

Economic Analysis of Animal Agriculture 2005-2015

NEBRASKA

**A Report for
United Soybean Board**



September 2016



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Nebraska Executive Summary

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

- \$20.3 billion in economic output
- 88,837 jobs
- \$4.2 billion in earnings
- \$1.1 billion in income taxes paid at local, state, and federal levels
- \$479.0 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Nebraska has increased economic output by over \$6.8 billion, boosted household earnings by \$1.4 billion, contributed 29,479 additional jobs and paid \$379.4 million in additional tax revenues.

Nebraska's animal agriculture consumed almost 840.9 thousand tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Hogs (420.9 thousand tons)
- Beef Cows (331.9 thousand tons)
- Egg-Laying Hens (54.1 thousand tons)

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

Nebraska Economic Impact of Animal Agriculture

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

- About \$20.3 billion in economic output
- \$4.2 billion in household earnings
- 88,837 jobs
- \$1.1 billion in income taxes

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

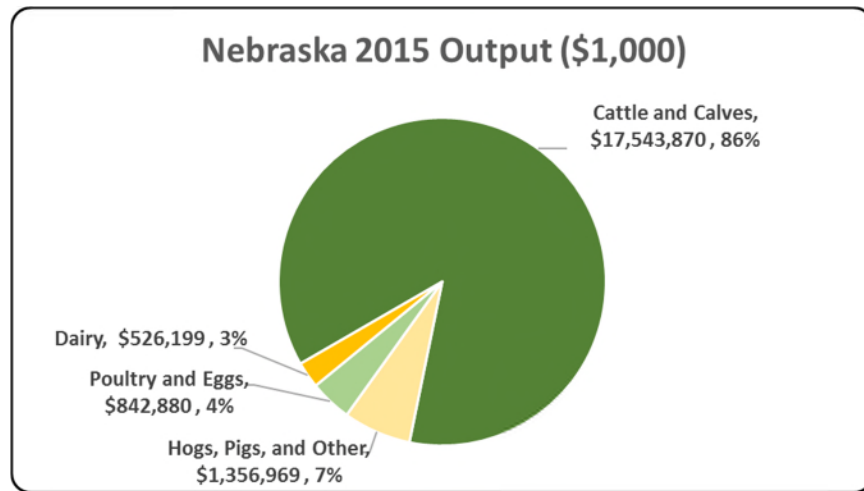
- Increased economic output by \$6.8 billion
- Boosted household earnings by \$1.4 billion
- Added 29,479 jobs
- Paid an additional \$379.4 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2015	Change 2005-2015	% Change 2005-2015
Output (\$1,000)	\$ 20,269,918	\$ 6,791,996	50.39%
Earnings (\$1,000)	\$ 4,218,298	\$ 1,396,416	49.49%
Employment (Jobs)	88,837	29,479	49.66%
Income Taxes Paid (\$1,000)	\$ 1,146,111	\$ 379,406	49.49%
Property Taxes Paid in 2012 (\$1,000)	\$ 478,972		

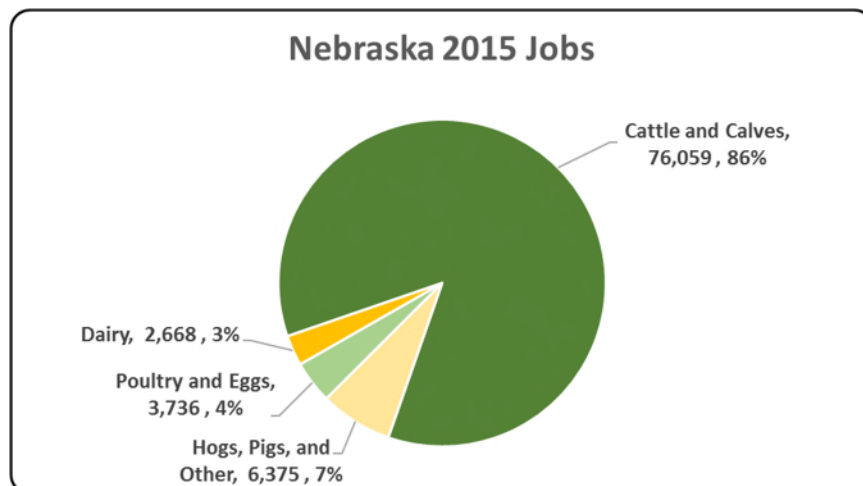
Nebraska Output

“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 Nebraska economy. Animal agriculture’s impact on Nebraska total economic output is about \$20.3 billion.



