2019 South Dakota Agriculture Economic Contribution Study

Prepared for:



Prepared by:



July 2019

Contents

List of Figures	3
List of Tables	4
Executive Summary	6
Key Findings	6
Background	8
South Dakota Agriculture	8
South Dakota Farm Demographics	9
Grains, Oilseeds, Livestock, and Poultry	11
Methodology	11
Defining Agriculture	12
Economic Impact Study versus Economic Contribution Study	13
State Level Results	14
State Value-Added	14
State Jobs	15
State Output	16
State Labor Income	17
Tax Summary	18
Results by Industry	19
Crops	19
Livestock	20
Other Agriculture	21
South Dakota Agriculture: Looking Ahead	22
Dairy Processing	22
Beginning Farmers and Ranchers	22
Adding Value	22
Appendix A. IMPLAN Aggregation Scheme	23

List of Figures

Figure 1, Number of South Dakota Farm Operations by Size	<u>9</u>
Figure 2, Number of South Dakota Farm Operations by Type	<u>9</u>
Figure 3, South Dakota Principal Producers by Age Group	10
Figure 4, South Dakota Value-Added Summary	14
Figure 5, South Dakota Jobs Summary	15
Figure 6, South Dakota Output Summary	
Figure 7, South Dakota Labor Income Summary	17
Figure 8, South Dakota Summary of Taxes Paid	18
Figure 9, South Dakota Crop Production Value-Added (\$M)	19
Figure 10, South Dakota Livestock Production Value-Added (\$M)	20
Figure 11, South Dakota Other Agriculture Value-Added (\$M)	21

List of Tables

Table 1, Acronyms	5
Table 2, Historical Census of Agriculture Data (USDA)	10
Table 3, South Dakota Farm Sales by Source	11

Table 1, Acronyms

<u>Acronym</u>	<u>Description</u>
USDA	United States Department of Agriculture
USDA/NASS	United States Department of Agriculture, National Agricultural Statistics Service
USDA/ERS	United States Department of Agriculture, Economic Research Service
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
SDDA	South Dakota Department of Agriculture

Executive Summary

The results of this study indicate that the agriculture industry in South Dakota is an important and growing piece of the state's economy. South Dakota has a diverse agriculture industry that includes a significant amount of crop and livestock production, as well as further processing for many of the commodities produced in the state. This analysis indicates that even during down times in the agriculture industry generally, South Dakota agriculture continues to thrive.

This study is based on a combination of the 2017 Census of Agriculture, USDA/NASS datasets, and the IMPLAN modeling system. This analysis is patterned after the 2014 South Dakota Ag Economic Contribution Study which allows us to identify key areas of growth over that timeframe.

Key Findings

In 2019, agriculture and related industries in South Dakota are estimated to contribute:

- \$11.2 billion in total value-added
- 132,105 jobs
 - This represents 22% of total South Dakota jobs and increased from 115,651 in 2014.
- \$32.5 billion in output (sales)
 - This represents nearly 33% of total South Dakota sales and increased from \$25.6 billion in 2014.
- **\$6.4 billion** in labor income
- \$496.75 million in state and local taxes
- \$1.25 billion in federal taxes

Of the **\$11.2 billion** in added value and **132,105 jobs** from the agriculture industry and related economic activity:

- Crop production and related industries contributed:
 - o \$3.4 billion in value-added
 - o 33,617 jobs
- Livestock production and related industries contributed:
 - \$5.8 billion in value-added
 - o 75,516 jobs
- Other agriculture contributed:
 - \$2.0 billion in value-added
 - o 22,972 jobs

Of the industries studied, the following are the top three contributors of value-added to the State of South Dakota:

- Animal slaughter (except poultry): \$1.9 billion in value-added
- Oilseed farming: **\$1.8 billion** in value-added
- Beef cattle ranching and farming: nearly **\$1.8 billion** in value-added

Background

This study on the Economic Contributions of South Dakota Agriculture quantifies agriculture, and related industries and their importance to the State of South Dakota. This study relies heavily on (2017) data from the IMPLAN modeling system rolled forward to 2019, the United States Department of Agriculture (USDA) 2017 Census of Agriculture, and other USDA/National Agricultural Statistics Service datasets. This 2019 Economic Contributions of South Dakota Agriculture is patterned in principle after similar Decision Innovation Solutions (DIS) studies for South Dakota in 2014, lowa in 2009, 2014, and 2019 (forthcoming), Illinois in 2015 and 2019 (forthcoming), and Alabama in 2016. The following provides important context for agriculture in the State of South Dakota.

