

The 2010 Economic Impact of the Nebraska Agricultural Production Complex

by

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A Research Study from the University of Nebraska—Lincoln
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The 2010 Economic Impact of the Nebraska Agricultural Production Complex

Executive Summary

Nebraska's agricultural production complex is remarkable in both its sheer volume of production and its diversity. The state is a national leader in the production of major crop and livestock commodities. It is also home to major input industries tied to agriculture as well as sectors processing agricultural production into value-added products, all of which contribute to its economic significance. Moreover, the growth of the state's agriculture over the past decade has been phenomenal. In 2010, total farm cash receipts exceeded \$20 billion for the first time, essentially double the 2000 level. And while the nation's economy was hit by the Great Recession followed by years of anemic recovery, this state's economy has fared much better than most, in large part due to the prosperity within its agricultural sectors.

Given the above, this study was conducted to provide a benchmark assessment of the economic impact of Nebraska agriculture on the state's economy, centering on the year, 2010, the most recent year for which comprehensive data is available. The focus is on the agricultural production complex which includes a set of industries closely involved in the growing, processing, and transportation of agricultural products. Included in this complex are: crop production, livestock production, agriculturally-related manufacturing (durable and non-durable), agriculturally-related transportation and wholesaling, agricultural-related research and education, and agri-tourism.

The economic model used for the analysis is the IMPLAN (**I**mpact Analysis for **P**lanning) model. This software program along with the data series just released for 2010, allow for a benchmark economic impact assessment of a particular sector as its activities ripple throughout the area economy. Measures of both direct and indirect economic benefits can be derived as point-in-time measures of a dynamic economy. Reliable economic measures of total effects attributed to a particular sector can be achieved which include: total dollar output (business receipts), gross state product (a value-added measure), labor income, and employment numbers.

Given the state's geographic diversity of natural resource endowment, demographics, etc., the economic impacts of the agricultural production complex vary widely across Nebraska's sub-state regions. Reflecting this fact, this study was expanded beyond the state level measures to also include analysis for eight sub-state regional economies. More refined geographic resolution is most valuable in assessing economic conditions by decision-makers in both the private and public sectors.

The Findings:

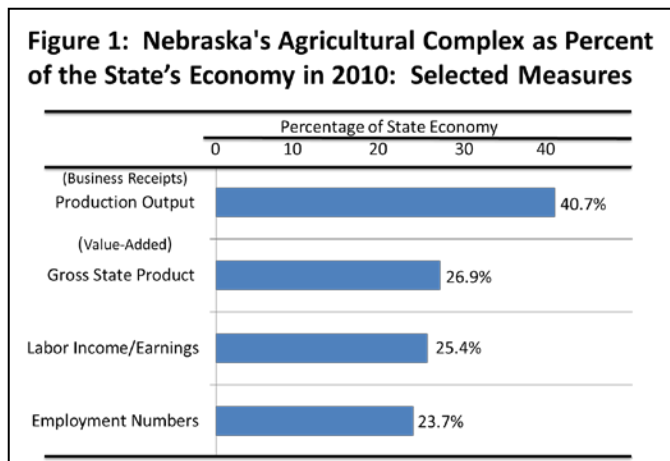
The combined direct and indirect effects of the agricultural production complex on Nebraska's economy are considerable. For the year 2010, **total dollar output** (business receipts) was **\$68.9 Billion** accounting for **40.7 %** of the state's total output. In terms of **gross state product (GSP)** (analogous to gross domestic product, the broadest measure of the U.S. economy), the amount was **\$22.6 Billion** which represented **26.9%** of the state's **GSP**. In short, more than a fourth of the Nebraska's economy can be attributed to the agricultural production complex. With the

possible exception of South Dakota, no other state has an economy with this degree of agricultural prominence.

The measures of labor income and employment numbers are also significant. Labor income (proprietor income, wages, salaries, and benefits) in 2010 attributed to the agricultural production complex is estimated to be **\$13.7 Billion**, or **25.4%** of the Nebraska total. In terms of employment numbers, the complex accounted for **289,000 positions** or **23.6%** of Nebraska’s total workforce. With essentially one out of every four Nebraskans employed in the agricultural production complex, it is, indeed, an *economic pillar* of the state’s economy.

As previously noted, the role of agricultural activity in the economy mix varies a great deal by sub-state region. Northeast Nebraska’s regional economy is especially influenced by agriculture which produces large volumes of both crop and livestock commodities along with considerable agriculturally-related production and processing activity. In that region, the agricultural production complex accounted for 81% of the production output, 63% of the region’s gross regional product, while employing 51% of the region’s workforce and producing 66% of its labor income in 2010. Agriculture’s prominence was also quite high in the North, Central, South, and Southeast regional economies where more than 45% of gross regional product and more than a third of the workforce numbers were agriculturally related in 2010. The East region of the state generated the largest regional dollar volume of agricultural activity and agriculturally-related employment numbers; but given the presence of the state’s two largest urban centers, agriculture’s portion of the East region’s broader-based economy was much less—albeit still quite important.

Overall, Nebraska is positioned, like few other areas of the country, to capitalize on the strength of its agricultural production complex. To a large extent, this state has a thriving *bio-economy* tied to a rich natural resource endowment and skilled human capital which will only increase in importance in a world of rising global demand for food and other agriculturally-based output. That said, however, economic volatility arising from agriculture will tend to ripple through the state’s total economy, often triggered by external forces of both national and global origin. This signals a clear need of a more comprehensive state-level strategy for long-term sustainable development around its agricultural base—a strategy engaging all stakeholders in a shared vision for the state and a commitment to pursue it.



Chapter 1

Introduction

Agriculture is a pillar of the Nebraska economy. Nebraska's total net farm income in most years accounts for between 5% and 8% of the state's total personal income. Those percentages rank Nebraska third highest of the 50 states and the highest percentage for any state with a population over 1 million. Moreover, this share only grows when closely related industries are considered such as agricultural cooperatives, food processing firms, agriculturally related manufacturing firms, and transportation companies that haul agricultural inputs and products. These industries are collocated due to the abundance of agricultural crop and livestock production in Nebraska. Together, these agriculture production and agricultural-related entities create a multi-faceted *agricultural production complex* that accounts for a substantial share of Nebraska's economic activity and output.

This agricultural production complex is an important part of Nebraska's economic history, dictating many of the early settlement patterns, and still observed throughout the state today. But, the complex also will be a very important part of Nebraska's economic future. This is because the state's production agriculture and its related manufacturing, wholesale, and transportation industries are leaders in an intensely competitive international food industry. To thrive in that industry this state's agricultural producers and manufacturers have been innovative, being early adopters of cutting-edge technologies and management techniques. These features allow the complex to be a leader in international trade and create a solid foundation for the Nebraska economy. This was never clearer than during the recent "Great Recession," when the export strength of Nebraska agriculture helped the state stave off the worst effects of that recession.

Thinking long-term, the Nebraska agriculture production complex will likely continue to grow, exporting more with the ongoing development of the global middle classes in China, India, and other countries of Asia and in Latin America. In many instances, that growth will help preserve employment and family-based agricultural operations. But, employment and income also will grow in other industries of the agricultural production complex such, such as food processing, agricultural based manufacturers and bio-technology companies, and in the transportation entities that carry

agricultural inputs and products between stages of production and on to international markets.

Given the importance and diversity of Nebraska's agricultural production complex, an up-to-date study estimating the Nebraska economic impact of the complex was deemed necessary; and 2010 was chosen to be the benchmark year of analysis. The year 2010 was a good income year for Nebraska agriculture. At the same time, 2010 was not a record year for agricultural prices and income such as 2011, or a near record year like 2008. Thus, we consider 2010 to be representative of the recent boom period for agriculture in Nebraska.

The study focuses on the statewide economic impact of agriculture in Nebraska. However, sub-state results are also presented for eight Nebraska regions (which correspond directly to the sub-state Agricultural Statistics Districts as used by the Nebraska Agricultural Statistics Service of USDA). This sub-state analysis indicates the significance of the economic impact within different regions of Nebraska. As would be expected, the agricultural production complex is a critical part of the economy throughout the state; but is the dominant industry in several non-metropolitan regions of Nebraska.

This study is a joint collaborative effort of the UNL Department of Agricultural Economics and the Bureau of Business Research within the UNL Department of Economics and funded internally by the Institute of Agricultural and Natural Resources (IANR) of the University of Nebraska–Lincoln. It draws on substantial expertise in key issues affecting agriculture such as irrigation, natural resources, the agricultural equipment industry, and community economic development.

This report is organized into six chapters. Following this introduction the second chapter provides a description of the agricultural production complex in Nebraska. Chapter 3 describes the economic impact methodology utilized in the study. The statewide economic impact of the agricultural production complex is presented in the fourth chapter, while Chapter 5 presents the economic impact of agriculture within the 8 sub-state regions. Conclusions and implications are presented in Chapter 6.

Chapter 2

Industry Statistics within the Agricultural Production Complex

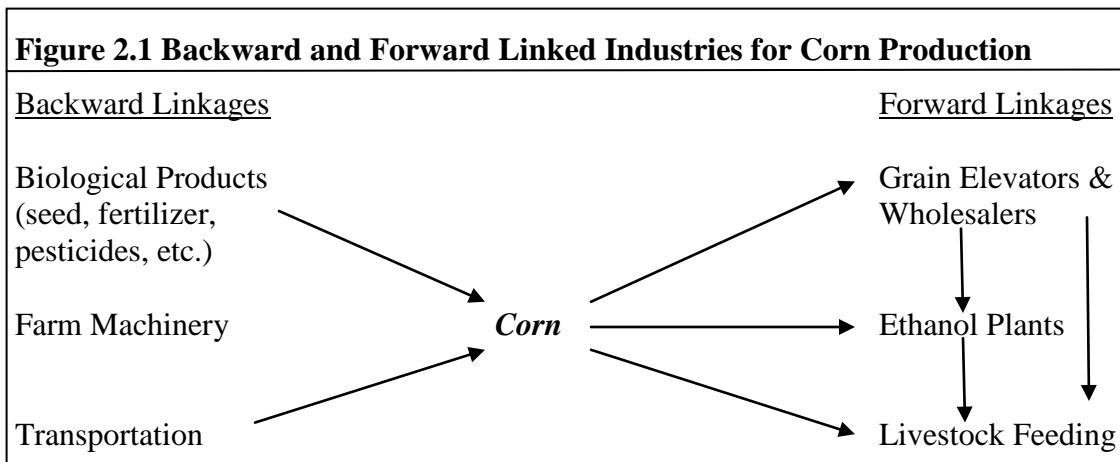
The agricultural production complex in Nebraska is a large and diverse set of sectors involved in raising and processing crops and livestock, along with agriculture-related activities in the manufacturing, transportation, wholesale, education, and tourism sectors. (See state ranking for selected items in Appendix Table 1) This Chapter describes characteristics of the complex including basic information such as industry output in each of its segments. Data on farm and ranch activity typically comes from the Nebraska Agricultural Statistical Service of the USDA (USDA-NASS) while information about output in agriculture-related manufacturing, transportation, wholesale, and tourism activity comes from the IMPLAN (IMPact analysis for PLANning) model developed by the Minnesota IMPLAN Group. IMPLAN is an input-output analysis software package and database that can provide a detailed picture of the economy in each state and county in the United States. For this analysis, IMPLAN data for 2010 (the latest available) was used. Data on the agriculture-related education industry was assembled by the University of Nebraska-Lincoln.

