

# Economic Analysis of Animal Agriculture 2005-2015

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## ARKANSAS

A Report for  
United Soybean Board



September 2016



Bridging Your Research Needs.



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## Arkansas Executive Summary

The use of soybean meal as a key feed ingredient is an important part of Arkansas'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 Arkansas. The success of Arkansas animal agriculture in turn has a large impact on the rest of the state and regional economies. For example, in the state of Arkansas during 2015 animal agriculture contributed:

- \$14.1 billion in economic output
- 65,203 jobs
- \$3.0 billion in earnings
- \$808.9 million in income taxes paid at local, state, and federal levels
- \$86.7 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Arkansas increased economic output by over \$920.4 million, boosted household earnings by \$188.1 million, contributed 3,960 additional jobs and paid \$51.4 million in additional tax revenues.

Arkansas's animal agriculture consumed about 1.7 million tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Broilers (1.4 million tons)
- Turkeys (233.1 thousand tons)
- Egg-Laying Hens (37.9 thousand tons)

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

## Arkansas Economic Impact of Animal Agriculture

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

- About \$14.1 billion in economic output
- \$3.0 billion in household earnings
- 65,203 jobs
- \$808.9 million in income taxes

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

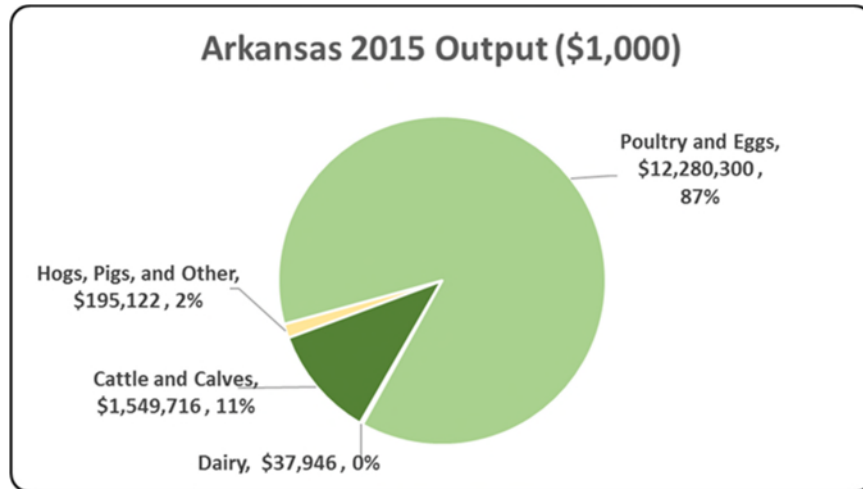
- Increased economic output by \$920.4 million
- Boosted household earnings by \$188.1 million
- Added 3,960 jobs
- Paid an additional \$51.4 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2015	Change 2005-2015	% Change 2005-2015
Output (\$1,000)	\$ 14,063,085	\$ 920,441	7.00%
Earnings (\$1,000)	\$ 2,959,920	\$ 188,082	6.79%
Employment (Jobs)	65,203	3,960	6.47%
Income Taxes Paid (\$1,000)	\$ 808,946	\$ 51,403	6.79%
Property Taxes Paid in 2012 (\$1,000)	\$ 86,682		

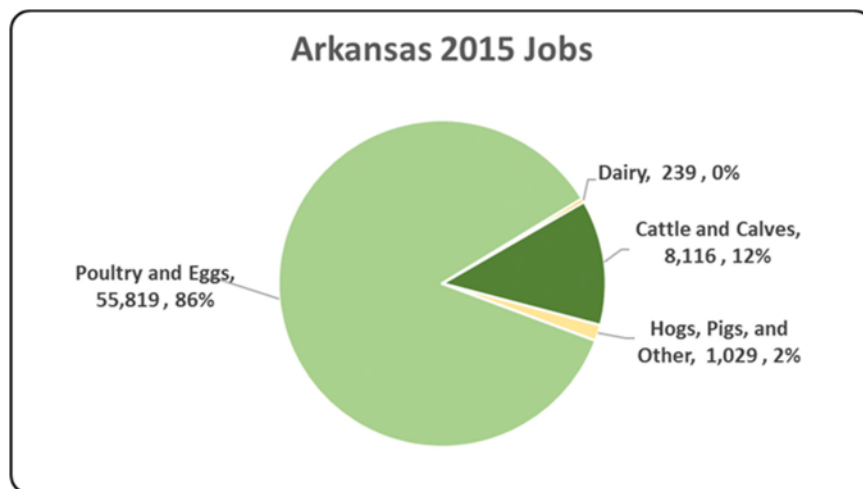
### Arkansas Output

“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 Arkansas economy. Animal agriculture’s impact on Arkansas total economic output is about \$14.1 billion.