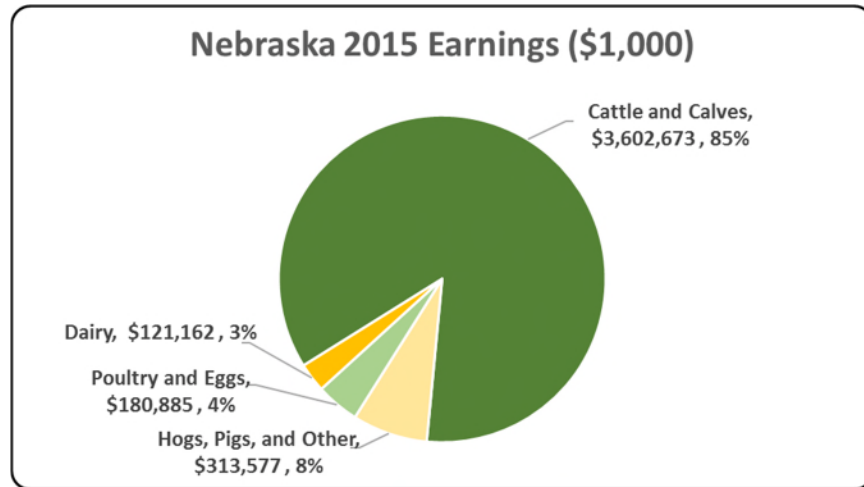
Nebraska Jobs

“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 Nebraska in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Nebraska total jobs, contributing 88,837 jobs within and outside of animal agriculture.



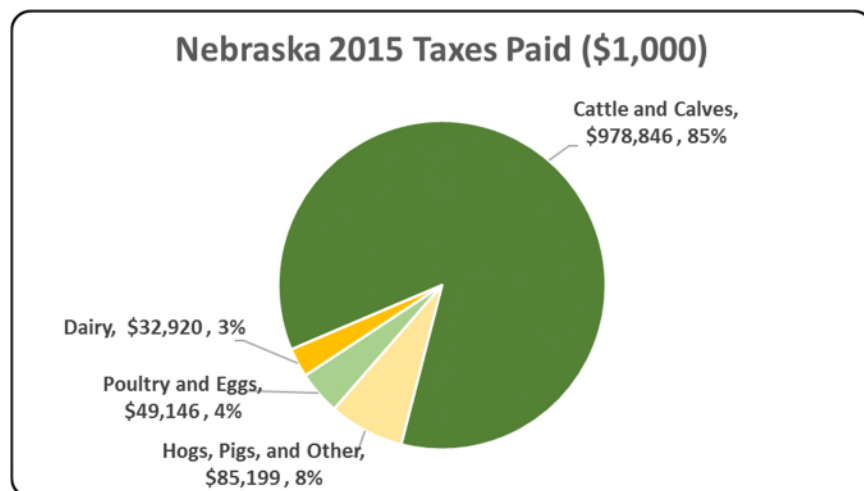
Nebraska Earnings

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 Nebraska economy in terms of earnings. Nebraska’s animal agriculture contributed about \$4.2 billion to household earnings in 2015.



Nebraska Taxes Paid by Animal Agriculture

Nebraska’s animal agriculture is also a significant source of tax revenue. In 2015, the state’s animal agriculture industry paid about \$1.1 billion in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated \$479.0 million in property taxes paid by all of Nebraska agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



