Economic Analysis of Animal Agriculture 2004-2014

WISCONSIN

A Report for

United Soybean Board

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Contents

Wisconsin Executive Summary

The use of soybean meal as a key feed ingredient is an important part of Wisconsin'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 Wisconsin. The success of Wisconsin animal agriculture in turn has a large impact on the rest of the state and regional economies. For example, in the state of Wisconsin during 2014 animal agriculture contributed:

- $20.5 billion in economic output
- 145,500 jobs
- $3.7 billion in earnings
- $1.0 billion in income taxes paid at local, state, and federal levels
- $311.2 million in the form of property taxes

Plus, from 2004-2014 animal agriculture in Wisconsin increased economic output by over $7.2 billion, boosted household earnings by $1.3 billion, contributed 50,300 additional jobs and paid $347.7 million in additional tax revenues.

Wisconsin's animal agriculture consumed about 719.0 thousand tons of soybean meal in 2014. This soybean meal was fed primarily to:

- Dairy Cows (485.5 thousand tons)
- Beef Cows (69.3 thousand tons)
- Broilers (62.1 thousand tons)

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

Wisconsin Economic Impact of Animal Agriculture

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

- About $20.5 billion in economic output
- $3.7 billion in household earnings
- 145,500 jobs
- $1.0 billion in income taxes

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

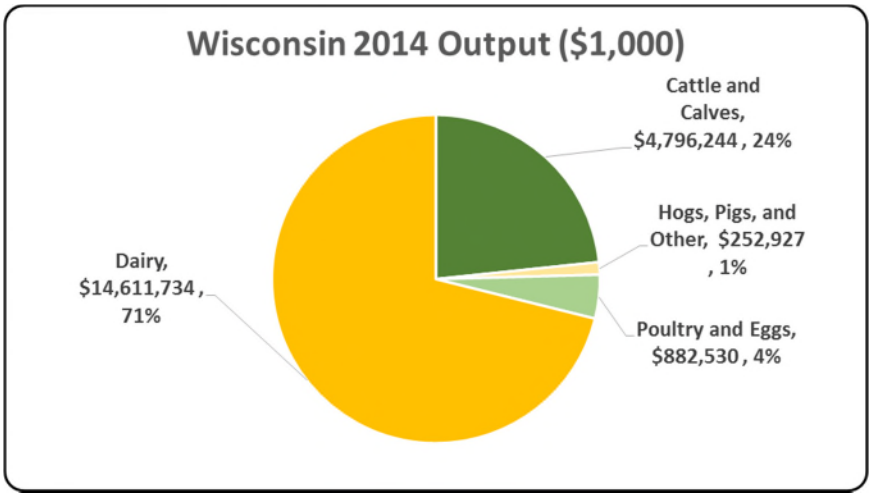
- Increased economic output by $7.2 billion
- Boosted household earnings by $1.3 billion
- Added 50,300 jobs
- Paid an additional $347.7 million in income taxes

Below is a table which demonstrates this decade of change.

Measure	2014	Change 2004-2014	% Change 2004-2014
Output ($1,000)	$ 20,543,435	$ 7,164,928	53.56%
Earnings ($1,000)	$ 3,738,214	$ 1,295,820	53.06%
Employment (Jobs)	145,500	50,300	52.84%
Income Taxes Paid ($1,000)	$ 1,002,963	$ 347,669	53.06%
Property Taxes Paid in 2012 ($1,000)	$ 311,228		

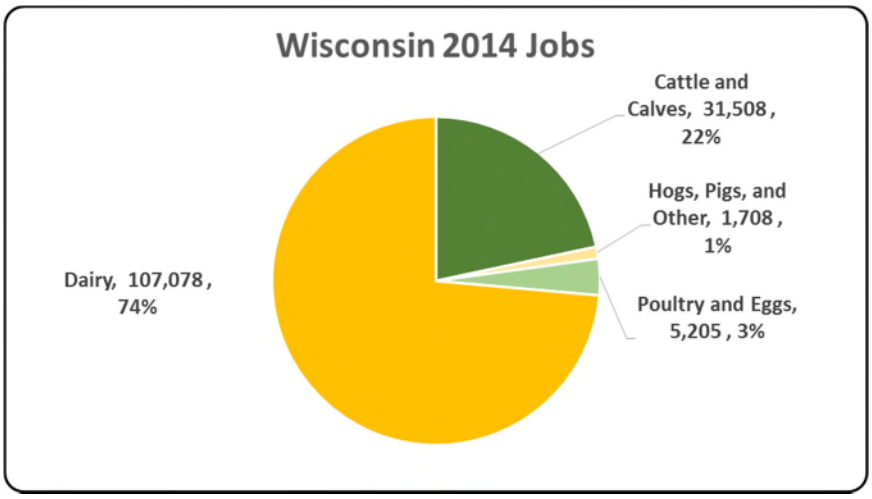
Wisconsin Output

"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 Wisconsin economy. Animal agriculture's impact on Wisconsin total economic output is about $20.5 billion.



