

Economic Analysis of Animal Agriculture 2004-2014

INDIANA

**A Report for
United Soybean Board**



September 2015



Bridging Your Research Needs.

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Indiana Executive Summary

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

- \$9.4 billion in economic output
- 48,865 jobs
- \$1.6 billion in earnings
- \$382.0 million in income taxes paid at local, state, and federal levels
- \$260.7 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in Indiana increased economic output by over \$3.6 billion, boosted household earnings by \$618.0 million, contributed 18,617 additional jobs and paid \$146.7 million in additional tax revenues.

Indiana's animal agriculture consumed about 990.4 thousand tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Hogs (413.8 thousand tons)
- Egg-Laying Hens (169.5 thousand tons)
- Turkeys (161.0 thousand tons)

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

Indiana Economic Impact of Animal Agriculture

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

- About \$9.4 billion in economic output
- \$1.6 billion in household earnings
- 48,865 jobs
- \$382.0 million in income taxes

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

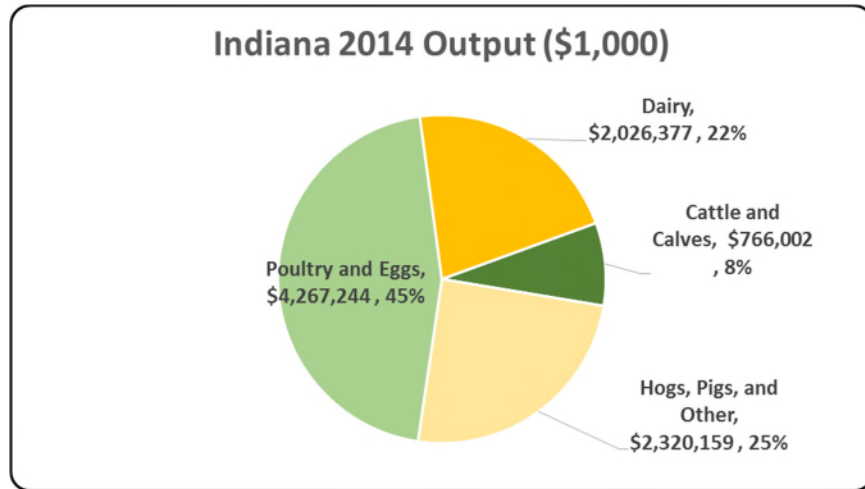
- Increased economic output by \$3.6 billion
- Boosted household earnings by \$618.0 million
- Added 18,617 jobs
- Paid an additional \$146.7 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output (\$1,000)	\$ 9,379,781	\$ 3,605,502	62.44%
Earnings (\$1,000)	\$ 1,609,785	\$ 617,995	62.31%
Employment (Jobs)	48,865	18,617	61.55%
Income Taxes Paid (\$1,000)	\$ 382,002	\$ 146,650	62.31%
Property Taxes Paid in 2012 (\$1,000)	\$ 260,733		

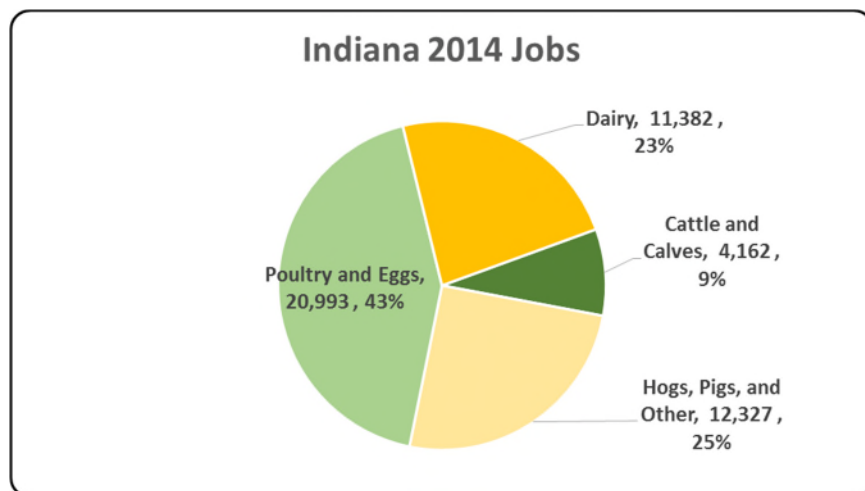
Indiana Output

“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 Indiana economy. Animal agriculture’s impact on Indiana total economic output is about \$9.4 billion.



