

Economic Analysis of Animal Agriculture 2004-2014

IOWA

**A Report for
United Soybean Board**



September 2015



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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 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 2014 animal agriculture contributed:

- \$30.1 billion in economic output
- 128,621 jobs
- \$5 billion in earnings
- \$1.4 billion in income taxes paid at local, state, and federal levels
- \$437.3 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in Iowa increased economic output by over \$13.5 billion, boosted household earnings by \$2.2 billion, contributed 57,872 additional jobs and paid \$632.5 million in additional tax revenues.

Iowa's animal agriculture consumed about 3.1 million tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Hogs (2.3 million tons)
- Egg-Laying Hens (368.4 thousand tons)
- Beef Cows (165.6 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. And, if past is prologue, 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 2014, Iowa's animal agriculture contributed the following to the economy:

- About \$30.1 billion in economic output
- \$5.0 billion in household earnings
- 128,621 jobs
- \$1.4 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:

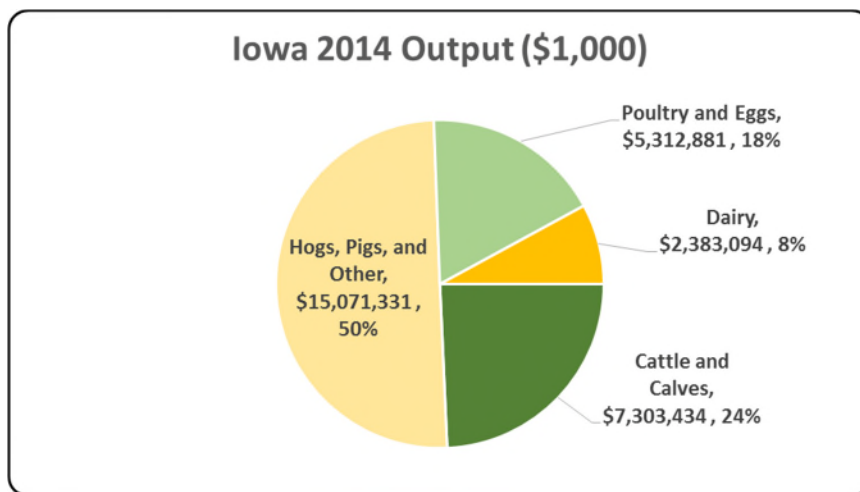
- Increased economic output by \$13.5 billion
- Boosted household earnings by \$2.2 billion
- Added 57,872 jobs
- Paid an additional \$632.5 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output (\$1,000)	\$ 30,070,740	\$ 13,534,986	81.85%
Earnings (\$1,000)	\$ 4,974,654	\$ 2,238,815	81.83%
Employment (Jobs)	128,621	57,872	81.80%
Income Taxes Paid (\$1,000)	\$ 1,405,340	\$ 632,465	81.83%
Property Taxes Paid in 2012 (\$1,000)	\$ 437,312		

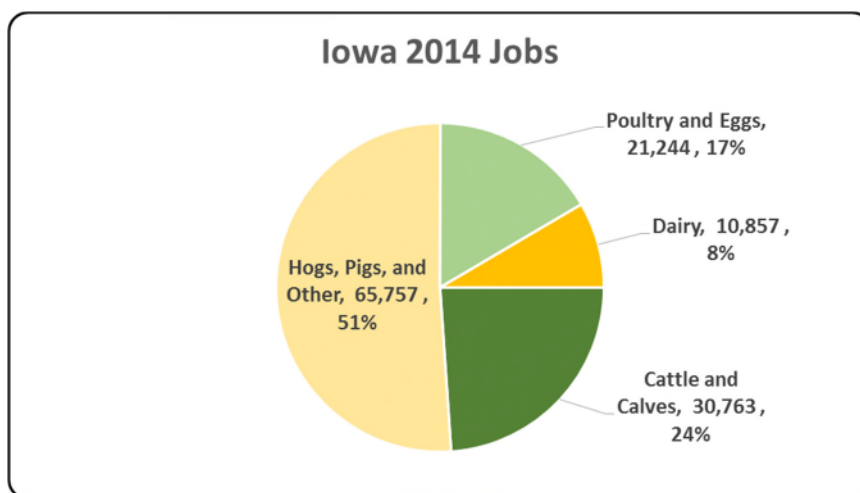
Iowa Output

“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 \$30.1 billion.