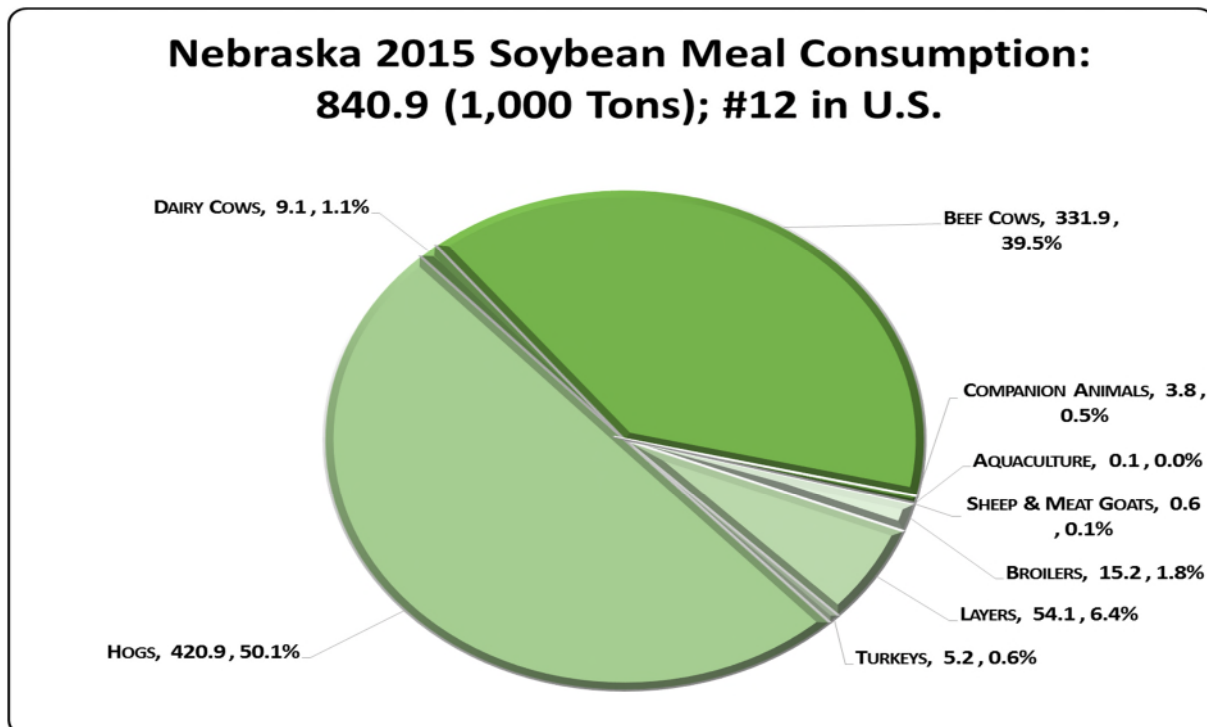
Nebraska Animal Agriculture Soybean Meal Consumption

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.

Nebraska’s animal agriculture consumed almost 840.9 thousand tons of soybean meal in 2015, placing the state as #12 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 (320.9 thousand tons)
- Beef Cows (331.9 thousand tons)
- Egg-Laying Hens (54.1 thousand tons)

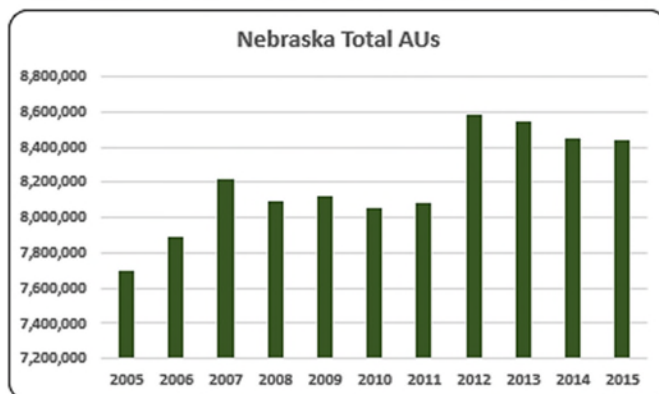
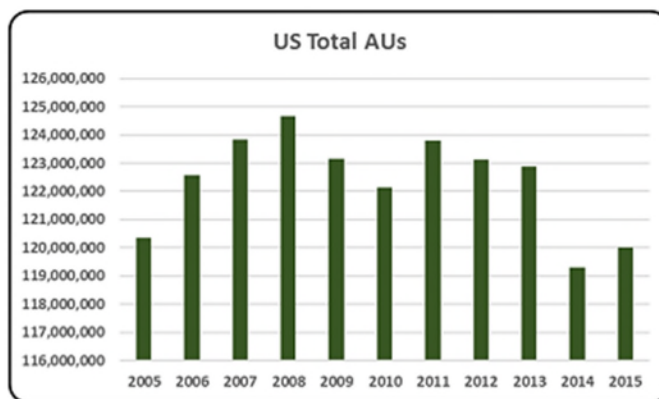


