Oregon Economic Analysis of Animal Agriculture: 2012-2022

September 2023

Prepared For:

UNITED SOYBEAN BOARD™

Prepared By:

Decision Innovation Solutions

Contents

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Oregon Executive Summary

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

- $4.4 billion in economic output
- 30,325 jobs
- $914.4 million in earnings
- $252.8 million in income taxes paid at local, state, and federal levels
- $151.4 million in the form of property taxes

Oregon's animal agriculture consumed almost 155.6 thousand tons of SBM in 2022. This SBM was fed primarily to:

- Dairy Cows (67.9 thousand tons)
- Broilers (33.7 thousand tons)
- Beef Cows (22.3 thousand tons)

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

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Oregon Economic Impact of Animal Agriculture

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

- About $4.4 billion in economic output
- $914.4 million in household earnings
- 30,325 jobs
- $252.8 million in income taxes

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

- Increased economic output by $343.3 million
- Boosted household earnings by $73.0 million
- Added 1,810 jobs
- Paid $20.2 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)	$	4,350,355	$	343,350	8.57%
Earnings ($1,000)	$	914,410	$	72,959	8.67%
Employment (Jobs)		30,325		1,810	6.35%
Income Taxes Paid ($1,000)	$	252,834	$	20,173	8.67%
Property Taxes Paid in 2017 ($1,000)	$	151,432			

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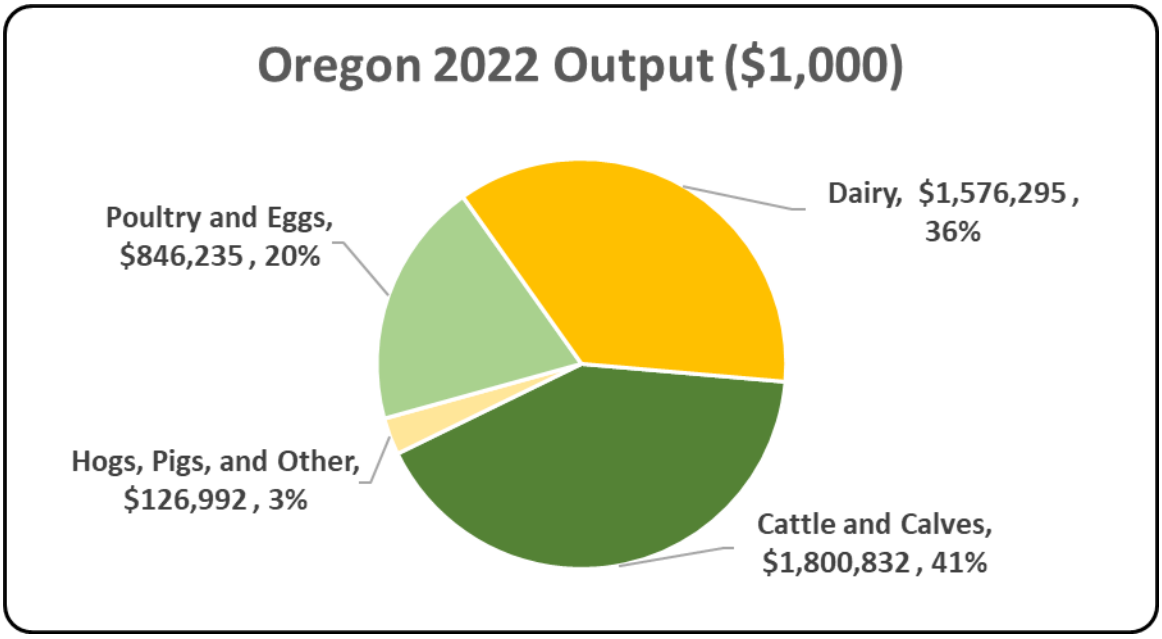
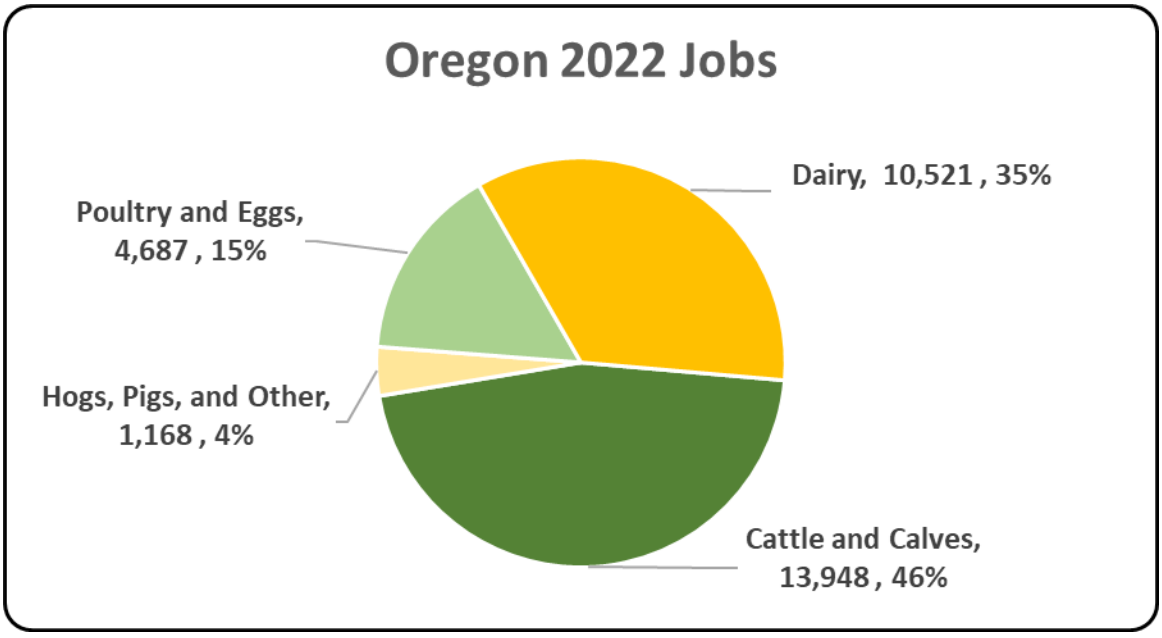
Oregon Output

"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 Oregon economy. Animal agriculture's impact on Oregon total economic output is about $4.4 billion.



