Iowa Economic Analysis of Animal Agriculture: 2012-2022

September 2023

Prepared For:

UNITED SOYBEAN BOARD™

Prepared By:

Decision Innovation Solutions

Contents

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Iowa Executive Summary

The use of SBM as a key feed ingredient is an important part of Iowa 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 Iowa. The success of Iowa animal agriculture in turn has a large impact on the rest of the state and regional economies. For example, in the State of Iowa during 2022 animal agriculture contributed:

- $41.1 billion in economic output
- 178,826 jobs
- $9.2 billion in earnings
- $2.3 billion in income taxes paid at local, state, and federal levels
- $538.3 million in the form of property taxes

Iowa's animal agriculture consumed more than 2.6 million tons of SBM in 2022. This SBM was fed primarily to:

- Hogs (1.8 million tons)
- Egg-Laying Hens (380.5 thousand tons)
- Dairy Cows (206.5 thousand tons)

This report examines animal agriculture in Iowa over the last decade. While this analysis is certainly instructive and allows improved understanding of animal agriculture's impact during that time, as the next decade unfolds in Iowa, many opportunities and challenges will arise. And, if past is prologue, animal agriculture will continue to be a major contributor to the economic well-being of the people of Iowa and beyond.

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Iowa Economic Impact of Animal Agriculture

Animal agriculture is an important part of Iowa's economy. In 2022, Iowa's animal agriculture contributed the following to the economy:

- About $41.1 billion in economic output
- $9.2 billion in household earnings
- 178,826 jobs
- $2.3 billion in income taxes

And the animal agriculture sector has shown some change during challenging economic times. During the last decade Iowa's animal agriculture has:

- Increased economic output by $9.9 billion
- Boosted household earnings by $2.2 billion
- Added 42,765 jobs
- Paid $544.2 million more in income taxes

Below is a table which demonstrates this decade of change.

Measure		2022		Change 2012-2022	% Change 2012-2022
Output ($1,000)	$	41,132,608	$	9,937,033	31.85%
Earnings ($1,000)	$	9,163,987	$	2,209,393	31.77%
Employment (Jobs)		178,826		42,765	31.43%
Income Taxes Paid ($1,000)	$	2,257,090	$	544,173	31.77%
Property Taxes Paid in 2017 ($1,000)	$	538,295			

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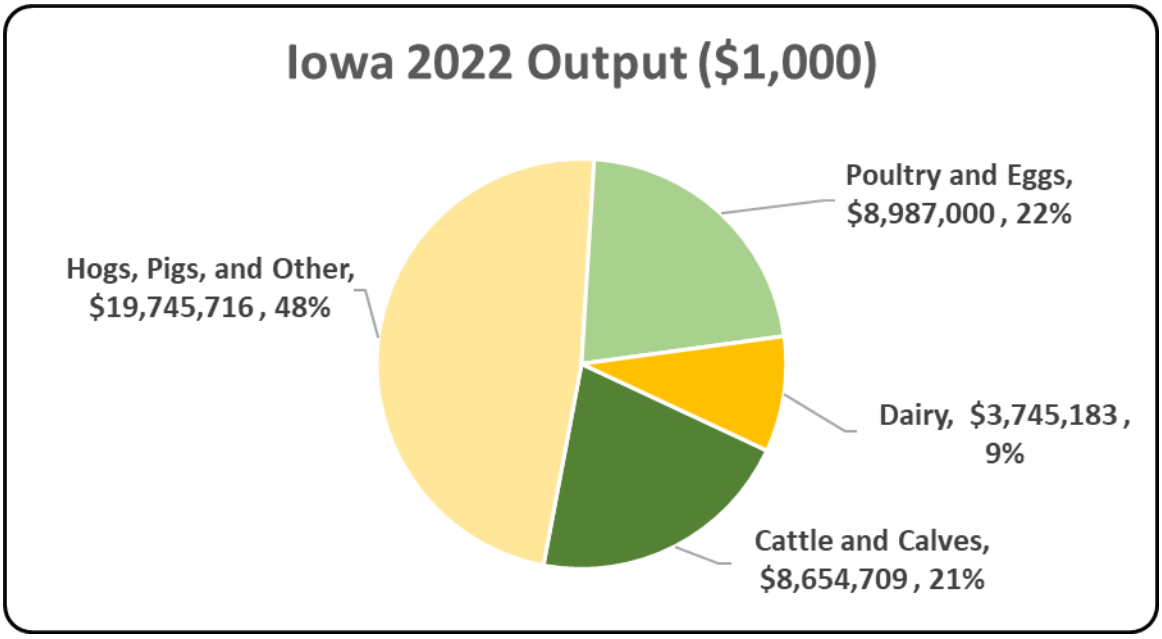
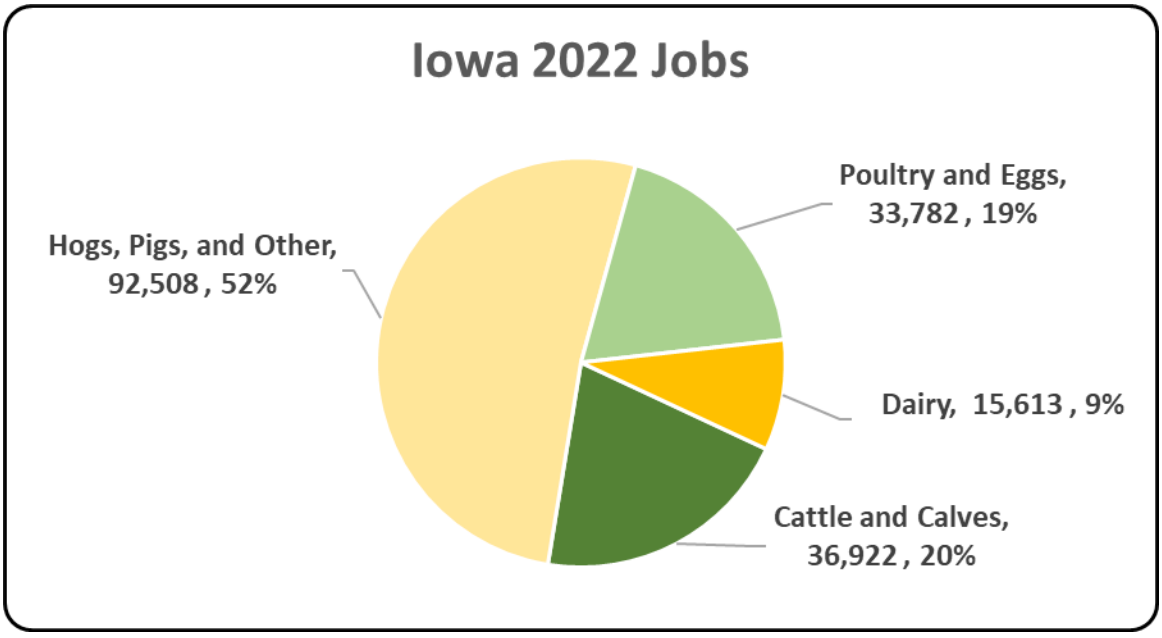
Iowa Output

"Output" refers to the total value of all the output (production or sales) of a study area and/or industry within a study area and was calculated using RIMS II multipliers. This is a gross number that does not make any deductions for the cost or origination of inputs that were used in the production process. The figure illustrates the impact of animal agriculture to the Iowa economy. Animal agriculture's impact on Iowa total economic output is about $41.1 billion.



