,000 cows.

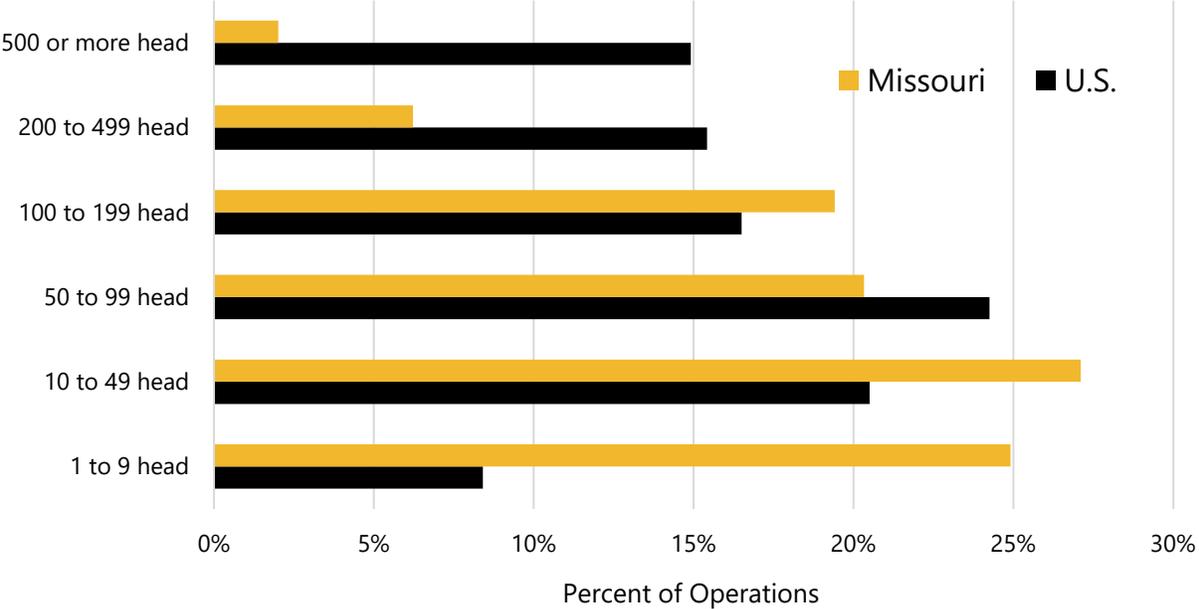
**Exhibit 2.2.3 — Missouri Dairy Farm Herd Size Distribution, 2002 to 2022**



Source: USDA, National Agricultural Statistics Service

Exhibit 2.2.4 evaluates the percent of operations that fit into the various herd size categories during 2022 for the U.S. and Missouri. The U.S. has a greater portion of operations than Missouri in 200 head or larger categories. On the other hand, Missouri has a greater share of its operations in the smaller herd size categories (except 50 to 99 head). Missouri only has a few operations larger than 500 cows.

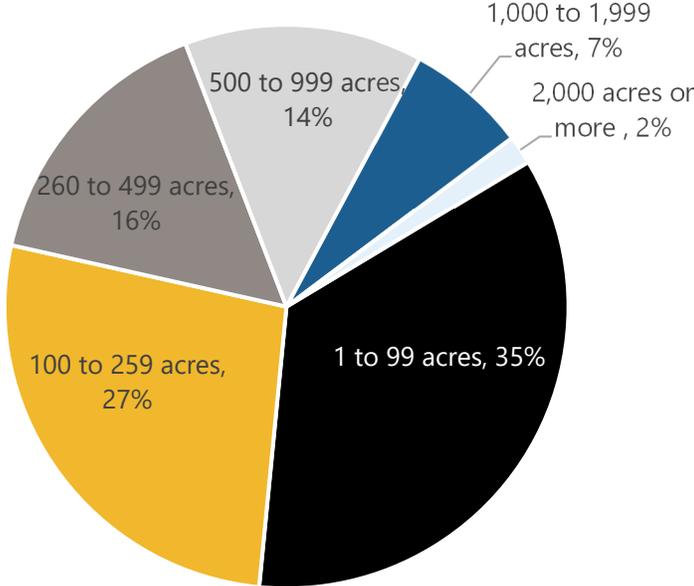
**Exhibit 2.2.4 — Missouri and U.S Dairy Herd Size Distribution, Pct. of Operations in NAICS Classification System (Code 11212), 2022**



Source: USDA, National Agricultural Statistics Service, Census of Agriculture

Missouri dairy cattle and milk production farms have significant land holdings. Exhibit 2.2.5 shares the distribution of these farms by acreage category. In 2022, 35 percent of Missouri dairy cattle and milk production farms maintained less than 100 acres, 27 percent maintained between 100 acres and 259 acres, 16 percent maintained between 260 and 499 acres and 22 percent maintained at least 500 acres in 2022.

**Exhibit 2.2.5 — Acreage of Missouri Dairy Cattle and Milk Production Farms by NAICS Classification System (11212), 2022**



Source: USDA, National Agricultural Statistics Service, Census of Agriculture

## 2.3 Dairy Farm Operator Characteristics

Exhibit 2.3.1 shares Missouri principal operator race, ethnicity and gender from 2022. Regarding race, Missouri is predominately white, with about 99 percent of producers. Of the principal dairy farm operators in Missouri during 2022, 35.9 percent were women and 64.1 percent were male.

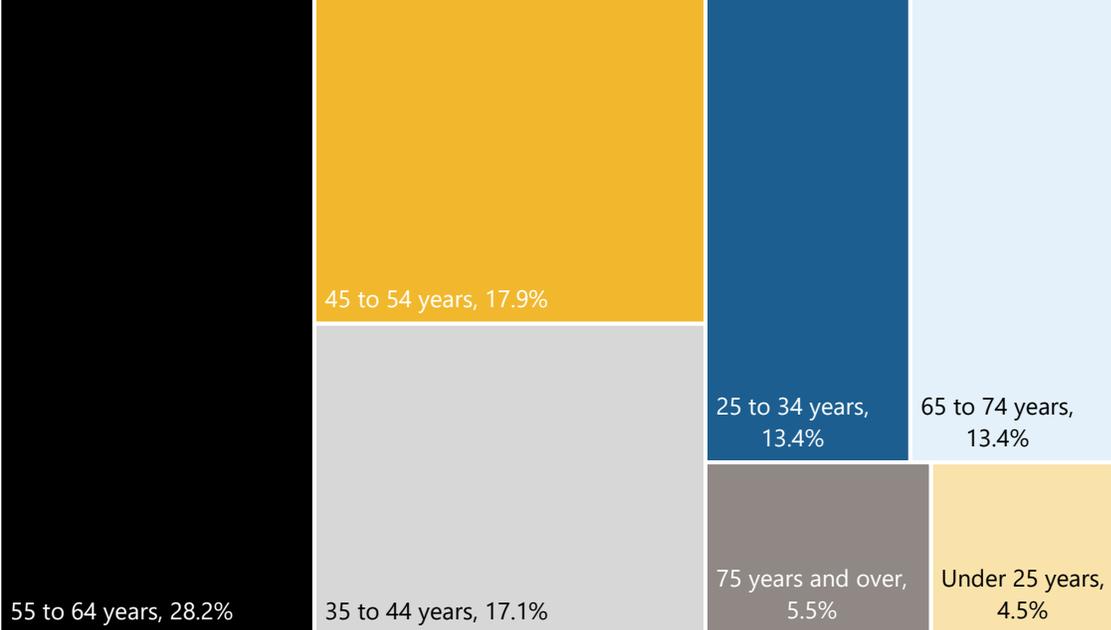
**Exhibit 2.3.1 — Producer Characteristics of Missouri Dairy Cattle and Milk Production Farms by NAICS Classification System (Code 11212), 2022**

	Number	Percent
<b>Race or Ethnicity</b>		
American Indian or Alaska Native	2	0.2%
Asian	4	0.3%
Black or African American	--	0.0%
Native Hawaiian or other Pacific Islander	--	0.0%
White	1,091	99.4%
Operators reporting more than one race	1	0.4%
Spanish, Hispanic or Latino origin	12	1.1%
<b>Gender</b>		
Male	704	64.1%
Women	394	35.9%

Source: USDA, National Agricultural Statistics Service, Census of Agriculture

Based on 2022 data from the U.S. Census of Agriculture, 28.2 percent of Missouri dairy cattle and milk production farm principal operators were 55 to 64 years old. See Exhibit 2.3.2. The 45- to 54-year-old segment represented 17.9 percent of all principal operators. Just 17.9 percent of the principal operators were younger than 35, indicating that Missouri dairy farm principal operators tend to be an older group.

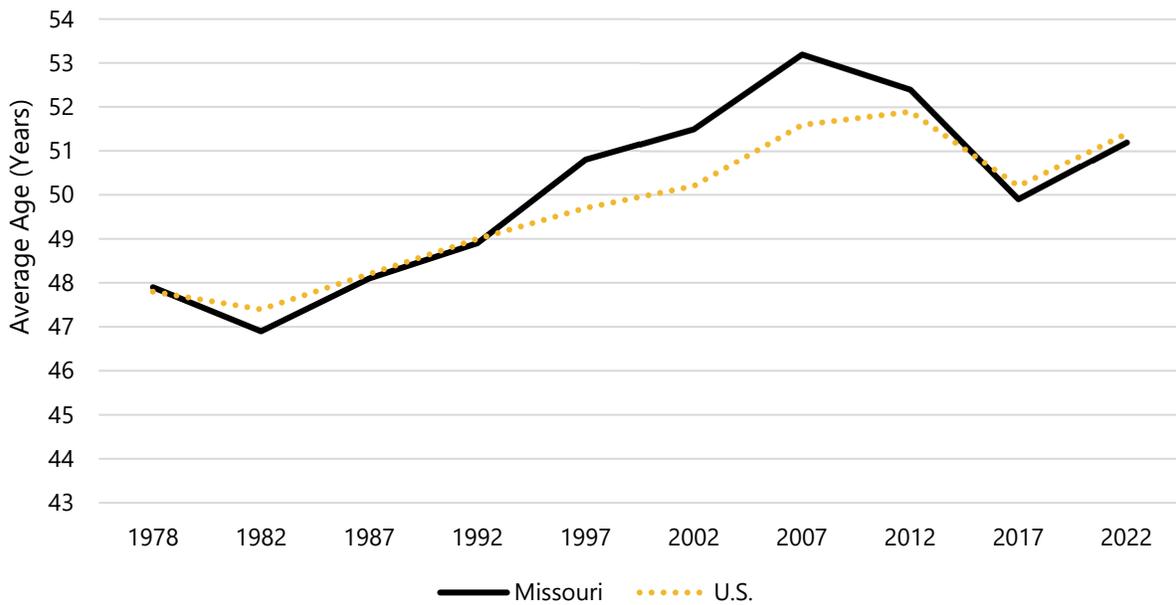
**Exhibit 2.3.2 — Age Distribution of Missouri Dairy Cattle and Milk Production Farm Principal Operators by NAICS Classification System (Code 11212), 2022**



Source: USDA, National Agricultural Statistics Service, Census of Agriculture

Exhibit 2.3.3 illustrates the trend in operator average age since 1978. Until the late 1990s, Missouri and U.S. dairy cattle and milk production farm operators tended to have similar average ages. In the late 1990s, however, the Missouri and U.S. operator average ages slightly increased their variance. This difference in average age narrowed in the last three censuses. In 2022, the average Missouri dairy cattle and milk production farm operator was 51.2 years old, and the U.S. average was 51.4 years old.

**Exhibit 2.3.3 — Trend in Missouri and U.S. Average Age of Dairy Cattle and Milk Production Farm Operators (NAICS Code 11212)**



Source: USDA, National Agricultural Statistics Service, Census of Agriculture

## 2.4 Dairy Farm Business Structure

Most Missouri farms in the dairy cattle and milk production industry have been organized as family or individual farms for tax purposes. These family or individual farms represented 79.8 percent of all Missouri dairy cattle and milk production farms in 2022. See Exhibit 2.4.1. Other Missouri dairies are formally organized as partnerships, 12.9 percent; corporations, 4.4 percent; and other structures, which include cooperatives, estates or trusts, institutions or other entities, 2.9 percent.

**Exhibit 2.4.1 — Legal Status for Tax Purposes of Missouri Dairy Cattle and Milk Production Farms by NAICS Classification System (11212), 2022**

	Farms	
	Number	Percent
Family or individual	438	79.8%
Partnership	71	12.9%
Corporation	24	4.4%
Other	16	2.9%
Total	549	100%

Source: USDA, National Agricultural Statistics Service, Census of Agriculture





# Milk Production

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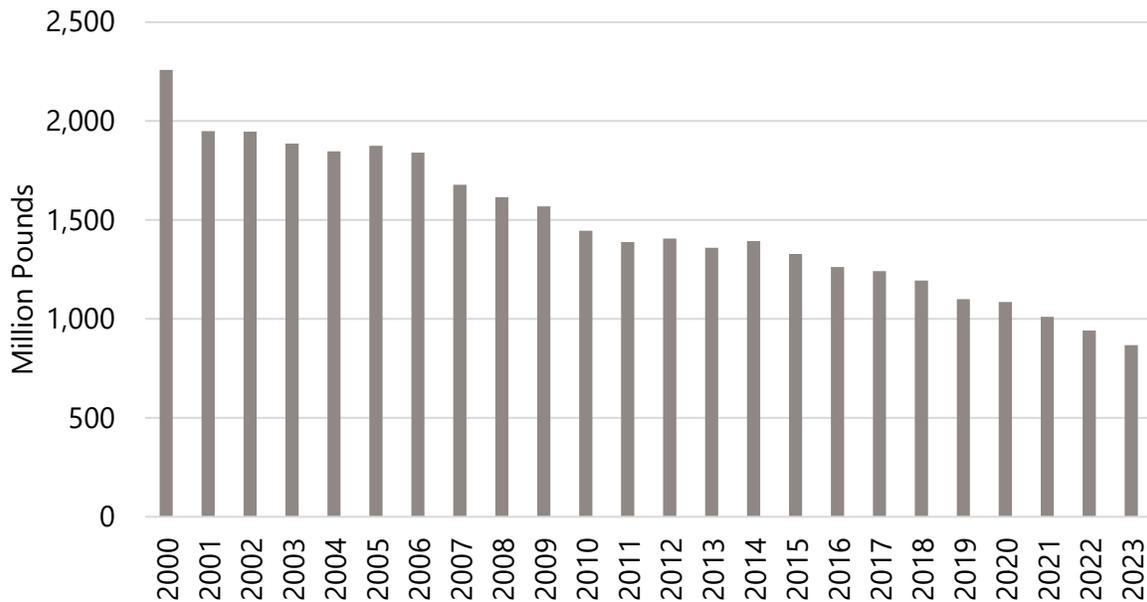
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# 3. Milk Production

## 3.1 Total Milk Production

Since 2000, Missouri milk production has trended downward, illustrated by Exhibit 3.1.1. Between 2000 and 2023, total Missouri milk production decreased by 69 percent. A shrinking Missouri dairy herd and stagnant milk yield per cow are two factors contributing to the state’s milk production decline. The lack of milk yield improvements may be attributed Missouri’s large share of pasture-based dairies. Pasture-based dairies operate at lower milk production per cow levels than confinement dairies.