Oregon 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 Oregon in terms of animal agriculture jobs. As shown, animal agriculture contributes significantly to Oregon total jobs, contributing 30,325 jobs within and outside of animal agriculture.



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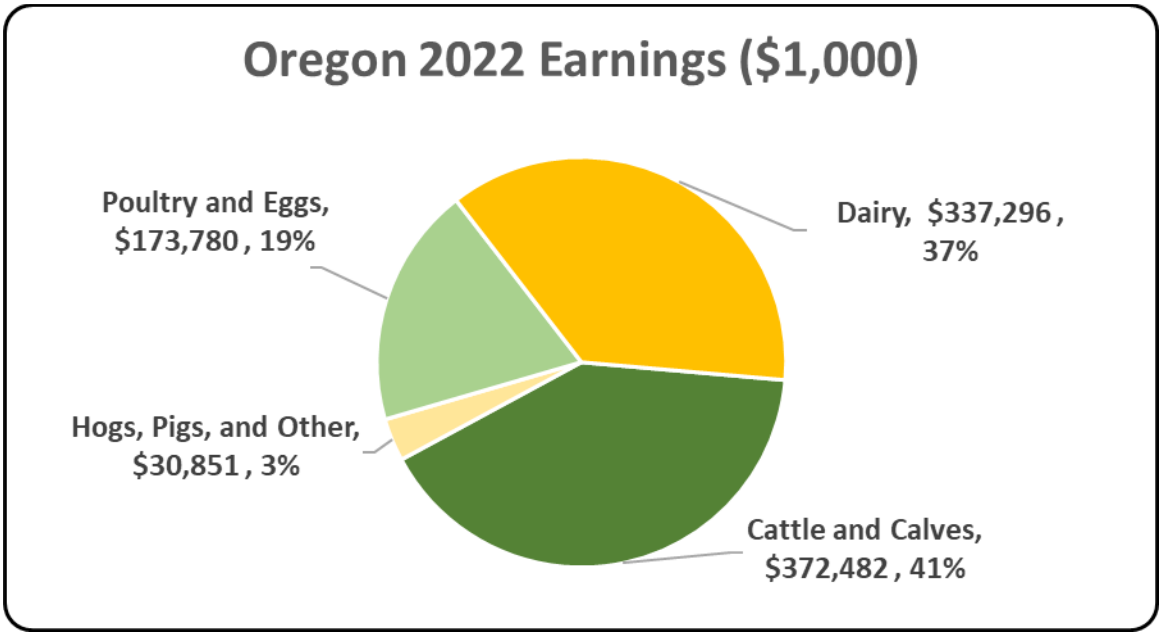
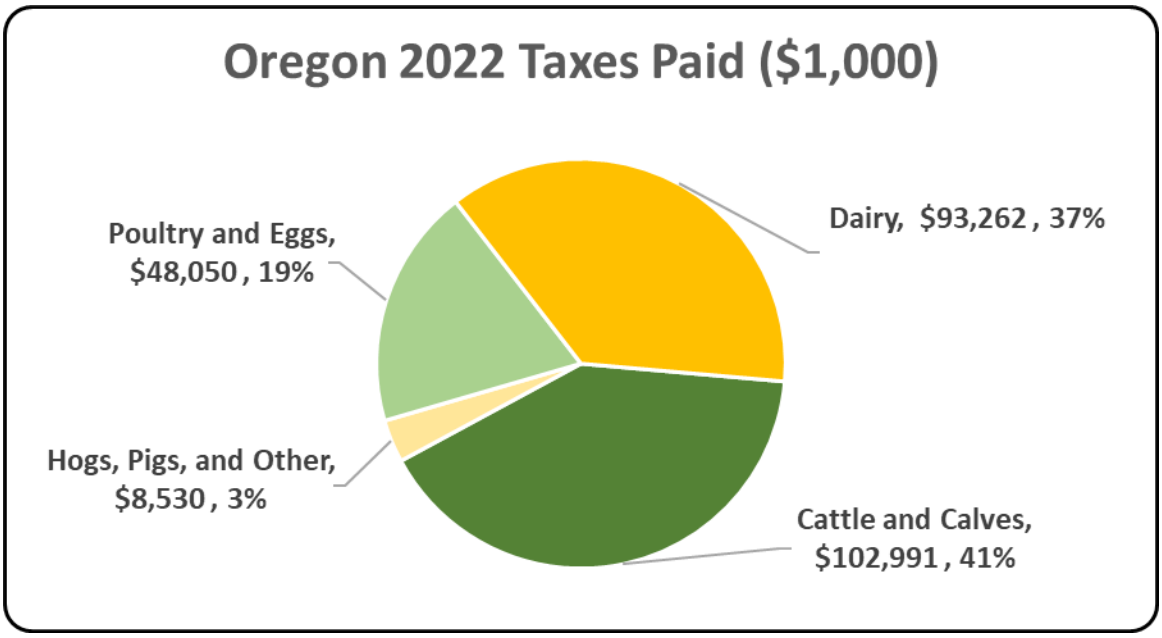
Oregon Earnings

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 Oregon economy in terms of earnings. Oregon's animal agriculture contributed about $914.4 million to household earnings in 2022.



