

Economic Analysis of Animal Agriculture 2004-2014

KANSAS

A Report for
United Soybean Board



September 2015



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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 driver of animal agriculture's success in 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 2014 animal agriculture contributed:

- \$16.3 billion in economic output
- 75,643 jobs
- \$2.6 billion in earnings
- \$653.3 million in income taxes paid at local, state, and federal levels
- \$227.6 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in Kansas increased economic output by over \$4.3 billion, boosted household earnings by \$691.3 million, contributed 20,329 additional jobs and paid \$174.4 million in additional tax revenues.

Kansas's animal agriculture consumed about 403.3 thousand tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Hogs (184.8 thousand tons)
- Beef Cows (157.4 thousand tons)
- Dairy Cows (44.1 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. And, if past is prologue, 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 2014, Kansas's animal agriculture contributed the following to the economy:

- About \$16.3 billion in economic output
- \$2.6 billion in household earnings
- 75,643 jobs
- \$653.3 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:

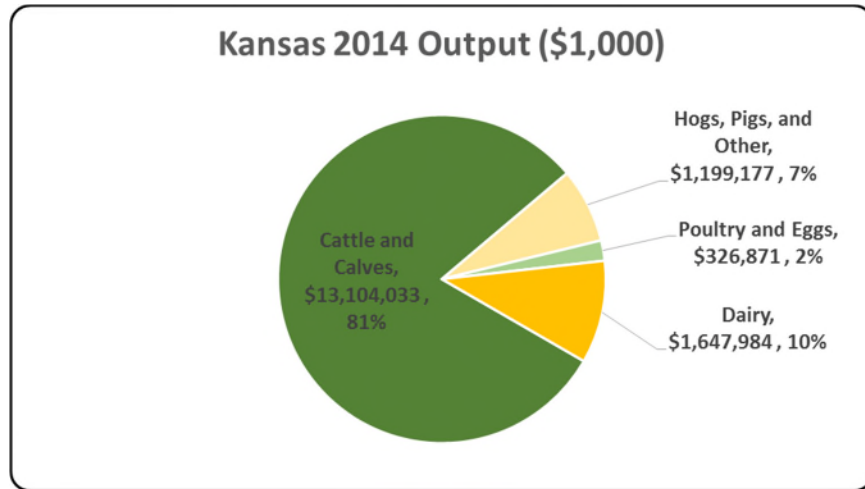
- Increased economic output by \$4.3 billion
- Boosted household earnings by \$691.3 million
- Added 20,329 jobs
- Paid an additional \$174.4 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output (\$1,000)	\$ 16,278,065	\$ 4,327,931	36.22%
Earnings (\$1,000)	\$ 2,589,457	\$ 691,271	36.42%
Employment (Jobs)	75,643	20,329	36.75%
Income Taxes Paid (\$1,000)	\$ 653,320	\$ 174,408	36.42%
Property Taxes Paid in 2012 (\$1,000)	\$ 227,644		

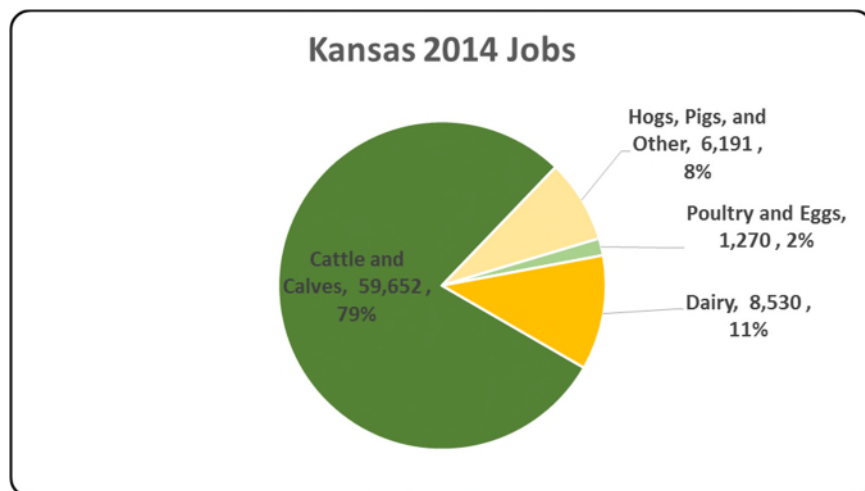
Kansas Output

“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 \$16.3 billion.



