

Economic Analysis of Animal Agriculture 2005-2015

ILLINOIS

A Report for
United Soybean Board



September 2016



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Illinois Executive Summary

The use of soybean meal as a key feed ingredient is an important part of Illinois 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 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 2015 animal agriculture contributed:

- \$5.3 billion in economic output
- 23,009 jobs
- \$1.2 billion in earnings
- \$298.0 million in income taxes paid at local, state, and federal levels
- \$321.3 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Illinois has increased economic output by over \$550.1 million, boosted household earnings by \$120.2 million, contributed 2,322 additional jobs and paid \$30.4 million in additional tax revenues.

Illinois's animal agriculture consumed almost 855.3 thousand tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Hogs (629.9 thousand tons)
- Broilers (73.5 thousand tons)
- Dairy Cows (71.9 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. It is expected that 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 2015, Illinois's animal agriculture contributed the following to the economy:

- About \$5.3 billion in economic output
- \$1.2 billion in household earnings
- 23,009 jobs
- \$298.0 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:

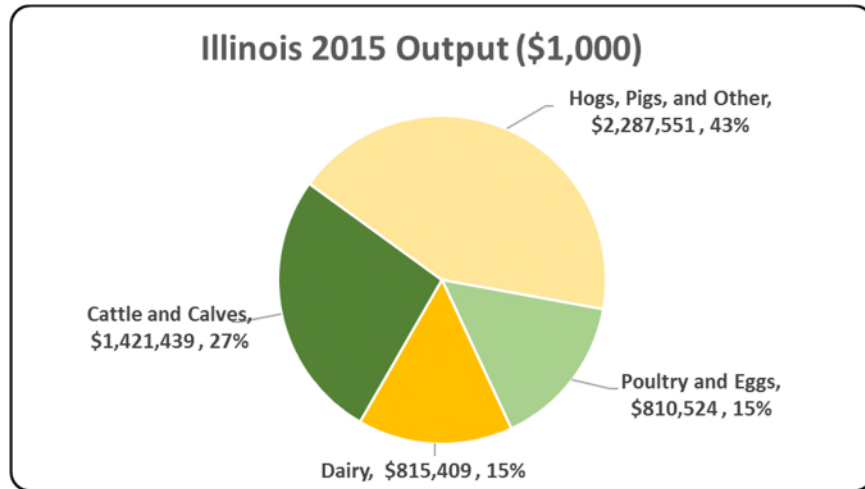
- Increased economic output by \$550.1 million
- Boosted household earnings by \$120.2 million
- Added 2,322 jobs
- Paid an additional \$30.4 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2015	Change 2005-2015	% Change 2005-2015
Output (\$1,000)	\$ 5,334,924	\$ 550,147	11.50%
Earnings (\$1,000)	\$ 1,176,562	\$ 120,156	11.37%
Employment (Jobs)	23,009	2,322	11.22%
Income Taxes Paid (\$1,000)	\$ 298,023	\$ 30,435	11.37%
Property Taxes Paid in 2012 (\$1,000)	\$ 321,273		

