

# Economic Analysis of Animal Agriculture 2004-2014

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## *OKLAHOMA*

**A Report for  
United Soybean Board**



**September 2015**



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## Oklahoma Executive Summary

The use of soybean meal as a key feed ingredient is an important part of Oklahoma'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 Oklahoma. The success of Oklahoma animal agriculture in turn has a large impact on the rest of the state and regional economies. For example, in the state of Oklahoma during 2014 animal agriculture contributed:

- \$14.6 billion in economic output
- 94,529 jobs
- \$2.5 billion in earnings
- \$634.7 million in income taxes paid at local, state, and federal levels
- \$114.3 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in Oklahoma increased economic output by over \$3.4 billion, boosted household earnings by \$566.4 million, contributed 21,585 additional jobs and paid \$144.9 million in additional tax revenues.

Oklahoma's animal agriculture consumed about 721.3 thousand tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Hogs (396.9 thousand tons)
- Broilers (241.8 thousand tons)
- Beef Cows (48.6 thousand tons)

This report examines animal agriculture in Oklahoma 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 Oklahoma, 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 Oklahoma and beyond.

## Oklahoma Economic Impact of Animal Agriculture

Animal agriculture is an integral part of Oklahoma's economy. In 2014, Oklahoma's animal agriculture contributed the following to the economy:

- About \$14.6 billion in economic output
- \$2.5 billion in household earnings
- 94,529 jobs
- \$634.7 million in income taxes

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

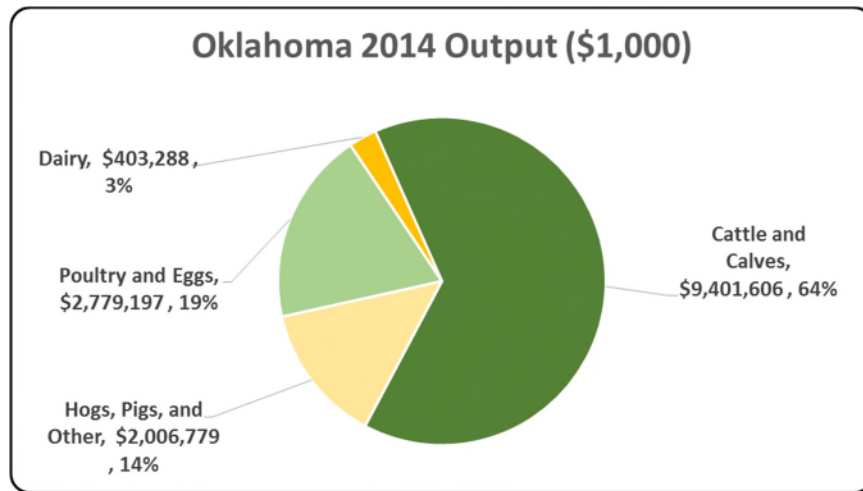
- Increased economic output by \$3.4 billion
- Boosted household earnings by \$566.4 million
- Added 21,585 jobs
- Paid an additional \$144.9 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output (\$1,000)	\$ 14,590,870	\$ 3,351,381	29.82%
Earnings (\$1,000)	\$ 2,481,261	\$ 566,437	29.58%
Employment (Jobs)	94,529	21,585	29.59%
Income Taxes Paid (\$1,000)	\$ 634,706	\$ 144,895	29.58%
Property Taxes Paid in 2012 (\$1,000)	\$ 114,320		

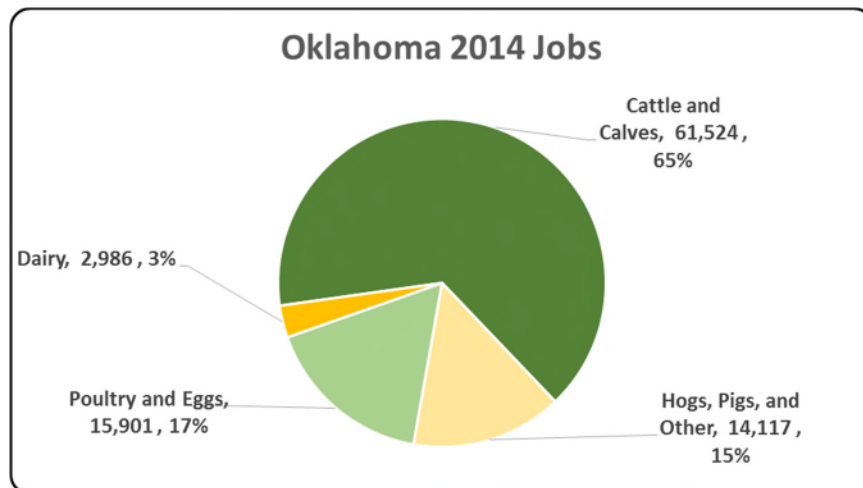
### Oklahoma Output

“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 Oklahoma economy. Animal agriculture’s impact on Oklahoma total economic output is about \$14.6 billion.