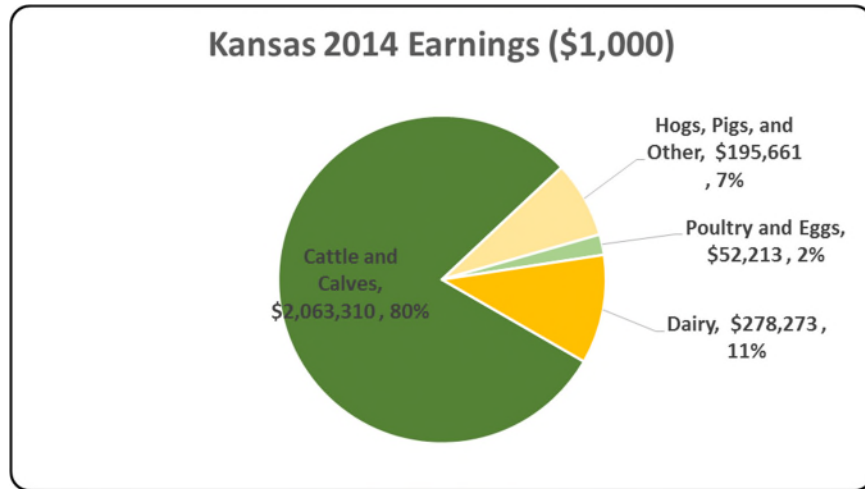
Kansas Jobs

“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 75,643 jobs within and outside of animal agriculture.



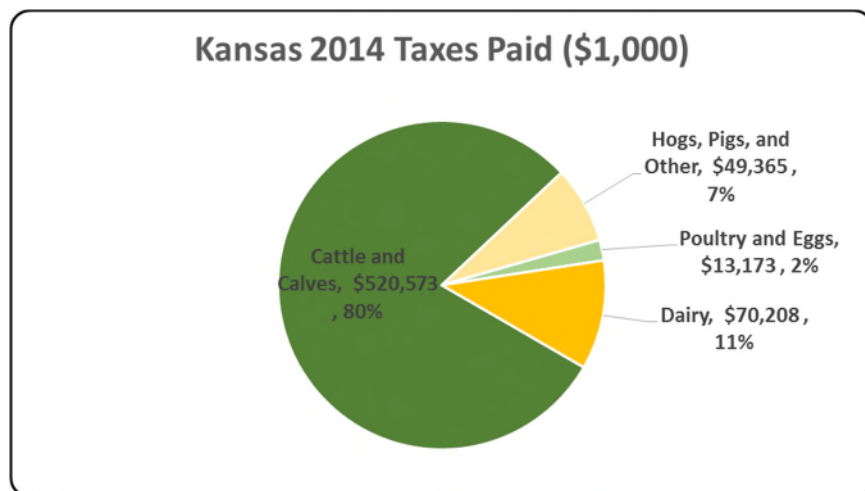
Kansas Earnings

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 \$2.6 billion to household earnings in 2014.



Kansas Taxes Paid by Animal Agriculture

Kansas's animal agriculture is also a significant source of tax revenue. In 2014, the state's animal agriculture industry paid about \$653.3 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.