Nebraska Animal Unit (AU) Trends

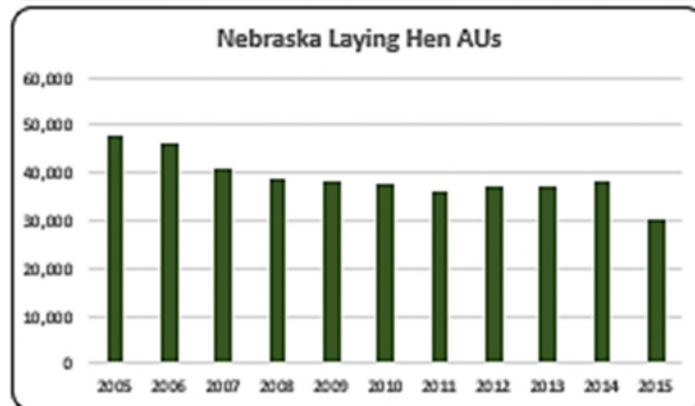
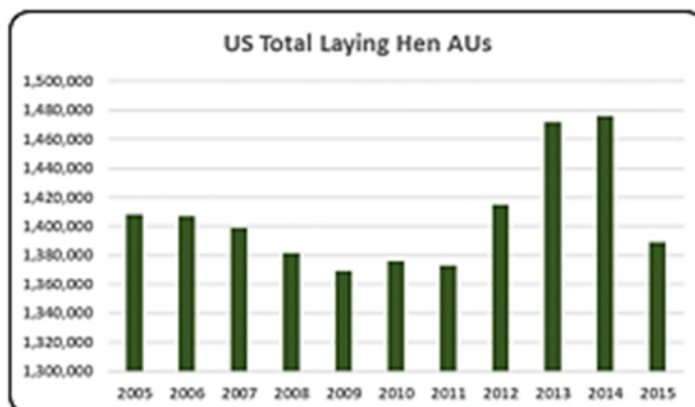
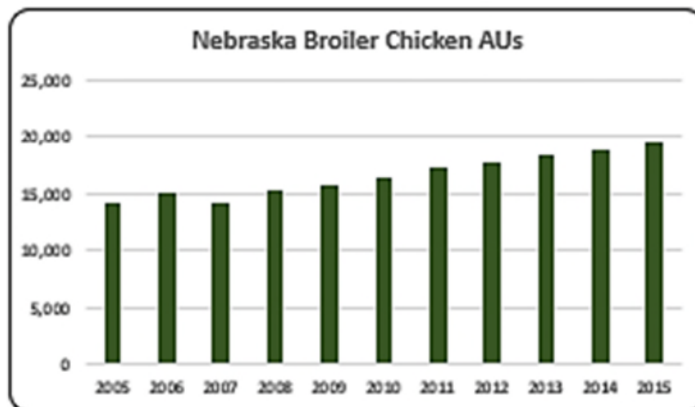
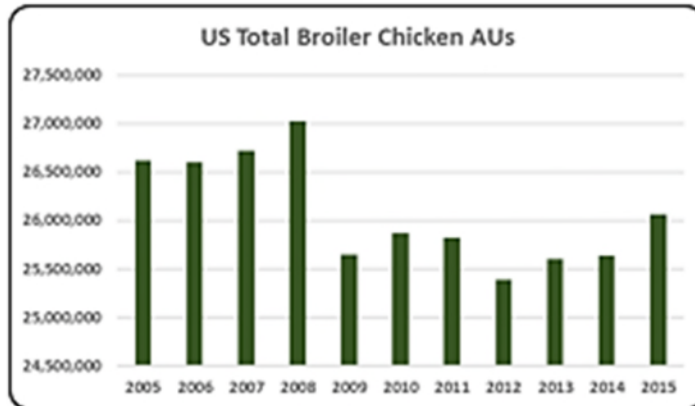
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Nebraska. Due to this reality, using a single year as a measure of the presence and strength of a sector can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