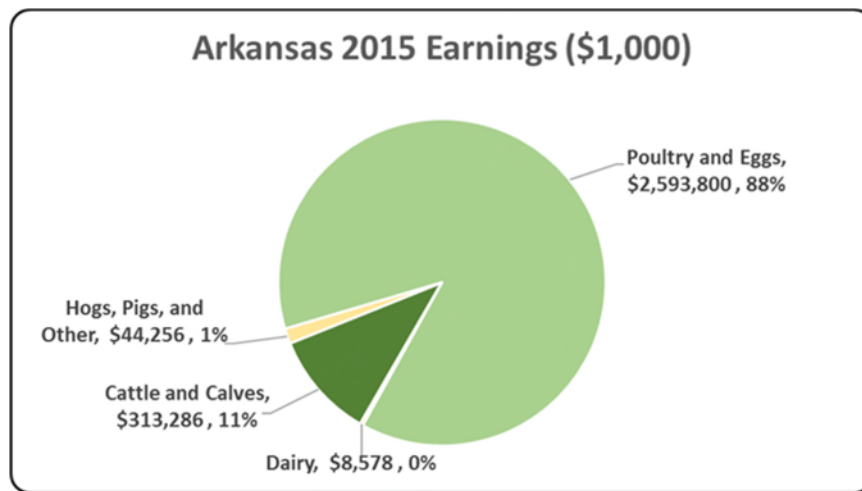
### Arkansas Jobs

“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 Arkansas in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Arkansas total jobs, contributing 65,203 jobs within and outside of animal agriculture.



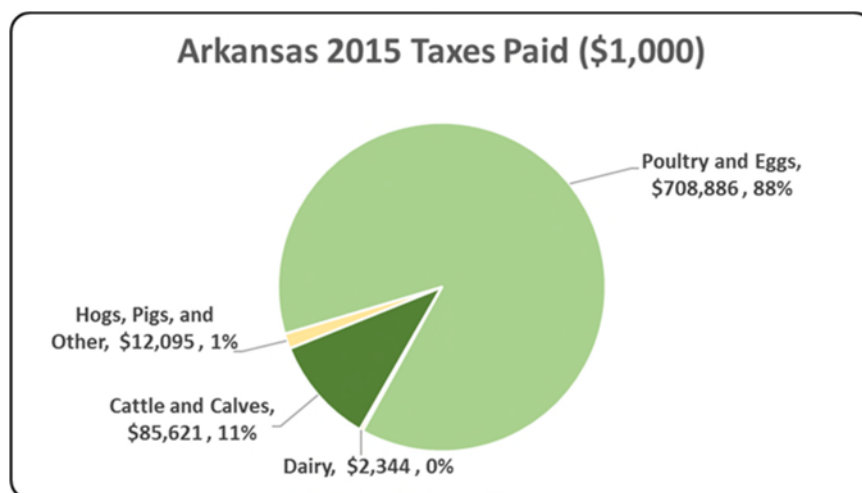
### Arkansas Earnings

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 Arkansas economy in terms of earnings. Arkansas's animal agriculture contributed about \$3.0 billion to household earnings in 2015.



### Arkansas Taxes Paid by Animal Agriculture

Arkansas's animal agriculture is also a significant source of tax revenue. In 2015, the state's animal agriculture industry paid about \$808.9 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$86.7 million in property taxes paid by all of Arkansas agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



