

Economic Analysis of Animal Agriculture 2005-2015

INDIANA

A Report for
United Soybean Board



September 2016



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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 the State of 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 2015 animal agriculture contributed:

- \$9.6 billion in economic output
- 42,397 jobs
- \$2.1 billion in earnings
- \$488.8 million in income taxes paid at local, state, and federal levels
- \$260.7 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Indiana has increased economic output by over \$4.2 billion, boosted household earnings by \$895.8 million, contributed 18,408 additional jobs and paid \$212.6 million in additional tax revenues.

Indiana's animal agriculture consumed about 1.0 million tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Hogs (453.1 thousand tons)
- Egg-Laying Hens (172.9 thousand tons)
- Turkeys (163.6 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. It is expected that 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 2015, Indiana’s animal agriculture contributed the following to the economy:

- About \$9.6 billion in economic output
- \$2.1 billion in household earnings
- 42,397 jobs
- \$488.8 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:

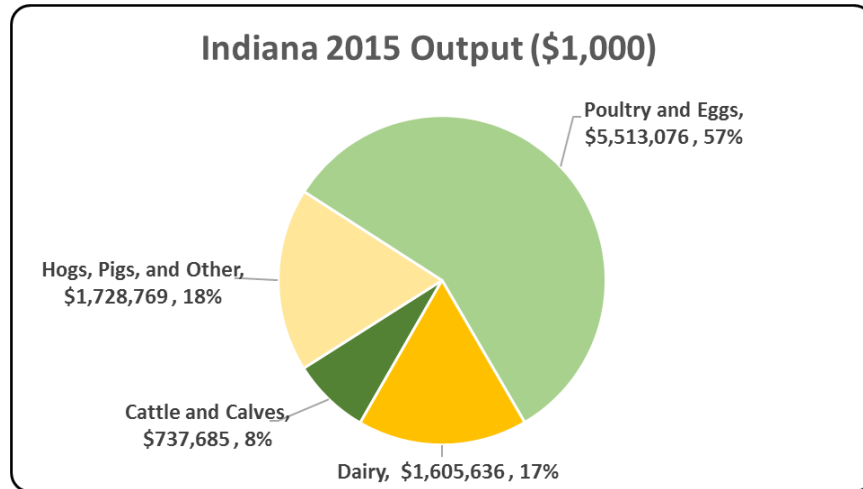
- Increased economic output by \$4.2 billion
- Boosted household earnings by \$895.8 million
- Added 18,408 jobs
- Paid an additional \$212.6 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2015	Change 2005-2015	% Change 2005-2015
Output (\$1,000)	\$ 9,585,165	\$ 4,228,698	78.95%
Earnings (\$1,000)	\$ 2,059,823	\$ 895,760	76.95%
Employment (Jobs)	42,397	18,408	76.73%
Income Taxes Paid (\$1,000)	\$ 488,796	\$ 212,564	76.95%
Property Taxes Paid in 2012 (\$1,000)	\$ 260,733		

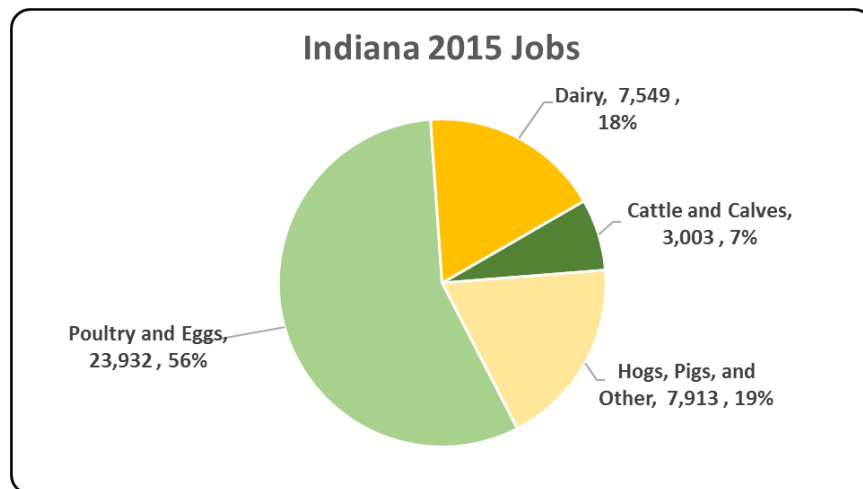
Indiana Output

“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 \$9.6 billion.



