

Economic Analysis of Animal Agriculture 2005-2015

IOWA

**A Report for
United Soybean Board**



September 2016



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Iowa Executive Summary

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

- \$25.5 billion in economic output
- 114,886 jobs
- \$5.5 billion in earnings
- \$1.6 billion in income taxes paid at local, state, and federal levels
- \$437.3 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Iowa has increased economic output by over \$10.0 billion, boosted household earnings by \$2.2 billion, contributed 44,538 additional jobs and paid \$607.9 million in additional tax revenues.

Iowa's animal agriculture consumed almost 3.2 million tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Hogs (2.4 million tons)
- Egg-Laying Hens (322.8 thousand tons)
- Beef Cows (161.7 thousand tons)

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

Iowa Economic Impact of Animal Agriculture

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

- About \$25.5 billion in economic output
- \$5.5 billion in household earnings
- 114,886 jobs
- \$1.6 billion in income taxes

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

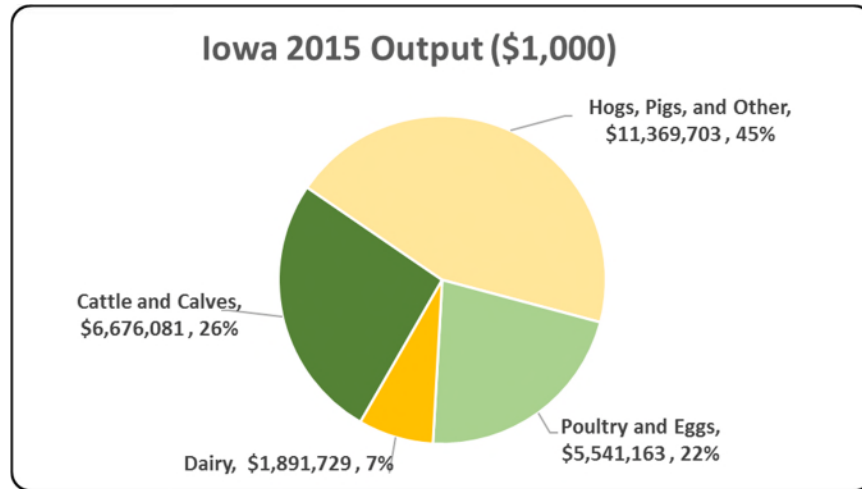
- Increased economic output by \$10.0 billion
- Boosted household earnings by \$2.2 billion
- Added 44,538 jobs
- Paid an additional \$607.9 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2015	Change 2005-2015	% Change 2005-2015
Output (\$1,000)	\$ 25,478,676	\$ 9,995,515	64.56%
Earnings (\$1,000)	\$ 5,538,130	\$ 2,151,809	63.54%
Employment (Jobs)	114,886	44,538	63.31%
Income Taxes Paid (\$1,000)	\$ 1,564,522	\$ 607,886	63.54%
Property Taxes Paid in 2012 (\$1,000)	\$ 437,312		

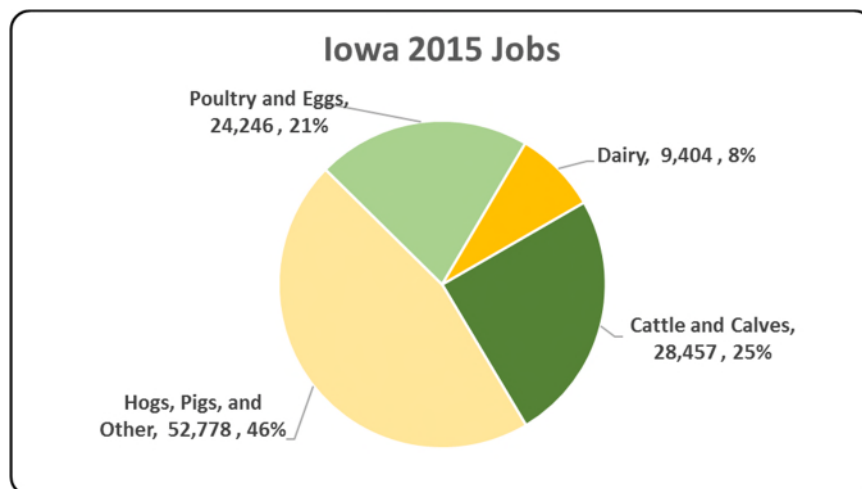
Iowa Output

“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 Iowa economy. Animal agriculture’s impact on Iowa total economic output is about \$25.5 billion.