Iowa Jobs

"Jobs" represents an estimate of the number of full or part-time positions (jobs) currently filled in an area and/or industry. The figure illustrates the contribution to Iowa in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Iowa total jobs, contributing 178,826 jobs within and outside of animal agriculture.



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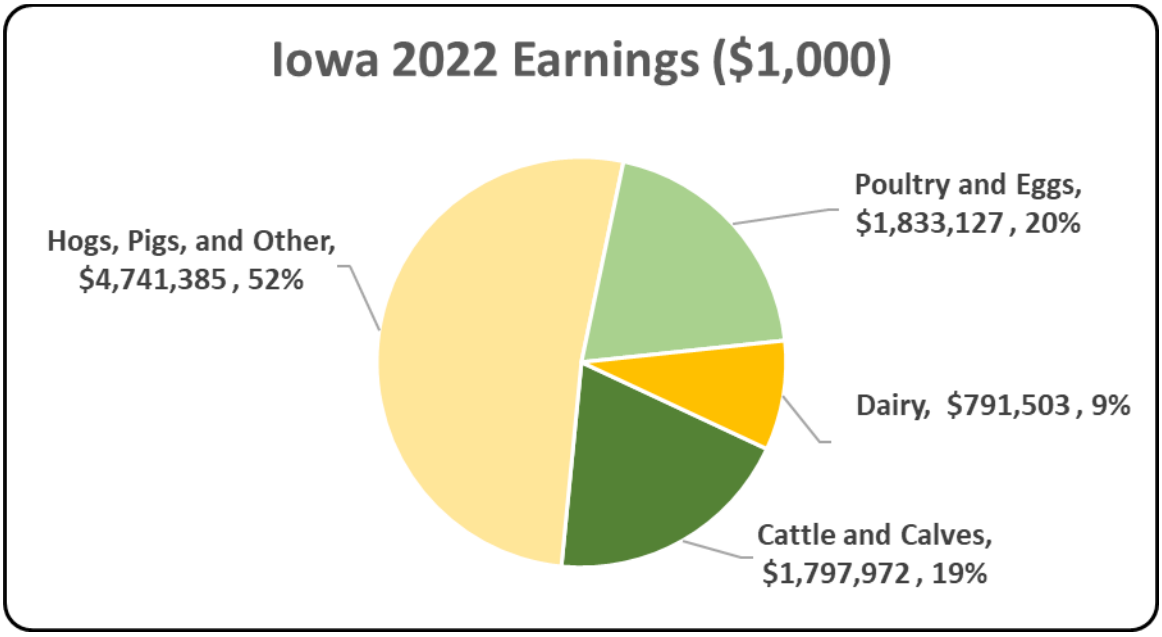
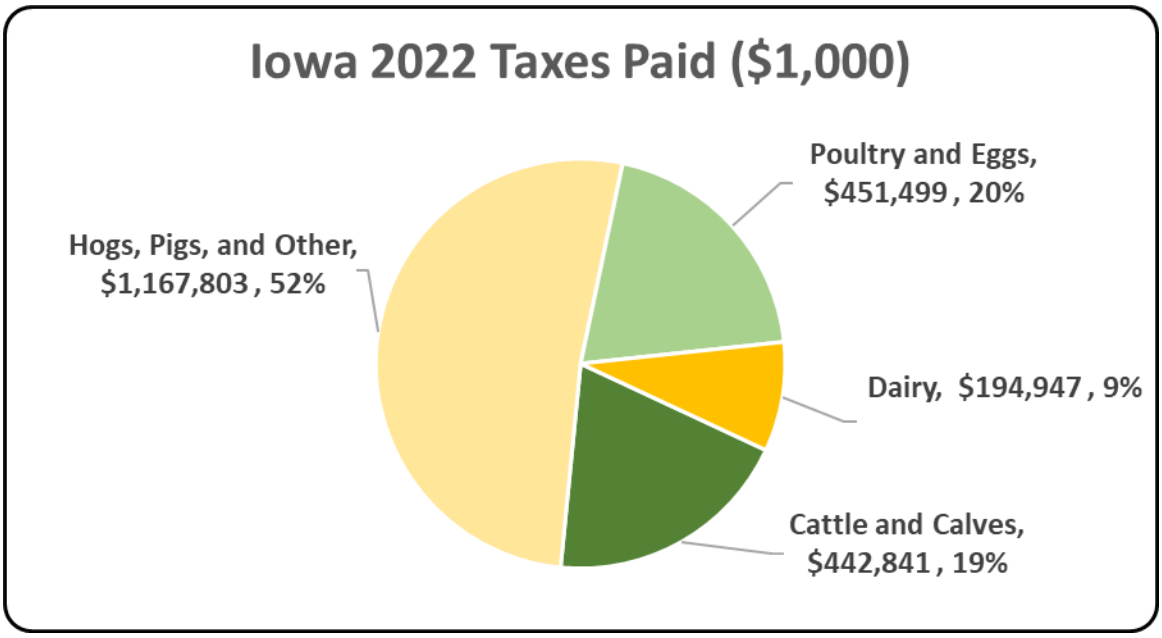
Iowa Earnings

Earnings includes wages and salaries plus proprietors' income, which is the net earnings of sole-proprietors and partnerships. The figure illustrates the impact of animal agriculture to the Iowa economy in terms of earnings. Iowa's animal agriculture contributed about $9.2 billion to household earnings in 2022.



Iowa Taxes Paid by Animal Agriculture

Iowa's animal agriculture is also a significant source of tax revenue. In 2022, the state's animal agriculture industry paid about $2.3 billion in income taxes at local, state, and federal levels. The 2017 Census of Agriculture estimated $538.3 million in property taxes paid by all of Iowa agriculture during 2017. Estimates of income taxes paid by animal agriculture are shown in the following chart.