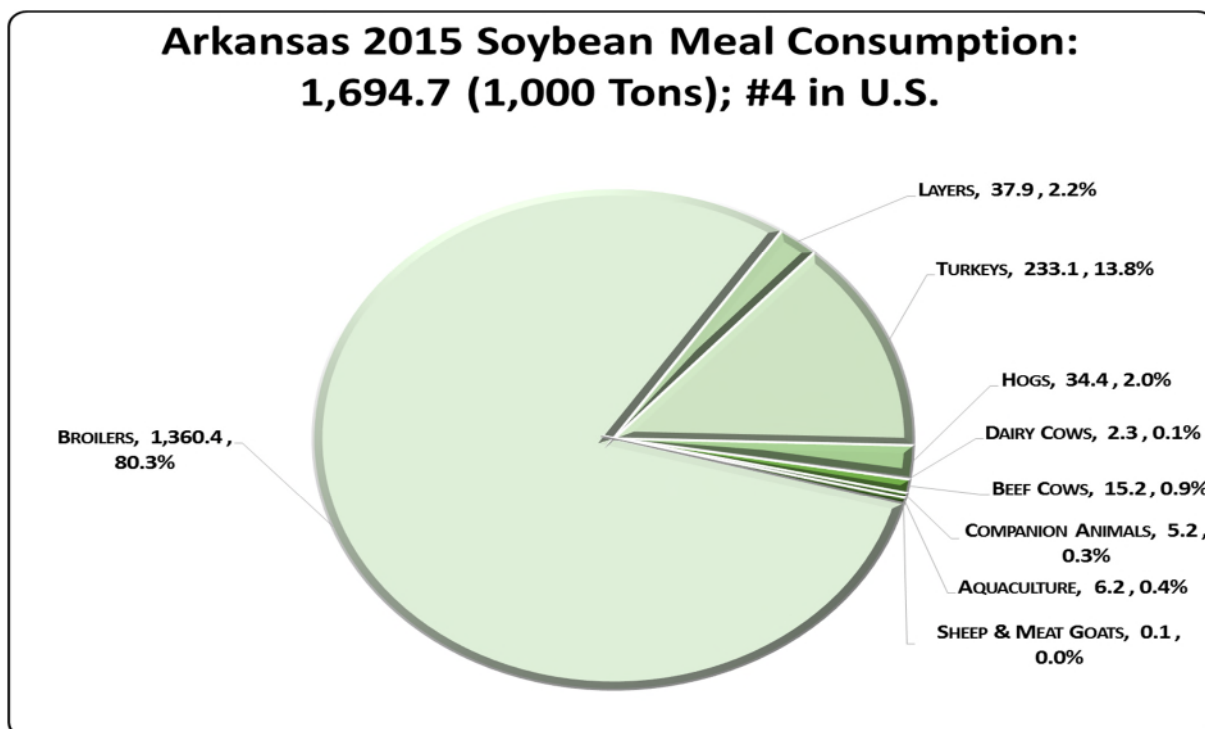
## Arkansas Animal Agriculture Soybean Meal Consumption

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.

Arkansas's animal agriculture consumed almost 1.7 million tons of soybean meal in 2015, placing the state as #4 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:

- Broilers (1.3 million tons)
- Turkeys (233.1 thousand tons)
- Egg-Laying Hens (37.9 thousand tons)

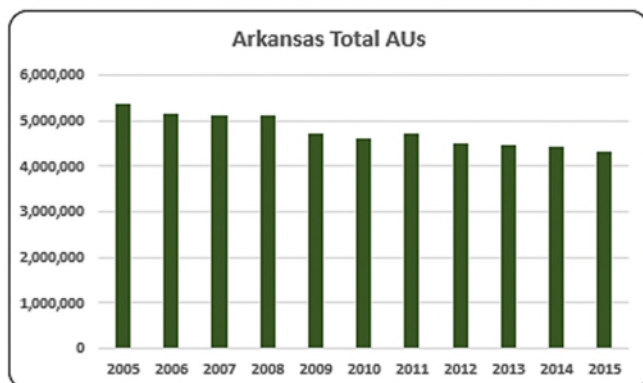
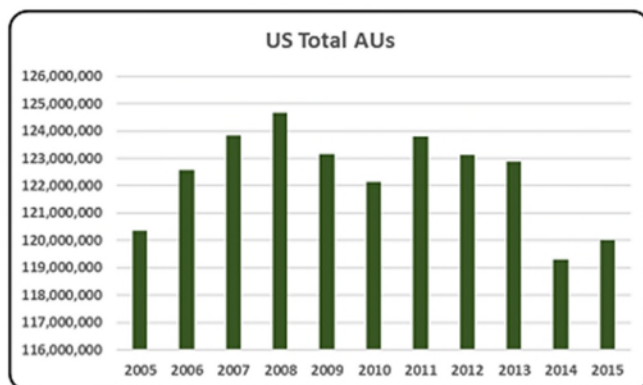


## Arkansas Animal Unit (AU) Trends

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 Arkansas. 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 Arkansas and to give perspective on Arkansas's contribution to the nation's animal agriculture industry and beyond.