South Dakota Agriculture

The South Dakota agriculture industry has the ability to produce a diverse mix of crops and livestock. In addition to ranking #1 in the U.S. for bison inventory and sunflower production, according to the 2017 Census of Agriculture, South Dakota is currently ranked in the top 15 nationally for many other categories including¹:

- Proso millet (#3)
- Honey production (#3)
- Oat production (#4)
- Beef cow inventory (#5)
- Flaxseed production (#5)
- Spring wheat (excluding durum) production (#5)
- Sorghum production (#6)
- Cattle and calves sales (#7)
- Other animals and animal products sales (#7)
- Grains, oilseeds, dry beans & dry peas sales (#8)
- Sheep, goats, wool, mohair, milk sales (#8)
- Hay & haylage production tons, dry basis (#11)
- Hogs and pigs sales (#12)
- Total Sales (#12)

1 https://www.nass.usda.gov/Publications/AgCensus/2017/Online Resources/County Profiles/South Dakota/cp99046.pdf https://quickstats.nass.usda.gov/

South Dakota Farm Demographics

The Census of Agriculture defines a 'farm' as any operation that produces for sale at least \$1,000 worth of agricultural commodities or would produce \$1,000 worth of primary agricultural commodities for sale in a normal year. The definition is based on expected sales rather than ownership or various operating characteristics.

Figure 1 displays the breakdown of South Dakota farm operations by size, according to the 2017 Census of Agriculture. The smaller size farms are generally hobby or specialty farms, while the farm operations larger in size typically make up the majority of farm sales.

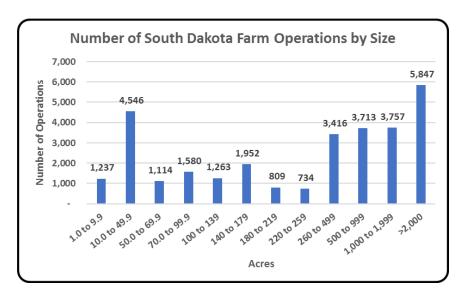


Figure 1, Number of South Dakota Farm Operations by Size

Out of the 29,968 farms in South Dakota, 83% of farms are owned by families or individuals, 8% are in partnerships, and 6% are in family held corporations. Only 1% are in corporations that are non-family held.

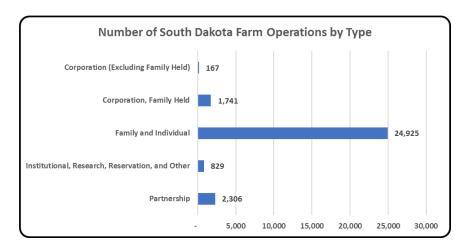


Figure 2, Number of South Dakota Farm Operations by Type

There are 48,913 total producers in South Dakota. 63% of the *principal* producers² are age 55 and older, with only 1% under age 25, 8% between the ages of 25 and 34, 12% from 35-44, and 17% from 45-54 years. Of the 39,136 *principal* producers in South Dakota, about 56% of them consider farming their primary occupation, while the other 44% have another job as their primary occupation.

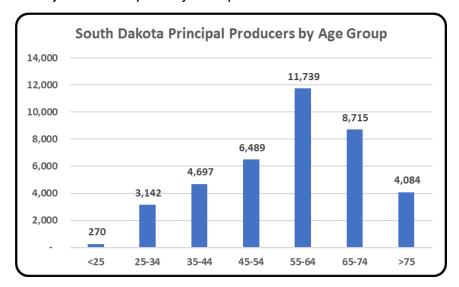


Figure 3, South Dakota Principal Producers by Age Group

According to the 2017 Census of Agriculture, there were 29,968 farms in South Dakota, which was a 6% decline since 2012. However, nearly every category of livestock inventory has been on the rise, as well as corn and soybean production.

