



# Animal Agriculture Economic Analysis: National, 2001 - 2011

A Report for  
United Soybean Board

June 2012



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## EXECUTIVE SUMMARY

In 2011, domestic animal agriculture consumed 30 million tons of soybean meal - by far the largest source of soybean meal demand. Animal agriculture encompasses mainly beef cattle, hogs, broilers, turkeys, eggs, sheep, dairy, and aquaculture. Future soybean demand is tightly linked to the health of these industries.

However, animal agriculture today faces battles over consumer demand, input costs, regulations, and production practices. As of the writing of this report, multiple issues threaten to keep production costs high or drive them higher, issues ranging from widespread drought conditions to implementation costs of the Food Safety Modernization Act. Environmental regulation is another area of concern, with the EPA set to expand regulations for animal feeding operations.

In all, significant changes to animal agriculture could occur over the next two to three years. How much feed costs will rise remains to be seen, but even small cost increases will have impacts in light of an already strained situation as feed and food compete with fuel for commodity inputs.

Consequently, actions to maintain and expand animal agriculture in the United States - by supporting its long-term competitiveness - are of critical importance to the soybean sector.

In order to take effective action at the state and local levels in support of animal agriculture, one needs data and analysis on the economic importance of the industry at those levels. The United Soybean Board contracted with Agralytica (formerly Promar International) to provide current estimates of the economic impacts of animal agriculture at the national, state and local levels.

In 2011, animal agriculture had the following positive national economic impacts:

1,692,000	»	Job impact throughout the economy
\$333 billion	»	Impact on total output in the economy
\$58 billion	»	Impact on household incomes
\$12 billion	»	Impact on income taxes paid
\$6 billion	»	Impact on property taxes paid.

This study provides the most recent data on livestock, poultry, and aquaculture output, their soybean meal usage, and the benefits animal agriculture brings to each individual state and the national economy as a whole.

## 1. INTRODUCTION

The US livestock, dairy, and poultry industries each face differing battles over consumer demand, input costs, regulations, and production practices. Widespread drought conditions as of mid-2012 threaten to keep prices for grains and other feedstuffs at high levels for another year. Production costs for feed will also be affected by the implementation of the Food Safety Modernization Act beginning next year.

How much feed costs will rise remains to be seen. Even small cost increases will have impacts in light of an already strained situation as feed and food compete with fuel for commodity inputs.

Environmental regulation is another area of concern for animal agriculture. The Environmental Protection Agency, for example, is set to promulgate additional regulation on the emissions from confined animal feeding operations. In all, some significant changes to the face of animal agriculture could occur over the next two to three years.

The scale of domestic animal product output is one of the major constraints on US soybean production and profitability. Actions to maintain and expand animal agriculture in the United States by supporting its long-term competitiveness are of critical importance to the soybean industry. In order to act at the state and local levels, one needs data and analysis on the economic importance of animal agriculture at those levels. This report addresses that constraint.

The United Soybean Board has set itself the objective of protecting the interests of US soybean farmers by supporting the long-term competitiveness of the domestic livestock and poultry industries. Beginning in 2004 with the 23 states that lead in production of these products, the annual Animal Agriculture Economic Analysis Report gradually expanded to cover all 50 states by 2007. This year we analyze the 2011 data that USDA published in April 2012.

Beyond this introduction,

- Section 2 reviews and describes the economic and animal product database for each state, which serves as a basis for the associated analysis and graphic presentations. The database itself is in the form of an Excel file.
- Section 3 highlights trends that have cropped up in our research, those we found to be high on the radar of the animal agriculture industry over the past year.
- Section 4 provides a quick review, with data maps of long-term changes across the country (2001-2011) in each major SBM-using category.
- Section 5 details our estimates of soybean meal use by species in each state for 2011.
- Section 6 presents the impacts of animal agriculture on output, earnings, employment, and tax revenue at the state, regional and national levels based on multiplier analysis.
- Section 7 analyzes the state economic impacts of relocation of animal agriculture.

## 2. ECONOMIC AND ANIMAL PRODUCT DATABASE

Last year we developed a menu-driven Excel file which contains the databases for all 50 states and the nation as a whole. Each state database contains information such as: livestock production and value data, economic impact calculations, taxation data, and computation of meal use by livestock and poultry. The information is presented in both table and chart form. The tables on the following pages display examples of the data types that we gathered. One sheet in each state file contains information on state income tax structure. Others calculate production indexes by species and soybean meal use by species. This section describes the database, using Ohio as an example.

Annually released publications from USDA's National Agricultural Statistics Service (NASS) served as the sole source for inventory, quantity of output, and value of production data in the first table.

The first of the tables on the next page shows animal agriculture output, by volume and value, in a time series format. The "Trend Analysis" sheet in each state database contains charts of both the linear trend in volume and the three-year moving average using this data. The "Index Tables" sheet in the database provides charts that enable one to see how the various species are faring relative to one another, using 2000 as the base year. Examples of a linear trend chart and an index chart are shown on page 5.

Calculated economic impacts are presented in the second table, along with the multipliers we obtained from the Bureau of Economic Analysis in the Department of Commerce. These multipliers were applied to the value of production to calculate output and earnings measured in dollars, and employment measured in number of jobs. Tax revenue effects were calculated separately using methods described in Section 6. The change in economic impact from 2001 to 2011 was computed by applying the multipliers and tax factors to the change over that period in the value of production.

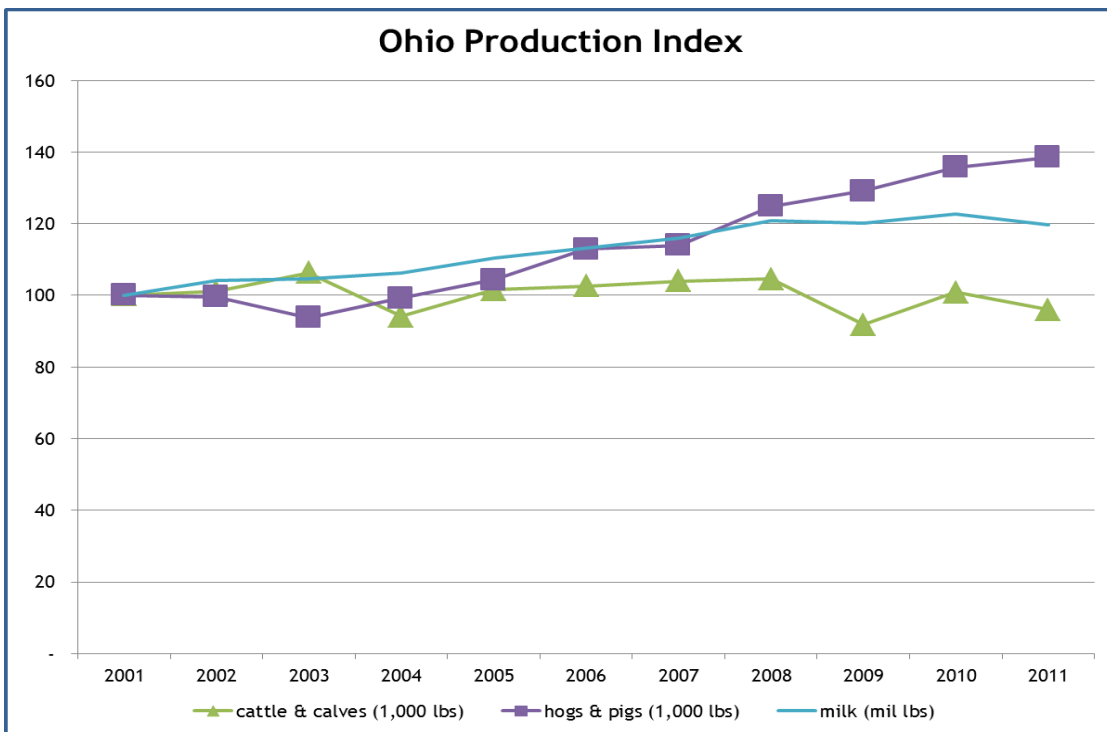
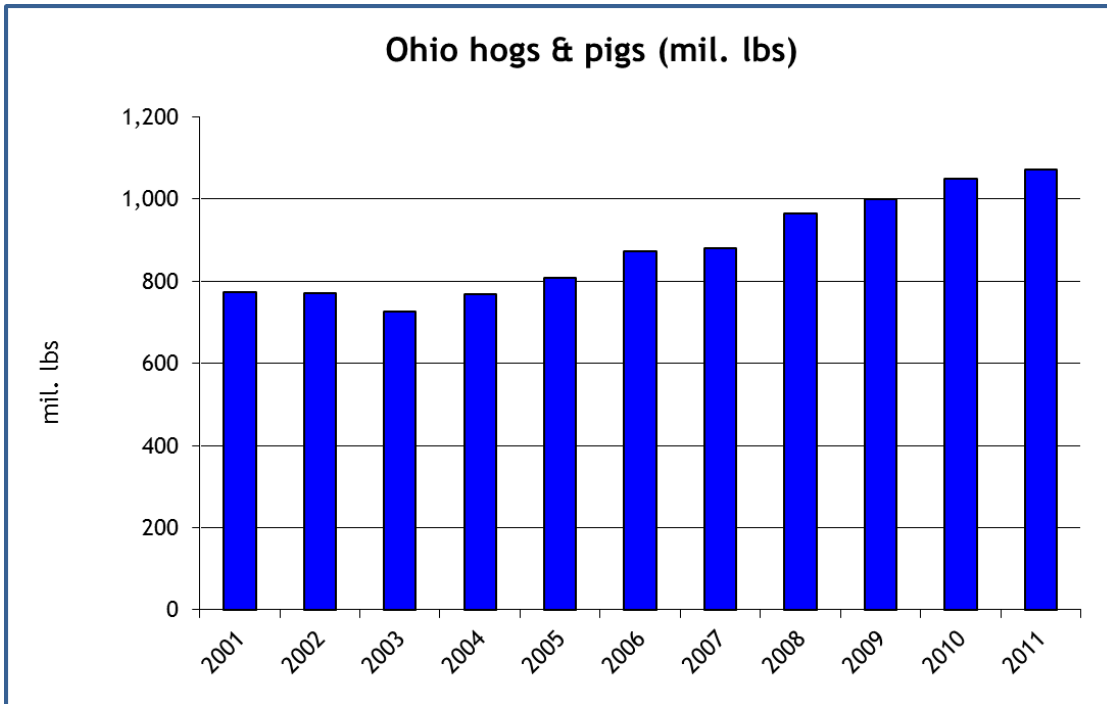
**Basic Livestock and Economic Impact Data**

<b>NASS DATA</b>												
Ohio												
Inventories	OH	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Jan 1('98 - '11)	cattle & calves (1,000 head)	1,250	1,220	1,230	1,300	1,280	1,280	1,230	1,280	1,280	1,280	1,230
Dec 1('97 - '10)	hogs & pigs (1,000 head)	1,430	1,440	1,520	1,450	1,550	1,680	1,830	1,940	1,940	2,040	2,150
<b>Quantity of output</b>	cattle & calves (1,000 lbs)	427,488	432,339	454,660	402,673	434,191	438,755	444,604	447,220	392,698	431,197	410,197
	hogs & pigs (1,000 lbs)	773,625	770,158	725,882	767,521	807,466	874,033	881,315	965,679	999,093	1,049,889	1,071,496
	broilers (1,000 lbs)	212,500	214,500	225,500	224,600	228,400	241,700	273,900	327,800	338,400	376,800	375,500
	turkeys (1,000 lbs)	181,440	218,880	212,300	219,820	223,800	190,740	227,400	230,400	203,320	192,740	210,000
	eggs (mil eggs)	7,900	7,940	7,642	7,355	7,506	7,507	7,151	7,168	7,426	7,540	7,607
	milk (mil lbs)	4,295	4,475	4,490	4,560	4,743	4,860	4,980	5,192	5,162	5,270	5,142
<b>Value of production (\$1,000)</b>	cattle & calves (\$1,000)	305,018	271,097	336,612	316,374	369,900	374,089	380,827	372,826	304,910	381,415	410,027
	hogs & pigs (\$1,000)	333,321	251,856	270,392	372,171	393,142	383,445	390,400	421,083	391,721	555,998	702,349
	broilers (\$1,000)	82,875	64,350	78,925	101,070	100,496	87,012	117,777	150,788	154,649	181,618	174,983
	turkeys (\$1,000)	63,504	76,608	82,797	92,324	98,472	87,740	104,604	133,632	105,726	119,499	143,220
	eggs (\$1,000)	323,242	295,765	374,458	333,750	228,182	287,198	483,441	585,477	403,793	427,361	490,563
	milk (\$1,000)	652,840	563,850	588,190	756,960	749,394	670,680	991,020	1,010,610	732,072	938,060	1,115,814
	other	8,352	7,876	12,812	12,328	14,224	12,545	10,471	13,372	14,346	16,184	
	sheep & lambs (\$1,000)	6,459	5,939	10,286	9,012	13,106	11,642	9,229	10,069	9,926	11,764	
	catfish (\$1,000)											
	trout (\$1,000)											
	mink (\$1,000)	1,893	1,937	2,526	3,316	1,118	903	1,242	3,303	4,420	4,420	
<b>Total</b>		1,769,152	1,531,402	1,744,186	1,984,977	1,953,810	1,902,709	2,478,540	2,687,788	2,107,217	2,620,135	3,036,956

