

Economic Analysis of Animal Agriculture 2005-2015

TEXAS

**A Report for
United Soybean Board**



September 2016



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Texas Executive Summary

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

- \$35.9 billion in economic output
- 233,556 jobs
- \$7.8 billion in earnings
- \$1.6 billion in income taxes paid at local, state, and federal levels
- \$553.9 million in the form of property taxes

Plus, from 2005-2015 animal agriculture in Texas has increased economic output by over \$8.2 billion, boosted household earnings by \$1.8 billion, contributed 53,550 additional jobs and paid \$362.4 million in additional tax revenues.

Texas's animal agriculture consumed almost 1.3 million tons of soybean meal in 2015. This soybean meal was fed primarily to:

- Broilers (850.7 thousand tons)
- Hogs (136.6 thousand tons)
- Beef Cows (117.9 thousand tons)

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

Texas Economic Impact of Animal Agriculture

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

- About \$35.9 billion in economic output
- \$7.8 billion in household earnings
- 233,556 jobs
- \$1.6 billion in income taxes

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

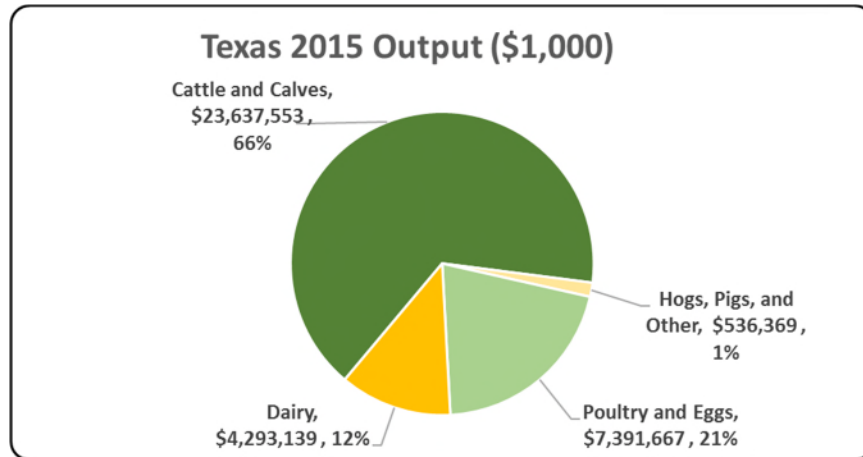
- Increased economic output by \$8.2 billion
- Boosted household earnings by \$1.8 billion
- Added 53,550 jobs
- Paid an additional \$362.4 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2015	Change 2005-2015	% Change 2005-2015
Output (\$1,000)	\$ 35,858,727	\$ 8,177,217	29.54%
Earnings (\$1,000)	\$ 7,752,235	\$ 1,782,657	29.86%
Employment (Jobs)	233,556	53,550	29.75%
Income Taxes Paid (\$1,000)	\$ 1,576,029	\$ 362,414	29.86%
Property Taxes Paid in 2012 (\$1,000)	\$ 553,870		

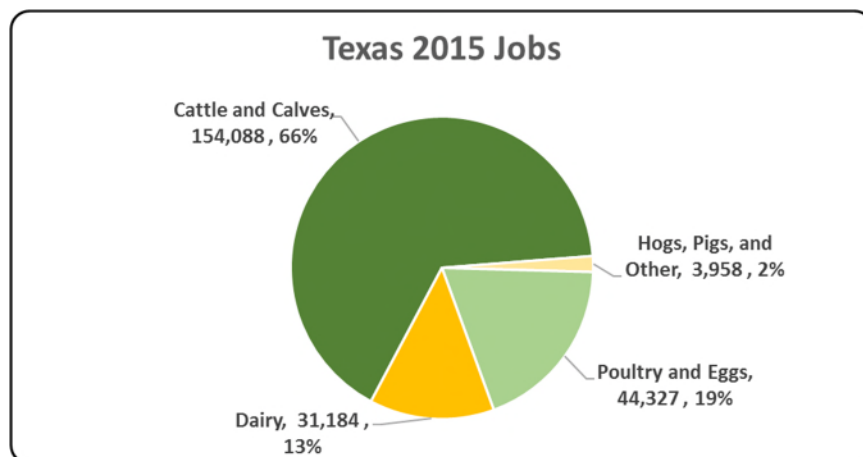
Texas Output

“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 Texas economy. Animal agriculture’s impact on Texas total economic output is about \$35.9 billion.