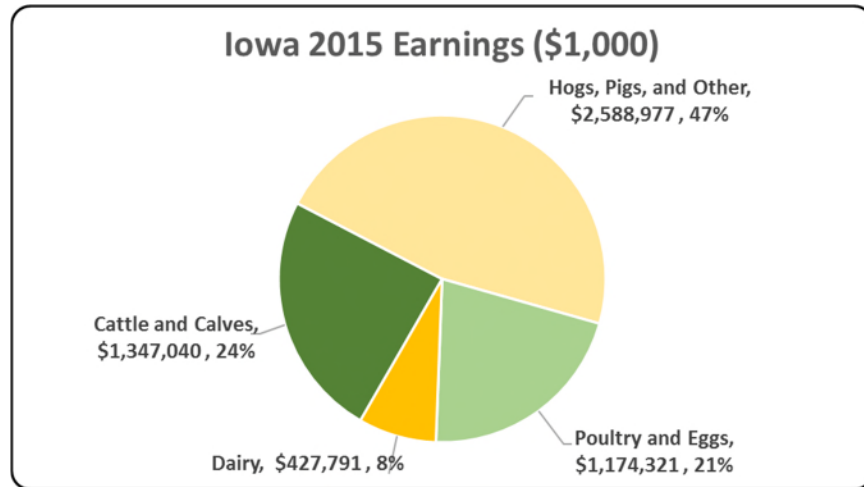
Iowa Jobs

“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 Iowa in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Iowa total jobs, contributing 114,886 jobs within and outside of animal agriculture.



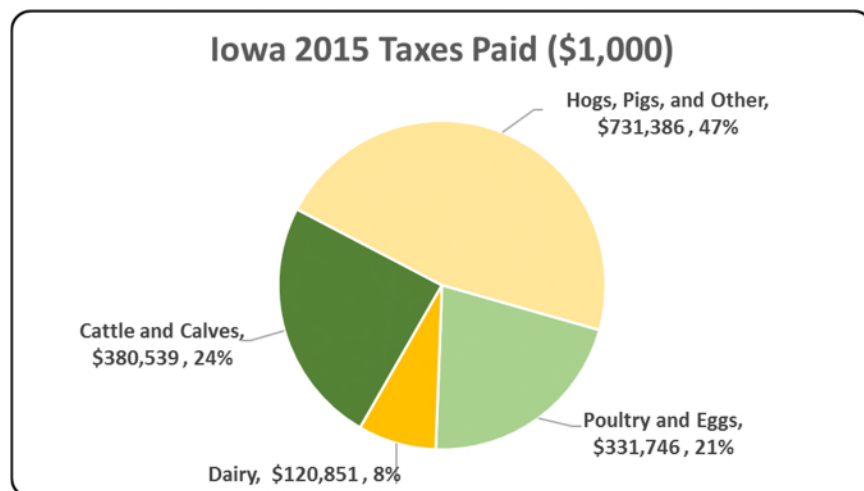
Iowa Earnings

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 Iowa economy in terms of earnings. Iowa’s animal agriculture contributed about \$5.5 billion to household earnings in 2015.



Iowa Taxes Paid by Animal Agriculture

Iowa’s animal agriculture is also a significant source of tax revenue. In 2015, the state’s animal agriculture industry paid about \$1.6 billion in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$437.3 million in property taxes paid by all of Iowa agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