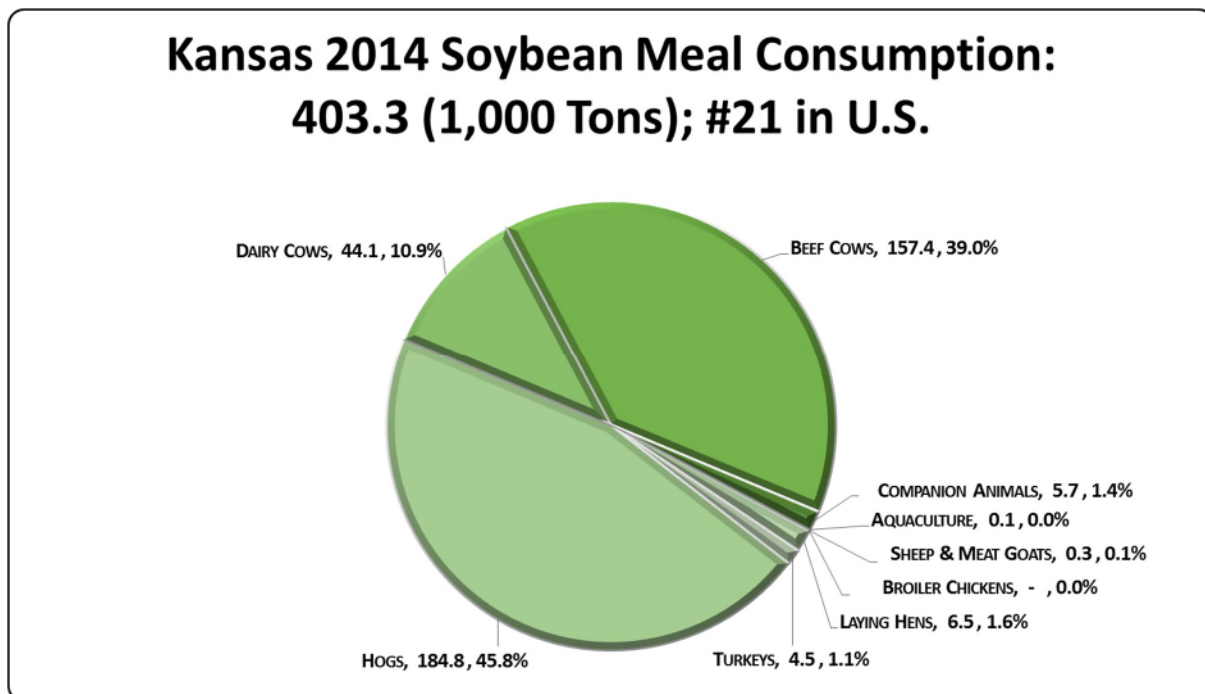
Kansas Animal Agriculture Soybean Meal Consumption

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 2013-14 soybean marketing year by up to sixteen specific animal species has been estimated.

Kansas’s animal agriculture consumed almost 403.3 thousand tons of soybean meal in 2014, 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 (184.8 thousand tons)
- Beef Cows (157.4 thousand tons)
- Dairy Cows (44.1 thousand tons)

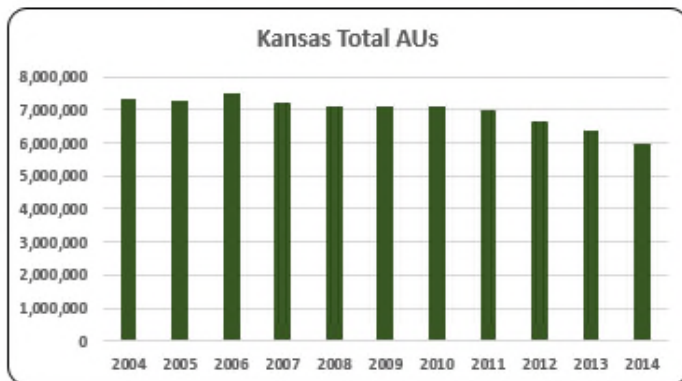
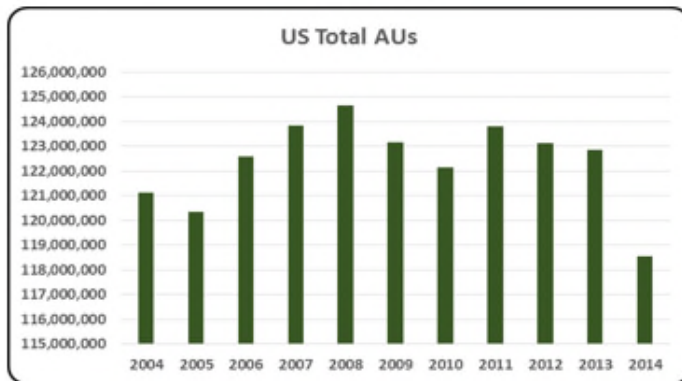