Table 2, Historical Census of Agriculture Data (USDA)

	2017	2012	2007	2002	1997
Number of South Dakota Farms	29,968	31,989	31,169	31,736	33,191
Average South Dakota Farm Size	1,443	1,352	1,401	1,380	1,330
Market Value (Per Farm)					
Land and Buildings (\$)	\$2,984,426	\$2,281,026	\$1,255,332	\$618,651	\$473,015
Machinery and Buildings (\$)	\$282,162	\$241,388	\$155,652	\$107,376	\$89,285
Farm Products Sold (\$)	\$324,397	\$317,929	\$210,801	\$120,829	\$110,395
Livestock Inventory					
Cattle and Calves	3,988,183	3,893,251	3,687,728	3,695,877	3,710,629
Beef Cows	1,799,801	1,610,559	1,649,492	1,694,091	1,662,162
Milk Cows	127,325	91,831	86,243	84,080	96,712
Hogs and Pigs	1,560,522	1,191,162	1,490,034	1,375,506	1,394,357
Laying Chickens	2,708,331	2,450,780	2,920,799	2,226,368	2,180,516
Broiler Chickens	146,197	144,015	272,986	321,260	291,387
Cattle and Calves Sold	2,752,025	2,567,027	2,745,227	2,707,872	2,449,587
Hogs and Pigs Sold	5,359,357	3,914,312	4,487,708	3,773,503	2,610,493
Production					
Corn for Grain	768,250,076	480,330,680	518,552,101	295,166,830	302,695,636
Wheat for Grain	45,137,278	100,675,153	141,003,068	42,413,607	88,644,257
Oats for Grain	4,474,218	4,525,084	8,758,284	5,717,330	13,387,804
Soybeans	240,114,687	130,534,273	130,377,538	126,607,265	110,801,775

² Principal producers are the primary decision makers for each farm operation.

Page 10

Grains, Oilseeds, Livestock, and Poultry

The grains and oilseeds category, along with cattle production, make up the majority of farm sales for primary agricultural commodities. Table 3 shows that grains and oilseeds typically make up about 53% of total farm sales, while cattle production adds an additional 33%. The remaining categories of livestock and poultry production are all around 5% or less of total South Dakota farm sales. Table 3, South Dakota Farm Sales by Source

Farm Sales by Source (South Dakota)	2017	% of 2017	2012	% of 2012	2007	% of 2007	2002	% of 2002
Total Sales (\$1000)	\$9,721,52 2	100%	\$10,170,22 7	100%	\$6,570,450	100%	\$3,834,62 5	100%
Average Per Farm	\$324,397		\$317,929		\$210,801		\$120,829	
Grains, Oilseeds, Dry Beans, and Dry Peas (\$1000)	\$5,166,55 7	53.15 %	\$6,072,922	59.71 %	\$3,383,497	51.5%	\$1,575,91 0	41.1%
Livestock, Poultry, and Their Products (\$1000)	\$4,554,96 6	46.85 %	\$4,097,304	40.29 %	\$3,186,953	48.5%	\$2,258,71 5	58.9%
Poultry and Eggs (\$1000)	\$166,997	1.72%	\$182,076	1.79%	\$140,798	2.14%	\$70,820	1.85%
Cattle and Calves (\$1000)	\$3,191,49 3	32.83 %	\$2,968,996	29.19 %	\$2,307,618	35.12 %	\$1,693,83 8	44.17 %
Milk and Other Dairy Products from Cows (\$1000)	\$495,112	5.09%	\$374,490	3.68%	\$279,765	4.26%	\$156,498	4.08%
Hogs and Pigs (\$1000)	\$577,034	5.94%	\$446,756	4.39%	\$381,360	5.80%		
Sheep, Goats, and their Products (\$1000)	\$41,972	0.43%	\$43,636	0.43%	\$36,697	0.56%	\$31,285	0.82%