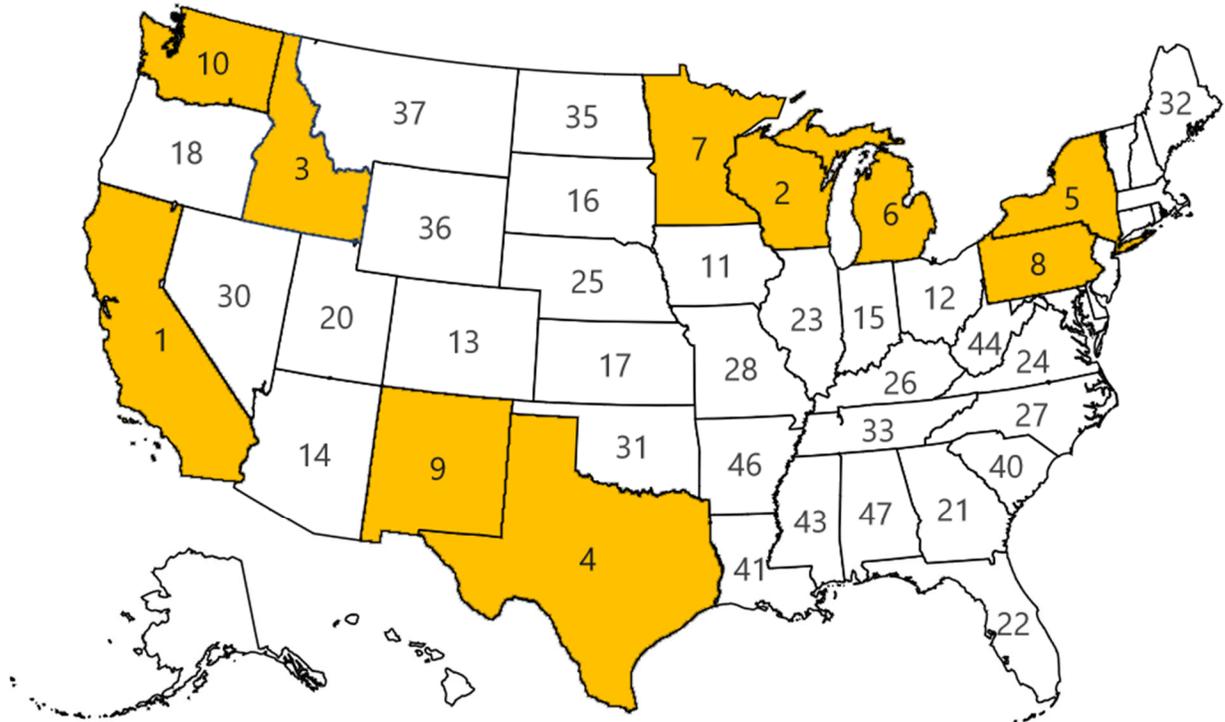
**Exhibit 3.1.1 — Missouri Milk Production, 2000 to 2023**



Source: USDA, National Agricultural Statistics Service

Relative to other states, Missouri ranked 28th for its milk production output during 2023. Exhibit 3.1.2 graphically depicts milk production rankings for Missouri and states that had a higher ranking (top 10 states in gold). The three states that produced the most milk during 2023 were California, Wisconsin and Idaho.

**Exhibit 3.1.2 — Annual Milk Production, 2023, Rankings by State and Top 10 States Highlighted**



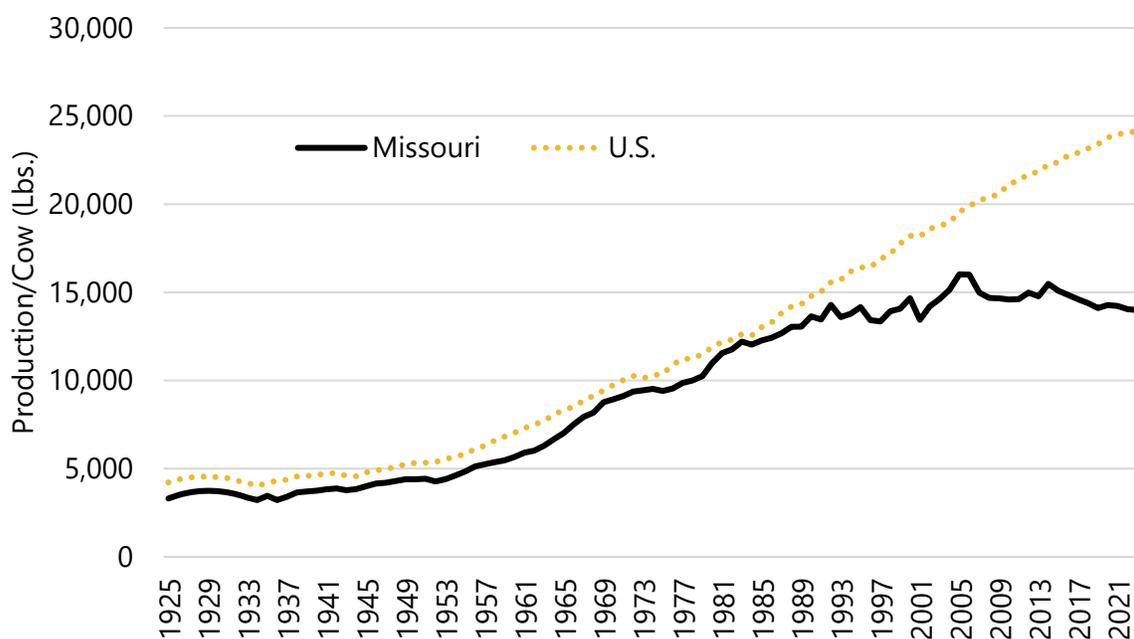
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Source: USDA, National Agricultural Statistics Service

### 3.2 Milk Production per Cow

Since the 1920s, Missouri dairy cows have lagged U.S. dairy cows in average milk yield per cow. Exhibit 3.2.1 charts the average milk yield per cow for Missouri and U.S. dairy cows. Another trend noted in the milk yield data involves the recent widening deviation between the average U.S. and Missouri milk yield per cow. Since the 1990s, U.S. average milk yield per cow has continued a consistent growth trend. Growth in the average milk yield for Missouri cows began to slow during the 1990's. A common explanation for this Missouri deviation is the state's reliance upon pasture-based dairy systems rather than confinement systems during this time.

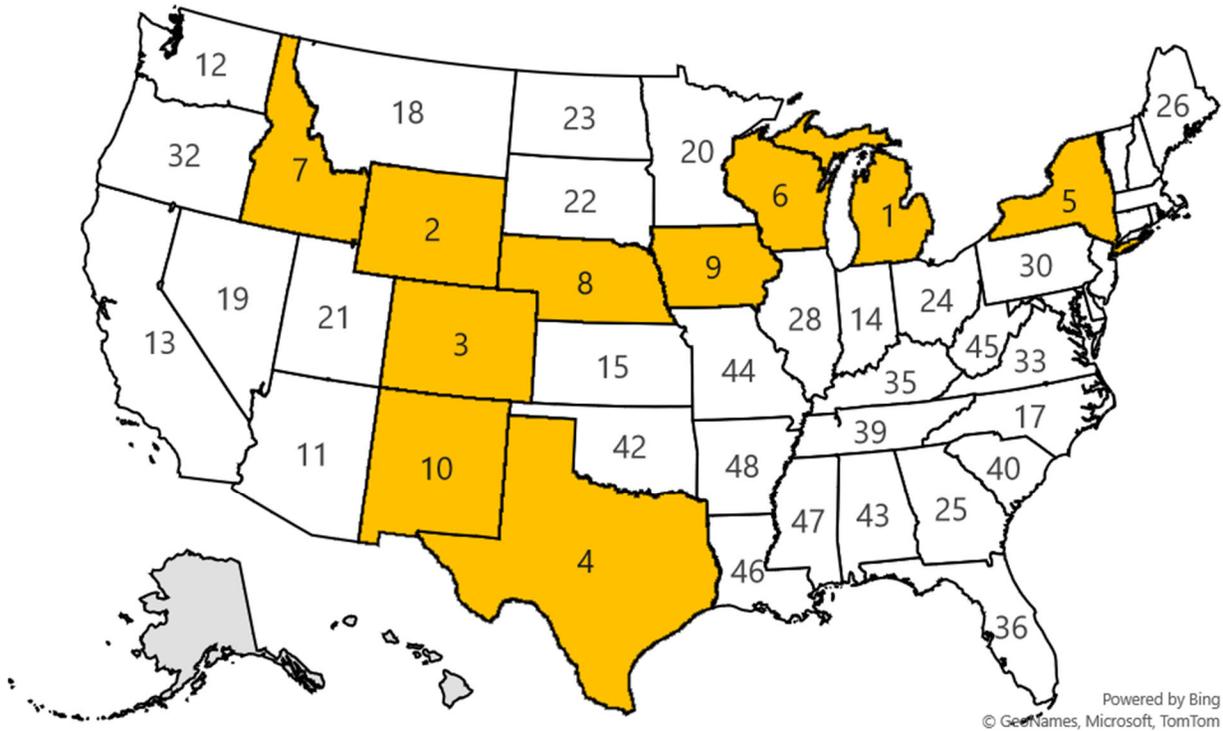
**Exhibit 3.2.1 — U.S. and Missouri Milk Yield per Cow Trends, 1924 to 2023**



Source: USDA, National Agricultural Statistics Service

Exhibit 3.2.2 depicts each state's rank in milk production per cow during 2023, and highlights states ranked in the top 10. Top three states include Michigan, Wyoming and Colorado. Missouri ranked 44th for milk production per cow. Of its neighboring states, only Arkansas averaged lower milk output per cow than Missouri.

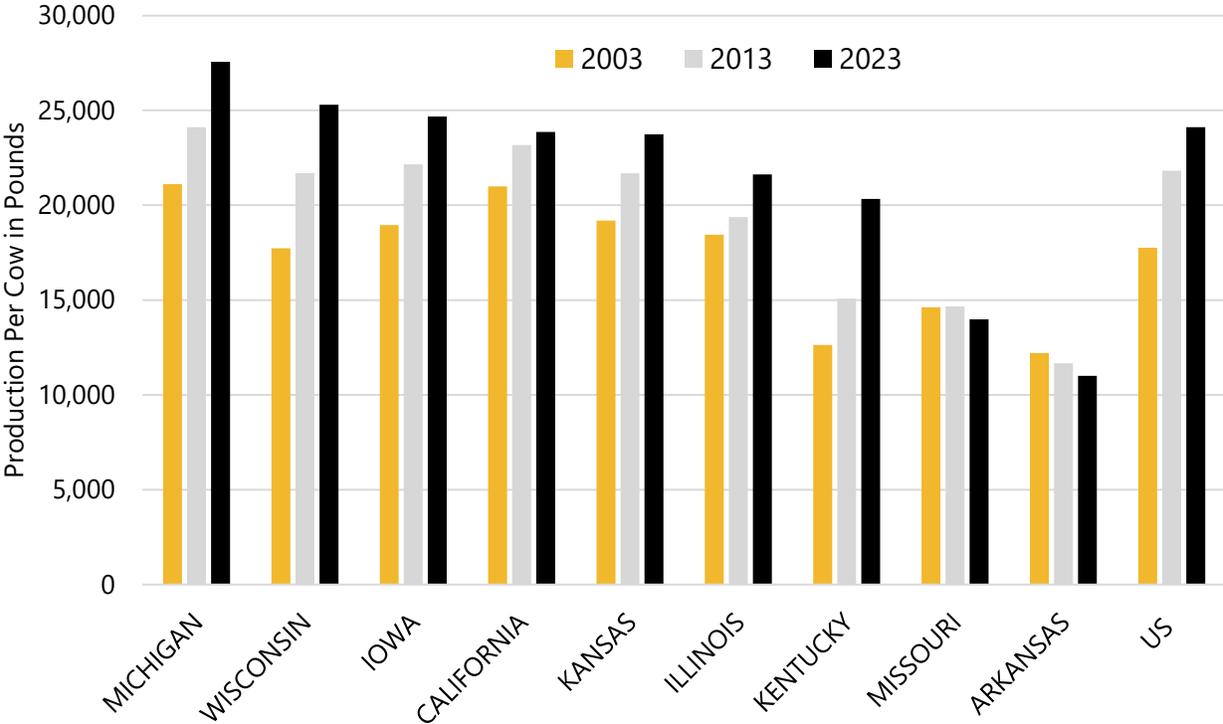
**Exhibit 3.2.2 — Milk Production per Cow, 2023, Rankings by State and Top Ten States Highlighted**



Source: USDA, National Agricultural Statistics Service

In 2023, U.S. milk production per cow averaged 24,117 pounds, nearly double Missouri’s 13,984 pounds per cow. Exhibit 3.2.3 shows milk production per cow for the U.S., Missouri and select states in 2003, 2013, and 2023. Between 1992 and 2022, milk production per cow accelerated in all states listed except Missouri and Arkansas. States with the greatest production output advances between 2003 and 2023 were Kentucky and Wisconsin, with increases of 61 and 43 percent, respectively. By comparison, milk production per cow in Missouri declined by 4% over the same period. Average U.S. milk production per cow increased 36% from 2003 to 2023.