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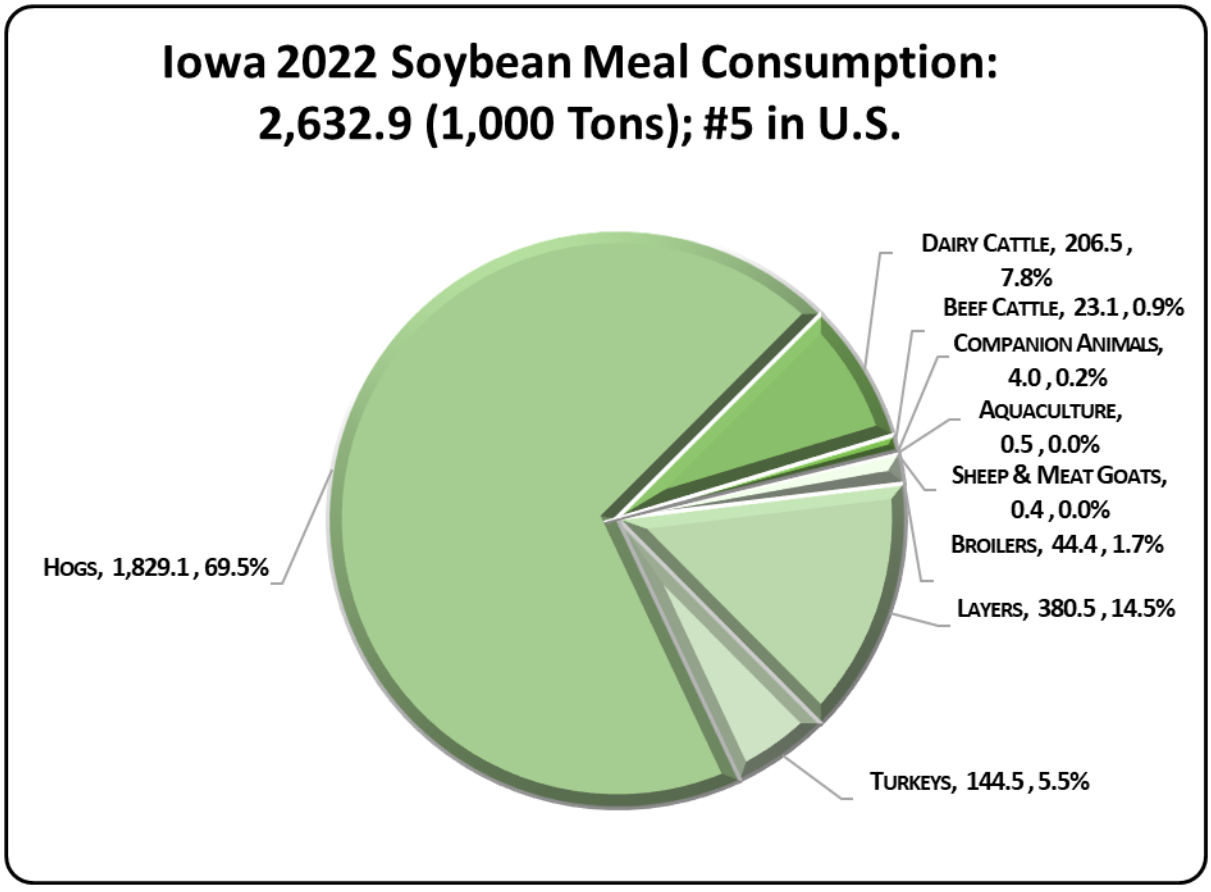
Iowa Animal Agriculture Soybean Meal Consumption

The choice to use SBM 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 SBM (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 SBM usage by animal type were determined. Using the input from these conversations and additional analysis performed by Decision Innovation Solutions, the quantity of SBM used during the 2021-22 soybean marketing year by up to sixteen specific animal species has been estimated.

Iowa's animal agriculture consumed more than 2.6 million tons of SBM in 2022, placing the state as 5 in the nation in terms of SBM consumption (see figure below). Additionally, animal agriculture in Iowa consumed 171.4 thousand tons of soy hulls. The three segments of animal agriculture that led the state in estimated SBM consumption are:

1. Hogs (1.8 million tons)
2. Egg-Laying Hens (380.5 thousand tons)
3. Dairy Cows (206.5 thousand tons)

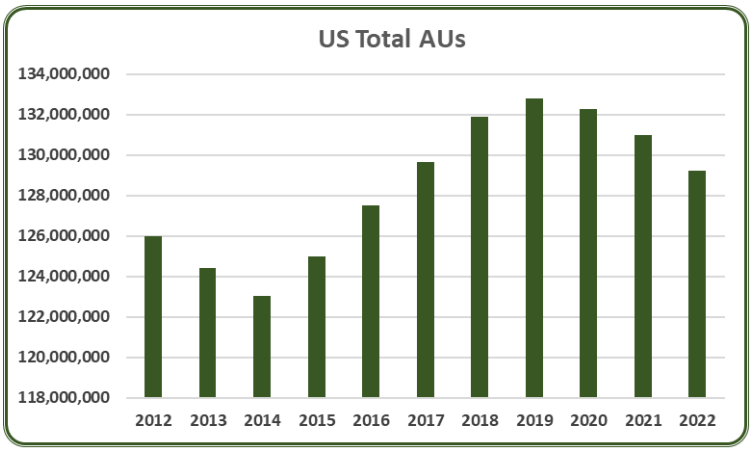


Iowa Animal Unit (AU) Trends

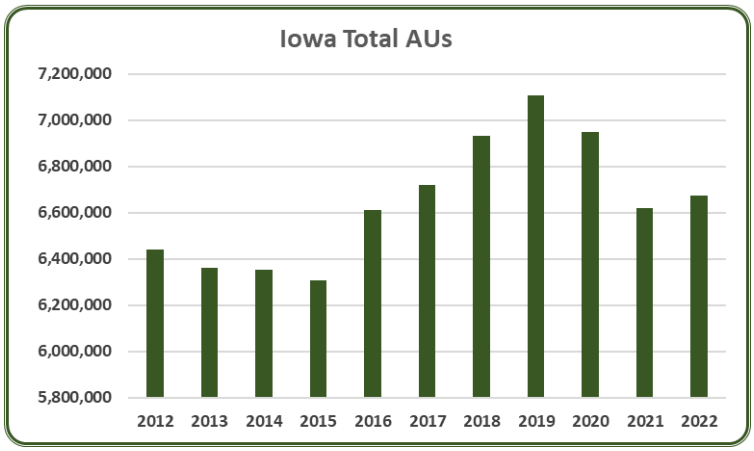
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the U.S. and abroad have an impact on the size of animal agriculture in the state of Iowa. Due to this reality, using a single year to measure a sector's presence and strength can be misleading. The use of animal units allows for a more accurate comparison of differing sizes of livestock and poultry. This section is included to bring context to the question of what animal agriculture means to Iowa and to give perspective on Iowa's contribution to the nation's animal agriculture industry and beyond.