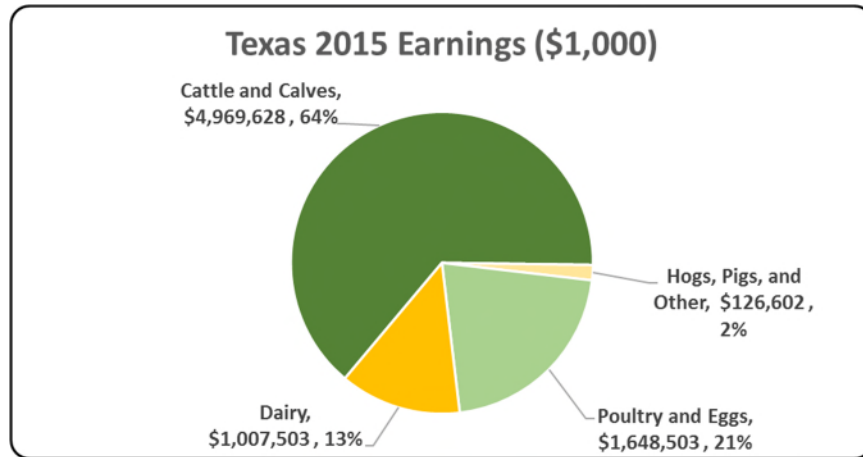
Texas Jobs

“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 Texas in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Texas total jobs, contributing 233,556 jobs within and outside of animal agriculture.



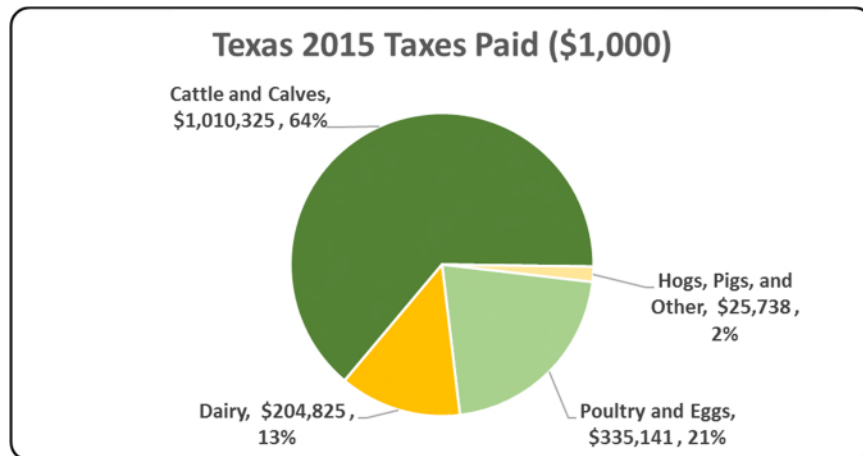
Texas Earnings

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 Texas economy in terms of earnings. Texas’s animal agriculture contributed about \$7.8 billion to household earnings in 2015.



Texas Taxes Paid by Animal Agriculture

Texas’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 \$553.9 million in property taxes paid by all of Texas agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



