

# Economic Analysis of Animal Agriculture 2005-2015

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***KANSAS***

**A Report for  
United Soybean Board**



**September 2016**



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## Kansas Executive Summary

The use of soybean meal as a key feed ingredient is an important part of Kansas's animal agriculture. While the degree to which animal agriculture utilizes this versatile feed ingredient has fluctuated with time, it remains a key driver of animal agriculture's success in the State of Kansas. The success of Kansas animal agriculture in turn has a large impact on the rest of the state and regional economies. For example, in the State of Kansas during 2015 animal agriculture contributed:

- \$14.5 billion in economic output
- 57,819 jobs
- \$2.9 billion in earnings
- \$721.6 million in income taxes paid at local, state, and federal levels
- \$227.6 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Kansas has increased economic output by over \$3.3 billion, boosted household earnings by \$657.8 million, contributed 13,239 additional jobs and paid \$166.0 million in additional tax revenues.

Kansas's animal agriculture consumed almost 409.1 thousand tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Hogs (190.3 thousand tons)
- Beef Cows (154.7 thousand tons)
- Dairy Cows (45.6 thousand tons)

This report examines animal agriculture in Kansas over the last decade. While this analysis is certainly instructive and allows improved understanding of animal agriculture's impact during that time, as the next decade unfolds in Kansas, many opportunities and challenges will arise. It is expected that animal agriculture will continue to be a major contributor to the economic well-being of the people of Kansas and beyond.

## Kansas Economic Impact of Animal Agriculture

Animal agriculture is an integral part of Kansas's economy. In 2015, Kansas's animal agriculture contributed the following to the economy:

- About \$14.5 billion in economic output
- \$2.9 billion in household earnings
- 57,819 jobs
- \$721.6 million in income taxes

And the animal agriculture sector has shown substantial growth during challenging economic times. During the last decade Kansas's animal agriculture has:

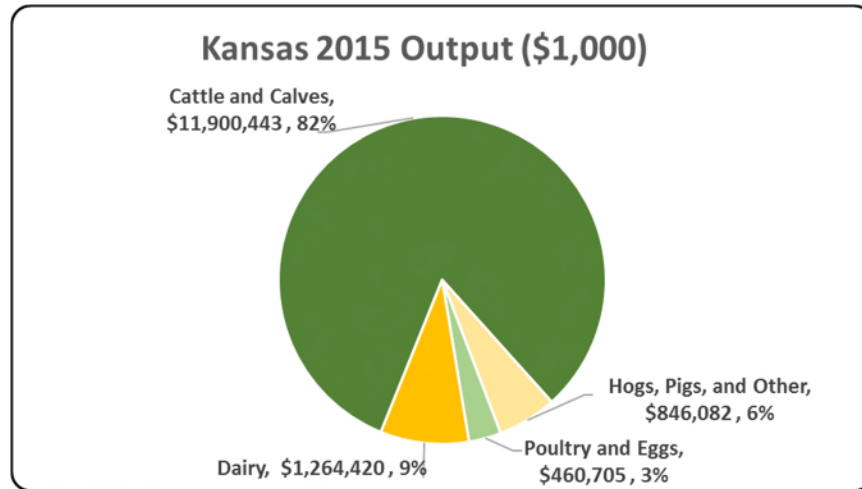
- Increased economic output by \$3.3 billion
- Boosted household earnings by \$657.8 million
- Added 13,239 jobs
- Paid an additional \$166.0 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2015	Change 2005-2015	% Change 2005-2015
Output (\$1,000)	\$ 14,471,650	\$ 3,341,597	30.02%
Earnings (\$1,000)	\$ 2,859,991	\$ 657,782	29.87%
Employment (Jobs)	57,819	13,239	29.70%
Income Taxes Paid (\$1,000)	\$ 721,576	\$ 165,958	29.87%
Property Taxes Paid in 2012 (\$1,000)	\$ 227,644		

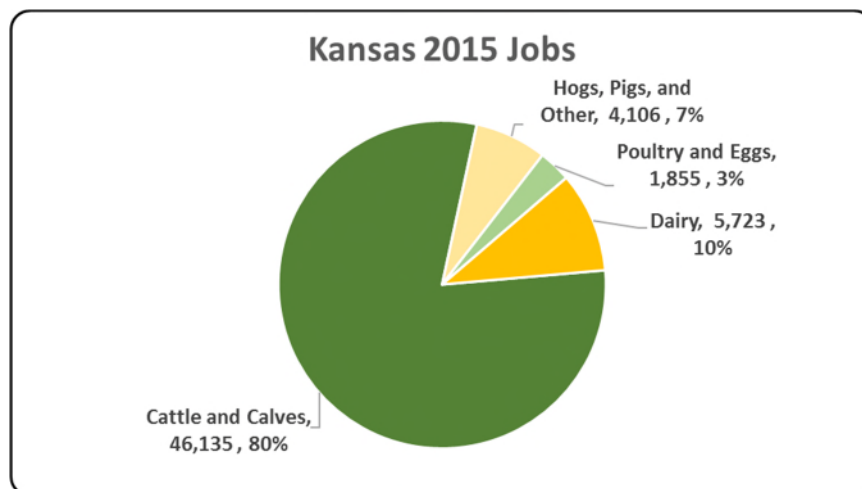
### Kansas Output

“Output” refers to the total value of all the output (production or sales) of a study area and/or industry within a study area and was calculated using RIMS II multipliers. This is a gross number that does not make any deductions for the cost or origination of inputs that were used in the production process. The chart illustrates the impact of animal agriculture to the Kansas economy. Animal agriculture’s impact on Kansas total economic output is about \$14.5 billion.