Like using a single year to measure the presence and strength of a sector, in some circumstances AUs can be misleading. This is because AUs do not reflect important considerations like increased weights, improved livability, increased laying potential, etc.

As shown in the accompanying charts and written commentary, certain components of animal agriculture are more present, and therefore more dominant than others. This is due primarily to geography (i.e., weather patterns and access to certain transportation hubs), proximity to high quality, relevant feed ingredients, and the local animal agriculture regulatory framework. In Iowa, the largest three segments of animal agriculture in terms of AUs during 2022 were: Hogs (2.98 million AUs), Beef Cattle (2.73 million Aus), and Dairy Cattle (495,599 AUs). Total AUs in Iowa during 2022 were 6.67 million AUs.



- In 2022, total AUs in the U.S. decreased by 1.4% to 129.2 million, continuing a downward trend that started in 2019. Nine out of the ten animal groups tracked saw a decrease, with the exception being broilers. Over 70% of the total decrease in AUs is due to lower beef cattle inventories.



- In 2022, Iowa had 6.67 million total AUs, a 0.8% increase from 2021. From 2012 to 2022, the average number of total AUs in Iowa was 6.64 million AUs. Since 2012, total AUs in Iowa have increased by 3.6%.

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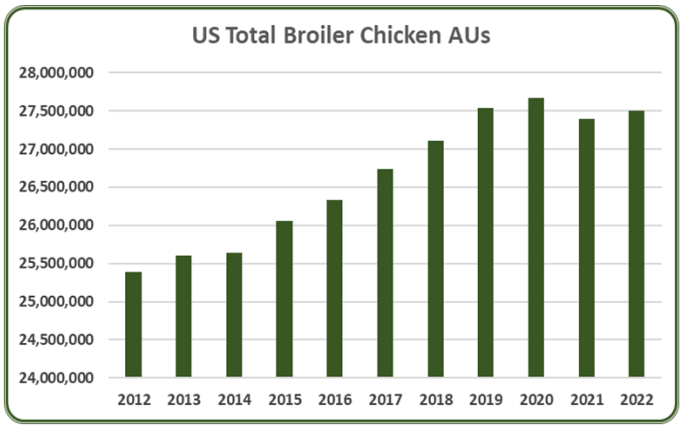
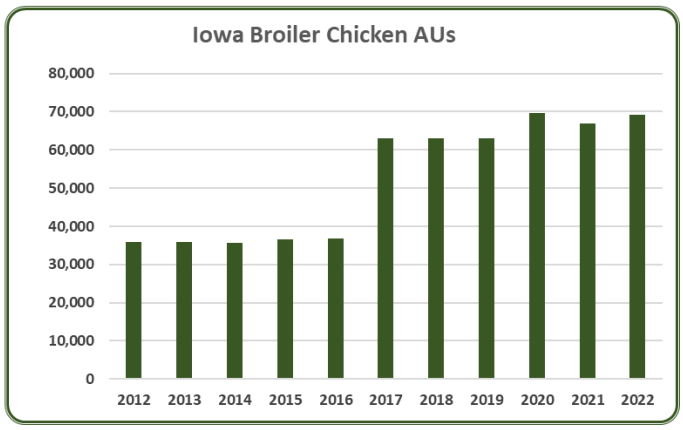
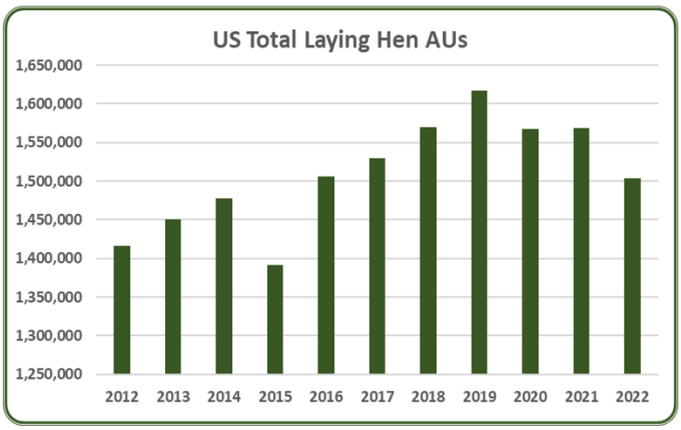


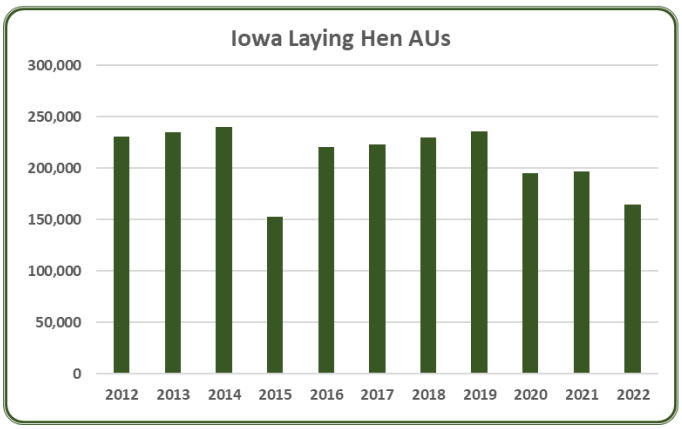
- From 2012 to 2022, broiler chicken AUs averaged 26.6 million across the U.S. Broiler AUs trended up and peaked in 2020 at 27.6 million. Broiler AUs are up 0.4% from 2021 and were the only animal group tracked here that increased compared to last year. Broilers make up about 21% of U.S. AUs.