A. Agricultural Production Complex

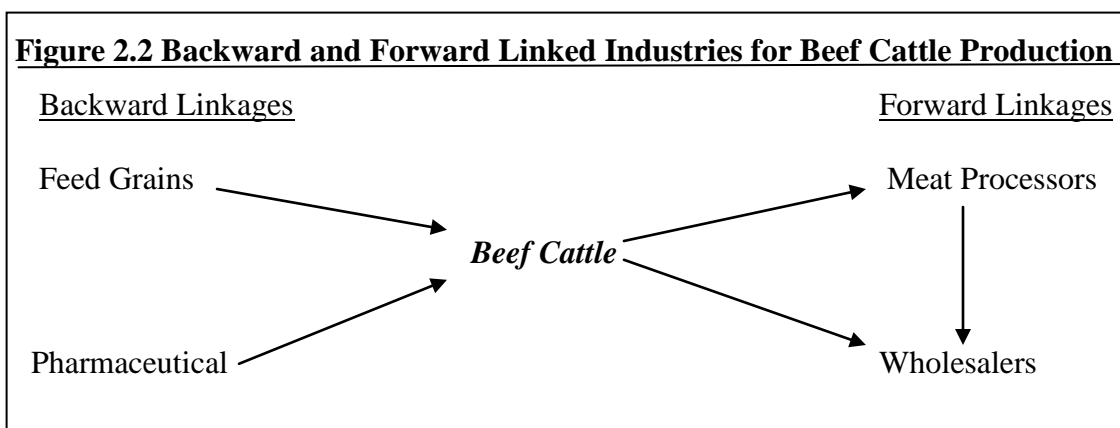
The agricultural production complex includes a set of entities closely involved in the growing, processing or transporting of food products. The complex is therefore much broader than farms and ranches. The complex also includes closely related industries such as food processors, agricultural cooperatives, farm equipment manufacturers, wholesalers, and components of the transportation industry. Components of the educational and research sector and other public agencies are also focused directly on the agricultural activity of the state. Further, Nebraska has an agri-tourism industry, albeit small but growing.

To understand the agricultural production complex, it is important to consider the linkages that include crop and livestock production. Figure 2.1 shows both “backward” and “forward” linked industries in crop production, for the example of corn production. Backward linked industries are suppliers to crop production such as farm machinery,

biological products, and transportation services that haul crops to market or supplies and equipment to farms. Forward linked industries are the customers of crop production, and are often highly dependent on local supplies in order to be viable businesses. A large supply of local grain is the basis of grain processing businesses such as grain elevators and ethanol plants.



There are also forward linkages to a variety of livestock feeding operations such as beef cattle, pork producers, and dairy. Figure 2.2 shows selected backward and forward linkages for livestock operations, for the example of beef cattle. Livestock producers utilize pharmaceutical products and feed grains. Forward linked industries include meat processors and wholesalers.



The interrelationships featured in Figures 2.1 and 2.2 point to the presence of an agricultural production complex with significant trade between agricultural producers, food wholesalers and transporters, and input providers. This study examines Nebraska

businesses within these industries; as these businesses trade with each other and also export to the outside world (beyond the state borders). The income and business activity generated by the agricultural production complex also creates an economic impact on the larger Nebraska economy. The components of the complex include crop and livestock production, and ancillary economic activity that occur on Nebraska farms and ranches, such as agri-tourism. But, the complex also includes other industries that service or process crops and livestock, and are collocated in Nebraska because of the abundant production of corn, soybeans, and other crops as well as cattle, hogs, and other livestock. The components of the agricultural production complex are:

- Crop production (Irrigated and Non-irrigated)
- Livestock Production
- Agricultural-Related Manufacturing (Durable and Non-durable)
- Agricultural-Related Transportation and Wholesaling
- Agricultural-Related Research and Education
- Agri-Tourism

This definition includes many important agricultural service industries, but also excludes several relevant support activities for agriculture including finance, veterinary services, and consultant services, among others. It would be appropriate to also include these agricultural services providers within the agricultural production complex in the analysis that follows. However, doing so is beyond the scope of the current report and is left for future research.

B. Description of the Complex

The first component is the total production of crop producers in Nebraska. In Table 2.1, output estimates are provided for the state's major crop categories. The covered crops are corn, soybeans, wheat, sorghum for grain, oats, sugar beets, dry beans, hay alfalfa, and other hay. Separate sales information is provided for irrigated and non-irrigated acres for corn and soybeans. Data on harvested acres of 2010 production and prices are from USDA-NASS.

Data from USDA-NASS indicates that 18.6 million acres of these major crops were harvested in Nebraska in 2010. Total values in the selected crops were \$11.42 billion. Nearly two-thirds (65%) of dollar value was corn, from both irrigated or dryland

acres. Soybean sales accounted for another 26% of all crop proceeds in 2010. The remaining 9% of sales were divided among wheat, hay alfalfa, and other hay, as well as sugar beets, edible dry beans, oats, and sorghum.

Table 2.1: Nebraska 2010 Crop Production for Selected Crops

Crop	Harvested Crop Acres	Yield/Acre	Production (1000s)	Price per Unit	Total Value (Millions \$)
Irrigated Corn	5,420,000	179 bu.	972,550	\$5.09	\$4,950
Dry Corn	3,610,000	138 bu.	496,550	\$5.09	\$2,527
Irrigated Soybeans	2,383,000	59 bu.	141,250	\$11.00	\$1,554
Dry Soybeans	2,717,000	47 bu.	126,500	\$11.00	\$1,392
Wheat	1,476,500	43 bu.	63,492	\$5.27	\$335
Sorghum for Grain	75,000	90 bu.	6,750	\$8.74	\$33
Oats	25,000	68 bu.	1,700	\$3.03	\$5
Sugar beets	47,500	24 tn.	1,131	\$72.60	\$82
Dry Beans Edible	155,000	21 cwt.	3,193	\$27.00	\$86
Hay Alfalfa	890,000	4.1 tn.	3,649	\$78.00	\$285
Other Hay	1,800,000	1.5 tn.	2,700	\$65.00	\$176
Total	18,599,000				\$11,424

Source: USDA-NASS

Table 2.2 shows the total estimated production value for livestock in Nebraska in 2010. Estimates are provided for the four major livestock groupings including as cattle production, hog production, dairy cattle and milk production, and poultry and egg production. The total sales were \$8.38 billion in 2010. Approximately 86 % of total livestock sales were in cattle production. Hog production was the next largest category for sales, accounting for nearly 10% of the total.

Table 2.2: Nebraska 2010 Livestock Production

Livestock	Total Value (Millions \$)
Cattle Production	\$7,206
Hog Production	\$817
Dairy Cattle and Milk Production	\$203
Poultry and Egg Production	\$152
Total	\$8,378

Source: USDA-NASS

Table 2.3 shows the sales of agriculture-related manufacturing industries. Data on industry sales from Nebraska were gathered from the IMPLAN model. There are three primary types of agriculture-related manufacturing industries: food processing, ethanol production, and machinery, structures, and pharmaceuticals. The total sales of agriculture-related manufacturing industries were \$25.57 billion in 2010, approximately 30% more than the combined production value of crops and livestock at the farm/ranch level.

Table 2.3: 2010 Nebraska Sales in Agriculture-Related Manufacturing Industries

Industry	Sales (Millions \$)
Food Processing	
Animal Slaughtering (except Poultry)	\$10,983
Animal Slaughtering (Poultry)	\$153
Dog and Cat Food Manufacturing	\$1,329
Other Animal Food Manufacturing	\$1,032
Flour Milling and Malt Manufacturing	\$484
Soybean and Other Oilseed Processing	\$1,228
Fats and Oils Refining and Blending	\$604
Breakfast Cereal Manufacturing	\$391
Sugar Beet Manufacturing	\$133
Fluid Milk and Butter Manufacturing	\$306
Cheese Manufacturing	\$159
Other Food Processing	\$710
Ethanol Production	\$3,494
Machinery, Structures, and Pharmaceuticals	
Farm Machinery & Equipment	\$2,603
Lawn and Garden Machinery	\$45
Plate Work and Fabricated Buildings	\$620
Botanical, Pharmaceutical, and Biological Products	\$1,294
Total	\$25,568

Source: IMPLAN

Animal slaughtering (except poultry) was the largest industry, accounting for 43% of all sales of agriculture-related manufacturing industries. This corresponds to the fact that Nebraska ranks 1st among the 50 states in commercial red meat production. Three

other food processing industries had sales of over \$1 billion in sales during 2010. Dog and cat food manufacturing, other animal food manufacturing and soybean oil processing each had sales of over \$1 billion. Ethanol sales were approximately \$3.5 billion in 2010, the same year that Nebraska moved into number two position in ethanol production, second only to its neighboring state, Iowa. There also were substantial sales in machinery, structures and pharmaceuticals for agriculture. Farm machinery & equipment sales were \$2.60 billion in 2010. The sales of botanical, pharmaceutical and biological products were \$1.29 billion in 2010.

Table 2.4 shows the sales of agriculture-related transportation and wholesale industries. The table lists the estimated portion of trucking industry sales and railroad sales in Nebraska that were related to agriculture. According to truck shipping data, approximately one-third of all truck shipments in Nebraska, by value, are shipments of Nebraska agricultural inputs and products either within the state or to other states. The estimated share of total rail sales is approximately 8%.

The table also shows the total sales of agriculture cooperatives and farm machinery wholesalers. The research team estimated total employment in each industry. In the case of agricultural cooperatives, employment estimates of 5,200 jobs were provided by the Nebraska Cooperative Council. In the case of equipment dealers, the research team determined total employment of 3,682 based on the Quarterly Census of Employment and Wages from the U.S. Department of Labor. The IMPLAN model was utilized to estimate the total sales per job in the wholesale industry, of \$148,000. It is important to note that the concept of sales in the wholesale industry only refers to the value of the wholesale mark-up, and does not include full value of goods sold. This is done to avoid double-counting. The total estimated sales of agriculture-related transportation and wholesaling activity were \$2.79 billion. Trucking transportation had estimate value of \$1.10 billion, while agricultural cooperatives had estimated sales of \$768 million in 2010.

Table 2.4: Sales of Agriculture-Related Transportation and Wholesaling Activity

Industry	Sales (Millions \$)
Agricultural Cooperatives	\$768
Truck Transportation	\$1,095
Rail Transportation	\$381
Farm Machinery and Equipment Dealers	\$544
Total	\$2,788

Source: IMPLAN

Table 2.5 shows the level of agricultural related public research and education activities in Nebraska. These public sector activities are best presented in terms of employment and payroll rather than sales. This sector includes education and research at universities and colleges throughout the state but also includes federal employment in delivering agricultural programs and information in Nebraska as well as state employment in the Nebraska Department of Agriculture. Table 2.5 below shows agriculture-related employment and payroll in public universities and colleges, other state government, and the federal government. The total employment of agriculture-related public research and education was 2,647 in 2010, with a total estimated payroll of \$215 million. The largest share of both employment and payroll was at universities and colleges with the major share being within the UNL Institute of Agriculture and Natural Resources (IANR) on the Lincoln Campus.

Table 2.5: Employment and Payroll of Agriculture-Related Public Research and Education Activities

Industry	Payroll (Millions \$)	Employment
Universities & Community Colleges	\$170	1,651
Federal Government	\$38	850
State Government	\$7	146
Total	\$215	2,647

Source: University of Nebraska-Lincoln

Table 2.6 shows the estimated agri-tourism sales in Nebraska in 2010. Statewide sales data were derived utilizing the IMPLAN model, which provided information on the sales in the “other recreation” industry that occurred on farms and ranches. Such other recreation refers to the agri-tourism activity occurring on these farms and ranches such as leasing land for hunting, birding, or other on-farm recreation activities or hosting events

such as fruit or vegetable harvesting opportunities, agricultural festivals, or themed events (such as pumpkin farms and other entertainment venues).