Table 3, South Dakota Farm Sales by Source

Methodology

The 2019 South Dakota Agriculture Economic Contribution Study was completed with a combination of the 2017 South Dakota IMPLAN dataset, data from the USDA 2017 Census of Agriculture and other USDA/NASS sources. The IMPLAN modeling system and Microsoft Excel were used for calculating and tabulating the results of this analysis. While the 2017 IMPLAN dataset was used to calculate the economic contribution results, they have been adjusted forward to 2019 dollars using inflation factors within the IMPLAN modeling system. Results shown throughout this report are presented using these common economic modeling terms:

Sales (Output)

 The broadest measure of economic activity –sometimes referred to as "output".

• Employment (Jobs)

 A measure of job positions without regard to whether they are full-time equivalents.

Value-Added

Sales(output) minus the cost of inputs.

Labor Income

 The sum of employee compensation (work for hire) and proprietor income (self-employed) and is a sub-component of value-added.

Defining Agriculture

When completing an economic contribution study, there are generally questions as to what economic activity up and down the value chain should be included for a particular industry. Outlined below is the process used in this study for defining agriculture.

There is usually considerable discussion regarding the blurred lines between production agriculture, processing and retail, and how agriculture should be defined. Agriculture can be defined as: 1) including only farm-level production, 2) including farm-level production, input manufacturing, and food processing, or 3) from the "farm to fork" perspective, which would also include distribution, restaurants, and retail.

While there is room for discussion as to what rightly should and should not be included as part of the agriculture sector, there are few arguments that its inclusion should be limited to strictly the production of crops and livestock. This is because in its most basic form, the crop and livestock processing, slaughtering, meat, and rendering industries depend nearly completely upon economic activities that produce primary agricultural commodities (crops, livestock, etc.), which takes place at the farm level.

To move beyond the production and processing of agricultural products (i.e. to include grocery stores) opens an analysis up to criticism related to whether the inclusion of additional layers of the value chain inflate the numbers associated with the agriculture industry. For example, if one were to include grocery stores as a component of agriculture, what would be the appropriate method to separate agricultural products from other products within a typical grocery store? The fact that grocery stores also sell household goods, often house banks, and offer personal services add to the precarious nature of including them as part of agriculture.

To strike middle (and defensible) ground between including more than just farm level production and seeking to attribute excess economic activity to the animal agriculture industry, this analysis includes production agriculture plus the first round of value-added to the process. For example, in addition to the production of livestock and poultry, we have also included the industries that process them (i.e. production, processing, slaughtering, and rendering).

Using the above rationale as a guide, the IMPLAN models were created and analyzed using the recommended methodology for a Multi-Industry Contribution Analysis. The IMPLAN modeling system uses more than 20,000 industries and classifies them according to the North American Industry Classification System (NAICS) and groups

them into 536 industries. There were 49 IMPLAN sectors identified for this analysis to represent agriculture and related economic activities in the State of South Dakota.

Economic Impact Study versus Economic Contribution Study

The term "Economic Impact Study" implies a change has taken place within a local economy. The change in a local economy typically comes from one of the following sources:

- Entrance/departure of a new business or industry
- Expansion/contraction of an existing business or industry

While estimating a change (economic impact study) such as the entrance or departure of industry activity is a worthwhile endeavor in many instances, this is not how the contribution of the agri-food sector in this analysis was estimated. This analysis is an effort to evaluate the structure of existing industries within an existing economy. As a result, shocking the economy to create or eliminate parts of the industry is not appropriate. For that reason, this study is called an "economic contribution analysis"; in other words, we are interested in understanding what South Dakota agriculture currently contributes to the overall economy. This is a key difference from what is traditionally termed an "economic impact study", which attempts to understand the economic impacts of a change within an economy (i.e. a business/industry entering or leaving a local area). With a contribution analysis, the sum of individual industry estimates will never differ from the total of what actually exists in a given study area.