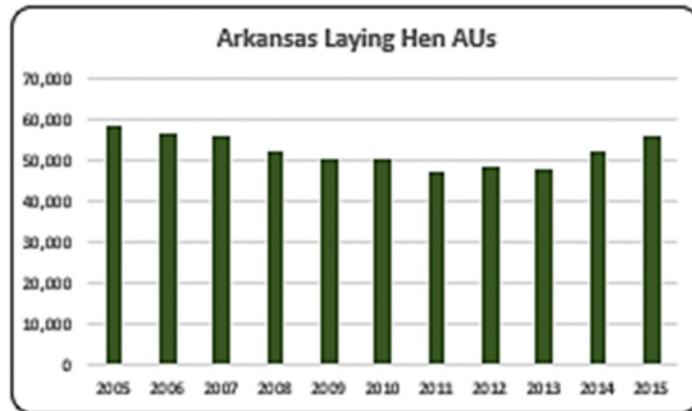
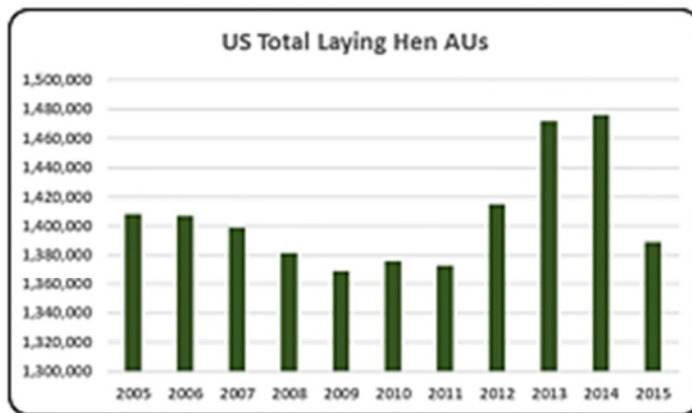
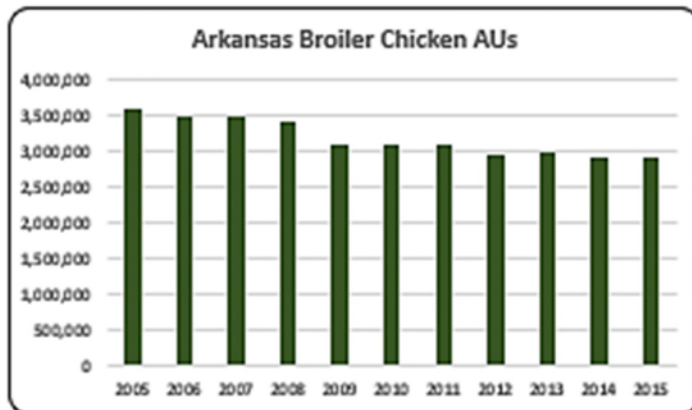
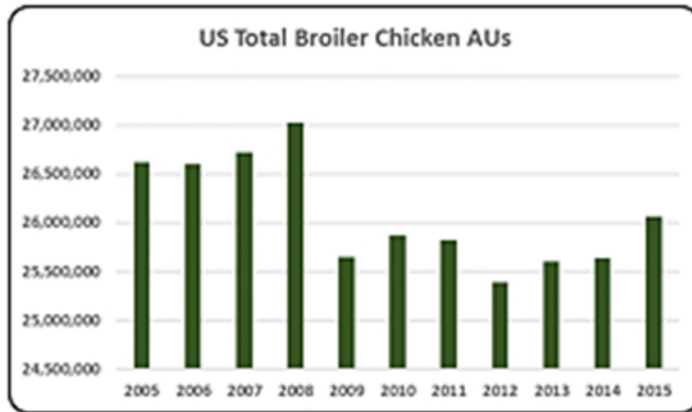
Similar to using a single year to measure the presence and strength of a sector, in some circumstances AUs can be misleading. This is because AUs do not reflect important considerations like increased weights, improved livability, increased laying potential, etc.

