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Economic Impact of Agriculture on South Dakota

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ECONOMIC IMPACT OF AGRICULTURE ON SOUTH DAKOTA

by

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Agricultural production, whether in the form of crops or livestock, has traditionally played a large role in the economic prosperity of South Dakota. In the last few years the value of agricultural commodities produced in the state has averaged $6.0 billion annually. The impacts of this activity go beyond the agricultural sector alone. The effects of this production are threefold, the direct, indirect, and induced. The direct effect is the actual value of the commodities produced in the state. The indirect effect is the business to business activity that is created through the production of these commodities. The induced effect is the additional consumer spending resulting from the increased economic activity in the state. Combined, these three effects provide an estimate of the total economic impact of agriculture on the South Dakota economy.

There will be two separate parts to this analysis. Initially only the impact of production agriculture will be considered. Then, the effects of agricultural processing and manufacturing will be included.

Methodology

To analyze the impact of agriculture on the state of South Dakota the input-output modeling software IMPLAN Pro was employed. This software was originally developed for the National Forest Service and has been adapted for commercial use. The economic relationships among industries in South Dakota are the internal production functions imbedded within the program. After constructing a baseline model of the state, the impacts of production agriculture alone and the combined production agriculture and agribusiness sectors are analyzed to determine their impact on the economy of South Dakota.

In this analysis we utilize 2006 data for South Dakota. The industry outputs employed are those that are already included in the IMPLAN Pro database. These outputs are gross sales, not Gross Domestic Product (GDP) figures. Therefore, the cost of inputs is included, not excluded as they would be in a measure of GDP. The value of all industry output for IMPLAN Pro is $58.7 billion (Table 1) as compared to a GDP of $32.0 billion for South Dakota in 2006 (Bureau of Economic Analysis). The $58.7 billion figure provides an estimate of the dollars flowing through the South Dakota economy.

Industry Breakdown

Using the IMPLAN Pro division of industries by North American Industry Classification System (NAICS) code, 509 different industry classifications in the model are divided into 20 different categories. Agriculture, forestry, fishing, and hunting are combined into one category. The remaining 19 are shown in Table 1.

The output multiplier for production agricultural industries in South Dakota is 2.374. This means that each dollar of revenue generated in agricultural industries generates an additional $1.374 worth of economic activity in the state. The multiplier does not represent the number of times a dollar is “turned over” in the economy, but is a real increase in business activity.

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Table 1. Output for South Dakota Industries 2006

Industry	Output $ million	Multiplier
Agriculture, Forestry, Fishing and Hunting	5,302	2.374
Mining	434	1.766
Utilities	952	1.458
Construction	3,608	2.152
Manufacturing	13,103	2.122
Wholesale Trade	2,682	1.790
Transportation and Warehousing	1,928	2.067
Retail Trade	3,685	1.811
Information	1,772	1.834
Finance and Insurance	4,650	1.763
Real estate and Rentals	2,627	1.570
Professional-scientific and Technical Services	1,678	2.062
Management of Companies	502	1.959
Administrative and Waste Services	1,017	2.003
Educational Services	428	2.088
Health and Social Services	4,726	2.050
Arts-Entertainment and Recreation	577	1.940
Accommodation and Food Services	1,764	2.012
Other Services	1,399	2.094
Government and non-NAICS	5,874	1.814
TOTAL	58,709	

Source: IMPLAN Pro 2006 database

The agricultural sector has the highest multiplier of the twenty different sectors of the South Dakota economy in 2006. The construction and manufacturing sectors have the next highest multipliers at 2.152 and 2.122, respectively. The utilities sector has the lowest multiplier at 1.458. This would imply that economic stimulus investment in the sectors with higher multipliers - agriculture, construction, and manufacturing - would have much larger positive impacts on the economy than investments in other sectors with lower multipliers, like utilities.

Production Agriculture Analysis

The direct effect of $5.3 billion represents the value of the products produced in the production agriculture sector (Table 2). The indirect effect is economic activity that results from industries supplying inputs into the production agriculture sector (business to business activity). The induced effect is the increase in household spending resulting from the increased economic activity in the state. The $5.3 billion of direct economic impact of production agriculture comprises 9% of the total economic activity generated in the State. The total economic impact of production agriculture in South Dakota is $12.6 billion, corresponding to 21.4% of the total economic impact generated by production agriculture in the State.

Table 2. Production Agriculture Impact

	$ million
Direct	5,302
Indirect	4,454
Indirect	2,833
TOTAL	12,590

Note: Denoted in nominal dollars.

