

Economic Analysis of Animal Agriculture 2004-2014

DELAWARE

**A Report for
United Soybean Board**



September 2015



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Delaware Executive Summary

The use of soybean meal as a key feed ingredient is an important part of Delaware's animal agriculture. While the degree to which animal agriculture utilizes this versatile feed ingredient has fluctuated with time, it remains a driver of animal agriculture success in Delaware. The success of Delaware animal agriculture in turn has a large impact on the rest of the state and regional economies. For example, in the state of Delaware during 2014 animal agriculture contributed:

- \$2.3 billion in economic output
- 7,466 jobs
- \$325.5 million in earnings
- \$84.2 million in income taxes paid at local, state, and federal levels
- \$6.2 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in Delaware increased economic output by over \$476.4 million, boosted household earnings by \$68.4 million, contributed 1,556 additional jobs and paid \$17.7 million in additional tax revenues.

Delaware's animal agriculture consumed about 292.7 thousand tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Broilers (276.9 thousand tons)
- Companion Animals (10.3 thousand tons)
- Horses (9.9 thousand tons)

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

Delaware Economic Impact of Animal Agriculture

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

- About \$2.3 billion in economic output
- \$325.5 million in household earnings
- 7,466 jobs
- \$84.2 million in income taxes

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

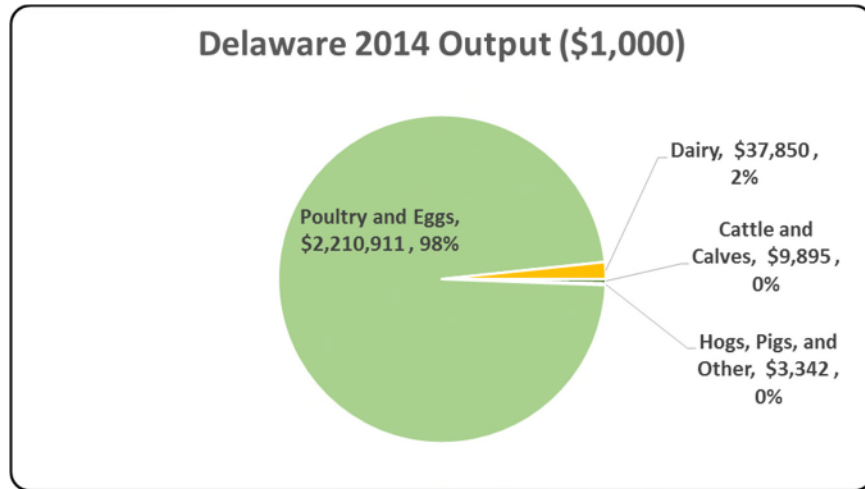
- Increased economic output by \$476.4 million
- Boosted household earnings by \$68.4 million
- Added 1,556 jobs
- Paid an additional \$17.7 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output (\$1,000)	\$ 2,261,998	\$ 476,361	26.68%
Earnings (\$1,000)	\$ 325,481	\$ 68,375	26.59%
Employment (Jobs)	7,466	1,556	26.34%
Income Taxes Paid (\$1,000)	\$ 84,234	\$ 17,695	26.59%
Property Taxes Paid in 2012 (\$1,000)	\$ 6,223		

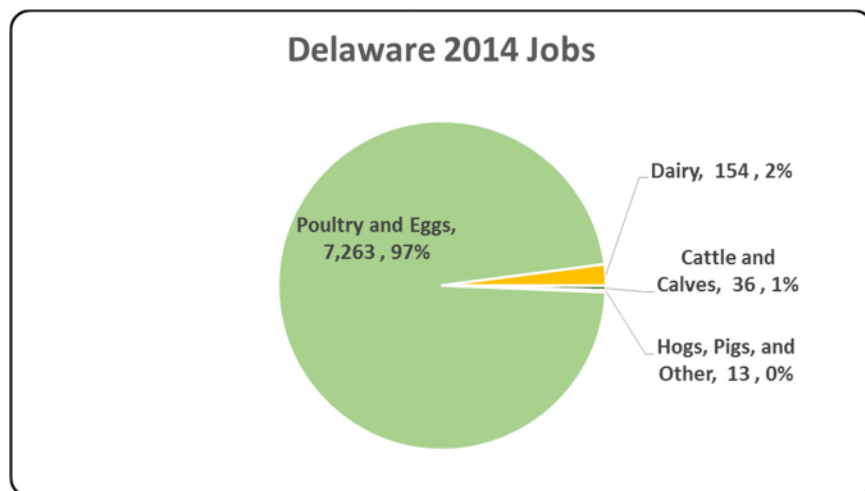
Delaware Output

“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 Delaware economy. Animal agriculture’s impact on Delaware total economic output is about \$2.3 billion.