Kansas Animal Unit (AU) Trends

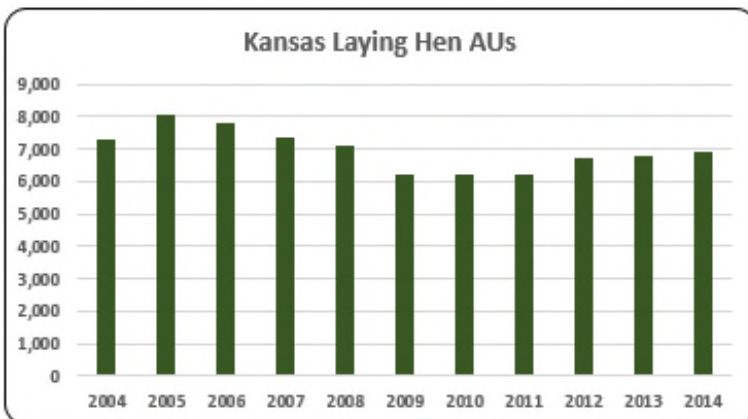
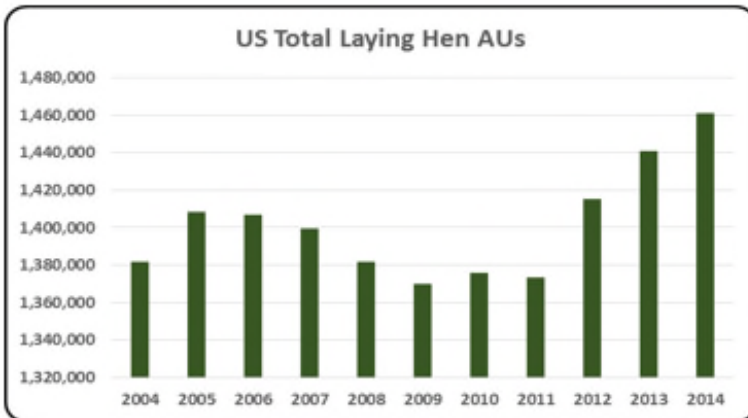
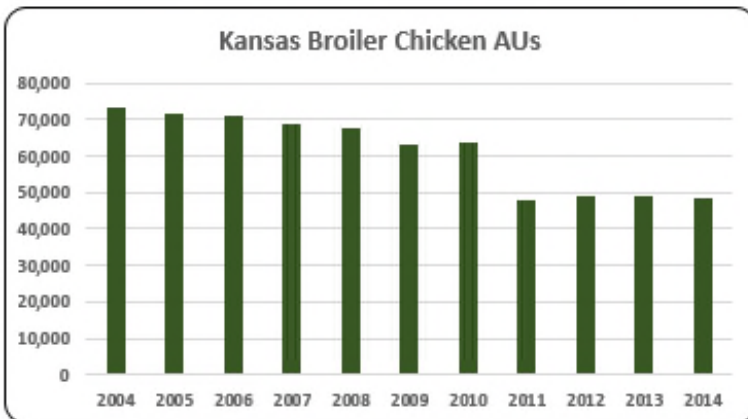
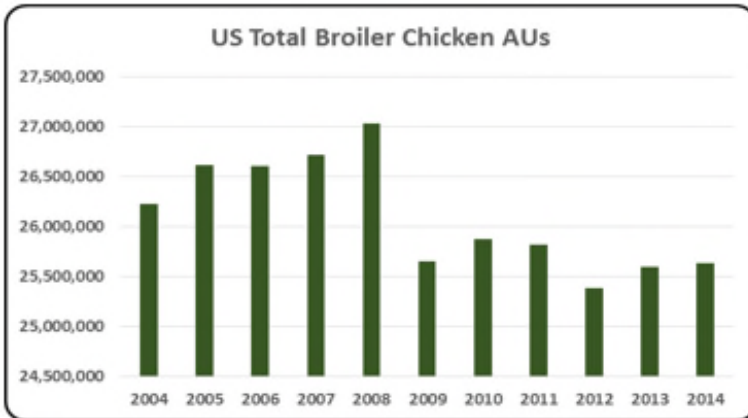
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Kansas. Due to this reality, using a single year as a measure of the presence and strength of a sector can be 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.