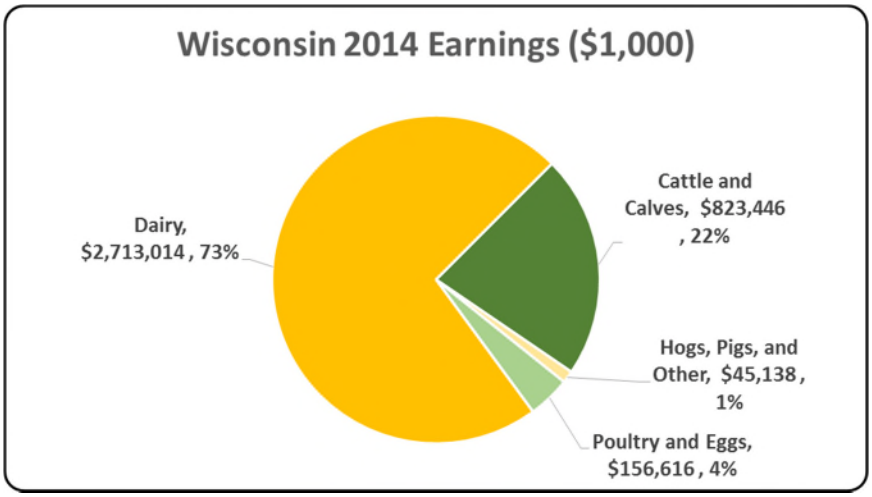
Wisconsin Jobs

"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 Wisconsin in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Wisconsin total jobs, contributing 145,500 jobs within and outside of animal agriculture.



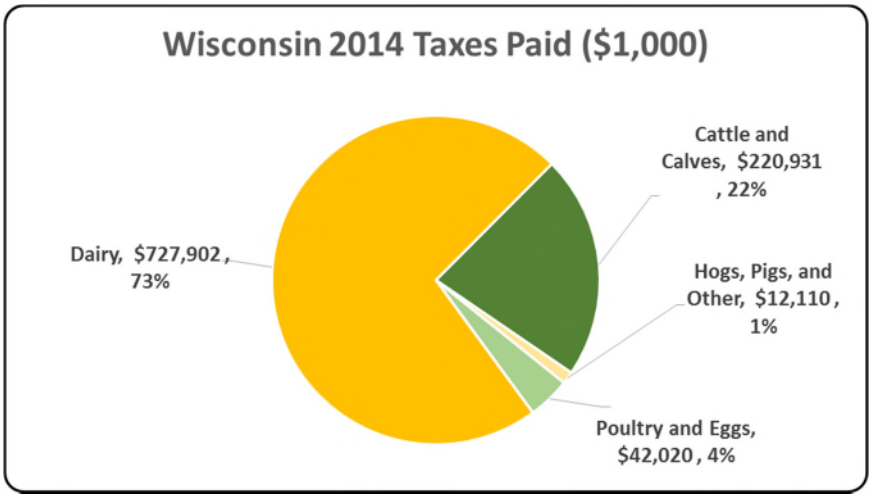
Wisconsin Earnings

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 Wisconsin economy in terms of earnings. Wisconsin's animal agriculture contributed about $3.7 billion to household earnings in 2014.



Wisconsin Taxes Paid by Animal Agriculture

Wisconsin's animal agriculture is also a significant source of tax revenue. In 2014, the state's animal agriculture industry paid about $1,003.0 million in income taxes at local, state, and federal levels. Plus the 2012 Census of Agriculture estimated $311.2 million in property taxes paid by all of Wisconsin agriculture during 2012. Estimates of income taxes paid by animal agriculture are shown in the following chart.