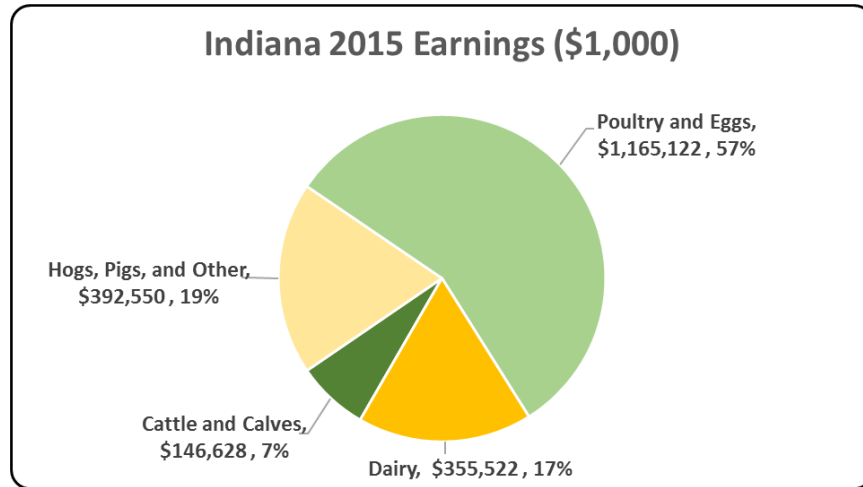
Indiana Jobs

“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 42,397 jobs within and outside of animal agriculture.



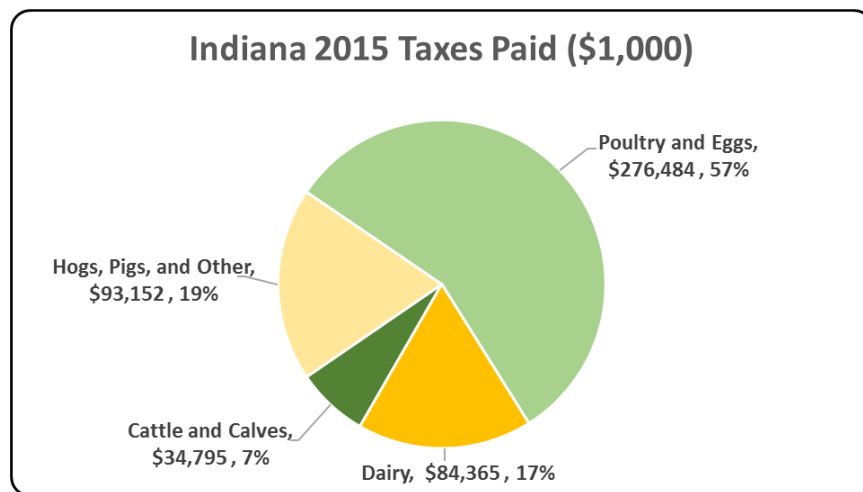
Indiana Earnings

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 \$2,059.8 million to household earnings in 2015.



Indiana Taxes Paid by Animal Agriculture

Indiana’s animal agriculture is also a significant source of tax revenue. In 2015, the state’s animal agriculture industry paid about \$488.8 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.