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 Arkansas, the largest three segments of animal agriculture in terms of AUs during 2015 were: Broilers (2.9 million AUs), Beef Cows (773,850 AUs), and Turkeys (408,904 AUs). Total animal units in Arkansas during 2015 were 4.3 million AUs.

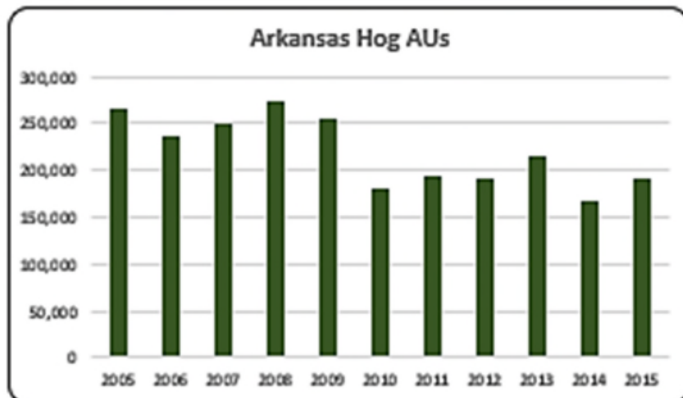
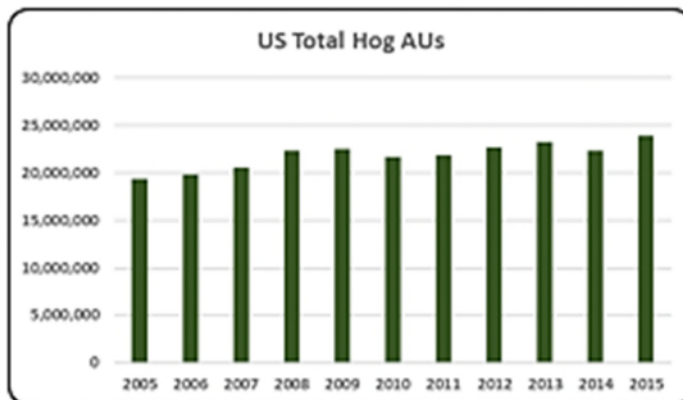
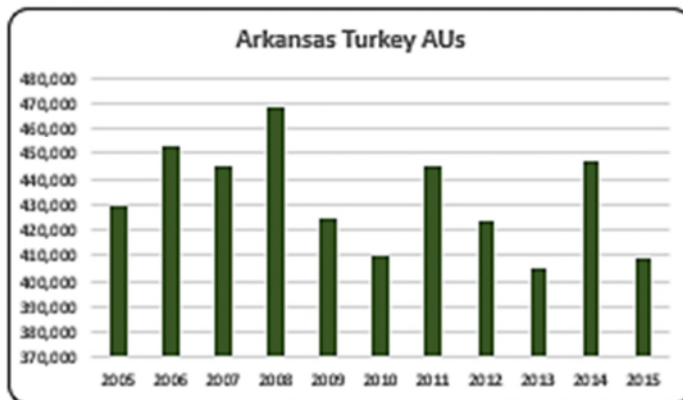
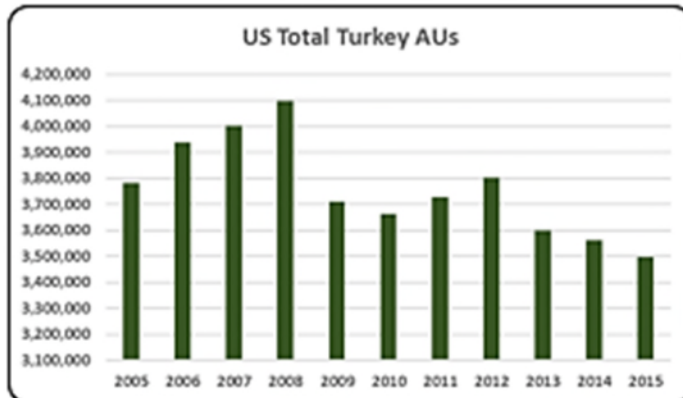


- Overall U.S. total AUs have varied from 2005 to 2015. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2005-15 time period, total AUs in the nation peaked in 2008.
- 3.6% (4.3 million) of the total U.S. AUs in 2015 were in Arkansas. Overall AUs in Arkansas have been decreasing over the last ten years from about 5.4 million in 2005 to 4.3 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 were about 26.0 million. In 2015, AUs rebounded 3% from the low AUs numbers in 2012 (25.4 million AUs).
- Broiler chickens are the largest animal sector in Arkansas representing about 65% (2.9 million) of all AUs in the state 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.
- Layer AUs rose to 55,683 in 2015. Layer AUs numbers remained below the levels in 2005 (58,236).