Table 2.6: 2010 Agri-Tourism Sales in Nebraska

Region	Sales (Millions \$)
Nebraska	\$99

Source: IMPLAN

Chapter 3

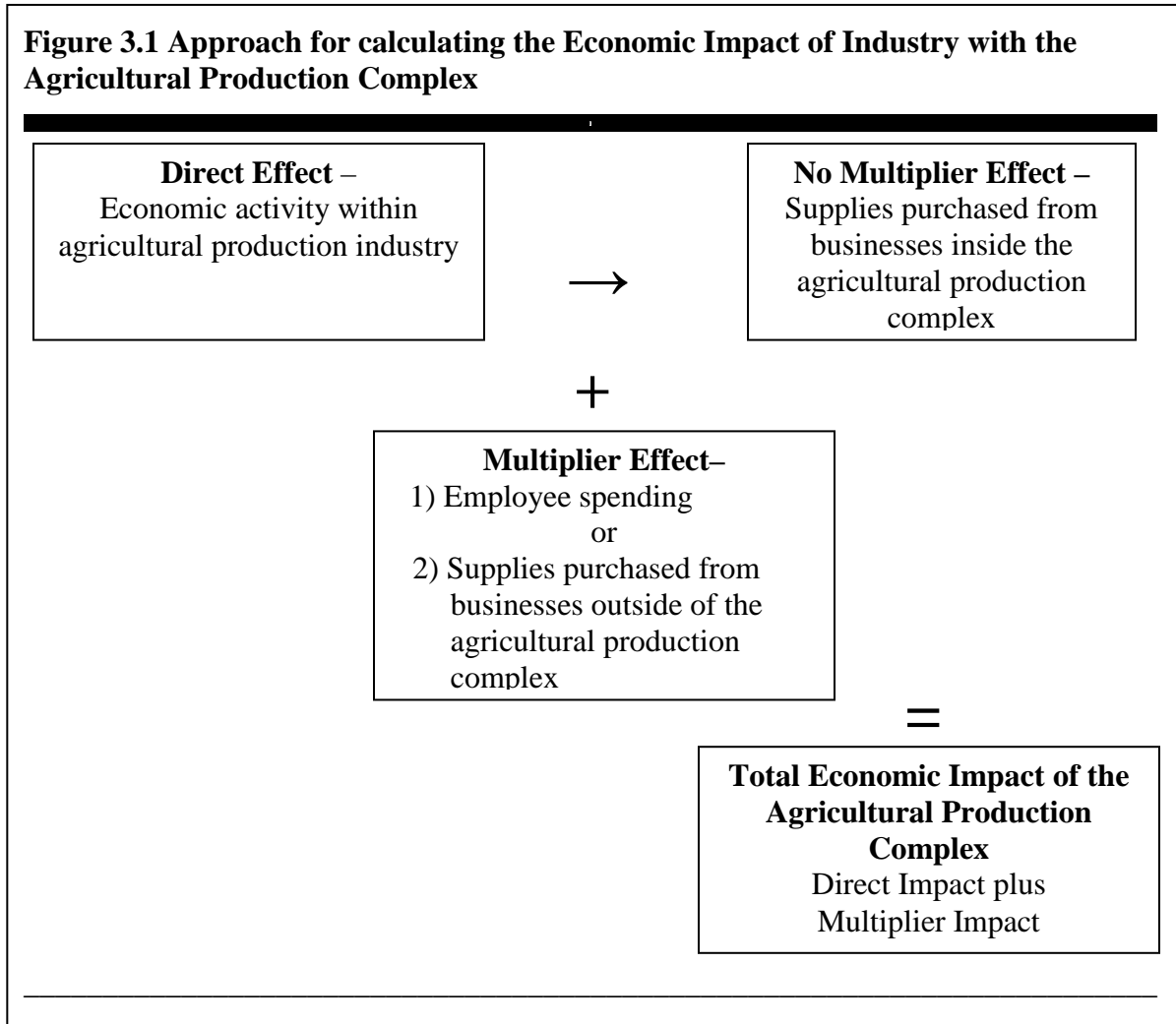
Method for Evaluating the Economic Impact

This chapter discusses the methodology for calculating the total economic impact on Nebraska of the agricultural production complex, including the jobs and economic activity in the complex itself as well as the jobs and economic activity which it supports in the larger economy. Economic activity within the complex itself includes the business sales, employment, and labor income (wages and salaries, proprietor's income, employee benefits) within the crop and livestock production businesses and agriculture-related manufacturing, wholesale, transportation, education/research and tourism activity. Businesses in other sectors of the economy also benefit from production in the agricultural production complex, by providing goods and services to the complex, and to workers in the complex spending their paychecks in a variety of industries. These sales generate additional jobs, salaries, and other regional benefits known as **multiplier impacts**.

The multiplier impact refers to economic activity supported in other industries besides those in the agricultural production complex itself. This multiplier impact therefore includes purchased business supplies such as accounting services, veterinary services, legal services, or construction activities. The multiplier impact also includes businesses throughout the economy where workers in the agricultural production complex would spend their paychecks such as retail businesses, eating and drinking places, entertainment and recreation businesses, utilities, housing, health care, and insurance. The multiplier impact therefore captures how business activity throughout the economy benefits from the agricultural production complex.

The total economic impact on Nebraska from the agricultural production complex is the sum of the direct impact and the multiplier impact. Figure 3.1 shows how the total economic impact is calculated for each industry within the agricultural production complex. As the Figure shows, purchases by firms from businesses outside of the agricultural production complex are part of the multiplier effect. Further, purchases by employees of the complex also contribute to the multiplier impact. The multiplier impact is added to the direct impact to yield the total economic impact.

It is important to note that a distinction is made between purchases from other business and industries within the agricultural production complex. Those purchases from other entities within the complex are not part of the multiplier impact and do not contribute to the total economic impact. This is done to avoid double-counting, since the business receipts, employment, and labor income of these industries are already part of the direct economic impact of the agricultural production complex



In this analysis, the business receipts, contribution to gross state product, employment, and labor income is estimated for each industry within the agricultural production complex.¹ Then, the multiplier impact is estimated for each industry, showing the additional businesses receipts, contribution to gross state product, employment, and

¹ Formally, the IMPLAN model provides estimates of contributions to value-added but these are the same as contributions to gross state product

labor income generated at businesses outside of the agricultural production complex. More specifically, a set of “economic multipliers” is estimated for each industry within the agricultural production complex. One economic multiplier shows the businesses receipts generated at businesses outside of the agricultural production complex for each \$1 dollar of business receipts in an agricultural production complex industry. Another economic multiplier shows the jobs generated at businesses outside of the agricultural production complex for each job generated in a complex industry. A similar economic multiplier is calculated for labor income, while another multiplier for the contribution to gross state product. The economic multipliers always show the additional economic activity generated outside of the agricultural production complex for \$1 (or 1 job) of economic activity in an agricultural production complex industry. Hence, economic multipliers can be used to calculate the total economic impact resulting from a particular industry within the agricultural production complex.

Take a hypothetical example of an economic multiplier for business receipts from hog farming, which is one of the industries within the agricultural production complex. In the example, assume that the total business receipts (i.e., sales) of the hog farming industry were \$1 billion in 2010, and that the economic multiplier for business receipts is 0.5. The direct economic impact measured in business receipts is \$1 billion. The multiplier impact on Nebraska businesses outside of the agricultural production complex is \$0.5 billion (i.e., 0.5 multiplied by each \$1 in business receipts in the hog farm industry). So, the total economic impact of the hog farm industry on Nebraska would be \$1.5 billion. A similar set of calculations could be made for the total employment impact, labor income impact, or gross state product impact of the hog farming industry. All that is required is information on the direct economic activity in hog farming (whether business receipts, contribution to gross state product, employment, or labor income) and the appropriate economic multiplier.

Appropriate economic multipliers must be calculated for each specific industry. This is because the value of the economic multipliers can vary, sometimes substantially, across specific industries within the agricultural production complex. For example, crop production will have different economic multipliers than agriculture-related manufacturing or the trucking industry.

Unique economic multiplier impacts are calculated for each industry in this study using the IMPLAN model developed by the Minnesota Implan Group. This software can generate economic impact estimates for hundreds of individual industries in every U.S. county or state, or combinations of counties and states.

In this report, a set of 4 economic multipliers (business receipts, gross state product, labor income, employment) were generated for the State of Nebraska in each specific industry within the agricultural production complex. Additionally, another set of multipliers were then calculated for each specific industry within the complex for each of the 8 sub-state regions of Nebraska. Multiplier values for the 8 regions are typically less than the statewide multipliers, since some suppliers are located within a different region of Nebraska. The sum of regional economic impacts, therefore, will be less than the statewide impact.

Economic multipliers were then applied to the industry data presented in Chapter 2 in order to calculate the total economic impact of the agricultural production complex in Nebraska. Statewide economic impacts are presented in Chapter 4. Economic impacts for each sub-state region are presented in Chapter 5.

Chapter 4

Statewide Economic Impact

The large and diverse agricultural production complex in Nebraska includes a variety of inter-related industries such as crop production, livestock, food processing, transportation, and wholesale services, as was noted in the previous chapter. This chapter considers the total economic impact of the complex, providing an estimate of the economic impact of the complex itself, and the additional business and employment opportunities it supports throughout the Nebraska economy. The analysis is calculated for each component of the agricultural production complex. Results are then summarized for the complex overall, and the impact of the complex is compared with the aggregate Nebraska economy.

A. Statewide Economic Impact of Crop Production in Nebraska

As noted in Chapter 3, the estimated value of crop production among the covered crops of corn, soybeans, wheat, sorghum for grain, oats, sugar beets, dry beans, hay alfalfa, and other hay was \$11.42 billion in 2010. This figure, with one adjustment, represents the direct economic impact of the crop sector on the Nebraska economy. The required adjustment is for seed production. In particular, part of the sales for corn, soybeans, and many of the other crops is to produce seeds used to grow these crops, including in Nebraska. Total Nebraska value of production for each crop must be adjusted to account for estimated seed purchases within Nebraska, as is done in Table 4.1A below. This adjustment is naturally minimal for the case of alfalfa and other hay.

Table 4.1A also shows the economic impact calculation for each of the crops. This includes the direct impact (i.e., final sales) and the multiplier impact. As has been noted, the multiplier impact includes impacts on businesses outside of the agricultural production complex, and therefore, does not include economic impacts on cooperatives, or transportation businesses. The total economic impact is the direct impact plus the multiplier impact.

Results from Table 4.1A show that irrigated crop production account for more than half of the total economic impact of the crop sector. Irrigated corn (\$7.47 billion) and irrigated soybeans (\$2.31 billion) together account for \$9.78 billion of a \$17.69

billion crop impact, or 55% of the total. The share would grow further if irrigated sugar beet, alfalfa, hay, wheat, or other types of production were included.

Table 4.1A 2010 Economic Impact (Business Receipts) of Crop Production Industries

Industry	Total Value (Millions \$)	Direct Impact (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Irrigated Corn	\$4,950	\$4,826	\$2,642	\$7,468
Dryland Corn	\$2,527	\$2,468	\$1,695	\$4,163
Irrigated Soybeans	\$1,554	\$1,508	\$807	\$2,313
Dryland Soybeans	\$1,392	\$1,345	\$820	\$2,165
Wheat	\$335	\$328	\$164	\$492
Sorghum for Grain	\$33	\$33	\$17	\$49
Oats	\$5	\$5	\$3	\$8
Sugar beets	\$82	\$75	\$45	\$120
Edible Dry Beans	\$86	\$85	\$65	\$150
Alfalfa	\$285	\$284	\$187	\$471
Hay	\$176	\$175	\$115	\$290
Total	\$11,424	\$11,130	\$6,560	\$17,691

Source: USDA-NASS (for sales) and authors' calculations using IMPLAN.

Dryland corn and soybean production also had a significant economic impact, however. The total economic impact of dryland corn production was \$4.16 billion, the second largest among any sector. The total impact of dryland soybean production was \$2.17 billion. Among remaining crops, wheat had the 5th largest economic impact of \$492 million closely followed by \$471 million for alfalfa production and \$290 million for other hay production.

The multiplier impact was 59% as large as the direct impact. This implies that each \$1 of crop production value would yield \$0.59 in additional receipts for Nebraska businesses, primarily outside of the agricultural production complex.

Table 4.1B shows the contribution of crop production to gross state product in Nebraska. This measure is of interest since it is akin to gross domestic product, the official measure for the size of the U.S. economy. Indeed, gross state product is often referred to as gross domestic product by state. Recall that the IMPLAN model can calculate the direct gross state product within an industry based on industry sales. Thus, the direct economic impact in Table 4.1B is the gross state product within crop

production industries while the multiplier impact primarily shows the impact on gross state product of Nebraska industries outside of the agricultural production complex. The total GSP impact is the direct impact plus the multiplier impact. For the crop sector as a whole, the GSP multiplier impact was 105% as large as the direct impact, meaning that each \$1.00 of GSP generated by the sector results in an addition of \$1.05 of GSP.

Table 4.1B: 2010 GSP (Value-added) Impact of Crop Production Industries

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Irrigated Corn	\$1,258	\$1,502	\$2,759
Dryland Corn	\$764	\$975	\$1,740
Irrigated Soybeans	\$662	\$461	\$1,123
Dryland Soybeans	\$580	\$469	\$1,048
Wheat	\$73	\$91	\$164
Sorghum for Grain	\$7	\$10	\$17
Oats	\$1	\$2	\$3
Sugarbeets	\$32	\$25	\$57
Edible Dry Beans	\$44	\$39	\$83
Alfalfa	\$90	\$106	\$196
Hay	\$56	\$65	\$121
Total	\$3,567	\$3,744	\$7,311

Source: Authors' calculations using IMPLAN.