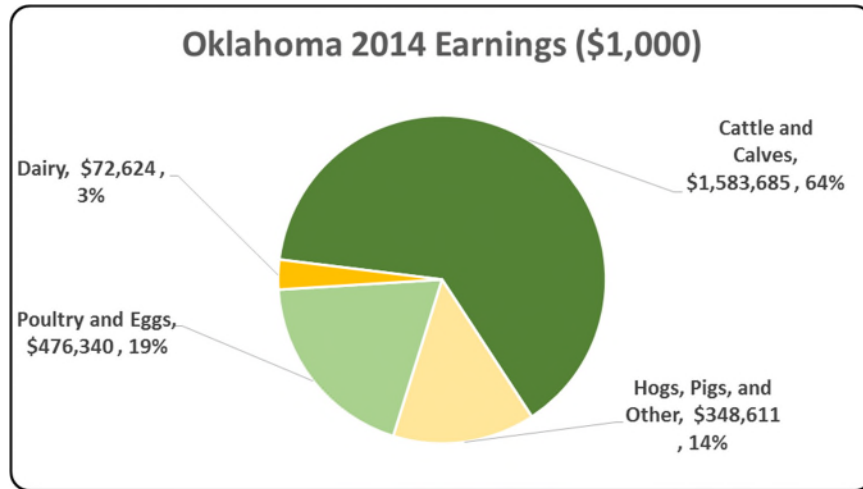
### Oklahoma Jobs

“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 Oklahoma in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Oklahoma total jobs, contributing 94,529 jobs within and outside of animal agriculture.



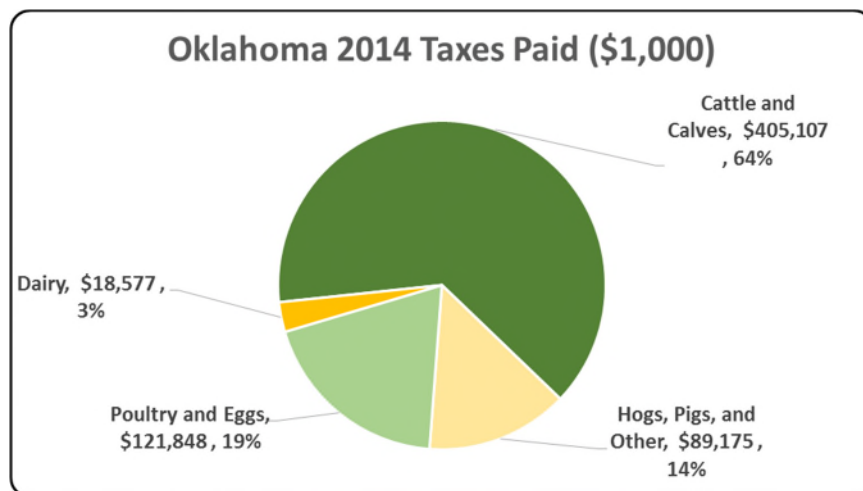
### Oklahoma Earnings

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 Oklahoma economy in terms of earnings. Oklahoma's animal agriculture contributed about \$2.5 billion to household earnings in 2014.



### Oklahoma Taxes Paid by Animal Agriculture

Oklahoma's animal agriculture is also a significant source of tax revenue. In 2014, the state's animal agriculture industry paid about \$634.7 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$114.3 million in property taxes paid by all of Oklahoma agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