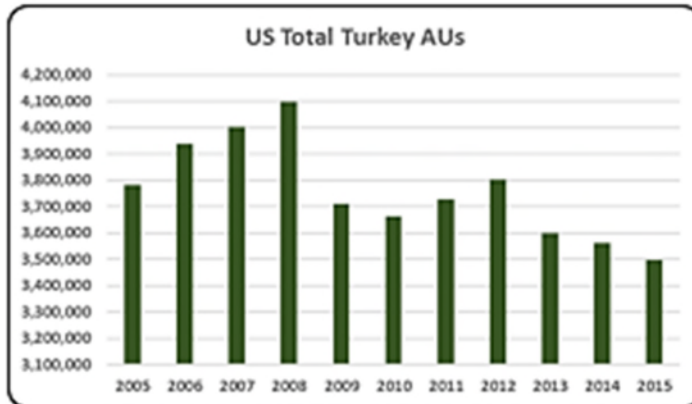
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Nebraska, the largest three segments of animal agriculture in terms of AUs during 2015 were: Beef Cows (7.2 million AUs), Hogs (1.1 million AUs), and Dairy Cows (75,600 AUs). Total animal units in Nebraska during 2015 were 8.4 million AUs.



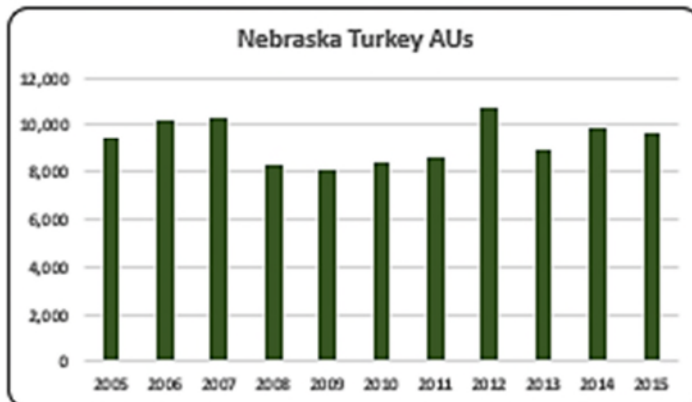
- Overall U.S. total AUs have varied from 2005 to 2015. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2005-15 time period, total AUs in the nation peaked in 2008.
- The number of AUs in Nebraska in 2015 were at 8.4 million. AUs have risen 10% during the 2005-2015 period.



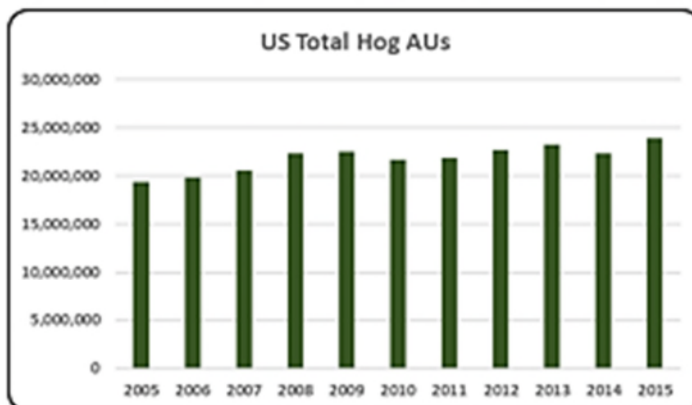
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2005 to 2015, broiler chicken AUs were about 26.0 million. In 2015, AUs rebounded 3% from the low AUs numbers in 2012 (25.4 million AUs).
- Broiler production in Nebraska represented only 0.2% (19,416 broiler AUs) of all animal production in 2015. The average broiler AUs from 2005 to 2015 has been 16,589.
- 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.
- Less than 0.4% (30,129) of all AUs in the state of Nebraska came from layer production in 2015. Layer production has declined 37% since 2005.