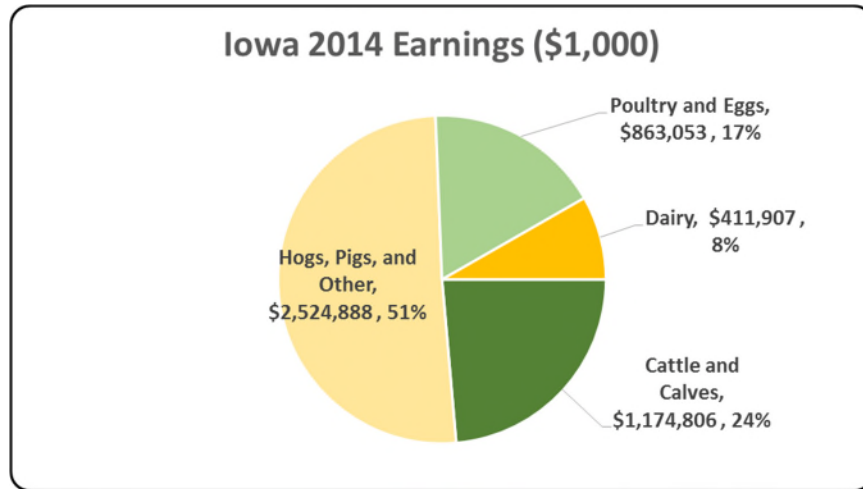
Iowa Jobs

“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 128,621 jobs within and outside of animal agriculture.



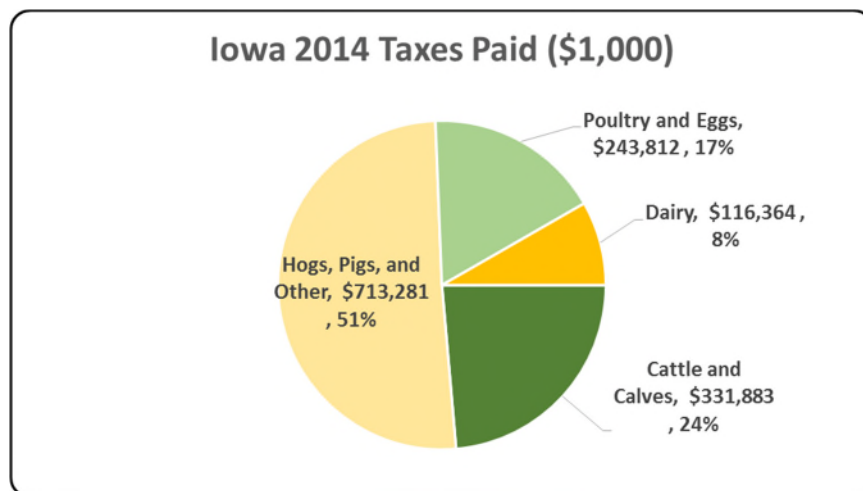
Iowa Earnings

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 \$5.0 billion to household earnings in 2014.



Iowa Taxes Paid by Animal Agriculture

Iowa's animal agriculture is also a significant source of tax revenue. In 2014, the state's animal agriculture industry paid about \$1.4 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.