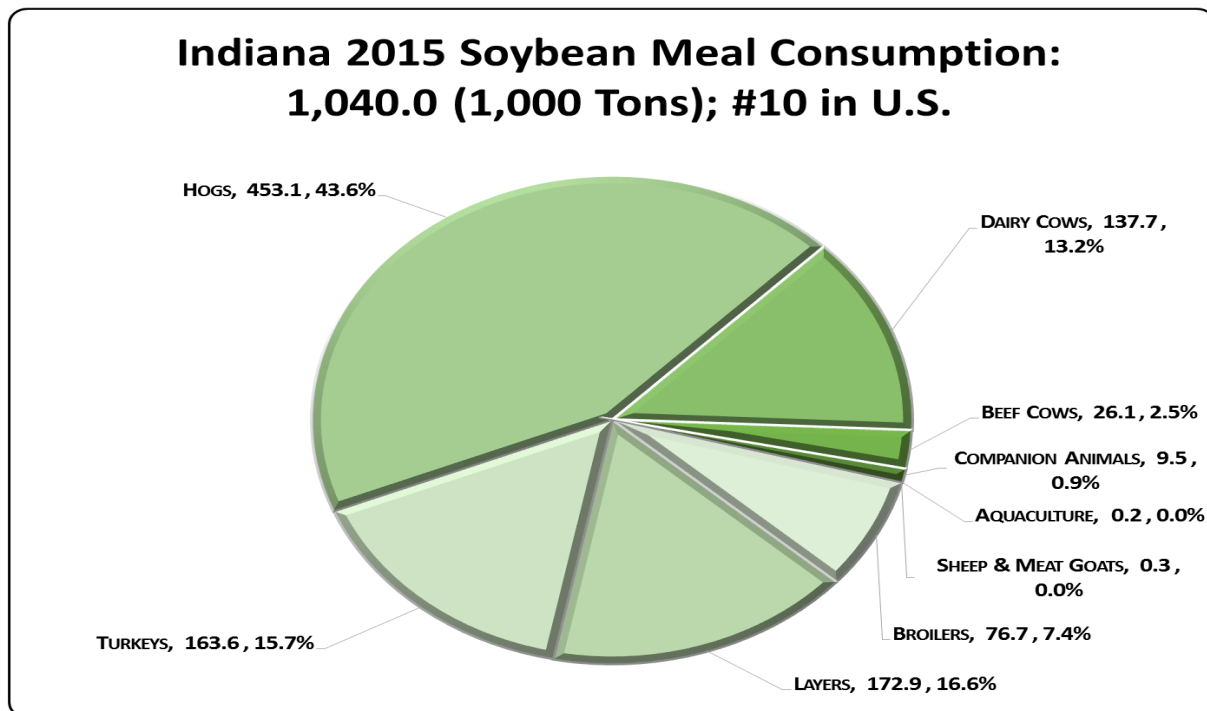
Indiana Animal Agriculture Soybean Meal Consumption

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 2014-15 soybean marketing year by up to sixteen specific animal species has been estimated.

Indiana’s animal agriculture consumed almost 1.0 million tons of soybean meal in 2015, 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 (453.1 thousand tons)
- Egg-Laying Hens (172.9 thousand tons)
- Turkeys (163.6 thousand tons)

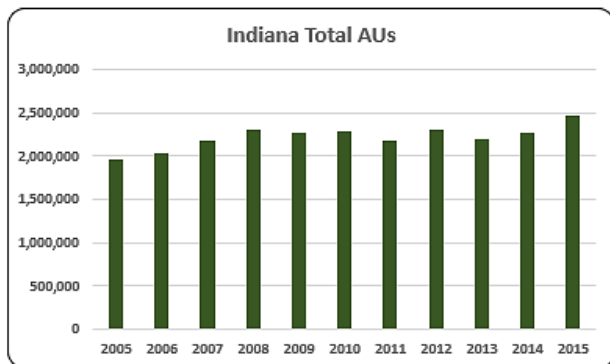
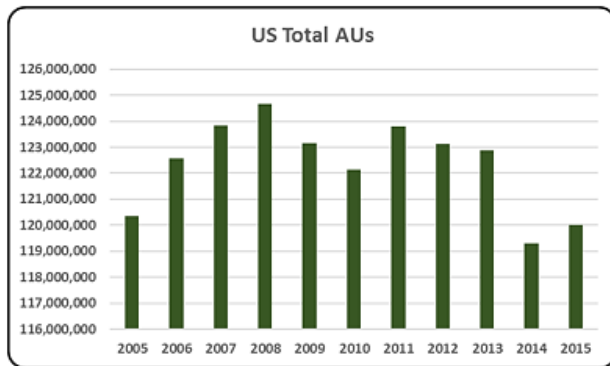