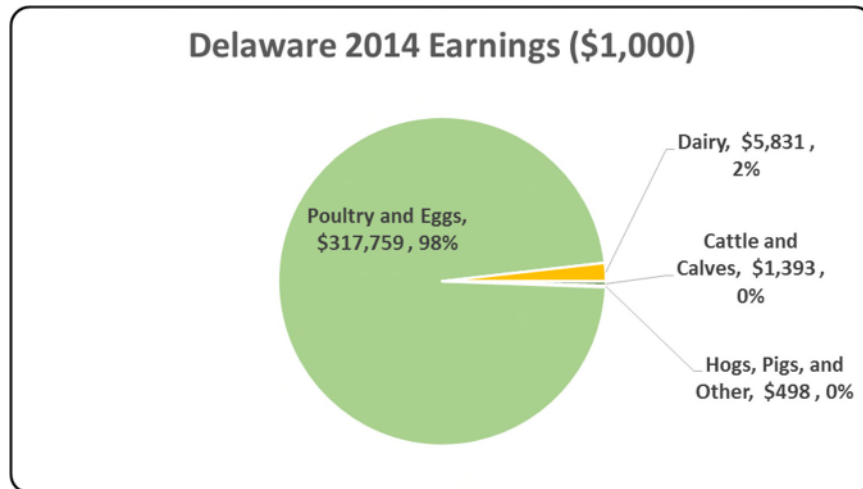
Delaware Jobs

“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 Delaware in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Delaware total jobs, contributing 7,466 jobs within and outside of animal agriculture.



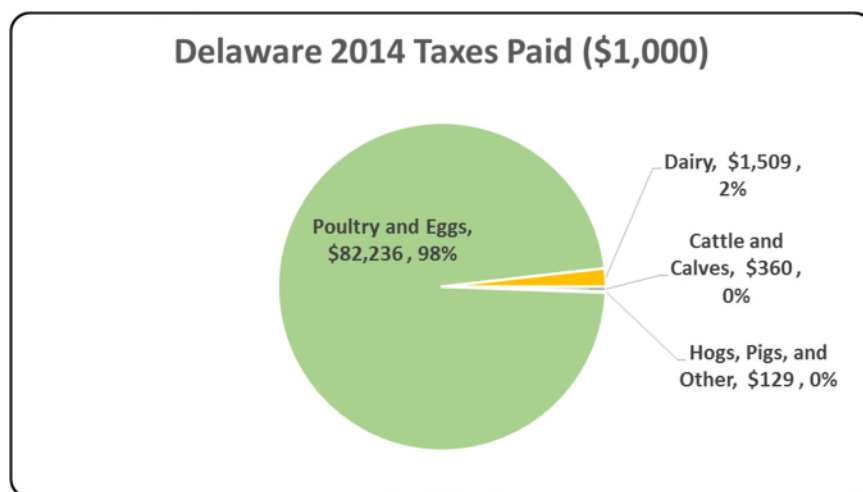
Delaware Earnings

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 Delaware economy in terms of earnings. Delaware's animal agriculture contributed about \$325.5 million to household earnings in 2014.