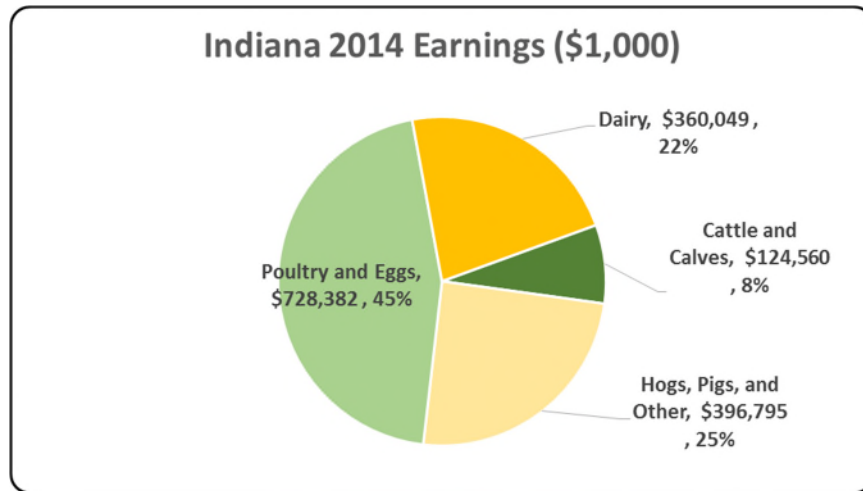
Indiana Jobs

“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 Indiana in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Indiana total jobs, contributing 48,865 jobs within and outside of animal agriculture.



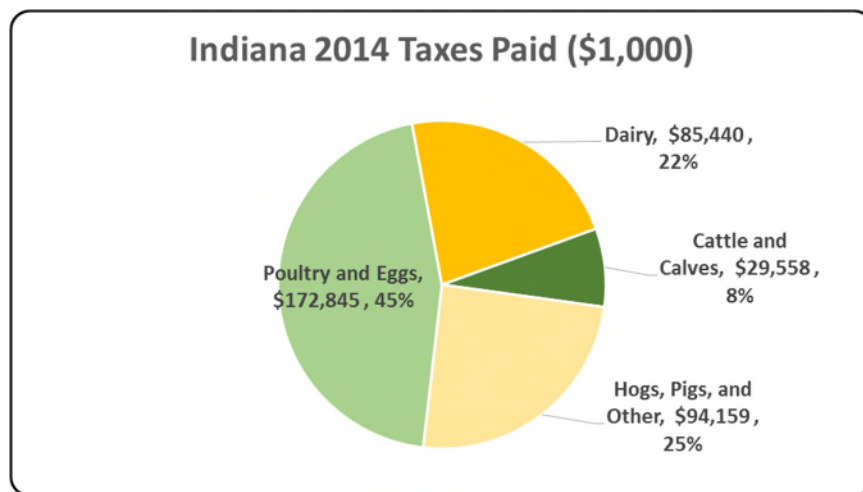
Indiana Earnings

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 Indiana economy in terms of earnings. Indiana's animal agriculture contributed about \$1.6 billion to household earnings in 2014.



Indiana Taxes Paid by Animal Agriculture

Indiana's animal agriculture is also a significant source of tax revenue. In 2014, the state's animal agriculture industry paid about \$382.0 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$260.7 million in property taxes paid by all of Indiana agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