**Exhibit 3.2.3 — Trends in Milk Yield per Cow for Selected States in 1992, 2002, 2012 and 2022.**

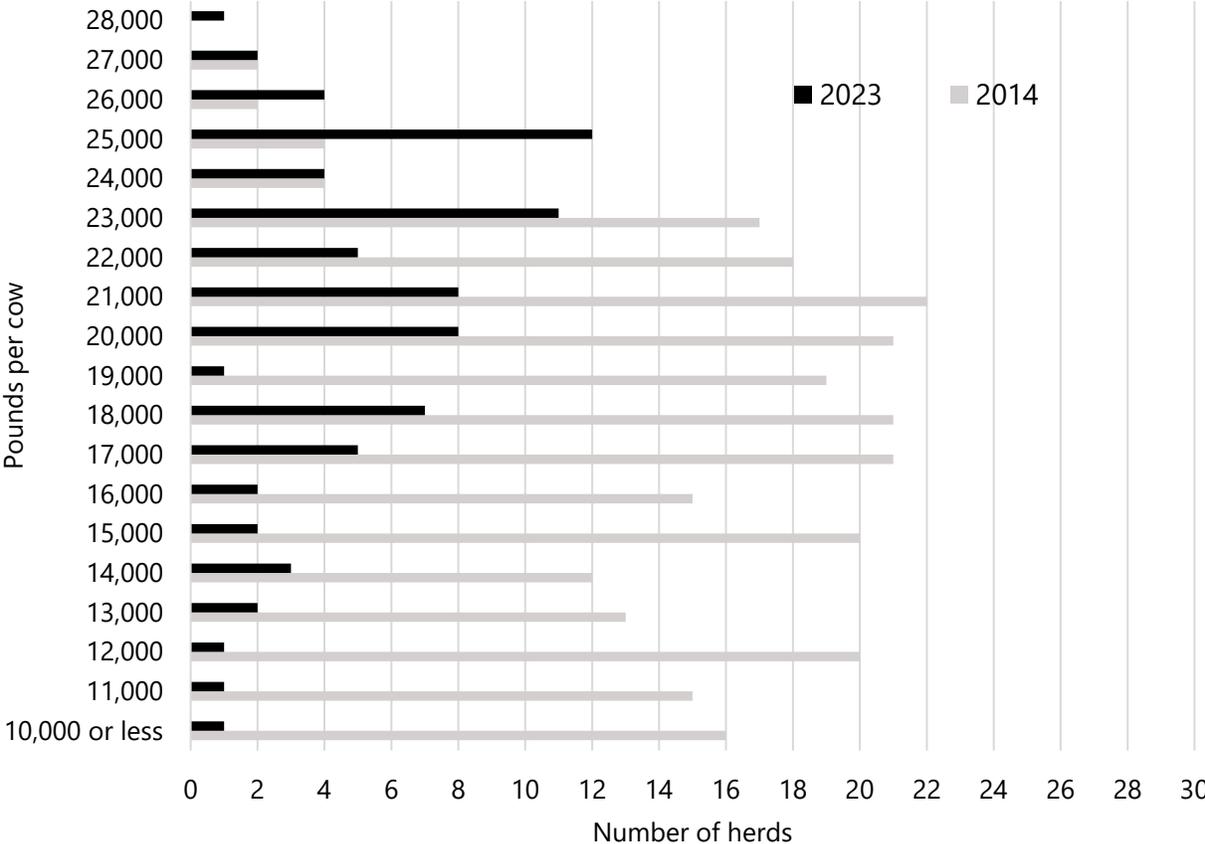


Source: USDA, National Agricultural Statistics Service

### 3.3 Rolling Herd Averages

Rolling herd averages estimate the average milk production for an average milk cow during a particular year. Comparing the 2014 and 2023 rolling averages in Exhibit 3.3.1 communicates the extent to which average Missouri milk output per cow has changed during the past nine years. These rolling average data suggest that Missouri dairy farmers have improved milk production per cow during the past decade. The dynamics have been interesting, though. In 2014, 37 percent of the Missouri Dairy Herd Improvement Association (DHIA) rolling herd averages were at 15,000 or less pounds. In 2023, 13 percent of Missouri farm rolling herd averages on DHIA were at or below this threshold. Approximately 3 percent of Missouri dairy farms had DHIA rolling herd averages that were at or exceeded 25,000 pounds in 2014, but that share increased to 24 percent in 2023.

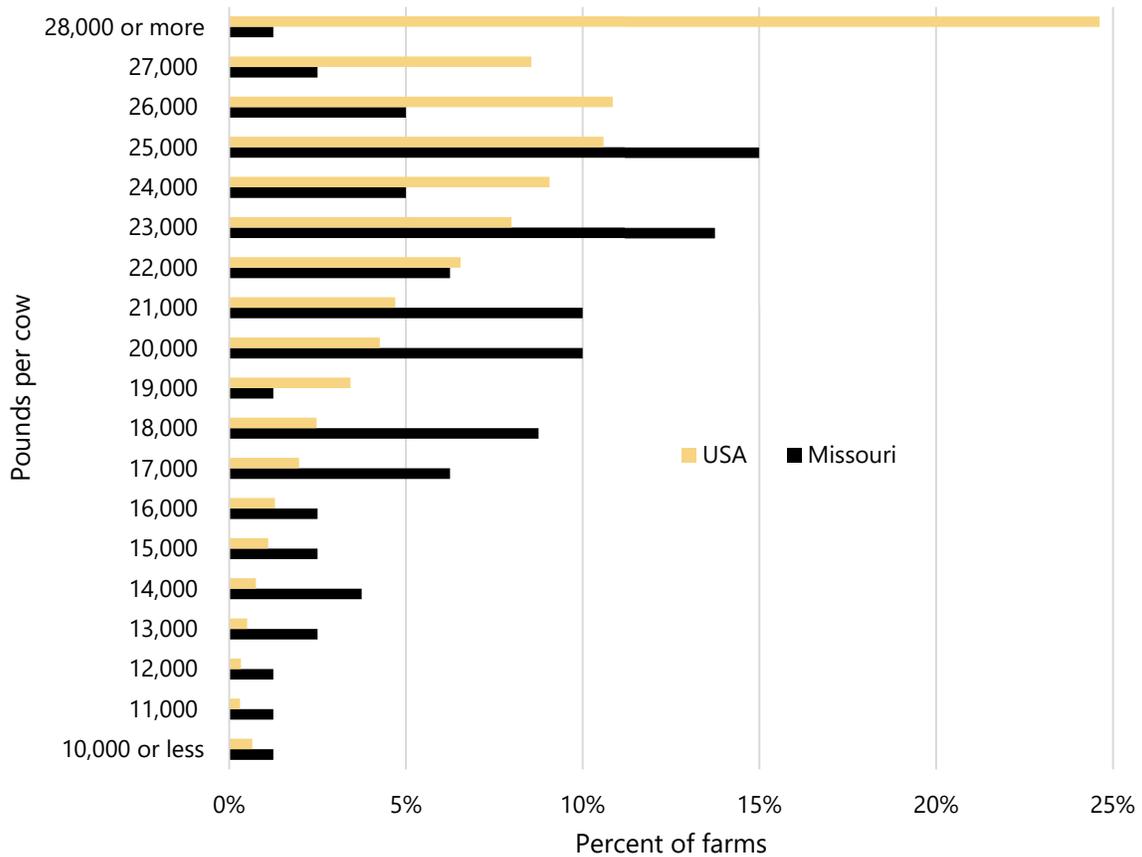
**Exhibit 3.3.1 — Missouri Rolling Herd Averages, 2014 and 2023**



Source: Dairy Herd Information Association (DHIA), Dairy Records Management Systems (DRMS)

Exhibit 3.3.2 displays the percent of Missouri and U.S. dairy farms by various rolling herd average categories in 2023. Approximately 55 percent of U.S. herds are producing at 25,000 pounds or greater. For Missouri, this share was approximately 24 percent of its herds.

**Exhibit 3.3.2 — Missouri and U.S. Rolling Herd Averages, 2023**



Source: Dairy Herd Information Association (DHIA), Dairy Records Management Systems (DRMS)

### 3.4 Per Capita Milk Production and Consumption

Per capita consumption of all dairy products in the U.S. averaged 653 pounds (milk-fat basis) during 2022. Between 1990 and 2022, U.S. consumer demand for milk in all dairy products increased by 15 percent. Exhibit 3.4.1 displays the trends for U.S. dairy product consumption.

Note that consumption of fluid milk, dry products and frozen products clearly trended downward over the years shown. Steady growth in the cheese, butter and yogurt consumption categories has supported the increase in U.S. dairy consumption.

**Exhibit 3.4.1 — U.S. per Capita Dairy Product Consumption Trends, Pounds**

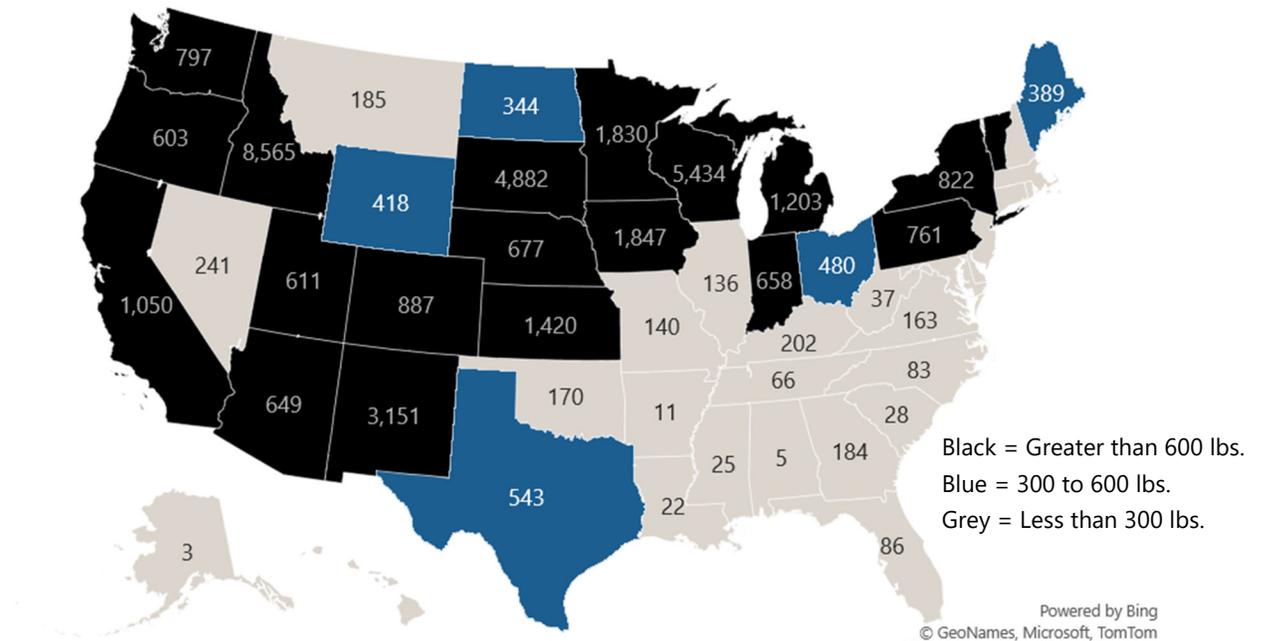
Year	Fluid milk	Cheese	Butter	Frozen products	Dry products	Yogurt	All products, milk-equivalent (milk-fat basis)
1990	220	27.9	4.3	28.2	7.4	3.9	568
1995	205	29.3	4.6	28.9	7.7	6.1	572
2000	196	32.1	4.5	27.5	6.6	6.5	590
2005	185	34.0	4.5	25.2	7.3	10.3	603
2010	177	35.0	4.9	23.9	5.3	13.4	603
2015	155	37.2	5.6	23.3	5.9	14.4	628
2020	141	40.1	6.3	22.2	4.3	13.6	651
2022	130	41.7	6.0	22.2	4.0	13.9	653

Source: USDA, Economic Research Service



Per capita milk production reflects an individual state's supply and demand balance. Missouri produced 140 pounds of milk per capita in 2022. Exhibit 3.4.2 shares milk production per capita data for all U.S. states. States shaded in grey do not produce enough milk for their population's fluid/soft needs (Class I and Class II products). Values tend to be lowest in the southeast U.S. From 2018 to 2023, Missouri's per capita milk production decreased by 28 percent.

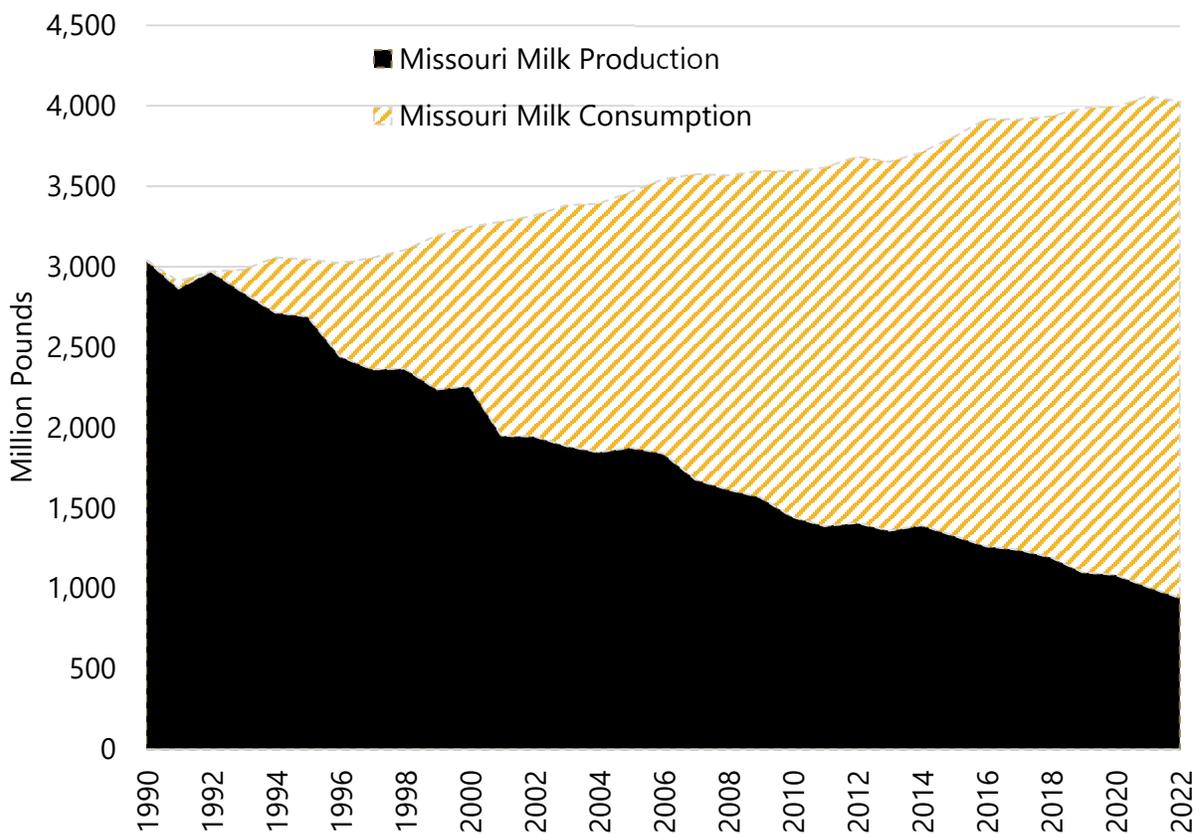
**Exhibit 3.4.2 — Per Capita Milk Production by State, 2023**



Source: Federal Milk Market Administrator, Central Order

Because milk production lags behind consumer needs, Missouri is a milk-deficit state. Exhibit 3.4.3 quantifies the supply and demand balance from 1990 to 2022. The exhibit considers the state’s milk production and consumer milk needs for all dairy products on a milk-equivalent basis. Missouri only recorded a milk surplus in 1990 and 1992 in the years observed. Recently, the state has consistently increased its milk deficit each year as production has declined and consumption needs have risen. In 2022, Missouri’s estimated milk deficit was about 3.1 billion pounds. Based on Missouri’s average yield per cow, it would need an additional 221,159 dairy cows to meet the milk deficit demand.