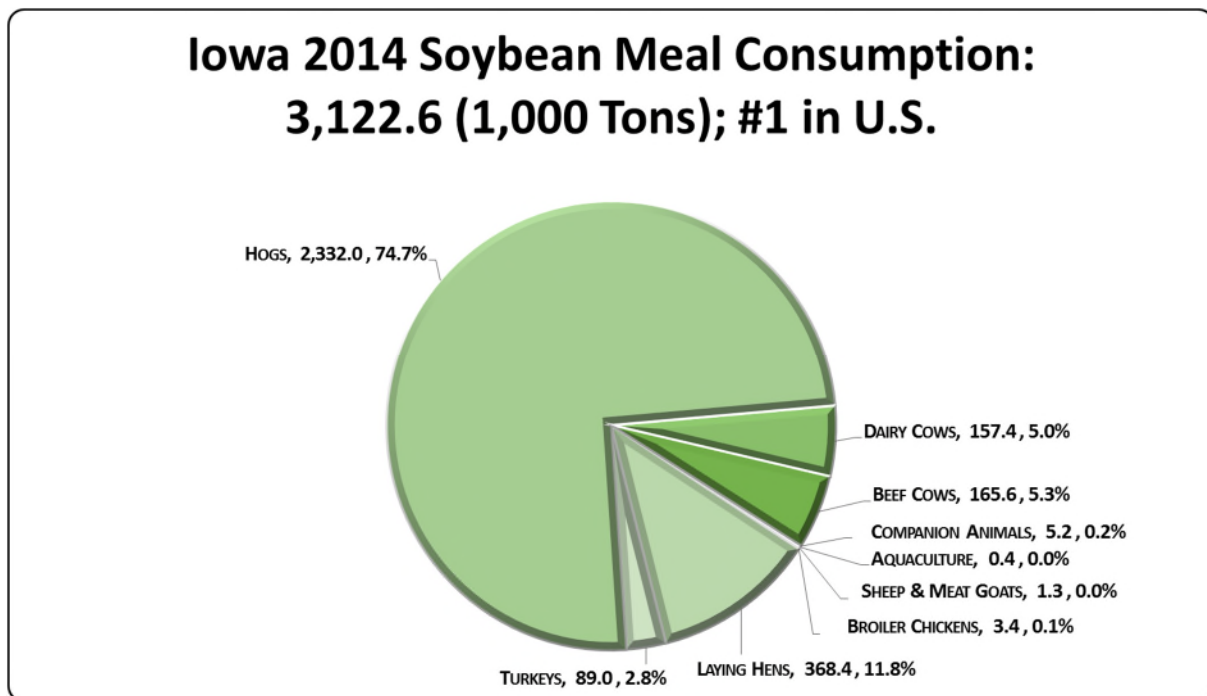
Iowa Animal Agriculture Soybean Meal Consumption

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 2013-14 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 2014, placing the state as #1 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 (2.3 million tons)
- Egg-Laying Hens (368.4 thousand tons)
- Beef Cows (165.6 thousand tons)