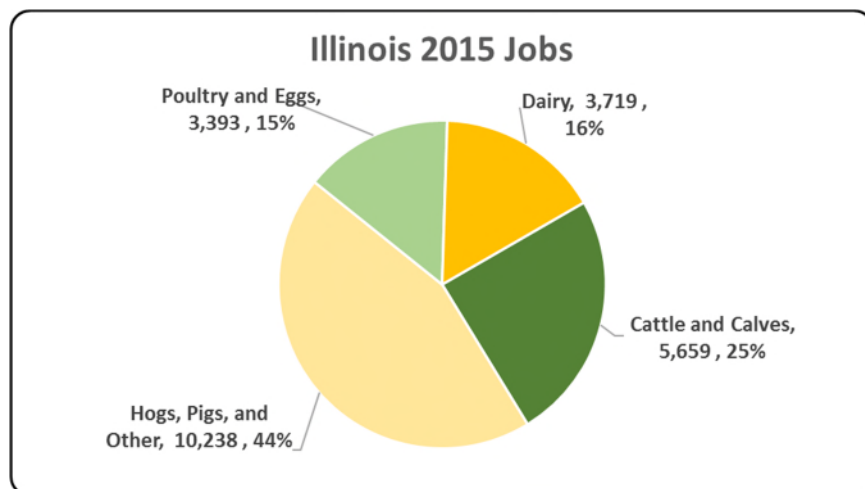
Illinois Output

“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 \$5.3 billion.



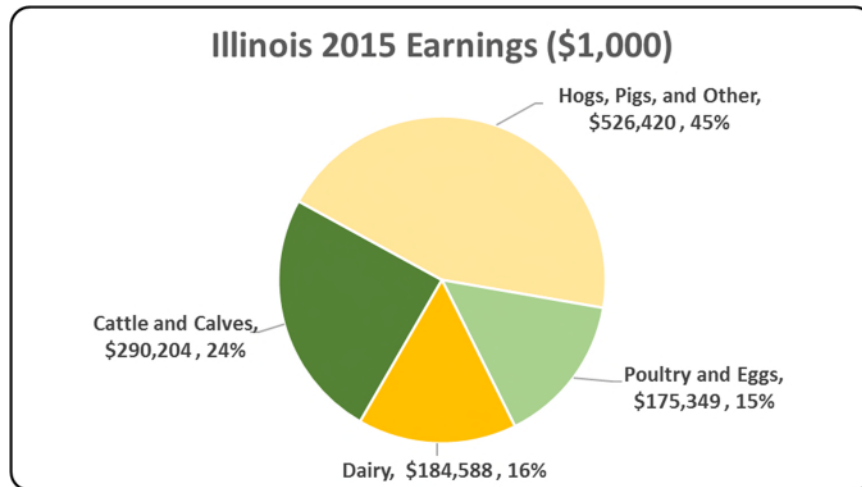
Illinois Jobs

“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 23,009 jobs within and outside of animal agriculture.



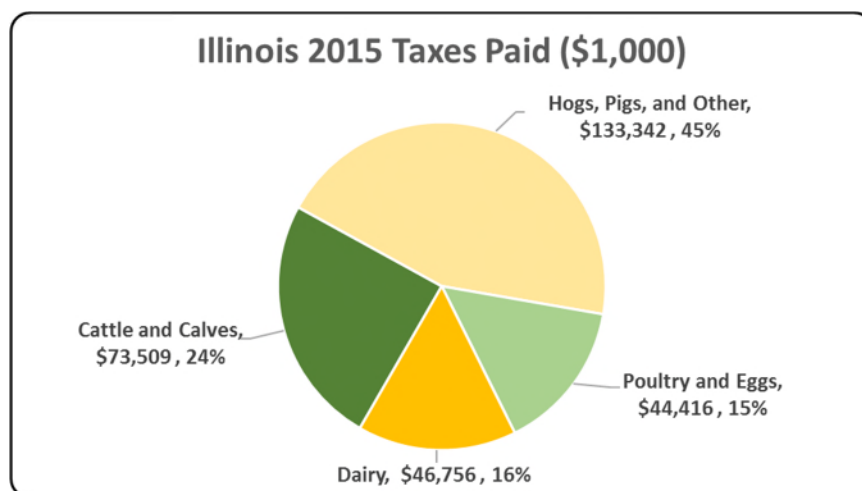
Illinois Earnings

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 2015.



Illinois Taxes Paid by Animal Agriculture

Illinois's animal agriculture is also a source of tax revenue. In 2015, the state's animal agriculture industry paid about \$298.0 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.



