

Economic Analysis of Animal Agriculture 2004-2014

ILLINOIS

**A Report for
United Soybean Board**



September 2015



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3315 109th St. Suite B

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Illinois Executive Summary

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

- \$6.6 billion in economic output
- 28,184 jobs
- \$1.2 billion in earnings
- \$300.7 million in income taxes paid at local, state, and federal levels
- \$321.3 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in Illinois increased economic output by over \$1.4 billion, boosted household earnings by \$255.8 million, contributed 6,059 additional jobs and paid \$64.8 million in additional tax revenues.

Illinois's animal agriculture consumed about 875.7 thousand tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Hogs (650.2 thousand tons)
- Broilers (72.4 thousand tons)
- Dairy Cows (72.1 thousand tons)

This report examines animal agriculture in Illinois 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 Illinois, many opportunities and challenges will arise. And, if past is prologue, animal agriculture will continue to be a contributor to the economic well-being of the people of Illinois and beyond.

Illinois Economic Impact of Animal Agriculture

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

- About \$6.6 billion in economic output
- \$1.2 billion in household earnings
- 28,184 jobs
- \$300.7 million in income taxes

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

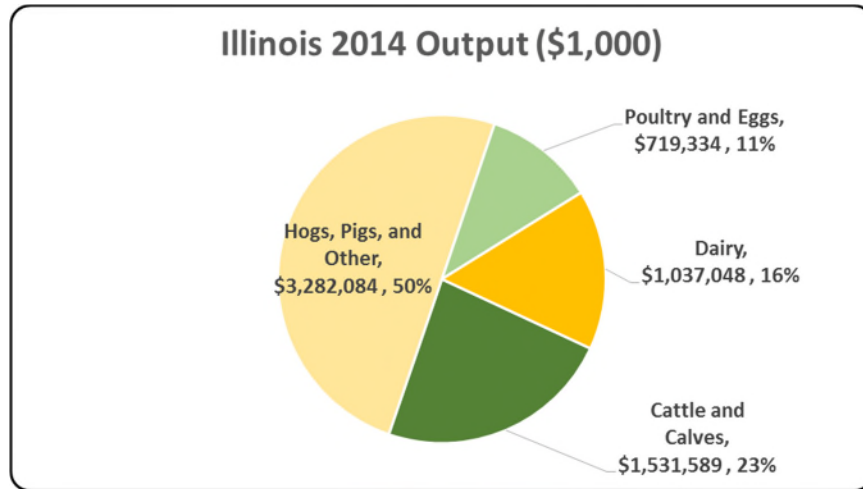
- Increased economic output by \$1.4 billion
- Boosted household earnings by \$255.8 million
- Added 6,059 jobs
- Paid an additional \$64.8 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output (\$1,000)	\$ 6,570,055	\$ 1,417,101	27.50%
Earnings (\$1,000)	\$ 1,187,211	\$ 255,792	27.46%
Employment (Jobs)	28,184	6,059	27.39%
Income Taxes Paid (\$1,000)	\$ 300,720	\$ 64,792	27.46%
Property Taxes Paid in 2012 (\$1,000)	\$ 321,273		

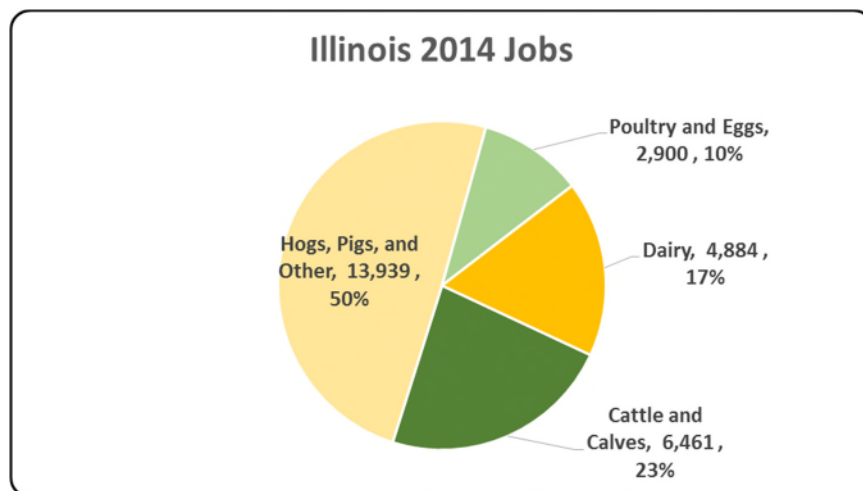
Illinois Output

“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 Illinois economy. Animal agriculture’s impact on Illinois total economic output is about \$6.6 billion.