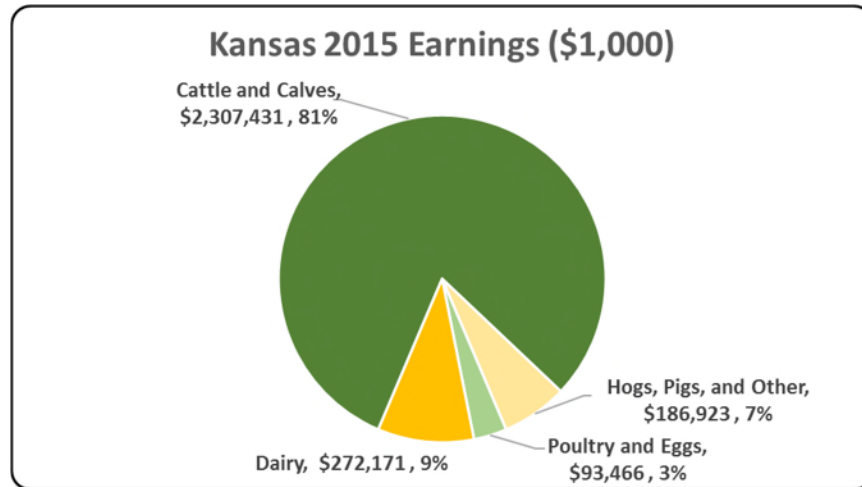
### Kansas Jobs

“Jobs” represents an estimate of the number of full or part-time positions (jobs) currently filled in an area and/or industry. The chart illustrates the contribution to Kansas in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Kansas total jobs, contributing 57,819 jobs within and outside of animal agriculture.



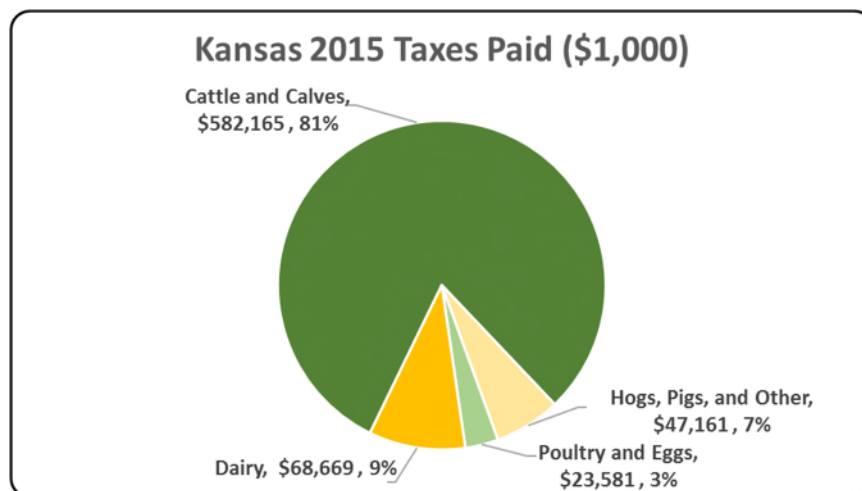
### Kansas Earnings

Earnings includes wages and salaries plus proprietors' income, which is the net earnings of sole-proprietors and partnerships. The chart illustrates the impact of animal agriculture to the Kansas economy in terms of earnings. Kansas's animal agriculture contributed about \$2.9 billion to household earnings in 2015.



### Kansas Taxes Paid by Animal Agriculture

Kansas's animal agriculture is also a significant source of tax revenue. In 2015, the state's animal agriculture industry paid about \$721.6 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$227.6 million in property taxes paid by all of Kansas agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