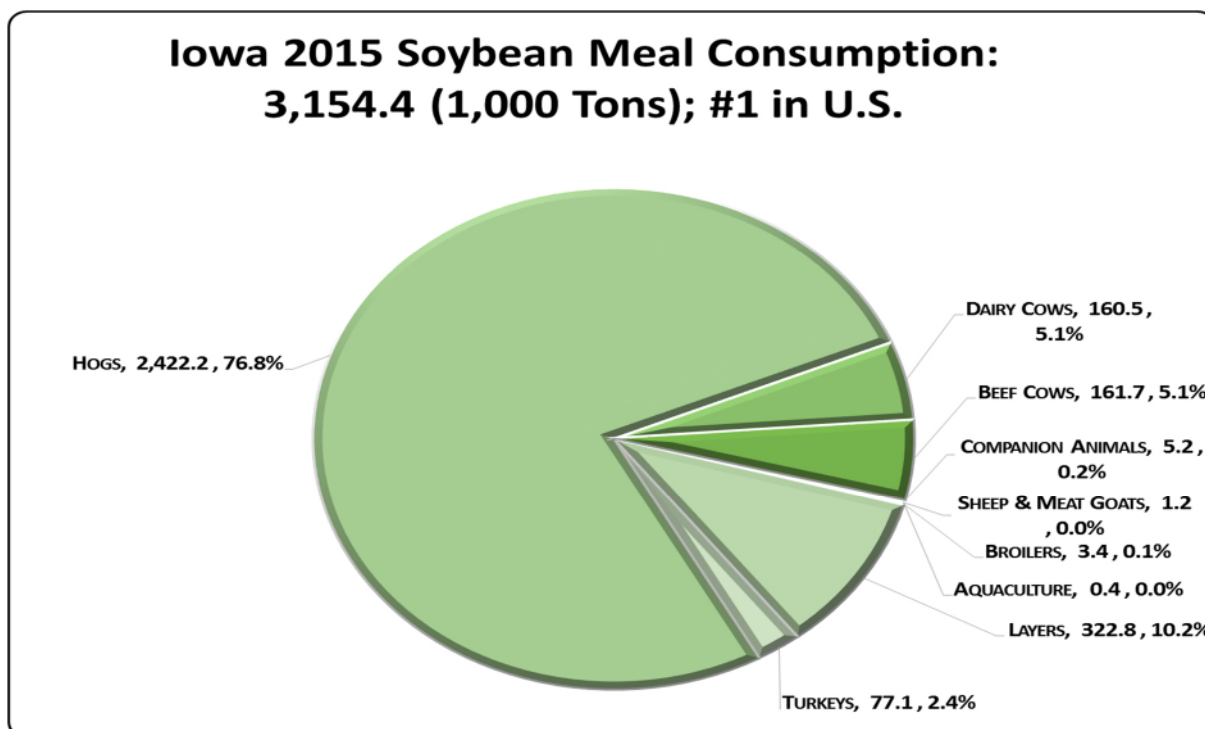
Iowa Animal Agriculture Soybean Meal Consumption

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.

Iowa's animal agriculture consumed almost 3.1 million tons of soybean meal in 2015, placing the state as #1 in the nation in terms of soybean meal consumption (see figure below). SBM consumption by egg laying hens in Iowa was estimated to be down about 45.6 million tons from 2014 due to the losses from avian influenza. The three segments of animal agriculture that led the state in estimated soybean meal consumption are:

- Hogs (2.4 million tons)
- Egg-Laying Hens (322.8 thousand tons)
- Beef Cows (161.7 thousand tons)

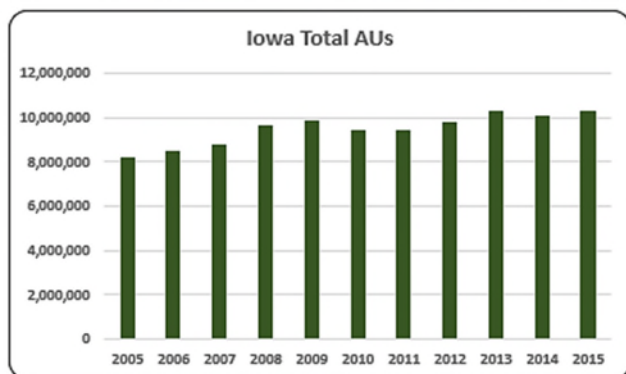
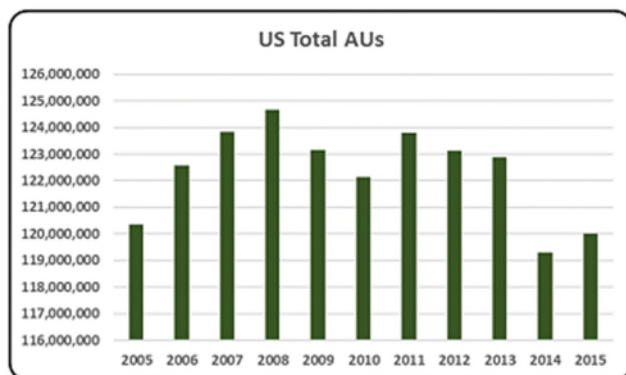


Iowa Animal Unit (AU) Trends

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 Iowa. 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 Iowa and to give perspective on Iowa'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.