Delaware Taxes Paid by Animal Agriculture

Delaware's animal agriculture is also a significant source of tax revenue. In 2014, the state's animal agriculture industry paid about \$84.2 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$6.2 million in property taxes paid by all of Delaware agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



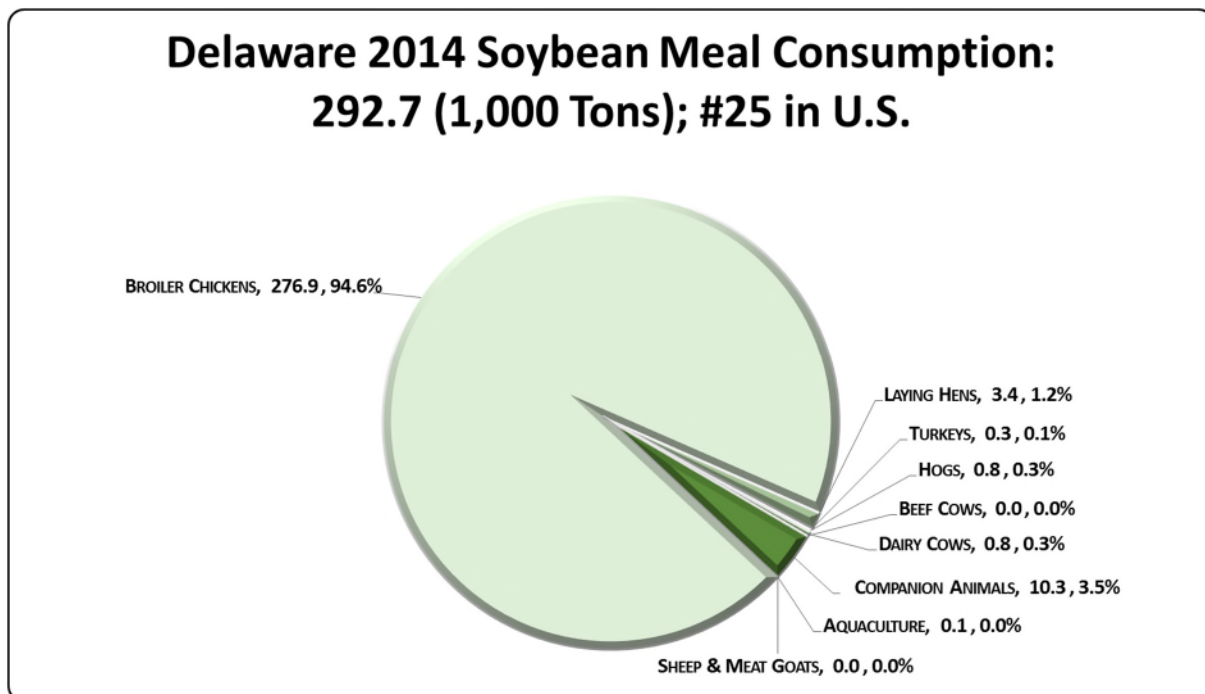
Delaware Animal Agriculture Soybean Meal Consumption

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.

Delaware’s animal agriculture consumed almost 292.7 thousand tons of soybean meal in 2014, placing the state as #25 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:

- Broilers (276.9 thousand tons)
- Companion Animals (10.3 thousand tons)
- Horses (9.9 thousand tons)

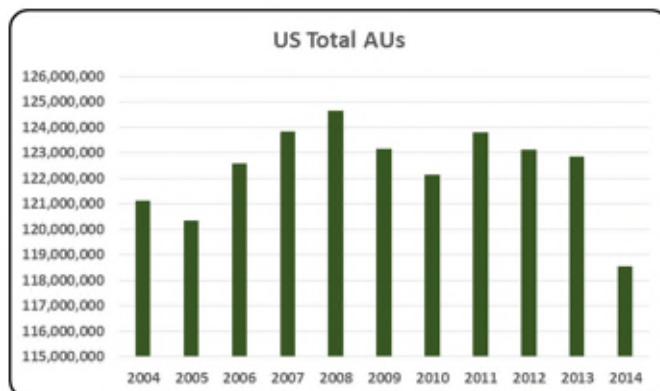


Delaware Animal Unit (AU) Trends

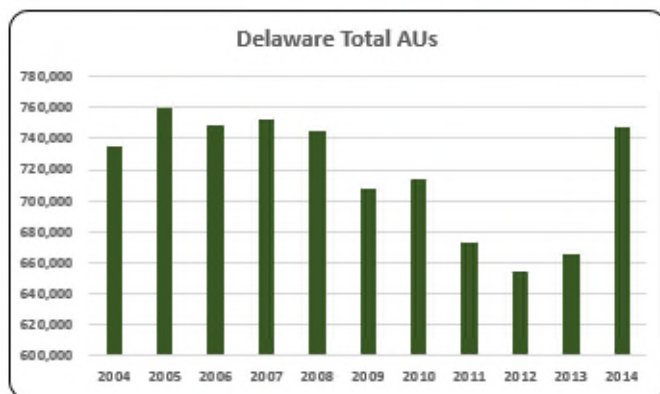
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Delaware. Due to this reality, using a single year as a measure of the presence and strength of a sector can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