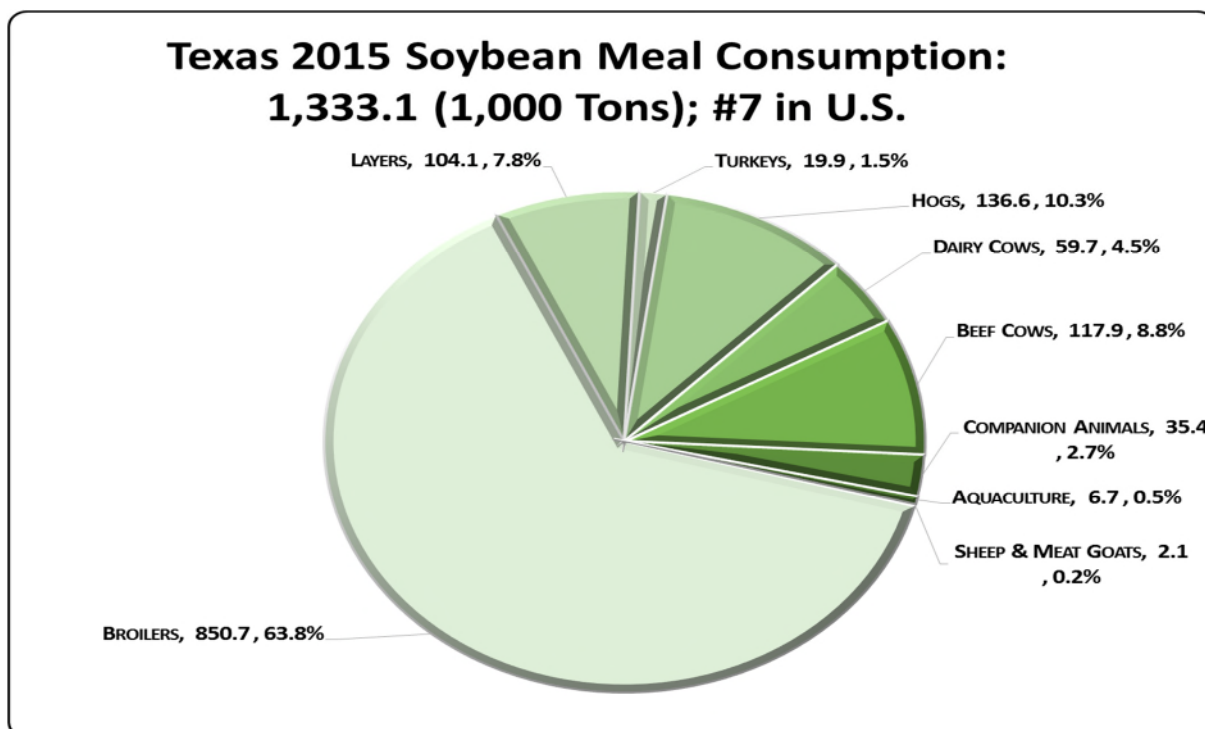
Texas Animal Agriculture Soybean Meal Consumption

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.

Texas's animal agriculture consumed almost 1.3 million tons of soybean meal in 2015, placing the state as #7 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 (850.7 thousand tons)
- Hogs (136.6 thousand tons)
- Beef Cows (117.9 thousand tons)

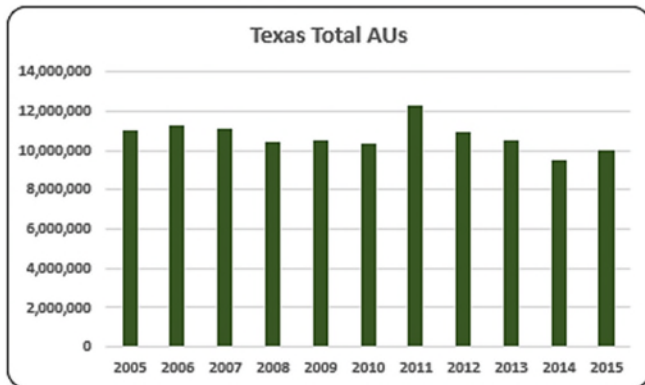
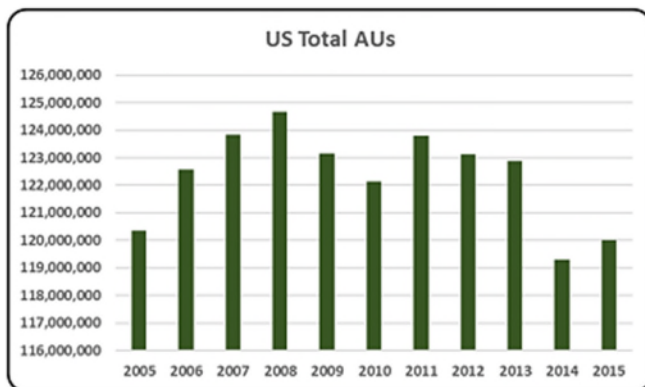