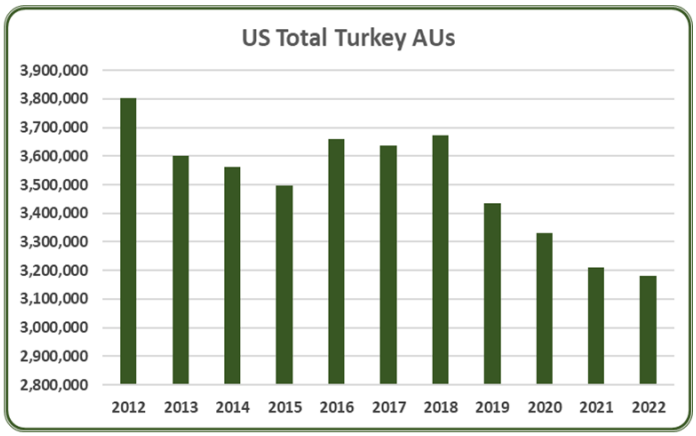
- In 2022, Iowa had 69,116 broiler AUs, a 3.3% increase from 2021. Broilers accounted for 1% of the total AUs (6.67 million) in Iowa. From 2012 to 2022, the average number of broiler AUs in Iowa was 52,347 AUs. Since 2012, broiler AUs have increased by 92%.



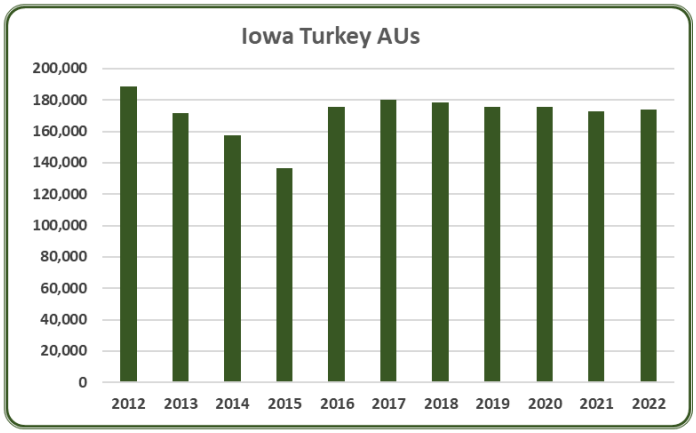
- From 2012 to 2022, U.S. layer AUs averaged 1.51 million. In 2022, layer AUs were 1.50 million, a 4.2% decrease from 2021. The 2022-23 Highly Pathogenic Avian Influenza (HPAI) outbreak contributed to this past year's decrease in layer AUs. Layers make up about 1% of U.S. AUs so large changes in layer AUs do not have a large impact on total AUs.



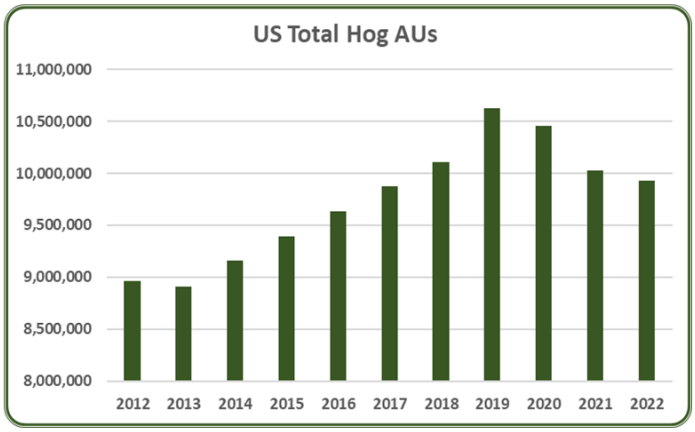
- In 2022, Iowa had 164,332 layer AUs, a 16.6% decrease from 2021. Layers accounted for 2.5% of the total AUs (6.67 million) in Iowa. From 2012 to 2022, the average number of layer AUs in Iowa was 211,146 AUs. Since 2012, layer AUs have decreased by 28.8%.



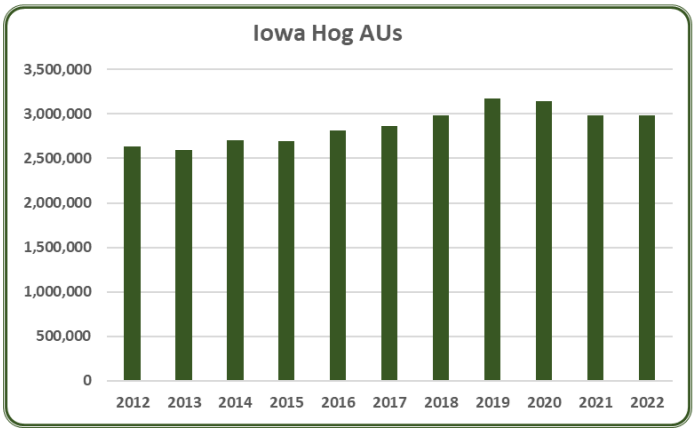
- In 2022, turkey AUs were at 3.18 million, a 0.9% drop from the previous year. This drop is surprisingly low considering the industry battled HPAI for most of 2022. Turkey AUs have been trending down since 2018. Turkey AUs represent about 2% of U.S. AUs, so like layers, large changes in turkey AUs do not cause large changes in total AUs.



- In 2022, Iowa had 174,000 turkey AUs, a 0.9% increase from 2021. Turkeys accounted for 2.6% of the total AUs (6.67 million) in Iowa. From 2012 to 2022, the average number of turkey AUs in Iowa was 171,429 AUs. Since 2012, turkey AUs have decreased by 7.8%.



- In 2022, hog AUs totaled 9.93 million, a 1.0% drop from the previous year. From 2012 to 2022, hog AUs averaged 9.73 million. Hog AUs have been trending down since 2019 when they peaked at 10.62 million AUs. Hogs make up 7.70% of all AUs within the U.S.



- In 2022, Iowa had 2.98 million hog AUs, a 0.1% increase from 2021. Hogs accounted for 44.7% of the total AUs (6.67 million) in Iowa. From 2012 to 2022, the average number of hog AUs in Iowa was 2.87 million AUs. Since 2012, hog AUs have increased by 13.2%.