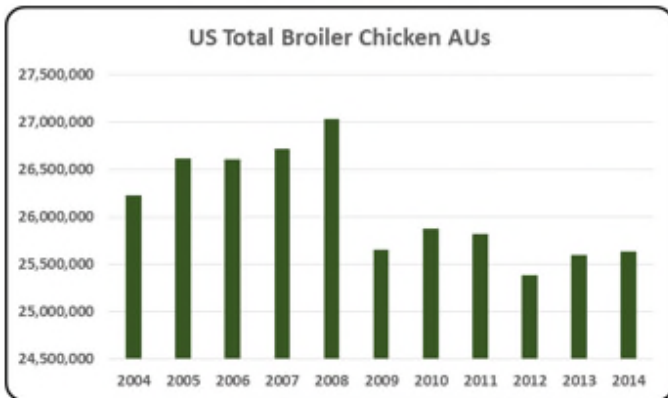
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Delaware, the largest three segments of animal agriculture in terms of AUs during 2014 were: Broilers (733.7 thousand AUs), Dairy Cows (6.6 thousand AUs), and Beef Cows (4.6 thousand AUs). Total animal units in Delaware during 2014 were 747.3 thousand AUs.



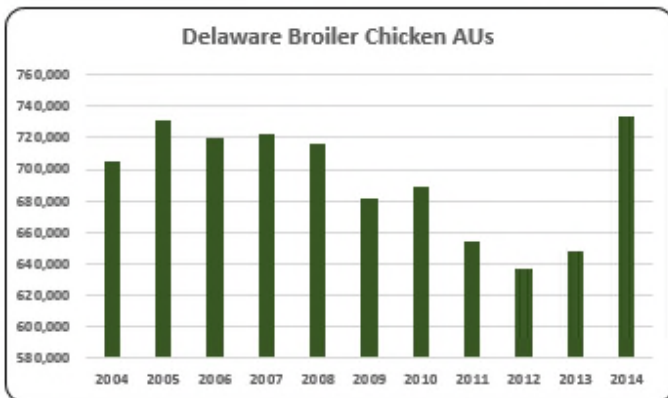
- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.



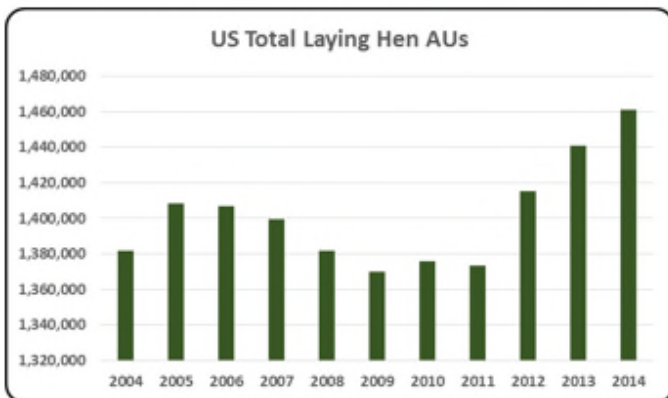
- The total number of AUs in Delaware in 2014 was 747,320, a number that represented only 0.6% of all AUs in the U.S. 2014. The state housed 2.9% (733,651) of all broiler AUs in the U.S. in 2014.