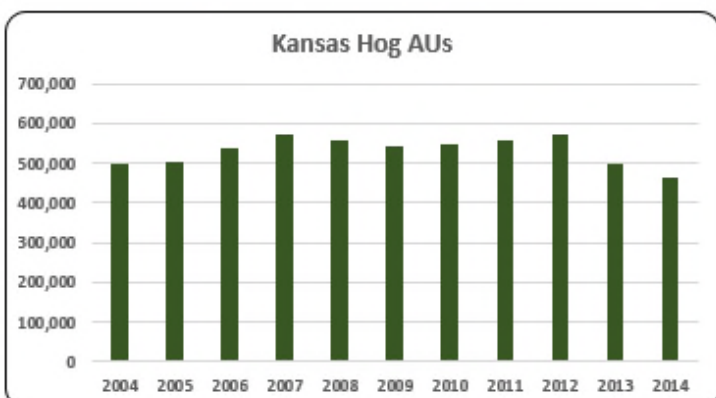
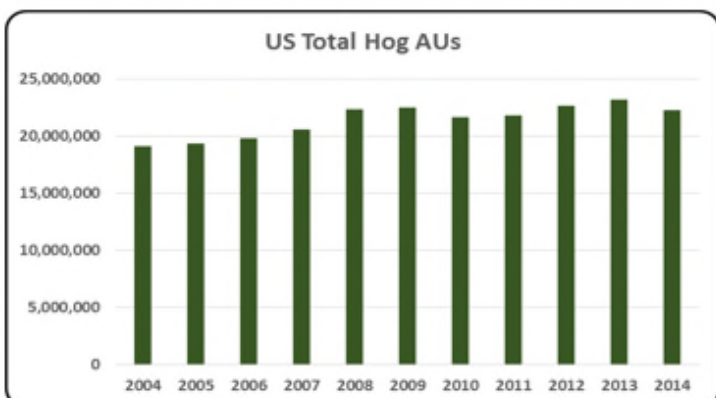
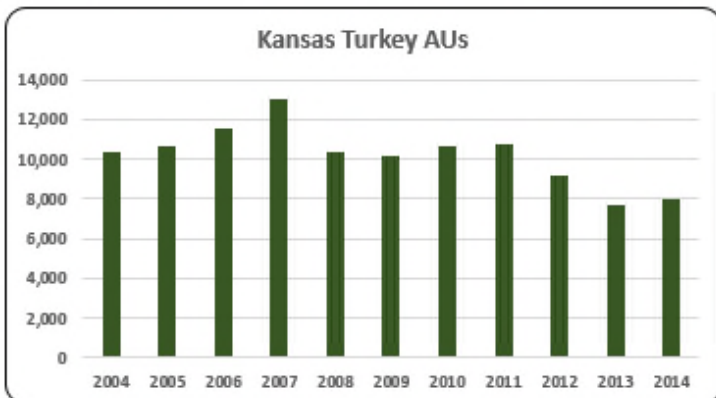
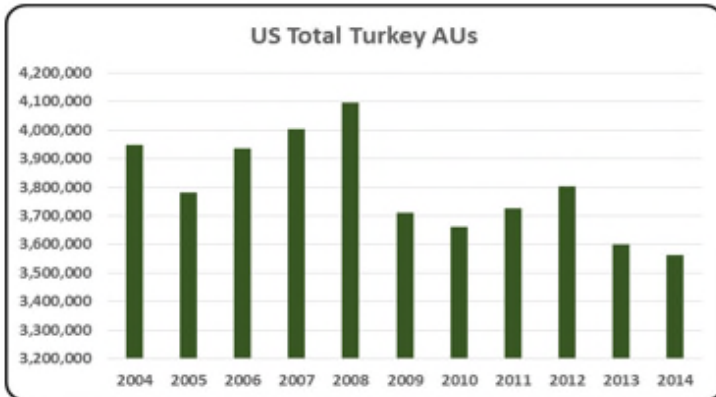
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Kansas, the largest three segments of animal agriculture in terms of AUs during 2014 were: Beef Cows (5,268.2 thousand AUs), Hogs (461.1 thousand AUs), and Dairy Cows (190.4 thousand AUs). Total animal units in Kansas during 2014 were 5,983.2 thousand AUs.