Texas Animal Unit (AU) Trends

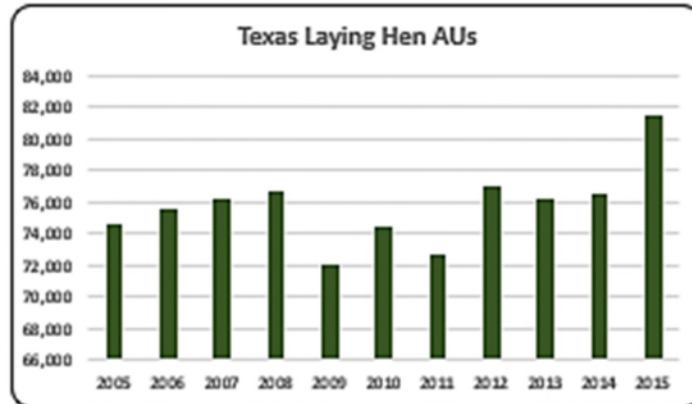
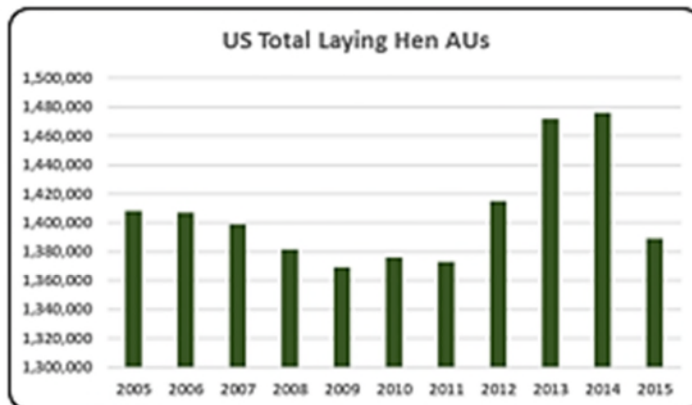
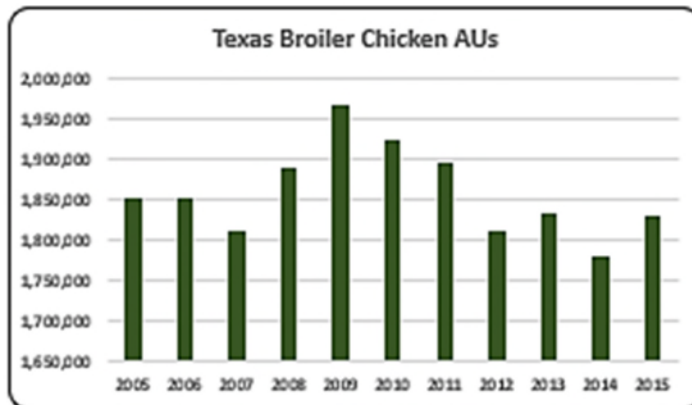
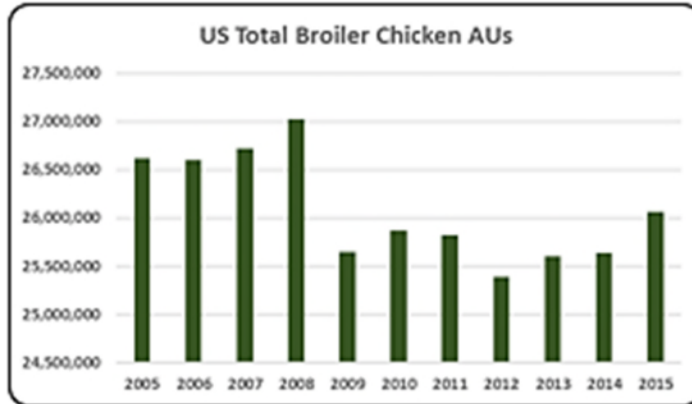
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Texas. Due to this reality, using a single year as a measure of the presence and strength of a sector can be 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 Texas and to give perspective on Texas’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 Texas, the largest three segments of animal agriculture in terms of AUs during 2015 were: Beef Cows (7.0 million AUs), Broilers (1.8 million AUs), and Dairy Cows (658,000 AUs). Total animal units in Texas during 2015 were 10.0 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.
- There were 10.0 million AUs in Texas in 2015. Eight percent of all AUs in the U.S. were in Texas in 2015.