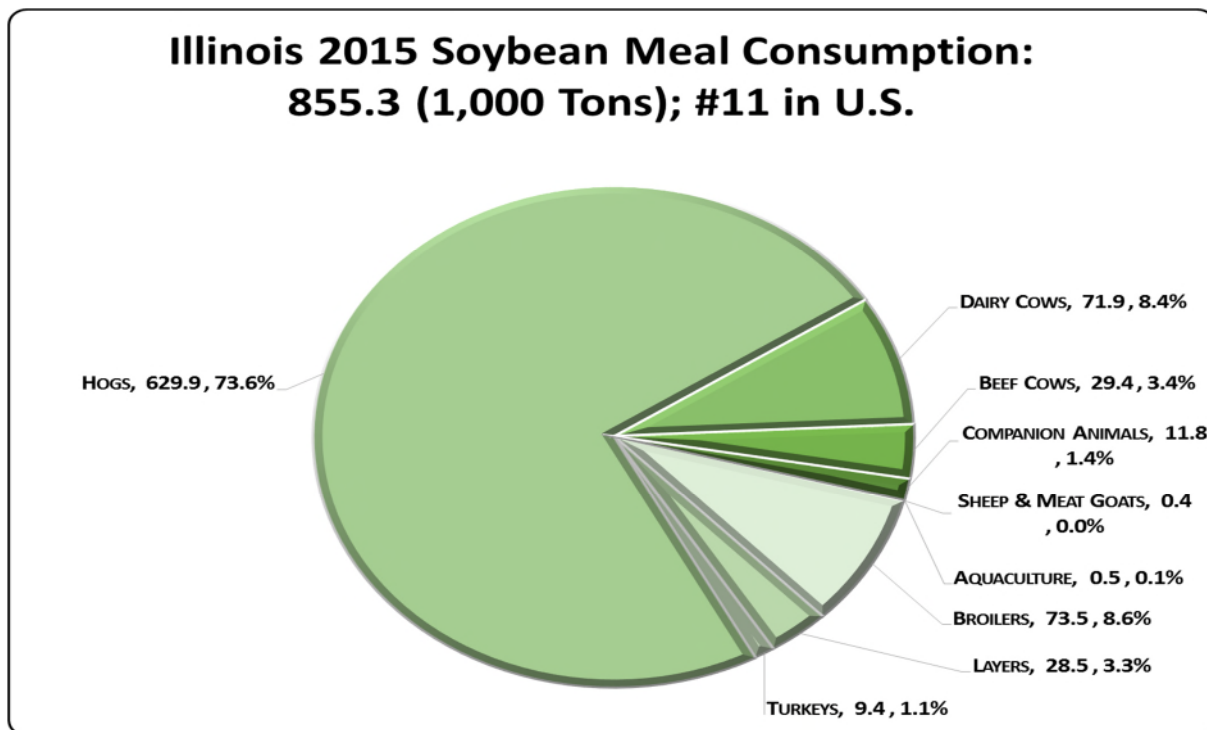
Illinois Animal Agriculture Soybean Meal Consumption

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

Illinois’s animal agriculture consumed almost 855.3 thousand tons of soybean meal in 2015, 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 (629.9 thousand tons)
- Broilers (73.5 thousand tons)
- Dairy Cows (71.9 thousand tons)