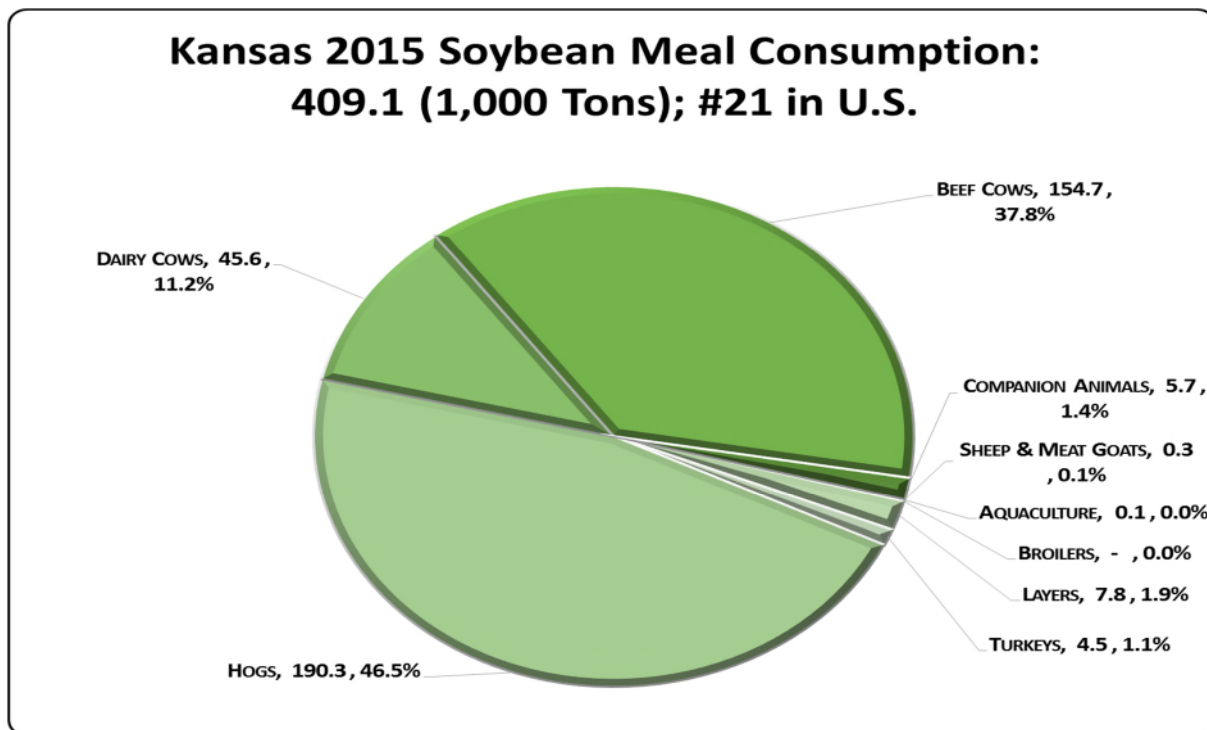
### Kansas Animal Agriculture Soybean Meal Consumption

The choice to use soybean meal in animal agriculture is highly dependent upon nutritional requirements of animals (which would encompass varying life stages within an animal species), accessibility to various feed ingredients capable of competing with soybean meal (from both a nutritional and price standpoint), and consumer preferences which have influence on production practices.

Through in-depth conversations with many of the nation’s top nutritionists and researchers from both private industry and public institutions, “bottom up” estimates of soybean meal usage by animal type were determined. Using the input from these conversations and additional analysis performed by Decision Innovation Solutions, the quantity of soybean meal used during the 2014-15 soybean marketing year by up to sixteen specific animal species has been estimated.

Kansas’s animal agriculture consumed almost 409.1 thousand tons of soybean meal in 2015, placing the state as #21 in the nation in terms of soybean meal consumption (see figure below). The three segments of animal agriculture that led the state in estimated soybean meal consumption are:

- Hogs (190.3 thousand tons)
- Beef Cows (154.7 thousand tons)
- Dairy Cows (45.6 thousand tons)

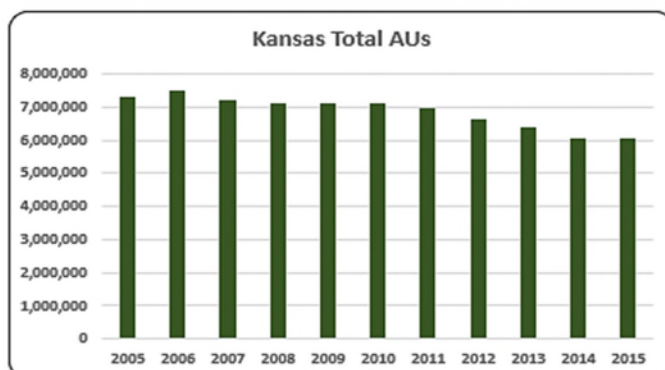
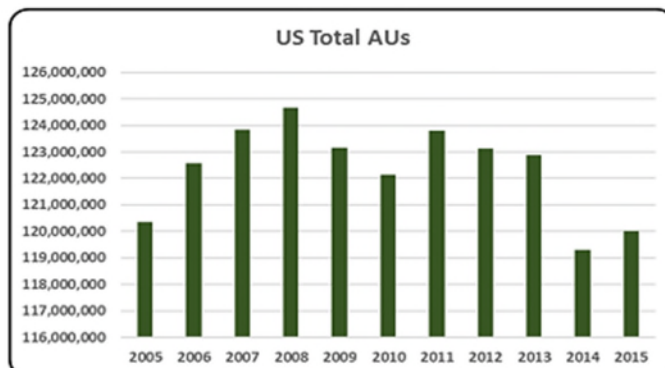


## Kansas Animal Unit (AU) Trends

Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Kansas. Due to this reality, using a single year as a measure of the presence and strength of a sector can be misleading. The use of animal units allows for a more accurate comparison of differing sizes of livestock and poultry. This section is included to bring context to the question of what animal agriculture means to Kansas and to give perspective on Kansas's contribution to the nation's animal agriculture industry and beyond.