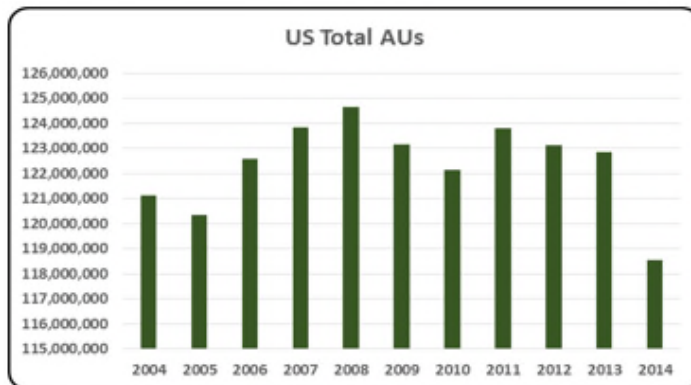


Iowa Animal Unit (AU) Trends

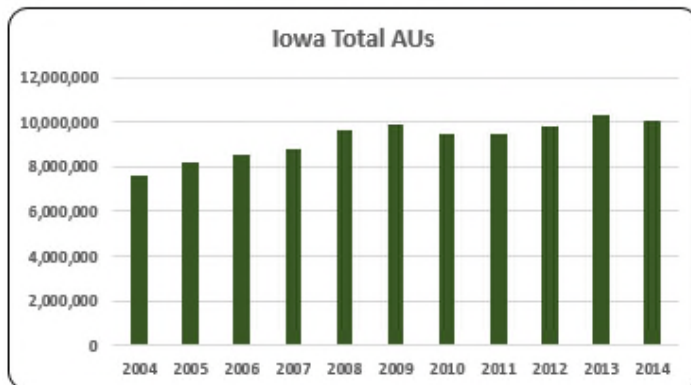
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Iowa. Due to this reality, using a single year as a measure of the presence and strength of a sector can be misleading.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

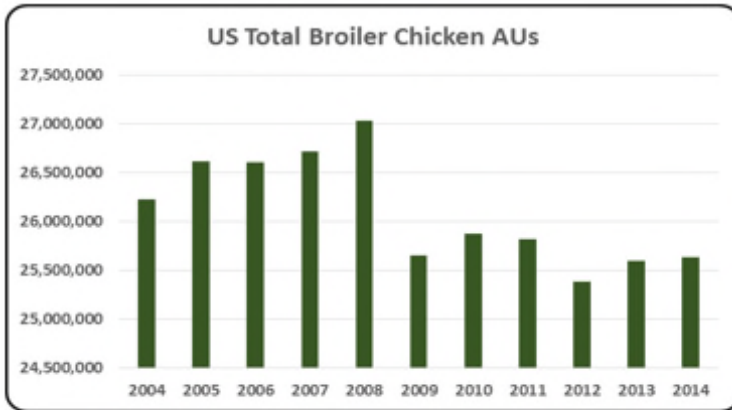
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Iowa, the largest three segments of animal agriculture in terms of AUs during 2014 were: Hogs (6,557.7 thousand AUs), Beef Cows (2,694.1 thousand AUs), and Dairy Cows (287.0 thousand AUs). Total animal units in Iowa during 2014 were 10,063.1 thousand AUs.



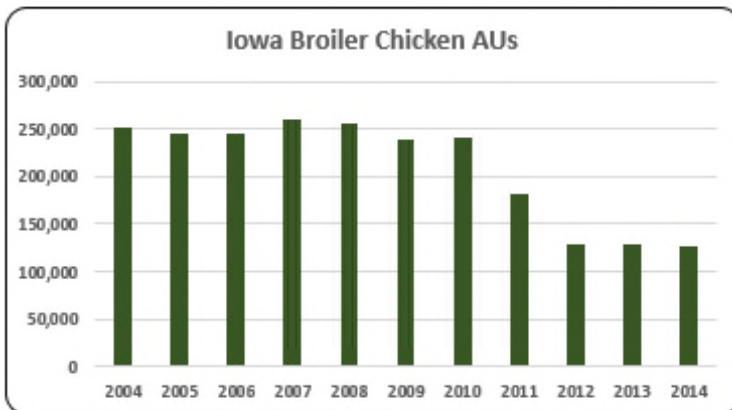
- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.



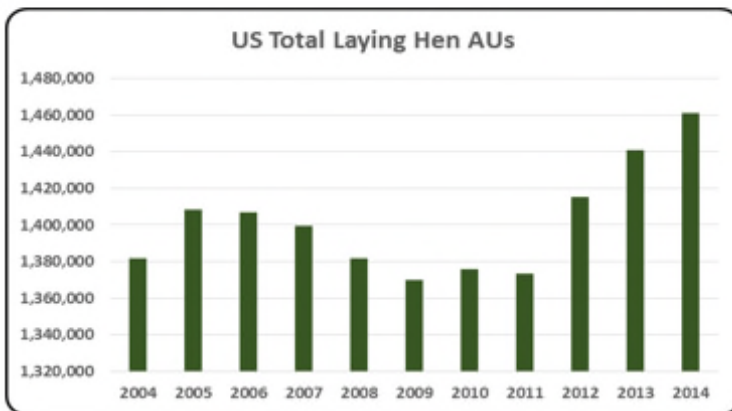
- There were 10,063 thousand AUs in the state of Iowa in 2014 which accounts for 8.5% of all AUs in the U.S.