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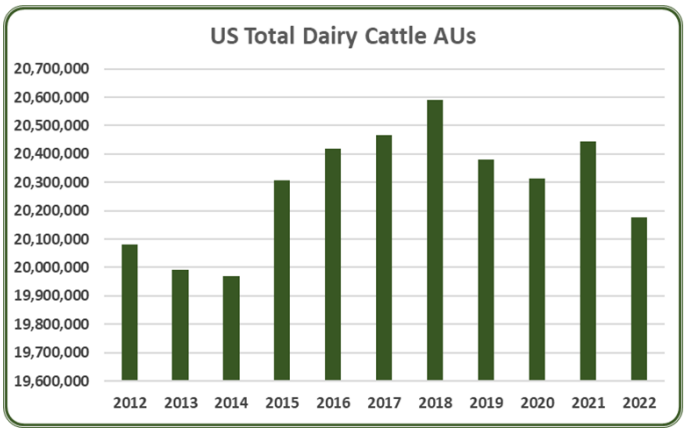
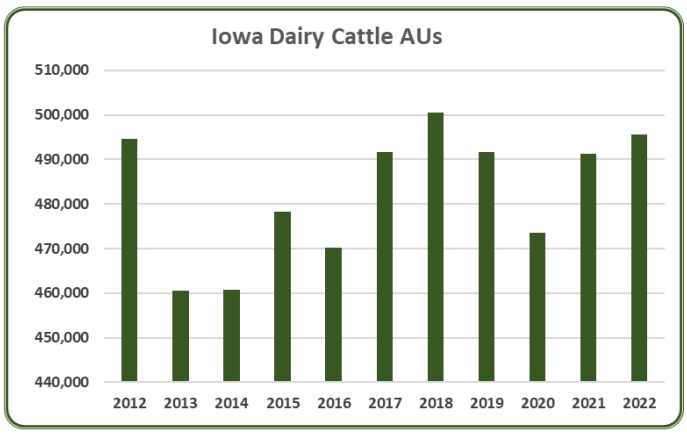
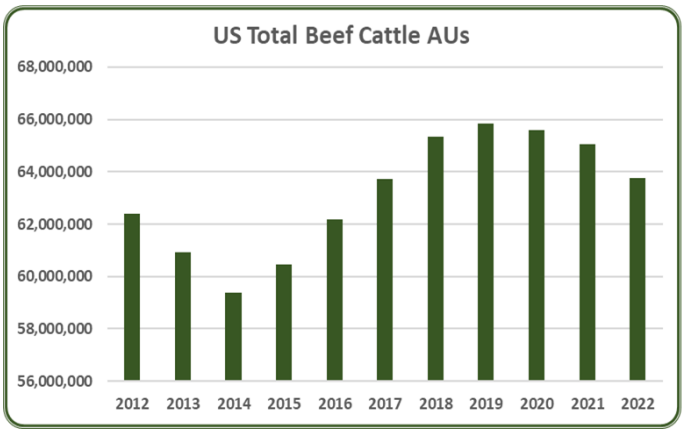


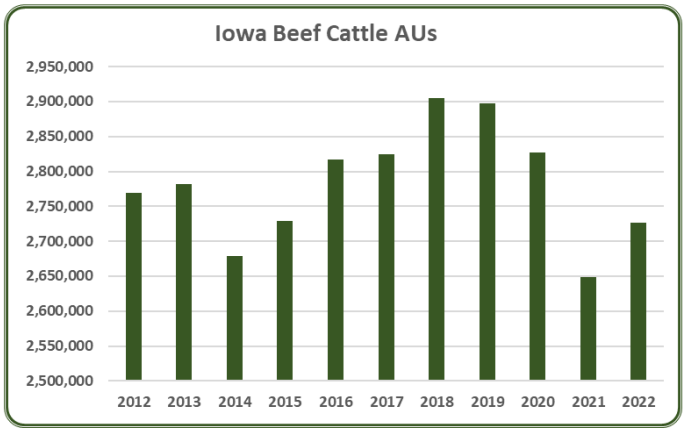
- From 2012 to 2022, dairy cattle AUs averaged 20.29 million. The herd was also relatively steady, fluctuating between 19.9-20.6 million AUs during that time. In 2022, dairy cattle AUs totaled 20.18 million, down 1.3% from 2021. Dairy cattle represented about 16% of all U.S. AUs.



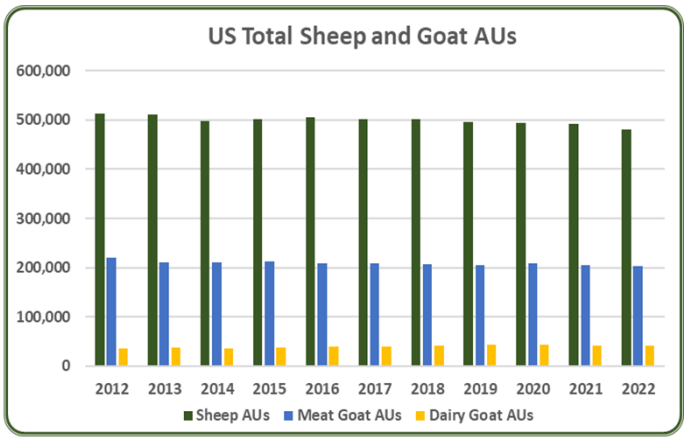
- In 2022, Iowa had 495,599 dairy cattle AUs, a 0.9% increase from 2021. Dairy cattle accounted for 7.4% of the total AUs (6.67 million) in Iowa. From 2012 to 2022, the average number of dairy cattle AUs in Iowa was 482,591 AUs. Since 2012, dairy cattle AUs have increased by 0.2%.



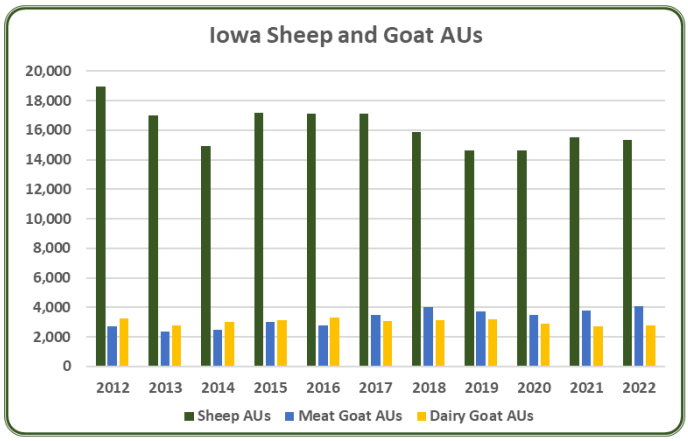
- From 2012 to 2022, beef cattle AUs averaged 63.9 million. In 2022 beef cattle AUs totaled 63.93 million, down 2% from last year, as beef cattle continued through a contraction phase in the cattle cycle which started in 2019. Beef AUs represent almost 50% of U.S. AUs, so changes in beef cattle AUs have large effects on total AUs.