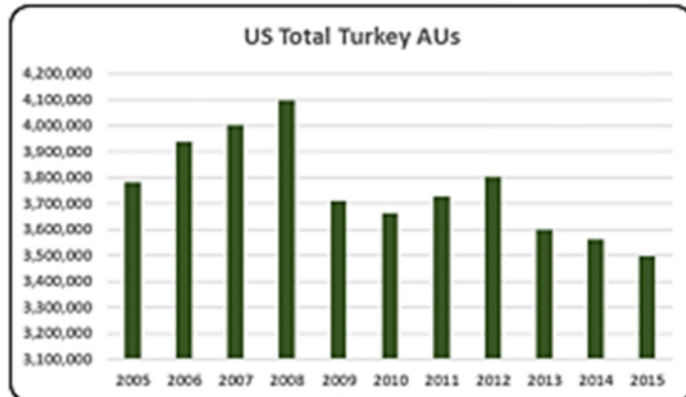


- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2005 to 2015, broiler chicken AUs were about 26.0 million. In 2015, AUs rebounded 3% from the low AUs numbers in 2012 (25.4 million AUs).

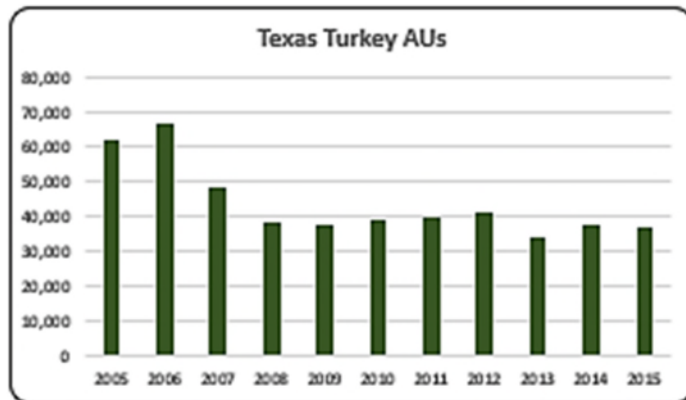
- Broiler production in Texas contributed 18.3% (1.8 million broiler AUs) of all animal production in the state in 2015. There was a record broiler inventory in 2009 with 1.97 million broiler AUs.

- 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.

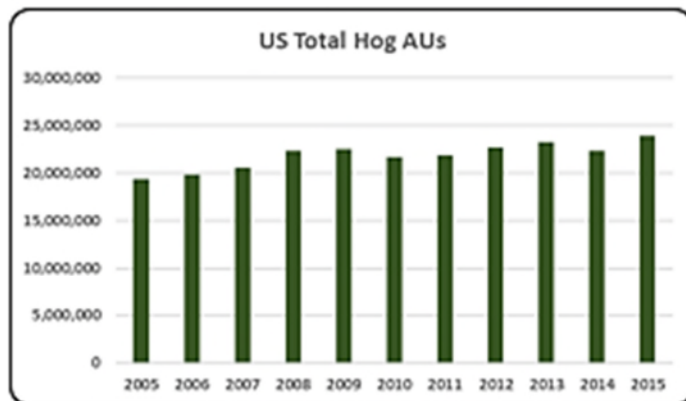
- Less than 1% (81,492 layer AUs) of all animal production in 2015 was in layer production. 2015 production was almost 9% above the level of layer AUs in 2005 (74,676).



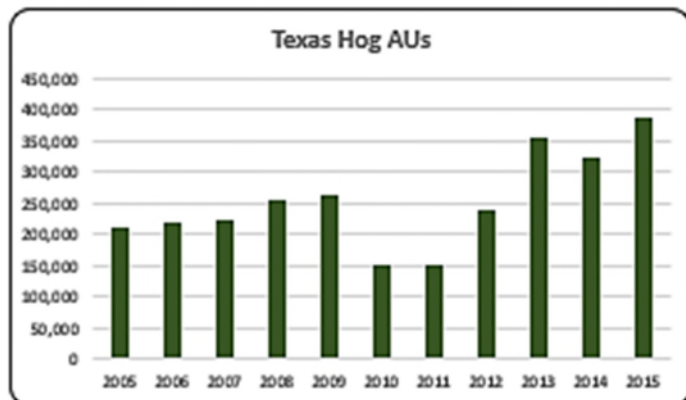
- In 2015 turkey AUs were the lowest of the decade at 3.5 million, decreasing 15% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade. The most recent contributor to this decline has been avian influenza.