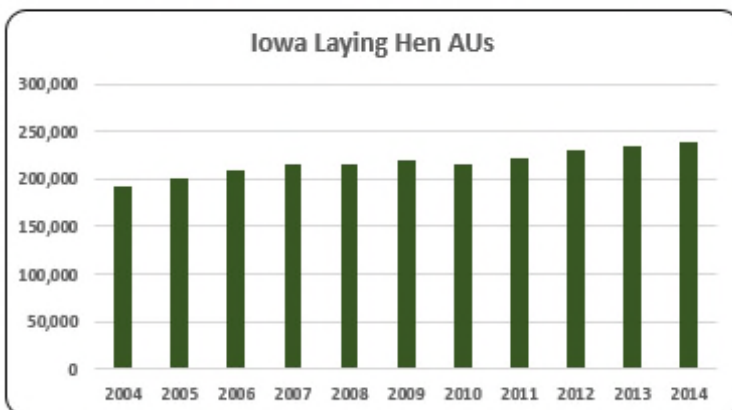
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).



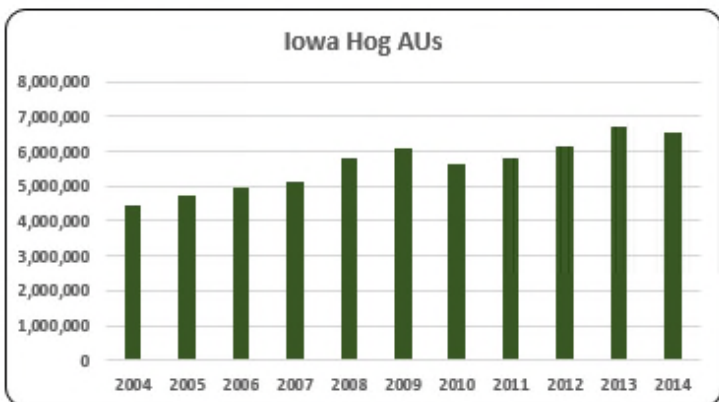
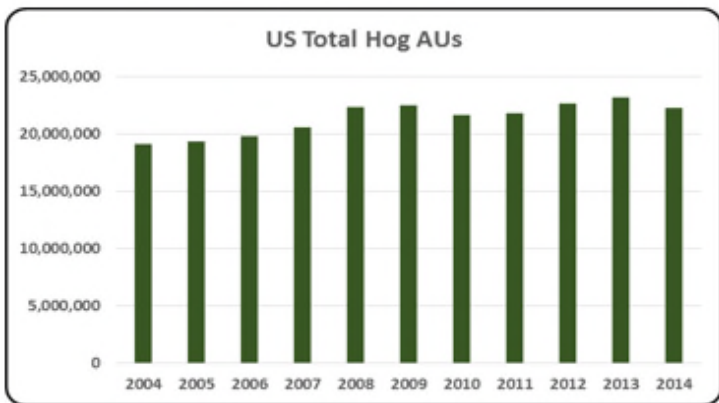
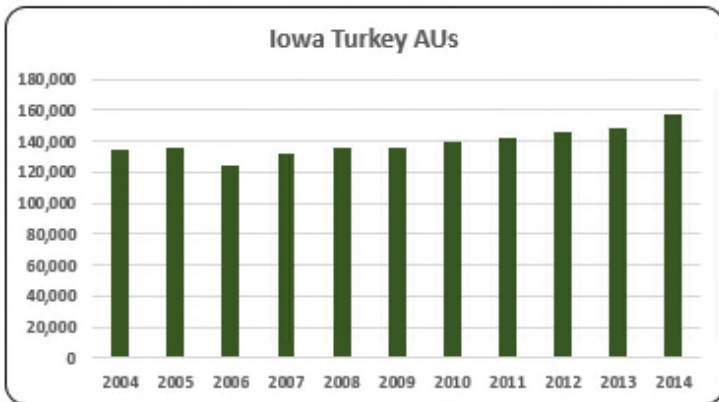
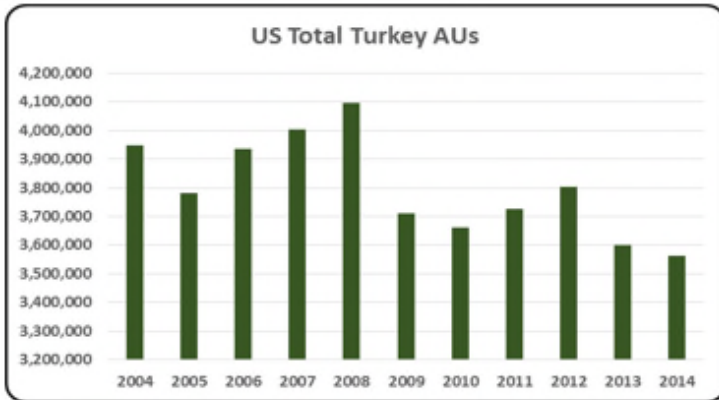
- Broiler production has been decreasing in Iowa from 251,368 AUs in 2004 to 127,252 AUs in 2014.