Two aspects of GSP generated by the crop sector are particularly noteworthy. First, the combined direct and multiplier effects of irrigated corn and irrigated soybean production accounted for more than half (53%) of the total GSP impact of Nebraska's crop production sector in 2010, implying a heavy reliance on irrigation for enhanced productivity. In fact, within the past decade Nebraska moved into number one ranking in terms of acres under irrigation (adding more than 930,000 acres between 2002 and 2007 to a total of 8.56 million acres). Higher and more consistent productivity due to irrigation is a significant part of the Nebraska Agricultural Story. And, should global climate change create greater frequency and severity of drought conditions in the Great Plains states, the value of Nebraska's irrigation complement will only increase.

While the production levels above from irrigated land are impressive, one should not interpret from these data that the production is completely attributed to irrigation

water. To do so, is to infer that these acres would produce nothing without supplemental water, which is certainly not the case. To more accurately assess the contribution of irrigation water to the state's economy, one would need to identify the difference in production between with-irrigation and without irrigation scenarios for these acres. For example, if an acre of rain-fed corn produced an average of 150 bushels per acre while that same acre could produce 220 bushels of corn with irrigation, then essentially the contribution of irrigation water is the yield differential of 70 bushels. When these yield differentials are accurately assessed for the sum of irrigated acres, and then analyzed though the entire agricultural production complex, then the irrigation contribution to the Nebraska economy would be measurable. This was beyond the scope of this research project, but is certainly a topic of further research.

Second, while the state is quite diverse in terms of crops grown, it is clear from the above that corn is, by far, Nebraska's dominant crop. This crop's combined irrigated and dryland contribution to state GSP is nearly \$4.5 billion, or 62% of the entire crop sector's contribution. Being consistently ranked as the number three state in total corn production (exceeded only Illinois and Iowa) the state's agricultural production complex is profoundly influenced by the economics of this one crop.

Table 4.1C focuses on the labor income impact of crop farming. In agriculture, most of this labor income is in the form of proprietor income rather than the wages and benefits of wage and salary workers. Labor income is a key component of gross state product, implying that the labor income impact will be smaller than the GSP impact.

The total labor income impact of crop production in Nebraska was \$5.10 billion in 2010. Irrigated corn and soybean production continue to account for approximately half of this economic impact. Once again, the next largest impacts were in dryland corn and soybeans, followed by alfalfa, wheat and hay production. Table 4.1D shows a similar pattern for the employment impact of crop production. The total employment impact estimated at 95,300 employment positions in 2010.

Table 4.1C: 2010 Labor Income Impact of Crop Production Industries

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Irrigated Corn	\$1,156	\$823	\$1,980
Dryland Corn	\$726	\$536	\$1,262
Irrigated Soybeans	\$421	\$255	\$676
Dryland Soybeans	\$406	\$258	\$664
Wheat	\$65	\$46	\$112
Sorghum for Grain	\$6	\$5	\$12
Oats	\$1	\$1	\$2
Sugar beets	\$17	\$14	\$31
Edible Dry Beans	\$63	\$23	\$87
Alfalfa	\$112	\$58	\$170
Hay	\$69	\$36	\$105
Total	\$3,044	\$2,057	\$5,101

Source: Authors' calculations using IMPLAN

Table 4.1D 2010 Employment Impact of Crop Production Industries

Industry	Direct	Multiplier	Total
Irrigated Corn	17,731	23,721	41,453
Dryland Corn	6,453	15,252	21,705
Irrigated Soybeans	4,276	7,300	11,575
Dryland Soybeans	3,472	7,370	10,842
Wheat	3,090	1,428	4,518
Sorghum for Grain	153	150	302
Oats	24	23	47
Sugar beets	489	393	881
Edible Dry Beans	109	630	738
Alfalfa	339	1,656	1,994
Hay	209	1,021	1,230
Total	36,343	58,942	95,285

Source: Authors' calculations using IMPLAN

B. Statewide Economic Impact of Livestock Production in Nebraska

The livestock sector also has a considerable economic impact in Nebraska, with substantial production volume, as was noted in Chapter 3. Further, the industry has a broad base of economic impact. Some of that impact is within the agricultural production complex, such as the impact from livestock industry purchases of animal feed or transportation services. But, much of the impact is on businesses and workers from all types of industries outside of the agricultural production complex. This section focuses on both the direct impact of the livestock industry as well as the multiplier impact that occurs outside of the agricultural production industry.

Table 4.2A show the relationship between livestock industry sales, direct impact, and the multiplier impact. Results are shown for cattle production, hog production, dairy cattle and milk production, and chicken and egg production. These estimates, therefore, account for essentially all livestock production in Nebraska.

Table 4.2A: 2010 Economic Impact (Business Receipts) of Livestock Production Industries

Industry	Total Value (Millions \$)	Direct Impact (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Cattle Production	\$7,206	\$6,387	\$4,345	\$10,732
Hog Production	\$817	\$798	\$237	\$1,034
Dairy Cattle and Milk Production	\$203	\$203	\$36	\$239
Poultry and Egg Production	\$152	\$150	\$39	\$189
Total	\$8,378	\$7,537	\$4,657	\$12,194

Source: USDA-NASS (for sales) and authors' calculations using IMPLAN.

Data on sales come from the Nebraska Agricultural Statistical Service (NASS-USDA). As was true with crop production, there is a difference between the direct impact (i.e., final sales) and the value of production. Feeder cattle and juvenile chicken and hogs are a significant part of livestock industry product, and are inputs purchased by cattle feed lots, and other livestock operations. For this reason, final sales are often significantly smaller than the total value of production. This is especially evident for the case of cattle production in Table 4.2A. Overall, the total value of livestock production is \$8.38 billion but final sales for livestock are \$7.54 billion, or 90%. The multiplier impact outside of the

agricultural production complex was \$4.66 billion in 2010, or 62% as large as the direct impact. In other words, each \$1 of livestock sales will yield \$0.62 in additional final sales for Nebraska businesses outside of the agricultural production complex. We note, however, that the livestock industry also has a substantial economic impact within the agricultural production complex including crop producers, food processors, wholesales, and transportation businesses. These impacts are not included in the multiplier impact in Table 4.2A.

As expected, the cattle industry accounts for most of the total economic impact of Nebraska livestock production. Cattle production had an annual economic impact of \$10.73 billion in 2010, including a \$4.35 billion multiplier impact on businesses and workers outside of the agricultural production complex. This represents 88% of the total economic impact of livestock production in Nebraska. Hog production is the next largest livestock industry with a total economic impact of \$1.03 billion in 2010. The dairy cattle and milk production industry had an estimated impact of \$239 million in 2010 while the poultry and egg production industry had an estimated impact of \$189 million.

Table 4.2B shows the gross state product impact of the livestock industry in Nebraska. The cattle industry continues to dominate, accounting for 80% of the total GSP impact of livestock production in Nebraska. Note also the GSP multiplier for the livestock industry. The GSP multiplier impact outside of agricultural industrial complex is larger than the direct impact, showing the industry's strong impact on the balance of the Nebraska economy. In this case, the GSP multiplier effect results in an additional \$1.09 of impact for every \$1.00 of direct livestock volume.

Table 4.2B: 2010 GSP (Value-added) Impact of Livestock Production Industries

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Cattle Production	\$1,062	\$1,528	\$2,590
Hog Production	\$392	\$132	\$524
Dairy Cattle and Milk Production	\$74	\$20	\$94
Poultry and Egg Production	\$28	\$20	\$49
Total	\$1,556	\$1,701	\$3,257

Source: Authors' calculations using IMPLAN

Tables 4.2C and 4.2D show the labor market impacts of livestock production in Nebraska. The first table shows the labor income impact while the second table shows the total employment associated with that labor income. As with crop production, a large share of the direct labor income impact is proprietor income. The total labor income impact of livestock production was \$1.19 billion in 2010, with 81% of the labor income impact attributed to cattle production. Poultry production has a larger impact on labor income than dairy cattle. Similar patterns hold for the employment impact of livestock production in Nebraska. The total employment impact was approximately 41,100 jobs in 2010, with 80% of the impact due to the cattle industry.

Table 4.2C: 2010 Labor Income Impact of Livestock Production Industries

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Cattle Production	\$362	\$596	\$958
Hog Production	\$107	\$71	\$178
Dairy Cattle and Milk Production	\$8	\$11	\$19
Poultry and Egg Production	\$19	\$12	\$31
Total	\$495	\$690	\$1,186

Source: Authors' calculations using IMPLAN

Table 4.2D: 2010 Employment of Livestock Production Industries

Industry	Direct	Multiplier	Total
Cattle Production	16,833	16,293	33,126
Hog Production	4,896	2,033	6,929
Dairy Cattle and Milk Production	351	300	651
Poultry and Egg Production	69	315	385
Total	22,149	18,941	41,091

Source: Authors' calculations using IMPLAN

C. Statewide Economic Impact of Agriculture-Related Manufacturing in Nebraska

Agriculture-related manufacturing includes food processing firms as well as agricultural input manufacturers that serve national and international markets such as implement manufacturers, agricultural building manufacturers, and biological, pharmaceutical, and botanic products firms. These manufacturing firms are a central component of the agricultural production complex in Nebraska. These manufacturers have collocated with Nebraska's large and productive crop and livestock production sector either as a processor of those abundant agricultural products, or as a key supplier that historically served the large farm industry of the Plains and Midwest.

Table 4.3A: 2010 Economic Impact (Business Receipts) of Agriculture-Related Manufacturing Industries

Industry	Total Value (Millions \$)	Direct Impact (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Food Processing				
Animal Slaughtering (except Poultry)	\$10,983	\$9,777	\$4,830	\$14,607
Animal Slaughtering (Poultry)	\$153	\$148	\$68	\$216
Dog and Cat Food Manufacturing	\$1,329	\$1,326	\$252	\$1,578
Other Animal Food Manufacturing	\$1,032	\$928	\$241	\$1,170
Flour Milling and Malt Manufacturing	\$484	\$482	\$117	\$599
Soybean and Other Oilseed Processing	\$1,228	\$1,202	\$174	\$1,376
Fats and Oils Refining and Blending	\$604	\$585	\$35	\$620
Breakfast Cereal Manufacturing	\$391	\$391	\$95	\$485
Sugar Beet Manufacturing	\$133	\$133	\$55	\$187
Fluid Milk and Butter Manufacturing	\$306	\$284	\$124	\$408
Cheese Manufacturing	\$159	\$156	\$41	\$197
Other Food Processing	\$710	\$699	\$317	\$1,015
Ethanol Production	\$3,495	\$3,399	\$1,148	\$4,546
Machinery, Structures and Pharmaceuticals				
Farm Machinery & Equipment	\$2,603	\$2,594	\$1,057	\$3,651
Lawn and Garden Machinery	\$45	\$45	\$15	\$60
Plate Work and Fabricated Buildings	\$620	\$616	\$339	\$954
Botanical, Pharmaceutical, and Biological Products	\$1,294	\$1,281	\$786	\$2,067
Total	\$24,568	\$24,044	\$9,693	\$33,737

Source: Authors' calculations using IMPLAN

The total value of production and direct impact (i.e., final sales) of the agriculture-related manufacturing industry is listed in Table 4.3A. This distinction is necessary because many firms in these manufacturing industries buy supplies from firms within the same industry. Total value of production of the industries was \$24.57 billion in 2010 while direct impact was \$24.04 billion.

The total economic impact of the agriculture-related manufacturing industry was \$33.74 billion in 2010, larger than the economic impact of the crop and livestock product sectors combined. As part of that total, agriculture-related manufacturers delivered a \$9.69 billion multiplier impact. Animal slaughtering was by far the largest industry among agriculture-related manufacturers, generating a \$14.61 billion impact in 2010, or 43% of the overall impact. Ethanol production and farm machinery and equipment were the other key industries. Ethanol plants had a \$4.55 billion impact on the Nebraska economy in 2010 while farm machinery & equipment manufacturers had a \$3.65 billion impact. Botanicals, pharmaceuticals and biological products had a \$2.07 billion impact. While some firms in this industry produce non-agricultural products, most are focused on agriculture, and furthermore, agricultural markets were key to the foundation of many of the manufacturing facilities in the state. Three other food processing industries had over a \$1 billion impact in 2010: including the two animal food manufacturers and soybean processing facilities.