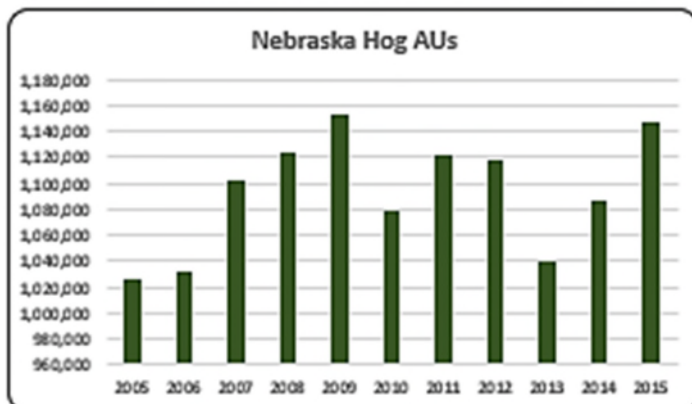
- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.



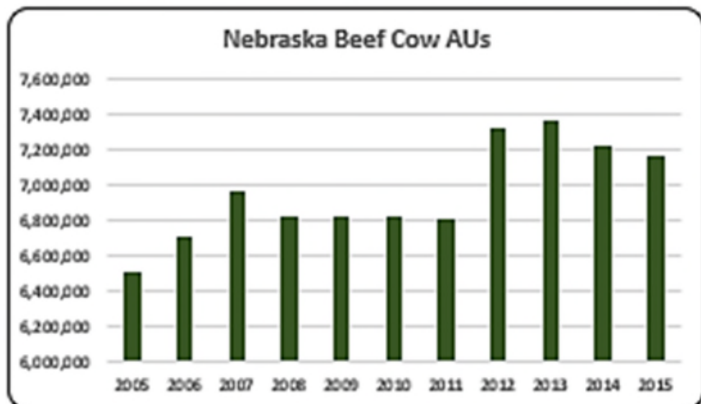
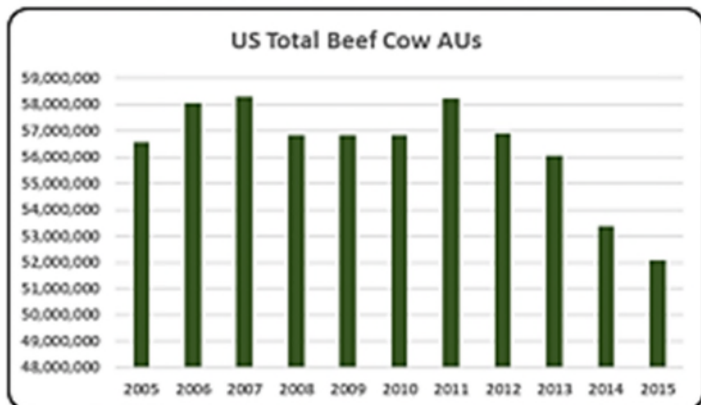
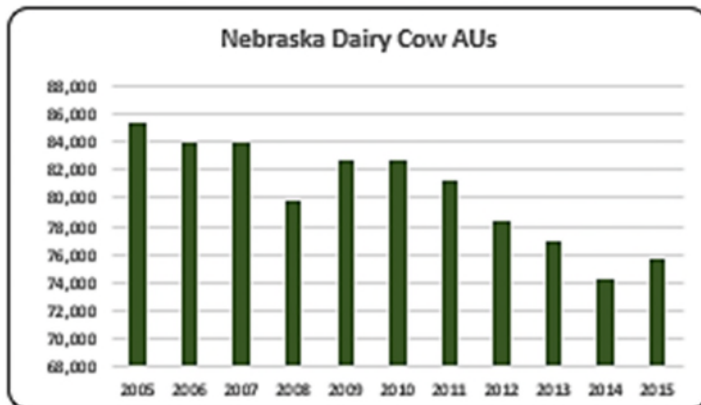
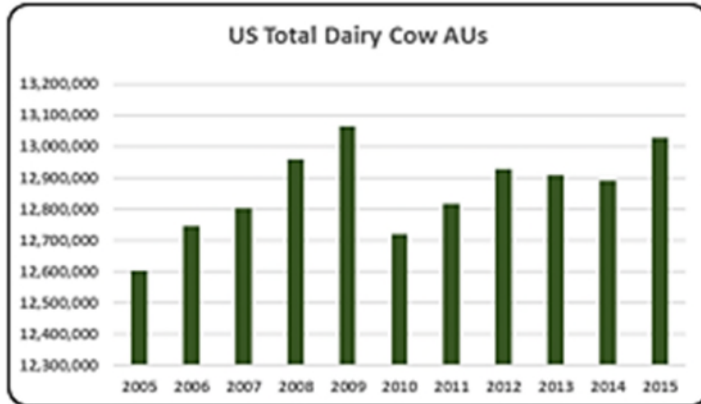
- From 2005 to 2015 turkey production averaged about 9,329 turkey AUs remaining lower than the high record turkey production in 2012 (10,731 turkey AUs).