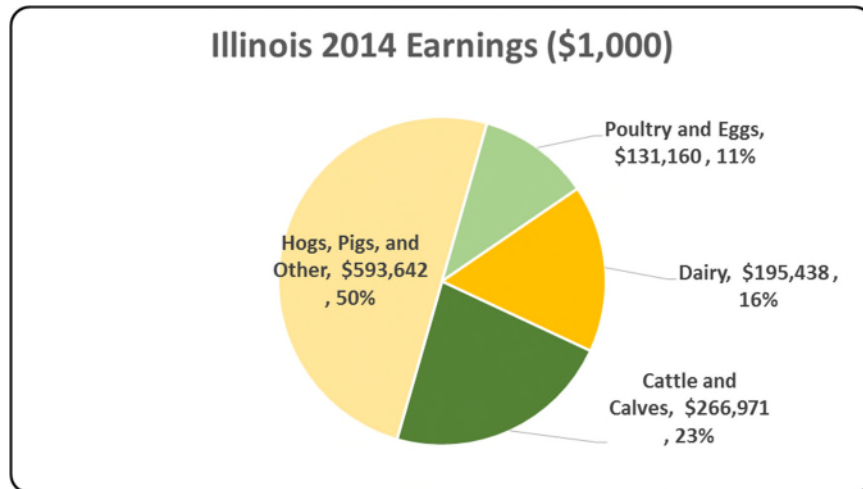
Illinois Jobs

“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 Illinois in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Illinois total jobs, contributing 28,184 jobs within and outside of animal agriculture.



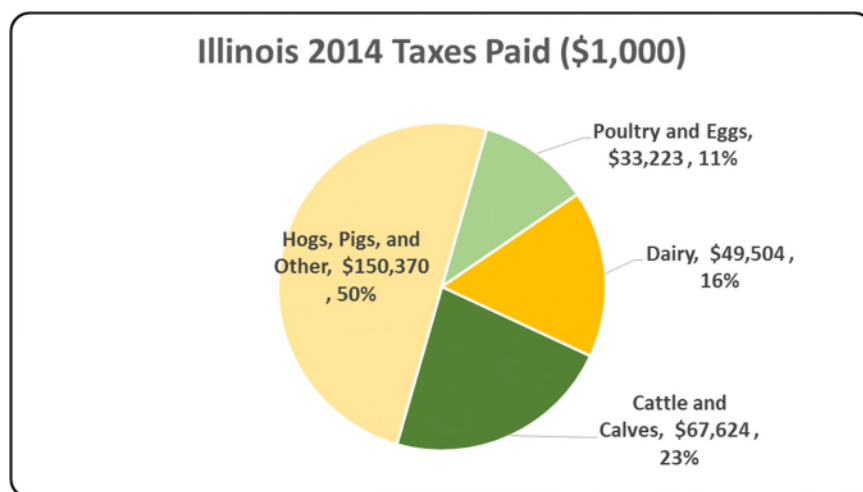
Illinois Earnings

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 Illinois economy in terms of earnings. Illinois’s animal agriculture contributed about \$1.2 billion to household earnings in 2014.



Illinois Taxes Paid by Animal Agriculture

Illinois’s animal agriculture is also a source of tax revenue. In 2014, the state’s animal agriculture industry paid about \$300.7 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$321.3 million in property taxes paid by all of Illinois agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