The employment effects are similar to the output effects (Table 3). In employment terms the direct effect of production agriculture represents the number of people employed in the agricultural industries. This number is 8.1 employees per million dollars of industry output. The indirect effect is the employment in the industries supplying inputs to the agricultural industries (5.5 employees per million dollars of output) and the induced effect is the additional employment resulting from the increased economic activity in the state (5.6 employees per million dollars of output).

Table 3. Other Production Agriculture Effects

	Employment	Indirect Business Taxes ($ millions)
Direct	43,199	102
Indirect	29,414	144
Induced	29,706	135
TOTAL	102,319	381

Note: Taxes are in nominal dollars.

Indirect business taxes are all of the taxes collected (sales, property, excise, etc.). The direct effect is the tax revenue generated by the agricultural industries (Table 3). The indirect effect results from the increased business to business activity and the induced effect is from the increased consumer activity associated with the agricultural production in the state. The relative amount of taxes paid at each level (direct, indirect, and induced) is representative of the changes in the type of taxes paid by agricultural producers, supply industries, and consumers.

Value Added Agriculture

To obtain a more accurate estimate of the full impact of agriculture on the state of South Dakota, it is necessary to include industries from the manufacturing/processing sector that can clearly be identified as agriculturally related. For this analysis these industries will include flour milling, soybean processing, fluid milk, cheese, dry milk, animal slaughter, meat processing, poultry processing, dry pasta, wineries, leather, sawmills, and ethanol. The sum of the output for these industries is $3.7 billion, or 6.2% of the total output for the state (Table 4).

Table 4. Output of Agribusiness Sectors

Industry	Output $ million
Flour milling	2
Soybean Processing	504
Fluid Milk	98
Cheese	441
Dry Milk	68
Animal Slaughter	1,344
Meat Processing	325
Poultry Processing	139
Dry Pasta	1
Wineries	7
Leather	11
Sawmills	142
Ethanol	587
TOTAL	3,668

Source: IMPLAN Pro 2006 database

The $3.7 billion that results from activity in the agribusiness sector is analyzed and its' impact on the agricultural sector is estimated. There is an additional $8.7 billion in economic impact from the agribusiness sector, nearly 71,000 additional people employed, along with an additional $264 million in tax revenue generated (Tables 5 and 6).

Table 5. Agribusiness (non-input) Impact

	$ million
Direct	3,668
Indirect	3,081
Induced	1,960
TOTAL	8,709

Note: Denoted in nominal dollars.

Table 6. Other Agribusiness Effects

	Employment	Indirect Business Taxes ($ million)
Direct	29,884	70
Indirect	20,348	100
Induced	20,550	93
TOTAL	70,782	264

Note: Taxes are in nominal dollars.

Total Impact of Agriculture

To get a complete picture of the total impact of agricultural sectors on the South Dakota economy, the production agriculture and agribusiness sector outputs were combined and their total impact estimated. These two sectors have a combined output of $9.0 billion, or 15.3% of the state output (Table 7). The total impact is $21.3 billion or 36.3% of state economic activity. The combined sectors employ 173,101 people and generate $645 million in taxes (Table 8).

Table 7. Total Economic Impact of Agriculture

	$ million
Direct	8,970
Indirect	7,536
Induced	4,793
TOTAL	21,299

Note: Denoted in nominal dollars.

Table 8. Total Employment and Tax Effects

	Employment	Indirect Business Taxes ($ million)
Direct	73,083	172
Indirect	49,762	244
Induced	50,256	229
TOTAL	173,101	645

Note: Taxes are in nominal dollars.

Concluding Remarks

Agriculture remains a major contributor to the total economic activity of the state of South Dakota. The agricultural sector in the state has a total impact of $21.3 billion in economic activity, employs 173,101 people, and contributes $645 million in tax revenues. Each dollar of revenue generated in the state from production agriculture creates another $1.374 in economic activity. This makes agriculture a potent engine for economic development within the state. Agriculture represents approximately 40% of employment opportunities in the state, out of 423,657 jobs in the state in December of 2006 (U.S. Bureau of Labor Statistics). Agriculture is also responsible for approximately 50% of the State's total tax collections in 2006 (U.S. Census Bureau). The expansion of the ethanol industry and the increase in commodity prices in the last few years likely served to increase the importance of agriculture in the state.

Sources

Bureau of Economic Analysis, U.S. Department of Commerce. www.bea.gov
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