<b>Census of AG</b>		1997	2002	2007				
<b>Number of farms</b>	<b>Beef cattle ranching and farming (112111)</b>	23,233	22,684	20,314				
<b>(NAICS classification)</b>	<b>Cattle feedlots (112112)</b>	566	161	16				
	<b>Dairy cattle and milk production (11212)</b>	196	215	116				
	<b>Hog and pig farming (1122)</b>	413	220	287				
	<b>Poultry and egg production (1123)</b>	3,233	3,450	3,818				
	<b>Sheep and goat farming (1124)</b>	343	697	1,626				
	<b>Animal aquaculture and other animal prdxn (1125,1129)</b>	2,449	4,667	6,219				
<b>Value of sales</b>	<b>cattle &amp; calves</b>	292,784	348,253	408,276				
<b>\$1,000</b>	<b>hogs &amp; pigs</b>	34,480	39,441	54,618				
	<b>poultry &amp; eggs</b>	2,093,768	2,137,299	3,113,194				
	<b>milk &amp; other dairy products</b>	52,573	46,129	38,270				
	<b>aquaculture (first Census, 1998)</b>	59,694	80,976	99,504				
	<b>other (calculated)</b>	9,145	22,583	24,701				
	<b>Total (livestock, poultry &amp; their products)</b>	2,542,444	2,674,681	3,738,563				
<b>Input purchases</b>	<b>Livestock and poultry purchased.....</b>	13,213	13,420	11,619				
	<b>\$1,000</b>	341,450	505,196	701,381				
	<b>Breeding livestock purchased.....</b>	NA	7,124	5,994				
	<b>\$1,000</b>	NA	17,300	56,499				
	<b>Other livestock and poultry purchased.....</b>	NA	7,830	7,022				
	<b>\$1,000</b>	NA	487,896	644,882				
	<b>Feed purchased.....</b>	26,309	32,201	30,051				
	<b>\$1,000</b>	1,140,545	927,774	1,611,020				

Economic impacts		Output (\$1,000)	Earnings (\$1,000)	Employment (jobs)	Tax (\$1,000)
2011 Animal Ag	cattle & calves (\$1,000)	\$ 796,436	\$ 135,432	5,802	\$ 33,892
	hogs & pigs (\$1,000)	\$ 1,342,470	\$ 238,869	10,094	\$ 59,777
	broilers (\$1,000)	\$ 3,386,128	\$ 605,686	20,824	\$ 151,573
	dairy (\$1,000)	\$ 2,418,638	\$ 449,115	18,481	\$ 112,391
	<b>Total impact</b>	<b>\$ 7,943,672</b>	<b>\$ 1,429,101</b>	<b>55,201</b>	<b>\$ 357,633</b>
Change 2001 - 2011	cattle & calves	\$ (33,572)	\$ (5,709)	(245)	\$ (1,429)
	hogs, pigs, & oth	\$ 373,199	\$ 66,404	2,806	\$ 16,618
	poultry & eggs	\$ 1,091,969	\$ 195,323	6,716	\$ 48,880
	dairy	\$ 398,403	\$ 73,979	3,044	\$ 18,513
	<b>Total impact</b>	<b>\$ 1,829,998</b>	<b>\$ 329,998</b>	<b>12,321</b>	<b>\$ 82,582</b>
RIMS II		Output (\$)	Earnings (\$)	Employment (jobs)	
Multipliers	cattle & calves	1.9424	0.3303	14.1493	
	dairy	2.1676	0.4025	16.5632	
	poultry & eggs	2.9289	0.5239	18.0125	
	hogs & pigs and other	1.9114	0.3401	14.3715	
Tax rates	Federal effective income tax rate		12.7%		
	Federal Social Security tax rate		7.7%		
	Ohio average effective income tax rate		4.7%		
	Total		25.0%		

Average effective tax rate, Best available data 2007 Sources: Tax Policy Institute,  
Self Employed and Employee/Employer combined rate. Source: Tax Foundation <http://www.taxfoundation.org/taxdata/show/24682.html>  
Agralytica estimated income tax rate/ Tax Foundation





### 3. CURRENT ISSUES

During the course of research for this project, a number of issues emerged repeatedly, across multiple states. Some may present little in the way of short-term implication for changes in production volumes; nevertheless, they are the issues with which state animal agriculture organizations are grappling - and will likely continue to face - in the years ahead.

**Raw milk legislation** - Just over half the states allow the sale of raw milk, and consumption of raw milk is legal in all 50 states. Interstate sales of raw milk are illegal, but legislation has been proposed to repeal this ban. The Food and Drug Administration continues to advise consumers that raw milk poses significant risks to health without any scientifically documented benefits.

**Animal welfare legislation** - In early July 2011, the Humane Society of the United States and the United Egg Producers announced an agreement to work together toward the enactment of new federal legislation for hens involved in egg production. The legislation would ban conventional cages for egg laying hens and require the conversion to enriched housing systems over the next 15-18 years, providing nearly double the space currently allocated to each hen. The proposed legislation, if passed, would supersede state laws; however, it would defer to California's 2015 conventional cage phase-out deadline and require that all eggs sold in the state come from facilities compliant with California's Proposition 2. In Senate consideration of the farm bill, the Senate leadership did not permit a layer housing amendment to be offered due to opposition by other livestock groups. The prospects for the proposed legislation remain unclear in both bodies.

**Livestock marketing** - Proposed rules affecting livestock and poultry marketing and contracting were published by the Grain Inspection, Packers and Stockyards Administration (GIPSA) in June 2011. This was in response to a requirement in the 2008 farm bill. The proposed regulations were aimed at providing new protections for producers against unfair, fraudulent, or retaliatory practices but have been controversial within the industry. The National Cattlemen's Beef Association, National Pork Producers Council, National Chicken Council, and National Turkey Federation all criticized the proposed regulations as unnecessarily raising costs. On the other side, the American Farm Bureau Federation supported USDA's regulatory effort. In December, 2011 USDA decided against any sweeping changes and published a watered down final rule on GIPSA.

**Action on climate change / pollution** - Another major theme over the past few years has been the trend toward trying to understand, as a precursor to possibly limiting, the environmental impact of animal agriculture, particularly greenhouse gas emissions and pollution. For instance, the EPA reached a settlement with environmental groups and will launch an initiative to track down unlicensed concentrated animal feeding operations (CAFOs) to identify polluters. The EPA also published a Federal Register notice in October 2011 that it is developing amendments to the reporting requirements for CAFOs. In late June 2012, a House committee began drafting legislation that will continue to exempt CAFO's from federal reporting of manure and ammonia emissions.

**Illegal immigration / labor issues** - Post-9/11 security concerns and the economic downturn have led to increased pressure for action on illegal immigration. New laws are being passed and both state and federal agencies have been targeting companies that hire illegal immigrants. There is no cap on the number of H-2A visas, which are temporary visas for hiring crop workers. Dairy farms, however, operate year-round, and thus cannot benefit from the visa program. Recently, the US Supreme Court struck down portions of Arizona's immigration laws, on the grounds that state laws cannot pre-empt federal laws. This ruling will affect other states that are trying to reform their laws to allow a greater labor pool of workers for the farmers in those states. Millions of dollars in crops have simply rotted in fields for lack of the labor supply to harvest them.

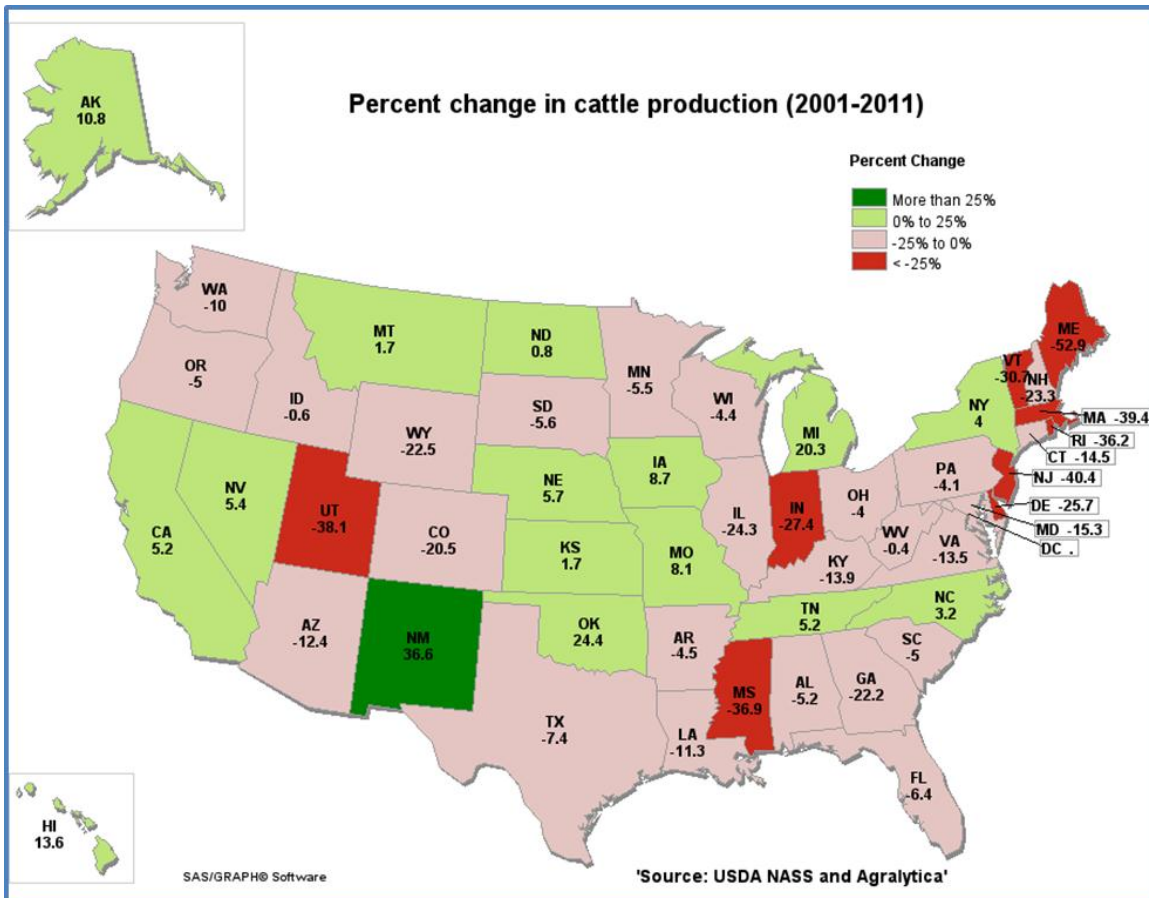
**Food safety** - The January 2011 signing of the Food Safety Modernization Act was supposed to result in implementation of new regulations by July 2012, governing the safety of both human and animal food. However, as of mid-year, proposed regulations had still not been published. The anticipated regulations on preventive controls for animal feeds will likely require feed mills and perhaps even grain elevators to have a written plan that identifies potential hazards, how they will be monitored, and what steps will be taken to deal with them if they should arise. The Act also has significant record keeping and inspection requirements.