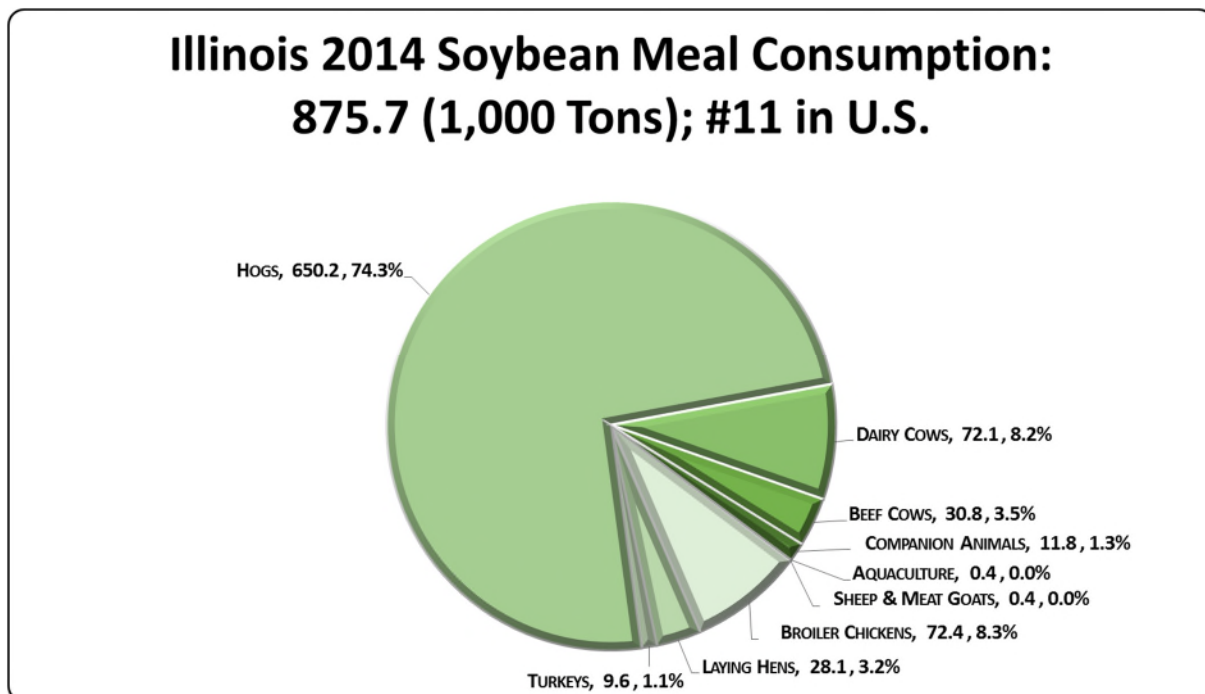
Illinois Animal Agriculture Soybean Meal Consumption

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.

Illinois's animal agriculture consumed almost 875.7 thousand tons of soybean meal in 2014, placing the state as #11 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 (650.2 thousand tons)
- Broilers (72.4 thousand tons)
- Dairy Cows (72.1 thousand tons)

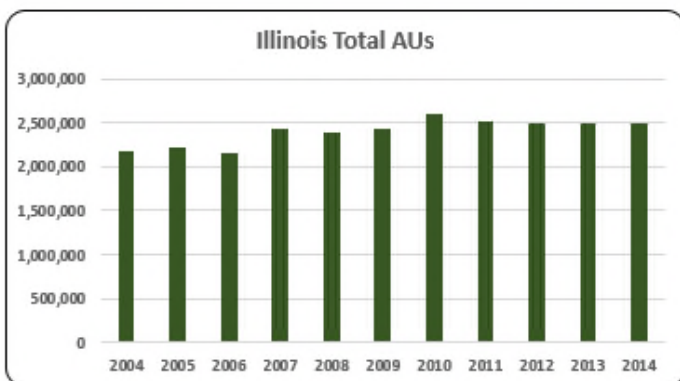
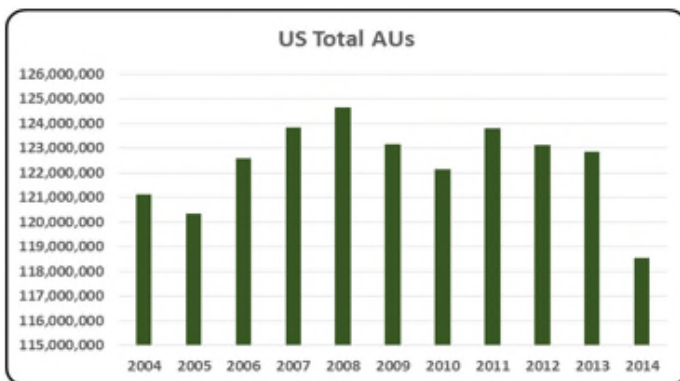