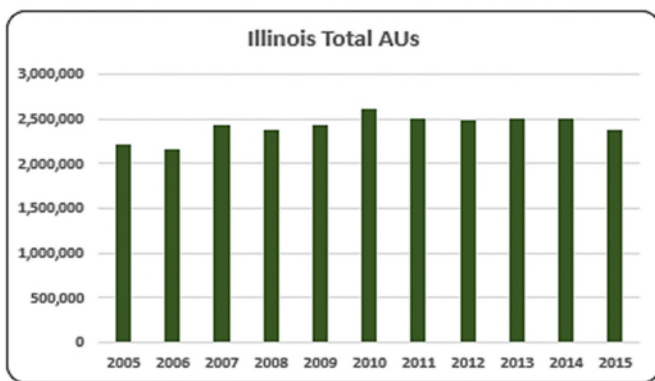
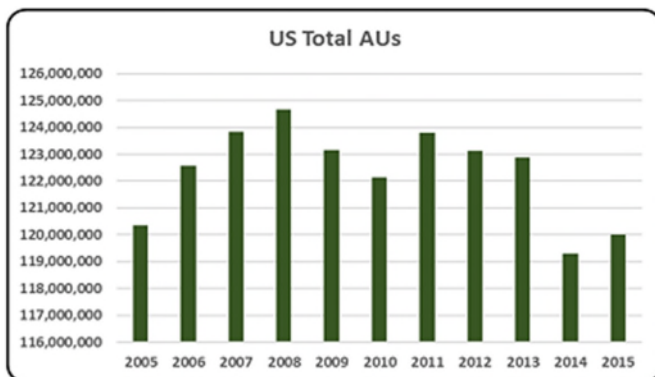


Illinois Animal Unit (AU) Trends

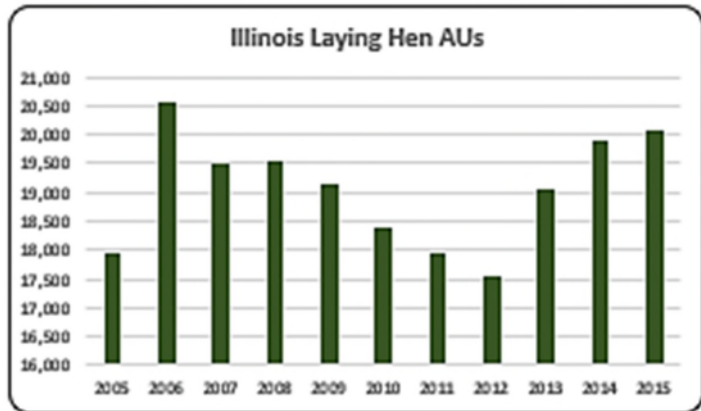
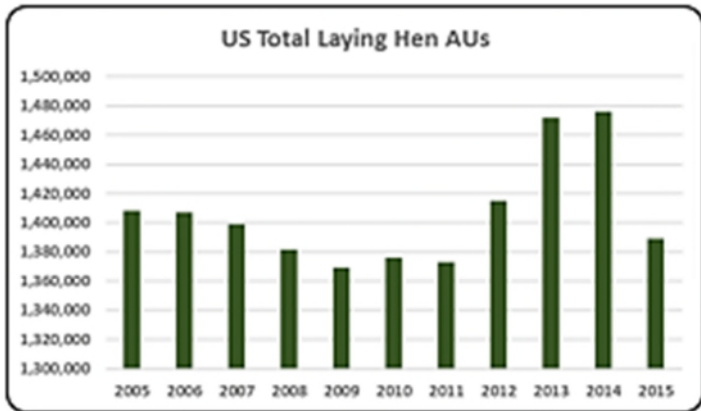
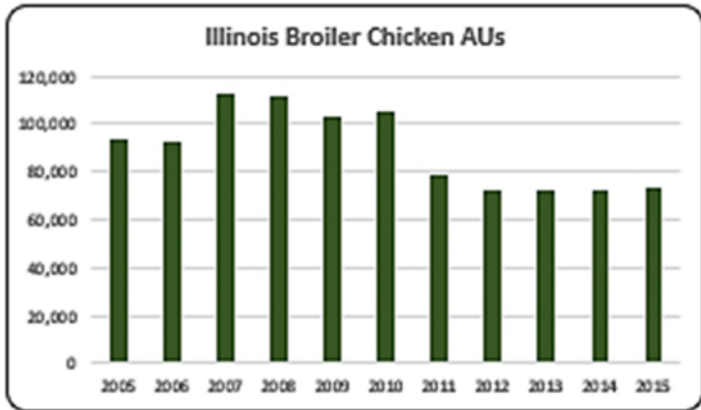
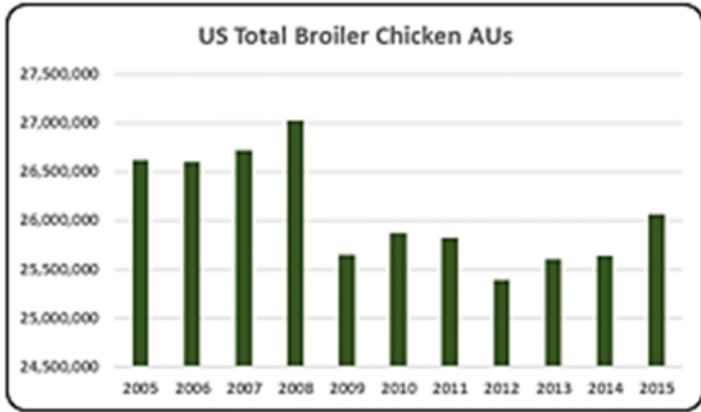
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Illinois. Due to this reality, using a single year as a measure of the presence and strength of a sector can 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 2015 were: Hogs (1.7 million AUs), Beef Cows (413,250 AUs), and Dairy Cows (131,600 AUs). Total animal units in Illinois during 2015 were almost 2.4 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.
- The number of AUs in Illinois in 2015 reached 2.4 million comprising 2.0% of all AUs in the U.S. On average, there were 2.4 million between 2005 and 2015.