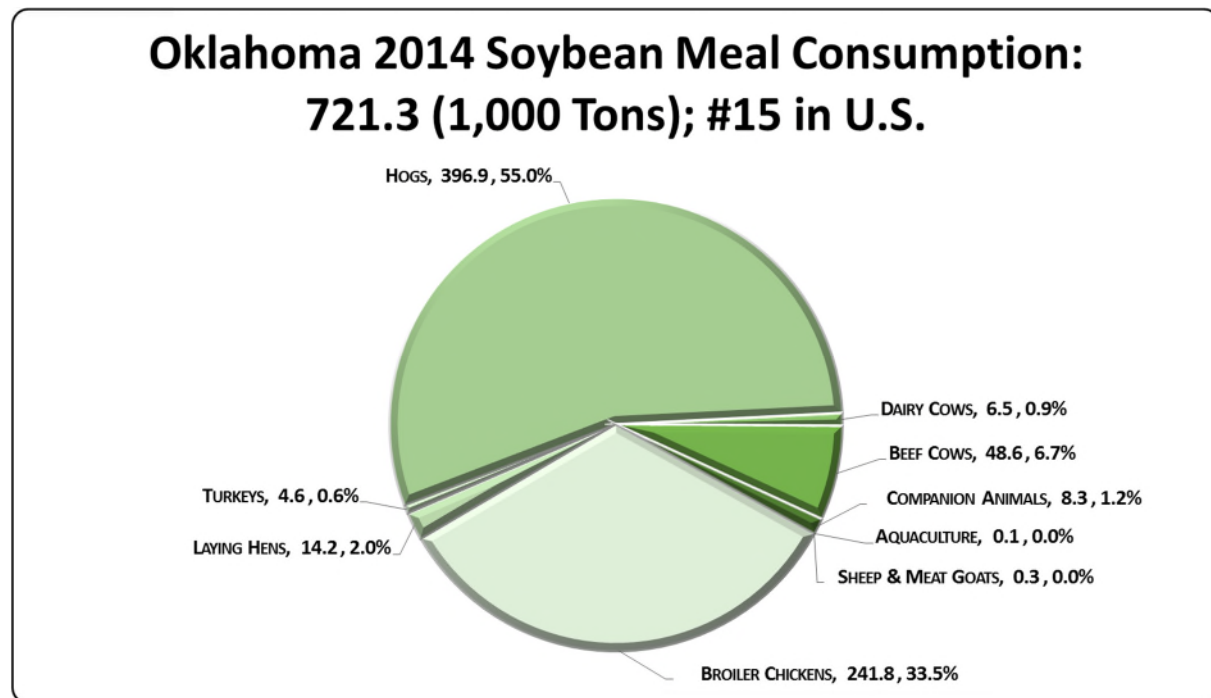
### Oklahoma Animal Agriculture Soybean Meal Consumption

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.

Oklahoma’s animal agriculture consumed almost 721.3 thousand tons of soybean meal in 2014, placing the state as #15 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 (396.9 thousand tons)
- Broilers (241.8 thousand tons)
- Beef Cows (48.6 thousand tons)

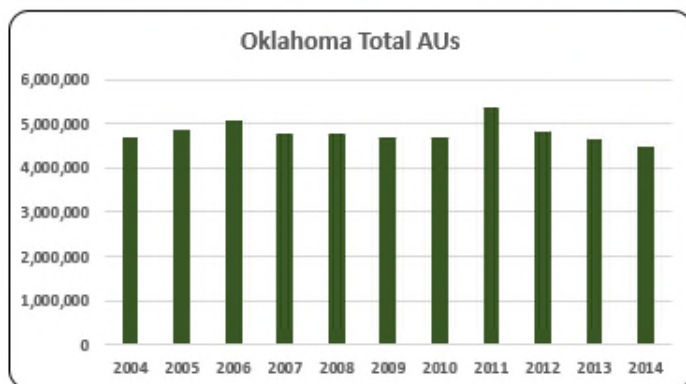
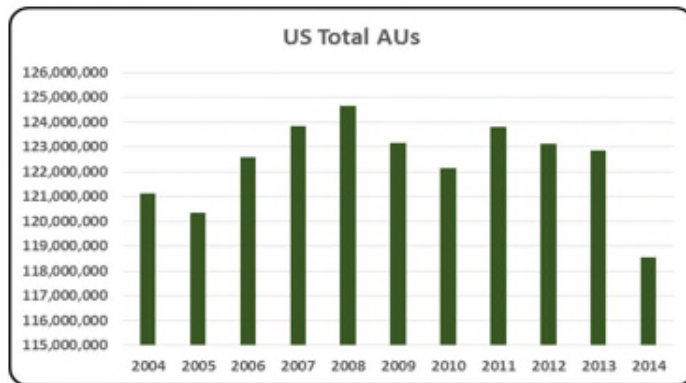


## Oklahoma Animal Unit (AU) Trends

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 Oklahoma. 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 Oklahoma and to give perspective on Oklahoma’s contribution to the nation’s animal agriculture industry and beyond.