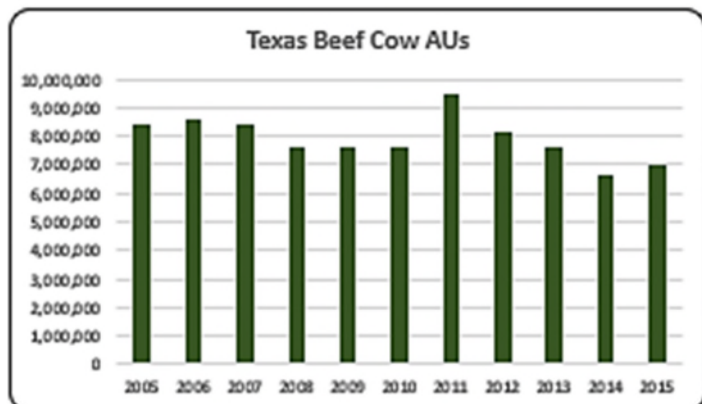
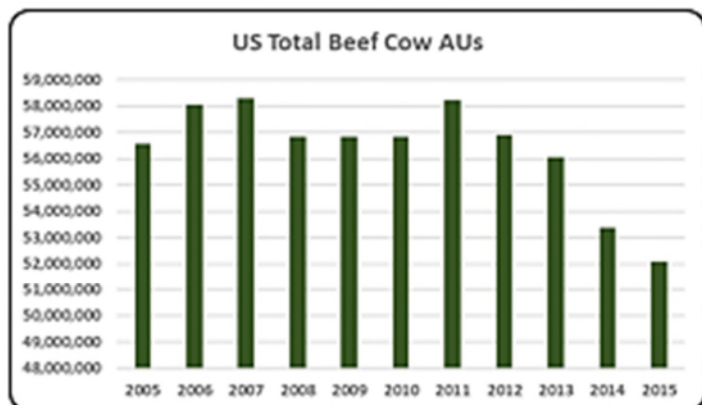
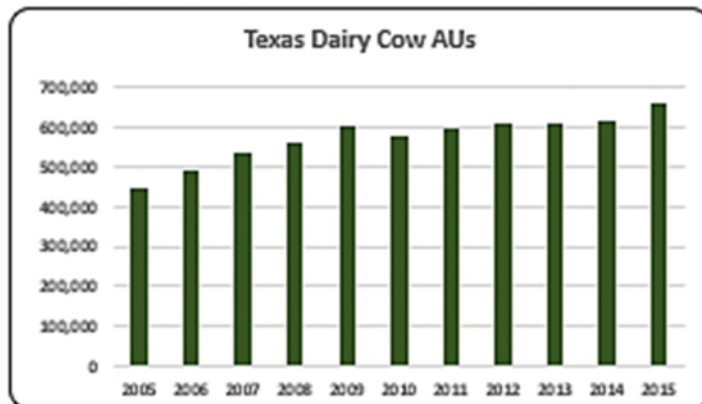
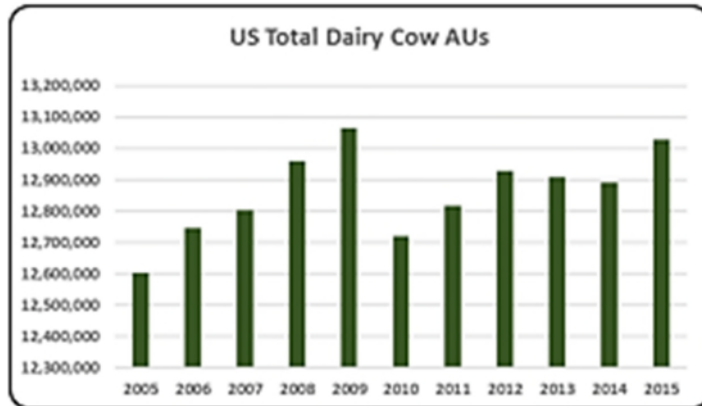
- Turkey production in Texas was the smallest of all animal production in the state, contributing only 0.37% (37,017) to Texas animal production in 2015.



- On average from 2005 to 2015, hog AUs were about 21.8 million. Hog AUs in 2015 increased 24% to 23.9 million AUs compared to the decade low in 2005 (19.4 million AUs). Despite the fluctuation in AUs, the pork supply was relatively stable.



