



Missouri Small Ruminant Production Economic Impact Report

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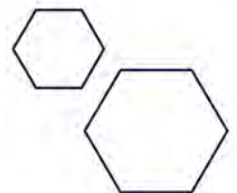
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Introduction

In 2025, Lincoln University and the University of Missouri (MU) Extension surveyed goat and sheep farmers, collectively the state's small ruminant producers, to understand the industry's operations and sales. The surveyⁱ findings will guide the development of Extension educational materials to support the growing impact of this industry on Missouri.

This economic impact brief uses data from the survey, the U.S. Department of Agriculture (USDA), and Extension farm sheep and goat budgets^{ii,iii} to assess the industry's broader impact on Missouri in 2024 and explore the potential impacts under a five-year growth scenario. The results can provide valuable information for industry development and policymaking.

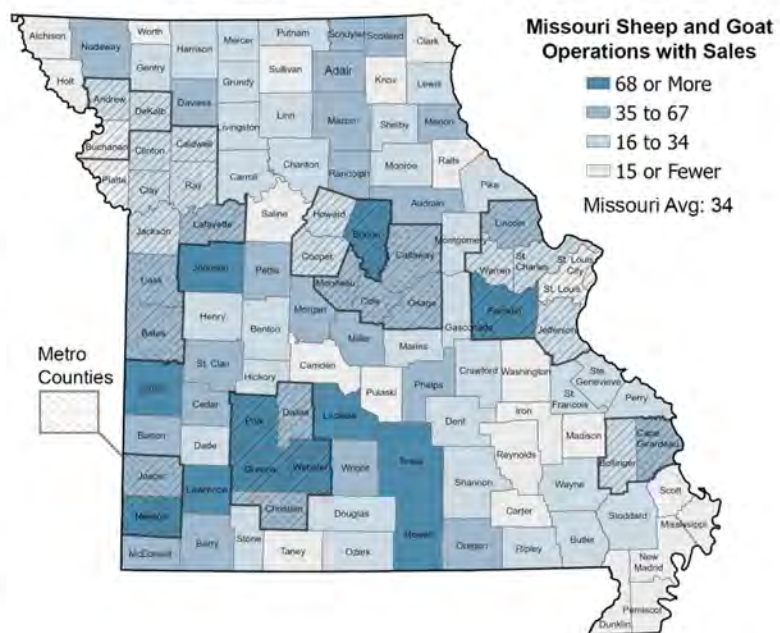
2022 Missouri Sheep and Goat Operations

Data from the 2022 U.S. Agriculture Census indicates that Missouri was home to 2,837 sheep operations, collectively managing over 120,000 sheep. Most operations were very small, with 57% having fewer than 24 sheep or lambs. From 2017 to 2022, the number of sheep farms decreased, but the total inventory of sheep increased by 8% from 111,621 to 120,895. The average sheep or lambs per farm increased from 36 to 43. Among them, 2,077 farms (73%) sold lamb or sheep, with a total of \$15.51 million in sales. About 580 farms produced 284,110 pounds of wool and sold it for \$65,000.

Missouri had 3,710 goat farms in 2022, which produced 74,139 goats. Over 75% of these farms produced meat goats, 31% produced milk goats, and 3.6% produced Angora goats. Among these farms, 2,120 farms sold 38,262 goats, with a value of \$8.16 million in sales.

The 2022 Agriculture Census shows that sheep and goat operations, with sales, are located throughout the state, with heavier concentrations in Southwest Missouri—see Figure 1. Interestingly, some counties within metropolitan areas show high numbers of sheep and goat operations.

Figure 1. Sheep and Goat Operations with Sales, 2022





U.S. Sheep and Goat Meat Consumers

Both sheep and goat meats are consumed in the United States. However, most U.S. residents have limited familiarity with these proteins, with per capita consumption of sheep and goat meat totaling less than two pounds annually.^{iv}

Compared to other red meats, goat meat offers lower levels of fat, saturated fatty acids, and cholesterol, making it a more favorable option for health-conscious individuals.^{vvi} Certain fatty acids present in sheep meat also provide health benefits.^{vii} Furthermore, the production of goats and sheep is generally more environmentally sustainable and can serve as an effective grazing complement alongside cattle operations.

Increasing consumer awareness of the health benefits, environmental sustainability, and proper preparation methods for goat and sheep meats may encourage broader acceptance and greater demand for these products.