Oregon Taxes Paid by Animal Agriculture

Oregon's animal agriculture is also a significant source of tax revenue. In 2022, the state's animal agriculture industry paid about $252.8 million in income taxes at local, state, and federal levels. The 2017 Census of Agriculture estimated $151.4 million in property taxes paid by all of Oregon agriculture during 2017. Estimates of income taxes paid by animal agriculture are shown in the following chart.



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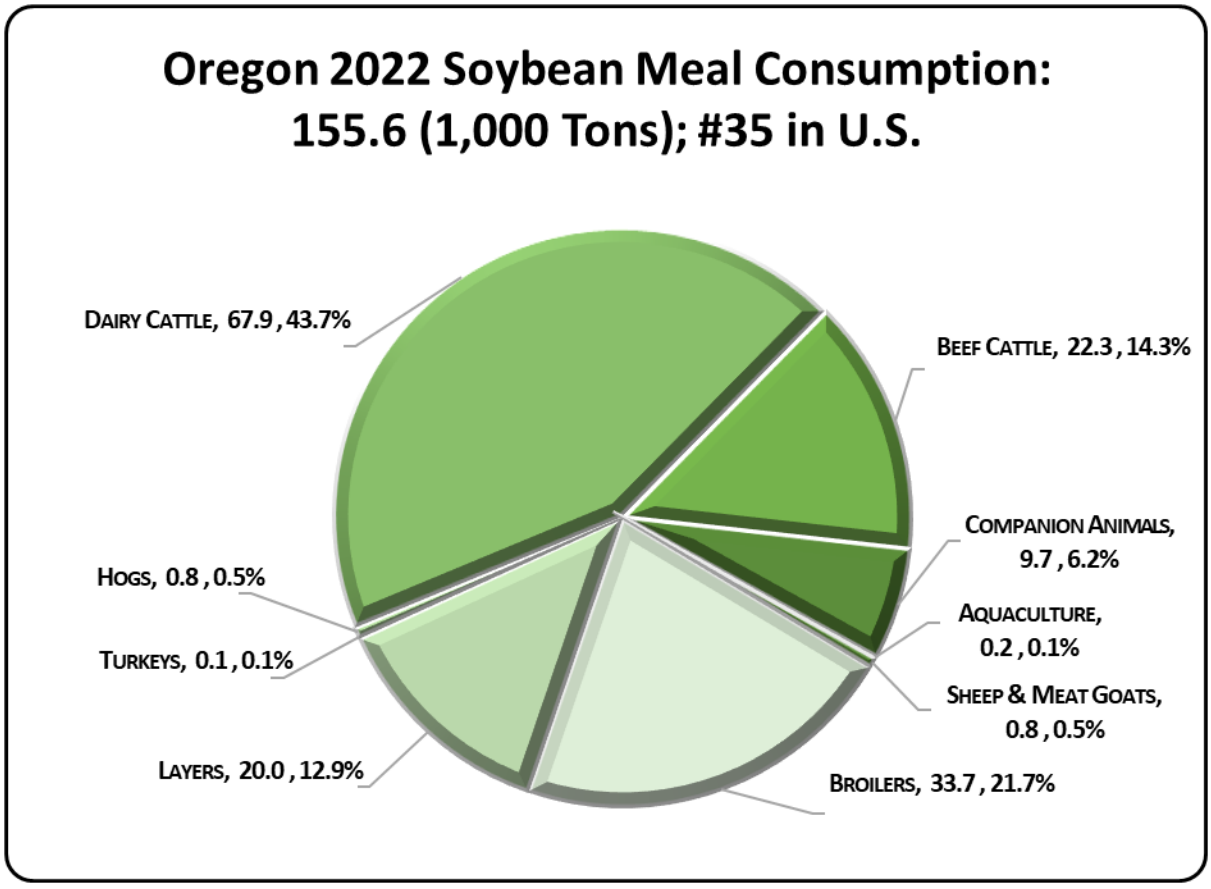
Oregon Animal Agriculture Soybean Meal Consumption

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.

Oregon's animal agriculture consumed almost 155.6 thousand tons of SBM in 2022, placing the state as 35 in the nation in terms of SBM consumption (see figure below). Additionally, animal agriculture in Oregon consumed 45.6 thousand tons in soy hulls. The three segments of animal agriculture that led the state in estimated SBM consumption are:

1. Dairy Cows (67.9 thousand tons)
2. Broilers (33.7 thousand tons)
3. Beef Cows (22.3 thousand tons)

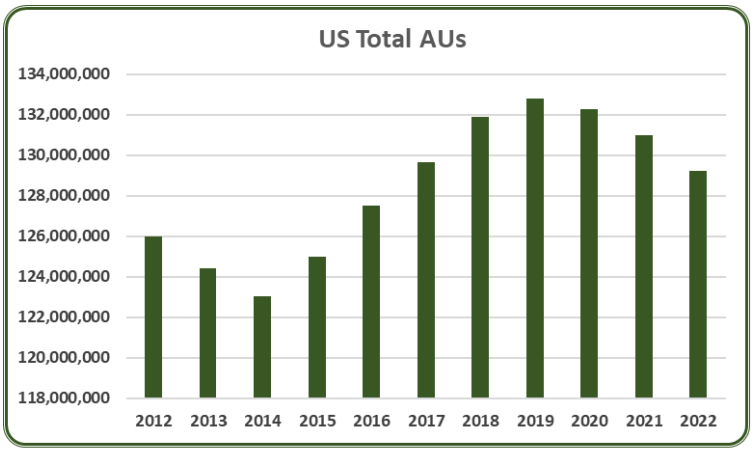


Oregon Animal Unit (AU) Trends

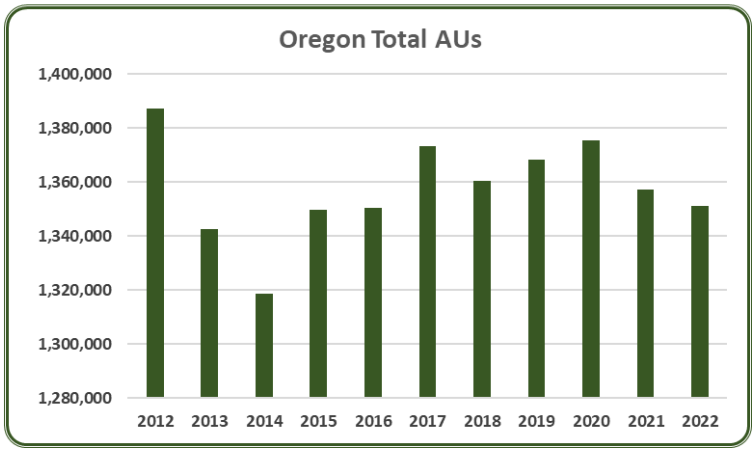
Over time, prices of feed, meat, eggs and milk, as well as levels of demand for these products in the U.S. and abroad have an impact on the size of animal agriculture in the state of Oregon. Due to this reality, using a single year to measure a sector's presence and strength can be misleading. The use 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 Oregon and to give perspective on Oregon'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 Oregon, the largest three segments of animal agriculture in terms of AUs during 2022 were: Beef Cattle (953,488 AUs), Dairy Cattle (265,416 AUs), and Broilers (53,523 AUs). Total AUs in Oregon during 2022 were 1.35 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, Oregon had 1.35 million total AUs, a 0.4% decrease from 2021. From 2012 to 2022, the average number of total AUs in Oregon was 1.36 million AUs. Since 2012, total AUs in Oregon have decreased by 2.6%.

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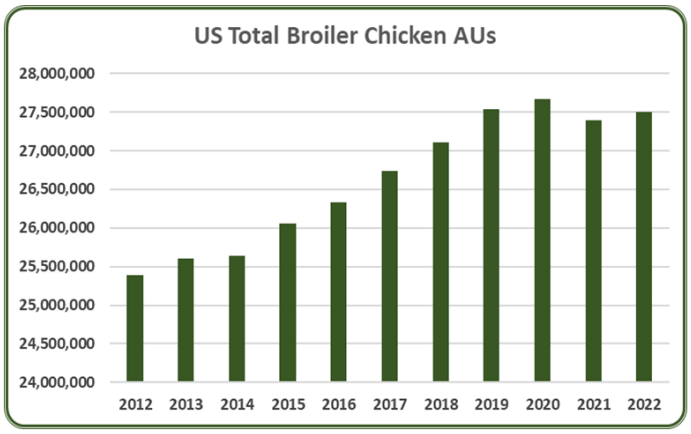
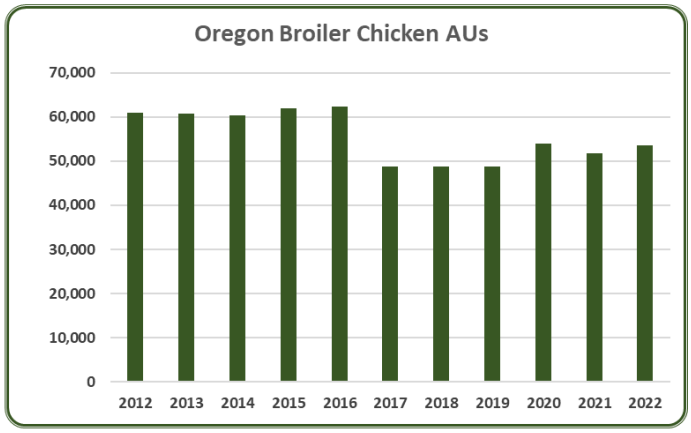
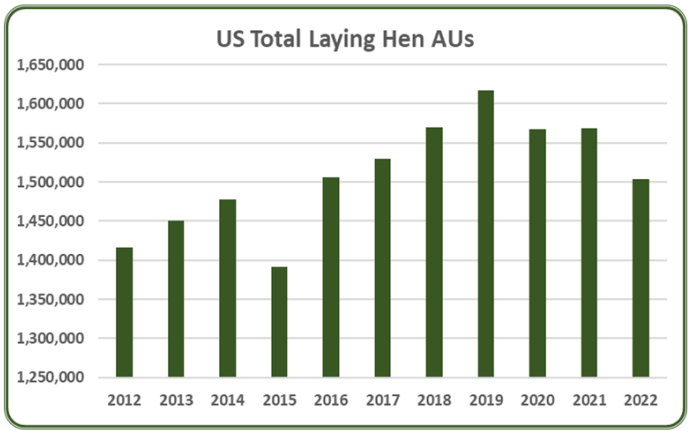


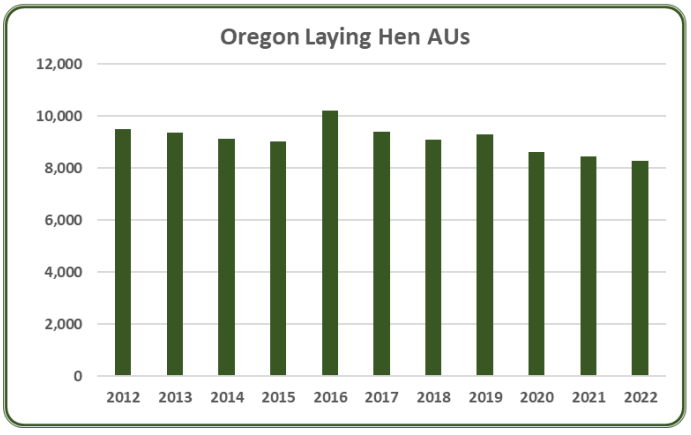
- From 2012 to 2022, broiler chicken AUs averaged 26.6 million across the U.S. Broiler AUs trended up and peaked in 2020 at 27.6 million. Broiler AUs are up 0.4% from 2021 and were the only animal group tracked here that increased compared to last year. Broilers make up about 21% of U.S. AUs.