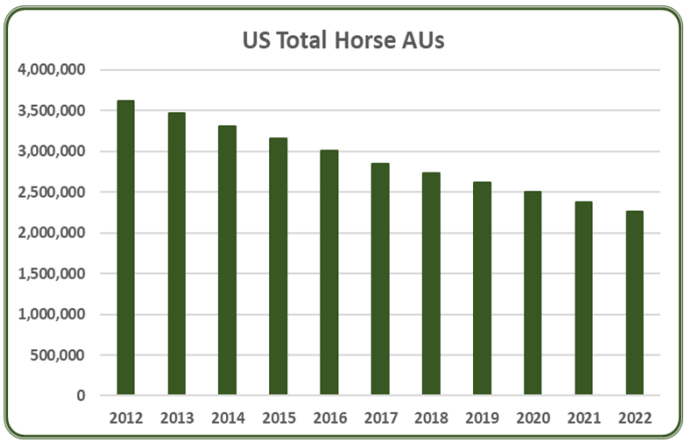
- In 2022, Iowa had 2.73 million beef cattle AUs, a 2.9% increase from 2021. Beef cattle accounted for 40.8% of the total AUs (6.67 million) in Iowa. From 2012 to 2022, the average number of beef cattle AUs in Iowa was 2.78 million AUs. Since 2012, beef cattle AUs have decreased by 1.6%.



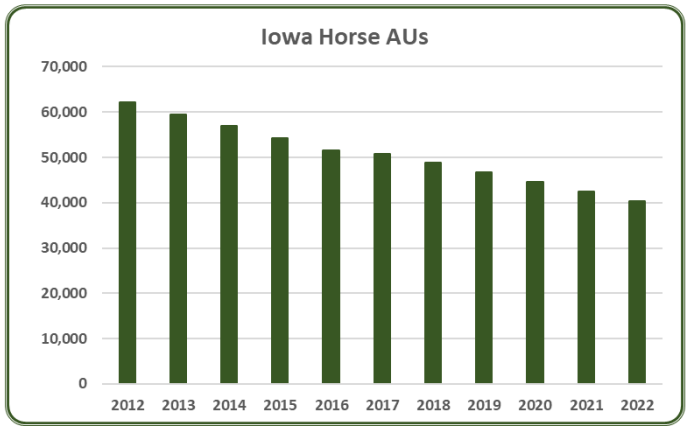
- Sheep, meat goats, and dairy goats account for less than 0.6% of U.S. total AUs. Over the past decade, sheep AUs averaged 500,000, meat goat AUs averaged 209,000 and dairy goat AUs averaged 40,000. Sheep and meat goat AUs have trended down while dairy goats trended up until 2019, then leveled off.



- In 2022, Iowa had a combined 22,225 sheep, meat goat, and dairy goat AUs, a 1% increase from 2021. These accounted for 0.3% of the total AUs (6.67 million) in Iowa. Individually, sheep AUs decreased 1.1%, meat goat AUs increased 7.9% and dairy goat AUs increased 3.7%. Combined there was a 10.7% decrease in sheep and goat AUs since 2012.



- Horses account for about 2% of U.S. total AUs. From 2012 to 2022, horse AUs averaged 2.90 million. However, a steady downtrend is present and 2022 horse AUs only totaled 2.26 million. U.S. horse AUs have decreased every year from 2012 to 2022, decreasing 37.6% over the entire period.



- In 2022, Iowa had 40,326 horse AUs, a 5% decrease from 2021. Horses accounted for 0.6% of the total AUs (6.67 million) in Iowa. From 2012 to 2022, the average number of horse AUs in Iowa was 50,725 AUs. Since 2012, horse AUs have decreased by 35.2%.

Iowa Additional Information and Methodology

Animal agriculture is an important part of Iowa's current and future economic health. To quantify the connection between animal agriculture and local economies, the United Soybean Board commissioned Decision Innovation Solutions, an economic research firm in Urbandale, Iowa, to conduct an in-depth analysis of several aspects of animal agriculture. This analysis includes the following components:

1. Economic impact of animal agriculture to local (state) economies during the 2012-2022 time period
2. SBM usage by animal species during the 2021/22 soybean marketing year
3. Animal Unit (AU) trends from 2012-2022

Given the long-term presence of animal agriculture in Iowa, of interest is the degree to which the industry impacts the Iowa economy. Estimates of output, jobs, earnings, taxes paid, and multipliers for Iowa animal agriculture are presented in this report. Methodology for this section of the report closely mirrors that followed in years' past. Also presented are estimates of the change in how animal agriculture has impacted Iowa's economy over the last decade. Differences, to the extent they are present, are noted within the larger national report which accompanies this state report.

As with any industry across the economic spectrum, there are ebbs and flows in activity that have implications for other parts of the economy. Again, using the same 2012-2022 time period as with the economic impact section of this state report, the "Animal Unit Trends" seeks to quantify production changes in animal agriculture in Iowa which have occurred. As shown in this state report, Iowa has seen changes within its animal agriculture industry. Expectations are that animal agriculture will continue to evolve over the next decade.

Animal agriculture is the single largest user of SBM in Iowa. Through in-depth conversations with many of the nation's top nutritionists and researchers, "bottom up" estimates of SBM usage by animal type were determined. Using the input from these conversations and additional analysis performed by Decision Innovation Solutions, the quantity of SBM used during the 2021-22 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 515.639.2900.

Iowa Multipliers

Economic multipliers give a sense for how economic activity in a given industry is related to other industries in the same study area. To estimate the impact of animal agriculture on Iowa's economy, we applied RIMS II multipliers from the Department of Commerce, Bureau of Economic Analysis for cattle ranching and farming, dairy cattle and milk production, poultry and egg production, and other animal production (primarily hogs and pigs), where applicable.

Multipliers are generally stated in the form of "per million dollars" of output. As it relates to this analysis, multipliers are stated as the activity related to every million dollars of economic output in animal agriculture. Referring to the multipliers below, for every million dollars in output generated by the various segments of animal agriculture in Iowa, $1.87 to $3.15 million in total economic activity, $0.45 to $0.64 in household wages and 9 to 12 additional jobs are generated in the economy at large.