Table 4.3B lists the GSP impact for the agriculture-related manufacturing industries during 2010. GSP impacts are much smaller than the manufacturing impacts. This is because manufacturing industries use many intermediate supplies, food products or other inputs. The GSP measure simply captures the value that is added to these intermediate products during manufacturing. As seen in Table 4.3B, the multiplier impact on GSP (\$4.67 billion) is larger than the direct GSP impact (\$4.05 billion). One dollar of direct GSP would lead to more than one dollar of multiplier impact. The total GSP impact is \$8.72 billion.

Note that this GSP impact of \$8.72 billion is less than the combined \$10.6 billion GSP impact of the crop and livestock production industries. By the gross state product measure, the combined impact of agricultural production is larger than the impact of agriculture-related manufacturing. Animal slaughtering (except poultry) is the largest

segment of the agriculture-related manufacturing industry. The total GSP impact of this animal slaughtering industry is \$3.29 billion, or 38% of the total impact.

Farm machinery & equipment is the second largest industry accounting for a \$1.35 billion of the GSP impact. The next largest industry is botanical, pharmaceutical and biological products, with a \$791 million GSP impact. Ethanol production falls to the third largest agriculture-related manufacturing industry in terms of GSP impact. Ethanol production efficiently adds value to a large intermediate supply of corn, creating a large output impact with a more modest use of labor and capital, the key inputs into gross state product. Dog and cat food manufacturing has the next largest GSP impact for Nebraska. Many other food processing industries also have relatively small GSP impacts, reflecting that plants in these industries are able to efficiently process agricultural raw materials with a modest use of labor and capital.

Table 4.3B: 2010 GSP (Value-added) Impact of Agriculture-Related Manufacturing Industries

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Food Processing			
Animal Slaughtering (except Poultry)	\$1,225.2	\$2,064.1	\$3,289
Animal Slaughtering (Poultry)	\$27.4	\$35.0	\$62.3
Dog and Cat Food Manufacturing	\$410.3	\$130.3	\$540.5
Other Animal Food Manufacturing	\$116.7	\$76.0	\$192.8
Flour Milling and Malt Manufacturing	\$64.0	\$67.5	\$131.5
Soybean and Other Oilseed Processing	\$58.6	\$81.8	\$140.4
Fats and Oils Refining and Blending	\$105.3	\$8.2	\$113.5
Breakfast Cereal Manufacturing	\$186.3	\$49.5	\$235.8
Sugar Beet Manufacturing	\$19.7	\$30.5	\$50.2
Fluid Milk and Butter Manufacturing	\$50.3	\$58.5	\$108.8
Cheese Manufacturing	\$15.2	\$21.8	\$37.0
Other Food Processing	\$147.1	\$171.0	\$318.1
Ethanol Production	\$327	\$601	\$928
Machinery, Structures and Pharmaceuticals			
Farm Machinery & Equipment	\$745	\$605	\$1,349
Lawn and Garden Machinery	\$10	\$9	\$19
Plate Work and Fabricated Buildings	\$221	\$194	\$415
Botanical, Pharmaceutical, and Biological Products	\$324	\$467	\$791
Total	\$4,052	\$4,670	\$8,722

Source: Authors' calculations using IMPLAN

Table 4.3C and Table 4.3D show the 2010 labor income and employment impact of each agriculture-related manufacturing industry. In table 4.3C, the total labor income impact was \$5.20 billion in 2010. This is less than the labor income impact of the crop and livestock production sectors during that year. In Table 4.3D, the total employment impact of the agriculture-related manufacturing industry in 2010 was an estimated 107,800. This again is less than the combined employment impact of crop and livestock production (around 136,400). The relatively labor-intensive animal slaughtering (except poultry) industry accounted for 48% of employment. Farm machinery & equipment was the second largest industry followed by ethanol production and botanical, pharmaceutical and biological products.

Table 4.3C: 2010 Labor Income Impact of Agriculture-Related Manufacturing Industries

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Food Processing			
Animal Slaughtering (except Poultry)	\$1,067	\$1,252	\$2,319
Animal Slaughtering (Poultry)	\$23	\$22	\$45
Dog and Cat Food Manufacturing	\$89	\$82	\$170
Other Animal Food Manufacturing	\$45	\$44	\$88
Flour Milling and Malt Manufacturing	\$27	\$40	\$67
Soybean and Other Oilseed Processing	\$21	\$48	\$69
Fats and Oils Refining and Blending	\$35	\$5	\$41
Breakfast Cereal Manufacturing	\$39	\$31	\$70
Sugar Beet Manufacturing	\$14	\$18	\$33
Fluid Milk and Butter Manufacturing	\$31	\$34	\$65
Cheese Manufacturing	\$11	\$13	\$25
Other Food Processing	\$86	\$105	\$191
Ethanol Production	\$223	\$362	\$585
Machinery, Structures and Pharmaceuticals			
Farm Machinery & Equipment	\$338	\$368	\$706
Lawn and Garden Machinery	\$5	\$5	\$11
Plate Work and Fabricated Buildings	\$145	\$117	\$262
Botanical, Pharmaceutical, and Biological Products	\$145	\$308	\$453
Total	\$2,343	\$2,857	\$5,200

Source: Authors' calculations using IMPLAN

Table 4.3D: 2010 Employment Impact of Agriculture-Related Manufacturing Industries

Industry	Direct	Multiplier	Total
Food Processing			
Animal Slaughtering (except Poultry)	21,643	30,296	51,939
Animal Slaughtering (Poultry)	627	517	1,143
Dog and Cat Food Manufacturing	952	1,919	2,871
Other Animal Food Manufacturing	775	1,120	1,894
Flour Milling and Malt Manufacturing	384	919	1,303
Soybean and Other Oilseed Processing	294	1,019	1,313
Fats and Oils Refining and Blending	330	297	627
Breakfast Cereal Manufacturing	331	733	1,064
Sugar Beet Manufacturing	245	406	651
Fluid Milk and Butter Manufacturing	462	801	1,263
Cheese Manufacturing	204	301	505
Other Food Processing	2,008	2,422	4,430
Ethanol Production	2,968	7,979	10,947
Machinery, Structures and Pharmaceuticals			
Farm Machinery & Equipment	5,331	8,805	14,136
Lawn and Garden Machinery	117	126	244
Plate Work and Fabricated Buildings	2,576	2,994	5,571
Botanical, Pharmaceutical, and Biological Products	1,586	6,316	7,902
Total	40,832	66,969	107,801

Source: Authors' calculations using IMPLAN

D. Statewide Economic Impact of Agriculture-Related Transportation and Wholesaling in Nebraska

Nebraska has large transportation and wholesaling sectors. This results in large part from agriculture-related activities. In particular, trucking and rail businesses haul Nebraska agricultural inputs and products around the country, and also within the state. Agricultural related products originating in Nebraska account for 33% of the value of all trucking shipments in Nebraska. The share for rail is about one fourth as large. In the wholesale sector, agriculture is related to specific sector segments. Specifically, agricultural cooperatives and farm implement dealers are a key part of the Nebraska wholesaling industry.

Table 4.4 lists the total economic impact of agriculture-related transportation and wholesaling, as well as the total GSP impact, and the total labor income and employment

impacts. These total estimates were calculated using the same basic methodology used in the previous three sections. The calculations are presented in detail in Tables A.1.4.4A through A.A.4.4D in Appendix 1. Summary total impact results are presented here for brevity.

The total economic impact was \$4.68 billion in 2010, with truck transportation accounting for the largest share of this impact, followed by agricultural cooperatives. The GSP impact is \$2.91 billion, including \$1.85 billion in labor income. This labor income impact was sufficient to support 37,730 jobs.

Table 4.4: 2010 Economic, GSP (Value-added), Labor Income, and Employment Impact Of Agriculture-Related Transportation and Wholesaling

Industry	Output (Millions \$)	GSP (Millions \$)	Labor Income (Millions \$)	Employment (Millions \$)
Cooperatives	\$1,217	\$868	\$498	9,482
Truck Transportation	\$1,949	\$1,096	\$803	18,348
Rail Transportation	\$656	\$326	\$200	3,186
Equipment Dealers	\$862	\$614	\$352	6,714
Total	\$4,684	\$2,905	\$1,853	37,730

Source: Authors' calculations using IMPLAN

E. Statewide Economic Impact of Agriculture-Related Research and Education in Nebraska

A variety of public sector workers provide research and education services to agricultural producers in Nebraska. Approximately 850 federal employees of the United States Department of Agriculture implement that Department's programs at a variety of sites in Nebraska or operate research facilities. Employees with the UNL Institute of Agriculture and Natural Resources conduct research and teach courses pertaining to agriculture and rural development as well as providing educational outreach programs through the UNL Cooperative Extension Service across the state. There are 1,650 such workers. Roughly 150 state employees with the Nebraska Department of Agriculture administer programs and provide data about Nebraska agriculture.

Table 4.5 demonstrates the total economic impact of these agriculture-related research and education personnel. This total impact includes direct employment and

payroll but also the multiplier impact on other components of the Nebraska economy. Once again, the calculations behind this Table are presented in detail in Appendix 1 in Tables A.1.4.5A through A.A.4.5D.

The total economic impact of agriculture-related research and education institutions was \$417 million in 2010. More than three-quarters of this impact occurred within the Nebraska University system. The total labor market impact was \$274 million in 2010. This labor income supported an estimated 4,332 jobs in 2010.

Table 4.5: 2010 Economic, GSP, Labor Income and Employment Impact of Agriculture-Related Research and Education

Industry	Output (Millions \$)	GSP (Millions \$)	Labor Income (Millions \$)	Employment
Universities & Colleges	\$331	\$275	\$217	2,984
Federal Government	\$73	\$61	\$49	1,151
State Government	\$13	\$11	\$8	197
Total	\$417	\$346	\$274	4,332

Source: University of Nebraska-Lincoln and authors' calculations using IMPLAN

F. Statewide Economic Impact of Agri-Tourism in Nebraska

Agricultural tourism (or agri-tourism) is an industry that some agricultural producers choose to engage in as a way to grow or diversify their income. Agri-tourism can include leasing land for hunting, birding, or other on-farm recreation activities or hosting events such as fruit or vegetable harvesting opportunities, agricultural festivals, or themed events (such as pumpkin farms at Halloween and other entertainment venues). Nationally, the U.S. Department of Agriculture has estimated that 2.5 % of farms and ranches are involved in some form of agri-tourism.²

The IMPLAN model reports the share of farm and ranch revenue that comes from providing “other recreation services,” in other words, from agri-tourism. In Nebraska, the largest share of revenue from “other recreation services” occurs on grain farms, and the total annual revenue was \$98.8 million during 2010. Table 4.6 below shows the economic, GSP, labor income, and employment impact of such on-farm agri-tourism

² Brown, Dennis and Richard Reeder, 2007. *Farm-Based Recreation: A Statistical Profile*. Economic Research Service, United States Department of Agriculture, Report Number 53. (December).

activity in 2010, based on this \$98.8 million in revenue. Detail on both the direct economic impact and the multiplier impact is provided. The total annual economic impact of agri-tourism in 2010 was \$161 million. In terms of gross state product, the total impact was \$95 million, including \$53 million in labor income. This labor income was sufficient to support just over 3,000 Nebraska jobs during 2010.

Table 4.6: 2010 Economic, GSP, Labor Income and Employment Impact of Agri-Tourism

Measure	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Output (Business Receipts) (Millions \$)	\$99	\$62	\$161
GSP (Millions \$)	\$58	\$37	\$95
Labor Income (Millions \$)	\$31	\$22	\$53
Employment	2,415	589	3,004

Source: Authors' calculation and IMPLAN

G. Summary of the Statewide Economic impact of the Agricultural Production Complex

The proceeding sections summarized the 2010 economic impact on Nebraska from crop and livestock production and agriculture-related manufacturing, transportation, wholesale, research/education, and agri-tourism sectors. The combined annual economic impacts across all six of these industry groups are summarized below in Table 4.7. Table 4.8 compares these combined impacts from the agricultural production complex to the aggregate Nebraska economy. For internal consistency, values for statewide aggregates were taken from the IMPLAN model, even though those IMPLAN model estimates may differ somewhat from estimates for 2010 Nebraska GSP, labor income, or employment developed by U.S. government statistical agencies.