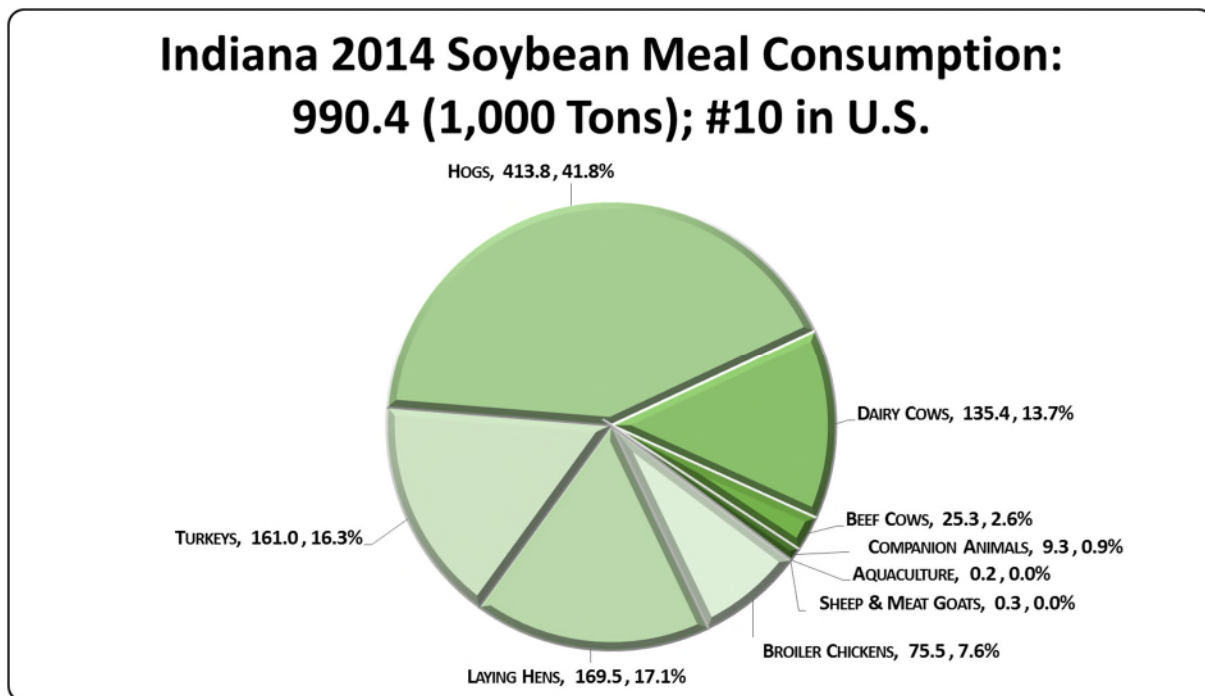
Indiana Animal Agriculture Soybean Meal Consumption

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.

Indiana’s animal agriculture consumed almost 990.4 thousand tons of soybean meal in 2014, placing the state as #10 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 (413.8 thousand tons)
- Egg-Laying Hens (169.5 thousand tons)
- Turkeys (161.0 thousand tons)

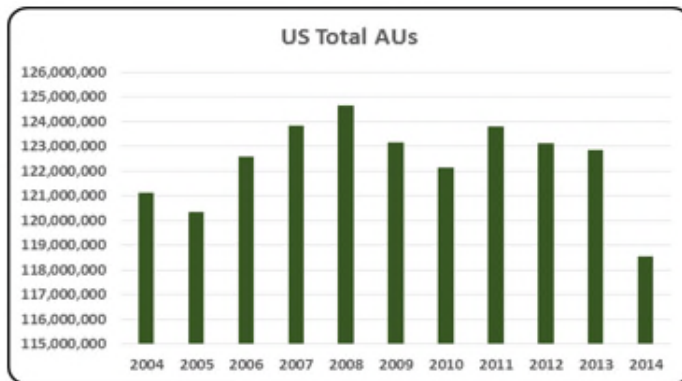


Indiana Animal Unit (AU) Trends

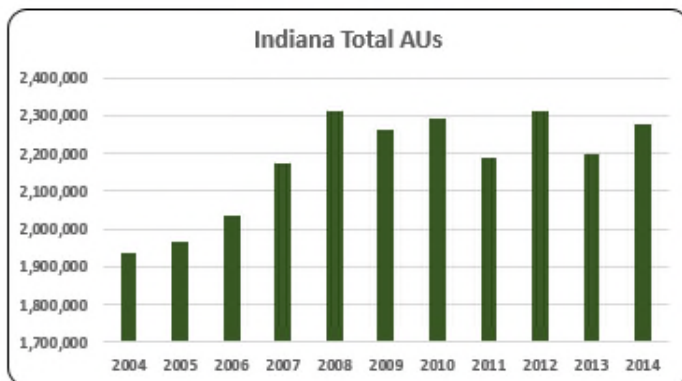
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Indiana. Due to this reality, using a single year as a measure of the presence and strength of a sector can be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