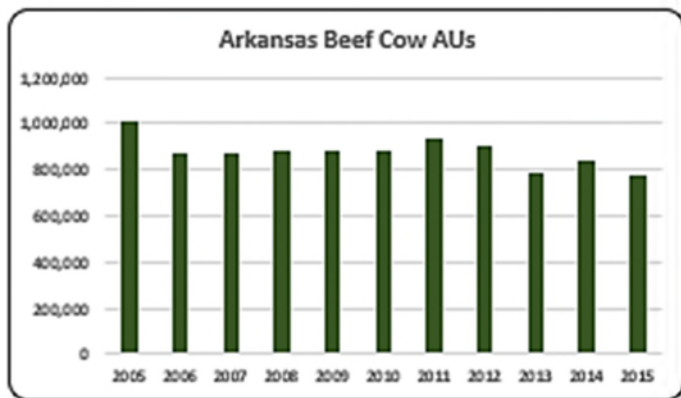
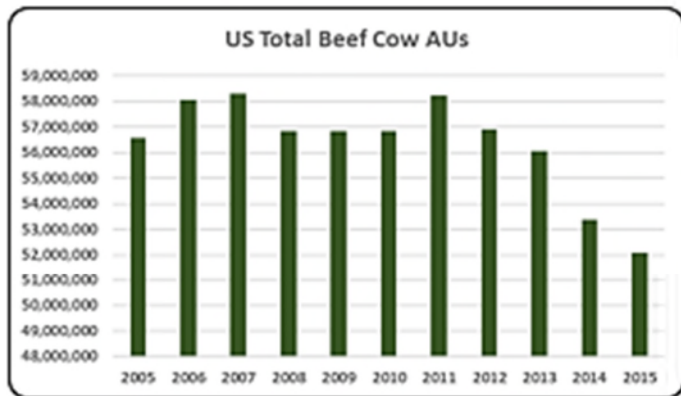
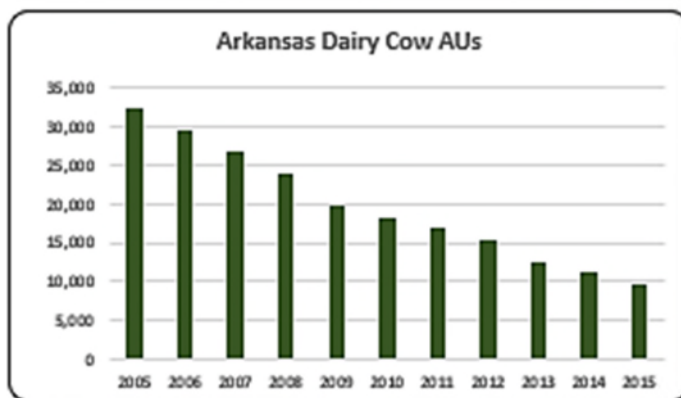
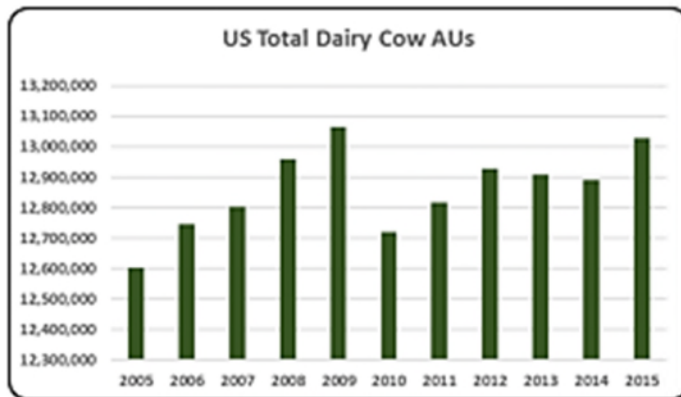


- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.

- Turkey AUs in 2015 were at a total of 408,904. The average of turkey AUs in the decade of 2005-2015 was at 432,793 AUs.

- 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 increased to 191,400 AUs in 2015. Overall, hog AUs represented 4.4% of all AUs in the state.