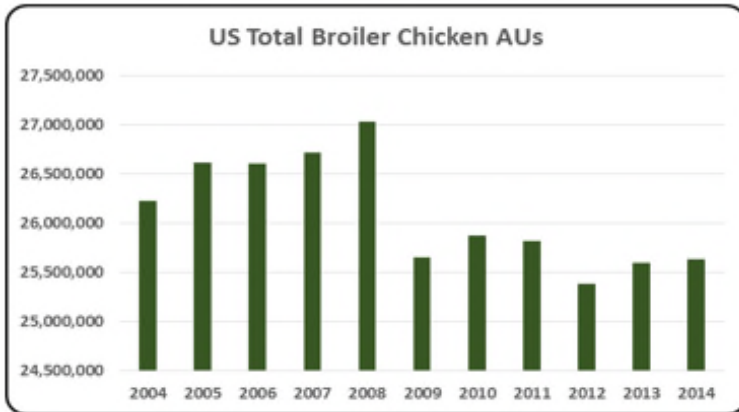
Similar to using a single year to measure the presence and strength of a sector, in some circumstances AUs can be misleading. This is because AUs do not reflect important considerations like increased weights, improved livability, increased laying potential, etc.

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 Oklahoma, the largest three segments of animal agriculture in terms of AUs during 2014 were: Beef Cows (2,644.5 thousand AUs), Hogs (1,113.8 thousand AUs), and Broilers (617.0 thousand AUs). Total animal units in Oklahoma during 2014 were 4,458.9 thousand AUs.

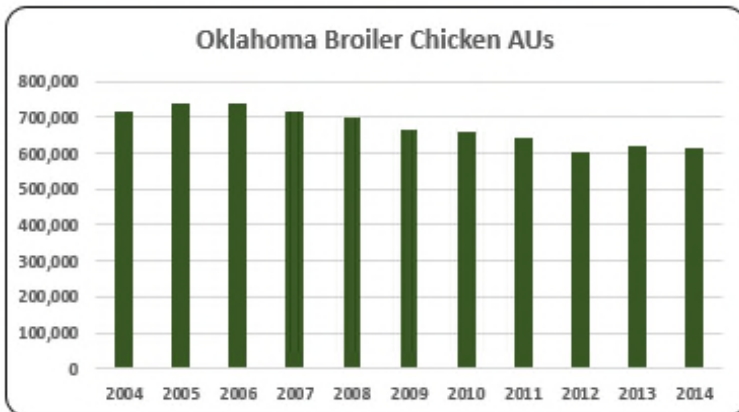


- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.
- There were 4,458.9 thousand AUs in Oklahoma in 2014 representing 3.8% of all AUs in the country. 2011 was a record year for animal production with 5,384.3 thousand. Overall, Oklahoma AUs fell 5.3% during last decade.

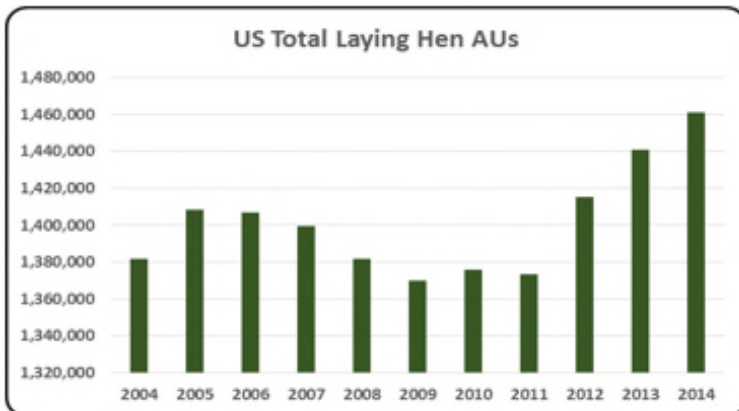




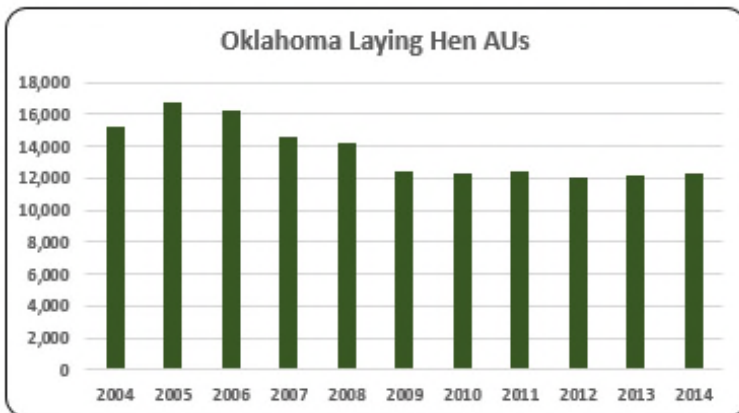
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).