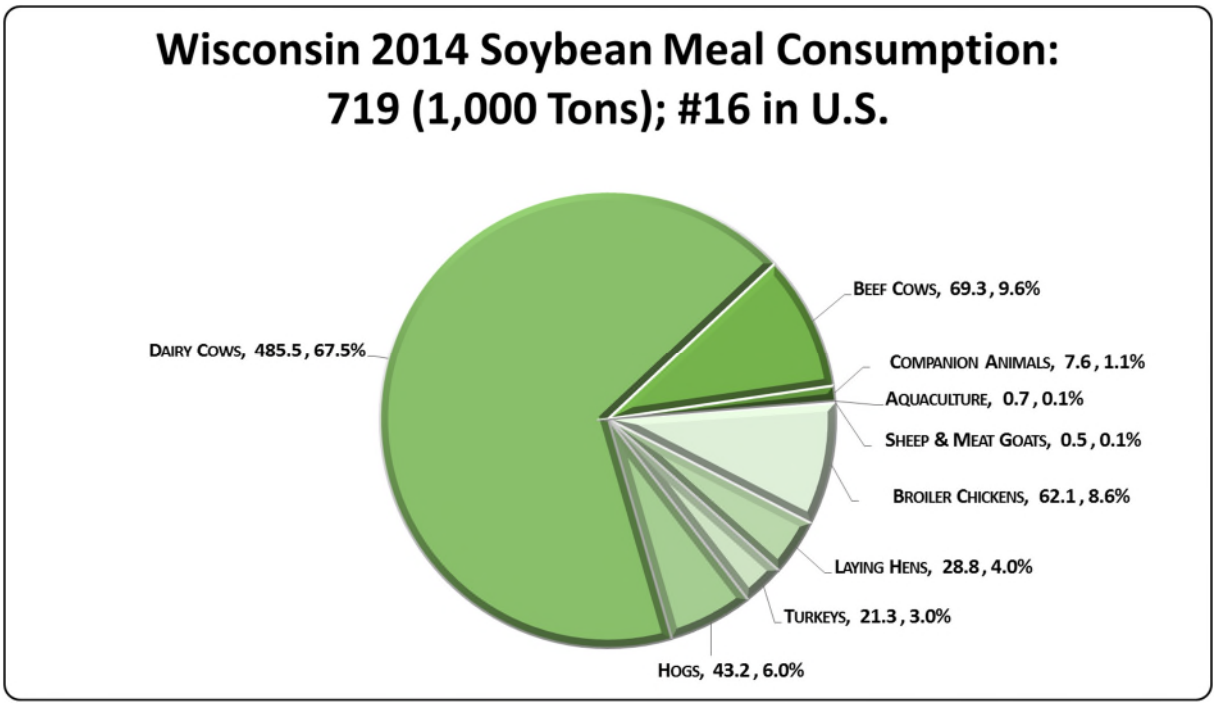
Wisconsin Animal Agriculture Soybean Meal Consumption

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.

Wisconsin's animal agriculture consumed almost 719.0 thousand tons of soybean meal in 2014, placing the state as #16 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:

- Dairy Cows (485.5 thousand tons)
- Beef Cows (69.3 thousand tons)
- Broilers (62.1 thousand tons)

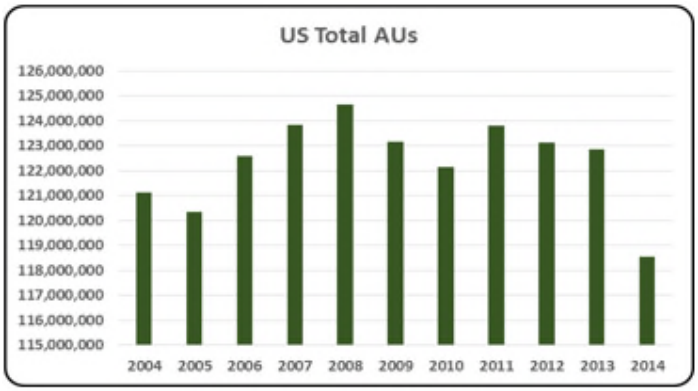


Wisconsin Animal Unit (AU) Trends

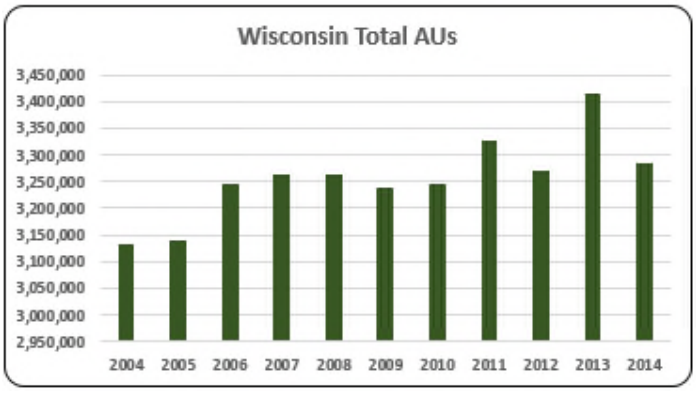
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the United States and abroad have an impact on the size of animal agriculture in the State of Wisconsin. Due to this reality, using a single year as a measure of the presence and strength of a sector can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