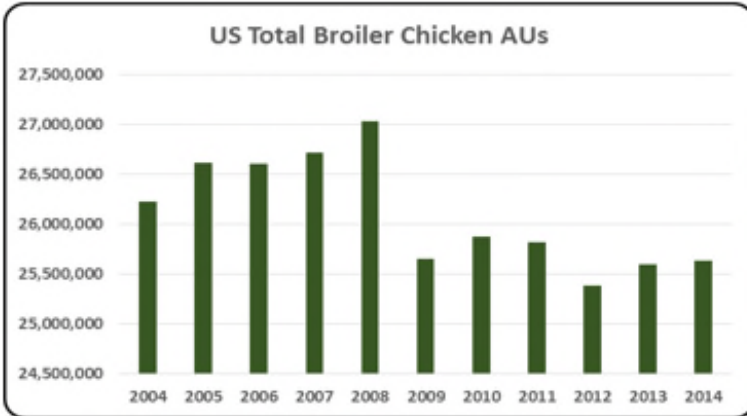
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Indiana, the largest three segments of animal agriculture in terms of AUs during 2014 were: Hogs (1,151.1 thousand AUs), Beef Cows (360.0 thousand AUs), and Turkeys (284.9 thousand AUs). Total animal units in Indiana during 2014 were 2,275 thousand AUs.



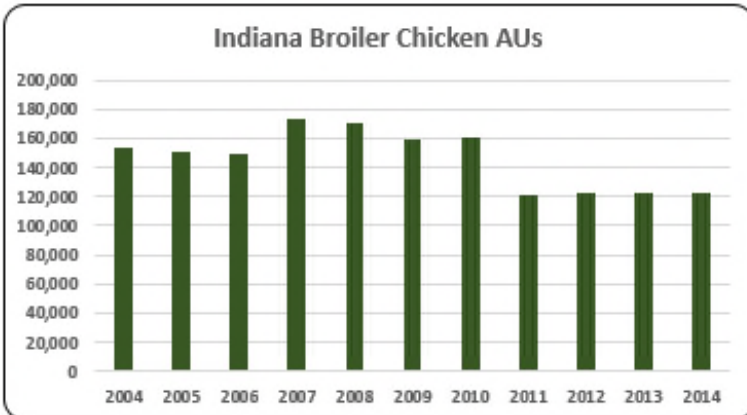
- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.



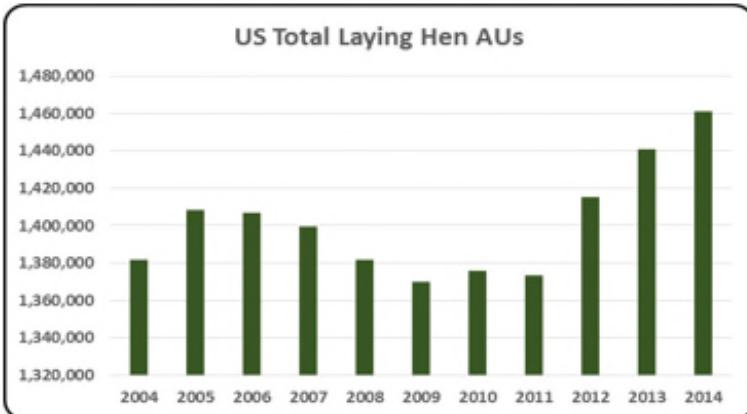
- In 2014 there were 2,275.0 thousand AUs in the state of Indiana and 50.6% (1,151.1) were hog AUs. In general, from 2004 to 2014, there has been an upward trend in the number of AUs in Indiana.



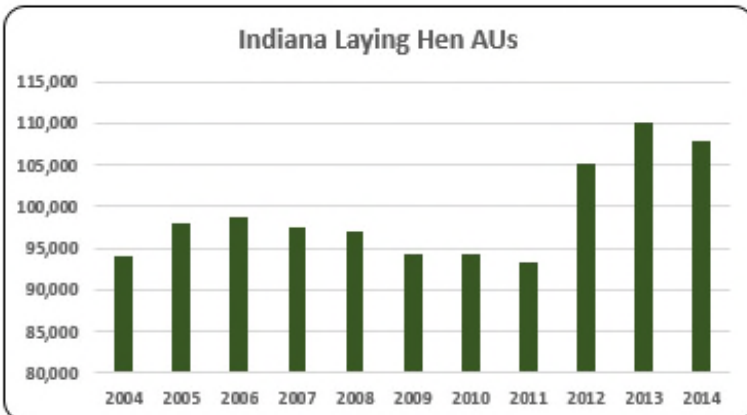
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).