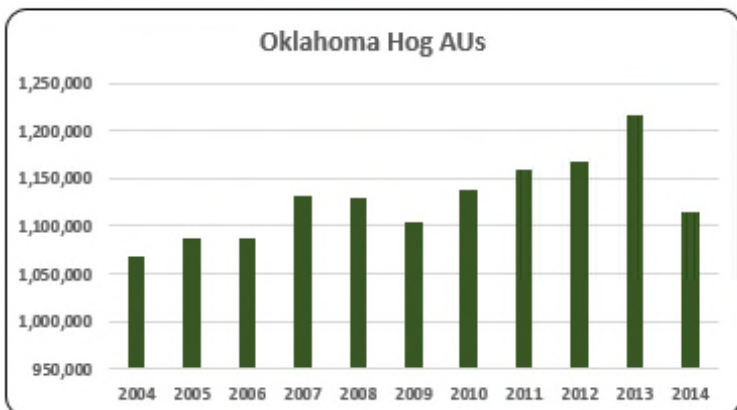
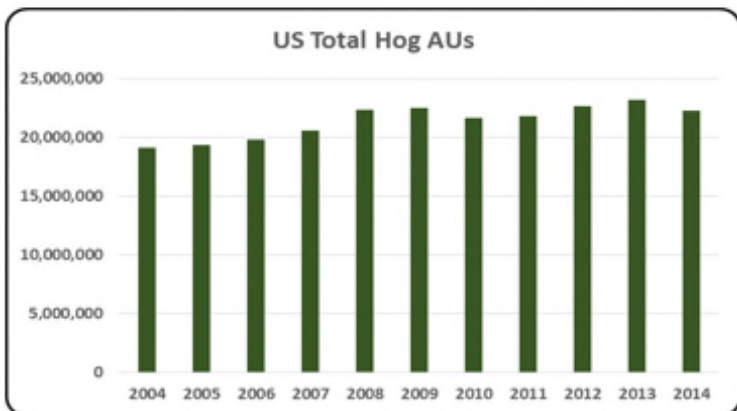
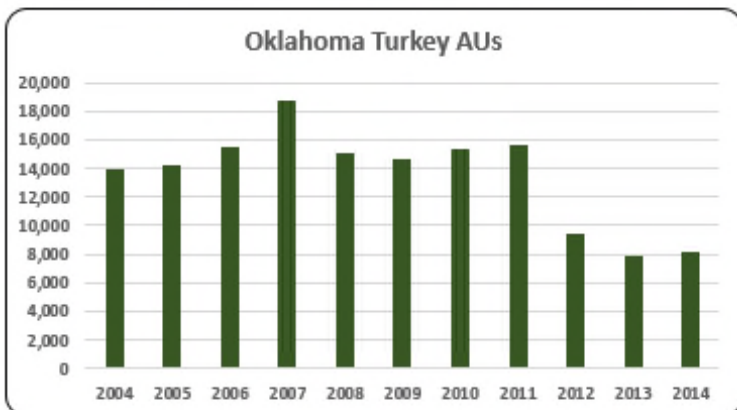
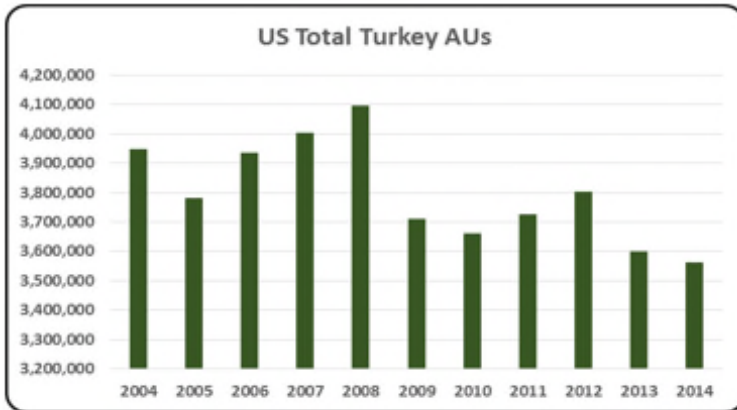
- Broiler production decreased 13.6% since the beginning of the decade. There were 617,036 broiler AUs in 2014.



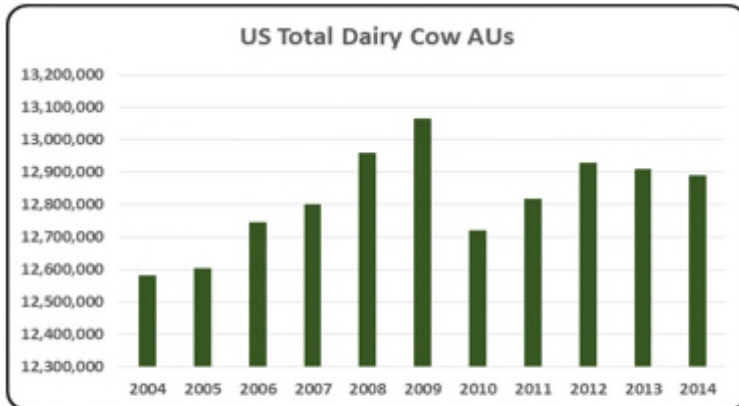
- On average, the layer AUs during 2004-2014 were 1.4 million. In 2014 layer AUs were 1.5 million, up 7% from the lowest number in 2009 (1.4 million AUs).