The agriculture production complex was found to have a combined economic impact on output of \$68.88 billion in 2010. Two-thirds of that impact, or \$45.84 billion, was the direct output of complex businesses, while the remaining one-third was the economic impact on the other Nebraska industries. As seen in Table 4.8, the total impact of \$68.88 billion is 40.7% of the total output of the Nebraska economy.

The output of the Nebraska economy includes both the value of purchased inputs (including those purchased out of state) plus the value added to those inputs by Nebraska business. Gross state product, by contrast, focuses on the value added. As seen in Table 4.7, the total gross state product impact of the agricultural production complex was \$22.64 billion in 2010. Half of that impact (50%) was due to the direct value-added in the agricultural production complex with the remainder of the impact on other industries in Nebraska. As seen in Table 4.8, the gross state product impact of the agricultural production complex was 26.9% of total gross state product in 2010. In short, on the basis of this metric, the complex accounts for more than one-quarter of the Nebraska economy.

Labor income is the largest component of gross state product. The labor income impact of the agriculture production complex was \$13.67 billion in 2010. Labor income includes wages, salaries, benefits and proprietor's income. Half of the labor income impact (50%) was income earned at businesses in the complex with the remaining income was earned in other industries. The labor income impact was 25.4% of total labor income in Nebraska. The total employment impact of the agricultural production complex was approximately 289,200 jobs in 2010, or 23.6% of total Nebraska employment. This share is consistent with the share for labor income because many jobs within the agricultural production complex have relatively higher wage rates.

Table 4.7: 2010 Economic Impact of the Agriculture Production Complex in Nebraska

Industry	Output (Business Receipts) (Millions \$)		Gross State Product (Value-added) (Millions \$)		Labor Income (Millions \$)		Employment	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total
Crops	\$11,130	\$17,691	\$3,567	\$7,311	\$3,044	\$5,101	36,343	95,285
Livestock	\$7,537	\$12,194	\$1,556	\$3,257	\$495	\$1,186	22,149	41,091
Agriculture-Related Manufacturing	\$24,044	\$33,737	\$4,052	\$8,722	\$2,343	\$5,200	40,832	107,801
Transportation, Equipment and Coops	\$2,788	\$4,684	\$1,771	\$2,905	\$1,160	\$1,853	19,729	37,730
Agricultural Research and Education	\$243	\$417	\$243	\$346	\$215	\$274	2,647	4,332
Agri-Tourism	\$99	\$161	\$58	\$95	\$31	\$53	2,415	3,004
Total	\$45,840	\$68,883	\$11,247	\$22,637	\$7,289	\$13,666	124,117	289,244

Source: Authors' calculation and IMPLAN

Table 4.8: The Agricultural Production Complex's Share of the 2010 Nebraska Economy

	Output (Millions \$)	Gross State Product (Value-added) (Millions \$)	Labor Income (Millions \$)	Employment
Impact of Agricultural Production Complex	\$68,883	\$22,637	\$13,666	289,244
Nebraska Total	\$169,453	\$84,076	\$53,732	1,225,142
Percentage	40.7%	26.9%	25.4%	23.6%

Source: Authors' calculation and IMPLAN

Chapter 5

Sub-State Economic Impact

Statewide analysis portrayed Nebraska’s agricultural production complex as a large and diverse set of inter-related industries that account for nearly 24% of the state’s employment and 27% of its gross state product. This diversity (and economic significance) is also evident in the sub-state regional economies, and in several instances, is even more profound. The agricultural production complexes in the Northeast, South, and Southeast regions are quite diverse, showing the similar patterns inter-related crop, livestock, and agriculture-related manufacturing, transportation, and wholesaling industries that are found at the state level. Other regions are more specialized, with a smaller set of collocated manufacturing industries. Western regions are more focused on livestock production, and the production of wheat, sugar beets, and dry beans.

Given this diversity, the current chapter examines the economic impact of the agricultural production complex within each of the eight sub-state regions of the Nebraska economy (Figure 5.1). The analysis focuses on production within each region, treating economic activity in other parts of the state as external. Sub-state economic multipliers are utilized rather than the state economic multipliers used in Chapter 4. The approach allows an estimate of the share of each sub-state economy accounted for by the agricultural production complex.

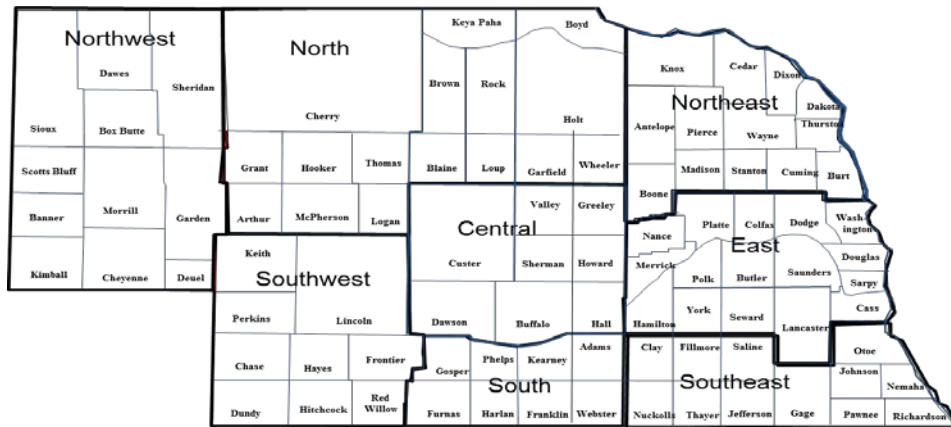
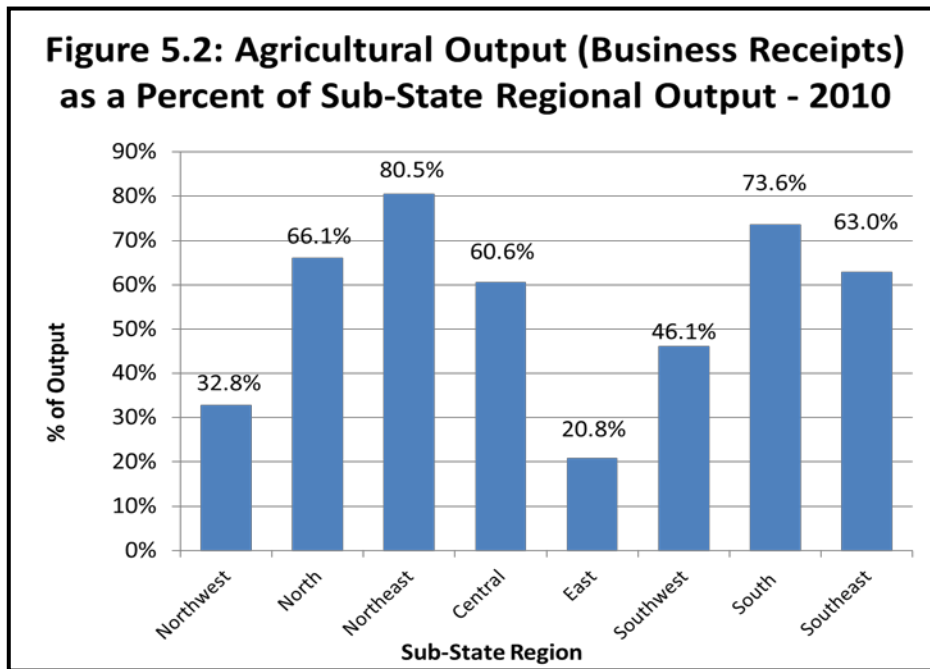


Figure 5.1 Nebraska Sub-State Economic Regions

Table 5.1 and shows the direct and total output for each of the six components of the agricultural production complex in each region. Figure 5.2 shows the economic impact of the agricultural production complex as a share of total output in each region. The total output measure includes intermediate goods purchased as well as the gross product produced within the region.³ As a result, the output measure of economic impact is a less precise measure of the economic activity that occurs within the regional economy. The gross regional product (i.e., gross state product for a region), labor income, and employment impact measures all provide a more accurate picture. Still, the output results are striking. The total economic impact of the agricultural production complex accounts for nearly 81% of the total output of the Northeast Nebraska region. The output share is also above 70% in the South region and above 60% in the North, Central and Southeast regions.



³ As is true at the state level, the total output impact does not include intermediate goods purchased from other agricultural production complex businesses from in the region.

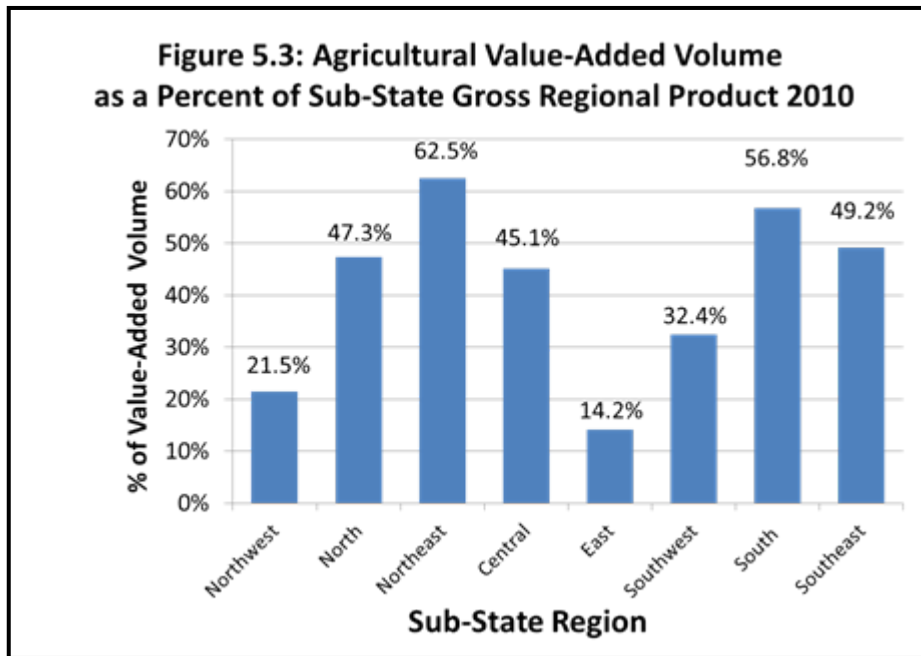
Table 5.1: 2010 Economic Impact of Agriculture in Nebraska -- Output (Business Receipts) (Millions \$)

Industry	Northwest		North		Northeast		Central		East		Southwest		South		Southeast	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
Crops	\$564.3	\$780.7	\$467.9	\$575.6	\$2,196.9	\$3,044.3	\$1,380.3	\$1,915.4	\$2,639.2	\$4,542.9	\$1,070.9	\$1,409.1	\$1,289.5	\$1,665.1	\$1,311.8	\$1,741.8
Livestock	\$651.2	\$1,057.8	\$750.4	\$1,079.2	\$1,850.4	\$2,587.3	\$1,081.4	\$1,584.3	\$1,448.6	\$2,117.2	\$518.7	\$817.7	\$775.2	\$1,203.5	\$461.6	\$603.6
Agriculture-Related	\$383.8	\$477.6	\$169.3	\$190.7	\$3,986.8	\$4,887.2	\$4,506.1	\$5,596.1	\$11,294.9	\$16,358.5	\$325.8	\$363.2	\$1,030.1	\$1,118.3	\$2,721.6	\$3,088.4
Manufacturing																
Transportation, Equipment and Coops	\$118.4	\$172.4	\$100.3	\$130.9	\$522.8	\$733.1	\$374.3	\$562.7	\$630.3	\$1,109.8	\$324.0	\$456.4	\$340.0	\$469.8	\$377.5	\$501.2
Agricultural Research and Education	\$10	\$15	\$2	\$3	\$14	\$20	\$5	\$9	\$182	\$324	\$10	\$14	\$6	\$8	\$14	\$20
Agri-Tourism	\$4.2	\$5.9	\$4.5	\$5.8	\$19.8	\$26.7	\$11.0	\$16.0	\$24.7	\$42.3	\$8.4	\$11.2	\$9.1	\$12.2	\$15.7	\$20.1
Total	\$1,732.0	\$2,509.5	\$1,494.6	\$1,985.1	\$8,590.4	\$11,298.6	\$7,358.5	\$9,683.1	\$16,219.5	\$24,495.2	\$2,257.6	\$3,072.1	\$3,449.8	\$4,477.1	\$4,902.1	\$5,974.6
Region Total		\$7,658		\$3,001		\$14,036		\$15,989		\$117,941		\$6,668		\$6,084		\$9,483
Percentage		32.8%		66.1%		80.5%		60.6%		20.8%		46.1%		73.6%		63.0%