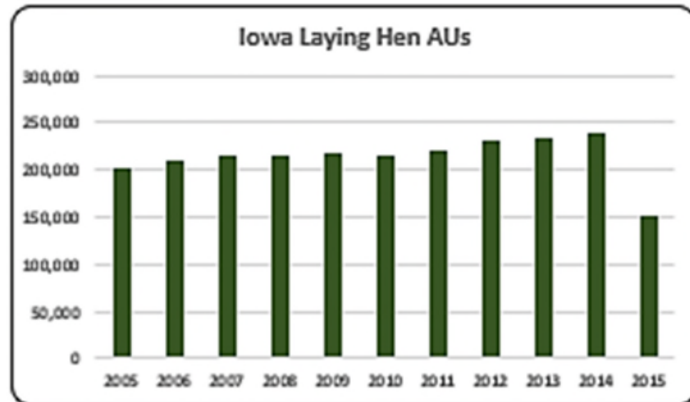
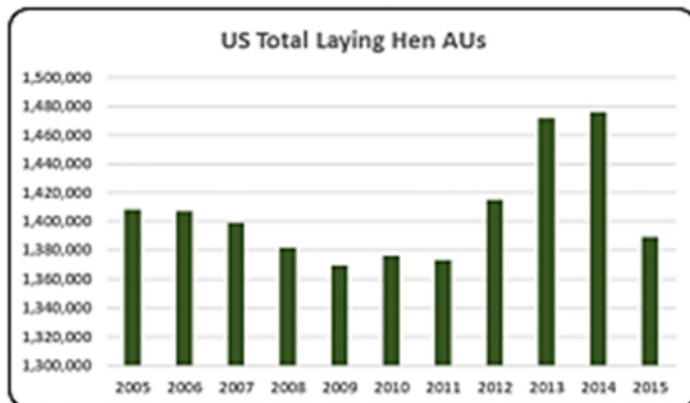
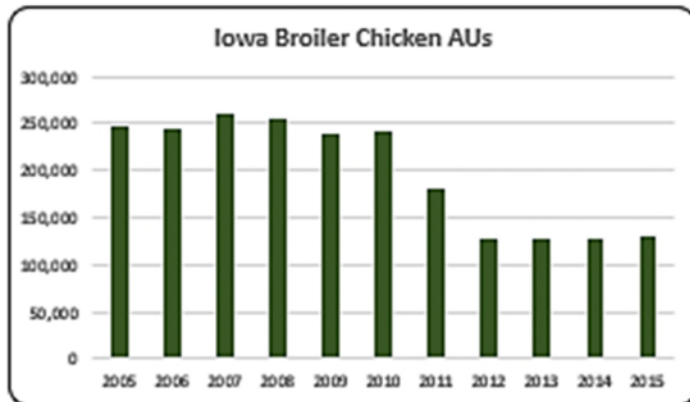
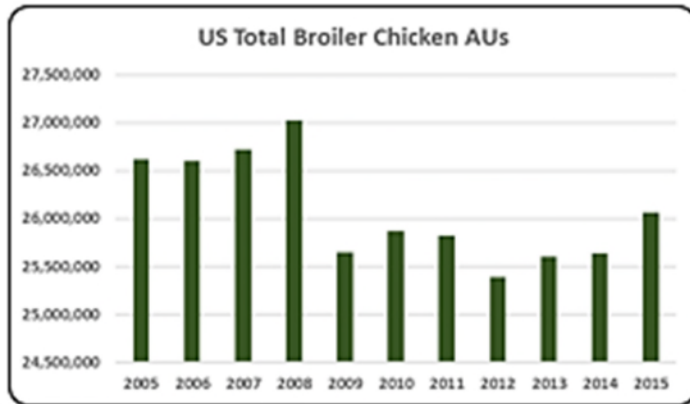
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Iowa, the largest three segments of animal agriculture in terms of AUs during 2015 were: Hogs (7.0 million AUs), Beef Cows (2.6 million AUs), and Dairy Cows (294,000 AUs). Total animal units in Iowa during 2015 were 10.3 million AUs.