**Exhibit 3.4.3 — Trend in Missouri Milk Surplus or Deficit, 1990 to 2022**



Sources: U.S. Census Bureau and USDA, National Agricultural Statistics Service



# Milk Prices

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## 4. Milk Prices

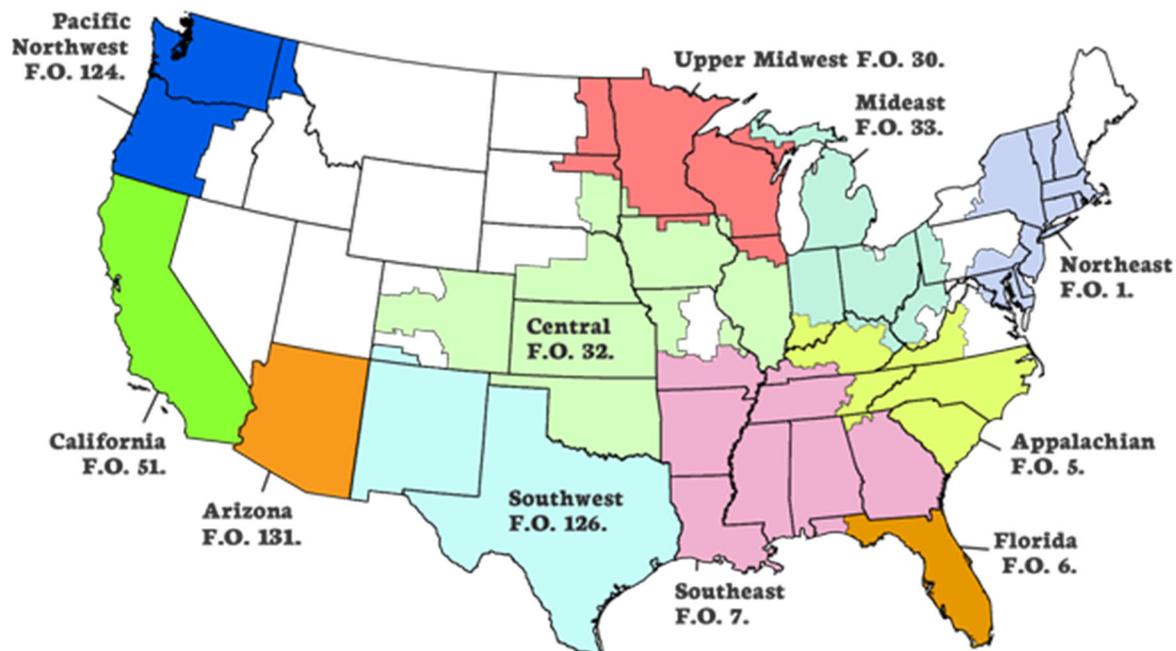
### 4.1 Mailbox Milk Prices

Federal milk marketing orders set minimum prices for about 75 percent of the U.S. milk production, and Grade A milk constitutes more than 99 percent of all U.S. milk produced. The revised Agricultural Marketing Agreement Act of 1937 authorizes federal orders. USDA cites a few major benefits of the federal milk orders program:

- 1) It provides consumers with an adequate milk supply to meet needs throughout the year and helps to prevent extreme price fluctuations during heavy and light milk production periods.
- 2) It ensures a reasonable minimum milk price for dairy producers throughout the year.

Exhibit 4.1.1 highlights the 11 federal milk marketing order coverage areas.

**Exhibit 4.1.1 — Federal Milk Marketing Order Areas**



Source: USDA, Agricultural Marketing Service

The Southeast Order, which includes portions of southern Missouri, has a high Class I (fluid milk) utilization. The utilization rate averaged around 74 percent in 2023. As a comparison, the Central Order in northern Missouri had a Class I utilization rate that averaged 27 percent. Because Class I is the highest-valued milk over time, orders with higher Class I utilization tend to have higher blend prices. Missouri is an increasingly milk-deficient area. Other states south and east of Missouri have experienced a similar phenomenon. It is expected that milk prices in this region will show relative increases compared with prices in other parts of the country, particularly as energy prices increase and milk transportation costs make local milk more valuable.

The national federal order mailbox milk price is a good measure of regional differences in U.S. milk prices received. Mailbox milk prices reflect the net pay price received by dairy farmers for milk. This includes all payments received for milk sold and all costs associated with marketing milk, including hauling. The reported price is a weighted average for the reporting area and is reported at the average butterfat test. Exhibit 4.1.2 presents mailbox milk prices for various U.S. states and regions in 2021, 2022 and 2023. The southeast region of the U.S. tends to have higher milk prices due to its high fluid milk demands and short supply. During the three years observed, the milk price in all federal order areas averaged \$20.67 per hundredweight.

**Exhibit 4.1.2 — Mailbox Milk Prices for Selected Reported Areas**

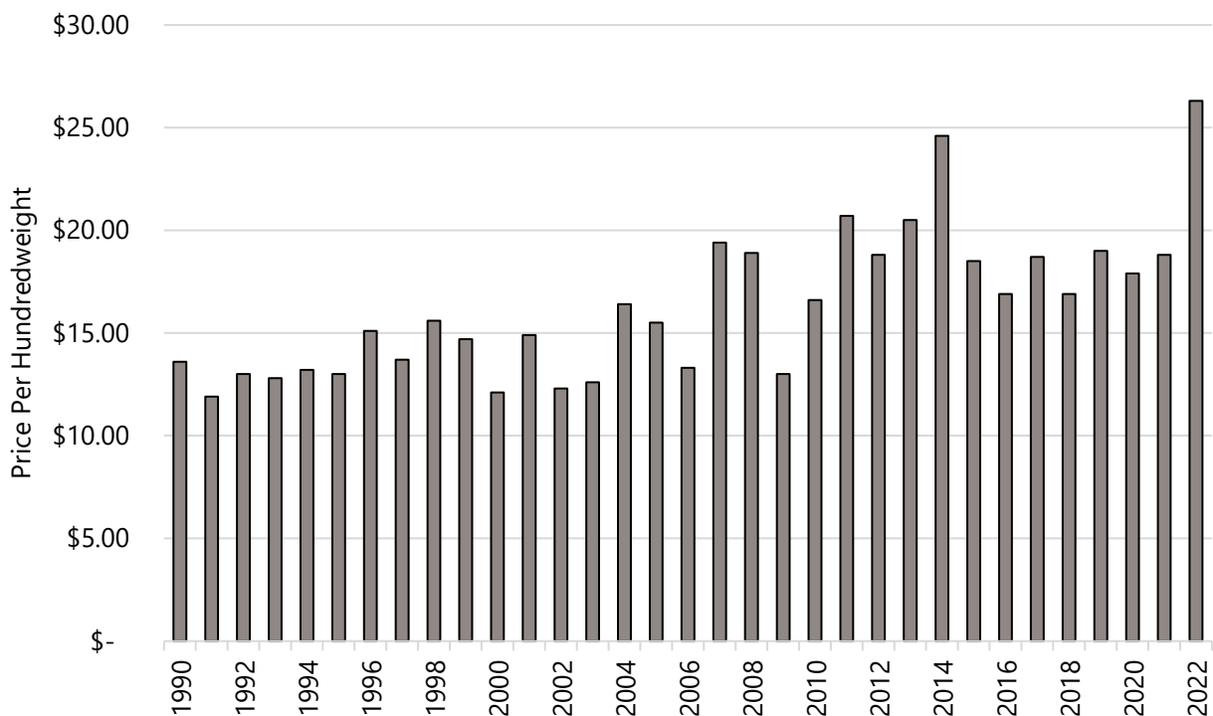
Reporting Area	2021	2022	2023	Three-Year Simple Average
	<i>Price Per Hundredweight</i>			
Florida	20.18	26.30	23.31	23.26
New York	17.96	25.53	20.85	21.45
Southern Missouri	18.03	26.34	19.61	21.33
Illinois	18.31	25.27	19.97	21.18
Indiana	17.70	24.65	20.36	20.90
California	17.76	24.85	19.71	20.77
Iowa	18.12	24.02	18.39	20.18
Western Texas	16.86	23.97	18.57	19.80
Corn Belt States <i>(including Northern Missouri)</i>	16.28	23.46	18.36	19.37
New Mexico	15.38	22.44	17.34	18.39
<b>All Federal Order Areas</b>	<b>17.69</b>	<b>24.64</b>	<b>19.67</b>	<b>20.67</b>

Source: USDA, Agricultural Marketing Service

## 4.2 Missouri Milk Prices

Missouri milk prices are typically volatile but have maintained an upward trend. Exhibit 4.2.1 tracks the change in the average price received for Missouri milk. The exhibit illustrates that milk prices tend to be cyclical, meaning that prices move from high levels to low levels every few years. The Missouri milk price received averaged \$21.00 per hundredweight in the past three years. The longer-term average price received from 1990 to 2022 was \$16.34 per hundredweight.

**Exhibit 4.2.1 — Average Prices for Missouri Milk, 1990 to 2022**

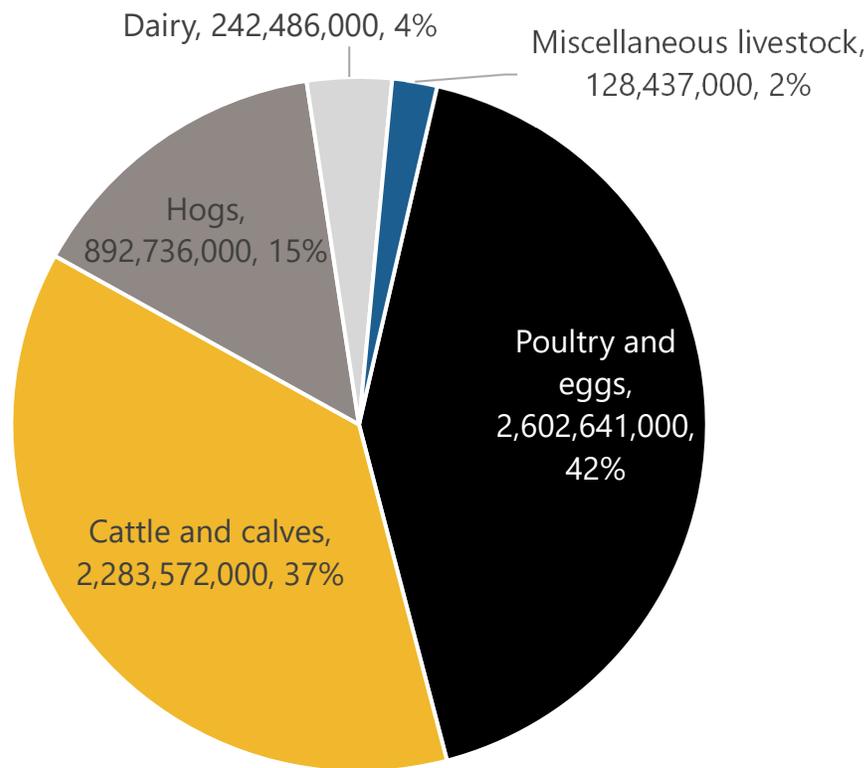


Source: USDA, National Agricultural Statistics Service

### 4.3 Farm Cash Receipts

The dairy industry is an important contributor to Missouri's economy. During 2022, the state's dairy industry generated \$242 million in cash receipts. Of all Missouri livestock driven cash receipts in 2022, dairy receipts represented 4 percent. See Exhibit 4.3.1. Poultry and eggs, cattle and calves, and hog sales generated greater cash receipts totals than the milk production sector. Their shares were 42 percent, 37 percent and 15 percent, respectively.

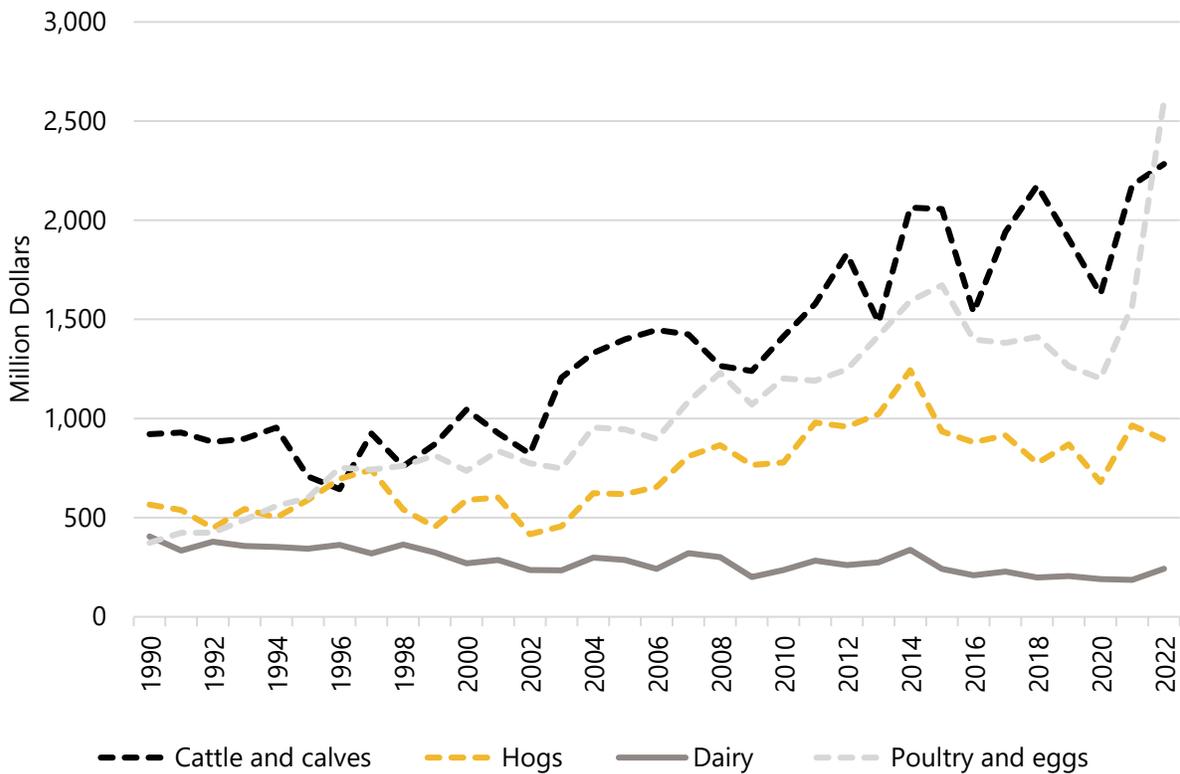
**Exhibit 4.3.1 — Missouri Livestock Cash Receipts by Sector, 2022**



Source: USDA, Economic Research Service

Missouri dairy cash receipts have declined over time as dairy cows and farms have decreased. Exhibit 4.3.2 charts Missouri cash receipts for various livestock production sectors from 1990 to 2022. Missouri dairy cash receipts decreased 40 percent between 1990 and 2022. Unlike the dairy cash receipt values, receipts for cattle and calves, hogs and poultry and eggs have generally increased since 1990. Between 1990 and 2022, cash receipts for these categories grew by 148 percent for cattle and calves, 58 percent for hogs and 597 percent for poultry and eggs.