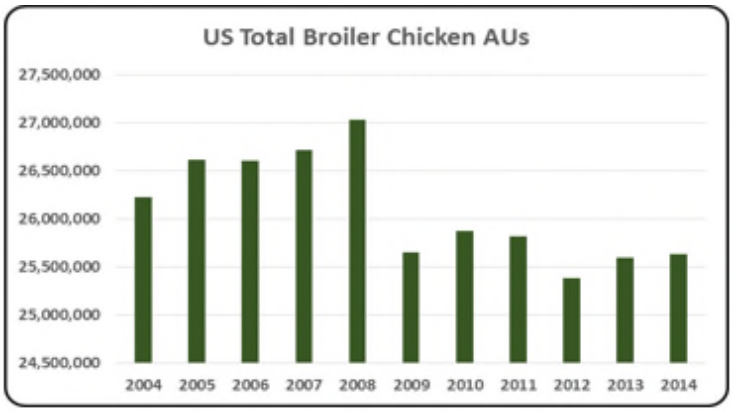
As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Wisconsin, the largest three segments of animal agriculture in terms of AUs during 2014 were: Dairy Cows (1,778.0 thousand AUs), Beef Cows (1,169.8 thousand AUs), and Broilers (160.5 thousand AUs). Total animal units in Wisconsin during 2014 were 3,282.8 thousand AUs.



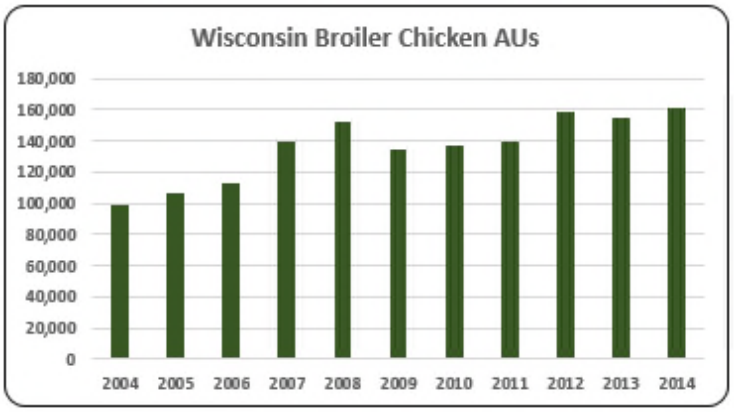
- Overall U.S. total AUs have varied from 2004 to 2014. In 2014 AUs were at an all-time low reflecting, in part, the impact of severe weather on cattle production in some parts of country. During the 2004-14 time period, total AUs in the nation peaked in 2008.



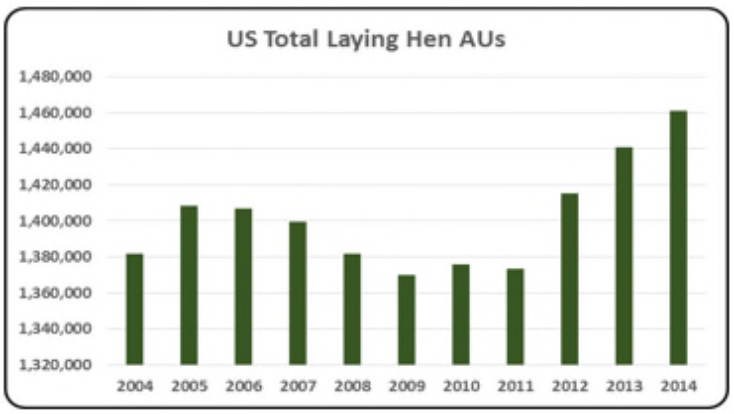
- There were 3,282.8 thousand AUs in Wisconsin in 2014 representing about 2.77% of all AUs in the U.S. AUs increased 4.8% in 2014 relative to 2004 (3,133.8 thousand AUs).



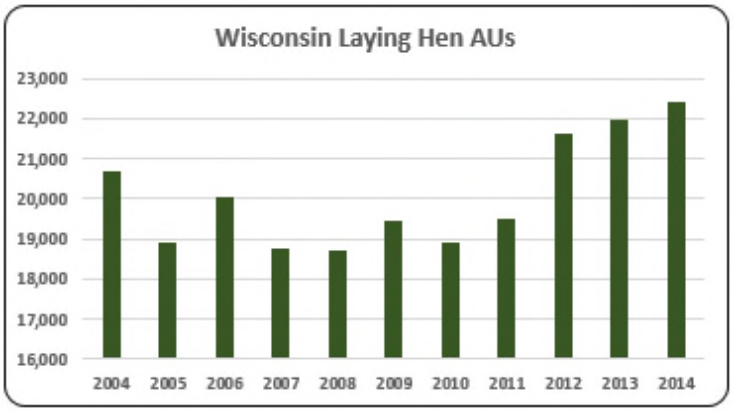
- U.S. broiler production is clustered in a number of states, with Georgia being the largest producer. On average from 2004 to 2014, broiler chicken AUs were about 26.1 million. In 2014, AUs rebounded 1% from the low AUs numbers in 2012 (25.4 million AUs).