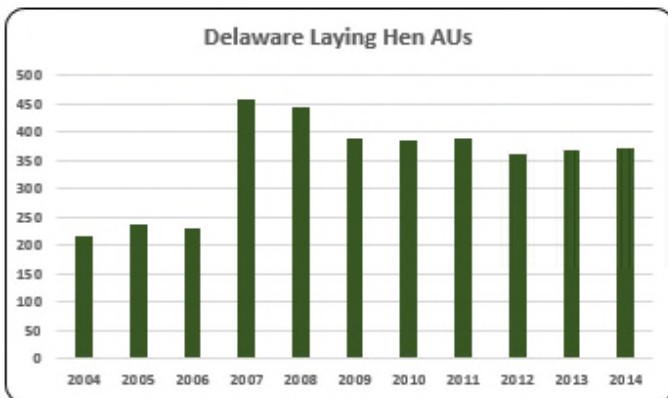
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).



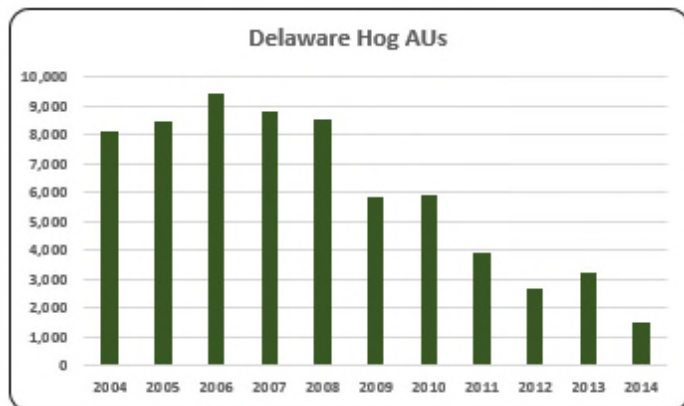
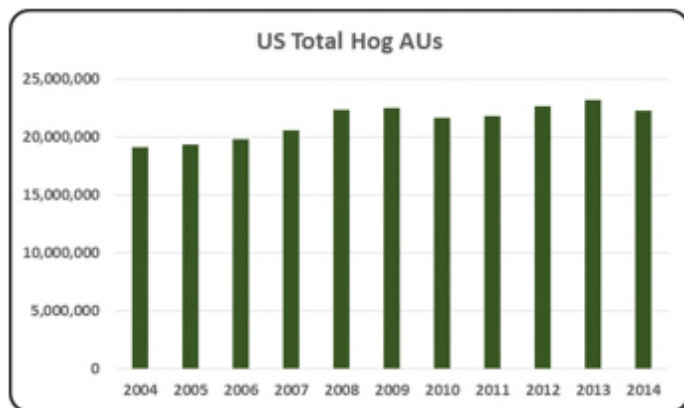
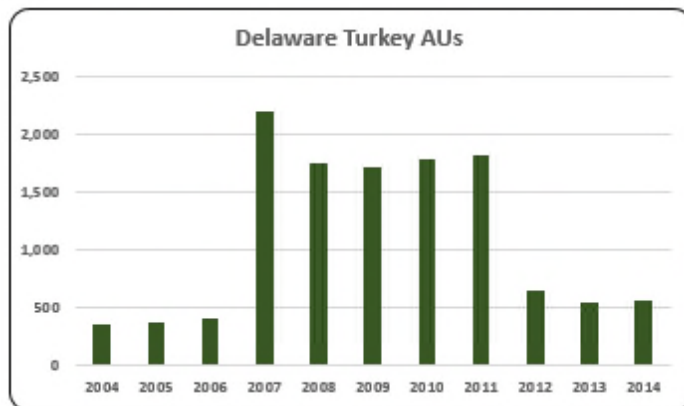
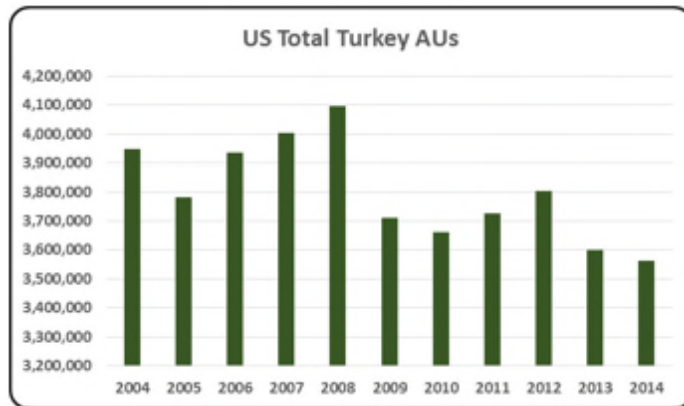
- The most important animal production in Delaware is the broiler production with 98.2% of all AUs in the state in 2014. Broiler AUs steadily declined since 2008, but in 2014 broiler AUs rose to a record level of 733,651.