**Antibiotics** - Another ongoing food safety issue, unrelated to that legislation, is the use of antibiotics in production of livestock and poultry products. The concern is that overuse of veterinary drugs could result in microbes with resistance to antibiotics that will make it difficult to treat human infections. USDA has announced that it will step up testing of meat and poultry for drug residues.

## 4. LONG TERM CHANGES

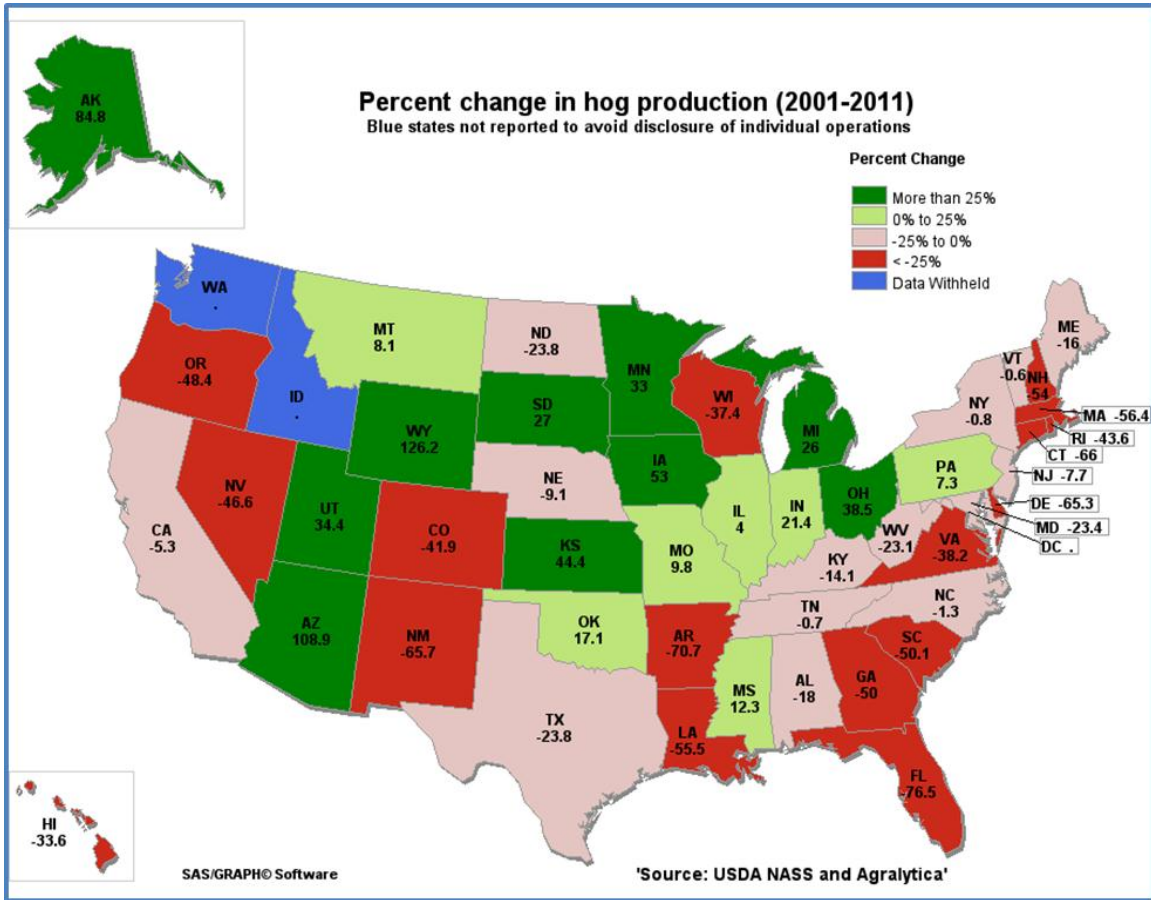
The following pages contain graphs and information documenting the shifts in animal agriculture across the country over the past decade (2001-2011). In the pages that follow, green indicates growth and red shows decline; the darker the color, the greater the change. For those who may only see this report in black-and-white, the percentage change is also shown numerically.

### 4.1. Cattle and calves



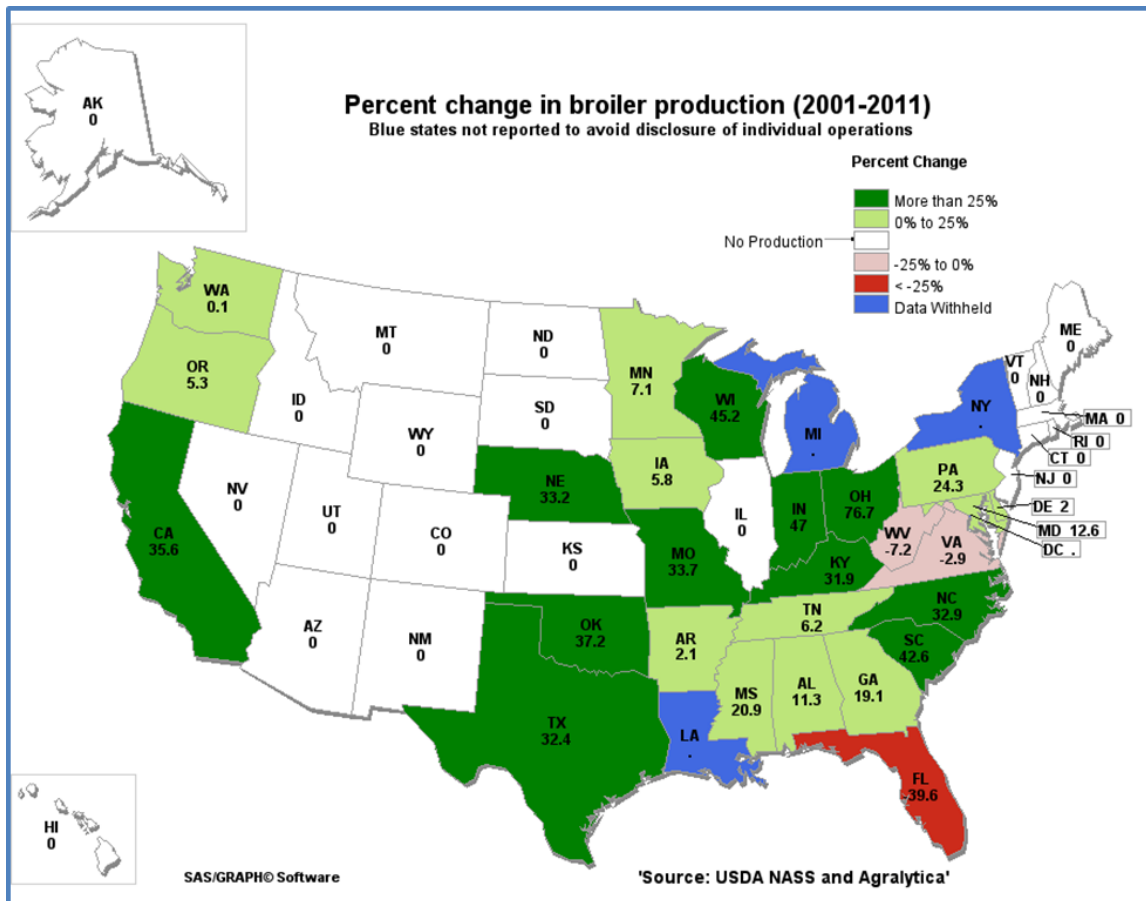
Much of the country has seen either moderate losses or small gains in cattle production over the past decade, i.e. less than 25 percent growth or decline. However, as of 2011 there have been some significant changes in several states with moderate sized herds. New Mexico production increased by 36%, while Utah, Mississippi, and Indiana all contracted by more than 25%. There are several states with small herds such as Alaska, Hawaii, West Virginia and most of the Northeastern states that show high variability from year to year. Of the states with large herds, Colorado is noteworthy for its 20.5% decrease over the decade and Oklahoma for its 24.4% increase.

## 4.2. Hogs and pigs



Pork production has generally shifted from the periphery of the country, particularly from coastal states, and moved toward the Midwest where feed costs are lower.

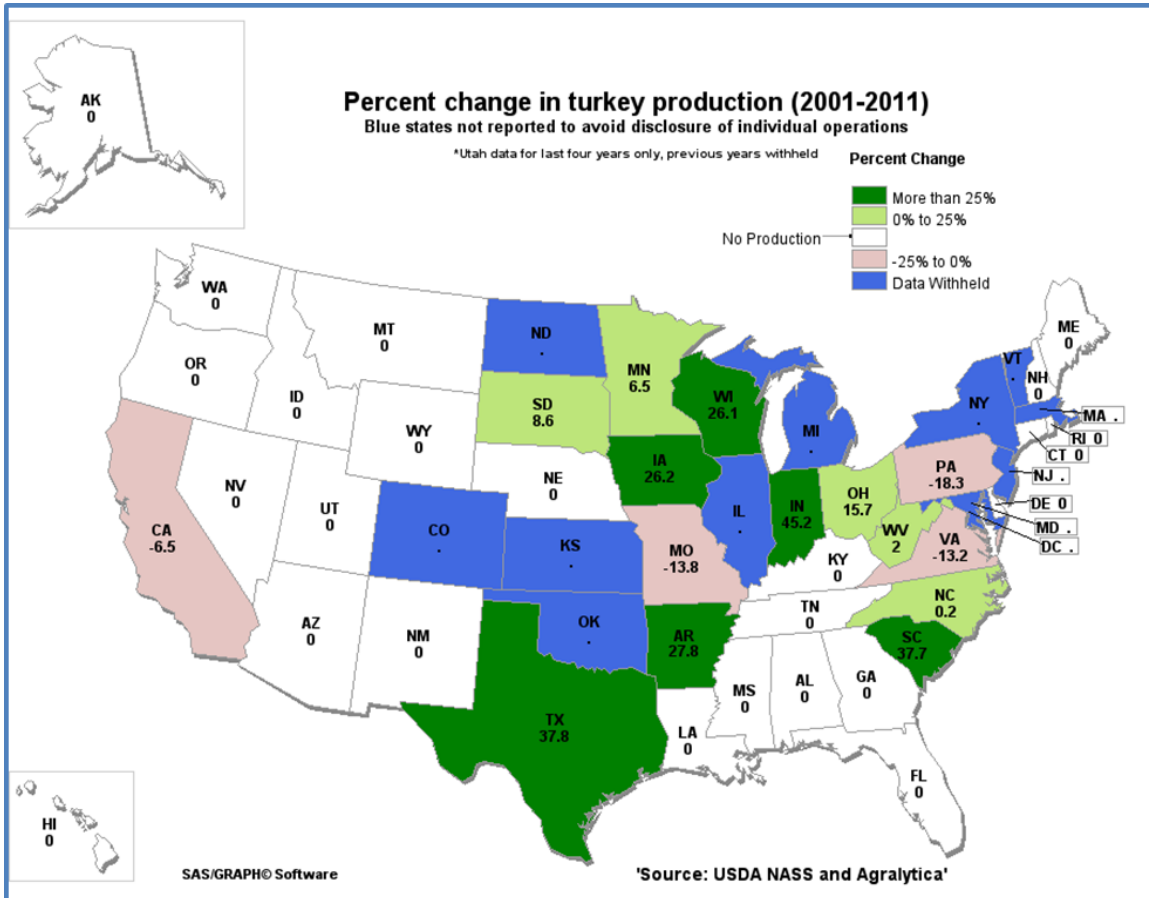
### 4.3. Broilers



This map is slightly more complex. States in white do not process broilers in volume. Blue indicates states that have broiler production - possibly large, possibly increasing - but for which there are so few producers that production data has been withheld to avoid disclosing individual operations.

So, we are left with the states that report data. We can see particularly large growth in California, Texas and Oklahoma, the Carolinas, and across a band running east-west from Pennsylvania to Nebraska. There are very few states where production is declining. Most notable is Florida. Florida is losing production in every animal agriculture category and has been for some time.