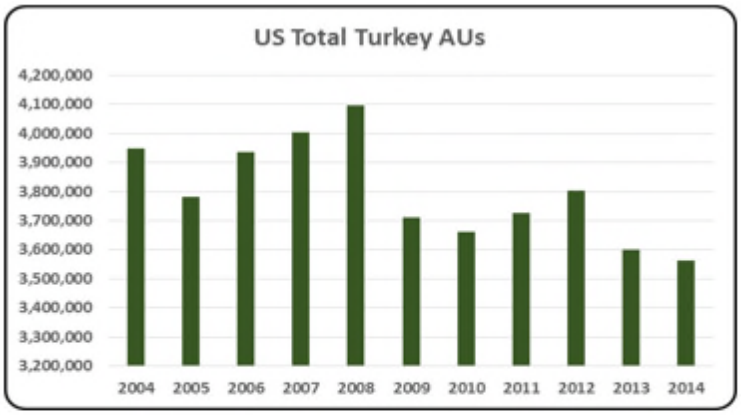
- On average, there were 135,936 broiler AUs in Wisconsin from 2004 to 2014. Broiler AUs in 2014 (160,496 broiler AUs) rose 62.2% compared to 2004 (98,955 broiler AUs).



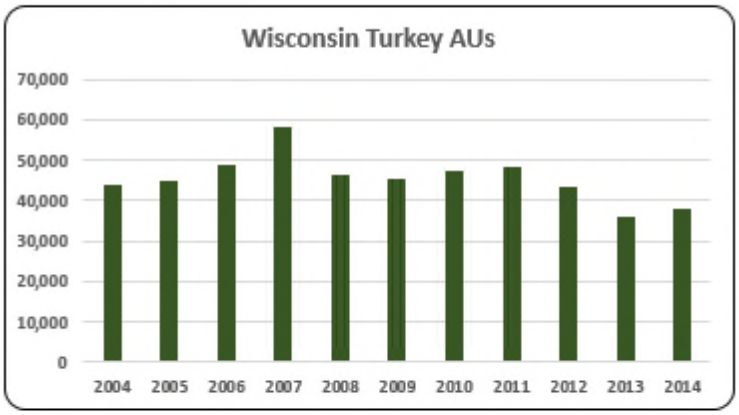
- On average, the layer AUs during 2004-2014 were 1.4 million. In 2014 layer AUs were 1.5 million, up 7% from the lowest number in 2009 (1.4 million AUs).



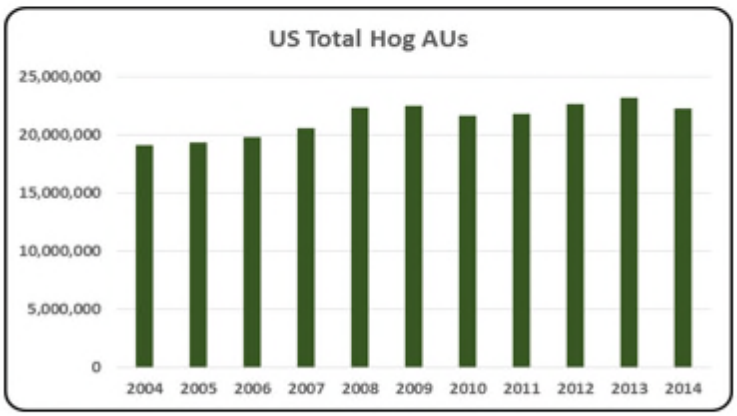
- Layer production was the smallest animal production in Wisconsin during last decade with only 0.68% (22,422 layer AUs) of the total animal production in 2014.