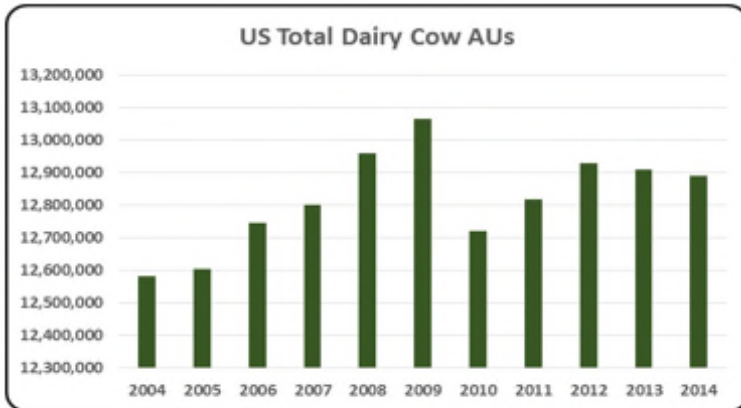
- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.
- There were on average 6,975.8 thousand AUs in Kansas from 2004 to 2014. AUs have been declining during the decade from the record high of 7,505.3 thousand AUs in 2007 to lowest level of 5,983.2 thousand in 2014.



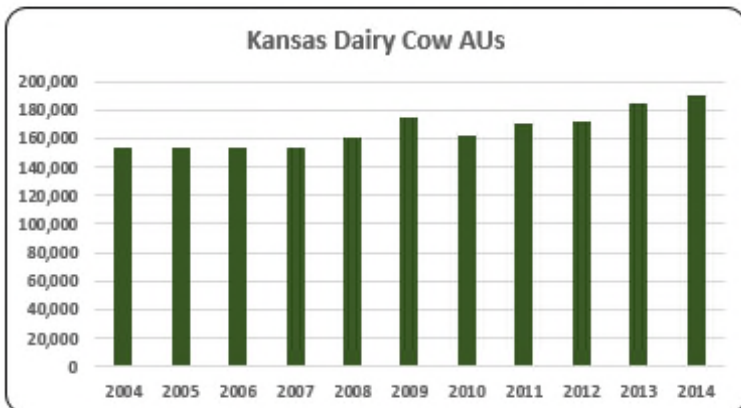
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).
- The broiler production in Kansas has been shrinking since the beginning of the decade, from 73,132 broiler AUs in 2004 to 48,623 AUs in 2014.
- On average, the layer AUs during 2004-2014 were 1.4 million. In 2014 layer AUs were 1.5 million, up 7% from the lowest number in 2009 (1.4 million AUs).
- On average there were 6,969 layer AUs in the state showing an increment of 1.6% from a year earlier.



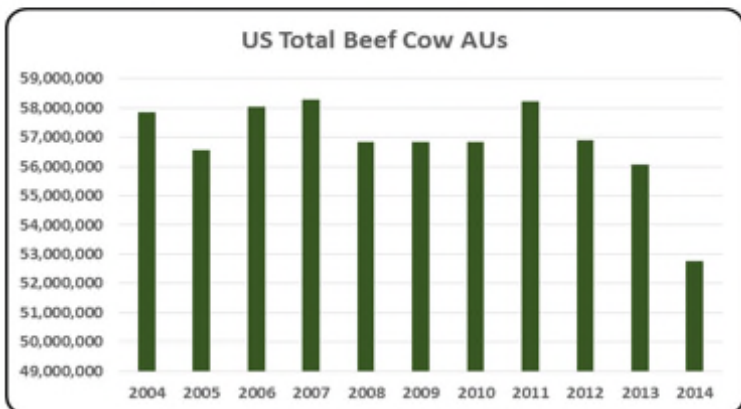
- From 2004 to 2014, the U.S. accounted for 50% of the world’s turkey production. However, in 2014 turkey AUs were the lowest of the decade at 3.5 million, decreasing 13% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade.
- Despite the decreasing trend in turkey AUs in Kansas, last year turkey AUs grew 4.4% to 8,027.
- On average from 2004 to 2014, hog AUs were about 21.4 million. In 2013 hog AUs reached a high of 23.2 million AUs as prices of main feed ingredients, particularly corn, decreased to pre-2010 price levels. Hog AUs in 2014 decreased 4.4% to 22.3 million AUs year-over-year, primarily due to the porcine epidemic diarrhea virus (PEDv) outbreak. Despite the fluctuation in AUs, the pork supply was relatively stable.
- Hog AUs in 2014 (461,100) represent about 7.7% of all AUs present in the state. Hog AUs deteriorated since 2012.