- 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.
- Dairy cow AUs have consistently decreased throughout the decade from 32,200 in 2005 to 9,800 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.
- Arkansas' beef cows are the second largest animal sector in the state with an average of 877,459 beef cow AUs during the last ten years (2005-2015).

## Arkansas Additional Information and Methodology

Animal agriculture is an important part of Arkansas'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 Arkansas, of interest is the degree to which the industry impacts the Arkansas economy. Estimates of output, jobs, earnings, taxes paid, and multipliers for Arkansas 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 Arkansas'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 Arkansas which have occurred. As shown in this state report, Arkansas 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 Arkansas. 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.

### Arkansas 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 Arkansas’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 Arkansas, \$1.69 to \$2.83 million in total economic activity, \$0.38 to \$0.60 in household wages and 9 to 15 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.439	\$ 0.493	12.8
	Hogs, Pigs, and Other	\$ 1.690	\$ 0.383	8.9
	Poultry and Eggs	\$ 2.830	\$ 0.598	12.9
	Dairy	\$ 2.304	\$ 0.521	14.5

## Appendix

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Animal Units (AUs)</b>	<b>Beef Cattle AUs</b>	1,012,500	876,750	867,900	884,250	884,250	884,250	936,150	904,200	789,000	838,950	773,850
	<b>Hog and Pig AUs</b>	265,500	237,750	248,700	274,500	255,000	181,800	193,800	192,600	214,650	168,450	191,400
	<b>Broiler AUs</b>	3,577,641	3,491,875	3,458,395	3,420,365	3,092,179	3,070,820	3,086,550	2,933,648	2,994,828	2,915,668	2,891,365
	<b>Turkey AUs</b>	429,757	452,480	445,427	468,010	424,942	409,602	445,508	423,624	405,521	446,951	408,904
	<b>Egg Layer AUs</b>	58,236	56,264	55,840	52,300	50,076	50,448	47,288	48,496	47,950	51,881	55,683
	<b>Dairy AUs</b>	32,200	29,400	26,600	23,800	19,600	18,200	16,800	15,400	12,600	11,200	9,800
	<b>Total Animal Units</b>	<b>5,375,835</b>	<b>5,144,518</b>	<b>5,102,862</b>	<b>5,123,225</b>	<b>4,726,047</b>	<b>4,615,120</b>	<b>4,726,096</b>	<b>4,517,968</b>	<b>4,464,549</b>	<b>4,433,100</b>	<b>4,331,003</b>
<b>Value of Production (\$1,000)</b>	<b>Cattle and Calves (\$1,000)</b>	\$ 472,815	\$ 474,407	\$ 483,335	\$ 423,360	\$ 415,817	\$ 432,186	\$ 486,144	\$ 485,745	\$ 474,912	\$ 624,530	\$ 635,468
	<b>Hogs and Pigs (\$1,000)</b>	\$ 97,763	\$ 76,747	\$ 84,903	\$ 89,283	\$ 75,690	\$ 80,809	\$ 95,731	\$ 79,885	\$ 104,985	\$ 83,396	\$ 66,386
	<b>Broilers (\$1,000)</b>	\$ 2,651,796	\$ 2,198,910	\$ 2,617,566	\$ 2,934,800	\$ 2,641,460	\$ 2,861,875	\$ 2,687,720	\$ 2,879,200	\$ 3,628,889	\$ 3,831,300	\$ 3,312,358
	<b>Turkeys (\$1,000)</b>	\$ 253,136	\$ 301,309	\$ 317,490	\$ 349,427	\$ 270,671	\$ 328,212	\$ 398,033	\$ 400,282	\$ 352,930	\$ 449,646	\$ 454,664
	<b>Eggs (\$1,000)</b>	\$ 352,645	\$ 335,499	\$ 364,490	\$ 427,404	\$ 372,702	\$ 366,173	\$ 406,514	\$ 438,769	\$ 454,913	\$ 490,121	\$ 572,613
	<b>Milk (\$1,000)</b>	\$ 45,892	\$ 35,346	\$ 43,120	\$ 37,014	\$ 22,110	\$ 26,163	\$ 29,601	\$ 24,472	\$ 21,840	\$ 24,480	\$ 16,471
	<b>Other</b>	\$ 110,542	\$ 104,349	\$ 98,156	\$ 91,963	\$ 85,771	\$ 79,578	\$ 73,385	\$ 67,192	\$ 60,999	\$ 54,806	\$ 48,613
	<b>Sheep and Lambs (\$1,000)</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	<b>Aquaculture (\$1,000)</b>	\$ 110,542	\$ 104,349	\$ 98,156	\$ 91,963	\$ 85,771	\$ 79,578	\$ 73,385	\$ 67,192	\$ 60,999	\$ 54,806	\$ 48,613
	<b>Total (\$1,000)</b>	<b>\$ 3,984,589</b>	<b>\$ 3,526,568</b>	<b>\$ 4,009,061</b>	<b>\$ 4,353,251</b>	<b>\$ 3,884,221</b>	<b>\$ 4,174,996</b>	<b>\$ 4,177,128</b>	<b>\$ 4,375,545</b>	<b>\$ 5,099,468</b>	<b>\$ 5,558,280</b>	<b>\$ 5,106,574</b>