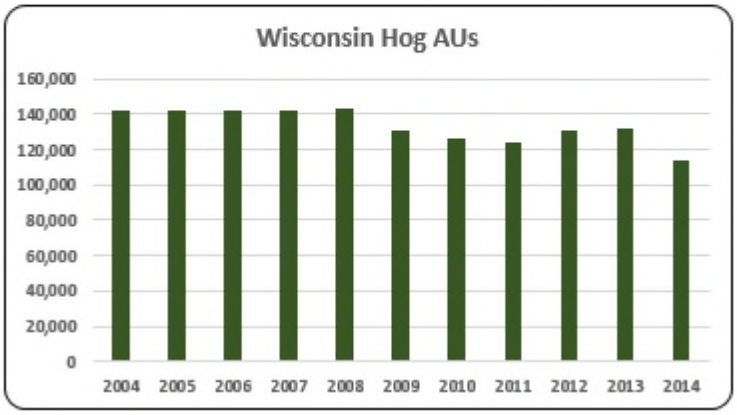
- From 2004 to 2014, the U.S. accounted for 50% of the world's turkey production. However, in 2014 turkey AUs were the lowest of the decade at 3.5 million, decreasing 13% compared to 2008 (4.1 million turkey AUs) the largest turkey AUs of the decade.



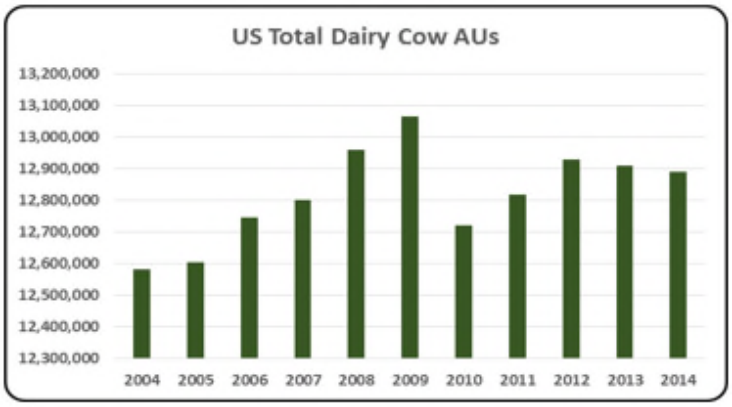
- There were 45,437 turkey AUs on average during the last decade. 2014 turkey AUs (37,775) rose 4.4 year-over-year.



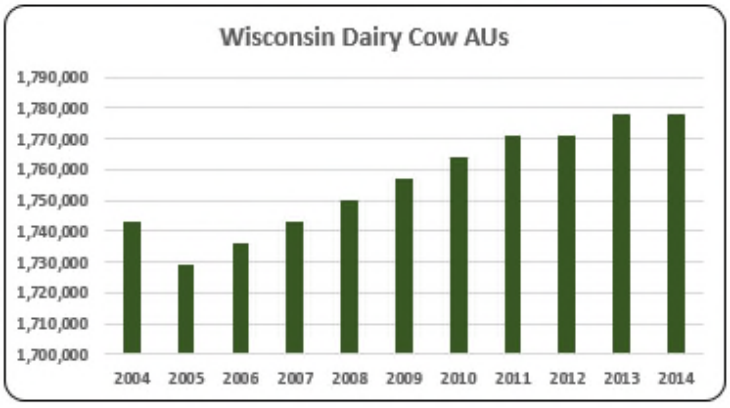
- On average from 2004 to 2014, hog AUs were about 21.4 million. In 2013 hog AUs reached a high of 23.2 million AUs as prices of main feed ingredients, particularly corn, decreased to pre-2010 price levels. Hog AUs in 2014 decreased 4.4% to 22.3 million AUs year-over-year, primarily due to the porcine epidemic diarrhea virus (PEDv) outbreak. Despite the fluctuation in AUs, the pork supply was relatively stable.



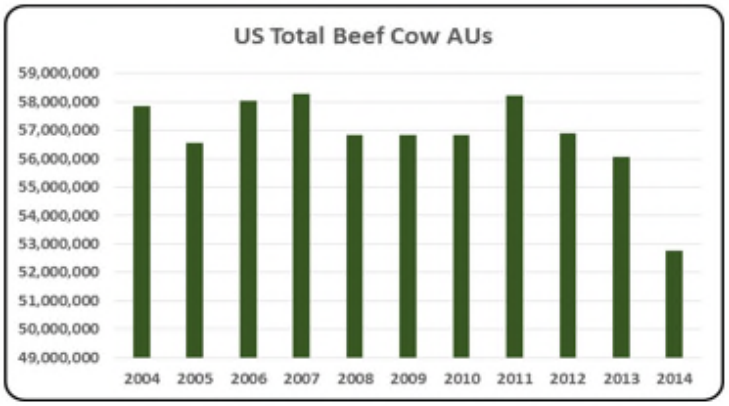
- Hog production in Wisconsin in 2014 decreased to a record low of 114,300 hog AUs. The average number of hog AUs throughout the decade was 133,635.