Appendix

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Animal Units (AUs)	Beef Cattle AUs	2,769,330	2,782,271	2,678,848	2,729,610	2,816,430	2,824,510	2,904,744	2,897,586	2,826,661	2,649,194	2,725,948
	Hog and Pig AUs	2,634,516	2,595,177	2,704,621	2,695,881	2,818,762	2,864,056	2,984,736	3,175,903	3,145,553	2,981,001	2,982,562
	Broiler AUs	35,999	35,875	35,673	36,593	36,867	63,051	63,096	63,074	69,578	66,892	69,116
	Turkey AUs	188,672	171,550	157,500	136,500	175,500	180,000	178,500	175,500	175,500	172,500	174,000
	Egg Layer AUs	230,948	234,704	239,720	152,328	220,672	222,752	229,708	235,540	194,876	197,024	164,332
	Dairy AUs	494,610	460,551	460,661	478,196	470,181	491,680	500,444	491,626	473,628	491,327	495,599
	Total Animal Units	**6,441,181**	**6,361,825**	**6,354,360**	**6,306,635**	**6,613,232**	**6,720,565**	**6,932,989**	**7,107,432**	**6,951,389**	**6,622,374**	**6,674,107**
Value of Production ($1,000)	Cattle and Calves ($1,000)	$ 2,201,647	$ 2,289,044	$ 2,863,921	$ 2,910,114	$ 2,537,193	$ 2,568,095	$ 2,555,325	$ 2,581,391	$ 2,316,457	$ 2,747,474	$ 3,385,374
	Hogs and Pigs ($1,000)	$ 6,174,367	$ 6,890,501	$ 7,994,929	$ 6,205,083	$ 5,685,661	$ 6,158,024	$ 6,605,574	$ 7,498,002	$ 5,925,579	$ 9,513,426	$ 10,515,371
	Broilers ($1,000)	$ 127,967	$ 155,925	$ 163,577	$ 142,706	$ 126,884	$ 148,992	$ 235,946	$ 205,857	$ 168,218	$ 236,606	$ 378,181
	Turkeys ($1,000)	$ 270,053	$ 284,786	$ 318,454	$ 285,409	$ 379,097	$ 309,553	$ 232,722	$ 277,046	$ 345,818	$ 408,673	$ 506,556
	Eggs ($1,000)	$ 1,062,683	$ 1,166,318	$ 1,408,632	$ 1,569,519	$ 558,776	$ 868,838	$ 1,314,715	$ 778,055	$ 878,645	$ 852,143	$ 1,968,823
	Milk ($1,000)	$ 866,496	$ 944,435	$ 1,143,162	$ 836,974	$ 835,644	$ 937,399	$ 869,550	$ 1,026,454	$ 1,047,930	$ 1,041,144	$ 1,413,650
	Other	$ 43,628	$ 35,736	$ 37,635	$ 47,356	$ 50,228	$ 54,195	$ 55,490	$ 57,078	$ 59,710	$ 65,023	$ 70,441
	Sheep and Lambs ($1,000)	$ 35,938	$ 24,818	$ 23,491	$ 29,985	$ 29,629	$ 30,369	$ 28,437	$ 26,798	$ 26,202	$ 28,288	$ 30,479
	Aquaculture ($1,000)	$ 7,690	$ 10,917	$ 14,144	$ 17,372	$ 20,599	$ 23,826	$ 27,053	$ 30,280	$ 33,508	$ 36,735	$ 39,962
	Total ($1,000)	**$ 10,746,841**	**$ 11,766,745**	**$ 13,930,310**	**$ 11,997,162**	**$ 10,173,484**	**$ 11,045,097**	**$ 11,869,322**	**$ 12,423,883**	**$ 10,742,356**	**$ 14,864,489**	**$ 18,238,396**

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Ag Census Data Category	Animal Type		2002	2007	2012	2017
Number of Farms by NAICS	Beef cattle ranching and farming (112111)		10,065	10,673	9,697	10,415
	Cattle feedlots (112112)		4,259	3,119	2,129	2,325
	Dairy cattle and milk production (11212)		2,306	1,686	1,224	1,022
	Hog and pig farming (1122)		5,742	4,970	3,310	3,672
	Poultry and egg production (1123)		442	775	732	706
	Sheep and goat farming (1124)		1,098	1,434	1,621	2,011
	Animal aquaculture and other animal production (1125,1129)		4,162	4,308	3,941	3,868
Value of Sales ($1,000)	Cattle and Calves		2,119,935	3,606,633	4,504,373	4,760,338
	Hogs and Pigs		3,078,455	4,827,224	6,767,424	7,796,511
	Poultry and Eggs		511,949	872,263	1,291,808	1,579,664
	Milk*				799,467	868,320
	Aquaculture		2,308	3,507	7,690	23,826
	Other (calculated)		47,284	75,204	69,206	95,223
		Total	6,202,362	10,074,511	13,439,968	15,123,882
Input Purchases	Livestock and poultry purchased	(Farms)	25,756	22,679	24,040	22,211
		$1,000	1,854,227	3,290,203	3,435,345	4,211,863
	Breeding livestock purchased	(Farms)	*13,436*	10,743	12,791	11,608
		$1,000	*100,883*	180,644	239,793	263,390
	Other livestock and poultry purchased	(Farms)	*16,372*	15,086	15,123	14,099
		$1,000	*1,753,344*	3,109,559	3,195,553	3,948,473
	Feed purchased	(Farms)	41,037	35,808	38,194	36,879
		$1,000	1,922,817	3,058,988	5,377,863	4,943,801

** Measurement of milk sales in 2002-2007 are not comparable to 2012-2017.*

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	Animal Type	Output ($1,000)	Earnings ($1,000)	Employment (Jobs)	Income Taxes Paid ($1,000)
2022 Animal Agriculture	Cattle and Calves	$ 8,654,709	$ 1,797,972	36,922	$ 442,841
	Hogs, Pigs, and Other	$ 19,745,716	$ 4,741,385	92,508	$ 1,167,803
	Poultry and Eggs	$ 8,987,000	$ 1,833,127	33,782	$ 451,499
	Dairy	$ 3,745,183	$ 791,503	15,613	$ 194,947
	Total	$ 41,132,608	$ 9,163,987	178,826	$ 2,257,090
Change from 2012 to 2022	Cattle and Calves	$ 1,375,951	$ 285,847	5,870	$ 70,404
	Hogs, Pigs, and Other	$ 4,746,696	$ 1,139,787	22,238	$ 280,730
	Poultry and Eggs	$ 3,037,871	$ 619,651	11,419	$ 152,620
	Dairy	$ 776,516	$ 164,108	3,237	$ 40,420
	Total	$ 9,937,033	$ 2,209,393	42,765	$ 544,173

	Animal Type	Output($)	Earnings ($)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	$ 2.56	$ 0.53	10.9
	Hogs, Pigs, and Other	$ 1.87	$ 0.45	8.7
	Poultry and Eggs	$ 3.15	$ 0.64	11.8
	Dairy	$ 2.65	$ 0.56	11.0

Tax Rates	Federal effective income tax rate	14.0%
	Federal Social Security tax rate	6.2%
	State Effective Rate	4.4%
	Total	24.6%

Sources: 2002, 2007, 2012 and 2017 Census of Agriculture, USDA/NASS Survey Data, RIMS II Multipliers (U.S. Bureau of Economic Analysis), Tax-Rates.org & The Motley Fool.

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