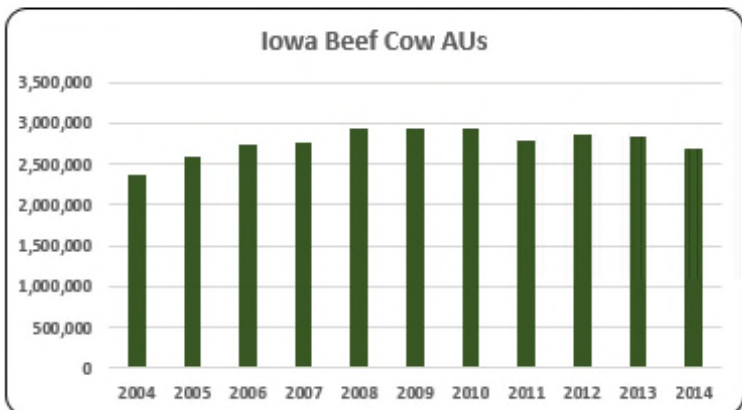
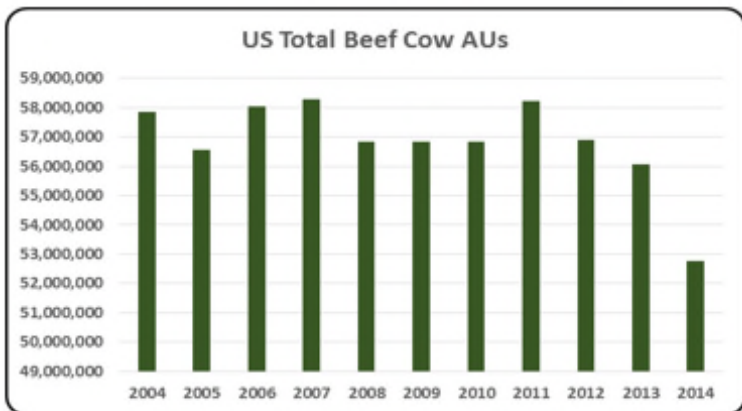
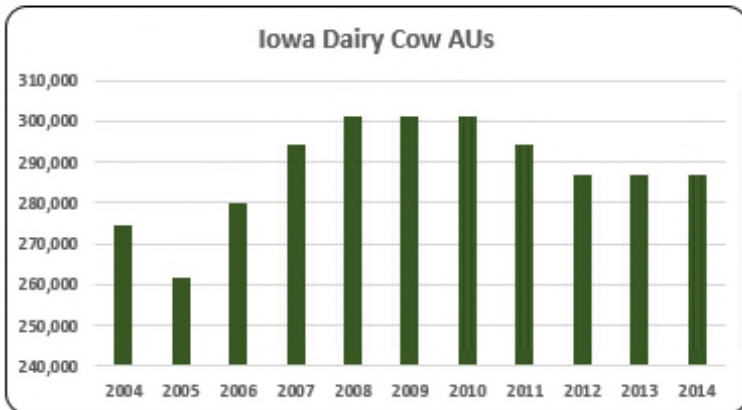
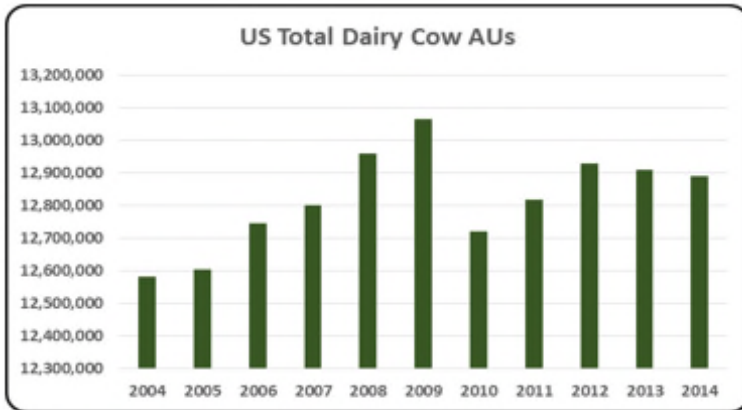
- On average, the layer AUs during 2004-2014 were 1.4 million. In 2014 layer AUs were 1.5 million, up 7% from the lowest number in 2009 (1.4 million AUs).