Illinois Animal Unit (AU) Trends

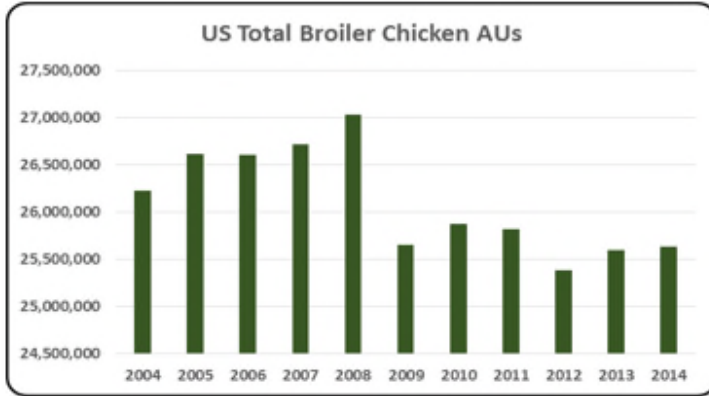
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Illinois. Due to this reality, using a single year as a measure of the presence and strength of a sector can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

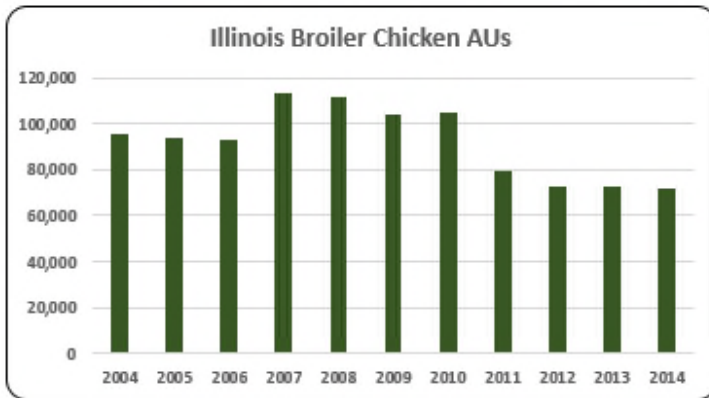
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Illinois, the largest three segments of animal agriculture in terms of AUs during 2014 were: Hogs (1,790.3 thousand AUs), Beef Cows (469.7 thousand AUs), and Dairy Cows (133.0 thousand AUs). Total animal units in Illinois during 2014 were 2,501.7 thousand AUs.



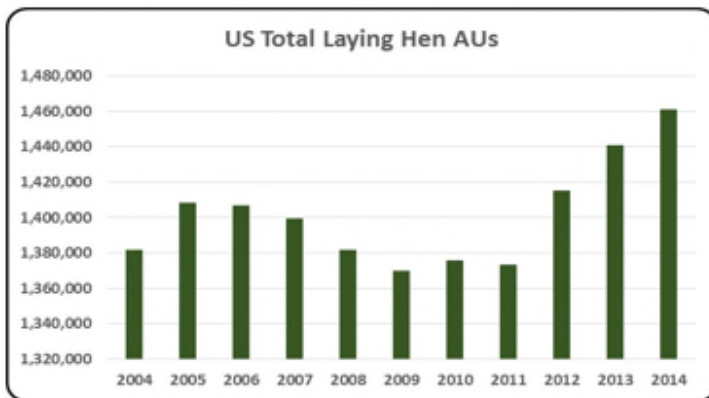
- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.
- The number of AUs in Illinois in 2014 reached 2,501.7 thousand comprising 2.11% of all AUs in the U.S. On average, there were 2,399.7 between 2004 and 2014.