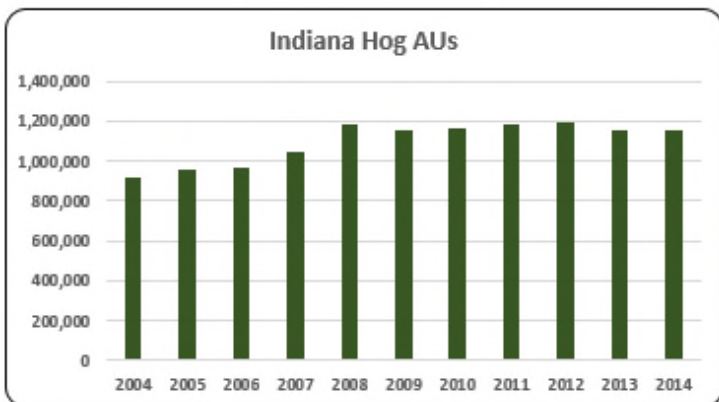
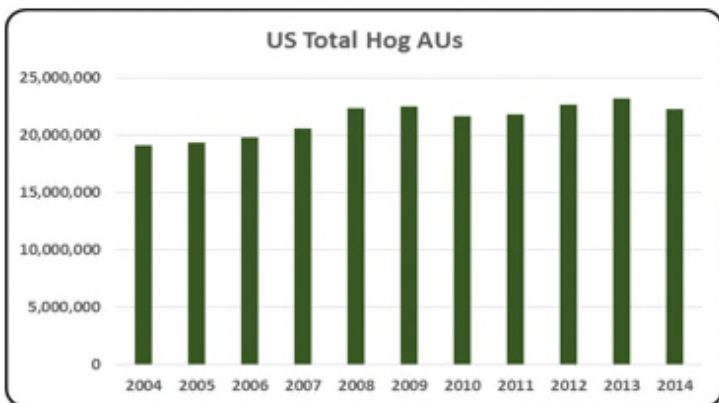
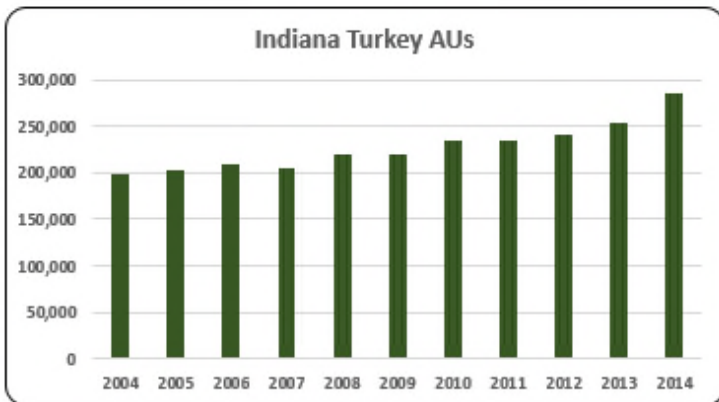
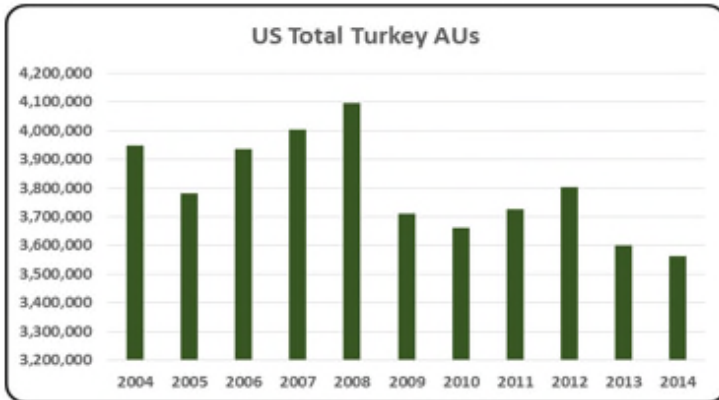
- Broiler AUs were 121,829 in 2014 and experienced a reduction of - 0.6% from a year earlier.