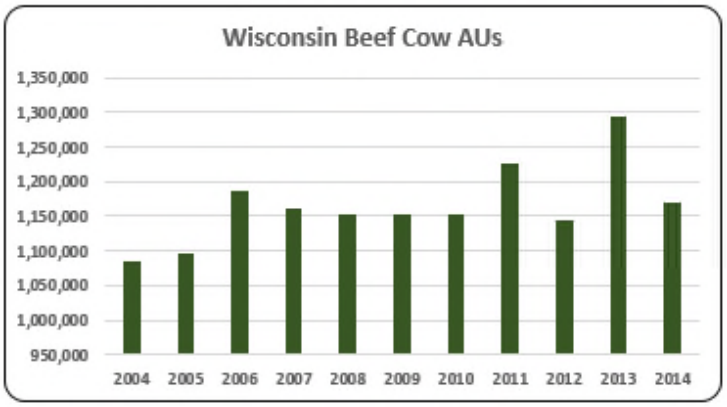
- From 2004 to 2014 dairy cow AUs averaged 12.8 million. In 2014, dairy cow AUs (12.9 million) remained about the same as the previous year but still below the high of 13.1 million AUs, the level in 2009. Despite the fluctuation in AUs, milk supplied has steadily risen.



- As the second largest dairy cow producer in the country, Wisconsin accounted for 13.79% (1,778.0 thousand dairy AUs) of all dairy cows in the U.S. 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.



- Beef cow production made up 35.63% (1,169.8 thousand beef cow AUs) of all animal production in Wisconsin in 2014. Beef cow production in 2014 fell 9.5% compared to 2013.

Wisconsin Additional Information and Methodology

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

Wisconsin 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 Wisconsin'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 Wisconsin, $1.882 to $2.580 million in total economic activity, $0.336 to $0.458 in household wages and 13 to 16 additional jobs are generated in the economy at large.

	Animal Type	Output($)	Earnings ($)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	$ 2.5005	$ 0.4293	16.4
	Hogs, Pigs, and Other	$ 1.8822	$ 0.3359	12.7
	Poultry and Eggs	$ 2.5797	$ 0.4578	15.2
	Dairy	$ 2.1457	$ 0.3984	15.7

Appendix

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Animal Units (AUs)	Beef Cattle AUs	1,085,100	1,097,550	1,185,150	1,162,350	1,152,000	1,152,000	1,152,000	1,225,185	1,144,635	1,292,595	1,169,790
	Hog and Pig AUs	142,350	142,200	142,365	141,510	143,700	130,845	126,165	124,050	130,350	132,150	114,300
	Broiler AUs	98,955	106,958	112,822	139,112	152,442	134,762	136,841	139,710	159,006	154,190	160,496
	Turkey AUs	43,768	44,888	48,775	57,966	46,334	45,385	47,274	48,117	43,359	36,170	37,775
	Egg Layer AUs	20,668	18,928	20,048	18,780	18,728	19,444	18,880	19,512	21,629	21,976	22,422
	Dairy AUs	1,743,000	1,729,000	1,736,000	1,743,000	1,750,000	1,757,000	1,764,000	1,771,000	1,771,000	1,778,000	1,778,000
	Total Animal Units	**3,133,840**	**3,139,524**	**3,245,160**	**3,262,718**	**3,263,204**	**3,239,437**	**3,245,160**	**3,327,575**	**3,269,980**	**3,415,080**	**3,282,783**
Value of Production ($1,000)	Cattle and Calves ($1,000)	$ 800,838	$ 855,031	$ 846,927	$ 819,104	$ 778,254	$ 708,203	$ 860,662	$ 1,164,319	$ 1,292,043	$ 1,443,995	$ 1,918,114
	Hogs and Pigs ($1,000)	$ 111,991	$ 112,235	$ 105,652	$ 108,595	$ 107,923	$ 90,766	$ 110,277	$ 135,219	$ 122,921	$ 128,999	$ 122,235
	Broilers ($1,000)	$ 68,445	$ 70,268	$ 62,345	$ 91,530	$ 99,866	$ 87,927	$ 95,243	$ 89,643	$ 111,100	$ 130,809	$ 142,879
	Turkeys ($1,000)	$ 40,610	$ 43,061	$ 50,893	$ 66,850	$ 62,581	$ 41,969	$ 56,227	$ 63,062	$ 62,885	$ 41,412	$ 69,337
	Eggs ($1,000)	$ 56,679	$ 39,702	$ 45,323	$ 89,263	$ 102,910	$ 78,301	$ 78,316	$ 85,397	$ 101,214	$ 115,879	$ 129,890
	Milk ($1,000)	$ 3,732,365	$ 3,567,096	$ 3,111,934	$ 4,647,440	$ 4,625,208	$ 3,306,309	$ 4,191,635	$ 5,289,774	$ 5,281,456	$ 5,597,116	$ 6,809,775
	Other	$ 13,717	$ 13,732	$ 11,960	$ 12,248	$ 11,634	$ 12,012	$ 14,129	$ 12,414	$ 12,324	$ 12,234	$ 12,143
	Sheep and Lambs ($1,000)	$ 6,477	$ 6,707	$ 5,150	$ 5,653	$ 5,255	$ 5,848	$ 8,180	$ 6,681	$ 6,806	$ 6,931	$ 7,055
	Aquaculture ($1,000)	$ 7,240	$ 7,025	$ 6,810	$ 6,595	$ 6,379	$ 6,164	$ 5,949	$ 5,734	$ 5,518	$ 5,303	$ 5,088
	Total ($1,000)	**$ 4,824,645**	**$ 4,701,125**	**$ 4,235,034**	**$ 5,835,030**	**$ 5,788,376**	**$ 4,325,487**	**$ 5,406,488**	**$ 6,839,828**	**$ 6,983,943**	**$ 7,470,443**	**$ 9,204,373**

