

AGRICULTURE, LIVESTOCK PRODUCTION AND THE NEBRASKA ECONOMY

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EXECUTIVE SUMMARY

Nebraska is an agricultural state. Nebraska cash receipts from agriculture ranked fourth among all the states in 2001, with only California, Texas and Iowa recording larger totals. Livestock production is extremely important with sixty percent of Nebraska's agricultural cash receipts coming from the livestock sector. Cattle sales alone account for more than half of Nebraska's agricultural cash receipts.

Crop Production - Nebraska agriculture cannot prosper based on the past or even the present. It must look to the future. In part, assessing the future requires a projection of the feed demand for Nebraska crops. Equally important, it appears a base is being built for increased industrial uses of crops.

As in the past, whatever market(s) Nebraska crop producers respond to must have a profit incentive. No citizen should expect anything less. If a government subsidy(s) is needed to assure production of a product desired by the public, so be it.

At the same time, the public seems braced to insist that the full range of activities associated with production agriculture—crop production, livestock production and industrial processing of crops—fully support and enhance the environment. The vast majority of producers do not disagree with this goal. Again, however, maintaining the nation's natural resource base ultimately must occur within the context of making a profit.

A more difficult and controversial issue relates to the structure of production agriculture. Animal agriculture, in particular, has been trending toward fewer, larger units. Some citizens, both within and outside the production agriculture sector, would like to see this trend reversed. Whether or not the latter could occur in the context of some of the other widespread goals for production agriculture is an open question.

Livestock Production - Livestock and livestock products are the largest contributor to cash receipts for Nebraska's farmers. The importance of the livestock sector becomes even more evident when one considers its role as a market for Nebraska's feed crops.

The trends in livestock production suggest that economies of scale play an important role in defining the structure of this agricultural sector. In the case of cattle on feed, there were 4,380 Nebraska feedlots with a capacity of less than 1,000 head in 2001. These 85.9 percent of the total feedlots provided only 6.2 percent of the fed cattle marketed from Nebraska feedlots. At the other extreme, there were only 7 (0.1 percent of the total) Nebraska feedlots with a capacity of 32,000 or more head. These 7 feedlots accounted for 12.6 percent of the total fed cattle marketed in 2001.

Even with the economies of scale exhibited by the numbers of fed cattle marketed from Nebraska feedlots with larger capacities, the national trends exhibit even greater concentration resulting from apparent scale economies. For the U.S. as a whole, 41.9 percent of the fed cattle marketed originated from feedlots with a capacity of more than 32,000 head, compared to the Nebraska experience with only 12.6 percent of fed cattle marketed originating from this feedlot size category.

The data on swine production by size of operation provides evidence that substantial scale economies are also at work in this sector. For all Nebraska swine operations as of December 2001, 41.0 percent of the inventory hogs and pigs were found at operations with a capacity of greater than 5,000 head. Moreover, research undertaken by the Economic Research Service of U.S.D.A. reports that average hog production costs decline substantially as the size of operation increases. Average production costs for "farrow-to-finish" facilities are reported to be \$51.25 per hundredweight greater (126.4 percent more) in operations with a capacity of less than 500 head than operations with more than 10,000 head.

Swine production has also experienced significant geographic shifts over time. Restrictions on the location and expansion of production facilities due to concerns about industry concentration and environmental impacts have resulted in swine production not being able to grow in areas where it may enjoy its most favorable competitive advantages. As a case in point, of the major hog-producing states Nebraska recorded the greatest decline

(-37.1 percent) in its inventory of market hogs over the 1992-2001 review period.

Nebraska continues to maintain a significant share of the U.S. livestock slaughter—particularly cattle slaughter. This is an important factor affecting the continued expansion of Nebraska’s meat processing (manufacturing) industry.

Nebraska led the Nation in cattle slaughter (7,649,000 head in 2001), accounting for 22.1 percent of the U.S. total. This compared with the Nebraska number of fed cattle marketed of 4,875,000 head, or 18.1 percent of the U.S. total.

Nebraska hog slaughter accounted for 6.9 percent of the U.S. total for 2001. However, the declining trend in the number of hogs and pigs on Nebraska farms, relative to other areas, raises a concern about the sustainability of Nebraska’s share of hog slaughter.