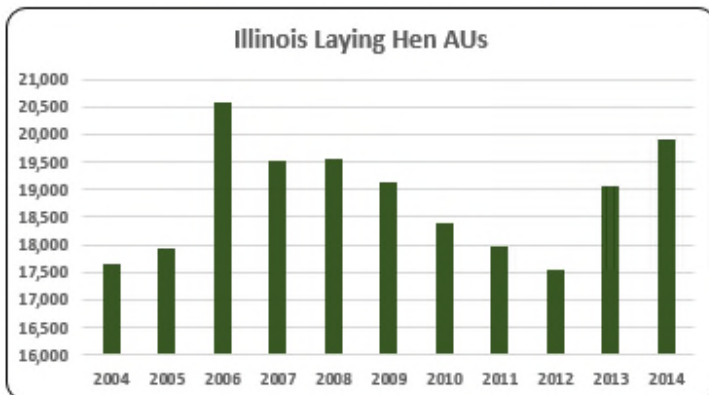
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).



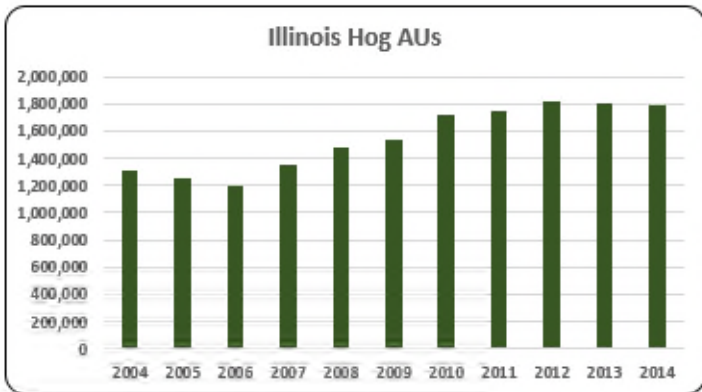
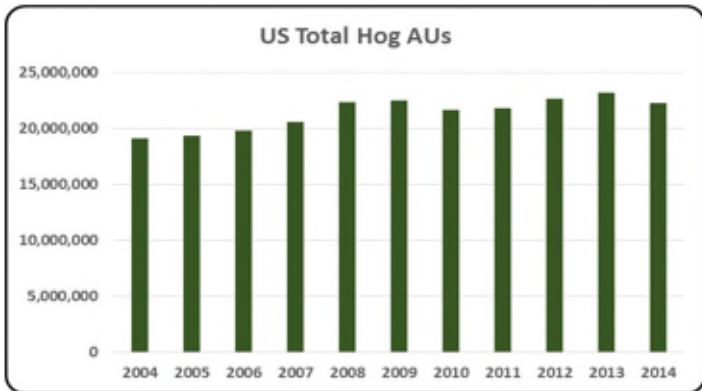
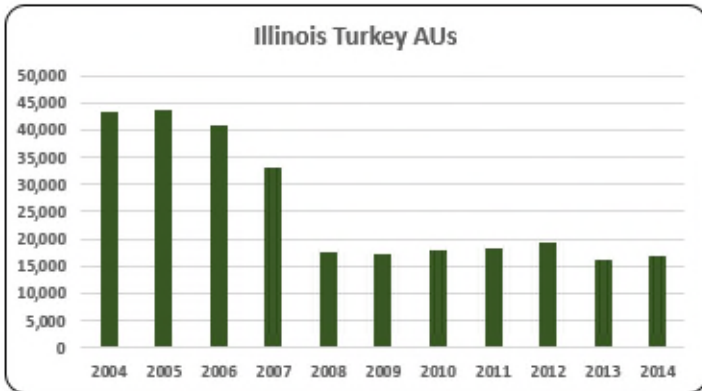
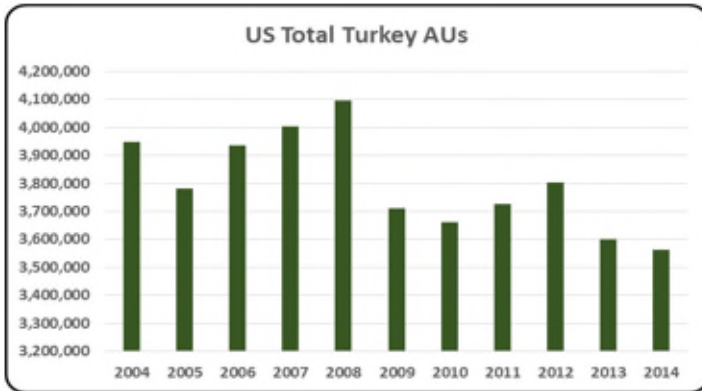
- There were 71,941 broiler AUs in Illinois in 2014 representing about 3% of all AUs in the state of Illinois. Overall numbers have been decreasing since 2010 (105,044).