In August 2025, a research group from Lincoln University and MU, led by Principal Investigator Dr. Ye Su, conducted a national survey on meat consumption in collaboration with the data company Dynata. The survey included responses from 2,616 U.S. meat consumers. Results indicated that 42% of respondents had eaten sheep meat and 35% had consumed goat meat within the past year. Below is a summary of the survey findings.

Sheep Consumer Demographics:

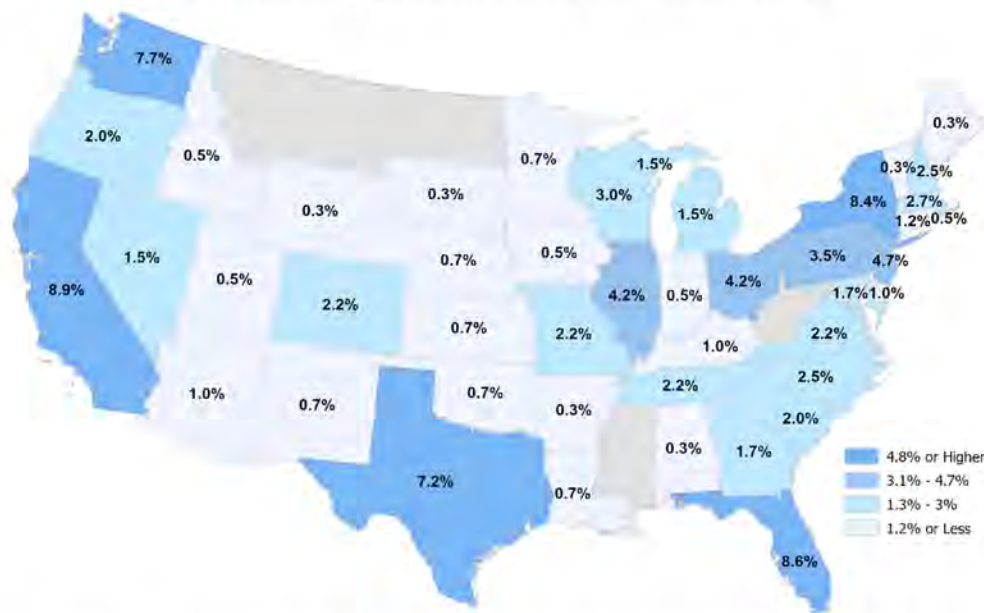
- Among sheep meat consumers, 59% are male and 41% are female.
- The mean age of consumers is 49.
- 92% have some college or more education.
- Most meat consumers are White (78%), 8% each are African American and Asian, 3% are Latino or Hispanic, and 1% are Native American.
- About two-thirds of sheep consumers do not have any immigrant background.
- The mean annual household income for sheep meat consumers is \$91,000.
- As shown in Figure 2, the survey found sheep meat consumers in nearly every state, with the largest shares of respondents located in California, New York, Florida, and Washington.



Sheep Consumption Patterns:

- 42% of sheep meat consumers purchase lamb or mutton at least once a month, and 21% purchase it once a week. No correlation is found between purchase frequency and immigration background or ethnicity.
- The most popular cut of meat is leg, followed by shoulder, loin, shank, rib, and ground.
- In terms of attributes that affect purchase decisions, the most important three are taste, quality, and safety. Price is also important, but not as significant as the above three. Out of more than 20 attributes, Kosher and Halal are the two least important. This aligns with the consumers' demographic, particularly their ethnic profile.
- Consumers preferred U.S.-produced products over those imported from Australia or New Zealand, organic products over conventional ones, grass-fed products over grain-fed ones, and fresh products over frozen ones.

Figure 2. Percentage of Surveyed Sheep Meat Consumers by State



Thirty-five percent of respondents surveyed reported consuming goat meat in the past year. The results for goat meat consumers are very similar to those of sheep meat consumers, except for gender and age.

Goat Consumer Demographics:

- 76% of goat meat consumers are male, compared to 59% of sheep consumers.
- The mean age of goat meat consumers is 40, younger than the mean age of 49 for sheep meat consumers.
- 94% of respondents have some college education or higher.
- The racial breakdown is as follows: 72% are White, 15% are Asian, 10% are African American, and 1% are Latino or Hispanic.
- Nearly eight in ten do not have any immigrant background (79%).
- The mean annual household income for goat consumers is \$89,000.
- As shown in Figure 3, the survey found goat meat consumers in over half the states, with the largest share of respondents located in California, Texas, Washington, and Missouri.