The continued viability of livestock slaughter and the meat processing industry in Nebraska, will be dependent on the ability of the livestock industry to continue to maintain its competitive position and to provide the essential material inputs required by this industry. Over the longer term, one would expect the location patterns in livestock slaughter and meat processing to adjust to the geographic dispersion of livestock production and other market forces.

Value-Added Processing - Employment growth in the value-added meat processing industry has played an important role in adding new employment opportunities and sustaining manufacturing employment levels in Nebraska, and particularly in the non-metropolitan portion of the state. Nebraska employment in meat processing grew by 4,989 between 1993 and 2001, with 3,921 (78.6 percent) of the added jobs located in the non-metropolitan areas of the state.

Manufacturing employment in value-added meat processing accounted for 22.6 percent of total manufacturing employment for Nebraska as a whole for 2001, with non-metropolitan areas having a much greater dependence on this processing sector as a source of manufacturing jobs. For non-metropolitan Nebraska, employment in meat processing represented 32.7 percent of total manufacturing

employment, compared to 9.6 percent for the metropolitan areas of the state.

Value added by Nebraska meat products manufacturers totaled \$2.2 billion for 2000, an increase of 64.1 percent from the 1997 level. The total value of shipments (output) by the meat products industry was \$11.3 billion and the value of purchased inputs (primarily livestock products) was \$9.1 billion. Nebraska’s value of shipments accounted for 9.5 percent of the total value of shipments of processed meat products for the U.S. as a whole.

Nebraska establishments processing dairy or meat products have a wide geographic dispersion throughout the state. There were 106 establishments reported by the *2002 Nebraska Manufacturers’ Directory* located in 36 of Nebraska’s 93 counties. Clearly, the meat products and dairy processing industry is an important source of jobs and income for workers located throughout Nebraska, in rural areas as well as in the metropolitan areas.

Economic Linkages - Nebraska’s livestock sector has an enormous impact on the Nebraska economy, in terms of job creation, wealth creation (value-added), and total economic activity.

The analysis presented in Section D estimates the total direct output of the selected livestock sectors (cattle feeding, swine production and dairy farm products) at \$5.3 billion for 2001. Applying the economic multipliers developed from an input-output model (for non-metropolitan Nebraska) results in an estimated total value of \$7.8 billion in output, total value-added of \$2.2 billion, and total employment of 46,722 to be associated with the selected livestock sectors. These estimates consider only the selected livestock sectors and the economic sectors supplying inputs to these sectors (backward linkages).

Other important linkages for Nebraska’s livestock production sectors are the forward linkages to the value-added meat processing industry. The two principal location factors for value-added meat processing establishments are access to the principal inputs (livestock and products) and ready access to consumer markets. Obviously, without the significant production of livestock and livestock products by our agricultural sector, the processing industry would not be as attracted to Nebraska locations.

INTRODUCTION

Nebraska is one of the leading agricultural states. In 2001, for example, Nebraska cash receipts from agriculture of \$9.5 billion ranked fourth among all the states. Only California, Texas and Iowa recorded larger totals.

Typically, more than half of Nebraska's agricultural cash receipts come from the livestock sector. In 2001, for example, livestock and livestock product sales totaled \$6.1 billion, or 64 percent of all cash receipts. Cattle sales alone totaled \$5.1 billion. Hogs were next in importance in terms of cash receipts, followed by dairy products.

The remaining \$3.5 billion of Nebraska's cash receipts from agriculture in 2001 came from crops, led by corn sales of \$2.0 billion. Soybeans ranked second at just under \$900 million, followed by wheat and sorghum.

Few states are as dependent on agriculture as is Nebraska. In a 1994 study, University of Nebraska-Lincoln Professors R.G. Taylor and Charles Lamphear found that 25 percent of the state's employment is directly or indirectly dependent on agriculture and agribusiness. Additionally, 27 percent of the value-added in Nebraska depends directly or indirectly on the agriculture-agribusiness complex. (Value-added can be thought of as a proxy for personal income.)

The point is that by any measure agriculture is important to Nebraska. Keeping the sector strong in the future should be a priority for every citizen.