- In 2022, Oregon had 53,523 broiler AUs, a 3.3% increase from 2021. Broilers accounted for 4% of the total AUs (1.35 million) in Oregon. From 2012 to 2022, the average number of broiler AUs in Oregon was 55,613 AUs. Since 2012, broiler AUs have decreased by 12.1%.



- 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, Oregon had 8,260 layer AUs, a 2% decrease from 2021. Layers accounted for 0.6% of the total AUs (1.35 million) in Oregon. From 2012 to 2022, the average number of layer AUs in Oregon was 9,117 AUs. Since 2012, layer AUs have decreased by 13.1%.

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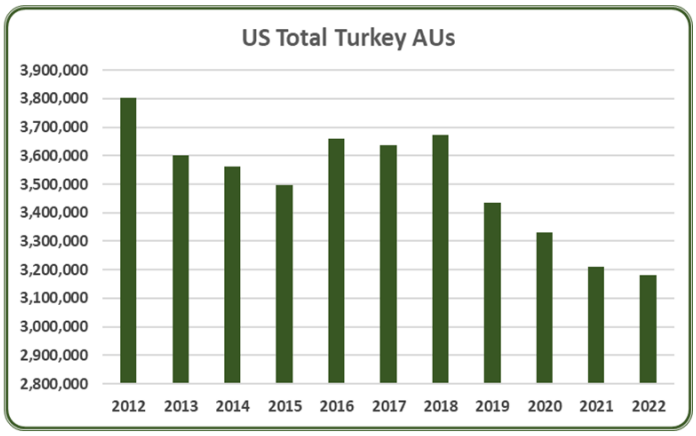
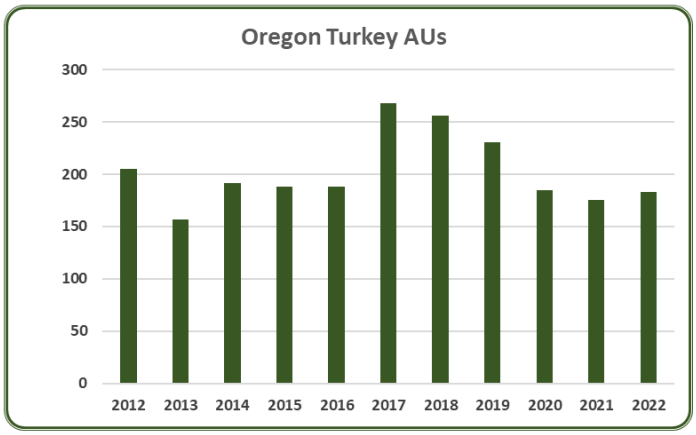
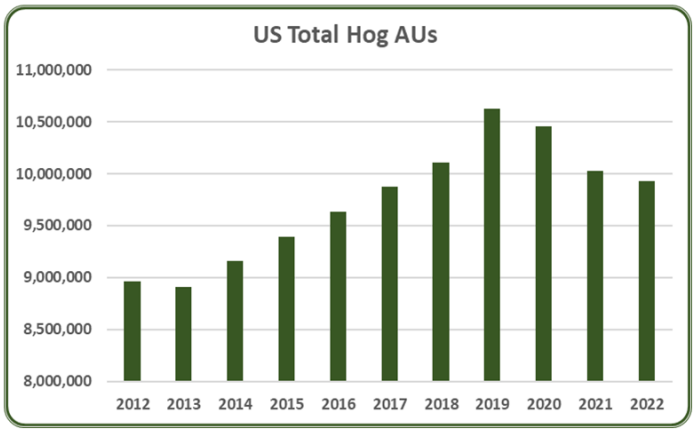


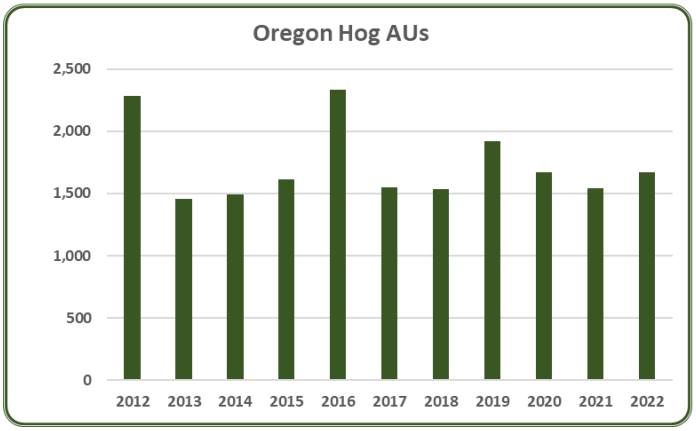
- In 2022, turkey AUs were at 3.18 million, a 0.9% drop from the previous year. This drop is surprisingly low considering the industry battled HPAI for most of 2022. Turkey AUs have been trending down since 2018. Turkey AUs represent about 2% of U.S. AUs, so like layers, large changes in turkey AUs do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



- In 2022, Oregon had 183 turkey AUs, a 4.3% increase from 2021. Turkeys accounted for less than 0.05% of the total AUs (1.35 million) in Oregon. From 2012 to 2022, the average number of turkey AUs in Oregon was 203 AUs. Since 2012, turkey AUs have decreased by 10.8%.