Table 5.2: 2010 Economic Impact of Agriculture in Nebraska – Gross Regional Product (Value-Added) (Millions \$)

Industry	Northwest		North		Northeast		Central		East		Southwest		South		Southeast	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
Crops	\$176.4	\$296.7	\$143.1	\$185.8	\$737.4	\$1,179.6	\$418.0	\$713.1	\$890.8	\$2,016.7	\$292.9	\$480.6	\$407.9	\$611.1	\$410.3	\$636.8
Livestock	\$109.2	\$232.6	\$148.0	\$236.8	\$421.0	\$657.5	\$196.3	\$362.4	\$342.1	\$642.5	\$87.2	\$172.8	\$130.8	\$249.4	\$131.5	\$183.0
Agriculture-Related	\$54.4	\$105.6	\$23.1	\$33.6	\$530.0	\$880.2	\$707.1	\$1,239.5	\$2,124.4	\$4,715.5	\$41.0	\$59.3	\$92.1	\$131.6	\$514.9	\$689.1
Manufacturing																
Transportation, Equipment and Coops	\$72.2	\$103.8	\$61.8	\$78.5	\$325.6	\$442.6	\$235.3	\$343.5	\$417.2	\$710.8	\$197.9	\$275.1	\$211.4	\$284.8	\$231.6	\$299.2
Agricultural Research and Education	\$10	\$13	\$2	\$3	\$14	\$17	\$5	\$7	\$182	\$268	\$10	\$13	\$6	\$7	\$14	\$17
Agri-Tourism	\$0.7	\$1.1	\$0.6	\$0.9	\$2.6	\$4.1	\$1.6	\$2.5	\$3.1	\$4.9	\$1.2	\$1.9	\$1.5	\$2.4	\$1.8	\$2.8
Total	\$423.0	\$752.9	\$378.7	\$538.2	\$2,030.1	\$3,181.2	\$1,563.8	\$2,668.3	\$3,959.5	\$8,358.5	\$630.1	\$1,0020.4	\$849.5	\$1,286.5	\$1,304.0	\$1,828.0
Region Total		\$3,505		\$1,139		\$5,087		\$5,910		\$58,833		\$3,091		\$2,265.0		\$3712
Percentage		21.5%		47.3%		62.5%		45.1%		14.2%		32.4%		56.8%		49.2%

Table 5.2 shows the direct and total impact of the agricultural production complex in terms of gross regional product. Figure 5.3 shows shares of gross regional product for each region. This provides a truer measure of the share of the economy in each sub-state region that is the direct or multiplier impact of the agricultural production complex. The largest total dollar impact is found in the East region, at \$8.36 billion in 2010. However, as a share of the overall regional economy, the agricultural production complex accounts for just 14.2 % of the gross regional product of the more metropolitan East region. While much of the impact in the East region is due to the large agriculture-related manufacturing industry, it is worth noting that the economic impact of the crop production sector is larger in the East than in any other region.



The next largest impact from the crop production sector is found in the Northeast region. The Northeast region also has the largest gross regional product impact from the livestock sector, and the third largest impact from the agriculture-related manufacturing sector. In other words, the Northeast region has the same type of large, diverse agricultural impact that is found in the East region, though the impact is smaller in terms of absolute gross regional product. However, the impact is much larger in terms of share

of the economy. The gross regional product impact of the agriculture production complex is 62.5 % of the gross regional product of the Northeast region economy. Well over half of the regional economy is due to agriculture and closely related industries.

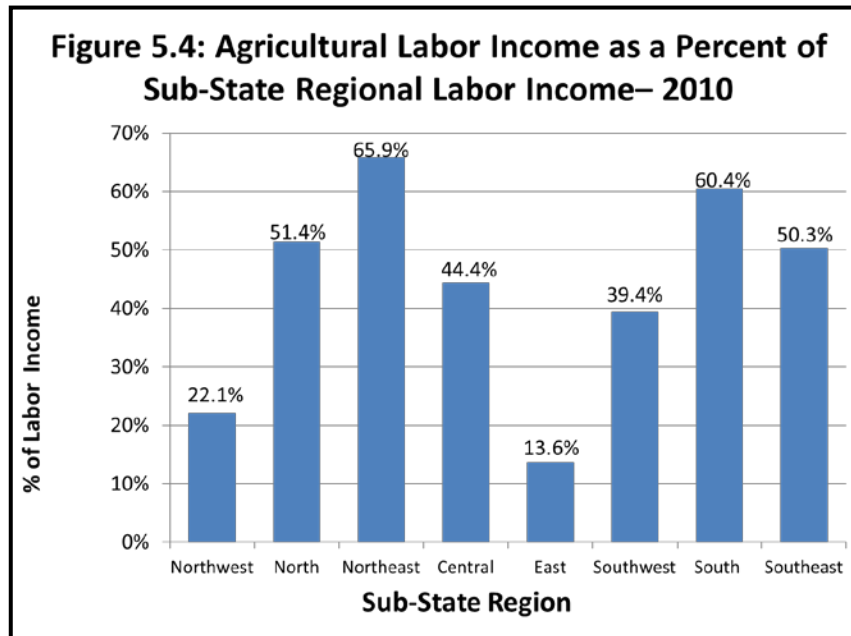
The impact from the agriculture production complex accounts for 45.1% of the economy of the Central region. Much of that impact is due to the large agriculture-related manufacturing sector, but there is also a large crop and livestock impact in the region. In terms of magnitude, the Central region has the third large impact from the agricultural production sector, at \$2.67 billion in 2010.

The dollar value of the impact is smaller in the remaining 5 regions. These regions tend to have significantly smaller agriculture-related manufacturing sectors. The gross regional product impact is \$1.83 billion in the Southeast, \$1.27 billion in the South, \$1.00 billion in the Southwest, \$0.75 billion in the Northwest and in the \$0.54 billion in the North. However, the agricultural production complex remains a large share of gross regional product in most of those regions. The complex accounts for 56.8% of gross regional product in the South region (the 2nd highest share among all regions), 49.2% in the Southeast, 47.3% in the North region, and 45.1% in the Central region. Overall, then, the gross regional product impact of the agricultural production complex accounts for 45% of the economy or more in 5 of 8 Nebraska regions. Shares are smaller in the Southwest (32.4%) and Northwest region (21.5%). Both of these regions have relatively little agriculture-related manufacturing activity. Apparently, the total output of crop and livestock products in these regions is not large or concentrated enough to attract a large set of collocating processors.

Similar patterns are observed for labor income, though the agricultural production complex accounts for an even larger share of labor income in some regions. Relevant data are presented in Table 5.3 and Figure 5.4. The complex accounts for more than 60% of income in the Northeast and South regions and more than 50% in the Southeast and North regions. The income impact was \$5.1 billion in 2010 in the East region but this large figure accounts for just one-seventh of total income in this metropolitan region.

These broad patterns may often differ from perceptions about agriculture which are found in Nebraska. It is often surprising to metropolitan residents that the agricultural production complex accounts for such a large share of the economy, such as between

one-quarter and one-third of the economy, as estimated in this report, while among non-metropolitan residents, it can be surprising that the agricultural production complex does not account for an even larger share of the regional and state economy.



As seen in Table 5.4 and Figure 5.5, the employment impact follows the same patterns as the labor income impact, though employment impacts are generally smaller as a share of the economy. This is for two reasons. First, farm proprietor incomes were relatively strong in 2010. Second, agriculture-related manufacturing, transportation, and wholesaling jobs typically pay above-average wages. Both factors suggest that the labor income impact will be larger than the employment impact. The impact of the complex was approximately 97,900 jobs in the East region and between 37,600 to 42,400 jobs in the Central and Northeast. The impact of the complex accounted for 51.4% of employment in the Northeast, 44.7% in the South, and over 30% in the North, Central, Southwest, and Southeast. The complex accounted for just 20.4% of employment in the Northwest and just 12.0% in the East.

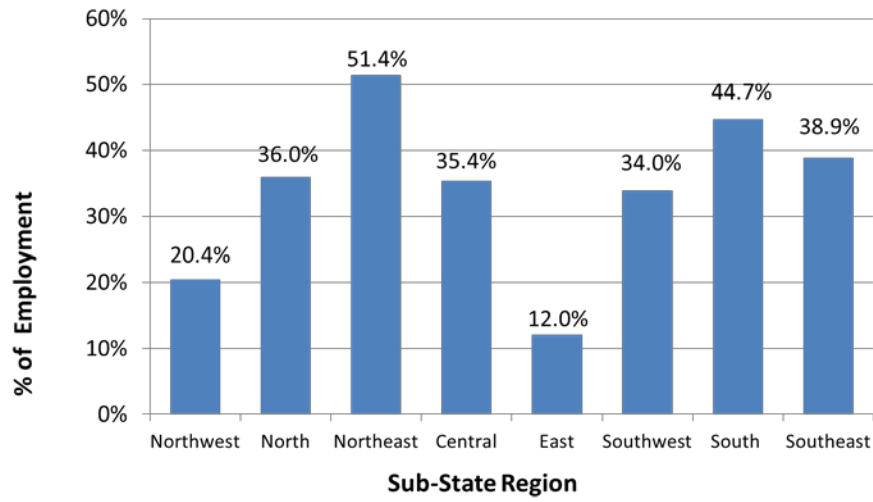
Table 5.3: 2010 Economic Impact of Agriculture in Nebraska – Labor Income (Millions \$)

Industry	Northwest		North		Northeast		Central		East		Southwest		South		Southeast	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
Crops	\$174.8	\$236.7	\$135.3	\$159.2	\$619.1	\$846.6	\$360.4	\$511.8	\$723.6	\$1,350.0	\$277.9	\$373.2	\$336.0	\$436.6	\$353.4	\$455.8
Livestock	\$38.5	\$77.3	\$45.8	\$69.2	\$122.4	\$198.6	\$66.3	\$120.5	\$112.7	\$245.0	\$25.5	\$50.3	\$49.9	\$84.0	\$39.3	\$60.9
Agriculture-Related Manufacturing	\$36.1	\$65.7	\$12.1	\$18.0	\$338.3	\$533.3	\$475.3	\$790.7	\$1,186.9	\$2,807.1	\$26.3	\$37.0	\$45.8	\$68.9	\$248.3	\$344.5
Transportation, Equipment and Coops	\$42.4	\$61.6	\$34.7	\$43.9	\$195.0	\$261.3	\$144.7	\$210.1	\$282.3	\$465.0	\$116.9	\$163.0	\$127.0	\$168.1	\$137.1	\$174.2
Agricultural Research and Education	\$9	\$10	\$2	\$2	\$12	\$14	\$5	\$6	\$162	\$211	\$9	\$10	\$5	\$6	\$12	\$14
Agri-Tourism	\$1.3	\$1.9	\$1.3	\$1.7	\$5.7	\$7.8	\$3.4	\$4.9	\$8.3	\$14.7	\$1.9	\$2.8	\$1.4	\$2.3	\$2.9	\$4.1
Total	\$302.0	\$453.8	\$231.1	\$294.0	\$1,292.5	\$1,861.3	\$1,055.0	\$1,644.0	\$2,475.4	\$5,093.1	\$457.2	\$636.4	\$565.1	\$765.6	\$793.3	\$1,053.3
Region Total		\$2,050		\$572		\$2,824		\$3,700.0		\$37,472		\$1,617		\$1,267		\$2,095
Percentage		22.1%		51.4%		65.9%		44.4%		13.6%		39.4%		60.4%		50.3%

Table 5.4: 2010 Economic Impact of Agriculture in Nebraska Employment

Industry	Northwest		North		Northeast		Central		East		Southwest		South		Southeast	
	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total	Direct	Total
Crops	2,666	4,278	1,335	2,774	6,354	14,395	4,548	9,964	8,013	23,107	4,212	7,849	4,447	8,378	4,228	7,449
Livestock	2,323	3,568	2,572	3,380	5,058	7,552	2,576	4,291	4,547	7,976	1,114	1,892	1,785	2,888	1,841	2,664
Agriculture-Related Manufacturing	678	1,392	200	385	6,965	13,121	8,963	18,016	18,807	54,283	401	698	911	1,548	4,603	7,937
Transportation, Equipment and Coops	952	1,522	811	1,163	4,069	6,412	2,850	4,928	4,312	8,751	2,590	3,971	2,648	4,093	3,002	4,388
Agricultural Research and Education	123	176	42	51	201	270	109	142	1,726	3,064	127	175	111	136	208	268
Agri-Tourism	100	117	127	141	494	566	276	329	571	734	231	259	324	356	485	531
Total	6,840	11,054	5,086	7,893	23,142	42,316	19,321	37,671	37,976	97,914	8,675	14,844	10,226	17,399	14,366	23,236
Region Total		54,096		21,936		82,386		106,397		818,090		43,616		38,967		59,758
Percentage		20.4%		36.0%		51.4%		35.4%		12.0%		34.0%		44.7%		38.9%

Figure 5.5: Agricultural Employment as a Percent of Sub-State Regional Employment – 2010



Chapter 6

Conclusions and Implications

Conclusions:

To even the casual observer, Nebraska is clearly an agricultural state. This study lends further resolution to reveal a profoundly significant and diverse agricultural production complex that is the single largest contributor to the State's economy.