Clearly, there is a high degree of interdependence between the crop and livestock sectors and, in turn, between the agricultural sector and the balance of the Nebraska economy. This report presents information and analyses providing further insights into these interdependencies. Special attention is

given to the importance of the livestock sector, both with respect to its contributions within the agricultural sector and with regard to its contributions to the Nebraska economy in general.

Section A of the report reviews trends in Nebraska crop production, with attention devoted to the relationship between crop and livestock production. Information is also provided on ethanol and biodiesel production and, in the case of ethanol production, the importance of livestock as a market for byproducts resulting from ethanol production.

Section B provides information on livestock production trends, including trends for cattle on feed, milk cows, beef cows, and chickens. Data is also included showing the trends in dairy farm products and egg production. Section B also provides data describing the structure of selected livestock enterprises, in the case of cattle on feed and swine production. For swine production, data is provided showing the significant geographic shifts in production over time. Finally, trends in Nebraska cattle and hog slaughter relative to production trends are presented.

Section C provides a review of the Nebraska meat products manufacturing sector. Information presented includes data on manufacturing establishments, employment, payroll, value-added, value of shipments, and capital expenditures. Information is also presented comparing the growth in Nebraska meat products manufacturing relative to other industrial sectors. Also provided in this section is information on the geographic dispersion of establishments and employment in the meat and dairy products processing sector.

Section D presents information defining and describing key economic interdependencies that exist between the livestock sectors and the other sectors

of the economy for a regional economy defined as the non-metropolitan areas of Nebraska. Employing an economic input-output model, information is developed identifying the economic impacts associated with feedlot and dairy farm operations along with the impacts associated with swine production in Nebraska. The analytical approach evaluates these impacts in terms of the employment, value-added, and output impacts, utilizing economic multipliers resulting from the input-output model.

Each section of the report also provides concluding comments, which are summarized in the Executive Summary.

This report has resulted from a collaborative effort by Dr. Donis N. Petersan (NPPD) and Dr. Roy Frederick (UN-L). Roy Frederick wrote Section A and the Donis N. Petersan wrote Sections B, C, and D.

SECTION A

TRENDS IN CROP PRODUCTION

by Roy Frederick⁽¹⁾

In 2002, a statewide drought significantly impacted crop production in Nebraska. Based on USDA's October estimate, corn production will be down 20 percent from 2001. Lower yields and abandoned acreage, particularly on dryland acres, contributed to this result.

Similarly, soybean and wheat production are estimated to be 22 percent lower. Even more stunning, sorghum production is expected to drop 59 percent.

Production results from the previous two years, 2000 and 2001, perhaps give a clearer picture of Nebraska crop production potential. Average production for those two years is compared with average production in 1985 and 1986 in Table A-1.

Feed Demand for Nebraska Crops

For many years, a strong symbiotic relationship has existed between crop and livestock production in Nebraska. In fact, traditionally both occurred on the same farm. Producers depended largely on crops grown on the farm to feed cattle, hogs and other livestock.

Over the past 25 years, however, the trend has been toward more specialization. Increasing numbers of farmers produce only crops. At the same time, cattle feeding and hog production have moved toward more specialized cattle feed yards and swine confinement units. But notwithstanding this structural change, Nebraska's cattle and hogs still consume large amounts of Nebraska's crops.

Table A-1
Nebraska (Average) Crop Production, 1985-86 and 2000-01

Commodity	1985-86 Average Production	2000-01 Average Production	Percent Change
- - - Million Bushels - - -			
Corn	924.8	1076.8	16.4
Soybeans	89.1	198.5	122.8
Wheat	82.9	52.8	-36.3
Sorghum	145.3	35.4	-75.6

Source: Nebraska Agricultural Statistics Service, *Nebraska Agricultural Statistics*.

The pattern of somewhat larger corn and much larger soybean crops would be evident in most production comparisons over the past 20 years. Similarly, wheat and sorghum production have been trending lower. Presumably, perceived profit opportunities have contributed to the crop choices made by farmers. However, an important question for the future is whether market opportunities, especially for corn and soybeans, will continue to grow.