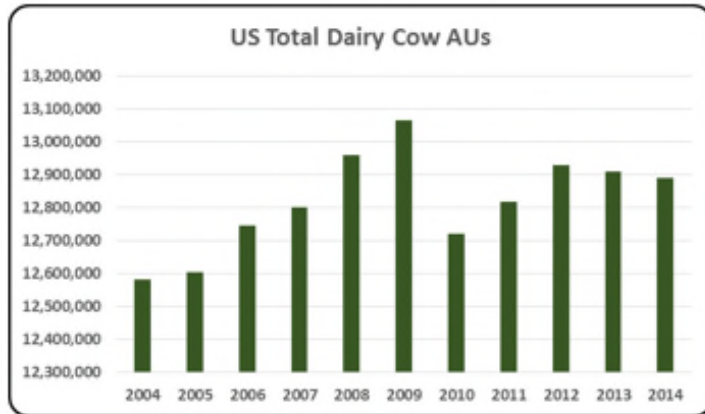
- On average, the layer AUs during 2004-2014 were 1.4 million. In 2014 layer AUs were 1.5 million, up 7% from the lowest number in 2009 (1.4 million AUs).



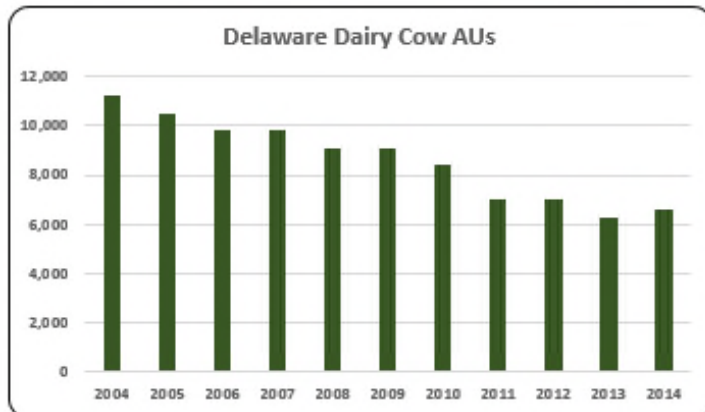
- Layer animal production is the smallest of all animal production in the state of Delaware with only 350, on average, layer AUs from 2004 to 2014.



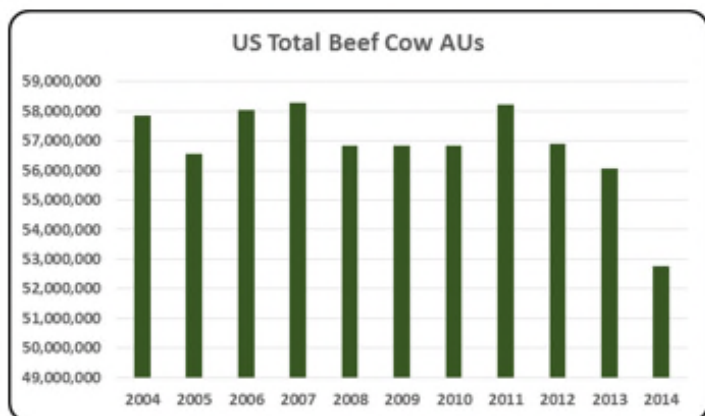
- From 2004 to 2014, the U.S. accounted for 50% of the world’s turkey production. However, in 2014 turkey AUs were the lowest of the decade at 3.5 million, decreasing 13% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade.
- Delaware turkey AUs in 2014 were 0.08% (567) of all AUs in the state. Turkey AUs have been diminishing since record high numbers in 2007 (2,193 turkey AUs).
- 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.
- The hog industry has been dwindling (9,450) since 2006 Hog AUs in Delaware and in 2014 reached a record low of 1,515 hog AUs (a 84% reduction compared to the numbers in 2006).