The complex, which essentially represents the production and processing of crop and livestock commodities and value-added products, has continued to develop and grow over time. Capitalizing on (1) a rich and diverse natural resource endowment conducive to agricultural production; (2) skilled human capital and management tapping the efficiency gains of modern technology and production science; (3) a centralized location with good transportation infrastructure; and (4) a synergistic system of both crop and livestock enterprises, Nebraska has come to the forefront as a national leader in responding to an ever-expanding global food economy.

In this study, the authors chose 2010 as a representative benchmark year of the recent changes to the agricultural industry, and traced through the full extent of economic impacts in the Nebraska economy. Using the IMPLAN (Input-Output Analysis) Model and the most recent 2010 data base, a comprehensive economic picture was constructed for the state as well as sub-state regions.

To understand Nebraska's agricultural production complex it is useful to first consider the economic activity directly generated and then the basic contribution of the complex in supporting many other businesses and industries which contribute to the state's economy.

In terms of **direct** economic activity generated by the agricultural production complex in 2010:

- Total dollar (or sales) volume was \$45.84 Billion in 2010—**27%** of Nebraska's total activity
- Total gross state product (value-added) was \$11.25 Billion—**13%** of the State's total gross state product

- Direct employment in the complex was over 124,100 Nebraskans—**10%** of the Nebraska workforce
- Wages, benefits and proprietor income earned in direct employment totaled \$7.29 Billion—**14%** on Nebraska labor income

While the above statistics are impressive in themselves, the true picture of economic impact on the state economy can only be seen by adding in the economic activity which occurs in the state due to the presence of the agricultural production complex. In short, because agriculture is a predominant basic industry, it provides a *multiplier effect* on support industries and services that also generate dollar revenues and jobs.

When both the direct effects and multiplier effects are added, the overall economic measures are enlarged considerably. Thus, in 2010, in terms of the combined **direct** and **multiplier** economic activity of the Nebraska agricultural production complex:

- Total dollar (sales) volume was \$68.88 Billion—**41%** of the State's total activity
- Total GSP (value-added) was \$22.64 Billion—**27%** of Nebraska's total gross state product
- Employment generated totaled 289,200 jobs—**24%** of the Nebraska workforce
- Total wages and proprietor's income was \$13.67 Billion—**25%** of the State's labor income

The above state-level metrics for the 2010 calendar year provide convincing evidence that the state's agricultural production complex is a key driving force to the Nebraska economy.

Further, when the analysis is carried further down to sub-state regional economic impacts, the predominance of agriculture becomes even more significant in many of the regions.

This is especially evident in Northeast region of Nebraska where the region's agricultural production complex in 2010:

- Generated total dollar volume of \$11.30 Billion (second only to the East Region) which was **81%** of the region's total
- Contributed nearly \$3.18 Billion of value-added activity, amounting to **63%** of the region's total gross regional product.

- Employed 42,300 people which was **51%** of the region's workforce and generated **66%** of the region's labor income.

The Northeast region produces large volumes of both crop and livestock commodities in any given year. But there is also considerable value-added activity of agriculturally-related production and processing which occurs in the region. In fact, the presence of both crop and livestock enterprises along with the associated processing creates a variety of synergistic economic relationships which further enhances the economic competitiveness of the area economy.

The East region in 2010 produced the largest regional dollar volume, \$24.50 Billion, a reflection of both a productive agriculture with considerable agriculturally-related value-added production and processing. Likewise, its gross regional product was highest of the regions, \$8.36 Billion. But, given the fact that the region includes the state's two largest metropolitan areas, the associated percentages of the above amounts were **21%** and **14%** respectively. Accordingly, the percentage of the East regional workforce attributed to the agricultural production complex was **12%** and the labor income **14%**. Even still, to have the agriculture complex reflect \$1 out of \$7 of gross regional product and labor income in the most urban region of the state is noteworthy.

The agricultural production complex accounted for more than 45% of the gross regional products of the North, Central, South, and Southeast regions, and generated 44% to 60% of the labor income in those regions in 2010.

For the other regions of the state, agricultural production was a predominant economic activity to be sure; but the relatively-lower incidence of value-added processing activity in those regions tempered somewhat the dominance of agriculture in the area economies.

Implications:

There are a number of implications to be drawn from this study.

First, Nebraska is positioned, like few other areas of the country, to capitalize on the strength of its agricultural industry. To a large extent, this state's economy could currently be classified as a **bio-economy**, in that natural resource-based production makes a substantial contribution to the state's economic momentum—even in the more urban

areas of the state. And given the rising global demands for food and other agriculturally-based products pushing against finite natural resources, the demands of the global market will likely enhance Nebraska's potential economic prominence. This infers, however, that all decision-makers—from the individual farm and business firm level to the larger industry and public policy levels—must seek to understand and adapt to these dynamic global economic forces.

Second, this study clearly reveals what happens in the agricultural production complex as a basic industry spills over significantly into the rest of this state's economy. In fact, the economic multipliers calculated in this analysis would suggest that these spillover multiplier effects result in direct economic effects being nearly doubled for gross state product and labor income levels, and more than a doubling of work-force numbers. In short, the direct effects of the state's agricultural production complex have an economic leverage of essentially 2-to-1 in terms of total impact on the state's economy.

While this leverage effect bodes well for the state's economy during periods of agricultural prosperity, it should also be remembered that it magnifies the extent of economic downturns within agriculture on the overall Nebraska economy. Economic downturns in agriculture are inevitable. In fact, economic volatility for our agricultural production complex is likely to increase in the global economy of the future.

Third, this analysis illustrates the expanse of the agricultural production complex in Nebraska. Agriculture does not begin and end at the "farm gate" but rather is a very complex and interwoven economic system of both backward and forward linkages of activity. And ultimately the economic outcomes are reflected in a vast array of value-added products and services. Agriculture has moved significantly from a *commodity economy* to an *agricultural product economy*. For example, only a third of the state's corn production is exported (from the state) as a commodity. The rest is processed through livestock and ethanol production and exported as food, fuel, and related products. Likewise, the presence of the center pivot irrigation industry in the state results in irrigation technology and products produced in Nebraska not only for sales here but also for national and global markets. It is these types of value-added activities and cluster industries that create a more robust economic climate.

The study's sub-state regional analysis reveals the importance of value-added activity. Those regions with relatively greater value-added activity in place tended to generate greater economic impact from basic agriculture. This would suggest that regional stakeholders in those regional economies may want to encourage more value-added industries associated with their respective agricultures even though it may mean visible socio-economic changes. In fact, local opposition to expanding activity of this nature could curtail positive economic and community development in the long run.

Finally, the economic significance of agriculture to the state would suggest the need for more comprehensive state-level strategy for long-term sustainable development around its agricultural base. This may involve a number of aspects including streamlining of regulatory provisions, enhancing investment opportunities for new and emerging agricultural-based technologies, providing effective workforce training and management education, expanding basic and applied research for innovation in agriculture, practicing sustainable stewardship of our rich natural resource environment, and enhancing quality-of-life aspects for citizens and communities across the state. This will involve the need to engage all stakeholders (from both private and public sectors) in a shared vision for the state and a commitment to pursue it. To do otherwise could expose the state to growing external forces that may not have the best long-term interests of Nebraska in mind.

Appendix 1

Table A.1.0: Nebraska Agriculture at a Glance: 2010 State Ranking in U.S. and Percent of U.S. Total

Rank	Topic	Percent U.S. Total
1	Commercial red meat production	14.6
1	Commercial cattle slaughter	20.9
1	Great Northern beans production	84.5
1	Irrigated cropland acreage	15.0
2	Cattle and calves cash receipts	14.3
2	Pinto beans production	11.9
2	Proso millet production	22.9
2	Corn-based ethanol production	13.6
3	Meat animals cash receipts	11.8
3	Cattle and calves (numbers)	6.7
3	Corn for grain production	11.8
3	Dry edible beans production	10.0
3	Feed crops cash receipts	10.0
3	Grain Sorghum cash receipts	4.5
4	All commodities cash receipts	5.4
4	Livestock and products cash receipts	6.1
4	Soybean production	8.0
4	Beef cows and heifers that have calved	5.7
4	Land (acres) in farms and ranches	5.0
4	On-farm grain storage capacity	8.9
4	Net farm income	5.3
5	Value of principal crops	6.2
5	All hay production	4.4
5	Sugarbeets cash receipts	4.7
6	All hogs and pigs	4.9
7	Winter wheat production	4.3

Source: National Agricultural Statistics Service, U. S. Department of Agriculture

Table A.1.4.4A: 2010 Economic Impact (Business Receipts) of Agriculture Related Transportation and Wholesaling

Industry	Total Value (Millions \$)	Direct Impact (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Cooperatives	\$768	\$768	\$449	\$1,217
Truck Transportation	\$1,095	\$1,095	\$854	\$1,949
Rail Transportation	\$381	\$381	\$275	\$656
Equipment Dealers	\$544	\$544	\$318	\$862
Total	\$2,788	\$2,788	\$1,897	\$4,684

Table A.1.4.4B: 2010 GSP (Value-Added) Impact of Agriculture-Related Transportation and Wholesaling

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Cooperatives	\$598	\$270	\$868
Truck Transportation	\$577	\$519	\$1,096
Rail Transportation	\$173	\$153	\$326
Equipment Dealers	\$424	\$191	\$614
Total	\$1,771	\$1,133	\$2,905

Table A.1.4.4C: 2010 Labor Income Impact of Agriculture-Related Transportation and Wholesaling

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Cooperatives	\$337	\$161	\$498
Truck Transportation	\$478	\$324	\$803
Rail Transportation	\$107	\$94	\$200
Equipment Dealers	\$239	\$114	\$352
Total	\$1,160	\$693	\$1,853

Table A.1.4.4D: 2010 Employment Impact of Agriculture-Related Transportation and Wholesaling

Industry	Direct	Multiplier	Total
Cooperatives	5,200	4,282	9,482
Truck Transportation	9,934	8,414	18,348
Rail Transportation	913	2,273	3,186
Equipment Dealers	3,682	3,032	6,714
Total	19,729	18,001	37,730

Table A.1.4.5A: 2010 Economic Impact (Business Receipts) of Agriculture-Related Research and Education

Industry	Total Value (Millions \$)	Direct Impact (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Universities & Community Colleges	\$193	\$193	\$138	\$331
Federal Government	\$42	\$42	\$31	\$73
State Government	\$7	\$7	\$5	\$13
Total	\$243	\$243	\$174	\$417

Table A.1.4.5B: 2010 GSP (Value-Added) Impact of Agriculture-Related Research and Education

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Universities & Community Colleges	\$193	\$82	\$275
Federal Government	\$42	\$18	\$61
State Government	\$7	\$3	\$11
Total	\$243	\$103	\$346

Table A.1.4.5C: 2010 Labor Income Impact of Agriculture-Related Research and Education

Industry	Direct (Millions \$)	Multiplier (Millions \$)	Total (Millions \$)
Universities & Community Colleges	\$170	\$46	\$217
Federal Government	\$38	\$10	\$49
State Government	\$7	\$2	\$8
Total	\$215	\$59	\$274

Table A.1.4.5D: 2010 Employment of Agriculture-Related Research and Education

Industry	Direct	Multiplier	Total
Universities & Community Colleges	1,651	1,333	2,984
Federal Government	850	301	1,151
State Government	146	51	197
Total	2,647	1,685	4,332