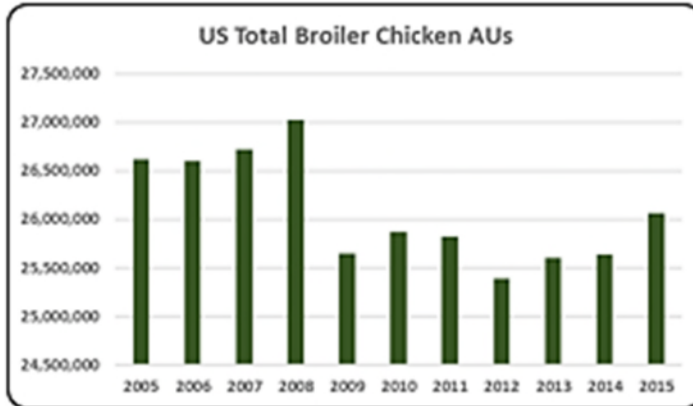
Similar to using a single year to measure the presence and strength of a sector, in some circumstances AUs can be misleading. This is because AUs do not reflect important considerations like increased weights, improved livability, increased laying potential, etc.

As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Kansas, the largest three segments of animal agriculture in terms of AUs during 2015 were: Beef Cows (5.27 million AUs), Hogs (489,600 AUs), and Dairy Cows (200,200 AUs). Total animal units in Kansas during 2015 were 6.0 million AUs.

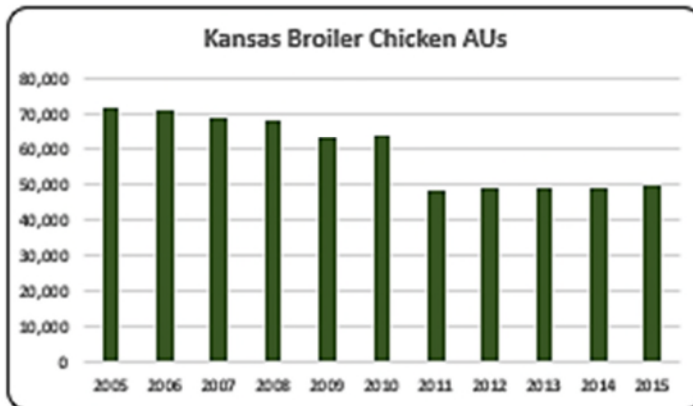


- Overall U.S. total AUs have varied from 2005 to 2015. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2005-15 time period, total AUs in the nation peaked in 2008.
- There were on average 6.9 million AUs in Kansas from 2005 to 2015. AUs have been declining during the decade from the record high of 7.5 million AUs in 2006 to lowest level of 6.0 million in 2015.

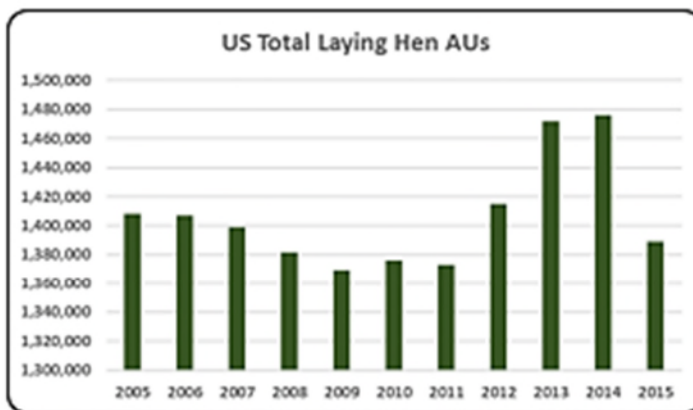




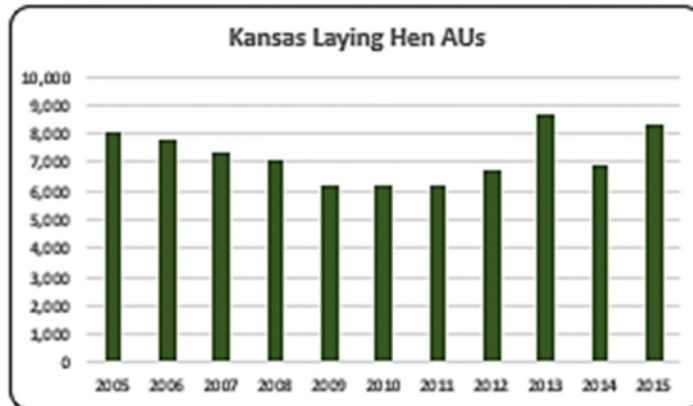
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2005 to 2015, broiler chicken AUs was about 26.0 million. In 2015, AUs rebounded 3% from the low AUs numbers in 2012 (25.4 million AUs).