- On average, there were 252,095 hog AUs in Texas from 2005 to 2015. Hog production in 2015 (385,500 hog AUs) was 84% higher than production in 2005 (209,850 hog AUs).



- 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 in 2015 (658,000 dairy cow AUs) made up 6.14% of all AUs in the state.

- 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.

- Seventy percent (7.0 million beef cow AUs) of all Texas AUs were from beef cows. Beef cow production declined 16% throughout the decade.

Texas Additional Information and Methodology

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

Texas 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 Texas’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 Texas, \$1.77 to \$2.63 million in total economic activity, \$0.42 to \$0.59 in household wages and 13 to 17 additional jobs are generated in the economy at large.

	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	\$ 2.581	\$ 0.543	16.8
	Hogs, Pigs, and Other	\$ 1.771	\$ 0.418	13.1
	Poultry and Eggs	\$ 2.626	\$ 0.586	15.7
	Dairy	\$ 2.356	\$ 0.553	17.1

Appendix

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Animal Units (AUs)	Beef Cattle AUs	8,405,250	8,565,000	8,393,250	7,581,750	7,581,750	7,581,750	9,523,500	8,115,900	7,593,150	6,629,400	7,025,625
	Hog and Pig AUs	209,850	218,100	221,550	255,150	264,300	151,050	151,800	239,850	354,900	321,000	385,500
	Broiler AUs	1,850,108	1,850,806	1,812,577	1,890,047	1,967,590	1,922,536	1,894,354	1,811,287	1,833,746	1,778,675	1,829,495
	Turkey AUs	61,504	66,830	47,940	38,319	37,535	39,097	39,794	41,083	34,271	37,833	37,017
	Egg Layer AUs	74,676	75,576	76,228	76,676	71,992	74,488	72,672	77,001	76,268	76,554	81,492
	Dairy AUs	445,200	490,000	532,000	560,000	602,000	574,000	595,000	609,000	609,000	616,000	658,000
	Total Animal Units	11,046,588	11,266,311	11,083,544	10,401,942	10,525,167	10,342,921	12,277,120	10,894,122	10,501,334	9,459,462	10,017,129
Value of Production (\$1,000)	Cattle and Calves (\$1,000)	\$ 6,045,767	\$ 5,704,640	\$ 6,025,583	\$ 6,449,008	\$ 5,481,429	\$ 6,101,526	\$ 8,076,312	\$ 7,423,536	\$ 7,536,504	\$ 9,197,494	\$ 9,157,228
	Hogs and Pigs (\$1,000)	\$ 101,839	\$ 104,926	\$ 107,819	\$ 131,583	\$ 106,533	\$ 75,023	\$ 103,262	\$ 266,045	\$ 197,889	\$ 241,847	\$ 205,525
	Broilers (\$1,000)	\$ 1,436,644	\$ 1,198,800	\$ 1,404,552	\$ 1,592,244	\$ 1,650,227	\$ 1,757,083	\$ 1,678,517	\$ 1,747,550	\$ 2,184,957	\$ 2,261,860	\$ 2,030,358
	Turkeys (\$1,000)	\$ 58,422	\$ 69,069	\$ 54,526	\$ 47,059	\$ 42,860	\$ 53,931	\$ 59,984	\$ 67,286	\$ 53,277	\$ 60,284	\$ 64,193
	Eggs (\$1,000)	\$ 238,798	\$ 254,055	\$ 373,500	\$ 462,283	\$ 347,480	\$ 395,052	\$ 421,982	\$ 445,497	\$ 471,264	\$ 525,954	\$ 720,036
	Milk (\$1,000)	\$ 985,932	\$ 951,881	\$ 1,454,648	\$ 1,573,792	\$ 1,175,720	\$ 1,509,588	\$ 1,993,056	\$ 1,794,452	\$ 1,960,440	\$ 2,536,260	\$ 1,822,215
	Other	\$ 82,889	\$ 73,761	\$ 75,786	\$ 71,214	\$ 84,557	\$ 93,346	\$ 88,269	\$ 90,557	\$ 92,846	\$ 95,134	\$ 97,423
	Sheep and Lambs (\$1,000)	\$ 47,530	\$ 34,101	\$ 31,824	\$ 22,951	\$ 31,992	\$ 36,480	\$ 27,101	\$ 25,088	\$ 23,076	\$ 21,063	\$ 19,050
	Aquaculture (\$1,000)	\$ 35,359	\$ 39,660	\$ 43,962	\$ 48,263	\$ 52,565	\$ 56,866	\$ 61,167	\$ 65,469	\$ 69,770	\$ 74,071	\$ 78,373
	Total (\$1,000)	\$ 8,950,291	\$ 8,357,133	\$ 9,496,413	\$ 10,327,183	\$ 8,888,805	\$ 9,985,549	\$ 12,421,382	\$ 11,834,923	\$ 12,497,177	\$ 14,918,833	\$ 14,096,977