Indiana Animal Unit (AU) Trends

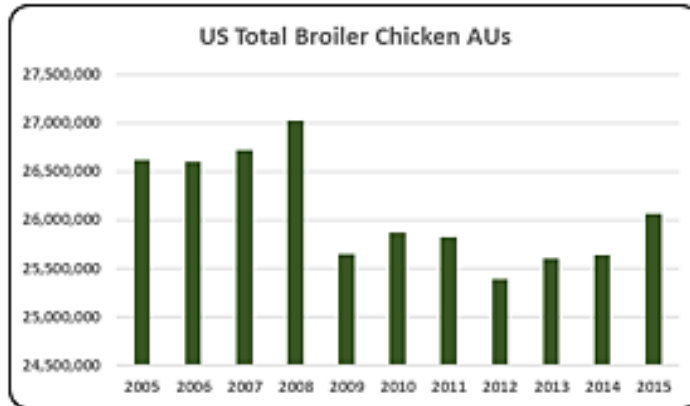
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Indiana. Due to this reality, using a single year as a measure of the presence and strength of a sector can be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

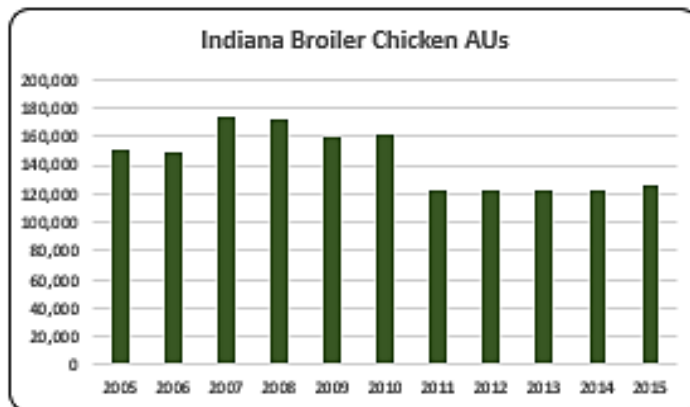
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Indiana, the largest three segments of animal agriculture in terms of AUs during 2015 were: Hogs (1.3 million AUs), Beef Cows (360,000 AUs), and Turkeys (286,977 AUs). Total animal units in Indiana during 2015 were 2.5 million AUs.



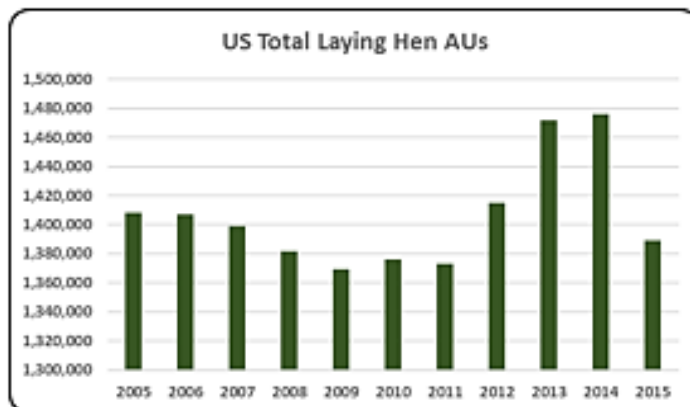
- Overall U.S. total AUs have varied from 2005 to 2015. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2005-15 time period, total AUs in the nation peaked in 2008.
- In 2015 there were 2.5 million AUs in the state of Indiana and 53.7% (1.3 million) were hog AUs. In general, from 2005 to 2015, there has been an upward trend in the number of AUs in Indiana.