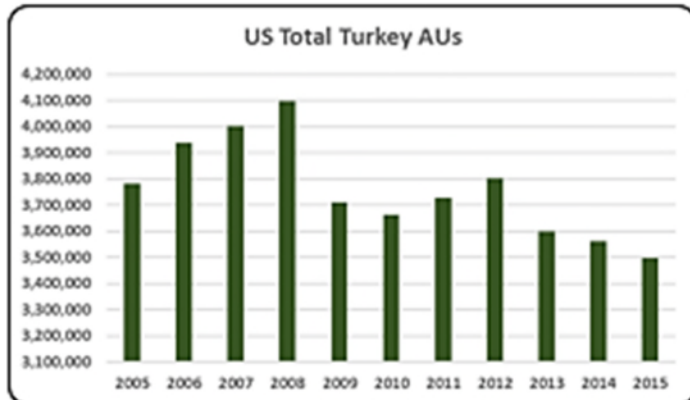
- Broiler numbers in Kansas have been shrinking since the beginning of the decade, from 71,593 broiler AUs in 2005 to 49,878 AUs in 2015.



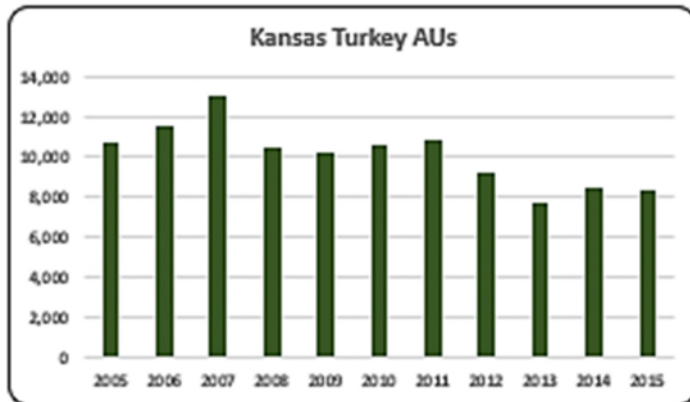
- On average, the layer AUs during 2005-2015 were 1.4 million. In 2015 layer AUs were 1.3 million, down 6% from the 2014 decade high (1.4 million AUs). This drastic decrease in 2015 was due to the losses in major egg laying states from the avian influenza outbreak.



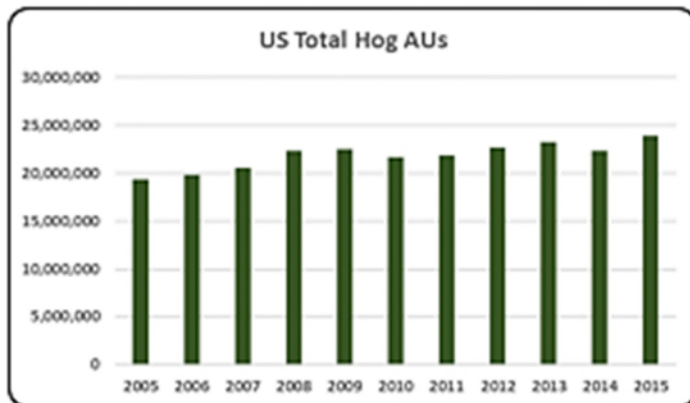
- On average there were 7,230 layer AUs in the state in the 2005 to 2015 decade.



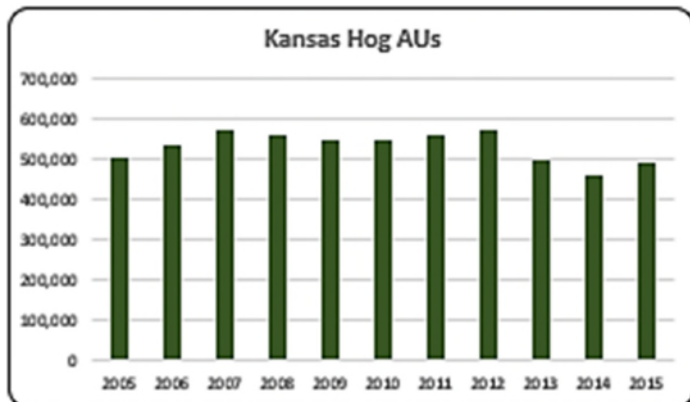
- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.