Nationally, feed uses are expected to consume about 53 percent of available corn supplies during the 2002-03 marketing year. However, in part because of a smaller 2002 crop, only 30 percent of sorghum supplies will go for feed uses. More importantly, feed-use projections for a single year give no indication of multi-year trends that may be underway, either nationally or in Nebraska.

⁽¹⁾Section A prepared by Dr. Roy Frederick, Professor, Agricultural Economics, University of Nebraska-Lincoln.

Sparks Companies, Inc., in a November, 2000 study for the Nebraska Corn Board, reported that feed use in Nebraska had stagnated over the 15-year period beginning in 1985. In essence, modest growth in cattle feeding was offset by declining hog numbers. The result was little overall change in total feed usage. Consumption fluctuated between 10 and 12 million tons (350 million to 420 million bushels) annually. About 83 percent of the feed consumed was corn, with most of the remainder being sorghum and soybean meal.

Similarly, net shipments of feed outside Nebraska (to domestic and export markets) are also estimated to have remained fairly steady at about 600 million bushels annually during the 1990s.

Taken together, feed demand, both inside and outside Nebraska, appears to be lagging the upward trend in production of corn and soybeans. As we look to the future, it will be important either to increase livestock production or to commit additional quantities of corn and soybeans to alternative uses.

Ethanol Production

A hopeful possibility for increased crop utilization is through renewable fuels. Ethanol is the leading product, although interest is growing in biodiesel, a product typically made from soybeans.

Nebraska's ethanol production capacity continues to grow. The current capacity of seven separate processing plants approaches 400 million gallons annually (Table A-2). Two other plants under construction near Axtell and Plainview will add about 60 million gallons to this total.

Corn is the primary feed stock for Nebraska ethanol plants although sorghum (milo) also is used in some plants.

Sparks Commodities, Inc., has estimated that 230 million bushels of corn were used in Nebraska plants to produce ethanol in 1999. While this number seems a bit high based on a typical conversion of 1 bushel of corn into 2.5 gallons of ethanol, perhaps the more important point is that the ethanol production is large and growing. As recently as 1990, fewer than 50 million bushels of corn were used for this purpose in Nebraska.

Table A-2
Nebraska Ethanol Plants
October, 2002

Plant; Location	Capacity (mil. gal. per year)
Minnesota Corn Processors, Columbus ^(a)	100
Cargill, Inc., Blair	83
Chief Ethanol, Hastings	62
AGP, Hastings	52
High Plains Corp, York	50
Williams Bio-Energy, Aurora	35
Sutherland Associates, Sutherland	15
Kappa Ethanol, Axtell (under const.)	40
Husker Ag, Plainview (under const.)	20

^(a) Minnesota Corn Processors has been acquired by ADM and is now operated as ADM Corn Processing.

Source: Renewable Fuels Association: www.ethanolrfa.org.

Increased use of corn and other crops in ethanol production obviously is a plus for Nebraska crop producers. Ethanol production increases overall demand, not to mention the special price impact it may have in communities where plants are located. Frequently, local cash corn prices increase by 5 to 8 cents a bushel when an ethanol plant begins operations. The precise impact depends, of course, on all supply and demand factors in play in a market at any point in time.

Ethanol production also has an added benefit that is important—and could be even more important in the future. A byproduct of ethanol production is a high-protein feed that can be fed to cattle, either in dry or wet form. The latter, referred to as wet corn gluten, requires feeding operations to be located in close proximity to ethanol plants to maintain quality of the feed and to reduce transportation costs.

Research completed at the University of Nebraska-Lincoln by Professors Richard K. Perrin and Terry J. Klopfenstein in May, 2000 indicates that wet feeding of byproducts offers special benefits to cattle feeders. Using a combination of experimental and survey data and market prices, they calculated that the feed value of wet corn gluten averaged \$130 per ton of dry matter during the 1990s. This compares to \$93 per ton of dry matter for dried byproducts. The difference, \$37 per ton of dry matter, is the net benefit of the wet corn gluten.

The authors calculate that about 85 percent of the benefit from wet corn gluten is passed along to

livestock feeders. The remaining 15 percent stays with processors.

With the growth in production from two large wet milling plants in Nebraska during the 1990s, the economic impact from wet corn gluten shot upward. Perrin and Klopfenstein peg the annual net economic value of wet corn gluten at \$42 million for the 1997-99 period. This compares to \$1 million in 1992.