Goat Consumption Patterns:

- 43% of goat consumers purchase goat meat at least once a month, and 42% purchase it once a week.
- The most popular meat cut is leg, followed by rib, shoulder, loin, ground, and rack.
- The most important attributes that affect purchase decisions are taste, quality, and safety. Price is also important, but not as significant as the above three. Kosher and Halal are the two least important ones of more than 20 attributes. This is aligned with the consumers' demographic, especially the ethnic profile.
- Consumers prefer U.S.-produced products over those imported from Australia or New Zealand, organic products over conventional ones, grass-fed products over grain-fed ones, and fresh products over frozen ones.

Map of the United States showing the percentage of the population aged 65 and over by state. The map uses a color scale from dark blue (7.6% - 17.1%) to light blue (0.6% - 1.6%). States with the highest percentages are California (17.1%), Texas (11.5%), and Florida (5.0%). States with the lowest percentages are Washington (0.6%), Nevada (0.6%), Arizona (0.6%), New Mexico (0.6%), Colorado (0.6%), Kansas (0.6%), Oklahoma (0.6%), Nebraska (0.6%), South Dakota (0.6%), North Dakota (0.6%), Minnesota (0.9%), Iowa (0.6%), Missouri (0.6%), Arkansas (0.6%), Louisiana (0.6%), Mississippi (0.6%), Alabama (0.6%), Georgia (0.6%), South Carolina (0.6%), North Carolina (0.6%), Virginia (0.6%), West Virginia (0.6%), Maryland (0.6%), Delaware (0.6%), Pennsylvania (0.6%), New Jersey (0.6%), New York (0.6%), Connecticut (0.6%), Rhode Island (0.6%), Massachusetts (0.6%), Vermont (0.6%), New Hampshire (0.6%), and Maine (0.6%).

State	Percentage
California	17.1%
Texas	11.5%
Florida	5.0%
Washington	7.5%
Colorado	5.6%
Illinois	6.9%
Michigan	4.7%
New York	5.9%
Massachusetts	4.1%
Wisconsin	2.2%
Indiana	2.2%
Ohio	3.7%
Pennsylvania	3.7%
Delaware	3.4%
New Jersey	2.5%
Connecticut	1.3%
Rhode Island	1.3%
Massachusetts	1.6%
Vermont	1.6%
New Hampshire	1.6%
Maine	1.6%
Minnesota	0.9%
Washington	0.6%
Nevada	0.6%
Arizona	0.6%
New Mexico	0.6%
Colorado	0.6%
Kansas	0.6%
Oklahoma	0.6%
Nebraska	0.6%
South Dakota	0.6%
North Dakota	0.6%
Minnesota	0.6%
Iowa	0.6%
Missouri	0.6%
Arkansas	0.6%
Louisiana	0.6%
Mississippi	0.6%
Alabama	0.6%
Georgia	0.6%
South Carolina	0.6%
North Carolina	0.6%
Virginia	0.6%
West Virginia	0.6%
Maryland	0.6%
Delaware	0.6%
Pennsylvania	0.6%
New Jersey	0.6%
New York	0.6%
Connecticut	0.6%
Rhode Island	0.6%
Massachusetts	0.6%
Vermont	0.6%
New Hampshire	0.6%
Maine	0.6%

U.S. Sheep and Goat Meat Consumption Trends

The supply of sheep meat increased from 160 metric tons in 2014 to nearly 206 metric tons in 2024 — a rise of more than 36% (see Figure 4). However, a growing portion of this supply was sourced from foreign producers, as imports captured an increasing share of the U.S. sheep meat market. U.S. sheep production, from 2014 to 2024, declined from 73 to 63 metric tons, a decrease of nearly 14%. Put another way, in 2014, U.S. farmers produced nearly half of the U.S.-consumed sheep meat (48%), but by 2024, that share had declined to 31%.



Figure 4. U.S. Sheep Meat Supply, 2014-24



Like sheep consumption, demand for goat meat also increased from 2014 to 2024. While goat meat consumption increased by 11% in the U.S. over the ten-year period, supply levels fluctuated significantly from year to year (see Figure 5)¹. U.S. goat production held relatively steady over those years, accounting for roughly one-third of the goat meat supply, with the remaining two-thirds of the supply coming from imports. From 2014 to 2024, U.S. goat production increased from 8.5 to 9.3 mt, a gain of over 9%.

Figure 5. U.S. Goat Meat Supply, 2014-24



¹Goat supply figures are not directly available from the USDA. Supply was estimated using the following equation: number of commercially slaughtered goats x average pounds x 45 percent dressing yield.