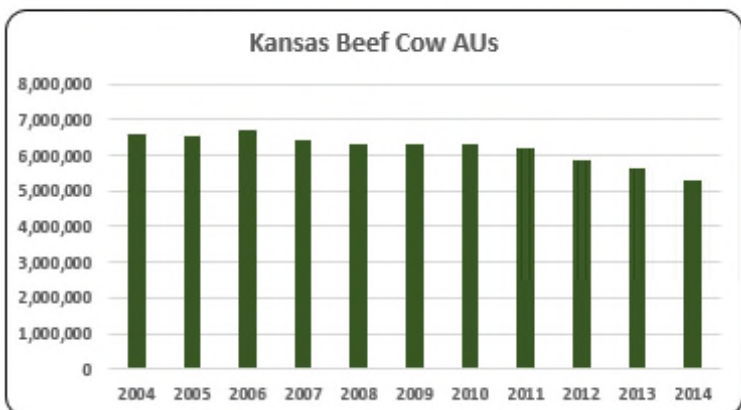
- From 2004 to 2014 dairy cow AUs averaged 12.8 million. In 2014, dairy cow AUs (12.9 million) remained about the same as the previous year but still below the high of 13.1 million AUs, the level in 2009. Despite the fluctuation in AUs, milk supplied has steadily risen.



- Among all animal production in Kansas, dairy cow production has shown the most consistent growth during the decade with a 24% increase from 154,000 dairy cow AUs in 2004 to 190,400 dairy cow AUs in 2014.



- From 2004 to 2014 beef cow AUs averaged 56.8 million. In 2014 beef cow AUs decreased to 52.8 million, the lowest of the decade. States that raise a large number of cattle and calves like Texas and Oklahoma were plagued with drought conditions during 2014.



- About 88.1% of all AUs in Kansas were beef cow AUs in 2014. The beef cow production has experienced a declining trend from a record high of 6,725.5 thousand beef cow AUs in 2006 to record low of 5,268.2 thousand beef cow AUs in 2014.

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 2004-2014 time period
- Soybean meal usage by animal species during the 2013/14 soybean marketing year
- Animal Unit (AU) trends from 2004-2014

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 2004-2014 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 2013-14 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 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, \$1.955 to \$2.796 million in total economic activity, \$0.319 to \$0.440 in household wages and 10 to 13 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.7957	\$ 0.4402	12.7
	Hogs, Pigs, and Other	\$ 1.9551	\$ 0.3190	10.1
	Poultry and Eggs	\$ 2.5248	\$ 0.4033	9.8
	Dairy	\$ 2.2072	\$ 0.3727	11.4