- 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 4.8% (1.1 million) of hog production in the U.S. came from Nebraska in 2015. Production in 2015 remained 0.5% behind record high production in 2009 (1.15 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.
- Dairy cow production represented less than 1% (75,600 dairy cow AUs) of all animal production in the state in 2015. Dairy cow production has dropped 11% during the 2005-2015 decade.
- 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 production in Nebraska represented 84.8% (7.2 million AUs) of all animal production in 2015. The industry has climbed 10% since the beginning of the decade.

Nebraska Additional Information and Methodology

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

Nebraska 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 Nebraska'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 Nebraska, \$1.72 to \$2.70 million in total economic activity, \$0.40 to \$0.58 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	\$ 2.369	\$ 0.487	10.3
	Hogs, Pigs, and Other	\$ 1.721	\$ 0.398	8.1
	Poultry and Eggs	\$ 2.695	\$ 0.578	11.9
	Dairy	\$ 2.262	\$ 0.521	11.5

Appendix

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Animal Units (AUs)	Beef Cattle AUs	6,509,850	6,701,850	6,965,850	6,827,850	6,827,850	6,813,900	7,318,650	7,367,100	7,220,550	7,160,550	
	Hog and Pig AUs	1,026,900	1,031,850	1,102,350	1,124,700	1,153,050	1,079,550	1,122,000	1,117,650	1,040,250	1,087,050	
	Broiler AUs	14,143	15,023	14,117	15,333	15,830	16,362	17,246	17,794	18,334	18,875	
	Turkey AUs	9,424	10,240	10,340	8,265	8,096	8,433	8,583	10,731	8,952	9,883	
	Egg Layer AUs	47,712	46,140	40,936	38,940	38,020	37,484	36,252	37,393	37,430	38,265	
	Dairy AUs	85,400	84,000	84,000	79,800	82,600	82,600	81,200	78,400	77,000	74,200	
	Total Animal Units	7,693,429	7,889,103	8,217,593	8,094,888	8,125,446	8,052,279	8,079,181	8,580,619	8,549,067	8,448,823	8,443,015
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 3,874,740	\$ 4,094,920	\$ 4,246,461	\$ 4,201,844	\$ 3,746,363	\$ 4,108,779	\$ 5,044,827	\$ 5,820,360	\$ 5,860,830	\$ 7,414,063	\$ 7,405,289
	Hogs and Pigs (\$1,000)	\$ 727,650	\$ 699,144	\$ 727,299	\$ 710,448	\$ 622,442	\$ 800,932	\$ 913,304	\$ 842,576	\$ 844,760	\$ 1,004,858	\$ 778,171
	Broilers (\$1,000)	\$ 12,232	\$ 11,322	\$ 12,330	\$ 9,615	\$ 5,676	\$ 3,305	\$ 13,635	\$ 14,344	\$ 14,967	\$ 15,168	\$ 14,795
	Turkeys (\$1,000)	\$ 8,952	\$ 10,583	\$ 11,760	\$ 10,150	\$ 9,244	\$ 11,632	\$ 12,938	\$ 17,576	\$ 13,917	\$ 15,747	\$ 16,768
	Eggs (\$1,000)	\$ 82,989	\$ 96,358	\$ 185,092	\$ 225,242	\$ 146,859	\$ 152,857	\$ 169,837	\$ 180,838	\$ 197,279	\$ 240,640	\$ 281,171
	Milk (\$1,000)	\$ 165,858	\$ 149,812	\$ 202,100	\$ 204,687	\$ 160,532	\$ 202,064	\$ 249,849	\$ 232,456	\$ 244,650	\$ 298,750	\$ 232,646
	Other	\$ 10,376	\$ 9,195	\$ 9,399	\$ 9,308	\$ 9,124	\$ 10,975	\$ 9,999	\$ 10,075	\$ 10,152	\$ 10,229	\$ 10,306
	Sheep and Lambs (\$1,000)	\$ 8,626	\$ 7,363	\$ 7,485	\$ 7,312	\$ 7,046	\$ 8,816	\$ 7,757	\$ 7,752	\$ 7,747	\$ 7,742	\$ 7,737
	Aquaculture (\$1,000)	\$ 1,750	\$ 1,832	\$ 1,914	\$ 1,996	\$ 2,078	\$ 2,159	\$ 2,241	\$ 2,323	\$ 2,405	\$ 2,487	\$ 2,569
	Total (\$1,000)	\$ 4,882,797	\$ 5,071,334	\$ 5,394,441	\$ 5,371,293	\$ 4,700,240	\$ 5,290,544	\$ 6,414,388	\$ 7,118,225	\$ 7,186,555	\$ 8,999,455	\$ 8,739,146