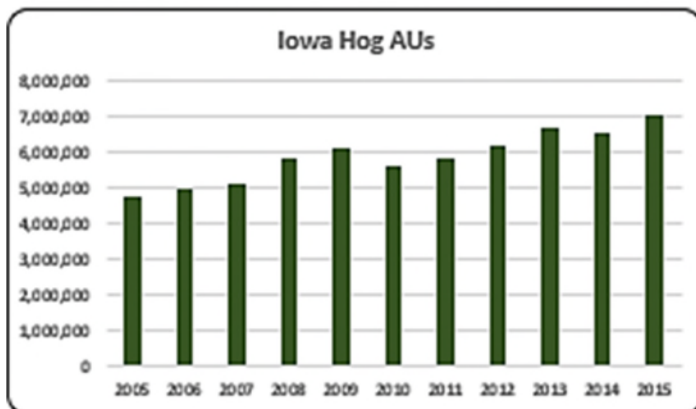
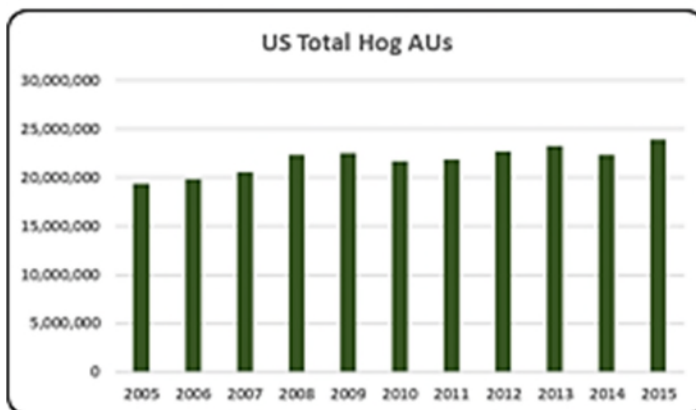
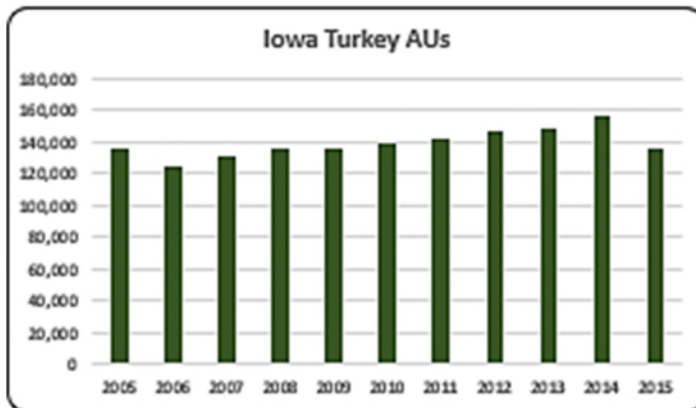
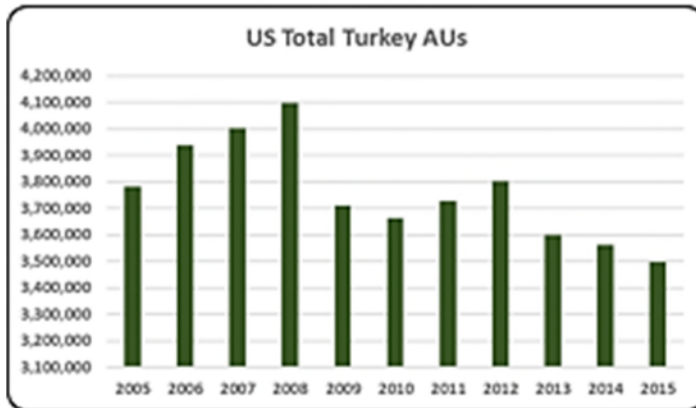
reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2005-15 time period, total AUs in the nation peaked in 2008.

- There were 10.3 million AUs in the state of Iowa in 2015 which accounts for 8.6% of all AUs in the U.S.