State Level Results

The forty-nine IMPLAN sectors identified (and present in South Dakota) for this study were aggregated into three main categories to provide an overview of the economic contribution of these industries. These aggregated industries are:

- Crops
- Livestock
- Other Agriculture

Further details on the industries included in each of these categories are shown in the 'Results by Industry' section of the report and also in Appendix A.

State Value-Added

Total value-added refers to the portion of total sales that actually created additional value from the economic activity in an area and/or industry and is an accurate indicator of the ability of an industry to improve economic prospects in a given area. Total value-added for an industry represents the value of the industry's total sales minus the value of any inputs used in the production process from other industries. Key components of value-added are employee compensation (hired labor) and proprietor's income (self-employed), which is collectively known as 'labor income'.

The agriculture industry and related economic activity add a significant contribution to the South Dakota economy with about \$11.2 billion in value-added. Of this amount, 30% comes from the crops category, 52% from livestock, and 18% from Other Agriculture.

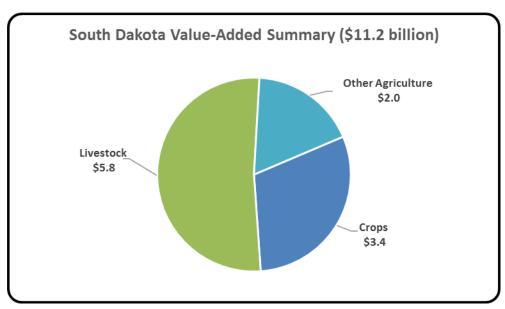


Figure 4, South Dakota Value-Added Summary

State Jobs

The jobs³ number represents an estimate of the number of positions (jobs) currently filled in an area or industry. The estimates provided here originate from the IMPLAN input-output model. Jobs includes positions whether they are full or part time, so care must be used in making comparisons. Jobs does not count positions that are unfilled.

As shown in Figure 5, South Dakota's agriculture industry and related economic activities contribute a sizeable amount of jobs to the economy with 132,105 jobs. Of this amount, 25% comes from the crops category, 57% from livestock, and 17% from Other Agriculture.

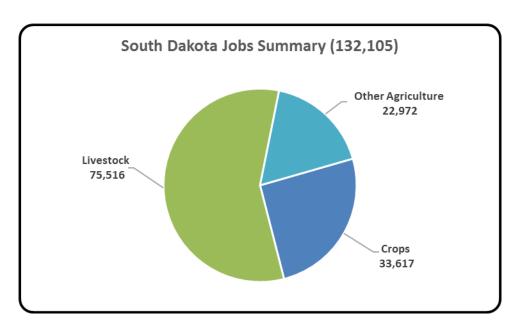


Figure 5, South Dakota Jobs Summary

³ Jobs do not refer to the number of people working or to full-time equivalent employment. Jobs can be full or part time, and a single individual can hold multiple jobs. In short, jobs cannot be looked upon as interchangeable or comparable across industries, businesses, or locations.

State Output

Total output (sales) refers to the total value of all production or sales of the identified industries within a study area. This is a total number that does not make deductions for the cost or origination of inputs that were used in the production process, which means that there is some double-counting that occurs with this measure of economic activity. Figure 6 illustrates the contribution of agriculture and related industries to South Dakota's economy. As shown, South Dakota's agriculture industry and related economic activities contribute significantly to the state economy with about \$32.5 billion in total output.

Of this amount, 29% comes from crops, 53% from livestock, and 18% from Other Agriculture.

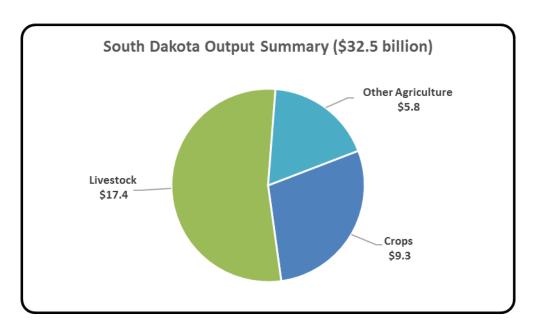


Figure 6, South Dakota Output Summary

State Labor Income

Labor income is the sum of employee compensation (work for hire) and proprietor income (self-employment) and is a sub-component of value-added. Figure 7 illustrates the contribution of each of the four categories to South Dakota's total labor income. As shown, South Dakota's agriculture industry and related economic activities contribute about \$6.4 billion in labor income to the economy.