**Exhibit 4.3.2 — Missouri Livestock Cash Receipts, 1990 to 2022**



Source: USDA, Economic Research Service



# Production Economics and Practices

## *Missouri Dairy Industry Revitalization Study*

 Extension  
*University of Missouri*

an equal opportunity/ADA institution

## 5. Production Economics and Practices

### 5.1 Farm Financial Statements and Analysis

The USDA Agricultural Resource Management Survey (ARMS) collects dairy farm financial data for U.S. states. Exhibit 5.3.2 presents the average dairy farm business income statement for Missouri dairy farms and all farms in the ARMS study states.

#### Exhibit 5.1.1 — Dairy Farm Business Income Statement, 2022

Variable	Unit	Missouri	U.S.
Farms	Number	743	27,678
<b>Gross cash farm income</b>			
Livestock income	Dollars per farm	220,958	1,891,977
Crop sales	Dollars per farm	8,191	44,101
Government payments	Dollars per farm	12,667	11,140
Other farm-related income	Dollars per farm	6,266	92,035
	<b>Total</b>	<b>248,082</b>	<b>2,039,253</b>
<b>Total cash expenses</b>			
Livestock purchases	Dollars per farm	N/A	4,539
Feed	Dollars per farm	87,230	849,093
Other livestock-related	Dollars per farm	4,363	52,020
Seed and plants	Dollars per farm	5,698	25,924
Fertilizer and chemicals	Dollars per farm	18,622	55,060
Utilities	Dollars per farm	4,791	37,800
Labor	Dollars per farm	8,442	180,518
Fuels and oils	Dollars per farm	13,299	50,768
Repairs and maintenance	Dollars per farm	13,120	76,849
Machine-hire and custom work	Dollars per farm	5,494	70,582
Other variable expenses	Dollars per farm	12,615	57,340
	<b>Total</b>	<b>173,674</b>	<b>1,460,493</b>
<b>Fixed expenses</b>			
Real estate and property taxes	Dollars per farm	4,574	16,961
Interest	Dollars per farm	6,228	39,242
Insurance premiums	Dollars per farm	4,691	19,032
Rent and lease payments	Dollars per farm	2,872	30,361
	<b>Total</b>	<b>18,365</b>	<b>105,596</b>
<b>Net cash farm income</b>			
		56,043	473,164
Nonmoney income	Dollars per farm	10,760	19,462
Value of inventory change	Dollars per farm	19,776	32,164
Depreciation	Dollars per farm	17,438	94,192
Labor, non-cash benefits	Dollars per farm	0	2,248
Adjusted breeding livestock income	Dollars per farm	0	5,546
<b>Net farm income</b>	Dollars per farm	<b>69,141</b>	<b>422,804</b>

Source: USDA, Economic Research Service and National Agricultural Statistics Service (NASS), Agricultural Resource Management Survey and Bureau of Economic Analysis. Data as of December 14, 2023.

A dairy farm’s income statement summarizes the farm’s revenue, expenses and net income during a given year. From a revenue perspective, Missouri dairy farm gross cash income averaged 12.2 percent the gross cash income collected by an average farm in all surveyed states. Livestock income was the primary income source. Among Missouri dairy farms, livestock income represented approximately 89 percent of total gross cash income. Non-livestock-related income sources included crop sales, government payments and other farm-related income.

Regarding dairy farm business expenses, variable expenses were more significant than fixed expenses during 2022 for Missouri dairy farm businesses. Feed and fertilizer/chemicals were the most significant among the variable costs. For dairy farm businesses in all surveyed states, feed and labor were the most significant variable expenses during 2022. In Missouri and the U.S., interest was the largest fixed expense for dairy farm businesses during 2022. During 2022, net cash income per farm averaged \$473,164 for dairies in all surveyed states and \$56,043 in Missouri. After accounting for depreciation, non-cash labor benefits, inventory changes and nonmoney income, net farm income for dairy businesses averaged \$422,804 per farm for dairies in U.S. surveyed states and \$69,141 for Missouri dairy farm businesses.

A dairy farm’s balance sheet provides a snapshot of the farm’s assets, liabilities and equity on a given date. Exhibit 5.1.2 presents balance sheet data collected from dairy farm businesses in Missouri in the ARMS data set. In 2022, Missouri dairy farm assets totaled more than \$2.4 million per farm. Liabilities and equity finance a dairy farm’s assets. For most Missouri dairy farms, assets are more significantly financed with equity than liabilities.

**Exhibit 5.1.2 — Missouri Dairy Farm Business Balance Sheet, 2018 to 2022**

Variable	Unit	2018	2019	2020	2021	2022
Farm assets	Dollars per farm	4,356,864	1,743,090	2,021,867	3,675,639	2,415,284
Farm liabilities	Dollars per farm	478,765	253,186	175,567	392,319	114,227
Farm equity	Dollars per farm	3,878,099	1,489,905	1,846,300	3,283,320	2,301,057

Source: USDA, Economic Research Service and National Agricultural Statistics Service (NASS), Agricultural Resource Management Survey and Bureau of Economic Analysis. Data as of December 14, 2023.

Financial ratios summarize financial performance. Exhibit 5.1.3 shares financial ratios for dairy farm businesses in Missouri from 2018 to 2022. The current ratio conveys whether a farm can pay current liabilities with current assets. The average current ratios for Missouri farms indicate that they could repay current liabilities with ease. The debt-to-asset ratio indicates a farm’s reliance on debt to finance its assets. The ratio is low for Missouri dairy farms. The term debt coverage ratio also indicates that dairy farms produce adequate net income to repay term debt principal and interest. The return on assets and return on equity values suggest that Missouri dairy farms are less efficient at using assets and equity to generate return. The low operating profit margin for Missouri dairy farm businesses indicates that the average dairy struggled to efficiently earn a return from its sales.

**Exhibit 5.1.3 — Missouri Dairy Farm Business Financial Ratios Estimates**

Variable	Unit	2018	2019	2020	2021	2022
Current ratio	Ratio	0.6	1.8	2.8	2.8	5.9
Working capital-to-expense ratio	Percent	-34.3	26.1	32.2	34.8	51.7
Debt/asset ratio	Percent	11	14.5	8.7	10.7	4.7
Rate of return on assets	Percent	-0.9	-4.3	-2.5	0.7	-0.1
Rate of return on equity	Percent	-1.7	-6	-3.2	0.3	-0.4
Operating profit margin	Percent	-10	-24.9	-27.5	5.3	-1.1
Term debt coverage ratio	Number of times	3	2.7	1.9	3.9	5.1
Asset turnover ratio	Number of times	0.1	0.2	0.1	0.1	0.1
Operating expense ratio	Percent	75.4	79.7	86.3	68.2	77.4

Source: USDA, Economic Research Service and National Agricultural Statistics Service (NASS), Agricultural Resource Management Survey and Bureau of Economic Analysis. Data as of December 14, 2023.

Based on a percent of all dairy farms, fewer Missouri dairy farms carried debt than dairy farms in all surveyed states in 2022, and of the farms reporting debt, those in Missouri indicated that they have less debt per farm than dairy businesses in all surveyed states.

Exhibit 5.1.4 presents data about the capacity of dairies to repay their debt. On average, Missouri dairy farms reported less gross cash farm income, net farm income and income for debt coverage in 2022 than farms in all surveyed states. However, these lower income levels may not preclude them from repaying their debt because they also reported having less debt and less maximum feasible debt. On average, repayment capacity use indicators were lower for Missouri dairy farms than those for dairy farms in surveyed U.S. states.

**Exhibit 5.1.4 — Dairy Farm Business Debt Repayment Capacity, 2022**

<b>Variable</b>	<b>Unit</b>	<b>Missouri</b>	<b>All U.S. States</b>
Farms	Number	743	27,678
Number of farms with debt	Number	330	16,587
Gross cash farm income	Dollars per farm	248,081	2,039,253
Income for debt coverage	Dollars per farm	92,927	556,614
Principal/interest payments	Dollars per farm	19,620	101,612
Debt coverage margin	Dollars per farm	73,308	455,002
Maximum loan payment	Dollars per farm	80,323	451,693
Max feasible debt (7.5%)	Dollars per farm	517,813	2,382,210
Max feasible debt (10%)	Dollars per farm	483,418	2,191,334
Repayment capacity use (7.5%)	Percent	22.1	34.1
Repayment capacity use (10%)	Percent	23.6	37.1
Farm liabilities	Dollars per farm	114,227	812,048
Net farm income	Dollars per farm	69,141	422,804

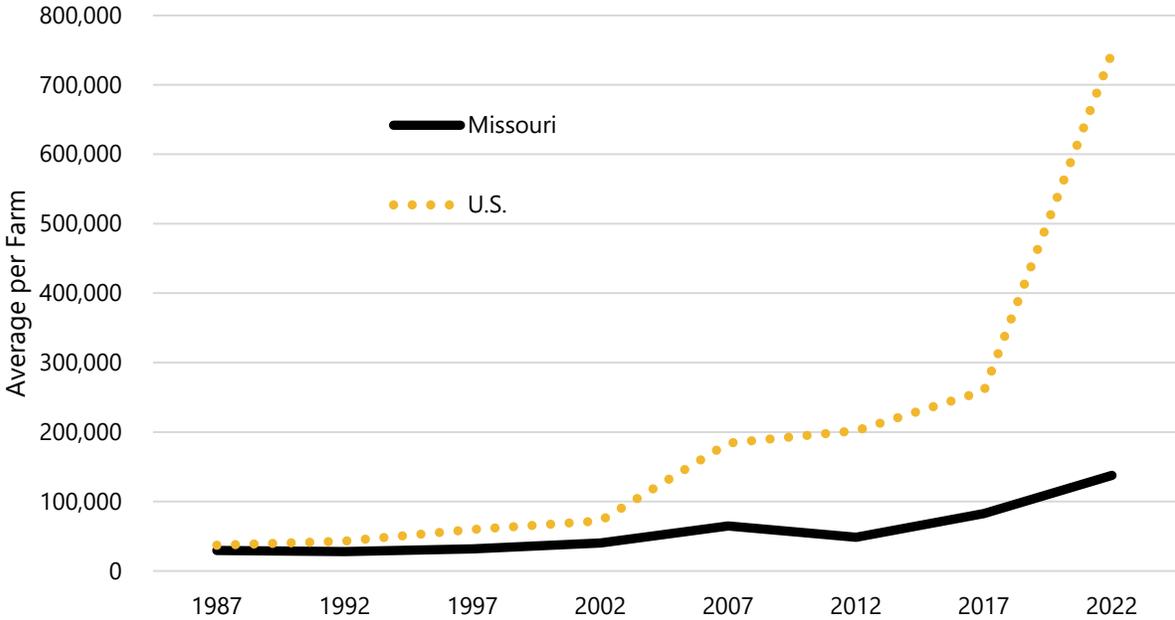
Source: USDA, Economic Research Service and National Agricultural Statistics Service (NASS), Agricultural Resource Management Survey and Bureau of Economic Analysis. Data as of December 14, 2023.



## 5.2 Net Cash Farm Income

Since 1987, U.S. dairy farms, on average, have improved their capacity to generate net cash farm income of operations. For the average U.S. dairy cattle and milk production farm, the net cash farm income of operations grew from \$37,110 in 1987 to \$745,994 in 2022. See Exhibit 5.2.1. For Missouri dairy cattle and milk production farms, the net cash farm income of operations has improved; however, the growth hasn't been as strong. The average Missouri dairy cattle and milk production farm generated \$29,571 in net cash farm income of operations in 1987 and \$137,672 in 2022.

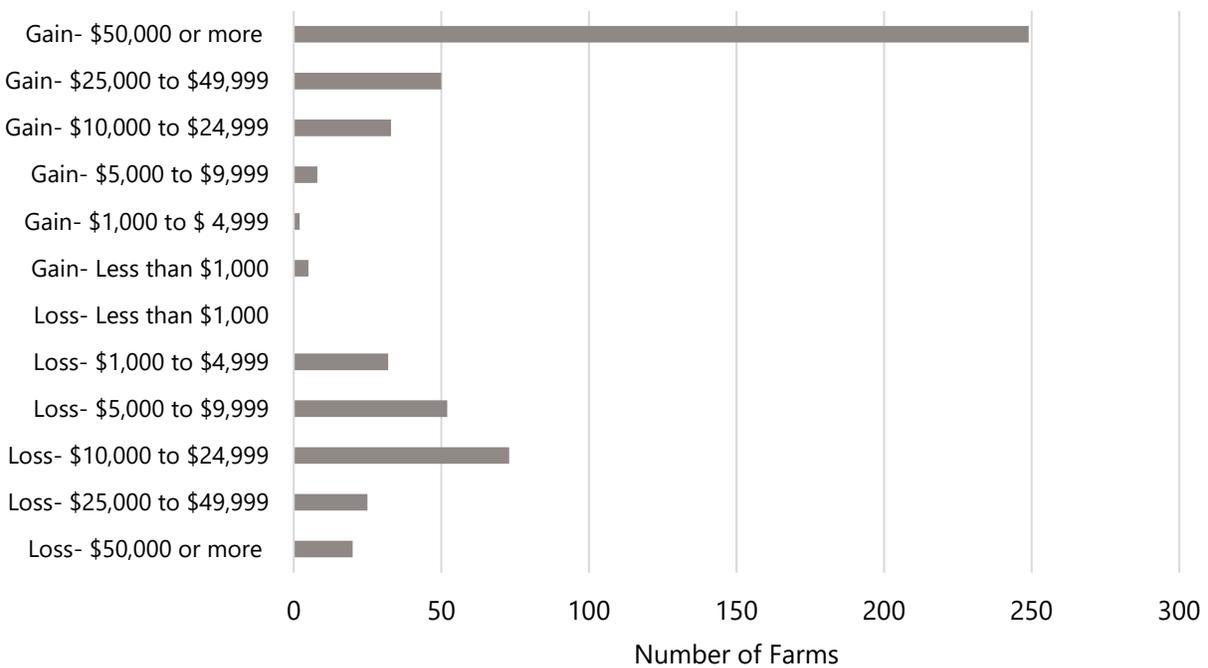
**Exhibit 5.2.1 — Missouri and U.S. Average Net Cash Farm Income of Operations on Dairy Cattle and Milk Production Farms, 1987 to 2022**



Source: USDA, National Agricultural Statistics Service, Census of Agriculture

During 2022, Missouri dairy cattle and milk production farms predominantly recorded net cash farm income that exceeded a \$50,000 gain. Exhibit 5.2.2 illustrates that almost 250 farms indicated their net cash farm income was more than \$50,000. Although most Missouri dairy cattle and milk production farms reported net cash farm income gains during 2022, note that several farms recorded losses. Twenty farms lost at least \$50,000 in net cash farm income in 2022. For these dairy cattle and milk production farms to maintain their long-term viability, they must improve their annual net cash farm income performance.

**Exhibit 5.2.2 — Missouri Dairy Cattle and Milk Production Farms, Distribution of Net Cash Farm Income, Gains and Losses, 2022**



Source: USDA, National Agricultural Statistics Service, Census of Agriculture

### 5.3 Herd Management

The Dairy Herd Improvement Association (DHIA) records several data indicators that may help dairy producers make better management decisions. The charts in this section share data downloaded from the DHIA database. Missouri had 70 farms on DHI in December 2023, reflecting 20% of all Grade A Dairies in the state.