#### 4.4. Turkeys

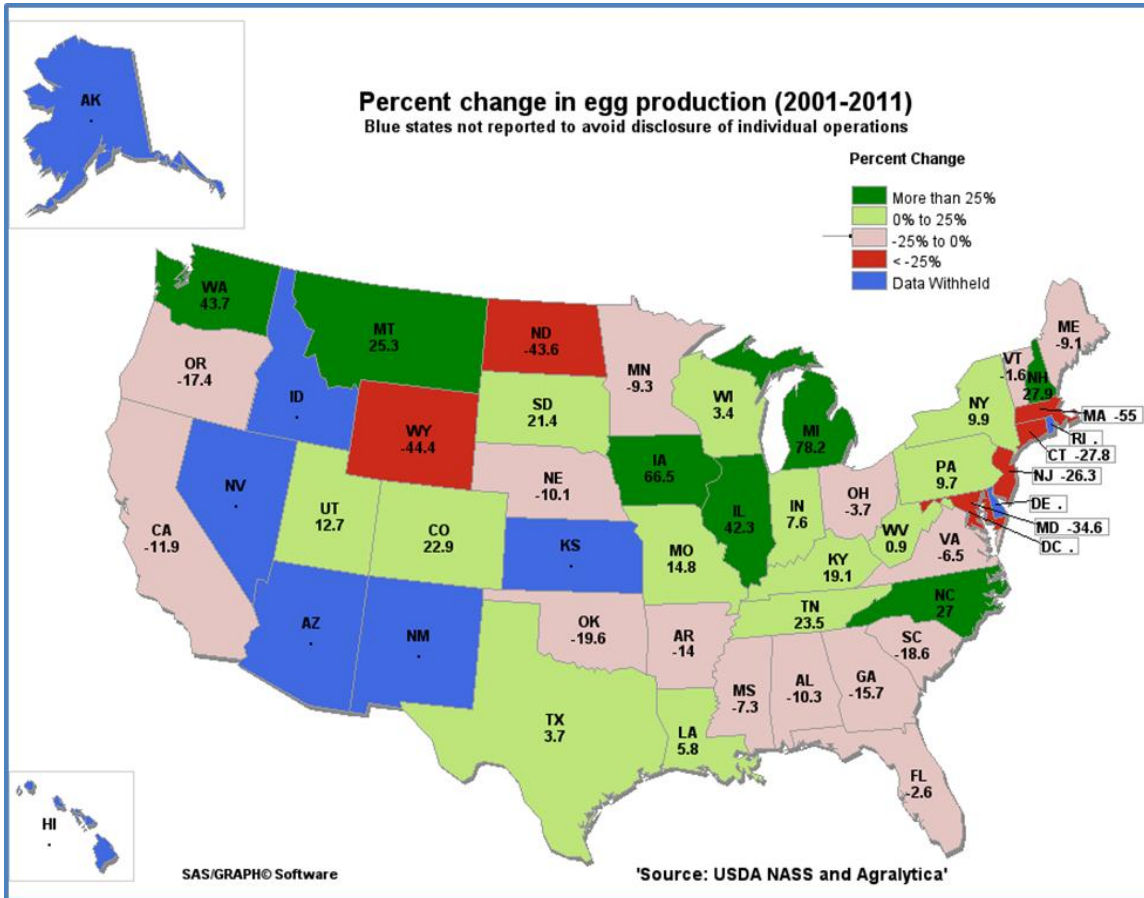


The data from the two largest turkey-producing states, Minnesota and Iowa, was withheld for the first time in 2009 because some facilities were closed and the change was made to avoid disclosing individual operations. Reporting resumed for Minnesota in 2010. The 2011 Iowa data was estimated.

To the extent that a pattern can be found in incomplete data, production seems to be declining in the east and increasing in the Midwest where feed is generally cheaper. Several states with high growth in broiler production also have high growth in turkey production. These states are Texas, South Carolina, Indiana, and Wisconsin.

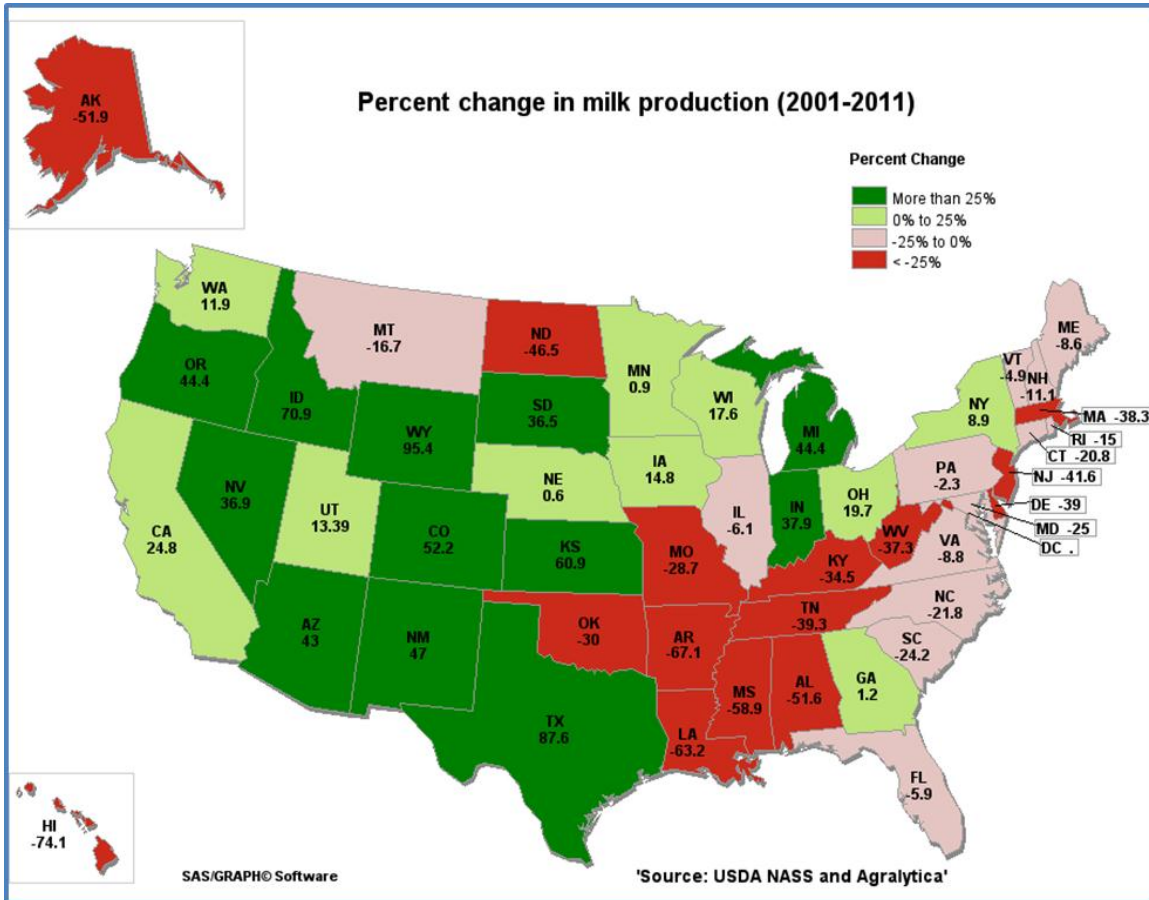


**4.5. Eggs**



Despite overall growth in national egg production, there have been declines across the south and east, and along most of the west coast. Egg production has shifted much closer to the corn and soybean producing regions; the most prominent growth has been close to the Great Lakes and Iowa, and in North Carolina, Tennessee, and Kentucky.

#### 4.6. Milk



Nationally, there has been a dramatic shift in milk production, with declines across the south-central and eastern states, and growth - much of it substantial - in the cornbelt and most states west of Missouri.

While national milk production grew 18% between 2001 and 2011, production fell by more than 50% in Alabama, Arkansas, Louisiana, and Mississippi, and by 30-50% in Delaware, Kentucky, Massachusetts, New Jersey, Tennessee, and West Virginia.



## 5. SOYBEAN MEAL USE BY STATE

Soybean growers should be concerned about the future of animal agriculture in the United States because domestic consumption of soybean meal by livestock, poultry, and other species is the single largest source of demand for US soybeans.

To calculate soybean meal use by species in 2010/11 in each state, we began with the 2011 animal production data published by NASS. For some states, data is withheld to maintain the confidentiality of individual firms' data. Normally there have to be three or more firms for NASS to be able to publish a state estimate. This mostly affects the broiler, turkey and egg production numbers. For eleven states, we made our own estimates of production (and soybean meal use) based on animal numbers shown in the Census of Agriculture. These estimates are shown in italics in the table below. The shaded cells are the other cases of data being withheld for confidentiality reasons.

Since most animals are fed for prolonged periods before they are slaughtered, fiscal year meal disappearance should roughly correspond to calendar year production or marketings. Comparing the live/slaughter weight production data for beef, pork and poultry to carcass/ready-to-consume production data in USDA's World Agricultural Supply and Demand Estimates, we calculated a three-year average (2009-2011) product yield per pound of animal production for each livestock product (except for eggs and milk, which we assigned a yield ratio of 1.00).

Using the new product yield estimates, we then applied feed conversion ratios to estimate protein meal used in feed per unit of meat, egg or milk production. The factors usually cited for the number of pounds of meal needed to produce a pound of chicken or some other meat assume a ration built around corn and soybean meal. However, there is an increasing amount of other protein sources going into the national feed mix including meat and blood meal, fishmeal, urea, synthetic amino acids, corn gluten feed and meal, other oilseed meals, and increasingly, distillers dried grains (DDG).

As in earlier reports, we attempted to reconcile our soybean meal estimates to that total disappearance of protein feeds by adjusting downwards the calculated amount of soybean meal. For pork and egg production, SBM consumption in 2010/11 is estimated at 76% of the amount calculated for a straight corn-SBM ration. For broilers and turkeys, we also used a factor of 76%. For beef cattle, we used a factor of just under 15% and for dairy 30% because of the increasing use of gluten feed and distillers' grains to meet cattle protein requirements.

In addition to the main species, other outlets for soybean meal as feed include aquaculture and pet food, plus much smaller markets like mink, goats, sheep, horses, ducks, geese, etc. In the past, we have estimated that this "other" category accounts for about 5% of total soybean meal used nationally in domestic feeding. We have used the same figure in our state estimates, but one should be aware that this will under- or over-estimate such use for certain states. For example, it may underestimate use of soybean meal in aquaculture in states like Louisiana.

The table on the next page presents the results of these calculations. In total, the state estimates add up to 29.3 million tons of SBM consumption for feed in 2010/11. Applying the factors to the national data that includes the data for certain states withheld for purposes of confidentiality shows use of 29.7 million tons of SBM. This is quite close to USDA's 30.2 million ton estimate of total domestic meal disappearance, which also includes production of soy flour, concentrate and isolate for human and animal consumption.

Broilers accounted for 11.3 million tons of soybean meal use, hogs and pigs 8.5 million, and turkeys and beef cattle each 1.9 million. Usage of SBM in the production of milk and eggs was 2.4 and 2.2 million tons, respectively. The dominance of broilers and hogs in SBM use is evident in the pie chart below. These two species account for two-thirds of total use.