Of this amount, 29% comes from crops, 48% from livestock, and 23% from Other Agriculture.

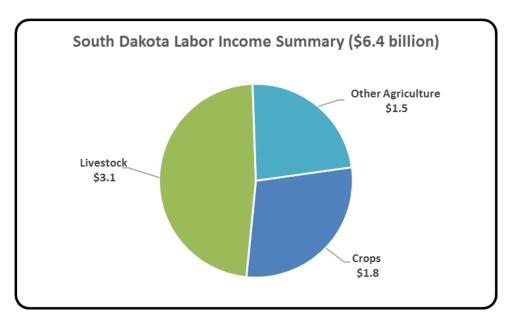


Figure 7, South Dakota Labor Income Summary

Tax Summary

South Dakota's agriculture industry and related economic activities are also sources of tax revenue, contributing about \$1.75 billion at all taxing levels. About \$500 million of that goes to the state and local level, and an additional \$1.25 billion at the federal level as shown in Figure 8.

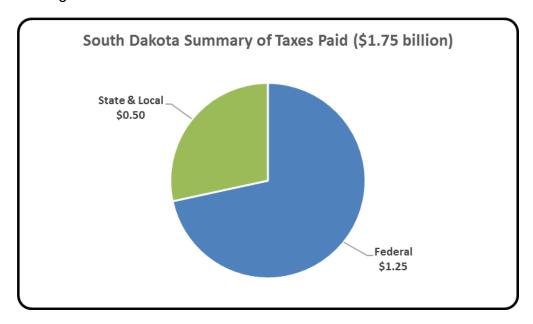


Figure 8, South Dakota Summary of Taxes Paid

Results by Industry

The previous section showed the state level results by the three major categories: 1) Crops, 2) Livestock, and 3) Other Agriculture. The following section shows the results by industry within each of the three major categories to show which specific industries are major contributors. Goods and services used by the agriculture industry to operate such as banking and insurance are not specifically shown, but they are embedded as required inputs for the agriculture industry and related economic activities.

Crops

The Crops category includes industries such as grain and oilseed farming, soybean processing, and more. Total value-added contributed to the South Dakota economy from crops was \$3.4 billion with the largest contributors being oilseed farming, grain farming, and soybean and other oilseed processing (see Figure 9).

Crop production and related economic activity in South Dakota also accounted for 33,617 jobs and about \$1.8 billion in labor income.

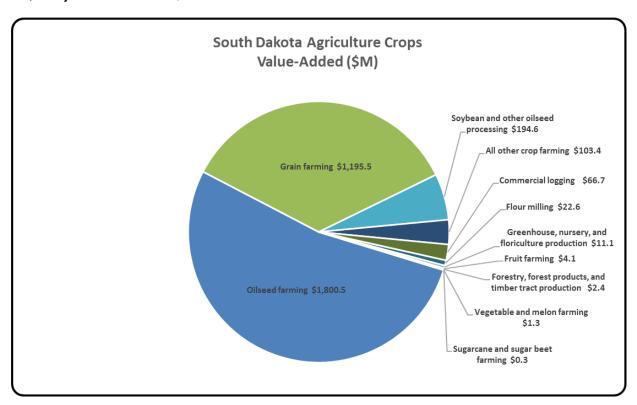


Figure 9, South Dakota Crop Production Value-Added (\$M)

Livestock

The Livestock category includes industries such as beef cattle production, hog production, dairy cattle, poultry and egg production, meat/poultry processing rendering, and more. Total value-added contributed to the economy from livestock and related economic activity in South Dakota was about \$5.8 billion (see Figure 10).