- 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).



- There were 19,904 layer AUs in Illinois in 2014 or 0.80% of all AUs in the state. Layer AUs rose 4.5% in 2014 compared to the previous year reaching the second largest turkey AUs during the 2004-2014 period.

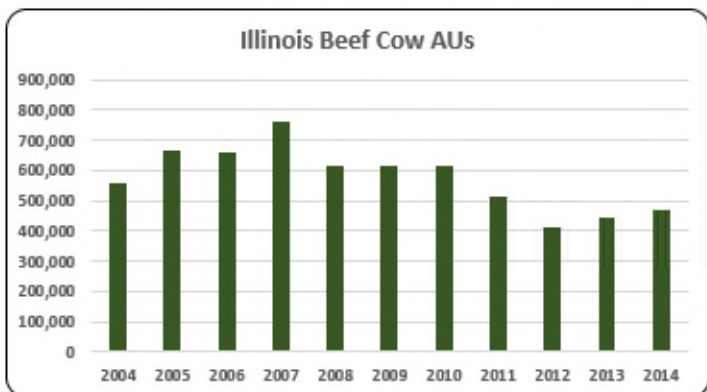
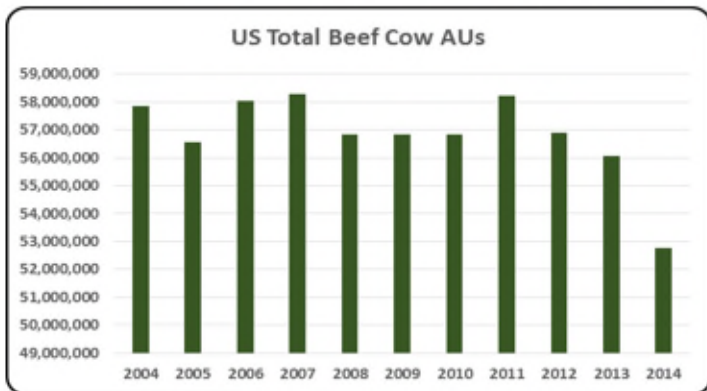
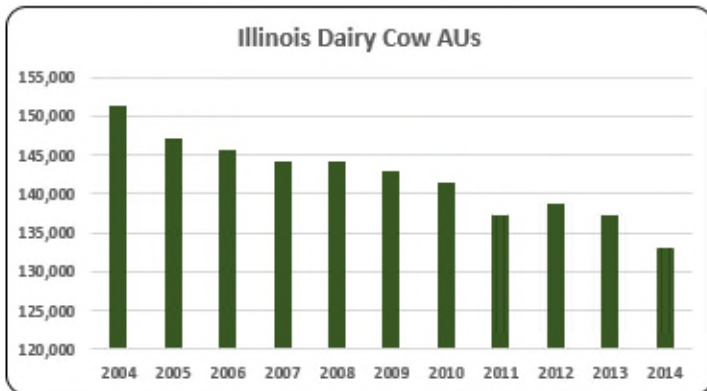
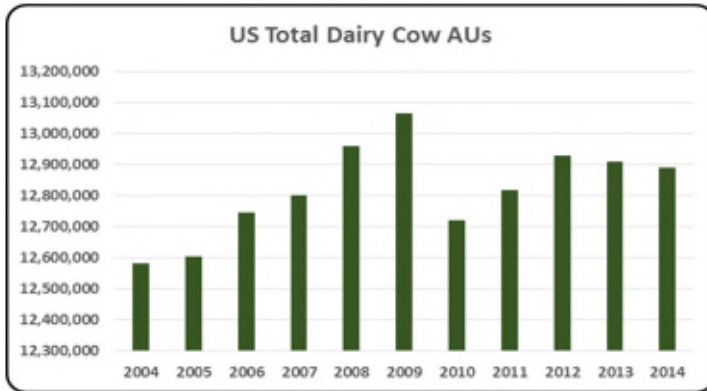


- From 2004 to 2014, the U.S. accounted for 50% of the world’s turkey production. However, in 2014 turkey AUs were the lowest of the decade at 3.5 million, decreasing 13% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade.