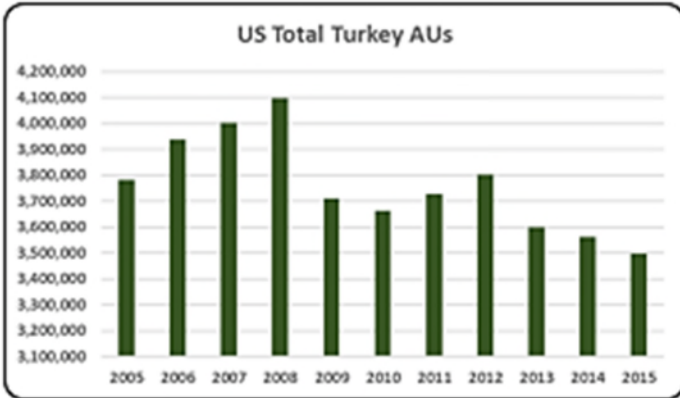


- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2005 to 2015, broiler chicken AUs were about 26.0 million. In 2015, AUs rebounded 3% from the low AUs numbers in 2012 (25.4 million AUs).

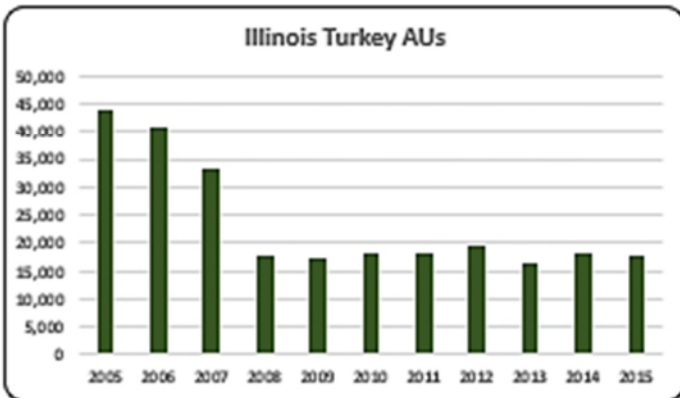
- There were 73,798 broiler AUs in Illinois in 2015 representing about 3% of all AUs in the state of Illinois. Overall numbers have decreased since 2010 (105,044).

- 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.