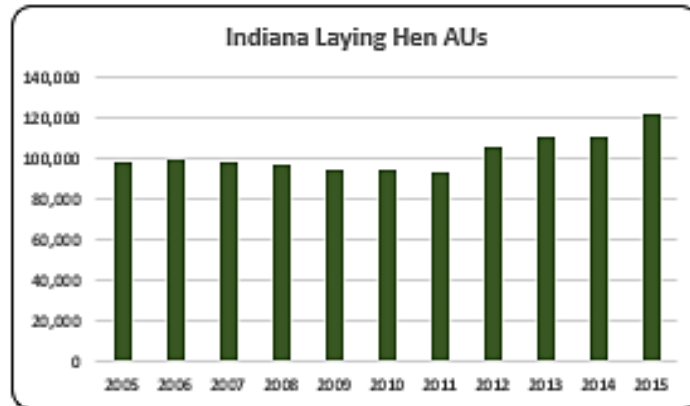
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2005 to 2015, broiler chicken AUs were about 26.0 million. In 2015, AUs rebounded 3% from the low AUs numbers in 2012 (25.4 million AUs).



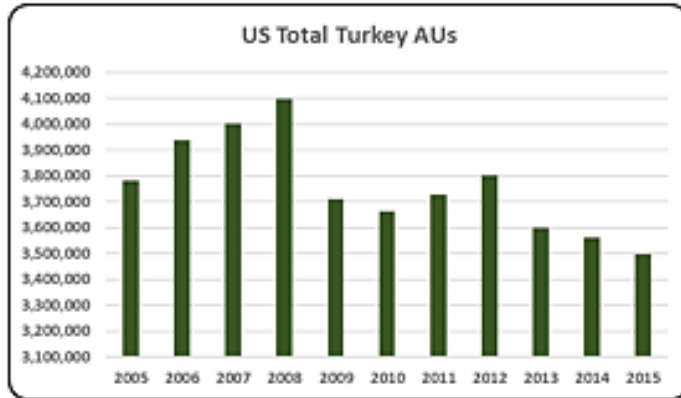
- Broiler AUs were 124,974 in 2015 and experienced an increase of 3% from a year earlier.



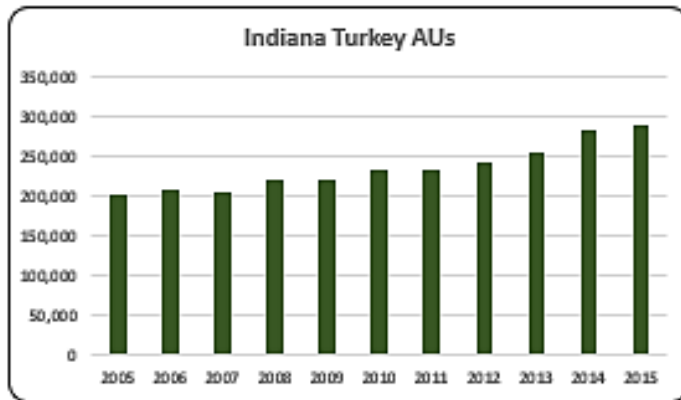
- On average, the layer AUs during 2005-2015 were 1.4 million. In 2015 layer AUs were 1.3 million, down 6% from the 2014 decade high (1.4 million AUs). This drastic decrease in 2015 was due to the losses in major egg laying states from the avian influenza outbreak.



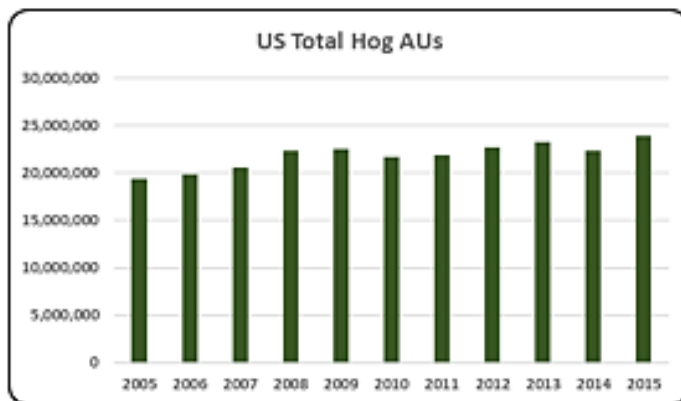
- Layers AUs have increased since 2012. In 2015 layer AUs (121,917) represented 4.9 % of all AUs in Indiana.