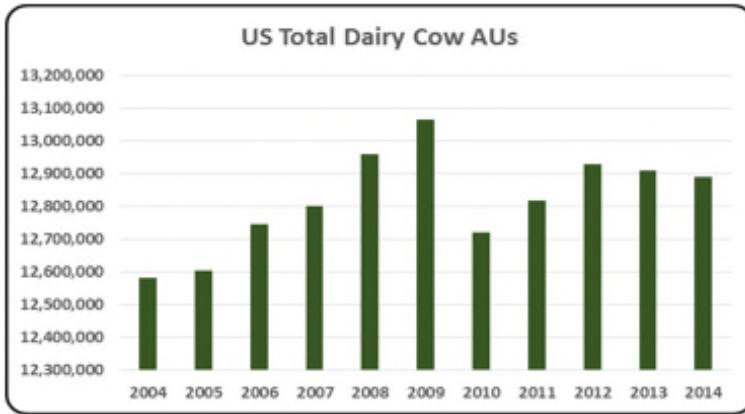
- On average, the layer AUs during 2004-2014 were 1.4 million. In 2014 layer AUs were 1.5 million, up 7% from the lowest number in 2009 (1.4 million AUs).



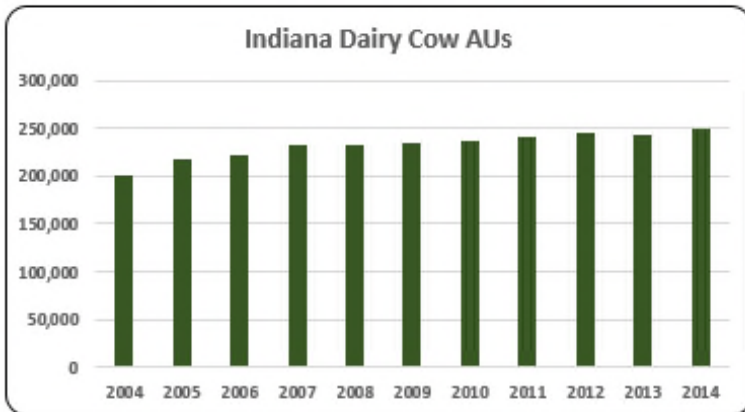
- Layers AUs have increased since 2012. In 2014 layer AUs (107,971) represented 7.4 % of all layers AUs in the U.S.



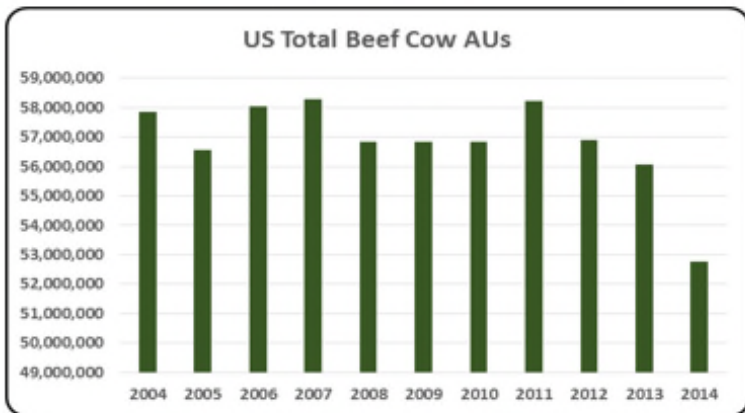
- From 2004 to 2014, the U.S. accounted for 50% of the world’s turkey production. However, in 2014 turkey AUs were the lowest of the decade at 3.5 million, decreasing 13% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade.
- Turkey AUs in 2014 (284,908) increased 12.4% year-over-year. Those numbers represented 8.0% of all turkey AUs in the U.S.
- 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.
- In 2014 over 5% (1,151.1 thousand) of all hog AUs in the U.S. were in Indiana. From 2004 (914,850) to 2008 (1,187.4 thousand) hog AUs increased 30%. From 2009 to 2014 hog AUs have averaged about 1,166.0 thousand.