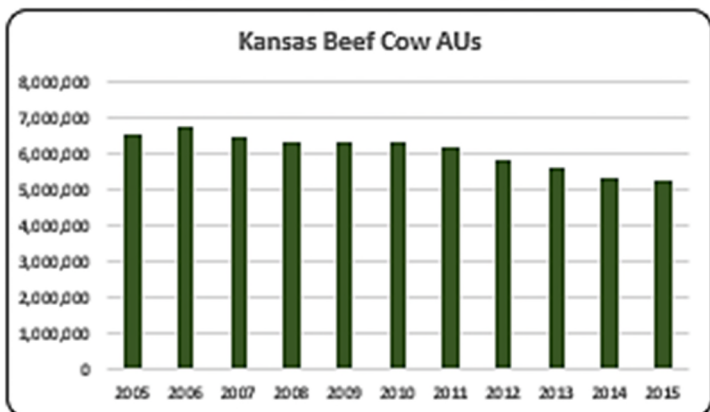
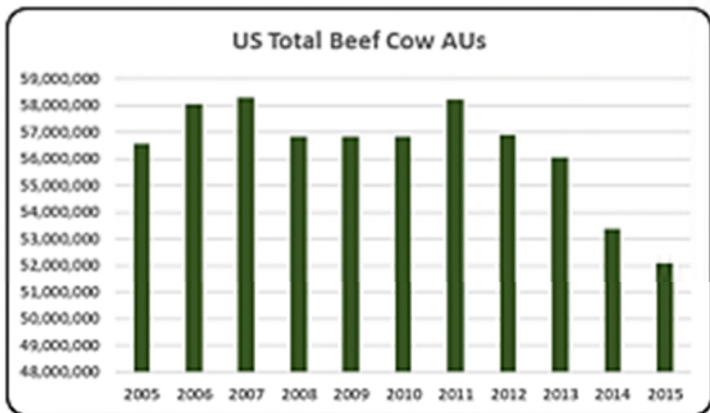
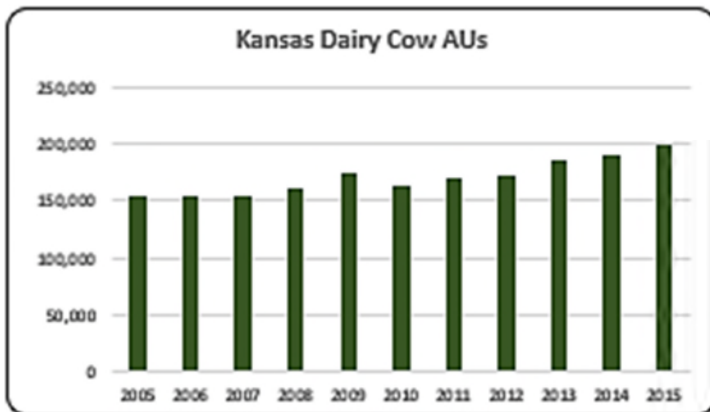
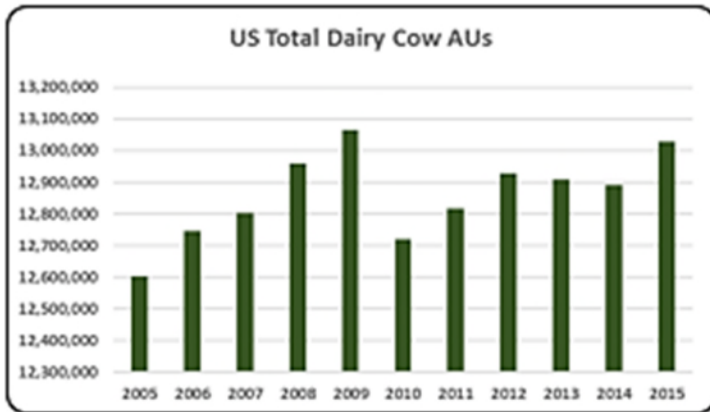
- Despite the decreasing trend in turkey AUs in Kansas, last year turkey AUs were at 8,302.



- On average from 2005 to 2015, hog AUs were about 21.8 million. Hog AUs in 2015 increased 24% to 23.9 million AUs compared to the decade low in 2005 (19.4 million AUs). Despite the fluctuation in AUs, the pork supply was relatively stable.



- Hog AUs in 2015 (489,600) represent about 8.1% of all AUs present in the state. Hog AUs deteriorated since 2012.



- From 2005 to 2015 dairy cow AUs averaged 12.8 million. In 2015, dairy cow AUs (13.0 million) finally reached near the 2009 high of 13.1 million AUs. Milk supplies have steadily risen.
- Kansas’ dairy cow production has shown the most consistent growth during the decade with an increase from 154,000 dairy cow AUs in 2005 to 200,200 dairy cow AUs in 2015.
- From 2005 to 2015 beef cow AUs averaged 56.3 million. In 2015 beef cow AUs decreased to 52.0 million, the lowest of the decade. States that traditionally raise a lot of cattle like Texas and Oklahoma continue to work through the lingering effects of the drought of the last several years.
- About 87.5% of all AUs in Kansas were beef cow AUs in 2015. Beef cow AUs have declined over the past decade in part due to long term drought.

## Kansas Additional Information and Methodology

Animal agriculture is an important part of Kansas's current and future economic health. To quantify the connection between animal agriculture and local economies, the United Soybean Board commissioned [Decision Innovation Solutions](#), an economic research firm in Urbandale, Iowa, to conduct an in-depth analysis of several aspects of animal agriculture. This analysis includes the following components:

- Economic impact of animal agriculture to local (state) economies during the 2005-2015 time period
- Soybean meal usage by animal species during the 2014/15 soybean marketing year
- Animal Unit (AU) trends from 2005-2015

Given the long-term presence of animal agriculture in Kansas, of interest is the degree to which the industry impacts the Kansas economy. Estimates of output, jobs, earnings, taxes paid, and multipliers for Kansas animal agriculture are presented in this report. Methodology for this section of the report closely mirrors that followed in years' past. Also presented are estimates of the change in how animal agriculture has impacted Kansas's economy over the last decade. Differences, to the extent they are present, are noted within the larger national report which accompanies this state report.