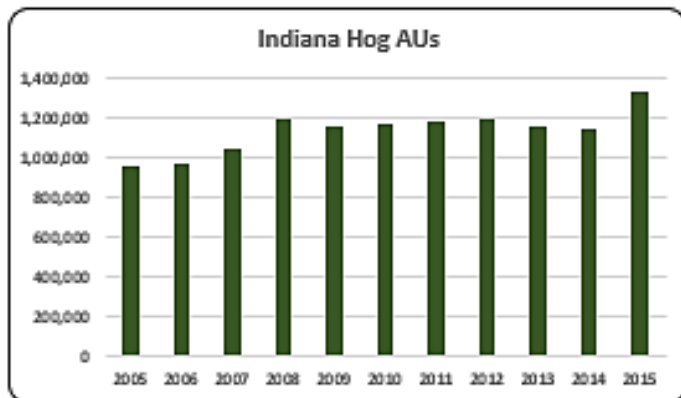
- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.



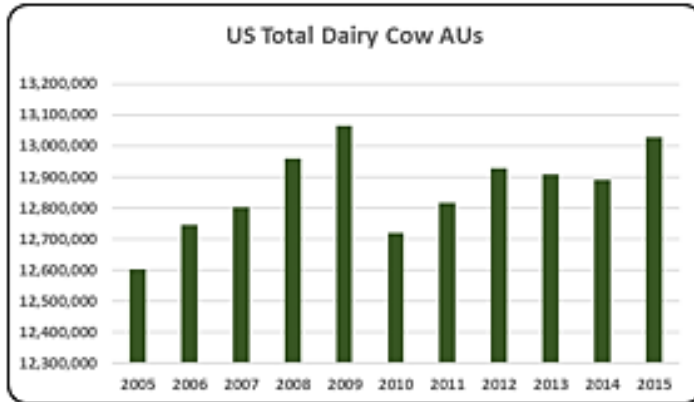
- Turkey AUs in 2015 (286,977) represented 11.5% of all AUs in Indiana. Those numbers represented 8.2% of all turkey AUs in the U.S.



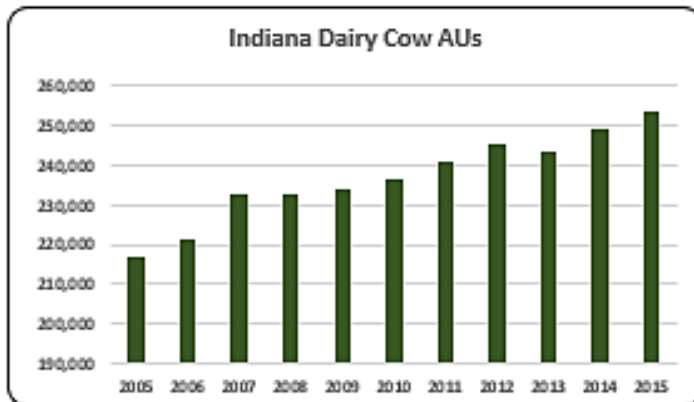
- On average from 2005 to 2015, hog AUs were about 21.8 million. Hog AUs in 2015 increased 24% to 23.9 million AUs compared to the decade low in 2005 (19.4 million AUs). Despite the fluctuation in AUs, the pork supply was relatively stable.