- Overall U.S. total AUs have varied from 2005 to 2015. In 2014 AUs were at an all-time low



- 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 numbers have been decreasing in Iowa from 246,077 AUs in 2005 to 130,537 AUs in 2015.
- On average, the layer AUs during 2005-2015 were 1.4 million. In 2015 layer AUs were 1.3 million, down 6% from the 2014 decade high (1.4 million AUs). This drastic decrease in 2015 was due to the losses in major egg laying states from the avian influenza outbreak.
- Iowa housed 11.0% (152,194) of all layer AUs in the country in 2015. Layers AUs have decreased significantly 36% from the previous year due to the avian influenza outbreak (239,577).

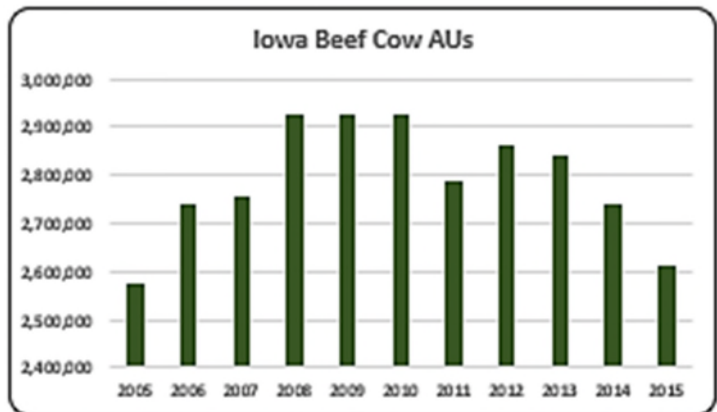
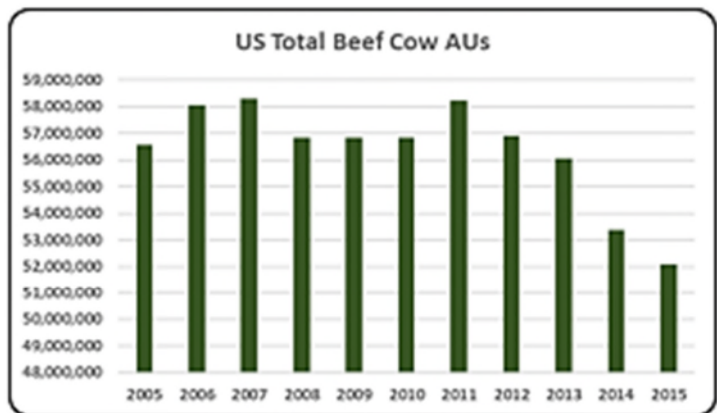
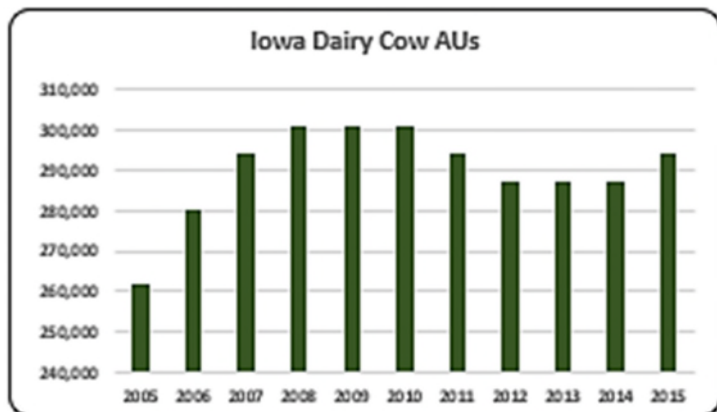
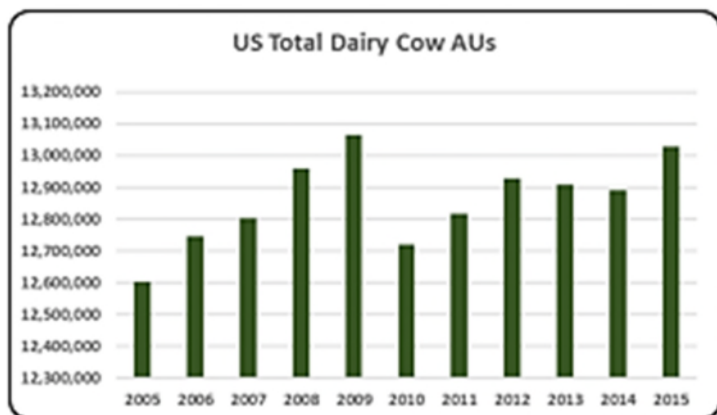


- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.