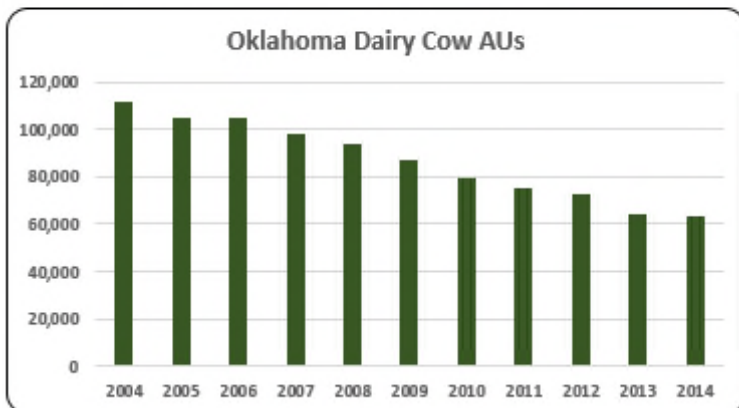
- On average, there were 13,681 layer AUs in Oklahoma from 2004 to 2014. The layer industry saw a downward trend of 19% throughout the last decade.



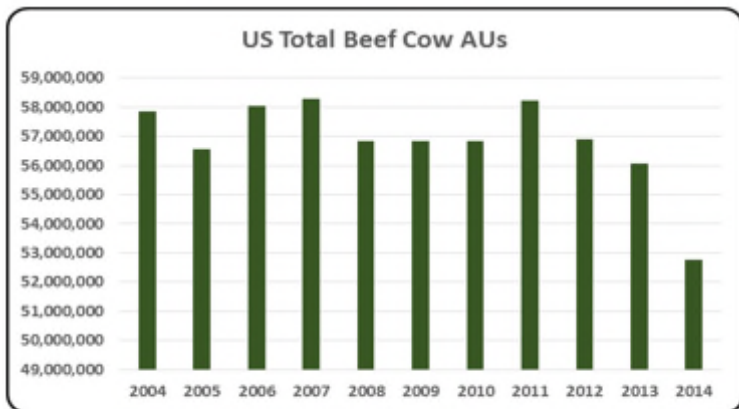
- From 2004 to 2014, the U.S. accounted for 50% of the world’s turkey production. However, in 2014 turkey AUs were the lowest of the decade at 3.5 million, decreasing 13% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade.
- Similar to layer production, turkey production declined (41%) during 2004 to 2014. Numbers decreased from 13,904 turkey AUs in 2004 to 8,216 turkey AUs in 2014.
- 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.
- Of all animal production in Oklahoma only hog production increased during the last decade. However, pork production dropped 8.4% to 1,113.8 hog AUs in 2014 from the previous year.



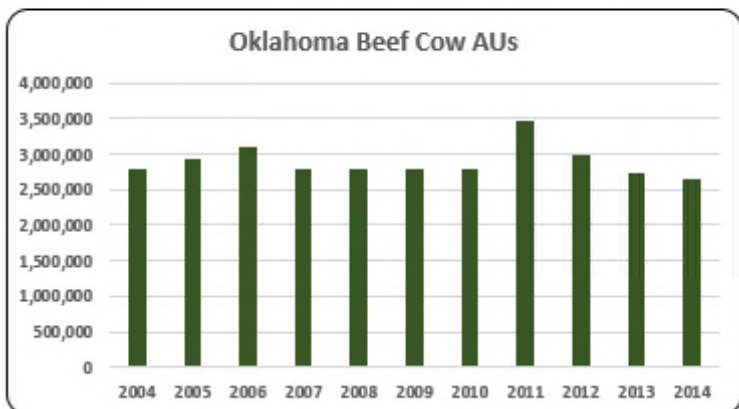
- From 2004 to 2014 dairy cow AUs averaged 12.8 million. In 2014, dairy cow AUs (12.9 million) remained about the same as the previous year but still below the high of 13.1 million AUs, the level in 2009. Despite the fluctuation in AUs, milk supplied has steadily risen.