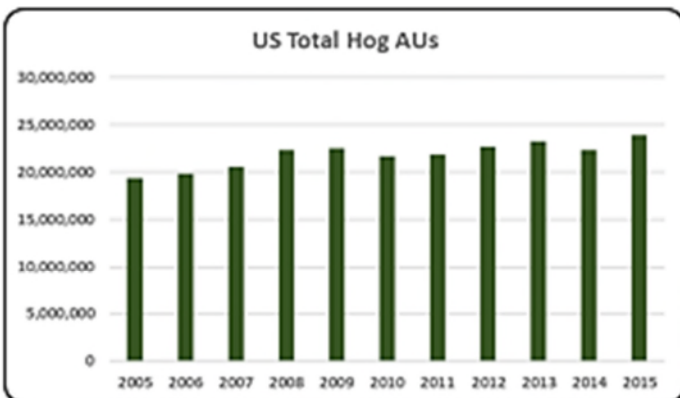
- There were 20,054 layer AUs in Illinois in 2015 or 0.84% of all AUs in the state. The average layer AUs in the 2005-2015 period was at 19,057 AUs.



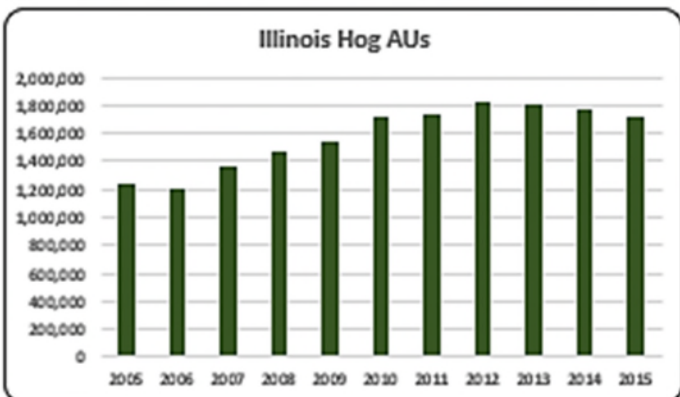
- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.



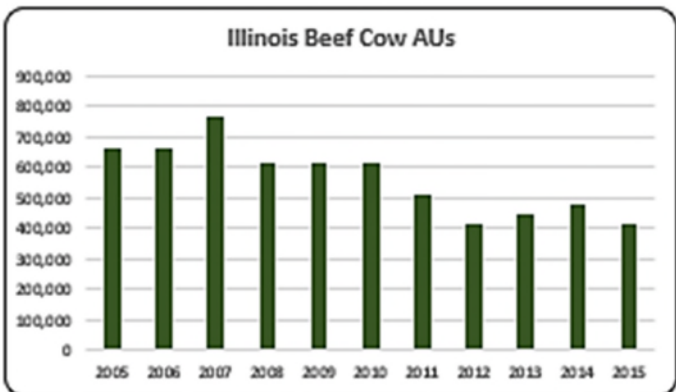
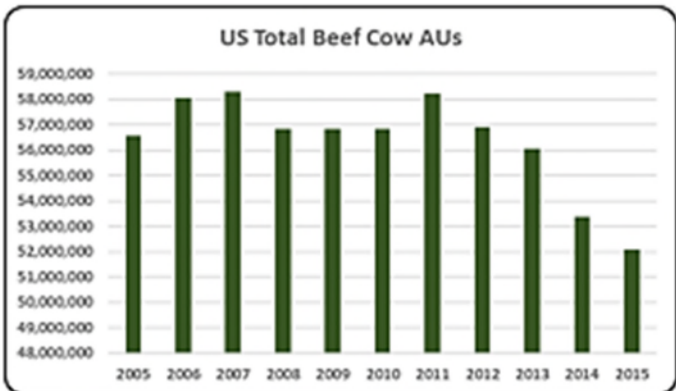
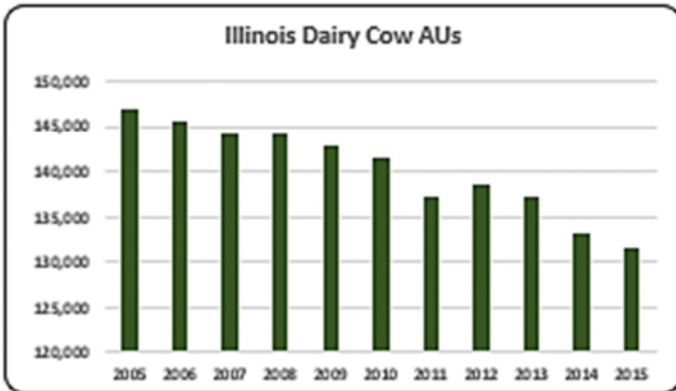
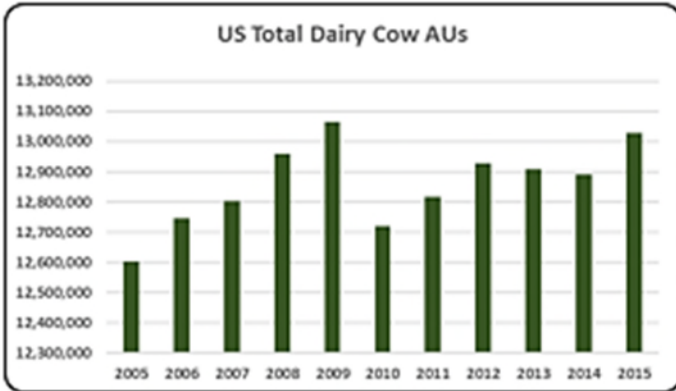
- The turkey industry in Illinois declined from 2006 (40,723 turkey AUs) to 2009 (17,295 turkey AUs). There were 17,580 turkey AUs in 2015.