The Economic Contribution of Missouri Small Ruminant Production in 2024

The 2022 Agriculture Census indicated total Missouri goat and sheep sales were \$25.8 million that year. Most of those sales, \$17.6 million, were generated from sheep and sheep-related products such as milk and wool. Goat and goat-related products accounted for the remainder of sales (\$8.2 million). Those sales were generated by 3,939 farming operations, where goat and sheep production was their sole farming activity or part of a larger livestock operation such as cattle, hogs, or poultry farming. The Census notes that there were 2,120 goat operations with sales, along with 2,077 sheep operations with sales, but some farms raise both livestock, so the overall number of operations is 3,939.

The Agriculture Census is conducted every five years, so no sales figures are available for 2024. However, annual small ruminant inventory figures are available by state, which were used to estimate 2024 sales. From 2022 to 2024, Missouri goat inventories rose by 17% while sheep inventories declined by 11%. Using these inventory changes as a proxy for sales fluctuations, revenues for small ruminant production in 2024 were estimated at \$25.2 million, a slight decrease from the sales two years prior. The 2024 Missouri sales are comprised of \$15.6 million from sheep operations and \$9.5 million from goat operations.

Employment on goat and sheep farms in 2024 was estimated using Census and survey figures. The Census only lists the number of goat and sheep operations with sales, as noted earlier, but not the total number of farm operators or total hours worked specifically on small ruminant production. Based on the 2025 small ruminant survey (Spell et al., 2025) and 2022 Census figures, however, most operators raise goats and sheep for extra income, rather than as their primary source of household income.

Given these difficulties in understanding jobs directly tied to small ruminant production, a conservative approach was used to estimate employment by allocating the total number of small ruminant operations in 2022 (3,939) based on the share of goat (50.5%) and sheep (49.5%) operations in Missouri. This results in 1,990 jobs attributed to goat operations and 1,949 jobs to sheep operations. It is important to note that these jobs mainly represent partial- or part-time employment, as operators typically have other jobs or retirement funds that provide their primary income.

Economic Impact Methodology

The small ruminant producer survey (Spell et al., 2025) provided insights into the production process, including sales, input purchases, and labor hours. Using the survey, Extension sheep/goat farm budgets (Lutes, 2024), and USDA data, a customized economic model was developed to better understand the larger contribution this industry has to Missouri's economy. After establishing a baseline 2024 impact, a growth scenario was modeled to explore the potential impact of increased production in the state.

The estimates of jobs, labor income, gross domestic product (GDP), and gross sales were derived using IMPLAN,^{viii} an input-output economic model. This model is widely used by development professionals and researchers to analyze the broader effects of industry activities. IMPLAN data is updated annually using three main sources: the U.S. Bureau of Labor Statistics, the Bureau of Economic Analysis, and the Census Bureau.

Economic models track the flow of spending within an economy through primary relationships between businesses and consumers. Spending effects describe how a business's gross sales cause money to flow to regional supply chains and consumer-oriented firms, supporting additional jobs, wages, profits, and taxes. These spending impacts can be categorized as direct, indirect, and induced effects.

Spending Effects

Spending starts with consumers and businesses buying small ruminant products, called direct effects, which describes gross sales:

- **Direct effects** include the revenue and subsequent labor income, profit, and jobs that come from selling a product. For Missouri small ruminant producers, sales are primarily for meat products, followed by milk. Labor is primarily provided by the landowner, who receives modest compensation from their sales.

These direct effects from small ruminant production and sales drive the other ripple effects – indirect and induced spending – in the Missouri economy.

- **Indirect effects** are impacts from supply-chain purchases made by small ruminant producers and their supply chain firms. Supply chain purchases include inputs needed to run a sheep or goat farm, such as feed, farm supplies, machinery, veterinary services, medicine, insurance, etc. These primary input businesses, in turn, purchase supplies for their operations. At each step in the supply chain, some purchases are made outside the state for specialized inputs or price considerations.
- **Induced effects** capture the household spending of the small ruminant producers and supply-chain workers from their extra labor income. That spending includes food, clothing, healthcare, and other expenses typically required by households.