Appendix

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Animal Units (AUs)	Beef Cattle AUs	6,611,475	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	5,268,150
	Hog and Pig AUs	499,200	500,400	535,350	569,550	555,450	544,200	546,750	558,000	572,250	497,250	461,100
	Broiler AUs	73,132	71,593	71,110	68,819	67,745	62,987	63,835	48,100	49,072	48,901	48,623
	Turkey AUs	10,398	10,664	11,587	13,003	10,394	10,181	10,605	10,794	9,214	7,686	8,027
	Egg Layer AUs	7,311	8,052	7,770	7,334	7,124	6,231	6,190	6,226	6,700	6,804	6,912
	Dairy AUs	154,000	154,000	154,000	154,000	161,000	175,000	162,400	170,800	172,200	184,800	190,400
	Total Animal Units	7,355,516	7,296,184	7,505,292	7,232,181	7,125,189	7,122,075	7,113,254	6,986,070	6,641,586	6,373,591	5,983,213
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 2,795,597	\$ 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
	Hogs and Pigs (\$1,000)	\$ 355,685	\$ 364,804	\$ 341,113	\$ 361,160	\$ 350,741	\$ 325,010	\$ 438,565	\$ 599,038	\$ 568,278	\$ 567,739	\$ 607,795
	Broilers (\$1,000)	\$ 61,511	\$ 58,266	\$ 45,027	\$ 51,771	\$ 53,281	\$ 46,153	\$ 48,577	\$ 42,799	\$ 48,884	\$ 59,554	\$ 62,474
	Turkeys (\$1,000)	\$ 9,648	\$ 10,230	\$ 12,091	\$ 14,996	\$ 14,038	\$ 9,415	\$ 12,613	\$ 14,146	\$ 13,363	\$ 8,800	\$ 14,734
	Eggs (\$1,000)	\$ 31,229	\$ 18,905	\$ 20,959	\$ 34,403	\$ 41,461	\$ 29,509	\$ 32,393	\$ 35,517	\$ 39,831	\$ 45,001	\$ 52,256
	Milk (\$1,000)	\$ 341,264	\$ 330,020	\$ 297,815	\$ 422,091	\$ 456,435	\$ 348,320	\$ 431,981	\$ 542,850	\$ 519,080	\$ 592,264	\$ 746,640
	Other	\$ 6,464	\$ 6,384	\$ 5,656	\$ 5,960	\$ 5,319	\$ 5,820	\$ 6,375	\$ 5,749	\$ 5,687	\$ 5,625	\$ 5,564
	Sheep and Lambs (\$1,000)	\$ 6,151	\$ 6,042	\$ 5,285	\$ 5,560	\$ 4,891	\$ 5,363	\$ 5,889	\$ 5,235	\$ 5,144	\$ 5,053	\$ 4,963
	Aquaculture (\$1,000)	\$ 313	\$ 342	\$ 371	\$ 400	\$ 428	\$ 457	\$ 486	\$ 515	\$ 543	\$ 572	\$ 601
	Total (\$1,000)	\$ 3,601,397	\$ 3,762,076	\$ 3,694,148	\$ 4,218,439	\$ 4,241,787	\$ 3,729,040	\$ 4,414,805	\$ 5,464,639	\$ 5,411,160	\$ 5,446,684	\$ 6,176,672

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	
	Total	5,960,622	6,327,797	9,525,971	11,459,853	
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)
2014 Animal Agriculture	Cattle and Calves	\$ 13,104,033	\$ 2,063,310	59,652	\$ 520,573
	Hogs, Pigs, and Other	\$ 1,199,177	\$ 195,661	6,191	\$ 49,365
	Poultry and Eggs	\$ 326,871	\$ 52,213	1,270	\$ 13,173
	Dairy	\$ 1,647,984	\$ 278,273	8,530	\$ 70,208
	Total	\$ 16,278,065	\$ 2,589,457	75,643	\$ 653,320
Change from 2004 to 2014	Cattle and Calves	\$ 3,309,190	\$ 521,052	15,064	\$ 131,461
	Hogs, Pigs, and Other	\$ 311,840	\$ 50,881	1,610	\$ 12,837
	Poultry and Eggs	\$ 2,901	\$ 463	11	\$ 117
	Dairy	\$ 704,000	\$ 118,875	3,644	\$ 29,992
	Total	\$ 4,327,931	\$ 691,271	20,329	\$ 174,408
	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
RIMS II Multipliers	Cattle and Calves	\$ 2.7957	\$ 0.4402	12.7	
	Hogs, Pigs, and Other	\$ 1.9551	\$ 0.3190	10.1	
	Poultry and Eggs	\$ 2.5248	\$ 0.4033	9.8	
	Dairy	\$ 2.2072	\$ 0.3727	11.4	
Tax Rates	Federal effective income tax rate			12.7%	
	Federal Social Security tax rate			7.7%	
	State Effective Rate			4.9%	
	Total			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.