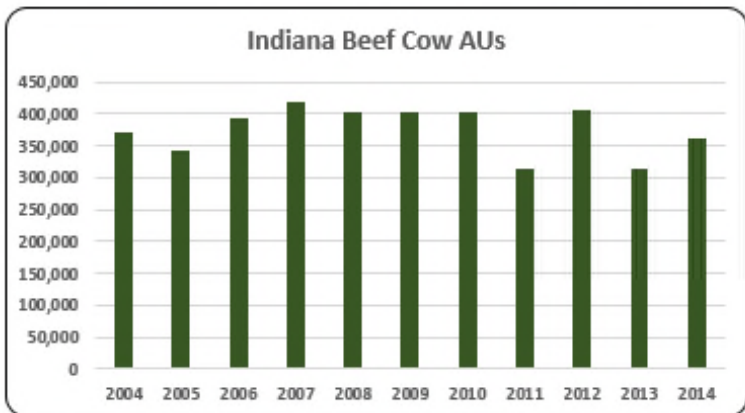
- From 2004 to 2014 dairy cow AUs averaged 12.8 million. In 2014, dairy cow AUs (12.9 million) remained about the same as the previous year but still below the high of 13.1 million AUs, the level in 2009. Despite the fluctuation in AUs, milk supplied has steadily risen.



- From 2004 to 2014, on average, there were 232,018 dairy cow AUs. This animal production has gradually increased throughout the 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.



- Beef cow production is the second most important animal production in Indiana. There were 360,000 beef cow AUs in 2014.

Indiana Additional Information and Methodology

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

Indiana 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 Indiana'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 Indiana, \$1.926 to \$3.081 million in total economic activity, \$0.327 to \$0.526 in household wages and 10 to 15 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.0091	\$ 0.3267	10.9
	Hogs, Pigs, and Other	\$ 1.9255	\$ 0.3293	10.2
	Poultry and Eggs	\$ 3.0810	\$ 0.5259	15.2
	Dairy	\$ 2.1426	\$ 0.3807	12.0

Appendix

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Animal Units (AUs)	Beef Cattle AUs	372,150	343,650	391,800	417,150	403,800	403,800	403,800	314,250	406,350	313,500	360,000
	Hog and Pig AUs	914,850	953,100	964,050	1,046,850	1,187,400	1,151,700	1,162,950	1,184,400	1,192,050	1,153,800	1,151,100
	Broiler AUs	153,858	150,619	149,602	173,789	171,079	159,063	161,202	121,468	122,954	122,525	121,829
	Turkey AUs	199,500	202,061	208,141	205,349	218,908	219,798	234,058	233,709	241,028	253,450	284,908
	Egg Layer AUs	94,004	98,092	98,620	97,404	96,988	94,156	94,384	93,172	105,047	110,119	107,971
	Dairy AUs	200,200	217,000	221,200	232,400	232,400	233,800	236,600	240,800	245,000	243,600	249,200
	Total Animal Units	1,934,562	1,964,523	2,033,413	2,172,942	2,310,575	2,262,317	2,292,995	2,187,798	2,312,429	2,196,995	2,275,008
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 189,713	\$ 209,091	\$ 227,138	\$ 221,007	\$ 183,082	\$ 200,726	\$ 215,539	\$ 206,130	\$ 289,984	\$ 275,856	\$ 381,266
	Hogs and Pigs (\$1,000)	\$ 678,718	\$ 703,129	\$ 643,469	\$ 712,960	\$ 818,183	\$ 722,435	\$ 900,624	\$ 1,081,867	\$ 1,081,041	\$ 1,056,695	\$ 1,199,250
	Broilers (\$1,000)	\$ 129,408	\$ 122,581	\$ 94,728	\$ 130,738	\$ 134,552	\$ 116,550	\$ 122,673	\$ 108,082	\$ 122,484	\$ 149,216	\$ 156,532
	Turkeys (\$1,000)	\$ 172,049	\$ 192,960	\$ 235,773	\$ 269,606	\$ 306,269	\$ 271,500	\$ 350,384	\$ 393,923	\$ 442,550	\$ 441,061	\$ 554,411
	Eggs (\$1,000)	\$ 291,841	\$ 192,327	\$ 229,297	\$ 422,640	\$ 535,571	\$ 353,020	\$ 373,592	\$ 420,152	\$ 474,014	\$ 545,130	\$ 674,076
	Milk (\$1,000)	\$ 505,509	\$ 506,560	\$ 435,841	\$ 664,087	\$ 644,252	\$ 453,322	\$ 590,968	\$ 746,130	\$ 716,632	\$ 796,640	\$ 945,756
	Other	\$ 4,375	\$ 4,413	\$ 4,138	\$ 4,260	\$ 4,239	\$ 4,791	\$ 5,641	\$ 5,216	\$ 5,382	\$ 5,548	\$ 5,714
	Sheep and Lambs (\$1,000)	\$ 2,685	\$ 2,669	\$ 2,339	\$ 2,406	\$ 2,330	\$ 2,827	\$ 3,622	\$ 3,142	\$ 3,254	\$ 3,365	\$ 3,476
	Aquaculture (\$1,000)	\$ 1,690	\$ 1,744	\$ 1,799	\$ 1,854	\$ 1,909	\$ 1,964	\$ 2,019	\$ 2,073	\$ 2,128	\$ 2,183	\$ 2,238
	Total (\$1,000)	\$ 1,971,612	\$ 1,931,061	\$ 1,870,384	\$ 2,425,298	\$ 2,626,148	\$ 2,122,344	\$ 2,559,421	\$ 2,961,500	\$ 3,132,086	\$ 3,270,146	\$ 3,917,005