Finally, it should be acknowledged that certain financial incentives offered by government have aided the growth of the ethanol industry. The federal government offers a tax credit, currently \$0.054 per gallon of finished fuel containing a minimum 10% ethanol. This amounts to \$0.54 when applied to a gallon of ethanol.

Nebraska state government also has encouraged the growth of the ethanol industry by providing incentives to build new plants or expand existing ones. Various fees and limited funding from the state's General Fund have been used to encourage capacity expansion. The most recent provision, which received legislative approval in 1999, runs through December 31, 2003.

Biodiesel Production

Production of biodiesel from soybeans is not as advanced as ethanol production. Nevertheless, some signs point to a bright future.

In 2001, about 25 million bushels of soybeans were used nationwide to produce 35 million gallons of biodiesel. As many as 200 large fleets of motor vehicles, both in government and the private sector, have converted in full or in part to biodiesel. More are expected to do so in the future.

A special quality of biodiesel is that it offers needed lubricating qualities in engines, while greatly reducing sulfur additives. Current federal law requires sulfur reductions in diesel fuels by 2006. As this date approaches, demand should increase.

Admittedly, biodiesel fuel is more expensive than regular diesel fuel. Therein lies the biggest challenge.

In 2000, USDA initiated a Bioenergy Program, which provides reimbursements for converting certain targeted products into bioenergy. Under the program, the cost of biodiesel was reduced by more than \$1 per gallon. The American Soybean Association says it has been the key factor in the recent growth of biodiesel production. However, if the reimbursement is cut by 50 percent or more—as was proposed recently by some policymakers—soydiesel would be uncompetitive.

Biodiesel probably will require governmental support similar to that offered to ethanol to push production up to several hundred million gallons annually. Moreover, that support will need to be assured over a significant period of years. Companies simply will not make financial commitments to build production capacity if government support is going to be subject to annual policy debates.

Concluding Comments

Nebraska agriculture cannot prosper based on the past or even the present. It must look to the future. In part, assessing the future requires a projection of the feed demand for Nebraska crops. Equally important, it appears a base is being built for increased industrial uses of crops.

As in the past, whatever market(s) Nebraska crop producers respond to must have a profit incentive. No citizen should expect anything less. If a government subsidy(s) is needed to assure production of a product desired by the public, so be it.

At the same time, the public seems braced to insist that the full range of activities associated with production agriculture—crop production, livestock production and industrial processing of crops—fully support and enhance the environment. The vast majority of producers do not disagree with this goal. Again, however, maintaining the nation's natural resource base ultimately must occur within the context of making a profit.

A more difficult and controversial issue relates to the structure of production agriculture. Animal agriculture, in particular, has been trending toward

fewer, larger units. Some citizens, both within and outside the production agriculture sector, would like to see this trend reversed. Whether or not the latter

could occur in the context of some of the other widespread goals for production agriculture is an open question.

SECTION B

LIVESTOCK PRODUCTION TRENDS

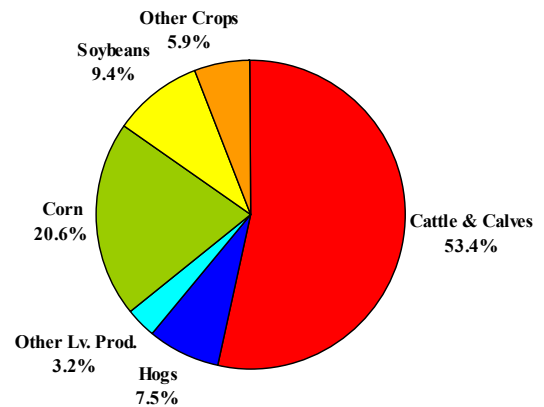
by Dr. Donis N. Petersan⁽¹⁾

Livestock and livestock products are the largest contributor to cash receipts for Nebraska's farmers. Cash receipts for Nebraska agricultural products totaled \$9,488.6 million for 2001. The top four commodities marketed by Nebraska farmers - cattle and calves, corn, soybeans, and hogs, accounted for 91 percent of Nebraska's total cash receipts from farm marketings.