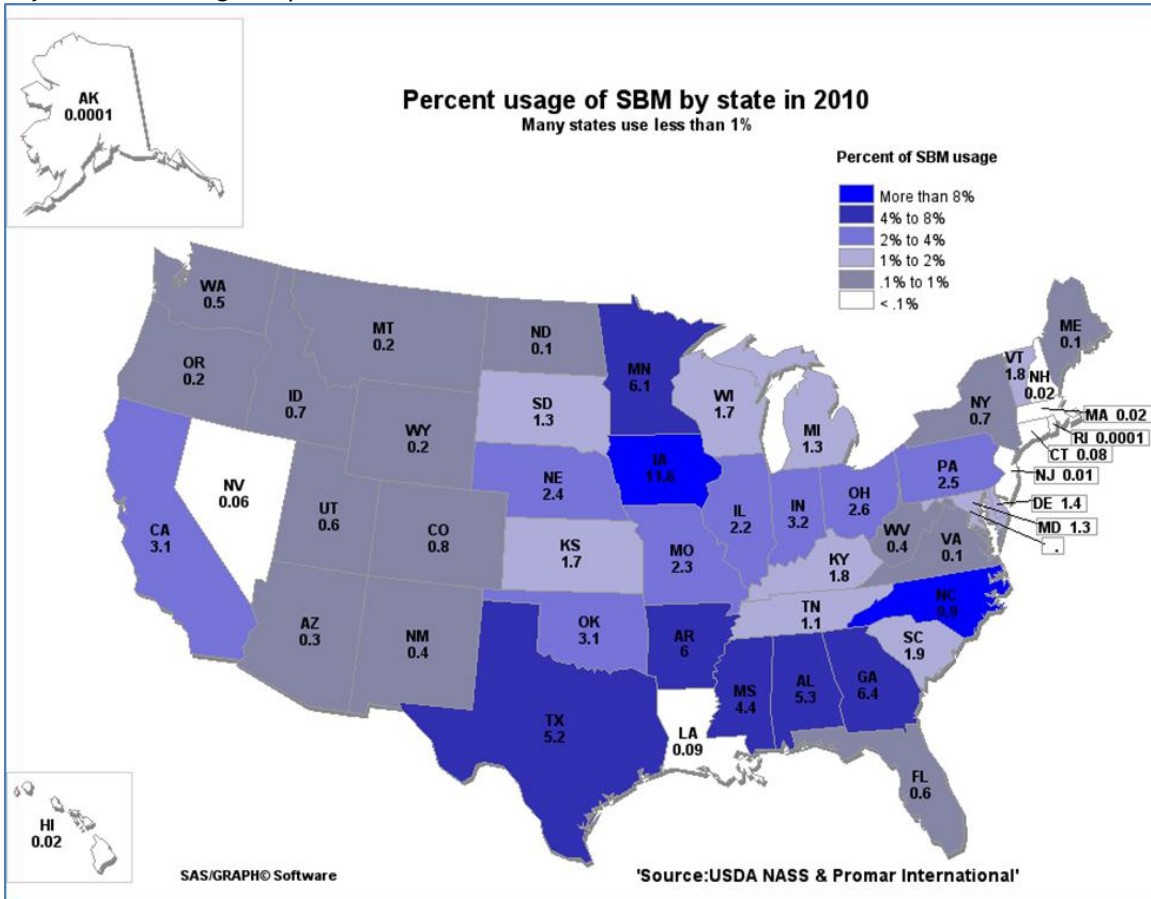
By state, Iowa was the leading user of soybean meal in animal agriculture, at 3.4 million tons, followed closely by North Carolina with 2.8 million, and then Georgia and Arkansas at 2.0 and 1.7 million tons respectively.

Soybean Meal Use by Species in 2010/11 (1,000 short tons)

State	Beef	Pork	Broilers	Turkeys	Eggs	Milk	Other	State Total
Alabama	21	15	1,305	0	51	2	73	1,467
Alaska	0	0	0	0	0	0	0	0
Arizona	25	26	0	0	0	53	5	109
Arkansas	24	23	1,337	158	71	2	85	1,699
California	94	14	314	110	127	498	61	1,218
Colorado	76	83	0	0	28	36	12	234
Connecticut	1	0	0	0	15	4	1	22
Delaware	0	1	348	0	0	1	18	369
Florida	19	1	87	0	64	27	10	209
Georgia	16	24	1,695	0	103	17	98	1,953
Hawaii	2	1	0	0	0	0	0	3
Idaho	47	0	0	0	0	159	11	217
Illinois	20	524	0	0	30	23	31	628
Indiana	9	484	39	151	156	42	46	929
Iowa	79	2,702	13	71	348	52	172	3,438
Kansas	181	257	0	0	0	31	25	493
Kentucky	24	49	389	0	27	13	26	528
Louisiana	9	1	0	0	12	3	1	27
Maine	1	1	0	0	24	7	2	34
Maryland	3	3	355	0	14	12	20	408
Massachusetts	0	1	0	0	1	3	0	5
Michigan	19	171	0	0	72	102	19	383
Minnesota	48	1,018	54	306	68	107	84	1,685
Mississippi	8	45	1,056	0	35	2	60	1,206
Missouri	58	365	312	149	49	17	50	1,000
Montana	46	21	0	0	3	3	4	77
Nebraska	207	364	5	14	65	14	35	704
Nevada	8	0	0	0	0	8	1	17
New Hampshire	0	0	0	0	1	3	0	6
New Jersey	0	0	0	0	10	2	1	13
New Mexico	41	0	0	0	0	98	7	146
New York	11	8	0	0	30	154	11	214
North Carolina	15	1,008	1,275	296	77	11	141	2,823
North Dakota	30	19	0	0	1	4	3	57
Ohio	18	296	86	55	183	62	37	736
Oklahoma	102	369	348	0	18	11	45	893
Oregon	25	2	28	0	16	30	5	107
Pennsylvania	23	131	199	46	176	127	37	739
Rhode Island	0	0	0	0	0	0	0	0
South Carolina	7	14	342	117	28	3	27	538
South Dakota	66	215	0	47	17	22	19	386
Tennessee	26	26	226	0	9	10	16	312
Texas	323	55	820	35	118	115	77	1,544
Utah	11	84	0	26	23	22	9	175
Vermont	2	0	0	0	1	30	2	36
Virginia	20	20	295	120	17	21	26	520
Washington	26	0	33	0	46	74	9	189
West Virginia	6	1	78	24	6	2	6	122
Wisconsin	52	48	46	66	31	313	29	585
Wyoming	23	46	0	0	0	1	4	74
Withheld data*	0	13	259	122	38	0	23	454
National	1,875	8,549	11,345	1,914	2,211	2,355	1,486	29,734

Blue shaded cells are estimated using NASS Census of Agriculture 2002, 2007 Data  
Green shaded cells indicate where the data was withheld.

Soybean meal usage map



This graphic offers a visual representation of the percentage share of soybean meal used in each state in 2011. Since there are 50 states, “average” usage would be 2%. Higher usage states are darker in color.

The graphic thus makes visible the main “pockets of usage”; for instance, there is below average usage in New England, the Pacific Northwest, and much of the west. By contrast, usage is much higher in the Midwest and Deep South, and particularly strong in Iowa and North Carolina.

In fact, if you look at the two darkest shades of states - the eight of them account for 53% of the country’s soybean meal usage.

## 6. ECONOMIC IMPACTS OF ANIMAL AGRICULTURE

### 6.1. Output, earnings and employment multipliers

To estimate the impact of livestock production on the overall economy of any given geographic area, it is necessary to quantify the relationship between the livestock industry and each of the other major components of the area's economy. So-called input-output (I-O) models are commonly used for this purpose. Given the great amount of detailed information that is required to build and maintain a national I-O model, there are comparatively few of them in operation. One of the most elaborate of these models is the Regional Industrial Modeling System (RIMS II) operated by the Bureau of Economic Analysis (BEA) in the US Department of Commerce. This is the model used in this analysis.

RIMS II is based on BEA's 2002-benchmark I-O table and 2008 regional data. It is comprised of approximately 500 industries. The model traces the interactions among these industries so that the effect of a given level of output in one industry on all other industries can be measured. These measures take the form of multipliers or factors that can be applied to output measured in dollars. They indicate the total economic activity in the state associated with a dollar of sales in that industry. In addition to measuring the value of output, multipliers are also derived for measuring impacts on earnings and employment.

The employment multiplier is the number of total jobs in the state associated with one million dollars of sales in that industry. This includes jobs not just in the cattle industry, for example, but jobs in feed, finance, insurance, grocery stores, retailing, transportation, housing, etc.

Given the complexity of tracing these effects throughout the economy, some simplification in methodology was required to keep the task manageable. The first simplifying step in constructing RIMS II was to collapse the nearly 1,200 industries identified in the Census Bureau's North American Industry Classification System (NAICS) to a smaller number of industries. (NAICS replaced the old Standard Industrial Classification system). For purposes of this analysis, unique multipliers are now available for four industries that include all livestock and poultry production:

- Cattle ranching and farming
- Dairy cattle and milk production
- Poultry and egg production
- Swine, aquaculture, and other animal production

A second important step in estimating multipliers is in defining the geographic region of interest. The RIMS II model permits the region of examination to be as small as an individual county or as large as a set of contiguous states (multipliers are no longer available for the nation as a whole). The choice of region can have an important effect on the outcome, depending on whether the associated industries are located within the region. Generally, the more broadly a region is defined, the greater the likelihood that associated industries are represented within the region and the larger the multipliers.

For this analysis, we have defined individual states as the regions of principal interest. While there are variations in the degree to which associated industries are represented (and, correspondingly, in the size of the multipliers), states are generally of sufficient size to capture most of the impact of livestock production.

The first table that follows summarizes the multipliers for beef cattle. Alaska, Hawaii, and the northeast and mid-Atlantic states have low multipliers due to either small size or low state output, so output multipliers ranged from about 1.4 in several states to 3.1 in Texas. Earnings multipliers were mostly within the 0.2-0.5 range. Employment multipliers were as low as 4.9 in Delaware and as high as 21 in Kentucky and Montana.

The second table summarizes the multipliers for dairy cattle and milk production. The highest output multipliers for dairy are around 2.2 for Arkansas, and the lowest is 0.2 for Rhode Island. The average is 0.6. The average earnings multiplier is 0.35, but is as high as 0.45 for some states including Texas. The average employment multiplier is 11.6. The employment multiplier ranges from 6.1 in Delaware to 17.9 in Montana.

The third table summarizes the RIMS-II multipliers for poultry and egg production. Output multipliers range from 1.3 for several states to over 3.0 for Missouri, Indiana, and Illinois. The earnings multipliers range from 0.19 in Alaska to 0.55 in Missouri. The employment multiplier ranges from 5.2 in Alaska to 19.8 in Kentucky.

Finally, the multipliers for Industry 112A00, “animal production, except cattle, poultry and eggs” (i.e. hogs and pigs and smaller sectors like aquaculture) are summarized in the fourth table. They average 1.7 for output, 0.3 for income, and 10.1 for employment.

<b>Beef Cattle</b>			
	<b>Output (\$)</b>	<b>Earnings (\$)</b>	<b>Employment (\$)</b>
Min	1.410 Alaska	0.197 Alaska	4.943 Delaware
Max	3.127 Texas	0.567 Texas	21.321 Montana
Avg	2.189	0.363	11.860

<b>Dairy Cattle</b>			
	<b>Output (\$)</b>	<b>Earning</b>	<b>Employment (\$)</b>
Min	0.245 Rhode Island	0.215 Alaska	6.080 Delaware
Max	2.231 Arkansas	0.450 Texas	17.892 Montana
Avg	0.597	0.350	11.605

<b>Poultry and eggs</b>			
	<b>Output (\$)</b>	<b>Earnings (\$)</b>	<b>Employment (\$)</b>
Min	1.324 Alaska	0.189 Alaska	5.173 Alaska
Max	3.244 Missouri	0.548 Missouri	19.781 Kentucky
Avg	2.215	0.375	10.903

<b>Swine and others</b>			
	<b>Output (\$)</b>	<b>Earnings (\$)</b>	<b>Employment (\$)</b>
Min	1.345 Alaska	0.198 Alaska	6.024 Delaware
Max	2.110 Missouri	0.367 Illinois	16.699 Utah
Avg	1.747	0.301	10.115

The next four tables detail the multipliers for each industry and each state.