Missouri herds tend to average fewer lactating cows than average herds in the other areas. Feed costs and income were other factors that varied for Missouri and the other geographic areas. In Missouri, feed costs tend to be higher when evaluated on a milk production basis. See Exhibit 5.3.1. During November 2023, Missouri dairy farms incurred \$10.48 in feed costs per 100 pounds of milk produced. The average U.S. dairy farm, however, spent \$1.50 less per hundredweight produced for feed. Average days in milk are similar for Missouri, surrounding states and the U.S.

**Exhibit 5.3.1 — General DHIA Statistics, Missouri vs. Other Areas, November 2023**

Category	Unit	Herds			Averages		
		MO	Surr. States	U.S.	MO	Surr. States	U.S.
Number of Cows - All Lact	Number	70	551	6,165	99	232	246
Number of Cows - 1st Lact	Number	70	551	6,165	35	83	86
Number of Cows - 2nd Lact	Number	70	551	6,165	26	61	65
Number of Cows - 3+ Lact	Number	70	551	6,165	36	86	93
Days in Milk	Days	70	551	6,163	175	177	176
Age of 1st Lact Cows	Months	70	548	6,156	26.6	25.6	25.3
Cows Died - All Lact	Percent	70	551	6,165	18	17	15
Daily Val Prod - Milk Cows	Dollars	70	551	6,161	\$12.00	\$12.86	\$13.37
Daily Feedcost - Milk Cows	Dollars	21	78	300	\$6.89	\$6.07	\$6.19
Daily Feedcost/Cwt Milk	Dollars	21	78	300	\$10.48	\$8.60	\$8.98
Daily Inc/Feed - Milk Cows	Dollars	21	78	300	\$8.09	\$8.80	\$9.48

Source: Dairy Herd Information Association (DHIA), Dairy Records Management Systems (DRMS)

Of the geographic areas evaluated, Missouri herds averaged the lowest rolling milk production, daily milk production, rolling fat content and rolling protein content. Exhibit 5.3.2 further describes production-related statistics. The peak milk data indicates that the peak production difference between the total U.S. and Missouri increases between the first lactation period and the second to third lactation periods. Production output measured in the rolling milk value is important because production output greatly influences a producer's income potential. The daily milk production, projected milk production and standardized milk production data sets all suggest that Missouri lags the averages for surrounding states and the U.S.

**Exhibit 5.3.2 — Production DHIA Statistics, Missouri vs. Other Areas, November 2023**

Category	Unit	Herds			Averages		
		MO	Surr. States	U.S.	MO	Surr. States	U.S.
Rolling Milk	Pounds	70	551	6,165	20,475	24,292	24,225
Rolling Fat	Pounds	70	548	6,138	806	954	977
Rolling Protein	Pounds	70	548	6,138	659	760	764
Daily Milk-Milk cows	Pounds	70	551	6,163	66	76	75
Daily Fat	Percent	70	545	6,127	4.2	4.2	4.2
Daily Protein	Percent	70	545	6,127	3.3	3.3	3.3
Peak Milk 1st Lact	Pounds	70	544	6,127	70	80	80
Peak Milk 2nd Lact	Pounds	70	546	6,136	88	101	101
Peak Milk 3rd+ Lact	Pounds	69	548	6,143	94	108	108
Proj 305 Day ME Milk	Pounds	70	551	6,165	22,276	25,636	26,086
Standardized 150 Day Milk	Pounds	70	550	6,159	71	81	81

Source: Dairy Herd Information Association (DHIA), Dairy Records Management Systems (DRMS)

To improve udder health, producers target reducing somatic cell counts. A somatic cell count reading indicates the extent to which a cow’s udder is experiencing inflammation and mastitis. Exhibit 5.9.4 shares somatic cell count measures for Missouri, its surrounding states, and the U.S. average. Missouri had the highest value of the three regions presented for the actual somatic cell count and the somatic cell count score. During November 2023, 68 percent of Missouri milk cows scored between zero and three for somatic cell count.

**Exhibit 5.3.3 — Udder Health DHIA Statistics, Missouri vs. Other Areas, November 2023**

Category	Unit	Herds			Averages		
		MO	Surr. States	U.S.	MO	Surr. States	U.S.
SCC Actual	x thousands	70	535	6,066	236	208	187
SCC Score	Linear or log	70	535	6,066	2.6	2.4	2.2
Cows (SCC of 0-3)	Percent	70	535	6,066	68	72	75
Cows (<41D with SCC>4)	Percent	60	453	4,711	24	24	22

Source: Dairy Herd Information Association (DHIA), Dairy Records Management Systems (DRMS)

Compared with the U.S. average, Missouri dairy cows had a lower pregnancy rate, more days open, a longer time span to first service and a lower share of heats observed per year based on November 2023 DHIA data. These data indicate several reproduction-related improvements that could be made on Missouri dairy farms. Exhibit 5.3.4 provides these data points and other 2023 reproduction-related DHIA statistics for Missouri, its surrounding states, and the U.S.

**Exhibit 5.3.4 — Reproduction DHIA Statistics, Missouri vs. Other Areas, November 2023**

Category	Unit	Herds			Averages		
		MO	Surr. States	U.S.	MO	Surr. States	U.S.
Preg Rate-Year Ave	Percent	42	401	5,393	11	14	16
Days Open-Proj Min-Total Herd	Days	70	551	6,164	183	164	147
Proj Calving Interval	Months	70	551	6,164	15.3	14.6	14.1
Actual Calving Interval	Months	70	551	6,165	14.5	13.9	13.6
Voluntary Waiting Period	Days	70	551	6,165	59	57	60
Days to 1st Serv-Total Herd	Days	66	518	5,985	107	98	92
First Service Success Rate	Percent	66	512	5,973	42	44	44
Serv per Preg-All Lact	Number	64	509	5,933	3.5	3.1	2.9
Heats Observed for Year	Percent	63	483	5,806	33	37	45
Abortions in Past Year	Number	70	551	6,165	0	1	3

Source: Dairy Herd Information Association (DHIA), Dairy Records Management Systems (DRMS)



# **Economic Contribution Analysis**

## ***Missouri Dairy Industry Revitalization Study***

 **Extension**  
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## 6. Economic Contribution Analysis

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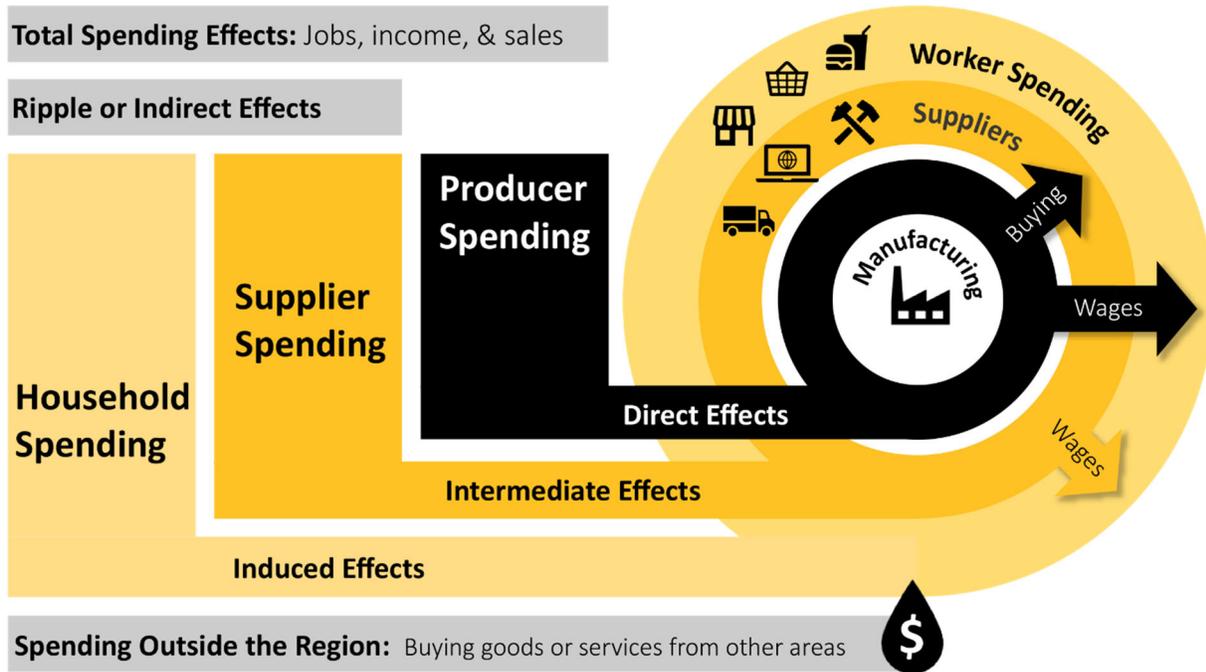
### 6.1 Overview and Methodology

Missouri dairy farm production and dairy product manufacturing both provide significant economic impacts to Missouri. The focus of this report section is to analyze the economic contributions of both industries and provide economic metrics that can be used to discuss the value that these industries provide to their various stakeholders or other interested parties.

Estimations were prepared based on the use of the IMPLAN economic impact software system. IMPLAN is an input-output model and includes economic data sets, multipliers, and demographic statistics for the entire U.S. economic infrastructure. It is a robust tool that assesses the effects of changes in the economy by sector, and it is widely used by economists and analysts. Estimations in this report used the 2022 IMPLAN data set for Missouri and its counties.

The IMPLAN impacts can be separated into three economic effects: direct, indirect, and induced. A **direct** effect can be defined as a direct change in an area that occurs as a result of a change in an industry. For example, estimated sales revenue from dairy farms or dairy product manufacturing plants is a direct economic effect. Farms or plants create an **intermediate** or “indirect” effect when they purchase goods or services from other industries (milk, transportation, utilities, repairs, etc.). **Induced** effects are changes in household spending that stem from income generated by direct and indirect effects. For instance, employees at dairy farms or processing facilities will spend their income to buy real estate, shop at grocery stores or spend on other goods or services in the local economy (see Exhibit 1).

**Exhibit 6.1.1 — Economic Model of Spending Flows: Dairy Product Manufacturing Example**

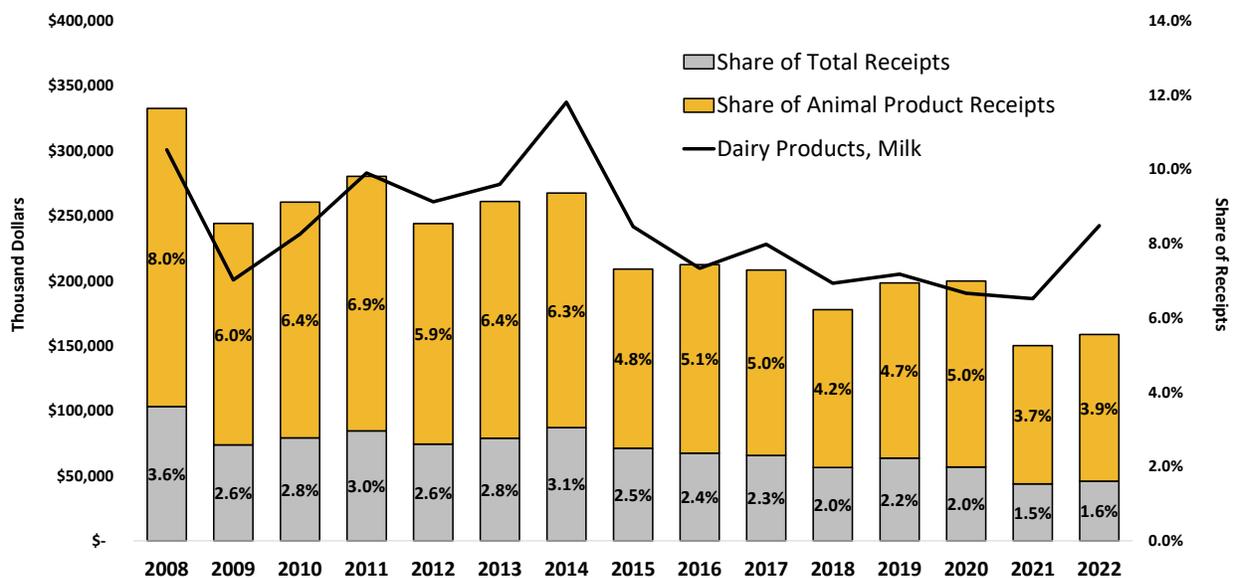


Economic impacts from IMPLAN are categorized by various indicators such as output, jobs and value-added. **Value-added** refers to the difference between the industry output (value of production) and the cost of the inputs used in its production. It can also be interpreted as the net gain or contribution to the state’s gross domestic product. Salaries, wages, taxes and profit would be included in this value-added classification. Another economic indicator is the number of **jobs**, which can be either full-time or part-time, supported by the industry. **Output** reflects the total value of industry production or sales.

## 6.2 Missouri Dairy Farms – Economic Contribution

The dairy farming industry is an important contributor to Missouri’s economy. During 2022, the state’s dairy farms generated \$242.5 million in cash receipts for milk. Of all Missouri livestock cash receipts collected in 2022, milk cash receipts represented 3.9 percent of the total, a decrease of 2.5 percentage points from 2013. Missouri milk cash receipts have declined over time as dairy cows and farms maintained in the state have decreased. Exhibit 6.2.1 charts Missouri milk cash receipts from 2008 to 2022. These milk cash receipts generate economic activity throughout Missouri. However, note that Missouri milk cash receipts decreased 19.4 percent between 2008 and 2022.