- 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, Oregon had 1,674 hog AUs, a 8.6% increase from 2021. Hogs accounted for 0.1% of the total AUs (1.35 million) in Oregon. From 2012 to 2022, the average number of hog AUs in Oregon was 1,734 AUs. Since 2012, hog AUs have decreased by 26.7%.

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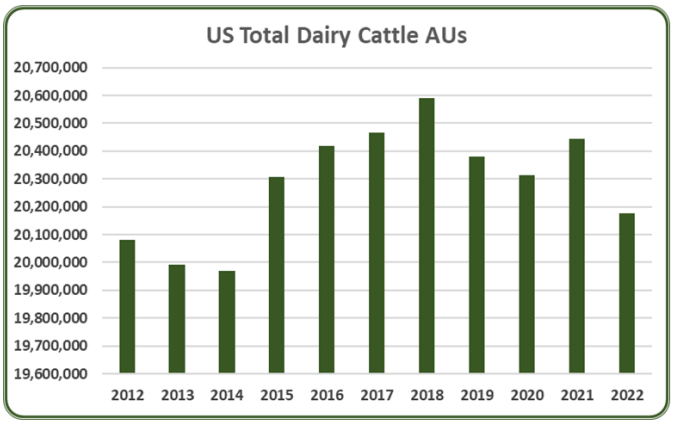
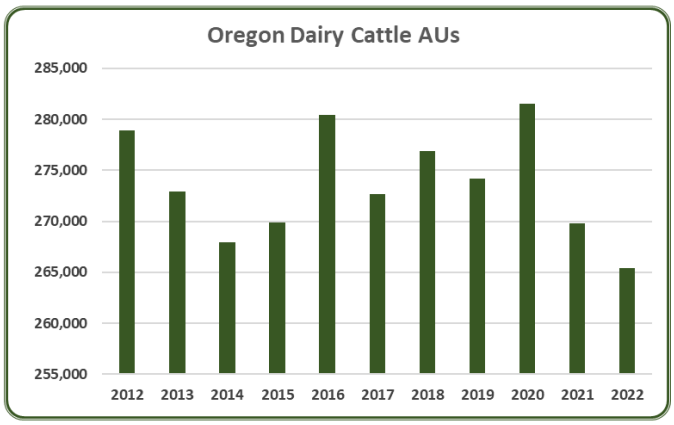
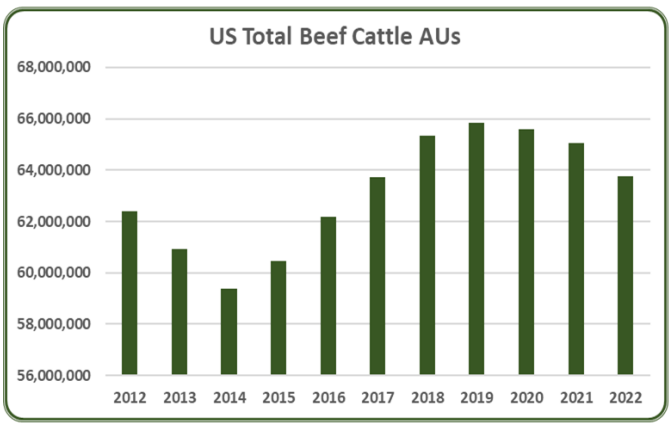


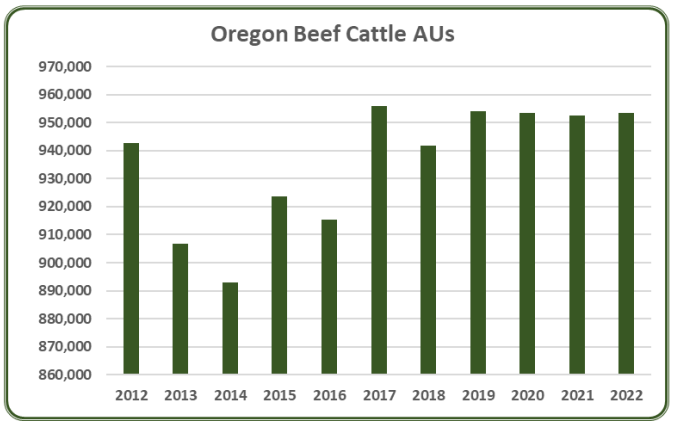
- From 2012 to 2022, dairy cattle AUs averaged 20.29 million. The herd was also relatively steady, fluctuating between 19.9-20.6 million AUs during that time. In 2022, dairy cattle AUs totaled 20.18 million, down 1.3% from 2021. Dairy cattle represented about 16% of all U.S. AUs.



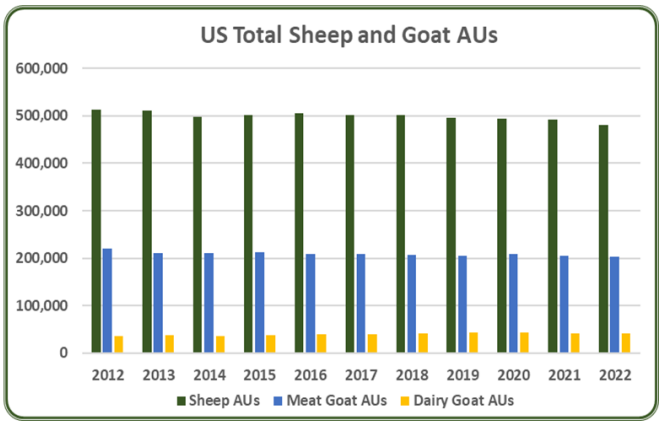
- In 2022, Oregon had 265,416 dairy cattle AUs, a 1.6% decrease from 2021. Dairy cattle accounted for 19.6% of the total AUs (1.35 million) in Oregon. From 2012 to 2022, the average number of dairy cattle AUs in Oregon was 273,687 AUs. Since 2012, dairy cattle AUs have decreased by 4.8%.