- Dairy cow production showed a consistent decline throughout the decade from 112,000 dairy cow AUs in 2004 to 63,000 dairy cow AUs in 2014. This was a 44% reduction in dairy cow AUs during the last decade.



- 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.



- The largest animal production in Oklahoma during 2004 to 2014 was beef cow production which represents 60.18% (2,644.5 thousand beef cow AUs) of all AUs in the state.

## Oklahoma Additional Information and Methodology

Animal agriculture is an important part of Oklahoma'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 Oklahoma, of interest is the degree to which the industry impacts the Oklahoma economy. Estimates of output, jobs, earnings, taxes paid, and multipliers for Oklahoma 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 Oklahoma'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 Oklahoma which have occurred. As shown in this state report, Oklahoma 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 Oklahoma. 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](mailto:info@decision-innovation.com) or 515.257.6077.

### Oklahoma 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 Oklahoma’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 Oklahoma, \$1.995 to \$2.873 million in total economic activity, \$0.347 to \$0.492 in household wages and 14 to 19 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.8531	\$ 0.4806	18.7
	Hogs, Pigs, and Other	\$ 1.9952	\$ 0.3466	14.0
	Poultry and Eggs	\$ 2.8729	\$ 0.4924	16.4
	Dairy	\$ 2.2340	\$ 0.4023	16.5

## Appendix

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
<b>Animal Units (AUs)</b>	<b>Beef Cattle AUs</b>	2,784,750	2,918,250	3,107,250	2,791,500	2,802,750	2,802,750	2,802,750	3,476,250	2,976,000	2,733,750	2,644,500
	<b>Hog and Pig AUs</b>	1,069,050	1,087,200	1,087,650	1,132,650	1,129,050	1,103,100	1,138,650	1,159,350	1,167,150	1,215,900	1,113,750
	<b>Broiler AUs</b>	713,762	736,331	737,612	714,678	701,175	664,985	662,132	645,072	601,458	619,464	617,036
	<b>Turkey AUs</b>	13,904	14,260	15,495	18,800	15,027	14,720	15,332	15,606	9,431	7,867	8,216
	<b>Egg Layer AUs</b>	15,229	16,773	16,185	14,576	14,160	12,385	12,303	12,375	11,979	12,165	12,359
	<b>Dairy AUs</b>	112,000	105,000	105,000	98,000	93,800	86,800	79,800	75,600	72,800	64,400	63,000
	<b>Total Animal Units</b>	<b>4,708,695</b>	<b>4,877,813</b>	<b>5,069,192</b>	<b>4,770,204</b>	<b>4,755,962</b>	<b>4,684,739</b>	<b>4,710,966</b>	<b>5,384,252</b>	<b>4,838,818</b>	<b>4,653,546</b>	<b>4,458,861</b>
<b>Value of Production (\$1,000)</b>	<b>Cattle and Calves (\$1,000)</b>	\$ 1,930,138	\$ 2,180,872	\$ 2,105,137	\$ 2,001,874	\$ 1,938,825	\$ 1,892,957	\$ 2,155,295	\$ 2,686,218	\$ 2,571,177	\$ 2,580,613	\$ 3,295,225
	<b>Hogs and Pigs (\$1,000)</b>	\$ 578,810	\$ 609,305	\$ 517,206	\$ 549,716	\$ 514,635	\$ 470,649	\$ 656,887	\$ 902,933	\$ 855,855	\$ 947,769	\$ 1,002,181
	<b>Broilers (\$1,000)</b>	\$ 547,096	\$ 556,290	\$ 473,270	\$ 540,918	\$ 579,738	\$ 557,723	\$ 724,446	\$ 729,259	\$ 670,350	\$ 825,702	\$ 850,077
	<b>Turkeys (\$1,000)</b>	\$ 12,901	\$ 13,680	\$ 16,168	\$ 21,681	\$ 20,296	\$ 13,612	\$ 18,236	\$ 20,453	\$ 13,677	\$ 9,007	\$ 15,081
	<b>Eggs (\$1,000)</b>	\$ 67,102	\$ 59,862	\$ 59,646	\$ 71,107	\$ 80,888	\$ 70,175	\$ 84,499	\$ 88,168	\$ 91,776	\$ 97,227	\$ 102,226
	<b>Milk (\$1,000)</b>	\$ 221,025	\$ 201,468	\$ 179,672	\$ 239,096	\$ 214,322	\$ 146,292	\$ 172,620	\$ 203,060	\$ 172,659	\$ 167,485	\$ 180,523
	<b>Other</b>	\$ 5,666	\$ 5,800	\$ 4,930	\$ 4,641	\$ 4,486	\$ 4,186	\$ 5,091	\$ 4,201	\$ 4,008	\$ 3,815	\$ 3,622
	<b>Sheep and Lambs (\$1,000)</b>	\$ 3,521	\$ 3,842	\$ 3,159	\$ 3,056	\$ 3,088	\$ 2,975	\$ 4,067	\$ 3,363	\$ 3,357	\$ 3,351	\$ 3,345
	<b>Aquaculture (\$1,000)</b>	\$ 2,145	\$ 1,958	\$ 1,771	\$ 1,585	\$ 1,398	\$ 1,211	\$ 1,024	\$ 838	\$ 651	\$ 464	\$ 277
	<b>Total (\$1,000)</b>	<b>\$ 3,362,738</b>	<b>\$ 3,627,277</b>	<b>\$ 3,356,029</b>	<b>\$ 3,429,033</b>	<b>\$ 3,353,190</b>	<b>\$ 3,155,594</b>	<b>\$ 3,817,074</b>	<b>\$ 4,634,291</b>	<b>\$ 4,379,502</b>	<b>\$ 4,631,618</b>	<b>\$ 5,448,935</b>