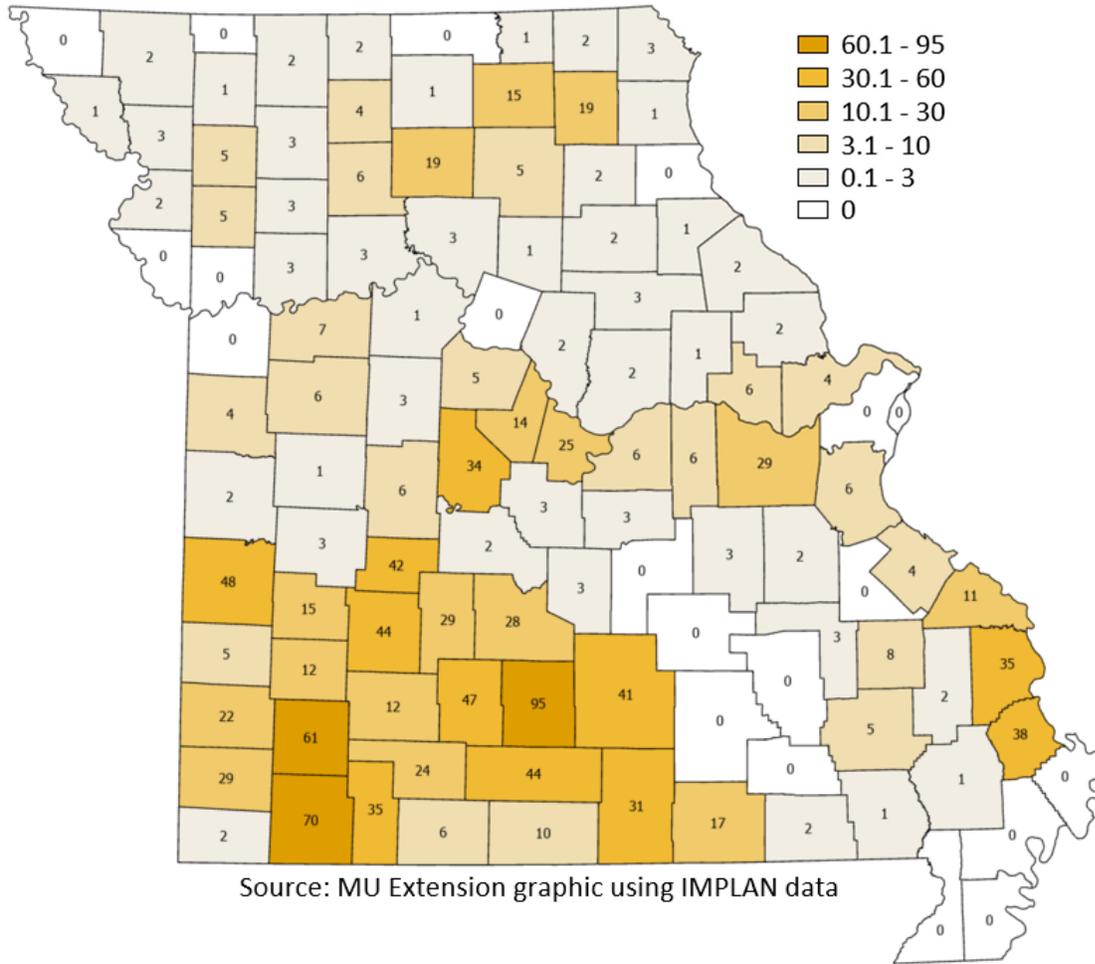
**Exhibit 6.2.1 — Missouri Milk Cash Receipts, 2008 to 2022**



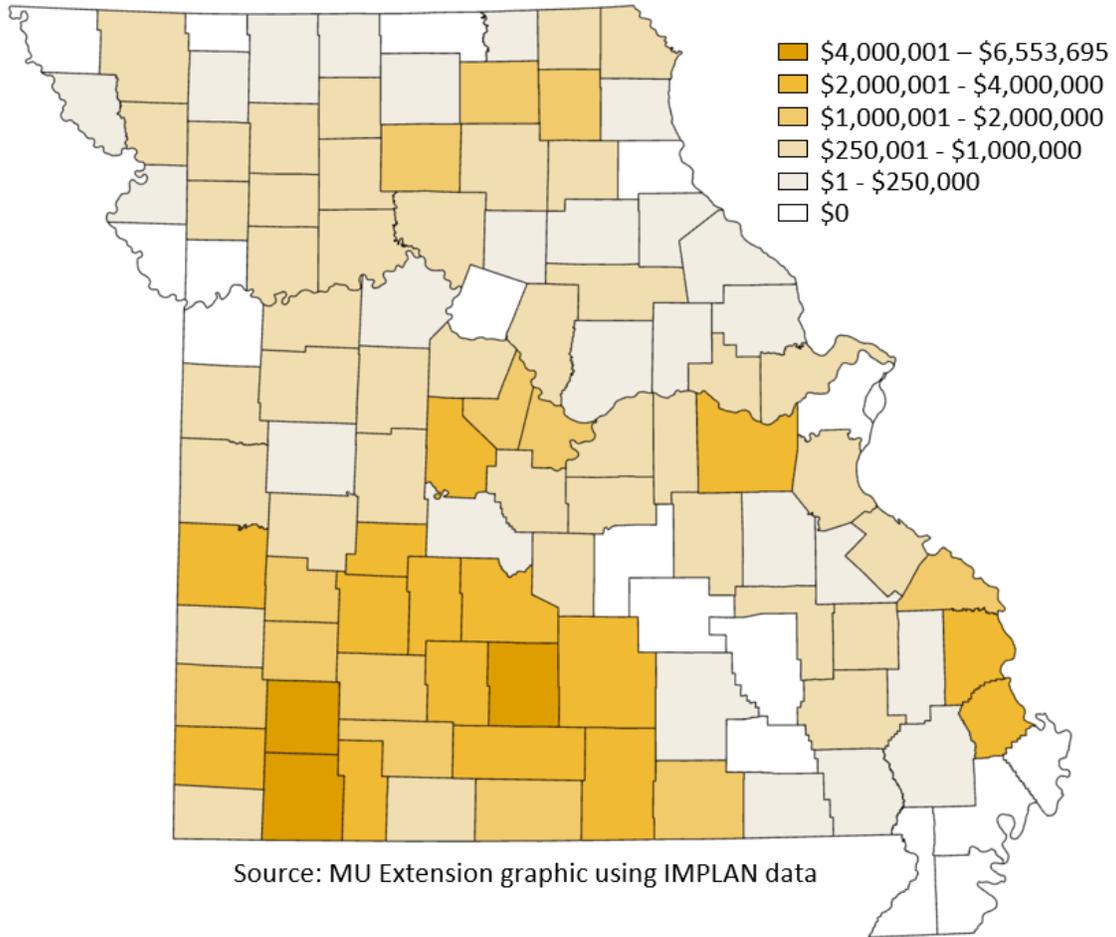
Source: USDA Economic Research Service

For each county, economic contributions from Missouri dairy farms were estimated using 2022 IMPLAN county-level data. This information would include direct, indirect and induced economic effects from the operation of Missouri dairy farms. The Missouri dairy farming industry supported a total of 2,499 jobs in 2022, as shown in Exhibit 6.2.2, down from 3,680 in 2013. Exhibit 6.2.3 displays the value-added impact from these farms, the value-added impact measures an industry’s contribution to Missouri’s gross domestic product. In 2022, dairy farms added \$207 million to Missouri’s gross domestic product, up from \$131 million in 2013. Output or sales values from these operations by county are reported in Exhibit 6.2.4.

**Exhibit 6.2.2 — Missouri Dairy Farm Economic Contribution, Jobs by County, 2022**



**Exhibit 6.2.3 — Missouri Dairy Farm Economic Contribution, Value-Added by County, 2022**



**Exhibit 6.2.4 — Missouri Dairy Farm Economic Contribution, Output by County, 2022**

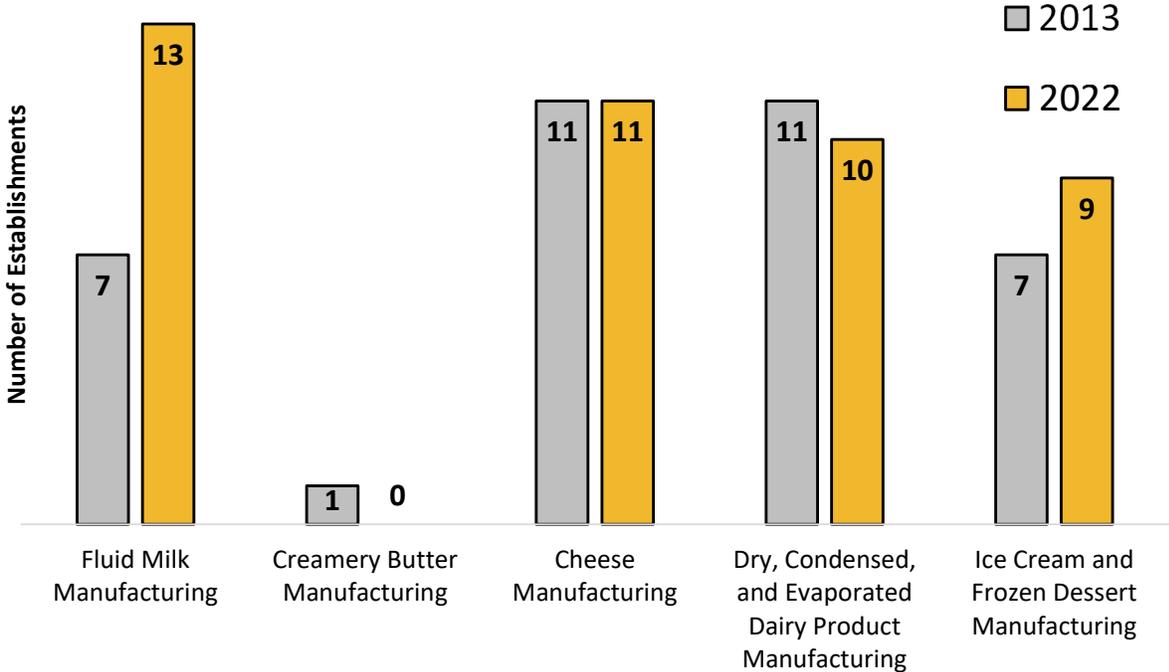
<b>County</b>	<b>Total Output (Dollars)</b>	<b>County</b>	<b>Total Output (Dollars)</b>	<b>County</b>	<b>Total Output (Dollars)</b>
<b>Adair</b>	4,967,098	<b>Greene</b>	2,853,153	<b>Ozark</b>	2,286,883
<b>Andrew</b>	880,734	<b>Grundy</b>	1,642,164	<b>Pemiscot</b>	0
<b>Atchison</b>	0	<b>Harrison</b>	475,093	<b>Perry</b>	2,922,884
<b>Audrain</b>	1,504,816	<b>Henry</b>	477,998	<b>Pettis</b>	922,997
<b>Barry</b>	27,839,949	<b>Hickory</b>	10,981,053	<b>Phelps</b>	0
<b>Barton</b>	2,281,955	<b>Holt</b>	436,764	<b>Pike</b>	668,795
<b>Bates</b>	973,542	<b>Howard</b>	0	<b>Platte</b>	0
<b>Benton</b>	2,172,277	<b>Howell</b>	6,292,196	<b>Polk</b>	13,243,016
<b>Bollinger</b>	446,116	<b>Iron</b>	401,433	<b>Pulaski</b>	776,056
<b>Boone</b>	576,497	<b>Jackson</b>	0	<b>Putnam</b>	0
<b>Buchanan</b>	544,916	<b>Jasper</b>	5,629,938	<b>Ralls</b>	403,879
<b>Butler</b>	449,459	<b>Jefferson</b>	1,124,453	<b>Randolph</b>	405,341
<b>Caldwell</b>	914,324	<b>Johnson</b>	1,878,195	<b>Ray</b>	864,190
<b>Callaway</b>	477,708	<b>Knox</b>	7,487,263	<b>Reynolds</b>	0
<b>Camden</b>	460,208	<b>Laclede</b>	9,647,656	<b>Ripley</b>	437,960
<b>Cape Girardeau</b>	9,787,348	<b>Lafayette</b>	2,759,719	<b>Saline</b>	493,119
<b>Carroll</b>	916,978	<b>Lawrence</b>	17,447,147	<b>Schuyler</b>	441,702
<b>Carter</b>	0	<b>Lewis</b>	468,956	<b>Scott</b>	20,360,365
<b>Cass</b>	1,112,465	<b>Lincoln</b>	440,733	<b>Scotland</b>	979,306
<b>Cedar</b>	4,289,519	<b>Linn</b>	5,496,579	<b>Shannon</b>	26,918
<b>Chariton</b>	943,755	<b>Livingston</b>	1,841,020	<b>Shelby</b>	911,614
<b>Christian</b>	5,053,926	<b>Macon</b>	1,388,926	<b>St Charles</b>	1,007,436
<b>Clark</b>	1,265,356	<b>Madison</b>	2,158,495	<b>St Clair</b>	878,059
<b>Clay</b>	0	<b>Maries</b>	767,062	<b>St Francois</b>	10,698
<b>Clinton</b>	1,524,564	<b>Marion</b>	0	<b>St Louis</b>	0
<b>Cole</b>	5,807,470	<b>McDonald</b>	966,382	<b>St Genevieve</b>	928,720
<b>Cooper</b>	1,463,690	<b>Mercer</b>	414,206	<b>Stoddard</b>	530,278
<b>Crawford</b>	432,881	<b>Miller</b>	910,541	<b>Stone</b>	7,476,184
<b>Dade</b>	3,757,363	<b>Mississippi</b>	0	<b>Sullivan</b>	406,826
<b>Dallas</b>	6,812,344	<b>Moniteau</b>	5,296,131	<b>Taney</b>	943,897
<b>Daviess</b>	1,202,787	<b>Monroe</b>	736,266	<b>Texas</b>	10,255,093
<b>Dekalb</b>	1,458,992	<b>Montgomery</b>	459,386	<b>Vernon</b>	15,563,221
<b>Dent</b>	0	<b>Morgan</b>	11,874,151	<b>Warren</b>	1,792,759
<b>Douglas</b>	9,580,207	<b>New Madrid</b>	0	<b>Washington</b>	262,596
<b>Dunklin</b>	0	<b>Newton</b>	9,959,507	<b>Wayne</b>	821,066
<b>Franklin</b>	5,901,102	<b>Nodaway</b>	823,872	<b>Webster</b>	9,611,965
<b>Gasconade</b>	1,350,441	<b>Oregon</b>	2,556,892	<b>Worth</b>	0
<b>Gentry</b>	457,701	<b>Osage</b>	1,810,847	<b>Wright</b>	22,228,994

Source: IMPLAN

### 6.3 Missouri Dairy Product Manufacturing Industry – Economic Contribution

Dairy product manufacturing also provides valuable economic contributions to Missouri. The state’s dairy product manufacturing industry processes dairy products from raw milk, processed milk and dairy substitutes. This industry can be divided into subsectors: fluid milk; creamery butter; cheese; dry, condensed and evaporated dairy; and ice cream and frozen desserts. Exhibit 6.3.1 shows the breakdown of dairy product manufacturing establishments in Missouri by industry sector.

**Exhibit 6.3.1 — Missouri Dairy Product Manufacturing Establishments by Sector**



Note: Dairy manufacturing plants may be engaged in multiple sectors.  
 Source: U.S. Bureau of Labor Statistics

The U.S. Bureau of Labor Statistics reports industry data on establishments, employment, and wages for the dairy manufacturing sector. Exhibit 6.3.2 provides information concerning Missouri’s dairy product manufacturing industry during 2022. Total wages paid to Missouri dairy manufacturing employees totaled \$383 million, up from \$275 million in 2013. Overall, the dairy product manufacturing industry directly employed 5,958 people (up from 5,354 in 2013), and annual wages per employee averaged \$64,844 (up from \$51,340 in 2013).

**Exhibit 6.3.2 — Missouri Dairy Product Manufacturing, 2022**

<b>Metric</b>	<b>Dairy Product Manufacturing <i>(including ice cream and frozen desserts)</i></b>
Establishments	44
Employees (#)	5,958
Total Wages (dollars)	\$383,407,178
Average annual pay (dollars)	\$64,844

\*Estimates using 2023 Q1 and Q2 data (U.S. BLS).