Beef cattle			
State	Output (\$)	Earnings (\$)	Employment (jobs)
Alabama	2.2431	0.3862	16.6442
Alaska	1.4099	0.1969	5.9688
Arizona	2.2382	0.39	13.975
Arkansas	2.7681	0.4558	13.6608
California	2.2007	0.3977	9.249
Colorado	2.9879	0.534	18.5727
Connecticut	1.4579	0.229	7.3952
Delaware	1.527	0.2147	4.943
DC	0	0	0
Florida	1.9021	0.3354	10.3661
Georgia	2.0968	0.3709	9.794
Hawaii	1.8035	0.3005	12.4269
Idaho	2.6219	0.4272	11.5709
Illinois	2.0092	0.3504	7.4248
Indiana	2.0211	0.3292	9.3889
Iowa	2.5508	0.408	9.9765
Kansas	2.778	0.4371	11.6032
Kentucky	2.9264	0.4899	21.2084
Louisiana	2.0957	0.357	13.5562
Maine	1.7423	0.2975	9.8546
Maryland	1.5519	0.2459	8.8366
Massachusetts	1.5091	0.2445	6.6527
Michigan	1.9603	0.3386	10.6851
Minnesota	2.9822	0.5109	12.3425
Mississippi	2.2704	0.3701	13.0712
Missouri	2.9603	0.4897	17.4138
Montana	2.783	0.4661	21.3212
Nebraska	2.6052	0.4117	9.8266
Nevada	1.8356	0.29	11.0784
New Hampshire	1.5421	0.2388	7.3089
New Jersey	1.5912	0.2569	7.6533
New Mexico	2.5927	0.4245	13.695
New York	1.5458	0.2382	8.5389
North Carolina	1.9585	0.3303	10.7447
North Dakota	2.6408	0.4108	9.6949
Ohio	1.9424	0.3303	14.1493
Oklahoma	2.895	0.4901	15.8735
Oregon	2.6918	0.4572	19.6972
Pennsylvania	1.903	0.3248	13.0049
Rhode Island	1.4373	0.2201	6.8802
South Carolina	1.8337	0.3096	14.4999
South Dakota	2.5326	0.3961	9.2908
Tennessee	1.9879	0.3309	9.9478
Texas	3.1265	0.5665	16.2132
Utah	2.5132	0.4421	16.1628
Vermont	1.9896	0.3227	13.4569
Virginia	1.7656	0.2808	8.4482
Washington	2.3181	0.4024	11.071
West Virginia	1.9106	0.2938	9.6539
Wisconsin	2.4848	0.4275	16.6321
Wyoming	2.4272	0.3629	11.5768

Dairy cattle			
State	Output (\$)	Earnings (\$)	Employment (jobs)
Alabama	2.12	0.3924	17.0236
Alaska	1.4015	0.2149	6.8358
Arizona	1.8354	0.3481	13.0349
Arkansas	2.2311	0.3953	12.2441
California	2.1356	0.4133	9.5348
Colorado	2.2069	0.4236	14.9612
Connecticut	1.5132	0.2638	10.9663
Delaware	1.6288	0.2508	6.0802
DC	0	0	0
Florida	1.8771	0.3595	11.7432
Georgia	2.2575	0.4294	10.8915
Hawaii	1.6799	0.3047	14.4901
Idaho	2.0371	0.3588	9.752
Illinois	2.2667	0.4276	9.1519
Indiana	2.1457	0.3822	10.5425
Iowa	2.0702	0.3556	8.754
Kansas	2.1743	0.3667	9.9837
Kentucky	2.35	0.42	14.1062
Louisiana	2.0588	0.3789	13.3935
Maine	1.8417	0.3399	15.7128
Maryland	1.6268	0.2837	10.9838
Massachusetts	1.5325	0.2733	12.0045
Michigan	1.8527	0.3481	11.2292
Minnesota	2.3644	0.4326	10.5685
Mississippi	2.1056	0.3701	13.6603
Missouri	2.4097	0.4258	16.2497
Montana	2.141	0.3833	17.8917
Nebraska	2.0608	0.349	8.3865
Nevada	1.6077	0.2777	9.054
New Hampshire	1.6093	0.2752	8.5925
New Jersey	1.654	0.2919	9.8073
New Mexico	1.8947	0.335	10.5933
New York	1.5954	0.2709	9.6854
North Carolina	2.0076	0.3682	10.779
North Dakota	2.0835	0.3463	8.2443
Ohio	2.1676	0.4025	16.5632
Oklahoma	2.2796	0.4125	13.3752
Oregon	2.0388	0.3745	15.0466
Pennsylvania	2.0432	0.379	11.1863
Rhode Island	1.4477	0.2452	8.0018
South Carolina	1.7894	0.3294	15.8497
South Dakota	1.9767	0.3282	7.8593
Tennessee	1.8176	0.3314	10.15
Texas	2.3283	0.4499	13.0291
Utah	2.2113	0.418	14.5491
Vermont	1.8568	0.3228	14.1309
Virginia	1.8059	0.3169	9.6209
Washington	2.1546	0.4019	10.8511
West Virginia	1.5801	0.2671	9.0631
Wisconsin	2.1551	0.4007	15.2303
Wyoming	1.6472	0.2672	8.8086



Poultry and eggs			
State	Output (\$)	Earnings (\$)	Employment (jobs)
Alabama	2.5291	0.4421	14.0461
Alaska	1.3244	0.1894	5.1729
Arizona	1.5875	0.2795	6.8206
Arkansas	2.9413	0.4929	12.9015
California	2.1396	0.3897	8.6956
Colorado	2.252	0.4132	13.1057
Connecticut	1.4896	0.2414	6.6711
Delaware	2.006	0.2886	6.0517
DC	0	0	0
Florida	1.6928	0.2998	8.5277
Georgia	2.7621	0.5006	11.1862
Hawaii	1.4244	0.2361	9.9137
Idaho	2.2036	0.3667	10.5298
Illinois	2.8932	0.5277	10.7713
Indiana	3.089	0.5289	13.8936
Iowa	2.7833	0.4486	10.4287
Kansas	2.4428	0.3892	8.8061
Kentucky	3.0897	0.5228	19.7809
Louisiana	2.4752	0.4325	15.2662
Maine	2.021	0.3529	13.7823
Maryland	1.8852	0.3089	9.3123
Massachusetts	1.4926	0.2473	9.1243
Michigan	1.8917	0.337	9.3383
Minnesota	3.0957	0.5408	12.2106
Mississippi	2.8566	0.4763	15.3291
Missouri	3.2444	0.5478	17.2264
Montana	2.3089	0.3901	14.8916
Nebraska	2.5267	0.4006	9.7651
Nevada	1.3841	0.2221	6.0671
New Hampshire	1.5562	0.2486	6.5661
New Jersey	1.6722	0.2802	8.4408
New Mexico	1.8463	0.3058	9.5661
New York	1.5449	0.2424	6.8784
North Carolina	2.6273	0.4601	11.6594
North Dakota	2.4181	0.3749	8.6251
Ohio	2.9289	0.5239	18.0125
Oklahoma	2.9775	0.5133	14.9776
Oregon	2.0088	0.3477	11.2174
Pennsylvania	2.4321	0.4342	14.6061
Rhode Island	1.3902	0.2184	6.0111
South Carolina	1.9574	0.3376	13.4134
South Dakota	2.5646	0.3933	9.0462
Tennessee	2.1725	0.3748	10.0087
Texas	2.5062	0.4629	11.9589
Utah	2.3567	0.4276	15.6844
Vermont	1.8308	0.2936	11.6547
Virginia	2.1615	0.3624	9.4904
Washington	2.2947	0.405	10.3016
West Virginia	1.6624	0.2627	7.6594
Wisconsin	2.5607	0.4549	13.4949
Wyoming	1.4634	0.2215	6.2783

Swine and others			
State	Output (\$)	Earnings (\$)	Employment (jobs)
Alabama	1.8412	0.3278	13.0404
Alaska	1.3451	0.1975	6.0542
Arizona	1.6459	0.2978	11.0556
Arkansas	1.9746	0.3372	9.3807
California	1.8061	0.3357	7.8078
Colorado	1.9657	0.3612	12.632
Connecticut	1.4041	0.2324	7.1871
Delaware	1.474	0.2195	6.0239
DC	0	0	0
Florida	1.6577	0.3031	10.3478
Georgia	1.8555	0.3385	9.0113
Hawaii	1.5502	0.2694	10.4299
Idaho	1.8423	0.3129	9.2382
Illinois	2.0281	0.3672	7.8777
Indiana	1.9264	0.33	8.9357
Iowa	1.8621	0.3102	7.6077
Kansas	1.9344	0.3151	8.9587
Kentucky	2.0771	0.3599	16.3782
Louisiana	1.8023	0.3189	11.1453
Maine	1.7009	0.3018	14.0034
Maryland	1.4845	0.2476	8.8771
Massachusetts	1.4348	0.243	10.1889
Michigan	1.719	0.3078	9.5581
Minnesota	2.0708	0.3634	8.4765
Mississippi	1.9108	0.3261	11.5619
Missouri	2.1095	0.3604	13.9733
Montana	1.9295	0.334	15.9761
Nebraska	1.848	0.303	7.2213
Nevada	1.4644	0.2417	7.5612
New Hampshire	1.4638	0.2385	7.3122
New Jersey	1.521	0.2566	9.5654
New Mexico	1.6607	0.284	9.3081
New York	1.447	0.2349	7.0024
North Carolina	1.8282	0.3214	9.4634
North Dakota	1.8641	0.3001	7.0157
Ohio	1.9114	0.3401	14.3715
Oklahoma	2.0251	0.3531	11.3555
Oregon	1.764	0.3112	13.1143
Pennsylvania	1.7819	0.3163	13.1752
Rhode Island	1.3705	0.2218	10.9998
South Carolina	1.6458	0.2898	13.4412
South Dakota	1.785	0.2873	6.7789
Tennessee	1.6417	0.2857	8.6399
Texas	1.9751	0.3671	10.6174
Utah	1.9862	0.3595	16.6986
Vermont	1.6152	0.272	11.333
Virginia	1.5967	0.2685	8.0949
Washington	1.8536	0.3319	9.1201
West Virginia	1.4631	0.2371	7.8061
Wisconsin	1.883	0.3363	11.8963
Wyoming	1.6203	0.2518	8.112



## 6.2. Impact estimates for output and earnings

The multipliers preceding can be used to estimate the economic impacts of animal agriculture:

- Output impacts were calculated by taking the value of production for each of the four livestock categories (i.e. beef cattle, dairy cattle, broilers/turkeys/eggs, and hogs/other), and applying the respective output multiplier to each one to yield the dollar value impact of that sector on each state's economy. The sums of the four category impacts represent the overall impact of animal agriculture on each state's economy.
- To calculate the impact on earnings, the value of production estimate for each category was multiplied by its respective earnings multiplier. The resulting value represents the dollar value of earnings of households, employed by all industries throughout the state, associated with the production of each category of livestock.
- To calculate the impact on employment, employment multipliers were also applied to production figures. The resulting estimate represents the number of direct and indirect jobs in each state attributable to livestock production.

Across all states, the total output impact of animal agriculture in 2011 was \$333 billion. The effect on household earnings was \$58 billion, and the sector is responsible for almost 1.7 million jobs. The employment impact exceeds 10,000 jobs in 36 of the states, exceeds 100,000 jobs in California and Wisconsin, and tops 188,000 jobs in Texas.