- 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.



- About 72% (1.7 million) of all AUs in the state of Illinois were hog AUs in 2015 which represented at the same time 7.2% of all hog AUs in the U.S. (23.96 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.
- Illinois had an average of 140,255 dairy cow AUs from 2005 to 2015. Numbers have consistently decreased from 147,000 in 2005 to 131,600 in 2015, which is the lowest during this period.
- 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.
- The second largest animal sector in Illinois is beef cow production with 413,250 AUs in 2015. Beef cow AUs decreased 46% since the record of the decade in 2007 (763,800).

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 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 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 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 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 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.

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, \$1.87 to \$2.77 million in total economic activity, \$0.42 to \$0.60 in household wages and 8 to 12 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.076	\$ 0.424	8.3
	Hogs, Pigs, and Other	\$ 1.872	\$ 0.431	8.4
	Poultry and Eggs	\$ 2.771	\$ 0.600	11.6
	Dairy	\$ 2.435	\$ 0.551	11.1

Appendix

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Animal Units (AUs)	Beef Cattle AUs		663,150	661,650	763,800	612,600	612,600	612,600	512,280	413,100	443,400	481,650	413,250
	Hog and Pig AUs		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	1,779,900	1,719,300
	Broiler AUs		93,501	92,870	113,246	111,480	103,650	105,044	79,152	72,605	72,351	71,941	73,798
	Turkey AUs		43,730	40,723	33,218	17,657	17,295	18,015	18,337	19,512	16,276	17,968	17,580
	Egg Layer AUs		17,944	20,584	19,504	19,564	19,128	18,400	17,952	17,547	19,041	19,904	20,054
	Dairy AUs		147,000	145,600	144,200	144,200	142,800	141,400	137,200	138,600	137,200	133,000	131,600
	Total Animal Units		2,211,975	2,159,477	2,431,318	2,379,251	2,436,574	2,609,359	2,509,570	2,483,864	2,498,619	2,504,363	2,375,583
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$	522,161	\$ 527,581	\$ 587,362	\$ 500,092	\$ 421,683	\$ 489,657	\$ 521,986	\$ 539,376	\$ 570,135	\$ 751,184	\$ 684,767
	Hogs and Pigs (\$1,000)	\$	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	\$ 1,216,457
	Broilers (\$1,000)	\$	78,572	\$ 60,869	\$ 87,397	\$ 89,288	\$ 77,036	\$ 80,505	\$ 70,482	\$ 72,345	\$ 88,151	\$ 92,477	\$ 80,678
	Turkeys (\$1,000)	\$	39,512	\$ 43,003	\$ 42,595	\$ 21,684	\$ 19,749	\$ 24,851	\$ 27,640	\$ 31,956	\$ 25,303	\$ 28,631	\$ 30,487
	Eggs (\$1,000)	\$	38,058	\$ 45,876	\$ 87,034	\$ 109,290	\$ 71,103	\$ 73,893	\$ 82,016	\$ 88,598	\$ 92,194	\$ 124,361	\$ 181,327
	Milk (\$1,000)	\$	297,616	\$ 279,603	\$ 377,649	\$ 364,952	\$ 247,646	\$ 314,640	\$ 380,940	\$ 362,392	\$ 378,810	\$ 456,950	\$ 334,884
	Other	\$	7,199	\$ 5,564	\$ 5,536	\$ 5,472	\$ 6,032	\$ 6,660	\$ 5,942	\$ 5,903	\$ 5,864	\$ 5,825	\$ 5,787
	Sheep and Lambs (\$1,000)	\$	4,023	\$ 2,427	\$ 2,439	\$ 2,414	\$ 3,013	\$ 3,681	\$ 3,002	\$ 3,002	\$ 3,003	\$ 3,004	\$ 3,004
	Aquaculture (\$1,000)	\$	3,176	\$ 3,137	\$ 3,097	\$ 3,058	\$ 3,019	\$ 2,979	\$ 2,940	\$ 2,900	\$ 2,861	\$ 2,822	\$ 2,782
	Total (\$1,000)	\$	1,884,961	\$ 1,743,878	\$ 1,973,383	\$ 2,001,163	\$ 1,745,017	\$ 2,106,102	\$ 2,411,248	\$ 2,461,107	\$ 2,615,498	\$ 3,070,043	\$ 2,534,387

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) <i>n/a</i>	6,918	6,443	6,746	
		\$1,000	<i>n/a</i>	40,328	57,009	81,200
	Other livestock and poultry purchased	(Farms) <i>n/a</i>	7,362	6,404	7,350	
		\$1,000	<i>n/a</i>	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)
2015 Animal Agriculture	Cattle and Calves		\$ 1,421,439	\$ 290,204	5,659	\$ 73,509
	Hogs, Pigs, and Other		\$ 2,287,551	\$ 526,420	10,238	\$ 133,342
	Poultry and Eggs		\$ 810,524	\$ 175,349	3,393	\$ 44,416
	Dairy		\$ 815,409	\$ 184,588	3,719	\$ 46,756
	Total		\$ 5,334,924	\$ 1,176,562	23,009	\$ 298,023
Change from 2005 to 2015	Cattle and Calves		\$ 106,011	\$ 21,643	422	\$ 5,482
	Hogs, Pigs, and Other		\$ 222,771	\$ 51,265	997	\$ 12,985
	Poultry and Eggs		\$ 285,413	\$ 61,746	1,195	\$ 15,640
	Dairy		\$ (64,048)	\$ (14,499)	(292)	\$ (3,673)
	Total		\$ 550,147	\$ 120,156	2,322	\$ 30,435
RIMS II Multipliers	Animal Type		Output(\$)	Earnings (\$)	Employment (Jobs)	
	Cattle and Calves		\$ 2.076	\$ 0.424	8.3	
	Hogs, Pigs, and Other		\$ 1.872	\$ 0.431	8.4	
	Poultry and Eggs		\$ 2.771	\$ 0.600	11.6	
	Dairy		\$ 2.435	\$ 0.551	11.1	
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.