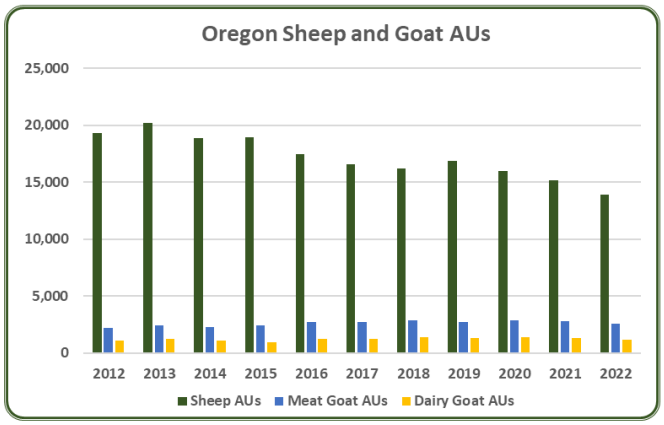
- From 2012 to 2022, beef cattle AUs averaged 63.9 million. In 2022 beef cattle AUs totaled 63.93 million, down 2% from last year, as beef cattle continued through a contraction phase in the cattle cycle which started in 2019. Beef AUs represent almost 50% of U.S. AUs, so changes in beef cattle AUs have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



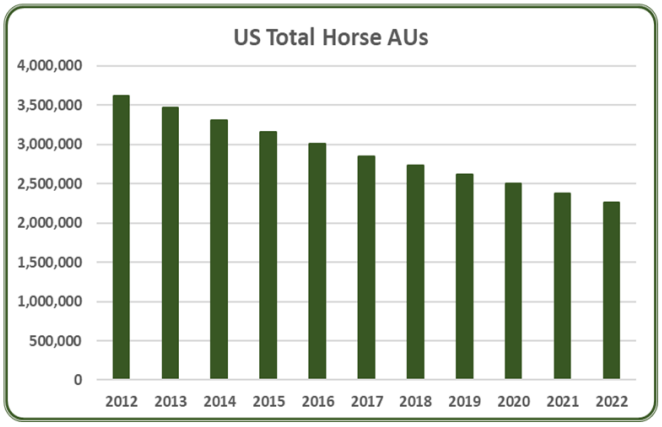
- In 2022, Oregon had 953,488 beef cattle AUs, a 0.1% increase from 2021. Beef cattle accounted for 70.6% of the total AUs (1.35 million) in Oregon. From 2012 to 2022, the average number of beef cattle AUs in Oregon was 935,695 AUs. Since 2012, beef cattle AUs have increased by 1.2%.



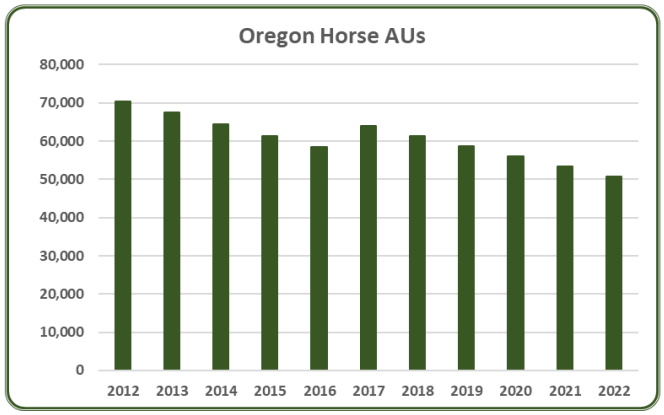
- Sheep, meat goats, and dairy goats account for less than 0.6% of U.S. total AUs. Over the past decade, sheep AUs averaged 500,000, meat goat AUs averaged 209,000 and dairy goat AUs averaged 40,000. Sheep and meat goat AUs have trended down while dairy goats trended up until 2019, then leveled off.



- In 2022, Oregon had a combined 17,730 sheep, meat goat, and dairy goat AUs, a 8.1% decrease from 2021. These accounted for 1.3% of the total AUs (1.35 million) in Oregon. Individually, sheep AUs decreased 7.9%, meat goat AUs decreased 7.1% and dairy goat AUs decreased 12.6%. Combined there was a 21.6% 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, Oregon had 50,808 horse AUs, a 5% decrease from 2021. Horses accounted for 3.8% of the total AUs (1.35 million) in Oregon. From 2012 to 2022, the average number of horse AUs in Oregon was 60,605 AUs. Since 2012, horse AUs have decreased by 27.9%.

Oregon Additional Information and Methodology

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

Oregon 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 Oregon'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 Oregon, $1.59 to $2.28 million in total economic activity, $0.39 to $0.47 in household wages and 12 to 18 additional jobs are generated in the economy at large.