Missouri’s large fluid milk bottling plants are owned by dairy farmers through their dairy cooperatives. Prairie Farms cooperative runs these bottling plants directly or in joint ventures with the Dairy Farmers of America (DFA) cooperative. These cooperatives own other dairy processing plants that make soft products, specialty drinks and other custom dairy products. DairiConcepts, a national dairy ingredient company with headquarters in Springfield and an El Dorado Springs processing plant, is also owned by dairy farmers via a joint venture between DFA and Fonterra cooperatives. Missouri’s non-farmer-owned dairy product manufacturing facilities are owned either by privately held companies and public corporations. Privately held companies include Schreiber Foods and Jasper Products. Public corporations include Kraft, Unilever, Smucker and DuPont.

Exhibit 6.3.3 details the 2022 economic contributions of Missouri dairy product manufacturers to the state. Missouri dairy manufacturing plants produced \$5.5 billion in dairy product sales during 2022 (up from 5.1 billion in 2013). After accounting for indirect and induced economic effects, dairy manufacturing plant estimated revenues in Missouri translate into total sales of \$8 billion (up from \$7.6 billion). Please note that an intermediate (indirect) effect would include the contribution from the Missouri dairy farms that supplied milk to these plants, so adding the previously reported economic contribution from the Missouri dairy farming industry would be considered double counting some economic effects. The Missouri dairy product manufacturing industry supported a total 17,212 jobs (down from 23,049) when considering all economic effects. Total value-added impact or Missouri gross domestic product (GDP) contribution was over \$2.1 billion in 2022.

**Exhibit 6.3.3 — Economic Contributions of Missouri Dairy Manufacturing, 2022**

Impact Type	Employment (Jobs)		Value-Added (Dollars)		Output (Dollars)	
	2022	Change from 2013	2022	Change from 2013	2022	Change from 2013
Direct	5,902	450	881,226,479	224,645,029	5,507,457,263	416,398,736
Intermediate	6,929	-4,567	791,389,001	(85,294,533)	1,732,687,743	17,636,134
Induced	4,381	-1,720	446,073,807	15,121,314	783,274,806	28,599,188
Total	17,212	-5,837	2,118,689,287	154,481,810	8,023,419,812	462,634,058

Source: IMPLAN

Another way of looking at the impact of Missouri’s dairy products industry output is by calculating the economic output effect of one dairy cow. To arrive at this figure, the total economic output of Missouri dairy manufacturing (\$8,023,419,812) was multiplied by 0.1008 (the percent of total milk input demand produced in Missouri). The remainder was then multiplied by 0.83 (the percent of Missouri-produced milk purchased by Missouri manufacturers), and finally divided by the Missouri dairy cow population (67,000). The economic output effect amounts to \$12,071 per cow.



A further breakdown of the leading industry sectors impacted economically by the Missouri dairy manufacturing industry can be seen in Exhibit 6.3.4. Please note that this information includes all direct, indirect and induced economic effects. Cheese manufacturing was the leading industry impacted based on total employment, value-added and total output. Fluid milk manufacturing and wholesale trade followed for the employment and value-added categories.

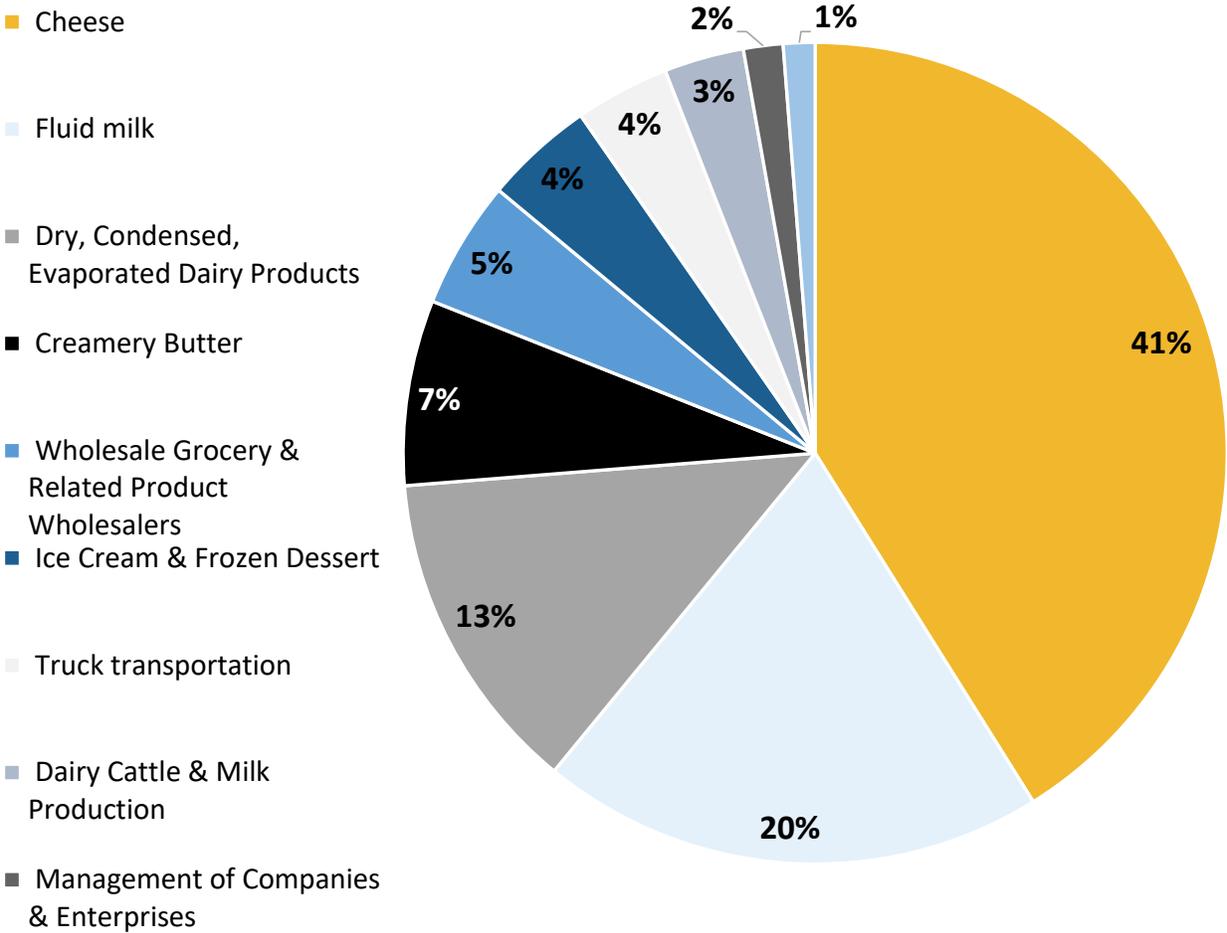
**Exhibit 6.3.4 — Top 10 Industries Affected by the Missouri Dairy Manufacturing Industry (Ranked Based on Total Employment), 2022**

Industry Sector Descriptor	Total Employment (Jobs)	Total Value-Added (Dollars)	Total Output (Dollars)
Cheese manufacturing	2,611	311,409,389	2,654,119,537
Fluid milk manufacturing	1,644	251,702,945	1,277,776,704
Wholesale - Grocery and related product wholesalers	1,239	160,361,741	324,364,617
Truck transportation	1,026	116,309,692	239,192,088
Dry, condensed, and evaporated dairy product mfg.	695	159,298,518	470,526,200
Ice cream and frozen dessert manufacturing	655	63,822,398	278,110,052
Dairy cattle and milk production	445	33,222,209	202,517,949
Management of companies and enterprises	406	62,002,362	100,090,525
Couriers and messengers	325	15,697,122	19,574,856
Creamery butter manufacturing	298	94,993,229	470,526,200

Source: IMPLAN

Exhibit 6.3.5 shows the top 10 industries economically impacted by Missouri dairy product manufacturing economic output and their percentage of the overall total output from direct, indirect and induced economic effects. Based on this graphic, cheese manufacturing and fluid milk manufacturing had the greatest annual impacts on average in 2022. Additionally, these relationships would change if existing Missouri dairy product manufacturers or dairy farms were to expand or cease operations.

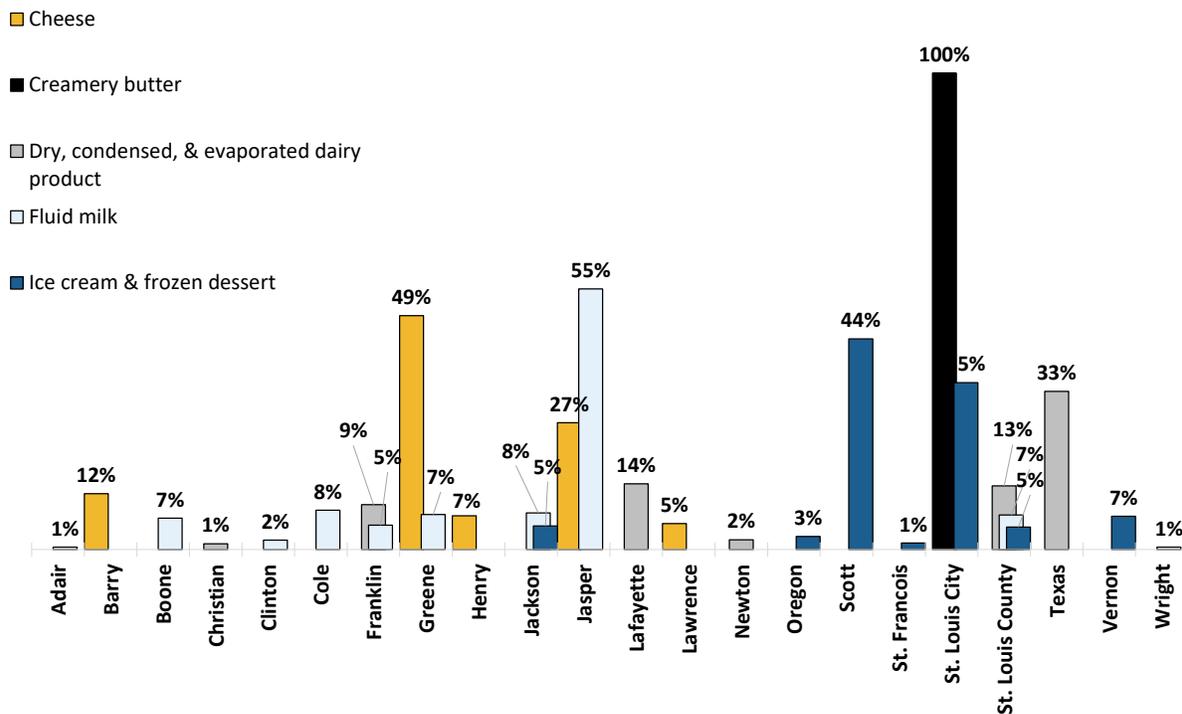
**Exhibit 6.3.5 — Top 10 Industries Affected by the Missouri Dairy Manufacturing Industry (Based on Total Output), 2022**



Source: IMPLAN

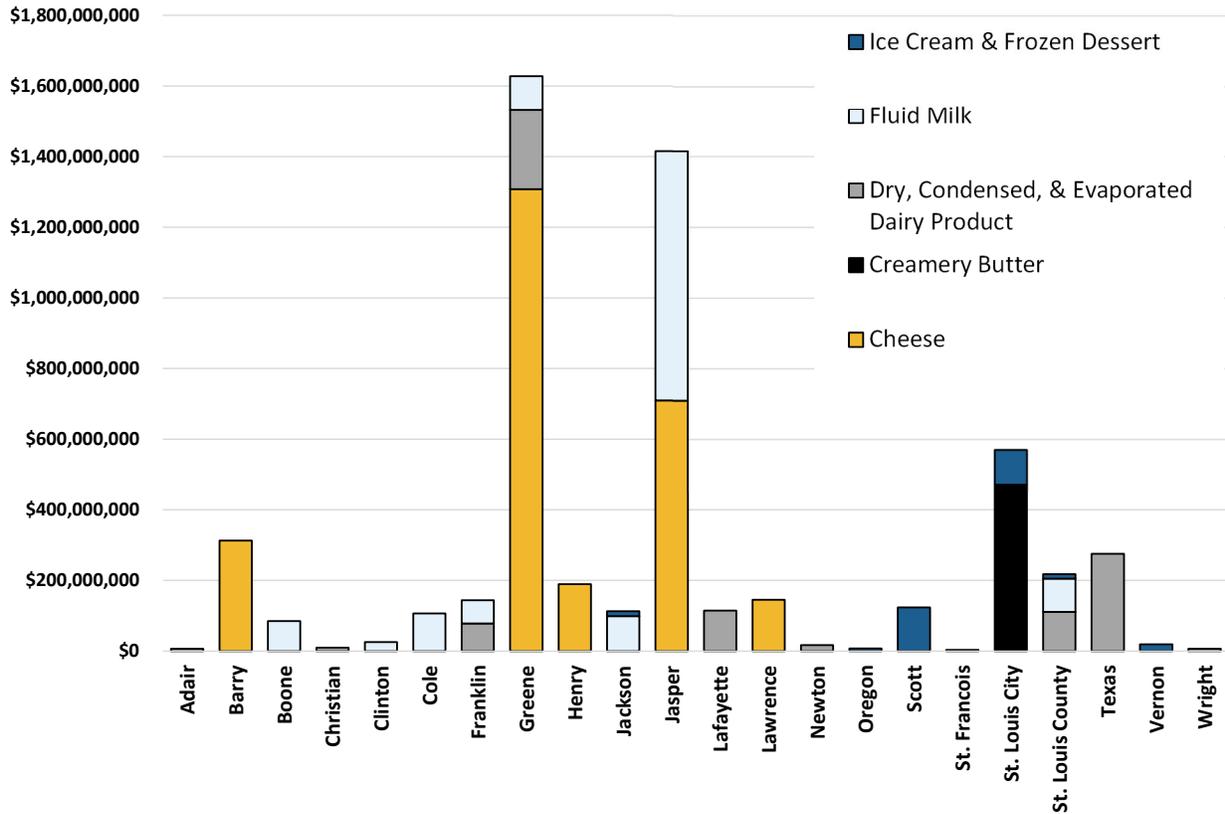
Exhibit 6.3.6 shows the distribution and concentration of Missouri’s dairy manufacturing industries across the state. Percentages represent the proportion of the state’s total output from each dairy manufacturing industry attributable to an individual county. For example, Greene County is responsible for 49 percent of Missouri’s total cheese manufacturing output, and seven percent of the state’s total fluid milk manufacturing output. Figure 6.3.7 shows the same figures, represented as total output per county. Greene (29.4%) and Jasper (25.6%) counties each account for over a quarter of the state’s total dairy product manufacturing output. When combined with the City of St. Louis (10.3%), the group accounts for almost two-thirds (65.2%) of total dairy manufacturing in the state of Missouri.

**Exhibit 6.3.6 — Dairy Manufacturing Industry Output by County and Industry (%)**



Source: IMPLAN

## Exhibit 6.3.7 — Dairy Manufacturing Industry Output by County and Industry (\$)



Source: IMPLAN