**Economic impact of 2011 Animal Agriculture**

State	Output (\$000)	Earnings (\$000)	Employment (jobs)	Income Tax (\$000)	2007 Property Taxes (\$000)
Alabama	8,893,402	1,553,844	51,828	393,589	43,059
Alaska	6,949	1,007	31	205	1,312
Arizona	3,026,518	552,773	20,323	135,816	32,745
Arkansas	12,061,731	2,018,770	53,802	551,730	76,778
California	24,162,221	4,581,832	105,409	1,357,597	638,682
Colorado	7,743,406	1,404,616	48,898	350,592	89,405
Connecticut	266,752	44,601	1,538	11,521	23,053
Delaware	1,468,981	211,658	4,460	57,317	4,524
Florida	2,493,872	455,836	14,172	92,671	180,155
Georgia	12,451,076	2,260,144	51,511	595,096	139,812
Hawaii	104,954	17,757	751	5,075	10,873
Idaho	7,958,813	1,362,832	37,024	383,365	62,915
Illinois	5,152,945	933,436	19,877	236,439	245,586
Indiana	7,022,481	1,210,126	32,606	287,163	207,559
Iowa	23,162,296	3,806,331	92,238	1,115,636	353,029
Kansas	14,107,819	2,239,621	59,947	599,770	191,132
Kentucky	5,318,325	903,020	35,630	237,765	102,439
Louisiana	723,658	125,370	4,641	33,010	26,956
Maine	406,202	73,315	3,173	21,137	24,156
Maryland	1,992,340	329,550	10,579	82,651	41,361
Massachusetts	95,704	16,762	695	4,296	32,509
Michigan	5,534,843	1,014,339	31,889	250,339	188,916
Minnesota	13,613,983	2,407,450	57,264	659,160	241,383
Mississippi	7,818,007	1,305,115	42,617	330,586	78,158
Missouri	10,545,024	1,773,772	62,269	467,034	172,858
Montana	3,327,838	559,383	25,624	152,320	115,971
Nebraska	15,626,271	2,485,433	59,365	675,292	316,430
Nevada	599,437	97,969	3,528	19,917	13,189
New Hampshire	127,774	21,470	658	5,438	19,974
New Jersey	169,671	28,767	896	7,681	54,754
New Mexico	5,770,177	984,062	31,407	248,279	29,117
New York	5,066,402	850,438	30,085	229,448	188,015
North Carolina	14,406,181	2,525,490	68,321	709,158	127,148
North Dakota	2,326,304	364,005	8,590	85,396	110,963
Ohio	7,943,672	1,429,101	55,201	357,633	164,687
Oklahoma	12,337,394	2,110,680	66,976	539,912	106,592
Oregon	2,966,982	519,738	21,373	152,439	101,411
Pennsylvania	9,748,839	1,765,445	57,611	413,114	211,603
Rhode Island	7,990	1,329	44	333	6,421
South Carolina	2,201,426	380,213	15,665	103,912	37,423
South Dakota	6,394,704	1,011,134	23,785	205,564	148,940
Tennessee	2,677,661	458,396	13,161	120,696	97,014
Texas	36,532,919	6,698,884	188,800	1,361,883	489,194
Utah	2,051,533	374,505	14,181	94,862	28,431
Vermont	1,146,230	197,752	8,608	55,628	30,579
Virginia	3,246,784	543,421	15,283	141,724	96,068
Washington	4,643,583	843,205	22,747	171,424	161,799
West Virginia	720,748	113,323	3,502	30,405	19,612
Wisconsin	15,246,269	2,787,212	105,255	747,809	307,453
Wyoming	1,696,976	255,357	8,162	51,914	30,904
<b>National</b>	<b>333,116,069</b>	<b>58,010,591</b>	<b>1,691,999</b>	<b>14,941,739</b>	<b>6,223,047</b>

### 6.3. Tax Effects

As shown in the preceding table, we estimate that animal agriculture results in \$14.9 billion in federal and state income and employment tax payments, plus \$6.2 billion in property tax payments. The methodology behind these estimates is described below.

The economic activity associated with the production of livestock also generates tax revenue for local, state, and federal governments. These taxes are applied in many different forms, depending on jurisdiction. Nationally, about 60 percent of all tax revenues are collected at the federal level with the remaining 40 percent spread among the several thousand state and local jurisdictions.

The USDA's Economic Research Service reports that farm households paid \$42.5 billion in taxes in 2004, the most recent year for which this information is available. Of this total, most was paid in the form of federal income taxes (49 percent), federal Social Security/self-employment taxes (25 percent), local property taxes (11.5 percent), state and local income taxes (12 percent) and estate taxes (2.1 percent). For this analysis, we focused on income taxes, Social Security/self-employment taxes, and property taxes.

In calculating federal income taxes, farm households include income from all sources (farm and non-farm). Given the adjustments, deductions, and exemptions that are currently allowed for farming enterprises, the average effective tax paid on farm income is lower now than it was in 2004. In 1996, (the most recent year for which information is available), the combined reported income of the 2.2 million farm households was entirely from non-farm sources. That is, farm income losses more than matched farm income gains when netted out across all farm households. Even among farms with annual sales in excess of \$250,000, two-thirds of reported income was from non-farm sources.

Based on the distribution of farm households with sales above \$250,000 among the federal tax brackets in 1996, adjusted for the lower tax rates adopted in 2001 and 2002, we estimate an average federal income tax rate of about 14 percent for these households. This should be considered an upper bound, however, since much of the income generated through the farming enterprises of these households is either taxed at a low rate or not taxed at all.

The other important federal tax is the self-employment (Social Security) tax. This tax has two components: the old age, survivor, and disability (OASDI) portion and the Medicare hospital insurance (HI) portion. While self-employed farmers are required to pay both the employer and employee shares of this tax (15.3 percent of net farm profit), they also receive an income tax deduction for one-half of the tax as well as a 7.65 percent exclusion of self-employment income. The Economic Research Service (ERS) reports that the average effective Social Security tax rate for all farmers was 10 percent in 1994. As with the estimate of the federal income tax rate, this should probably be considered an upper bound. According to ERS, a combination of higher self-employment taxes and reduced retirement benefits has provided farmers with an incentive to adopt changes in farm business operations designed to minimize their self-employment taxes. Thus, the effective rate could be lower than 10 percent, though we have no basis on which to estimate it.

While the incomes of livestock and crop producers are most directly impacted by the economic activity associated with livestock production, the earnings of workers in many other industries are impacted too, though to a lesser extent. Since the workers in these industries also pay taxes, the indirect impact of the livestock industry on the tax revenues originating in these industries should also be considered. This includes workers across a diversified array of input, service, manufacturing, and distribution industries.

Given the diversity of industries and occupations represented, we have used a composite of estimated average effective federal tax rates for all households. The latest CBO estimate is that the average individual federal income tax rate was 14.3 percent in 2007 and that the average social insurance tax rate was 9.5 percent the same year.

In estimating tax impacts, we have opted to use the Tax Policy Institute's estimated average effective rate of 12.7% for federal taxes and to apply this rate across the board to earnings in all industries. While this yields a somewhat lower estimate than that derived from using the average rates estimated by CBO, TPI's estimates are closer to the actual tax rates farmers pay and, if anything, are probably still higher than the rates currently in use for farm production. The estimates are calculated by multiplying the sum of the federal and state tax rates by the total earnings impact estimate for each state.

State and local income tax rates are highly variable ranging from no tax in several states to as high as 12 percent for the highest income bracket in one state. Typically, they are in the 4 to 7 percent range. Most state income taxes are progressive, though a few are flat.

In the case of property taxes, we have used the figures collected in the most recent Census of Agriculture. These were for 2007. The property taxes paid in each state by each type of livestock operation are shown in the database.

#### **6.4. Reasonableness of estimates**

In order to test whether the estimates of output impact are plausible, we compared them to the total economic output for each state. The Department of Commerce periodically estimates not just the national gross domestic product (GDP) but also the gross state product (GSP) for each state. The 2011 data are shown in the table that follows, along with the output impact estimates calculated above, and the ratio of the impact estimate to gross state product.

We find the estimates to be quite plausible. For most states, the impact of eliminating animal agriculture in the state as a percentage of total economic activity is in the single digits - typically 1-6 percent. However, in states where livestock and poultry industries are a bigger part of the state economy, the impacts are in the 8-16 percent range, which seems reasonable.

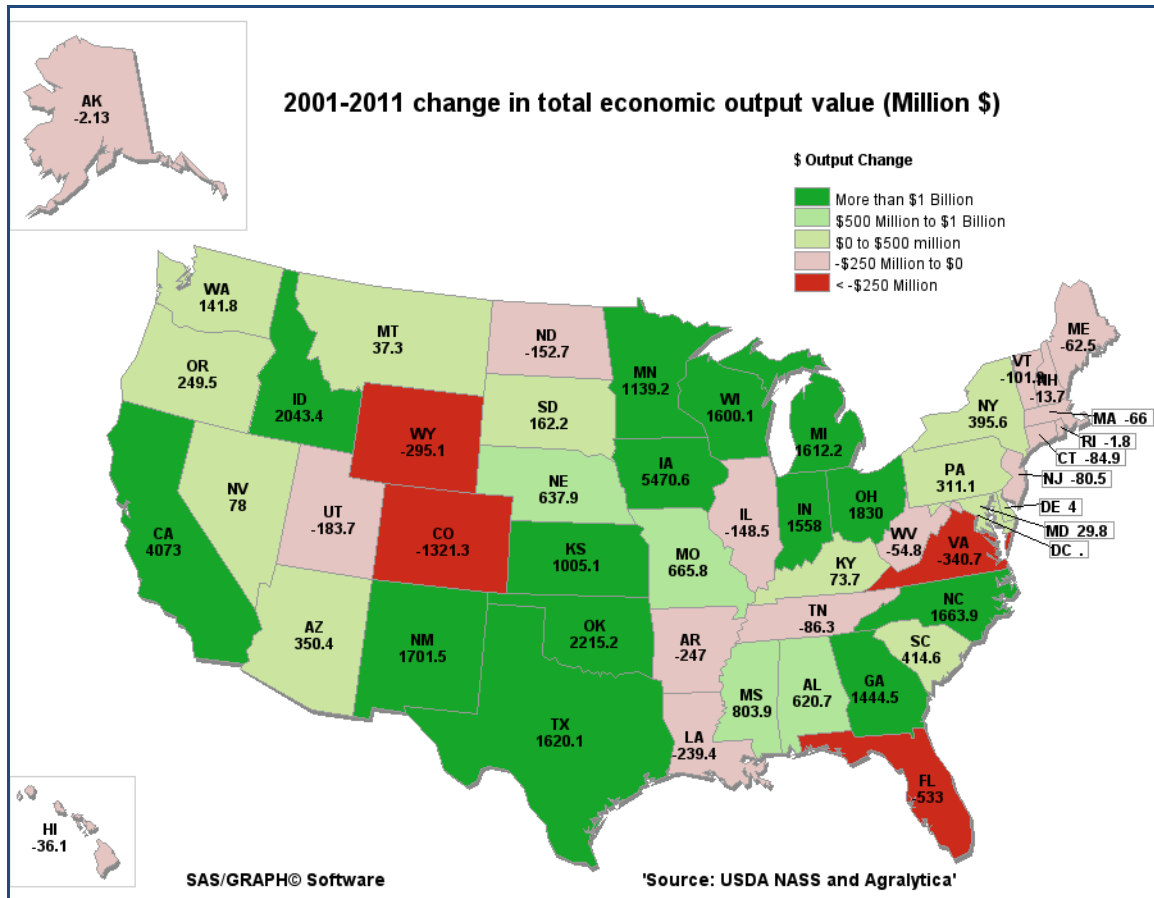
**Output Impact Share of Gross State Product, 2011**