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Appendix

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Animal Units (AUs)	Beef Cattle AUs	942,571	906,742	892,880	923,640	915,329	955,988	941,843	954,155	953,346	952,660	953,488
	Hog and Pig AUs	2,282	1,456	1,495	1,617	2,337	1,550	1,537	1,918	1,674	1,541	1,674
	Broiler AUs	60,858	60,649	60,307	61,862	62,326	48,827	48,861	48,844	53,881	51,802	53,523
	Turkey AUs	205	157	192	188	188	268	256	230	185	176	183
	Egg Layer AUs	9,504	9,344	9,132	9,020	10,200	9,396	9,088	9,292	8,616	8,432	8,260
	Dairy AUs	278,916	272,931	267,946	269,866	280,409	272,642	276,891	274,214	281,530	269,794	265,416
	Total Animal Units	**1,387,384**	**1,342,524**	**1,318,677**	**1,349,888**	**1,350,542**	**1,373,205**	**1,360,412**	**1,368,282**	**1,375,643**	**1,357,168**	**1,351,082**
Value of Production ($1,000)	Cattle and Calves ($1,000)	$ 675,073	$ 712,765	$ 914,324	$ 880,723	$ 701,147	$ 701,224	$ 654,871	$ 612,838	$ 587,180	$ 676,227	$ 791,505
	Hogs and Pigs ($1,000)	$ 3,322	$ 2,122	$ 2,017	$ 2,156	$ 2,567	$ 1,311	$ 1,849	$ 1,370	$ 2,072	$ 2,325	$ 2,602
	Broilers ($1,000)	$ 88,522	$ 107,863	$ 113,156	$ 98,719	$ 87,774	$ 103,067	$ 123,979	$ 108,169	$ 88,391	$ 124,326	$ 198,718
	Turkeys ($1,000)	$ 48,290	$ 38,236	$ 26,684	$ 28,677	$ 28,757	$ 18,551	$ 15,040	$ 18,768	$ 21,115	$ 28,520	$ 58,118
	Eggs ($1,000)	$ 54,128	$ 56,049	$ 65,800	$ 115,960	$ 42,447	$ 50,436	$ 85,136	$ 56,226	$ 72,999	$ 56,958	$ 140,104
	Milk ($1,000)	$ 497,574	$ 532,968	$ 655,350	$ 474,486	$ 469,333	$ 500,742	$ 473,297	$ 561,255	$ 559,044	$ 550,620	$ 724,900
	Other	$ 42,859	$ 41,902	$ 45,659	$ 51,890	$ 54,416	$ 58,043	$ 61,475	$ 66,751	$ 70,312	$ 73,360	$ 77,117
	Sheep and Lambs ($1,000)	$ 20,369	$ 15,315	$ 14,975	$ 17,110	$ 15,539	$ 15,069	$ 14,404	$ 15,583	$ 15,047	$ 13,998	$ 13,659
	Aquaculture ($1,000)	$ 22,490	$ 26,587	$ 30,684	$ 34,780	$ 38,877	$ 42,974	$ 47,071	$ 51,168	$ 55,264	$ 59,361	$ 63,458
	Total ($1,000)	**$ 1,409,768**	**$ 1,491,904**	**$ 1,822,990**	**$ 1,652,611**	**$ 1,386,441**	**$ 1,433,373**	**$ 1,415,647**	**$ 1,425,377**	**$ 1,401,113**	**$ 1,512,335**	**$ 1,993,063**

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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)		11,231	12,071	11,420	11,872
	Cattle feedlots (112112)		1,593	778	140	150
	Dairy cattle and milk production (11212)		521	432	344	269
	Hog and pig farming (1122)		534	425	447	434
	Poultry and egg production (1123)		622	891	965	736
	Sheep and goat farming (1124)		1,816	2,103	1,871	2,569
	Animal aquaculture and other animal production (1125,1129)		6,781	5,403	3,892	4,894
Value of Sales ($1,000)	Cattle and Calves		543,231	800,336	894,485	977,404
	Hogs and Pigs		3,540	5,662	3,195	3,431
	Poultry and Eggs		86,506	119,812	127,481	126,466
	Milk*				519,790	507,116
	Aquaculture		17,054	16,270	22,490	42,974
	Other (calculated)		56,328	66,189	55,405	66,075
		Total	1,000,586	1,410,055	1,622,846	1,723,466
Input Purchases	Livestock and poultry purchased	(Farms)	11,223	9,557	10,191	10,985
		$1,000	201,604	281,444	293,739	302,430
	Breeding livestock purchased	(Farms)	*5,484*	4,840	4,937	5,151
		$1,000	*22,334*	33,064	42,659	49,731
	Other livestock and poultry purchased	(Farms)	*7,244*	6,048	6,774	7,371
		$1,000	*179,270*	248,380	251,080	252,699
	Feed purchased	(Farms)	24,322	21,691	21,341	23,893
		$1,000	259,418	454,733	628,524	599,459

** 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	$ 1,800,832	$ 372,482	13,948	$ 102,991
	Hogs, Pigs, and Other	$ 126,992	$ 30,851	1,168	$ 8,530
	Poultry and Eggs	$ 846,235	$ 173,780	4,687	$ 48,050
	Dairy	$ 1,576,295	$ 337,296	10,521	$ 93,262
	Total	$ 4,350,355	$ 914,410	30,325	$ 252,834
Change from 2012 to 2022	Cattle and Calves	$ (185,419)	$ (38,352)	(1,436)	$ (10,604)
	Hogs, Pigs, and Other	$ 31,856	$ 7,739	293	$ 2,140
	Poultry and Eggs	$ 319,821	$ 65,677	1,771	$ 18,160
	Dairy	$ 177,092	$ 37,894	1,182	$ 10,478
	Total	$ 343,350	$ 72,959	1,810	$ 20,173

	Animal Type	Output($)	Earnings ($)	Employment (Jobs)
RIMS II Multipliers	Cattle and Calves	$ 2.28	$ 0.47	17.6
	Hogs, Pigs, and Other	$ 1.59	$ 0.39	14.7
	Poultry and Eggs	$ 2.13	$ 0.44	11.8
	Dairy	$ 2.17	$ 0.47	14.5

Tax Rates	Federal effective income tax rate	14.0%
	Federal Social Security tax rate	6.2%
	State Effective Rate	7.5%
	Total	27.7%

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.