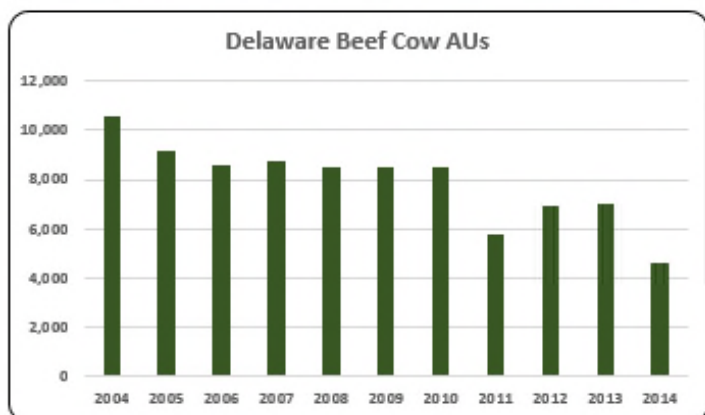
- From 2004 to 2014 dairy cow AUs averaged 12.8 million. In 2014, dairy cow AUs (12.9 million) remained about the same as the previous year but still below the high of 13.1 million AUs, the level in 2009. Despite the fluctuation in AUs, milk supplied has steadily risen.



- A distant second to broiler production, the dairy cow AUs in Delaware were about 1% (6,580) of all AUs in the state in 2014.



- 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.



- Representing only 0.6% (4,635) of all AUs in the state, Delaware beef cow AUs have been decreasing over the past decade. Beef cow AUs shrank 56% compared to the beef cow AUs in 2004.

Delaware Additional Information and Methodology

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

Delaware 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 Delaware'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 Delaware, \$1.471 to \$1.996 million in total economic activity, \$0.214 to \$0.287 in household wages and 5 to 7 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 1.5226	\$ 0.2143	5.5
	Hogs, Pigs, and Other	\$ 1.4708	\$ 0.2192	5.8
	Poultry and Eggs	\$ 1.9962	\$ 0.2869	6.6
	Dairy	\$ 1.6241	\$ 0.2502	6.6

Appendix

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Animal Units (AUs)	Beef Cattle AUs	10,560	9,180	8,610	8,730	8,475	8,475	8,475	5,805	6,900	7,020	4,635
	Hog and Pig AUs	8,100	8,430	9,450	8,805	8,550	5,835	5,910	3,885	2,700	3,225	1,515
	Broiler AUs	704,686	730,732	720,232	722,913	716,213	681,756	689,206	654,386	637,227	648,018	733,651
	Turkey AUs	363	372	404	2,193	1,753	1,717	1,789	1,821	650	543	567
	Egg Layer AUs	216	238	230	457	444	388	385	388	362	367	373
	Dairy AUs	11,200	10,500	9,800	9,800	9,100	9,100	8,400	7,000	7,000	6,300	6,580
	Total Animal Units	735,125	759,452	748,726	752,898	744,534	707,272	714,165	673,284	654,839	665,472	747,320
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 5,610	\$ 6,210	\$ 6,389	\$ 6,316	\$ 5,929	\$ 5,114	\$ 4,233	\$ 5,472	\$ 5,664	\$ 5,014	\$ 6,499
	Hogs and Pigs (\$1,000)	\$ 2,628	\$ 2,925	\$ 2,487	\$ 2,947	\$ 2,879	\$ 1,793	\$ 2,260	\$ 1,645	\$ 1,524	\$ 2,586	\$ 1,137
	Broilers (\$1,000)	\$ 686,458	\$ 741,520	\$ 613,206	\$ 734,942	\$ 726,294	\$ 730,606	\$ 783,395	\$ 699,791	\$ 752,600	\$ 929,196	\$ 1,103,985
	Turkeys (\$1,000)	\$ 337	\$ 357	\$ 422	\$ 457	\$ 500	\$ 542	\$ 585	\$ 627	\$ 670	\$ 713	\$ 755
	Eggs (\$1,000)	\$ 1,685	\$ 1,020	\$ 1,131	\$ 1,856	\$ 2,237	\$ 1,592	\$ 1,748	\$ 1,916	\$ 2,149	\$ 2,428	\$ 2,819
	Milk (\$1,000)	\$ 21,675	\$ 21,173	\$ 15,276	\$ 22,148	\$ 20,570	\$ 14,484	\$ 16,560	\$ 19,215	\$ 17,822	\$ 19,209	\$ 23,305
	Other	\$ 1,952	\$ 1,870	\$ 1,788	\$ 1,707	\$ 1,625	\$ 1,543	\$ 1,462	\$ 1,380	\$ 1,298	\$ 1,217	\$ 1,135
	Sheep and Lambs (\$1,000)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Aquaculture (\$1,000)	\$ 1,952	\$ 1,870	\$ 1,788	\$ 1,707	\$ 1,625	\$ 1,543	\$ 1,462	\$ 1,380	\$ 1,298	\$ 1,217	\$ 1,135
Total (\$1,000)	\$ 720,344	\$ 775,075	\$ 640,699	\$ 770,373	\$ 760,034	\$ 755,675	\$ 810,242	\$ 730,047	\$ 781,727	\$ 960,362	\$ 1,139,636	