Livestock production and related economic activity in South Dakota also accounted for 75,516 jobs and about \$3.1 billion in labor income.

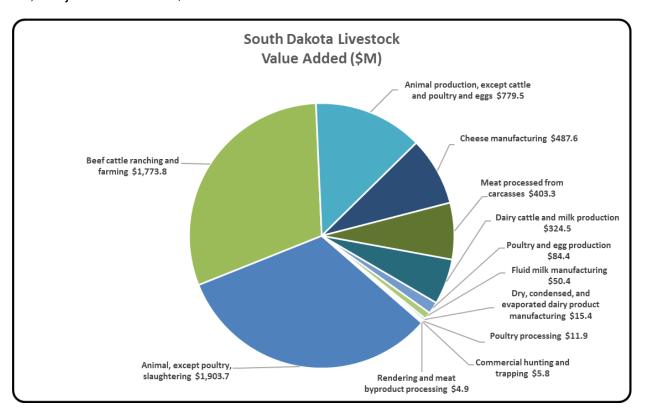


Figure 10, South Dakota Livestock Production Value-Added (\$M)

Other Agriculture

The Other Agriculture category include industries such as animal feed production, farm machinery and equipment manufacturing, dog and cat food manufacturing, veterinary services, many food manufacturing industries, and more. Total value-added contributed to the economy from Other Agriculture was \$2.0 billion (see Figure 11).

Other agriculture and related economic activity in South Dakota also accounted for 22,972 jobs and about \$1.5 billion in labor income.

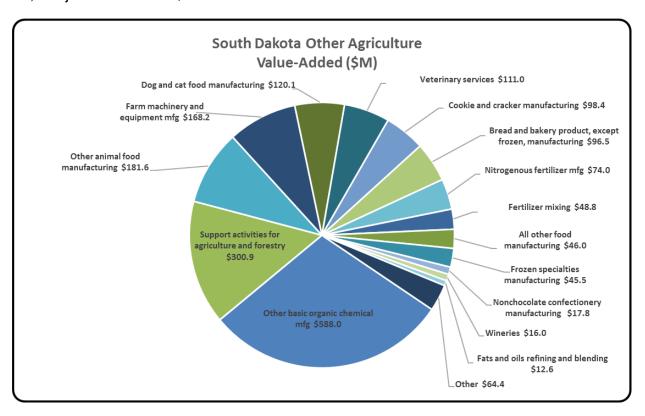


Figure 11, South Dakota Other Agriculture Value-Added (\$M)

South Dakota Agriculture: Looking Ahead

The State of South Dakota has programs in place designed to support the growth of livestock and poultry production operations. Programs are also in place to support beginning farmers and ranchers. Some of the increases in production numbers and sales are likely due to the success of these programs available through the State.

Farmers and ranchers are generally experiencing a period of economic stress in a volatile market. However, the State of South Dakota is providing an environment that is supportive of all segments of agriculture production. This environment is conducive to continued growth in agriculture as a major contributor to the state's economy.

Dairy Processing

Numerous finance programs are available through the State of South Dakota to assist in the growth of dairy production and value-added processing. The growth in the number of dairy cows and increase in sales of dairy products both in amount and as a percentage of the state total indicate these efforts are effective and should be continued.

Beginning Farmers and Ranchers

The 2017 USDA Census of Agriculture provides a more extensive view of production agriculture demographics than previous versions. As a result, a comparison of demographics is not a part of this study. It may be possible to evaluate the success of existing programs, such as the Beginning Farmer Bond program, once the 2022 census data is available.

Adding Value

While the economic climate has been volatile, since the 2012 Census of Agriculture at least one new ethanol plant, a new cattle slaughter plant and several dairy processing plants have been added to the state's economy. South Dakota farmers and ranchers are benefitting from the addition of processing facilities within the state. This lowers transportation costs and their effect on margins. Continued expansion in processing will allow more of the farm and ranch production to be processed locally.