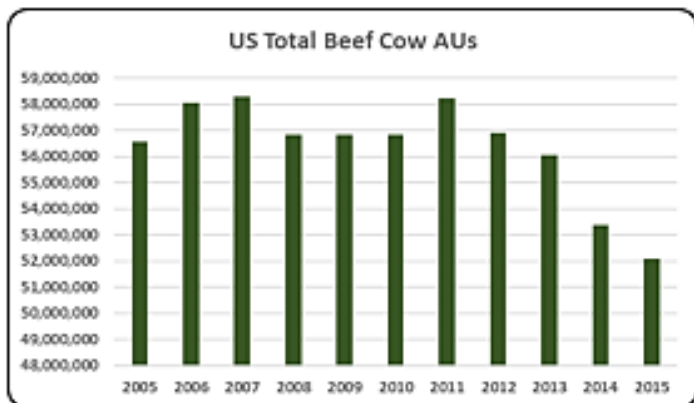
- In 2015 53.6% (1,330.0 thousand) of AUs in Indiana were hog AUs. From 2005 to 2015 hog AUs have averaged about 1.1 million.



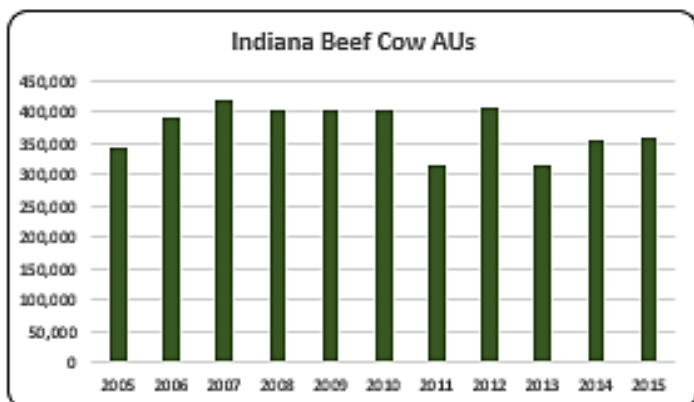
- From 2005 to 2015 dairy cow AUs averaged 12.8 million. In 2015, dairy cow AUs (13.0 million) finally reached near the 2009 high of 13.1 million AUs. Milk supplies have steadily risen.



- From 2005 to 2015, on average, there were 236,855 dairy cow AUs. Dairy AUs have steadily increased throughout the decade.



- 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.



- In terms of animal units, beef is the second largest animal sector in Indiana. There were 360,000 beef cow AUs in 2015.

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 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 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 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 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 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 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, \$1.79 to \$3.04 million in total economic activity, \$0.40 to \$0.64 in household wages and 8 to 13 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.030	\$ 0.403	8.3
	Hogs, Pigs, and Other	\$ 1.788	\$ 0.406	8.2
	Poultry and Eggs	\$ 3.041	\$ 0.643	13.2
	Dairy	\$ 2.316	\$ 0.513	10.9