Figure B-1 provides an overview of the relative importance of selected livestock and crop components in terms of their contribution to total cash receipts for agricultural products. Cash receipts from all livestock and products accounted for 64.1 percent of the total for all commodities, with cash receipts from cattle and calves accounting for 53.4 percent of the total. Cash receipts for corn was second in importance, accounting for 20.6 percent of the total, with soybeans (9.4 percent) and hogs (7.5 percent) following.

Clearly, the livestock and livestock products sector is a major contributor to Nebraska's agricultural economy and represents the largest source of revenue for Nebraska's farmers. This becomes even more apparent when one considers the importance of the livestock and products sector as a market for Nebraska's feed crops (corn, hay, sorghum, etc.).

Figure B-1
Nebraska Cash Receipts by Commodity Group, 2001



Total Nebraska cash receipts, 2001 - \$9,488.6 million.
Source: Economic Research Service, U.S.D.A.

Cattle and Calves

As previously noted, cattle and calves accounted for 53.4 percent of Nebraska's 2001 agricultural cash receipts. To provide further insights into the production characteristics and trends for the cattle and calves, Table B-1 provides data showing the January 1 inventory for all cattle and calves, for milk cows and for beef cows for the review period, 1983-2002. Also shown is Nebraska's share of the U.S. stock for each of the categories for the review period.

⁽¹⁾Section B prepared by Dr. Donis N. Petersan, Economic Research Supervisor, Nebraska Public Power District.

Table B-1
Cattle and Calves Inventory, Nebraska, January 1, 1983-2002

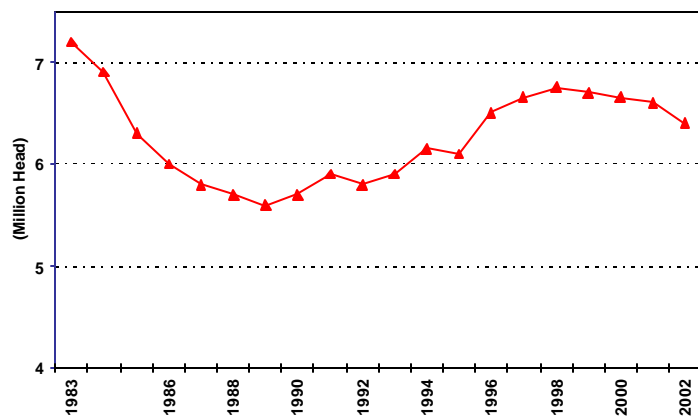
Year	Cattle and Calves	Milk Cows	Beef Cows	Cattle on Feed	Cattle and Calves	Milk Cows	Beef Cows	Cattle on Feed
	Thousand Head				Percent of U.S. Inventory			
1983	7,200	121	2,029	1,880	6.3	1.1	5.3	15.6
1984	6,900	121	2,054	1,760	6.1	1.1	5.5	15.2
1985	6,300	102	1,868	1,880	5.7	0.9	5.3	15.1
1986	6,000	112	1,808	1,900	5.7	1.0	5.4	16.2
1987	5,800	103	1,777	1,860	5.7	1.0	5.2	16.5
1988	5,700	104	1,756	2,000	5.7	1.0	5.3	16.8
1989	5,600	105	1,755	1,950	5.8	1.0	5.4	17.0
1990	5,700	100	1,760	2,060	5.9	1.0	5.4	17.7
1991	5,900	95	1,805	2,250	6.1	1.0	5.6	17.7
1992	5,800	90	1,760	1,990	5.9	0.9	5.3	16.7
1993	5,900	85	1,795	2,130	5.9	0.9	5.4	16.7
1994	6,150	80	1,920	2,110	6.1	0.8	5.5	16.2
1995	6,100	75	1,895	1,940	5.9	0.8	5.4	15.6
1996	6,500	70	1,930	2,030	6.3	0.7	5.5	15.7
1997	6,650	69	1,941	2,220	6.5	0.7	5.6	16.8
1998	6,750	70	1,940	2,300	6.8	0.8	5.7	16.9
1999	6,700	72	1,978	2,240	6.8	0.8	5.9	16.9
2000	6,650	76	1,974	2,440	6.8	0.8	5.9	17.4
2001	6,600	75	1,945	2,550	6.8	0.8	5.8	18.0
2002	6,400	68	1,932	2,370	6.6	0.7	5.8	17.1

Source: Nebraska Agricultural Statistics Service, 2002 *Nebraska Agricultural Statistics*, (www.agr.state.ne.us/agstats).