Ag Census Data Category	Animal Type	1997	2002	2007	2012
Number of Farms by NAICS	Beef cattle ranching and farming (112111)	123,248	127,974	124,992	127,726
	Cattle feedlots (112112)	2,481	5,035	2,229	898
	Dairy cattle and milk production (11212)	1,888	1,221	1,027	656
	Hog and pig farming (1122)	1,785	1,760	1,732	1,184
	Poultry and egg production (1123)	2,065	3,032	5,829	3,980
	Sheep and goat farming (1124)	5,580	8,786	13,272	15,603
	Animal aquaculture and other animal production (1125,1129)	9,703	23,378	28,622	26,587
Value of Sales (\$1,000)	Cattle and Calves	7,271,061	8,083,024	10,503,774	13,013,127
	Hogs and Pigs	116,079	128,231	237,504	239,358
	Poultry and Eggs	1,164,596	1,260,951	2,113,086	2,624,759
	Milk and Other Dairy Products	741,735	676,703	1,245,441	1,698,264
	Aquaculture	20,403	31,058	46,102	82,033
	Other (calculated)	226,460	223,026	289,592	201,944
	Total	9,540,334	10,402,993	14,435,499	17,859,485
Input Purchases	Livestock and poultry purchased	(Farms) 61,645	65,435	55,194	61,054
		\$1,000 3,221,969	4,524,369	6,017,794	6,860,573
	Breeding livestock purchased	(Farms) <i>n/a</i>	43,559	36,667	39,929
		\$1,000 <i>n/a</i>	186,906	420,373	418,586
	Other livestock and poultry purchased	(Farms) <i>n/a</i>	30,388	25,541	29,879
		\$1,000 <i>n/a</i>	4,337,463	5,597,421	6,441,987
Feed purchased	(Farms) 130,839	167,033	158,144	185,019	
	\$1,000 2,868,805	2,700,281	4,226,444	7,272,692	

	Animal Type	Output (\$1,000)	Earnings (\$1,000)	Employment (Jobs)	Taxes Paid (\$1,000)
2015 Animal Agriculture	Cattle and Calves	\$ 23,637,553	\$ 4,969,628	154,088	\$ 1,010,325
	Hogs, Pigs, and Other	\$ 536,369	\$ 126,602	3,958	\$ 25,738
	Poultry and Eggs	\$ 7,391,667	\$ 1,648,503	44,327	\$ 335,141
	Dairy	\$ 4,293,139	\$ 1,007,503	31,184	\$ 204,825
	Total	\$ 35,858,727	\$ 7,752,235	233,556	\$ 1,576,029
Change from 2005 to 2015	Cattle and Calves	\$ 4,698,112	\$ 987,745	30,626	\$ 200,809
	Hogs, Pigs, and Other	\$ 139,446	\$ 32,914	1,029	\$ 6,691
	Poultry and Eggs	\$ 1,865,549	\$ 416,058	11,187	\$ 84,585
	Dairy	\$ 1,474,110	\$ 345,940	10,708	\$ 70,330
	Total	\$ 8,177,217	\$ 1,782,657	53,550	\$ 362,414
	Animal Type	Output(\$)	Earnings (\$)	Employment (Jobs)	
RIMS II Multipliers	Cattle and Calves	\$ 2.581	\$ 0.543	16.8	
	Hogs, Pigs, and Other	\$ 1.771	\$ 0.418	13.1	
	Poultry and Eggs	\$ 2.626	\$ 0.586	15.7	
	Dairy	\$ 2.356	\$ 0.553	17.1	
Tax Rates	Federal effective income tax rate				12.7%
	Federal Social Security tax rate				7.7%
	State Effective Rate				0.0%
	Total				20.3%

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.