Page 22

Appendix A, IMPLAN Aggregation Scheme

		Aggregated
IMPLAN Code	Industry Description	<u>Industry</u>
1	Oilseed farming	Crops
2	Grain farming	Crops
3	Vegetable and melon farming	Crops
4	Fruit farming	Crops
5	Tree nut farming	Crops
6	Greenhouse, nursery, and floriculture production	Crops
7	Tobacco farming	Crops
8	Cotton farming	Crops
9	Sugarcane and sugar beet farming	Crops
10	All other crop farming	Crops
15	Forestry, forest products, and timber tract production	Crops
16	Commercial logging	Crops
67	Flour milling	Crops
68	Rice milling	Crops
69	Malt manufacturing	Crops
70	Wet corn milling	Crops
71	Soybean and other oilseed processing	Crops
74	Beet sugar manufacturing	Crops
75	Sugar cane mills and refining	Crops
81	Canned fruits and vegetables manufacturing	Crops
82	Canned specialties	Crops
83	Dehydrated food products manufacturing	Crops
11	Beef cattle ranching and farming	Livestock
12	Dairy cattle and milk production	Livestock
13	Poultry and egg production	Livestock
14	Animal production, except cattle and poultry and eggs	Livestock
17	Commercial fishing	Livestock
18	Commercial hunting and trapping	Livestock
84	Fluid milk manufacturing	Livestock
85	Creamery butter manufacturing	Livestock
86	Cheese manufacturing	Livestock
87	Dry, condensed, and evaporated dairy product manufacturing	Livestock
88	Ice cream and frozen dessert manufacturing	Livestock
89	Animal, except poultry, slaughtering	Livestock
90	Meat processed from carcasses	Livestock
91	Rendering and meat byproduct processing	Livestock
92	Poultry processing	Livestock
93	Seafood product preparation and packaging	Livestock
19	Support activities for agriculture and forestry	Other Agriculture

33	Potash, soda, and borate mineral mining	Other Agriculture
34	Phosphate rock mining	Other Agriculture
35	Other chem and fert mineral mining	Other Agriculture
65	Dog and cat food manufacturing	Other Agriculture
66	Other animal food manufacturing	Other Agriculture
72	Fats and oils refining and blending	Other Agriculture
73	Breakfast cereal manufacturing	Other Agriculture
76	Nonchocolate confectionery manufacturing	Other Agriculture
77	Chocolate and confectionery manufacturing from cacao beans	Other Agriculture
78	Confectionery manufacturing from purchased chocolate	Other Agriculture
79	Frozen fruits, juices and vegetables manufacturing	Other Agriculture
80	Frozen specialties manufacturing	Other Agriculture
94	Bread and bakery product, except frozen, manufacturing	Other Agriculture
95	Frozen cakes and other pastries manufacturing	Other Agriculture
96	Cookie and cracker manufacturing	Other Agriculture
97	Dry pasta, mixes, and dough manufacturing	Other Agriculture
98	Tortilla manufacturing	Other Agriculture
99	Roasted nuts and peanut butter manufacturing	Other Agriculture
100	Other snack food manufacturing	Other Agriculture
101	Coffee and tea manufacturing	Other Agriculture
102	Flavoring syrup and concentrate manufacturing	Other Agriculture
103	Mayonnaise, dressing, and sauce manufacturing	Other Agriculture
104	Spice and extract manufacturing	Other Agriculture
105	All other food manufacturing	Other Agriculture
106	Bottled and canned soft drinks & water	Other Agriculture

107	Manufactured ice	Other Agriculture
108	Breweries	Other Agriculture
109	Wineries	Other Agriculture
110	Distilleries	Other Agriculture
111	Tobacco product manufacturing	Other Agriculture
165	Other basic organic chemical mfg	Other Agriculture
169	Nitrogenous fertilizer mfg	Other Agriculture
170	Phosphatic fertilizer mfg	Other Agriculture
171	Fertilizer mixing	Other Agriculture
172	Pesticide and other agricultural chemical mfg	Other Agriculture
262	Farm machinery and equipment mfg	Other Agriculture
459	Veterinary services	Other Agriculture

NOTE: Bold Red font denotes industry was not present in South Dakota during study period.