- Over 3.9% of all turkey AUs in the U.S. in 2015 were in Iowa. In 2015 Iowa's turkey AUs were at 135,310 which was down slightly from the trend due to the losses from avian influenza.

- 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.

- Iowa is the number one hog producer in the country with nearly 7.0 million hog AUs in 2015. About 29.2% of all hog AUs in the U.S. in 2015 were in Iowa.



- 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.

- Iowa's dairy cow AUs averaged 289,800 over the last decade, but numbers are not as high as they were in 2010.

- 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.

- Beef cow AUs make up 25.3% of all AUs in Iowa. In 2015 there were 2.6 million beef cow AUs in Iowa.

Iowa Additional Information and Methodology

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

Iowa 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 Iowa’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 Iowa, \$1.72 to \$2.82 million in total economic activity, \$0.39 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	\$ 2.360	\$ 0.476	10.1
	Hogs, Pigs, and Other	\$ 1.722	\$ 0.392	8.0
	Poultry and Eggs	\$ 2.822	\$ 0.598	12.3
	Dairy	\$ 2.259	\$ 0.511	11.2

Appendix

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Animal Units (AUs)	Beef Cattle AUs	2,576,700	2,738,700	2,756,700	2,924,700	2,924,700	2,924,700	2,785,500	2,861,100	2,841,900	2,740,875	2,613,225
	Hog and Pig AUs	4,758,300	4,940,700	5,134,950	5,820,300	6,069,150	5,607,000	5,823,450	6,155,250	6,682,800	6,530,250	6,992,400
	Broiler AUs	246,077	244,415	260,465	256,404	238,395	241,602	182,049	128,427	127,978	127,252	130,537
	Turkey AUs	135,713	123,678	131,363	135,874	135,542	138,972	142,416	146,077	148,450	156,433	135,310
	Egg Layer AUs	201,400	208,656	216,536	214,872	218,700	214,856	221,652	230,832	234,519	239,577	152,194
	Dairy AUs	261,800	280,000	294,000	301,000	301,000	301,000	294,000	287,000	287,000	287,000	294,000
	Total Animal Units	8,179,989	8,536,149	8,794,015	9,653,149	9,887,487	9,428,130	9,449,067	9,808,687	10,322,647	10,081,387	10,317,666
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 1,350,505	\$ 1,387,461	\$ 1,445,594	\$ 1,601,554	\$ 1,416,653	\$ 1,692,657	\$ 1,941,155	\$ 2,201,647	\$ 2,273,750	\$ 2,854,242	\$ 2,828,728
	Hogs and Pigs (\$1,000)	\$ 3,617,637	\$ 3,417,443	\$ 3,632,366	\$ 4,029,267	\$ 3,582,445	\$ 4,503,113	\$ 5,926,789	\$ 6,174,367	\$ 6,890,501	\$ 8,017,968	\$ 6,584,559
	Broilers (\$1,000)	\$ 206,787	\$ 160,196	\$ 201,012	\$ 205,362	\$ 177,184	\$ 185,162	\$ 162,108	\$ 127,967	\$ 155,925	\$ 163,577	\$ 142,706
	Turkeys (\$1,000)	\$ 130,289	\$ 122,075	\$ 141,828	\$ 202,369	\$ 210,841	\$ 231,442	\$ 250,911	\$ 270,053	\$ 284,786	\$ 320,152	\$ 286,893
	Eggs (\$1,000)	\$ 335,318	\$ 406,865	\$ 824,806	\$ 1,117,850	\$ 755,830	\$ 832,528	\$ 947,998	\$ 1,062,683	\$ 1,166,457	\$ 1,404,761	\$ 1,533,821
	Milk (\$1,000)	\$ 615,825	\$ 536,380	\$ 817,098	\$ 783,660	\$ 567,732	\$ 716,430	\$ 886,215	\$ 866,496	\$ 944,435	\$ 1,143,162	\$ 837,493
	Other	\$ 31,513	\$ 26,590	\$ 28,369	\$ 26,363	\$ 23,436	\$ 27,044	\$ 23,838	\$ 22,872	\$ 21,906	\$ 20,940	\$ 19,973
	Sheep and Lambs (\$1,000)	\$ 30,044	\$ 24,953	\$ 26,564	\$ 24,391	\$ 21,296	\$ 24,736	\$ 21,362	\$ 20,228	\$ 19,095	\$ 17,961	\$ 16,827
	Aquaculture (\$1,000)	\$ 1,469	\$ 1,637	\$ 1,805	\$ 1,972	\$ 2,140	\$ 2,308	\$ 2,476	\$ 2,643	\$ 2,811	\$ 2,979	\$ 3,147
	Total (\$1,000)	\$ 6,287,874	\$ 6,057,010	\$ 7,091,073	\$ 7,966,425	\$ 6,734,121	\$ 8,188,376	\$ 10,139,014	\$ 10,726,084	\$ 11,737,760	\$ 13,924,802	\$ 12,234,173