- The turkey industry in Illinois declined from 2006 (40,723 turkey AUs) to 2009 (17,295 turkey AUs). There were 16,999 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.

- About 72% (1,790.3 thousand) of all AUs in the state of Illinois were hog AUs in 2014 which represented at the same time 8.1% of all hog AUs in the U.S. (22,251.3 thousand). Hog AUs decreased 1.1% relative to the previous year, however, hog production has experienced an upward trend since 2007.



- 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.

- Illinois had an average of 142,036 dairy cow AUs from 2004 to 2014. Numbers have consistently decreased from 151,200 in 2004 to 133,000 in 2014, which was the lowest during this period.

- 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 second largest animal production in Illinois is beef cow production with 469,650 AUs in 2014. Beef cow AUs increased 5.9% year-over-year but overall numbers have been decreasing since 2007 (763,800). In 2014, beef cow AUs represented 0.89% of all beef cow AUs in the U.S.

Illinois Additional Information and Methodology

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

Illinois 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 Illinois'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 Illinois, \$2.031 to \$2.902 million in total economic activity, \$0.355 to \$0.529 in household wages and 9 to 12 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.0389	\$ 0.3554	8.6
	Hogs, Pigs, and Other	\$ 2.0307	\$ 0.3673	8.6
	Poultry and Eggs	\$ 2.9018	\$ 0.5291	11.7
	Dairy	\$ 2.2695	\$ 0.4277	10.7

Appendix

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Animal Units (AUs)	Beef Cattle AUs	554,700	663,150	661,650	763,800	612,600	612,600	612,600	512,280	413,100	443,400	469,650
	Hog and Pig AUs	1,312,200	1,246,650	1,198,050	1,357,350	1,473,750	1,541,100	1,713,900	1,744,650	1,822,500	1,810,350	1,790,250
	Broiler AUs	95,512	93,501	92,870	113,246	111,480	103,650	105,044	79,152	72,605	72,351	71,941
	Turkey AUs	43,500	43,730	40,723	33,218	17,657	17,295	18,015	18,337	19,512	16,276	16,999
	Egg Layer AUs	17,668	17,944	20,584	19,504	19,564	19,128	18,400	17,952	17,547	19,046	19,904
	Dairy AUs	151,200	147,000	145,600	144,200	144,200	142,800	141,400	137,200	138,600	137,200	133,000
	Total Animal Units	2,174,780	2,211,975	2,159,477	2,431,318	2,379,251	2,436,574	2,609,359	2,509,570	2,483,864	2,498,623	2,501,744
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 489,612	\$ 522,161	\$ 527,581	\$ 587,362	\$ 500,092	\$ 421,683	\$ 489,657	\$ 521,986	\$ 539,376	\$ 570,135	\$ 751,184
	Hogs and Pigs (\$1,000)	\$ 937,613	\$ 901,842	\$ 781,381	\$ 785,810	\$ 910,385	\$ 901,768	\$ 1,115,896	\$ 1,322,243	\$ 1,360,537	\$ 1,455,041	\$ 1,610,615
	Broilers (\$1,000)	\$ 80,334	\$ 76,095	\$ 58,805	\$ 85,193	\$ 87,678	\$ 75,947	\$ 79,938	\$ 70,429	\$ 72,327	\$ 88,113	\$ 92,433
	Turkeys (\$1,000)	\$ 37,514	\$ 39,904	\$ 43,416	\$ 42,997	\$ 23,848	\$ 15,994	\$ 21,427	\$ 24,032	\$ 28,298	\$ 18,635	\$ 31,201
	Eggs (\$1,000)	\$ 51,478	\$ 38,058	\$ 45,876	\$ 87,034	\$ 109,290	\$ 71,103	\$ 73,893	\$ 82,016	\$ 88,598	\$ 92,194	\$ 124,258
	Milk (\$1,000)	\$ 310,546	\$ 297,616	\$ 279,603	\$ 377,649	\$ 371,224	\$ 247,646	\$ 314,640	\$ 380,940	\$ 362,392	\$ 378,810	\$ 456,950
	Other	\$ 6,554	\$ 7,199	\$ 5,564	\$ 5,536	\$ 5,472	\$ 6,032	\$ 6,660	\$ 5,844	\$ 5,769	\$ 5,693	\$ 5,618
	Sheep and Lambs (\$1,000)	\$ 3,339	\$ 4,023	\$ 2,427	\$ 2,439	\$ 2,414	\$ 3,013	\$ 3,681	\$ 2,904	\$ 2,868	\$ 2,832	\$ 2,796
	Aquaculture (\$1,000)	\$ 3,215	\$ 3,176	\$ 3,137	\$ 3,097	\$ 3,058	\$ 3,019	\$ 2,979	\$ 2,940	\$ 2,900	\$ 2,861	\$ 2,822
Total (\$1,000)	\$ 1,913,651	\$ 1,882,875	\$ 1,742,226	\$ 1,971,581	\$ 2,007,989	\$ 1,740,173	\$ 2,102,111	\$ 2,407,490	\$ 2,457,297	\$ 2,608,621	\$ 3,072,259	