Ag Census Data Category	Animal Type	1997	2002	2007	2012	
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	8,831	8,248	8,676	8,394	
	Cattle feedlots (112112)	1,986	2,493	1,114	319	
	Dairy cattle and milk production (11212)	1,921	1,875	1,462	1,459	
	Hog and pig farming (1122)	3,432	2,221	1,959	1,301	
	Poultry and egg production (1123)	673	705	1,442	1,336	
	Sheep and goat farming (1124)	663	980	1,547	1,719	
	Animal aquaculture and other animal production (1125,1129)	2,881	6,570	5,616	6,645	
Value of Sales (\$1,000)	Cattle and Calves	357,904	324,054	456,657	522,694	
	Hogs and Pigs	843,326	633,112	974,290	1,273,099	
	Poultry and Eggs	516,328	455,153	887,196	1,164,199	
	Milk and Other Dairy Products	262,007	333,339	583,212	659,314	
	Aquaculture	2,678	3,151	2,567	5,120	
	Other (calculated)	43,561	41,602	48,350	32,396	
	Total	2,025,804	1,790,411	2,952,272	3,656,822	
Input Purchases	Livestock and poultry purchased	(Farms)	14,780	14,613	11,645	14,009
		\$1,000	282,253	307,156	511,239	508,824
	Breeding livestock purchased	(Farms)	n/a	6,852	5,669	6,826
		\$1,000	n/a	39,425	57,350	84,804
	Other livestock and poultry purchased	(Farms)	n/a	9,431	7,398	9,346
		\$1,000	n/a	267,731	453,890	424,019
	Feed purchased	(Farms)	25,765	29,682	24,908	28,754
	\$1,000	818,113	660,587	1,092,067	1,592,005	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
2014 Animal Agriculture	Cattle and Calves	\$ 766,002	\$ 124,560	4,162	\$ 29,558
	Hogs, Pigs, and Other	\$ 2,320,159	\$ 396,795	12,327	\$ 94,159
	Poultry and Eggs	\$ 4,267,244	\$ 728,382	20,993	\$ 172,845
	Dairy	\$ 2,026,377	\$ 360,049	11,382	\$ 85,440
	Total	\$ 9,379,781	\$ 1,609,785	48,865	\$ 382,002
Change from 2004 to 2014	Cattle and Calves	\$ 288,328	\$ 46,885	1,567	\$ 11,126
	Hogs, Pigs, and Other	\$ 671,786	\$ 114,889	3,569	\$ 27,263
	Poultry and Eggs	\$ 1,976,394	\$ 337,353	9,723	\$ 80,054
	Dairy	\$ 668,994	\$ 118,868	3,758	\$ 28,207
	Total	\$ 3,605,502	\$ 617,995	18,617	\$ 146,650
RIMS II Multipliers	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
	Cattle and Calves	\$ 2.0091	\$ 0.3267	10.9	
	Hogs, Pigs, and Other	\$ 1.9255	\$ 0.3293	10.2	
	Poultry and Eggs	\$ 3.0810	\$ 0.5259	15.2	
	Dairy	\$ 2.1426	\$ 0.3807	12.0	
Tax Rates	Federal effective income tax rate			12.7%	
	Federal Social Security tax rate			7.7%	
	State Effective Rate			3.4%	
	Total			23.7%	

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.