Economic Contribution Terms

- **Gross Domestic Product (GDP)** is the value-added part of gross sales that represents new wealth to the business owners and community. Value-added deducts the input costs of goods and services from gross sales to show what new money from final sales is left to pay wages, profits, rents, interests, and taxes.
- **Gross Sales** estimate the total value of all small ruminant sales, including the input costs for goods and services, along with the money received when that product is sold for final use. Gross sales are also equal to the value-added part of production (GDP) plus the cost of input goods and services.
- **Labor Income** is a part of the value-added, or GDP, impact that describes wages, benefits, and owner pay associated with employment. It represents all spending, including health, retirement, and other benefits directed to workers, as well as income earned by proprietors.



- **Jobs** estimate the annual average mix of full-time, part-time, and seasonal employment needed for business operations. Employment is not equal to full-time equivalent jobs, which is an important distinction, as most small ruminant operators do not raise sheep or goats as their primary job but use them to supplement income from larger farm operations or other employment.

It is important to note that Labor Income is a component of GDP, and GDP is, in turn, a component of Gross Sales. Therefore, these figures are not additive—combining them would double-count overlapping effects.

The next sections describe how the direct sales and employment in small ruminant production contribute to Missouri's economy in terms of overall jobs, labor income, gross domestic product (GDP), and gross sales when the ripple effects of spending are analyzed with the IMPLAN economic model.

Missouri Goat Production Economic Contribution

Table 6 summarizes the economic contribution of Missouri goat production in 2024 based on IMPLAN analysis. Goat operations directly generated \$9.5 million in gross sales, over \$4 million in GDP, and \$2 million in labor income. That direct spending created ripple effects as goat operators purchased supplies and services from other businesses (called indirect or supply-chain impacts) and workers in these businesses spent their income on household needs (induced impacts).

Indirect impacts supported 29 additional Missouri jobs, along with \$1.6 million in labor income, and \$2.4 million in GDP. Indirect jobs were supported by supply-chain spending for inputs such as feed supplements, farm supplies, veterinary services, machinery, and other operating costs. Goat operation sales generated income for farmers and supply-chain workers that they could spend on household needs such as food, clothing, housing and other items. That additional induced spending supported 16 jobs, \$914,222 in labor income and \$1.7 million in GDP.

In total, Missouri goat operation sales supported 2,035 jobs in 2024, including \$4.5 million in labor income, \$8.1 million in GDP, and \$17.3 million in gross sales.

Table 6. Missouri Goat Production Economic Contribution, 2024

Impact	Jobs	Labor Income	GDP	Gross Sales
Direct	1,990	\$2,020,767	\$4,007,838	\$9,542,508
Indirect	29	\$1,576,711	\$2,404,049	\$4,937,770
Induced	16	\$914,222	\$1,709,448	\$2,825,214
Total	2,035	\$4,511,701	\$8,121,335	\$17,305,492

Missouri Sheep Production Economic Contribution

Table 7 summarizes the economic contribution of Missouri sheep production. Sheep operations are a larger share of the small ruminant production industry and directly generated \$15.6 million in gross sales, nearly \$6.6 million in GDP, and \$3.3 million in labor income in 2024. As with goat operators, the direct spending of sheep farmers created ripple effects in the economy as supply-chain goods and services were purchased and workers spent wages on household needs.

Indirect supply-chain impacts supported 51 additional Missouri jobs, along with \$2.5 million in labor income and \$8.0 million in GDP. Sheep operation sales generated income for farmers and supply-chain workers that they spent on household needs, and those induced expenditures supported 26 jobs, nearly \$1.5 million in labor income and \$2.7 million in GDP.

In total, Missouri sheep operation sales supported 2,026 jobs in 2024, including \$7.3 million in labor income, \$13.1 million in GDP, and \$28.1 million in gross sales.

Table 7. Missouri Sheep Production Economic Contribution, 2024

Impact	Jobs	Labor Income	GDP	Gross Sales
Direct	1,949	\$3,305,814	\$6,556,504	\$15,610,786
Indirect	51	\$2,501,491	\$3,850,577	\$8,003,660
Induced	26	\$1,466,878	\$2,743,017	\$4,533,604
Total	2,026	\$7,274,183	\$13,150,098	\$28,148,050

Missouri Small Ruminant Production Economic Contribution

The total economic contribution of small ruminant production in Missouri is summarized in Table 8. The 3,939 goat and sheep operations directly generated nearly \$25.2 million in gross sales, \$10.6 million in GDP, and \$5.3 million in labor income. The ripple effects of that direct spending created indirect supply-chain and induced household spending impacts that also benefited Missouri.

Indirect impacts supported 80 additional Missouri jobs, along with \$4.1 million in labor income and \$6.3 million in GDP. Induced impacts from worker spending on household needs supported an additional 41 jobs, \$2.4 million in labor income and \$4.5 million in GDP.