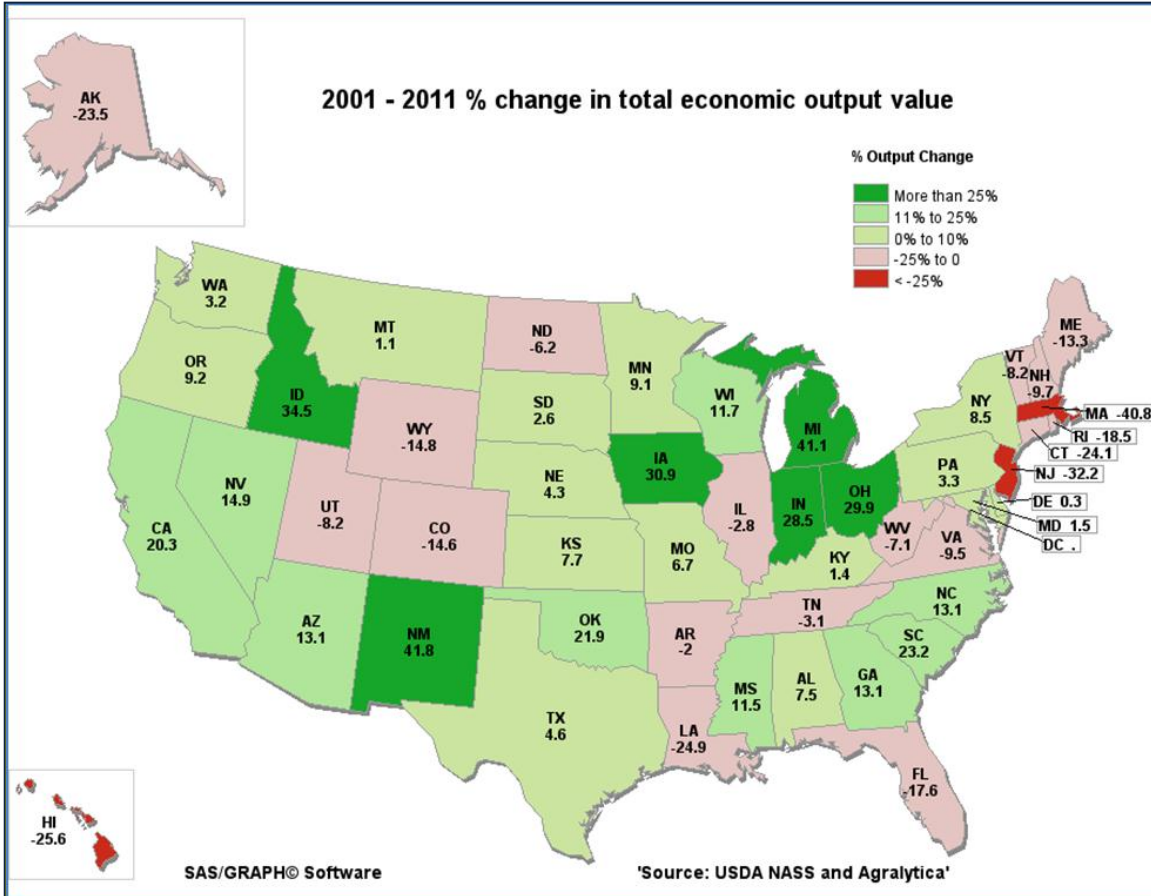
State	GSP (\$million)	Output (\$million)	Share (%)
Alabama	173,122	8,893	5.1%
Alaska	51,376	7	0.0%
Arizona	258,447	3,027	1.2%
Arkansas	105,846	12,062	11.4%
California	1,958,904	24,162	1.2%
Colorado	264,308	7,743	2.9%
Connecticut	230,090	267	0.1%
Delaware	65,755	1,469	2.2%
Florida	754,255	2,494	0.3%
Georgia	418,943	12,451	3.0%
Hawaii	66,991	105	0.2%
Idaho	57,927	7,959	13.7%
Illinois	670,727	5,153	0.8%
Indiana	278,128	7,022	2.5%
Iowa	148,986	23,162	15.5%
Kansas	130,923	14,108	10.8%
Kentucky	164,799	5,318	3.2%
Louisiana	247,720	724	0.3%
Maine	51,585	406	0.8%
Maryland	301,100	1,992	0.7%
Massachusetts	391,771	96	0.0%
Michigan	385,248	5,535	1.4%
Minnesota	281,712	13,614	4.8%
Mississippi	97,810	7,818	8.0%
Missouri	249,525	10,545	4.2%
Montana	37,990	3,328	8.8%
Nebraska	94,160	15,626	16.6%
Nevada	130,366	599	0.5%
New Hampshire	63,556	128	0.2%
New Jersey	486,989	170	0.0%
New Mexico	79,414	5,770	7.3%
New York	1,157,969	5,066	0.4%
North Carolina	439,862	14,406	3.3%
North Dakota	40,328	2,326	5.8%
Ohio	483,962	7,944	1.6%
Oklahoma	154,966	12,337	8.0%
Oregon	194,742	2,967	1.5%
Pennsylvania	578,839	9,749	1.7%
Rhode Island	50,091	8	0.0%
South Carolina	165,785	2,201	1.3%
South Dakota	40,117	6,395	15.9%
Tennessee	266,527	2,678	1.0%
Texas	1,308,132	36,533	2.8%
Utah	124,483	2,052	1.6%
Vermont	25,905	1,146	4.4%
Virginia	428,909	3,247	0.8%
Washington	355,083	4,644	1.3%
West Virginia	66,821	721	1.1%
Wisconsin	254,818	15,246	6.0%
Wyoming	37,617	1,697	4.5%
<b>National</b>	<b>14,981,020</b>	<b>333,116</b>	<b>2.2%</b>

## 7. EFFECTS OF RELOCATION OF ANIMAL AGRICULTURE

In addition to calculating the importance of animal agriculture in each state, it is also instructive to examine the magnitude of changes that can occur in a state economy over time. In the database for each state, we also calculate the economic impacts of the change in output between 2001 and 2011. This could in principle be misleading, because dollar sales figures are influenced by price changes as well as by animal numbers. We therefore used unit values to calculate the output changes, applying our multipliers to the change in production volumes between 2001 and 2011. Note also that our multipliers are for categories that aggregate products (e.g., poultry and egg production, and hogs and pigs and “other”). Thus, for example, a decline in aquaculture or sheep can be masked by an increase in hogs. The table on the next page shows the total impact for each state. (The impact for each separate livestock segment is shown in the Excel database for each state.)

Overall, the increased value of animal agriculture production in the 50 states resulted in almost \$30 billion in additional total economic output when one sums up the state numbers. This produced a \$5.3 billion increase in household incomes and 145,000 new jobs. About 70% of this growth was in states west of or bordering the eastern shore of the Mississippi. The main areas of decline have been New England and some of the mountain states, as illustrated in the maps below.



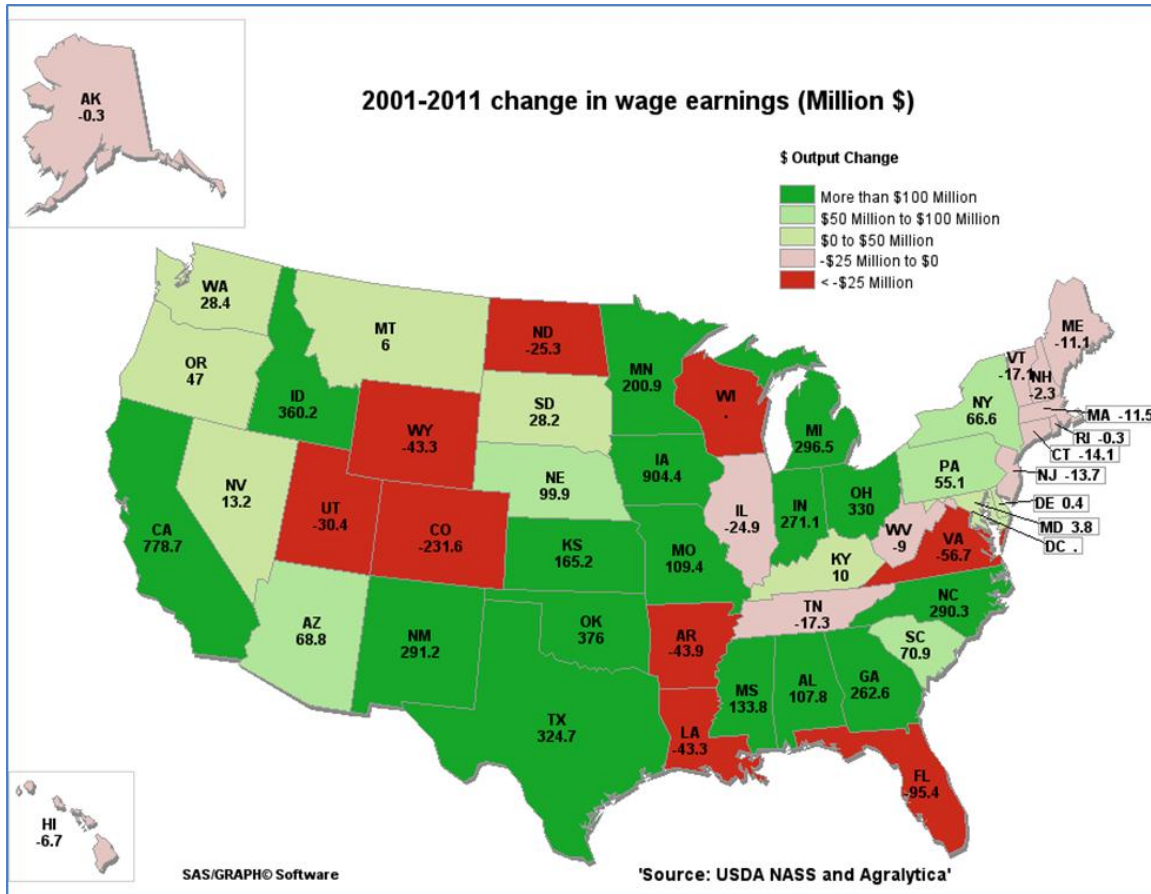


**Economic Impact of Change from 2001 to 2011**

State	Output (\$000)	Earnings (\$000)	Employment (jobs)	Income Tax (\$000)
Alabama	620,750	107,803	3,136	27,307
Alaska	-2,138	-333	-11	-68
Arizona	350,368	68,848	2,627	16,916
Arkansas	-246,956	-43,921	-1,430	-12,004
California	4,072,978	778,708	17,890	230,731
Colorado	-1,321,331	-231,616	-8,040	-57,811
Connecticut	-84,928	-14,137	-470	-3,652
Delaware	3,996	371	-4	101
Florida	-532,969	-95,357	-2,805	-19,386
Georgia	1,444,461	262,610	5,643	69,145
Hawaii	-36,142	-6,704	-329	-1,916
Idaho	2,043,440	360,151	9,789	101,310
Illinois	-148,506	-24,896	-545	-6,306
Indiana	1,557,921	271,102	7,218	64,333
Iowa	5,470,618	904,462	21,974	265,098
Kansas	1,005,147	165,204	4,547	44,242
Kentucky	73,686	10,042	296	2,644
Louisiana	-239,433	-43,264	-1,556	-11,391
Maine	-62,533	-11,054	-438	-3,187
Maryland	29,799	3,760	-82	943
Massachusetts	-65,988	-11,503	-473	-2,948
Michigan	1,612,200	296,473	9,260	73,169
Minnesota	1,139,180	200,852	4,656	54,993
Mississippi	803,892	133,790	4,080	33,889
Missouri	665,724	109,369	3,569	28,797
Montana	37,294	6,010	269	1,636
Nebraska	637,889	99,896	2,393	27,142
Nevada	77,955	13,188	447	2,681
New Hampshire	-13,738	-2,316	-74	-587
New Jersey	-80,495	-13,729	-433	-3,666
New Mexico	1,701,476	291,152	9,284	73,458
New York	395,650	66,640	2,356	17,980
North Carolina	1,663,939	290,273	7,252	81,509
North Dakota	-152,693	-25,269	-599	-5,928
Ohio	1,829,998	329,998	12,321	82,582
Oklahoma	2,215,160	376,033	11,811	96,189
Oregon	249,491	46,957	1,826	13,772
Pennsylvania	311,122	55,065	1,945	12,885
Rhode Island	-1,818	-296	-10	-74
South Carolina	414,603	70,950	2,685	19,391
South Dakota	162,163	28,196	681	5,732
Tennessee	-86,264	-17,251	-578	-4,542
Texas	1,620,096	324,694	8,634	66,010
Utah	-183,704	-30,419	-951	-7,705
Vermont	-101,892	-17,138	-734	-4,821
Virginia	-340,715	-56,665	-1,640	-14,778
Washington	141,838	28,410	753	5,776
West Virginia	-54,824	-8,998	-288	-2,414
Wisconsin	1,600,162	299,063	11,164	80,239
Wyoming	-295,146	-43,250	-1,371	-8,793
<b>National</b>	<b>29,900,786</b>	<b>5,301,955</b>	<b>145,646</b>	<b>817,267</b>



As far as change in total economic impact from animal agriculture goes, the big winners are Iowa, Idaho, New Mexico, Michigan, Indiana, and Ohio. States with substantial declines are New Jersey and Massachusetts. Other states with substantial declines (over 14%) include Colorado, Wyoming, Florida, and Louisiana. The earnings, employment, and tax effects are similar.



In terms of employment, growth states due to animal agriculture include Iowa, California, Indiana, Ohio, Oklahoma, and Wisconsin with gains of more than 10,000 (top chart on next page). States losing a significant number of jobs due to contraction in animal agriculture include Colorado and Florida.

The long-term impacts of animal agriculture changes on taxes are shown in the bottom chart. Most states show an increase in tax receipts; Iowa, California, Idaho, Oklahoma, Ohio, North Carolina, Wisconsin, New Mexico, Michigan, and Georgia show the largest growth. Colorado, Florida, Virginia, Arkansas, and Louisiana showed the largest absolute declines.