- As the number one egg producer in the country, Iowa housed 16.40% (239,576) of all layer AUs in the country in 2014. Layers AUs have increased 25% during the past decade.



- 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.
- Over 4% of all turkey AUs in the U.S. in 2014 were in Iowa. In 2014 Iowa’s turkey AUs (157,449) increased 6.1% year-over-year.
- 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.
- Iowa is the number one hog producer in the country with 6,557.7 hog AUs in 2014. About 20.5% of all hog AUs in the U.S. in 2014 were in Iowa. Overall the industry has followed an upward trend from and increased 48% from 2004-2014.



- 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.
- Iowa's dairy cow AUs averaged 288,018 over the last decade, but numbers have decreased since 2010.
- From 2004 to 2014 beef cow AUs averaged 56.8 million. In 2014 beef cow AUs decreased to 52.8 million, the lowest of the decade. States that raise a large number of cattle and calves like Texas and Oklahoma were plagued with drought conditions during 2014.
- Beef cow AUs have increased 14.4% over the last decade. In 2014 there were 2,694.1 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 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 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 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 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 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.

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, \$1.874 to \$2.815 million in total economic activity, \$0.314 to \$0.457 in household wages and 8 to 11 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.5588	\$ 0.4116	10.8
	Hogs, Pigs, and Other	\$ 1.8743	\$ 0.3140	8.2
	Poultry and Eggs	\$ 2.8151	\$ 0.4573	11.3
	Dairy	\$ 2.0851	\$ 0.3604	9.5