Ag Census Data Category	Animal Type		1997	2002	2007	2012
Number of Farms by NAICS	Beef cattle ranching and farming (112111)		9,469	9,852	11,593	10,241
	Cattle feedlots (112112)		2,540	3,749	2,485	892
	Dairy cattle and milk production (11212)		20,958	16,096	13,081	10,401
	Hog and pig farming (1122)		1,179	759	989	475
	Poultry and egg production (1123)		466	910	2,297	1,591
	Sheep and goat farming (1124)		805	1,117	1,501	1,555
	Animal aquaculture and other animal production (1125,1129)		2,864	6,347	5,816	4,814
Value of Sales ($1,000)	Cattle and Calves		702,854	834,895	1,014,553	1,416,881
	Hogs and Pigs		156,106	79,836	100,309	90,589
	Poultry and Eggs		242,238	224,968	375,284	465,717
	Milk and Other Dairy Products		2,800,298	2,651,018	4,573,294	4,952,039
	Aquaculture		5,226	14,262	14,182	13,847
	Other (calculated)		132,891	128,225	220,410	192,404
		Total	4,039,613	3,933,204	6,298,032	7,131,477
Input Purchases	Livestock and poultry purchased	(Farms)	22,888	21,117	19,948	19,759
		$1,000	306,830	294,121	356,954	454,402
	Breeding livestock purchased	(Farms)	*n/a*	12,329	10,799	10,907
		$1,000	*n/a*	108,518	139,475	186,105
	Other livestock and poultry purchased	(Farms)	*n/a*	11,343	11,816	11,748
		$1,000	*n/a*	185,603	217,479	268,297
	Feed purchased	(Farms)	39,355	43,074	38,826	39,784
		$1,000	847,206	785,165	1,091,862	2,066,721

	Animal Type	Output ($1,000)	Earnings ($1,000)	Employment (Jobs)	Taxes Paid ($1,000)
2014 Animal Agriculture	Cattle and Calves	$ 4,796,244	$ 823,446	31,508	$ 220,931
	Hogs, Pigs, and Other	$ 252,927	$ 45,138	1,708	$ 12,110
	Poultry and Eggs	$ 882,530	$ 156,616	5,205	$ 42,020
	Dairy	$ 14,611,734	$ 2,713,014	107,078	$ 727,902
	Total	$ 20,543,435	$ 3,738,214	145,500	$ 1,002,963
Change from 2004 to 2014	Cattle and Calves	$ 2,286,648	$ 392,585	15,022	$ 105,330
	Hogs, Pigs, and Other	$ (43,599)	$ (7,781)	(294)	$ (2,088)
	Poultry and Eggs	$ 346,718	$ 61,530	2,045	$ 16,508
	Dairy	$ 4,575,161	$ 849,487	33,528	$ 227,917
	Total	$ 7,164,928	$ 1,295,820	50,300	$ 347,669

	Animal Type	Output($)	Earnings ($)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	$ 2.5005	$ 0.4293	16.4
	Hogs, Pigs, and Other	$ 1.8822	$ 0.3359	12.7
	Poultry and Eggs	$ 2.5797	$ 0.4578	15.2
	Dairy	$ 2.1457	$ 0.3984	15.7

Tax Rates	Federal effective income tax rate	12.7%
	Federal Social Security tax rate	7.7%
	State Effective Rate	6.5%
	Total	26.8%

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.