Appendix

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Animal Units (AUs)	Beef Cattle AUs	343,650	391,800	417,150	403,800	403,800	403,800	314,250	406,350	313,500	354,000	360,000
	Hog and Pig AUs	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	1,143,750	1,330,050
	Broiler AUs	150,619	149,602	173,789	171,079	159,063	161,202	121,468	122,954	122,525	121,829	124,974
	Turkey AUs	202,061	208,141	205,349	218,908	219,798	234,058	233,709	241,028	253,450	283,069	286,977
	Egg Layer AUs	98,092	98,620	97,404	96,988	94,156	94,384	93,172	105,047	110,093	110,446	121,917
	Dairy AUs	217,000	221,200	232,400	232,400	233,800	236,600	240,800	245,000	243,600	249,200	253,400
	Total Animal Units	1,964,523	2,033,413	2,172,942	2,310,575	2,262,317	2,292,995	2,187,798	2,312,429	2,196,968	2,262,294	2,477,317
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 209,091	\$ 227,138	\$ 221,007	\$ 183,082	\$ 200,726	\$ 215,539	\$ 206,130	\$ 289,984	\$ 275,856	\$ 381,266	\$ 363,481
	Hogs and Pigs (\$1,000)	\$ 703,129	\$ 643,469	\$ 712,960	\$ 818,183	\$ 722,435	\$ 900,624	\$ 1,081,867	\$ 1,081,041	\$ 1,056,695	\$ 1,199,250	\$ 960,563
	Broilers (\$1,000)	\$ 126,571	\$ 98,053	\$ 134,120	\$ 137,022	\$ 118,221	\$ 123,545	\$ 108,163	\$ 122,513	\$ 149,280	\$ 156,606	\$ 136,625
	Turkeys (\$1,000)	\$ 191,066	\$ 233,533	\$ 267,084	\$ 307,438	\$ 258,576	\$ 336,266	\$ 378,786	\$ 425,738	\$ 418,002	\$ 554,197	\$ 610,029
	Eggs (\$1,000)	\$ 192,327	\$ 229,297	\$ 422,640	\$ 535,571	\$ 353,020	\$ 373,592	\$ 420,152	\$ 474,014	\$ 545,130	\$ 676,030	\$ 1,066,202
	Milk (\$1,000)	\$ 506,560	\$ 435,841	\$ 664,087	\$ 644,252	\$ 453,322	\$ 590,968	\$ 746,130	\$ 716,632	\$ 796,640	\$ 945,756	\$ 693,160
	Other	\$ 4,413	\$ 4,138	\$ 4,260	\$ 4,239	\$ 4,791	\$ 5,641	\$ 5,387	\$ 5,618	\$ 5,849	\$ 6,079	\$ 6,310
	Sheep and Lambs (\$1,000)	\$ 2,669	\$ 2,339	\$ 2,406	\$ 2,330	\$ 2,827	\$ 3,622	\$ 3,314	\$ 3,490	\$ 3,666	\$ 3,842	\$ 4,017
	Aquaculture (\$1,000)	\$ 1,744	\$ 1,799	\$ 1,854	\$ 1,909	\$ 1,964	\$ 2,019	\$ 2,073	\$ 2,128	\$ 2,183	\$ 2,238	\$ 2,293
	Total (\$1,000)	\$ 1,933,157	\$ 1,871,469	\$ 2,426,159	\$ 2,629,787	\$ 2,111,091	\$ 2,546,174	\$ 2,946,615	\$ 3,115,540	\$ 3,247,452	\$ 3,919,185	\$ 3,836,370

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) <i>n/a</i>	6,852	5,669	6,826	
		\$1,000	<i>n/a</i>	39,425	57,350	84,804
	Other livestock and poultry purchased	(Farms) <i>n/a</i>	9,431	7,398	9,346	
		\$1,000	<i>n/a</i>	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)
2015 Animal Agriculture	Cattle and Calves	\$ 737,685	\$ 146,628	3,003	\$ 34,795
	Hogs, Pigs, and Other	\$ 1,728,769	\$ 392,550	7,913	\$ 93,152
	Poultry and Eggs	\$ 5,513,076	\$ 1,165,122	23,932	\$ 276,484
	Dairy	\$ 1,605,636	\$ 355,522	7,549	\$ 84,365
	Total	\$ 9,585,165	\$ 2,059,823	42,397	\$ 488,796
Change from 2005 to 2015	Cattle and Calves	\$ 222,691	\$ 44,264	907	\$ 10,504
	Hogs, Pigs, and Other	\$ 193,455	\$ 43,928	885	\$ 10,424
	Poultry and Eggs	\$ 3,630,955	\$ 767,359	15,762	\$ 182,094
	Dairy	\$ 181,597	\$ 40,210	854	\$ 9,542
	Total	\$ 4,228,698	\$ 895,760	18,408	\$ 212,564
RIMS II Multipliers	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
	Cattle and Calves	\$ 2.030	\$ 0.403	8.3	
	Hogs, Pigs, and Other	\$ 1.788	\$ 0.406	8.2	
	Poultry and Eggs	\$ 3.041	\$ 0.643	13.2	
	Dairy	\$ 2.316	\$ 0.513	10.9	
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.