Ag Census Data Category	Animal Type	1997	2002	2007	2012	
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	7,391	6,178	7,296	6,600	
	Cattle feedlots (112112)	1,990	2,217	1,133	662	
	Dairy cattle and milk production (11212)	1,452	1,226	900	742	
	Hog and pig farming (1122)	3,369	1,693	1,259	871	
	Poultry and egg production (1123)	301	334	938	603	
	Sheep and goat farming (1124)	611	645	1,078	1,090	
	Animal aquaculture and other animal production (1125,1129)	2,567	3,295	4,186	4,150	
Value of Sales (\$1,000)	Cattle and Calves	584,737	624,976	808,487	984,466	
	Hogs and Pigs	1,067,018	844,360	1,105,271	1,519,514	
	Poultry and Eggs	98,025	83,807	163,507	136,876	
	Milk and Other Dairy Products	252,838	226,761	340,336	347,339	
	Aquaculture	2,871	2,282	4,011	5,425	
	Other (calculated)	26,424	22,511	31,080	24,054	
	Total	2,031,913	1,804,697	2,452,692	3,017,674	
Input Purchases	Livestock and poultry purchased	(Farms)	15,984	12,734	11,350	12,350
		\$1,000	334,161	411,546	588,949	689,855
	Breeding livestock purchased	(Farms)	n/a	6,918	6,443	6,746
		\$1,000	n/a	40,328	57,009	81,200
	Other livestock and poultry purchased	(Farms)	n/a	7,362	6,404	7,350
		\$1,000	n/a	371,218	531,940	608,656
	Feed purchased	(Farms)	27,101	24,652	23,374	24,338
	\$1,000	567,098	528,144	705,155	1,246,112	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
2014 Animal Agriculture	Cattle and Calves	\$ 1,531,589	\$ 266,971	6,461	\$ 67,624
	Hogs, Pigs, and Other	\$ 3,282,084	\$ 593,642	13,939	\$ 150,370
	Poultry and Eggs	\$ 719,334	\$ 131,160	2,900	\$ 33,223
	Dairy	\$ 1,037,048	\$ 195,438	4,884	\$ 49,504
	Total	\$ 6,570,055	\$ 1,187,211	28,184	\$ 300,720
Change from 2004 to 2014	Cattle and Calves	\$ 280,523	\$ 48,898	1,183	\$ 12,386
	Hogs, Pigs, and Other	\$ 879,232	\$ 159,030	3,734	\$ 40,282
	Poultry and Eggs	\$ 103,559	\$ 18,882	418	\$ 4,783
	Dairy	\$ 153,788	\$ 28,982	724	\$ 7,341
	Total	\$ 1,417,101	\$ 255,792	6,059	\$ 64,792
	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
RIMS II Multipliers	Cattle and Calves	\$ 2.0389	\$ 0.3554	8.6	
	Hogs, Pigs, and Other	\$ 2.0307	\$ 0.3673	8.6	
	Poultry and Eggs	\$ 2.9018	\$ 0.5291	11.7	
	Dairy	\$ 2.2695	\$ 0.4277	10.7	
Tax Rates	Federal effective income tax rate			12.7%	
	Federal Social Security tax rate			7.7%	
	State Effective Rate			5.0%	
	Total			25.3%	

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.