Appendix

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Animal Units (AUs)	Beef Cattle AUs	2,354,700	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	2,694,075
	Hog and Pig AUs	4,433,850	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	6,557,700
	Broiler AUs	251,368	246,077	244,415	260,465	256,404	238,395	241,602	182,049	128,427	127,978	127,252
	Turkey AUs	135,000	135,713	123,678	131,363	135,874	135,542	138,972	142,416	146,077	148,450	157,449
	Egg Layer AUs	191,916	201,400	208,656	216,536	214,872	218,700	214,856	221,652	230,832	234,575	239,576
	Dairy AUs	274,400	261,800	280,000	294,000	301,000	301,000	301,000	294,000	287,000	287,000	287,000
	Total Animal Units	7,641,234	8,179,989	8,536,149	8,794,015	9,653,149	9,887,487	9,428,130	9,449,067	9,808,687	10,322,703	10,063,052
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 1,311,027	\$ 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
	Hogs and Pigs (\$1,000)	\$ 3,264,095	\$ 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
	Broilers (\$1,000)	\$ 211,422	\$ 200,268	\$ 154,764	\$ 195,944	\$ 201,659	\$ 174,679	\$ 183,856	\$ 161,988	\$ 127,935	\$ 155,858	\$ 163,500
	Turkeys (\$1,000)	\$ 136,080	\$ 131,580	\$ 123,246	\$ 143,167	\$ 201,600	\$ 213,475	\$ 233,713	\$ 253,084	\$ 274,458	\$ 290,238	\$ 320,276
	Eggs (\$1,000)	\$ 491,656	\$ 335,318	\$ 406,865	\$ 824,806	\$ 1,117,850	\$ 755,830	\$ 832,528	\$ 947,998	\$ 1,062,683	\$ 1,166,457	\$ 1,403,504
	Milk (\$1,000)	\$ 627,713	\$ 615,825	\$ 536,380	\$ 817,098	\$ 799,015	\$ 567,732	\$ 716,430	\$ 886,215	\$ 866,496	\$ 944,435	\$ 1,142,916
	Other	\$ 27,079	\$ 31,513	\$ 26,590	\$ 28,369	\$ 26,363	\$ 23,436	\$ 27,044	\$ 24,844	\$ 24,255	\$ 23,666	\$ 23,077
	Sheep and Lambs (\$1,000)	\$ 25,778	\$ 30,044	\$ 24,953	\$ 26,564	\$ 24,391	\$ 21,296	\$ 24,736	\$ 22,368	\$ 21,612	\$ 20,855	\$ 20,099
	Aquaculture (\$1,000)	\$ 1,301	\$ 1,469	\$ 1,637	\$ 1,805	\$ 1,972	\$ 2,140	\$ 2,308	\$ 2,476	\$ 2,643	\$ 2,811	\$ 2,979
	Total (\$1,000)	\$ 6,069,072	\$ 6,282,646	\$ 6,052,748	\$ 7,087,343	\$ 7,977,308	\$ 6,734,250	\$ 8,189,341	\$ 10,142,072	\$ 10,731,841	\$ 11,744,904	\$ 13,925,483

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)
2014 Animal Agriculture	Cattle and Calves	\$ 7,303,434	\$ 1,174,806	30,763	\$ 331,883
	Hogs, Pigs, and Other	\$ 15,071,331	\$ 2,524,888	65,757	\$ 713,281
	Poultry and Eggs	\$ 5,312,881	\$ 863,053	21,244	\$ 243,812
	Dairy	\$ 2,383,094	\$ 411,907	10,857	\$ 116,364
	Total	\$ 30,070,740	\$ 4,974,654	128,621	\$ 1,405,340
Change from 2004 to 2014	Cattle and Calves	\$ 3,099,264	\$ 498,537	13,055	\$ 140,837
	Hogs, Pigs, and Other	\$ 7,340,569	\$ 1,229,760	32,027	\$ 347,407
	Poultry and Eggs	\$ 2,352,348	\$ 382,128	9,406	\$ 107,951
	Dairy	\$ 742,805	\$ 128,390	3,384	\$ 36,270
	Total	\$ 13,534,986	\$ 2,238,815	57,872	\$ 632,465
	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
RIMS II Multipliers	Cattle and Calves	\$ 2.5588	\$ 0.4116	10.8	
	Hogs, Pigs, and Other	\$ 1.8743	\$ 0.3140	8.2	
	Poultry and Eggs	\$ 2.8151	\$ 0.4573	11.3	
	Dairy	\$ 2.0851	\$ 0.3604	9.5	
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.