As with any industry across the economic spectrum, there are ebbs and flows in activity that have implications for other parts of the economy. Again using the same 2005-2015 time period as with the economic impact section of this state report, the "Animal Unit Trends" seeks to quantify production changes in animal agriculture in Kansas which have occurred. As shown in this state report, Kansas has seen changes within its animal agriculture industry. Expectations are that animal agriculture will continue to evolve over the next decade.

Animal agriculture is the single largest user of soybean meal in Kansas. Through in-depth conversations with many of the nation's top nutritionists and researchers, "bottom up" estimates of soybean meal usage by animal type were determined. Using the input from these conversations and additional analysis performed by Decision Innovation Solutions, the quantity of soybean meal used during the 2014-15 soybean marketing year for up to sixteen specific animal species has been estimated.

Should readers have comments or questions regarding methodology, results and interpretation, please contact the authors at [info@decision-innovation.com](mailto:info@decision-innovation.com) or 515.257.6077.

### Kansas Multipliers

Economic multipliers give a sense for how economic activity in a given industry is related to other industries in the same study area. To estimate the impact of animal agriculture on Kansas’s economy, we applied RIMS II multipliers from the Department of Commerce, Bureau of Economic Analysis for cattle ranching and farming, dairy cattle and milk production, poultry and egg production, and other animal production (primarily hogs and pigs), where applicable.

Multipliers are generally stated in the form of “per million dollars” of output. As it relates to this analysis, multipliers are stated as the activity related to every million dollars of economic output in animal agriculture. Referring to the multipliers below, for every million dollars in output generated by the various segments of animal agriculture in Kansas, \$1.77 to \$2.56 million in total economic activity, \$0.39 to \$0.52 in household wages and 9 to 11 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.526	\$ 0.490	9.8
	Hogs, Pigs, and Other	\$ 1.768	\$ 0.391	8.6
	Poultry and Eggs	\$ 2.560	\$ 0.519	10.3
	Dairy	\$ 2.354	\$ 0.507	10.7

## Appendix

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
<b>Animal Units (AUs)</b>	Beef Cattle AUs	6,551,475	6,725,475	6,419,475	6,323,475	6,323,475	6,323,475	6,192,150	5,832,150	5,628,150	5,340,150	5,279,850
	Hog and Pig AUs	500,400	535,350	569,550	555,450	544,200	546,750	558,000	572,250	497,250	458,400	489,600
	Broiler AUs	71,593	71,110	68,819	67,745	62,987	63,835	48,100	49,072	48,901	48,623	49,878
	Turkey AUs	10,664	11,587	13,003	10,394	10,181	10,605	10,794	9,214	7,686	8,485	8,302
	Egg Layer AUs	8,052	7,770	7,334	7,124	6,231	6,190	6,226	6,700	8,675	6,912	8,317
	Dairy AUs	154,000	154,000	154,000	161,000	175,000	162,400	170,800	172,200	184,800	190,400	200,200
	<b>Total Animal Units</b>	<b>7,296,184</b>	<b>7,505,292</b>	<b>7,232,181</b>	<b>7,125,189</b>	<b>7,122,075</b>	<b>7,113,254</b>	<b>6,986,070</b>	<b>6,641,586</b>	<b>6,375,462</b>	<b>6,052,971</b>	<b>6,036,148</b>
<b>Value of Production (\$1,000)</b>	Cattle and Calves (\$1,000)	\$ 2,973,468	\$ 2,971,488	\$ 3,328,059	\$ 3,320,511	\$ 2,964,814	\$ 3,444,301	\$ 4,224,540	\$ 4,216,036	\$ 4,167,701	\$ 4,687,210	\$ 4,711,927
	Hogs and Pigs (\$1,000)	\$ 364,804	\$ 341,113	\$ 361,160	\$ 350,741	\$ 325,010	\$ 438,565	\$ 599,038	\$ 568,278	\$ 567,739	\$ 607,795	\$ 472,676
	Broilers (\$1,000)	\$ 60,162	\$ 46,607	\$ 53,110	\$ 54,260	\$ 46,814	\$ 48,922	\$ 42,831	\$ 48,896	\$ 59,579	\$ 62,503	\$ 54,528
	Turkeys (\$1,000)	\$ 10,130	\$ 11,976	\$ 14,790	\$ 12,764	\$ 11,625	\$ 14,628	\$ 16,270	\$ 15,091	\$ 11,949	\$ 13,520	\$ 14,397
	Eggs (\$1,000)	\$ 18,905	\$ 20,959	\$ 34,403	\$ 41,461	\$ 29,509	\$ 32,393	\$ 35,517	\$ 39,831	\$ 45,001	\$ 72,032	\$ 111,059
	Milk (\$1,000)	\$ 330,020	\$ 297,815	\$ 422,091	\$ 456,435	\$ 348,320	\$ 431,981	\$ 542,850	\$ 519,080	\$ 592,264	\$ 747,360	\$ 537,251
	Other	\$ 6,384	\$ 5,656	\$ 5,960	\$ 5,319	\$ 5,820	\$ 6,375	\$ 5,900	\$ 5,894	\$ 5,888	\$ 5,883	\$ 5,877
	Sheep and Lambs (\$1,000)	\$ 6,042	\$ 5,285	\$ 5,560	\$ 4,891	\$ 5,363	\$ 5,889	\$ 5,385	\$ 5,351	\$ 5,316	\$ 5,282	\$ 5,248
	Aquaculture (\$1,000)	\$ 342	\$ 371	\$ 400	\$ 428	\$ 457	\$ 486	\$ 515	\$ 543	\$ 572	\$ 601	\$ 630
	<b>Total (\$1,000)</b>	<b>\$ 3,763,872</b>	<b>\$ 3,695,613</b>	<b>\$ 4,219,572</b>	<b>\$ 4,241,491</b>	<b>\$ 3,731,913</b>	<b>\$ 4,417,166</b>	<b>\$ 5,466,946</b>	<b>\$ 5,413,106</b>	<b>\$ 5,450,121</b>	<b>\$ 6,196,303</b>	<b>\$ 5,907,715</b>