Ag Census Data Category	Animal Type	1997	2002	2007	2012
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	48,670	49,043	45,871	40,939
	Cattle feedlots (112112)	1,158	1,799	956	372
	Dairy cattle and milk production (11212)	838	1,037	721	309
	Hog and pig farming (1122)	1,000	940	986	623
	Poultry and egg production (1123)	1,164	1,504	2,358	1,472
	Sheep and goat farming (1124)	633	1,426	2,446	2,269
	Animal aquaculture and other animal production (1125,1129)	3,555	7,792	8,513	8,660
Value of Sales (\$1,000)	Cattle and Calves	2,325,567	2,448,916	3,062,020	3,402,919
	Hogs and Pigs	343,147	462,849	555,521	656,407
	Poultry and Eggs	447,185	508,373	748,776	961,302
	Milk and Other Dairy Products	150,138	163,006	191,775	164,341
	Aquaculture	3,639	3,467	3,253	1,271
	Other (calculated)	32,372	50,715	57,091	25,609
	<b>Total</b>	<b>3,302,048</b>	<b>3,637,326</b>	<b>4,618,436</b>	<b>5,211,849</b>
Input Purchases	Livestock and poultry purchased	(Farms) 26,102	27,203	24,499	24,658
		\$1,000 1,100,066	1,244,354	1,463,556	1,696,662
	Breeding livestock purchased	(Farms) n/a	16,355	15,462	15,940
		\$1,000 n/a	80,813	187,690	173,024
	Other livestock and poultry purchased	(Farms) n/a	14,409	12,523	12,687
		\$1,000 n/a	1,163,542	1,275,865	1,523,638
	Feed purchased	(Farms) 53,275	64,090	57,396	61,650
	\$1,000 900,546	917,560	1,307,568	2,017,049	



	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
<b>2014 Animal Agriculture</b>	Cattle and Calves	\$ 9,401,606	\$ 1,583,685	61,524	\$ 405,107
	Hogs, Pigs, and Other	\$ 2,006,779	\$ 348,611	14,117	\$ 89,175
	Poultry and Eggs	\$ 2,779,197	\$ 476,340	15,901	\$ 121,848
	Dairy	\$ 403,288	\$ 72,624	2,986	\$ 18,577
	<b>Total</b>	\$ 14,590,870	\$ 2,481,261	94,529	\$ 634,706
<b>Change from 2004 to 2014</b>	Cattle and Calves	\$ 2,500,198	\$ 421,154	16,361	\$ 107,731
	Hogs, Pigs, and Other	\$ 545,324	\$ 94,732	3,836	\$ 24,232
	Poultry and Eggs	\$ 521,379	\$ 89,362	2,983	\$ 22,859
	Dairy	\$ (215,521)	\$ (38,811)	(1,596)	\$ (9,928)
	<b>Total</b>	\$ 3,351,381	\$ 566,437	21,585	\$ 144,895
	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
<b>RIMS II Multipliers</b>	Cattle and Calves	\$ 2.8531	\$ 0.4806	18.7	
	Hogs, Pigs, and Other	\$ 1.9952	\$ 0.3466	14.0	
	Poultry and Eggs	\$ 2.8729	\$ 0.4924	16.4	
	Dairy	\$ 2.2340	\$ 0.4023	16.5	
<b>Tax Rates</b>	Federal effective income tax rate				12.7%
	Federal Social Security tax rate				7.7%
	State Effective Rate				5.3%
	<b>Total</b>				25.6%

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.