Ag Census Data Category	Animal Type	1997	2002	2007	2012	
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	12,886	12,709	10,775	11,788	
	Cattle feedlots (112112)	2,371	2,511	1,534	1,083	
	Dairy cattle and milk production (11212)	603	507	267	247	
	Hog and pig farming (1122)	2,563	1,302	936	644	
	Poultry and egg production (1123)	149	173	489	282	
	Sheep and goat farming (1124)	428	464	558	837	
	Animal aquaculture and other animal production (1125,1129)	1,377	2,360	2,489	3,954	
Value of Sales (\$1,000)	Cattle and Calves	4,967,832	5,401,018	7,358,555	10,098,166	
	Hogs and Pigs	788,827	590,581	923,209	1,085,828	
	Poultry and Eggs	149,559	142,442	165,265	216,370	
	Milk and Other Dairy Products	124,134	148,941	172,066	219,724	
	Aquaculture	2,154	2,170	3,826	3,550	
	Other (calculated)	23,624	30,240	39,789	44,375	
	Total	6,056,130	6,315,392	8,662,710	11,668,013	
Input Purchases	Livestock and poultry purchased	(Farms)	19,837	16,074	13,253	16,094
		\$1,000	2,405,077	3,211,783	4,066,702	5,117,496
	Breeding livestock purchased	(Farms)	<i>n/a</i>	9,741	8,516	10,656
		\$1,000	<i>n/a</i>	90,966	175,943	251,297
	Other livestock and poultry purchased	(Farms)	<i>n/a</i>	9,173	6,927	8,217
		\$1,000	<i>n/a</i>	3,120,817	3,890,759	4,866,199
	Feed purchased	(Farms)	28,251	26,376	21,335	28,254
	\$1,000	1,408,802	1,490,523	2,045,635	3,981,917	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
2015 Animal Agriculture	Cattle and Calves	\$ 17,543,870	\$ 3,602,673	76,059	\$ 978,846
	Hogs, Pigs, and Other	\$ 1,356,969	\$ 313,577	6,375	\$ 85,199
	Poultry and Eggs	\$ 842,880	\$ 180,885	3,736	\$ 49,146
	Dairy	\$ 526,199	\$ 121,162	2,668	\$ 32,920
	Total	\$ 20,269,918	\$ 4,218,298	88,837	\$ 1,146,111
Change from 2005 to 2015	Cattle and Calves	\$ 6,403,408	\$ 1,314,954	27,761	\$ 357,273
	Hogs, Pigs, and Other	\$ (184,482)	\$ (42,631)	(867)	\$ (11,583)
	Poultry and Eggs	\$ 502,140	\$ 107,761	2,225	\$ 29,279
	Dairy	\$ 70,930	\$ 16,332	360	\$ 4,437
	Total	\$ 6,791,996	\$ 1,396,416	29,479	\$ 379,406
RIMS II Multipliers	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
	Cattle and Calves	\$ 2.369	\$ 0.487	10.3	
	Hogs, Pigs, and Other	\$ 1.721	\$ 0.398	8.1	
	Poultry and Eggs	\$ 2.695	\$ 0.578	11.9	
	Dairy	\$ 2.262	\$ 0.521	11.5	
Tax Rates	Federal effective income tax rate				12.7%
	Federal Social Security tax rate				7.7%
	State Effective Rate				6.8%
	Total				27.2%

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.