Ag Census Data Category	Animal Type	1997	2002	2007	2012	
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	19,839	20,314	18,708	15,991	
	Cattle feedlots (112112)	1,331	1,506	894	492	
	Dairy cattle and milk production (11212)	764	608	523	398	
	Hog and pig farming (1122)	1,098	634	618	348	
	Poultry and egg production (1123)	256	299	691	385	
	Sheep and goat farming (1124)	437	497	782	946	
	Animal aquaculture and other animal production (1125,1129)	1,894	3,110	3,493	3,484	
Value of Sales (\$1,000)	Cattle and Calves	5,437,006	5,715,204	8,542,872	10,153,087	
	Hogs and Pigs	297,492	297,505	506,448	697,020	
	Poultry and Eggs	48,014	withheld	69,807	88,403	
	Milk and Other Dairy Products	155,047	248,542	376,511	482,765	
	Aquaculture	withheld	745	2,228	4,997	
	Other (calculated)	23,063	65,801	28,105	33,581	
	<b>Total</b>	<b>5,960,622</b>	<b>6,327,797</b>	<b>9,525,971</b>	<b>11,459,853</b>	
Input Purchases	Livestock and poultry purchased	(Farms) 19,518	16,103	15,145	16,190	
		\$1,000	2,687,621	3,554,091	5,192,954	5,440,898
	Breeding livestock purchased	(Farms) <i>n/a</i>	9,506	9,558	10,480	
		\$1,000	<i>n/a</i>	60,943	150,517	206,584
	Other livestock and poultry purchased	(Farms) <i>n/a</i>	8,750	7,797	8,352	
		\$1,000	<i>n/a</i>	3,493,148	5,042,438	5,234,314
Feed purchased	(Farms)	32,955	33,531	29,672	32,131	
	\$1,000	1,506,407	1,410,837	2,237,287	4,207,051	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
<b>2015 Animal Agriculture</b>	Cattle and Calves	\$ 11,900,443	\$ 2,307,431	46,135	\$ 582,165
	Hogs, Pigs, and Other	\$ 846,082	\$ 186,923	4,106	\$ 47,161
	Poultry and Eggs	\$ 460,705	\$ 93,466	1,855	\$ 23,581
	Dairy	\$ 1,264,420	\$ 272,171	5,723	\$ 68,669
	<b>Total</b>	\$ 14,471,650	\$ 2,859,991	57,819	\$ 721,576
<b>Change from 2005 to 2015</b>	Cattle and Calves	\$ 2,786,525	\$ 540,292	10,803	\$ 136,316
	Hogs, Pigs, and Other	\$ 49,642	\$ 10,967	241	\$ 2,767
	Poultry and Eggs	\$ 183,619	\$ 37,252	739	\$ 9,399
	Dairy	\$ 321,811	\$ 69,271	1,457	\$ 17,477
	<b>Total</b>	\$ 3,341,597	\$ 657,782	13,239	\$ 165,958
<b>RIMS II Multipliers</b>	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
	Cattle and Calves	\$ 2.526	\$ 0.490	9.8	
	Hogs, Pigs, and Other	\$ 1.768	\$ 0.391	8.6	
	Poultry and Eggs	\$ 2.560	\$ 0.519	10.3	
	Dairy	\$ 2.354	\$ 0.507	10.7	
<b>Tax Rates</b>	Federal effective income tax rate				12.7%
	Federal Social Security tax rate				7.7%
	State Effective Rate				4.9%
	<b>Total</b>				25.2%

Sources: 1997, 2002, 2007 and 2012 Census of Agriculture, USDA/NASS Survey Data, RIMS II Multipliers (U.S. Bureau of Economic Analysis), Tax Policy Institute and Tax Foundation.