Overall, Missouri small ruminant operation sales supported 4,061 jobs in 2024, including \$11.8 million in labor income, \$21.3 million in GDP, and \$45.5 million in gross sales.



Table 8. Missouri Small Ruminant Production Economic Contribution, 2024

Impact	Jobs	Labor Income	GDP	Gross Sales
Direct	3,939	\$5,326,581	\$10,564,342	\$25,153,294
Indirect	80	\$4,078,202	\$6,254,625	\$12,941,430
Induced	41	\$2,381,101	\$4,452,466	\$7,358,818
Total	4,061	\$11,785,884	\$21,271,433	\$45,453,543

Small Ruminant Sales Growth and U.S. Supply Trends

While the Agriculture Census is only conducted every five years, it provides valuable historical data to analyze growth trends over time. Table 9 presents the growth rates in small ruminant sales in the U.S., Missouri, and surrounding states from 2017 to 2022. During those five years, Missouri small ruminant sales grew by 26.3%, more than double the U.S. rate, but lagged in some neighboring states. Kansas had lower 2017 small ruminant revenues than Missouri, yet it grew by 75.3% over five years to surpass the Show-Me State in sales.

Table 9. Small Ruminant Sales by Selected States and U.S., 2017-22

Area	2017 Sales	2022 Sales	2017-22 Sales Chg.	2017-22 % Sales Chg.
MISSOURI	\$20,440,000	\$25,809,000	\$5,369,000	26.3%
ARKANSAS	\$4,190,000	\$7,552,000	\$3,362,000	80.2%
ILLINOIS	\$12,513,000	\$12,964,000	\$451,000	3.6%
IOWA	\$61,679,000	\$58,098,000	-\$3,581,000	-5.8%
KANSAS	\$15,396,000	\$26,991,000	\$11,595,000	75.3%
KENTUCKY	\$11,792,000	\$13,577,000	\$1,785,000	15.1%
NEBRASKA	\$11,927,000	\$16,507,000	\$4,580,000	38.4%
OKLAHOMA	\$13,406,000	\$21,914,000	\$8,508,000	63.5%
TENNESSEE	\$11,942,000	\$12,501,000	\$559,000	4.7%
US TOTAL	\$1,027,586,000	\$1,132,536,000	\$104,950,000	10.2%

The recent trends in U.S. sheep and goat meat demand create a growth opportunity for Missouri producers in the years to come. Nationally, the combined sheep and goat meat supply grew by 15.2% from 2019 to 2024, with sheep imports accounting for most gains. Assuming similar U.S. growth in the coming five years, and more demand shifting to domestic production, it is reasonable to assume that Missouri's small ruminant producers could again increase sales by 26.3% from 2024 to 2029.

The following section highlights the economic contribution of Missouri's small ruminant producers if they were able to match the 26.3% growth rate of sales, seen from 2017 to 2022, over the next five years.



Missouri's Small Ruminant 2024-29 Growth Scenario Impact

If Missouri small ruminant sales grew by 26.3% over five years, sales would reach \$31.8 million by 2029. While this would continue to be a significant growth level, it would still not exceed the past growth rates of the surrounding states of Arkansas (80.2%), Kansas (75.3%), or Oklahoma (63.5%).

Under this growth scenario, the direct sales of small ruminant production would increase to \$31,760,341 in 2029. When accounting for the indirect supply chain and induced worker spending effects, this growth would generate nearly \$27 million in wealth for Missourians (GDP), including \$14.9 million in labor income. Total gross sales would reach \$57.5 million in 2029, given the additional spending benefits to Missourians—see Table 10.

Assuming constant productivity levels, the number of farm operators in 2029 would increase to 4,973. That higher level of small ruminant employment would also generate larger indirect and induced job gains. In 2029, total employment supported by small ruminant operations would exceed 5,100.

Table 10. 2029 Economic Impact of Small Ruminant Production with a 5-Year Growth Rate of 26.3%

Impact	Jobs	Labor Income	GDP	Gross Sales
Direct	4,973	\$6,725,720	\$13,339,291	\$31,760,341
Indirect	94	\$5,128,590	\$7,881,313	\$16,301,299
Induced	48	\$3,025,102	\$5,726,019	\$9,437,476
Total	5,115	\$14,879,413	\$26,946,623	\$57,499,115

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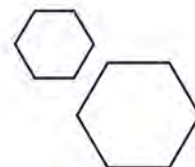
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