Ag Census Data Category	Animal Type	1997	2002	2007	2012	
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	11,392	10,065	10,673	9,697	
	Cattle feedlots (112112)	3,914	4,259	3,119	2,129	
	Dairy cattle and milk production (11212)	2,675	2,306	1,686	1,224	
	Hog and pig farming (1122)	9,388	5,742	4,970	3,310	
	Poultry and egg production (1123)	448	442	775	732	
	Sheep and goat farming (1124)	1,251	1,098	1,434	1,621	
	Animal aquaculture and other animal production (1125,1129)	3,098	4,162	4,308	3,941	
Value of Sales (\$1,000)	Cattle and Calves	1,886,416	2,119,935	3,606,633	4,504,373	
	Hogs and Pigs	3,012,764	3,078,455	4,827,224	6,767,424	
	Poultry and Eggs	414,587	511,949	872,263	1,291,808	
	Milk and Other Dairy Products	407,897	442,431	689,680	799,467	
	Aquaculture	1,628	2,308	3,507	7,690	
	Other (calculated)	57,197	47,284	75,204	69,206	
	Total	5,780,489	6,202,362	10,074,511	13,439,968	
Input Purchases	Livestock and poultry purchased	(Farms)	30,572	25,756	22,679	24,040
		\$1,000	1,260,448	1,854,227	3,290,203	3,435,345
	Breeding livestock purchased	(Farms)	<i>n/a</i>	13,436	10,743	12,791
		\$1,000	<i>n/a</i>	100,883	180,644	239,793
	Other livestock and poultry purchased	(Farms)	<i>n/a</i>	16,372	15,086	15,123
		\$1,000	<i>n/a</i>	1,753,344	3,109,559	3,195,553
	Feed purchased	(Farms)	46,733	41,037	35,808	38,194
	\$1,000	1,585,107	1,922,817	3,058,988	5,377,863	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
2015 Animal Agriculture	Cattle and Calves	\$ 6,676,081	\$ 1,347,040	28,457	\$ 380,539
	Hogs, Pigs, and Other	\$ 11,369,703	\$ 2,588,977	52,778	\$ 731,386
	Poultry and Eggs	\$ 5,541,163	\$ 1,174,321	24,246	\$ 331,746
	Dairy	\$ 1,891,729	\$ 427,791	9,404	\$ 120,851
	Total	\$ 25,478,676	\$ 5,538,130	114,886	\$ 1,564,522
Change from 2005 to 2015	Cattle and Calves	\$ 2,807,926	\$ 566,558	11,969	\$ 160,053
	Hogs, Pigs, and Other	\$ 3,745,824	\$ 852,955	17,388	\$ 240,960
	Poultry and Eggs	\$ 3,238,192	\$ 686,260	14,169	\$ 193,868
	Dairy	\$ 203,574	\$ 46,036	1,012	\$ 13,005
	Total	\$ 9,995,515	\$ 2,151,809	44,538	\$ 607,886
RIMS II Multipliers	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
	Cattle and Calves	\$ 2.360	\$ 0.476	10.1	
	Hogs, Pigs, and Other	\$ 1.722	\$ 0.392	8.0	
	Poultry and Eggs	\$ 2.822	\$ 0.598	12.3	
	Dairy	\$ 2.259	\$ 0.511	11.2	
Tax Rates	Federal effective income tax rate				12.7%
	Federal Social Security tax rate				7.7%
	State Effective Rate				7.9%
	Total				28.3%

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.