Ag Census Data Category	Animal Type	1997	2002	2007	2012	
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	24,329	23,888	22,854	22,009	
	Cattle feedlots (112112)	703	781	65	3	
	Dairy cattle and milk production (11212)	637	348	291	106	
	Hog and pig farming (1122)	582	444	396	228	
	Poultry and egg production (1123)	4,948	4,737	4,212	3,298	
	Sheep and goat farming (1124)	184	419	775	1,111	
	Animal aquaculture and other animal production (1125,1129)	1,922	4,406	4,922	4,148	
Value of Sales (\$1,000)	Cattle and Calves	383,466	421,226	625,996	766,476	
	Hogs and Pigs	218,626	123,803	84,202	47,178	
	Poultry and Eggs	2,605,644	2,617,592	3,716,164	4,011,725	
	Milk and Other Dairy Products	78,845	54,049	44,770	28,225	
	Aquaculture	84,120	92,638	118,744	67,453	
	Other (calculated)	10,016	20,706	17,957	8,123	
	<b>Total</b>	<b>3,380,717</b>	<b>3,330,014</b>	<b>4,607,833</b>	<b>4,929,180</b>	
Input Purchases	Livestock and poultry purchased	(Farms)	14,619	15,183	12,921	12,996
		\$1,000	467,737	515,620	828,459	891,909
	Breeding livestock purchased	(Farms)	n/a	8,543	7,012	7,686
		\$1,000	n/a	22,752	49,799	108,357
	Other livestock and poultry purchased	(Farms)	n/a	8,638	7,713	7,155
		\$1,000	n/a	492,868	778,660	783,552
	Feed purchased	(Farms)	29,654	34,143	30,394	32,540
	\$1,000	1,654,949	1,250,849	2,023,611	2,617,016	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
<b>2015 Animal Agriculture</b>	Cattle and Calves	\$ 1,549,716	\$ 313,286	8,116	\$ 85,621
	Hogs, Pigs, and Other	\$ 195,122	\$ 44,256	1,029	\$ 12,095
	Poultry and Eggs	\$ 12,280,300	\$ 2,593,800	55,819	\$ 708,886
	Dairy	\$ 37,946	\$ 8,578	239	\$ 2,344
	<b>Total</b>	\$ 14,063,085	\$ 2,959,920	65,203	\$ 808,946

<b>Change from 2005 to 2015</b>	Cattle and Calves	\$ 150,364	\$ 30,397	787	\$ 8,308
	Hogs, Pigs, and Other	\$ (232,497)	\$ (52,733)	(1,226)	\$ (14,412)
	Poultry and Eggs	\$ 1,092,938	\$ 230,846	4,968	\$ 63,090
	Dairy	\$ (90,364)	\$ (20,428)	(569)	\$ (5,583)
	<b>Total</b>	\$ 920,441	\$ 188,082	3,960	\$ 51,403

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
<b>RIMS II Multipliers</b>	Cattle and Calves	\$ 2.439	\$ 0.493	12.8
	Hogs, Pigs, and Other	\$ 1.690	\$ 0.383	8.9
	Poultry and Eggs	\$ 2.830	\$ 0.598	12.9
	Dairy	\$ 2.304	\$ 0.521	14.5

<b>Tax Rates</b>	Federal effective income tax rate	12.7%
	Federal Social Security tax rate	7.7%
	State Effective Rate	7.0%
	<b>Total</b>	27.3%

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.