Ag Census Data Category	Animal Type	1997	2002	2007	2012	
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	89	92	155	137	
	Cattle feedlots (112112)	30	25	21	2	
	Dairy cattle and milk production (11212)	91	78	63	32	
	Hog and pig farming (1122)	26	14	13	16	
	Poultry and egg production (1123)	822	809	777	645	
	Sheep and goat farming (1124)	11	38	77	31	
	Animal aquaculture and other animal production (1125,1129)	164	250	211	520	
Value of Sales (\$1,000)	Cattle and Calves	9,495	3,254	7,567	9,489	
	Hogs and Pigs	6,582	2,853	2,754	1,427	
	Poultry and Eggs	553,635	440,774	837,378	811,301	
	Milk and Other Dairy Products	19,357	20,651	21,715	16,593	
	Aquaculture	withheld	240	withheld	withheld	
	Other (calculated)	1,829	677	2,986	289	
	Total	590,898	468,449	872,400	839,099	
Input Purchases	Livestock and poultry purchased	(Farms)	1,122	1,039	981	947
		\$1,000	63,980	55,182	102,328	94,265
	Breeding livestock purchased	(Farms)	n/a	158	131	151
		\$1,000	n/a	444	1,043	1,871
	Other livestock and poultry purchased	(Farms)	n/a	928	899	842
		\$1,000	n/a	54,738	101,284	92,394
	Feed purchased	(Farms)	1,405	1,540	1,426	1,602
		\$1,000	363,258	207,528	416,368	503,159

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
2014 Animal Agriculture	Cattle and Calves	\$ 9,895	\$ 1,393	36	\$ 360
	Hogs, Pigs, and Other	\$ 3,342	\$ 498	13	\$ 129
	Poultry and Eggs	\$ 2,210,911	\$ 317,759	7,263	\$ 82,236
	Dairy	\$ 37,850	\$ 5,831	154	\$ 1,509
	Total	\$ 2,261,998	\$ 325,481	7,466	\$ 84,234
Change from 2004 to 2014	Cattle and Calves	\$ (809)	\$ (114)	(3)	\$ (29)
	Hogs, Pigs, and Other	\$ (5,100)	\$ (760)	(20)	\$ (197)
	Poultry and Eggs	\$ 488,537	\$ 70,214	1,605	\$ 18,171
	Dairy	\$ (6,267)	\$ (965)	(26)	\$ (250)
	Total	\$ 476,361	\$ 68,375	1,556	\$ 17,695
	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
RIMS II Multipliers	Cattle and Calves	\$ 1.5226	\$ 0.2143	5.5	
	Hogs, Pigs, and Other	\$ 1.4708	\$ 0.2192	5.8	
	Poultry and Eggs	\$ 1.9962	\$ 0.2869	6.6	
	Dairy	\$ 1.6241	\$ 0.2502	6.6	
Tax Rates	Federal effective income tax rate			12.7%	
	Federal Social Security tax rate			7.7%	
	State Effective Rate			5.6%	
	Total			25.9%	

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.