As reported by the data in Table B-1, cattle on feed (2,370,000 head) accounted for 37.0 percent of the total inventory of Nebraska cattle and calves as of January 1, 2002. Beef cows (1,932,000 head) represented 30.2 percent of the inventory, and milk cows (68,000 head) accounted for approximately 1.1 percent of the state's total cattle and calves in 2002. Nebraska's share of the U.S. stock of cattle and calves was 6.6 percent as of January 1, 2002, with cattle on feed accounting for 17.1 percent of the U.S. total Nebraska beef cows represented 5.8 percent of the total U.S. stock, and milk cows represented 0.7 percent of the total U.S. stock milk cows.

Figure B-2 shows the trend in the total January 1st inventory for all cattle and calves for the 1983-2002 review period. The total stock of cattle and calves has fluctuated during the review period, declining during the 1983-1989 period, increasing over the 1989-1998 span, and then declining once again between 1998 and 2002.

Figure B-2
Cattle and Calves Inventory, Nebraska, January 1, 1983-2002



Source: Nebraska Agricultural Statistics Service, 2002 *Nebraska Agricultural Statistics*.

Table B-2
Cattle: Operations and January 1, Inventory,
by Size Groups, Nebraska, 1997-2001

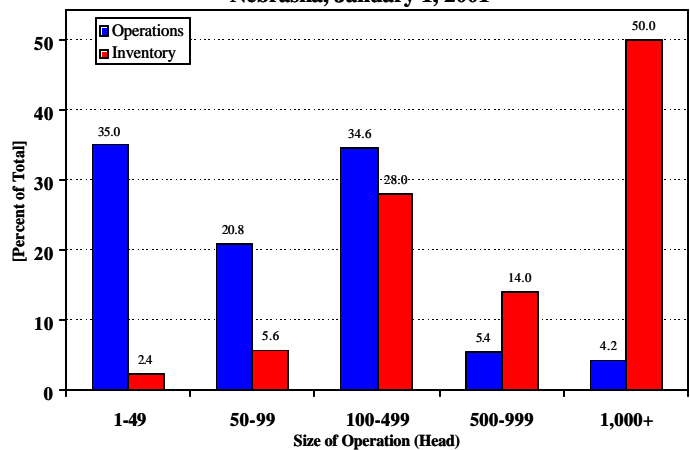
-- Part A --						
Year	Operations Having					Total Operations
	1-49	50-99	100-499	500-999	1,000+	
	----- Number -----					
1997	9,800	5,900	10,000	1,350	950	28,000
1998	10,900	6,100	9,700	1,350	950	29,000
1999	10,300	5,600	9,800	1,300	1,000	28,000
2000	9,600	5,400	9,500	1,400	1,100	27,000
2001	9,100	5,400	9,000	1,400	1,100	26,000

-- Part B --						
Year	Inventory on Operations Having					Total Inventory (1,000 Head)
	1-49	50-99	100-499	500-999	1,000+	
	----- Percent of Total Inventory -----					
1997	3.2	6.3	31.5	14.0	45.0	6,650
1998	3.5	6.2	30.0	13.3	47.0	6,750
1999	3.2	5.8	31.0	13.0	47.0	6,700
2000	2.5	5.5	30.0	14.0	48.0	6,650
2001	2.4	5.6	28.0	14.0	50.0	6,600

Source: Nebraska Agricultural Statistics Service, 2002 *Nebraska Agricultural Statistics*,
(www.agr.state.ne.us/agstats)

Table B-2 and Figure B-3 provide data showing the distribution of Nebraska cattle operations and cattle and calves inventory by size of operation. As the data for 2001 show, there were 9,100 operations, or 35 percent of the total Nebraska operations, having between 1 and 49 head. These operations accounted for only 2.4 percent of the total inventory of cattle and calves as of January 1, 2001. Conversely, the 1,100 operations (4.2 percent of the total) with more than 1,000 head accounted for 50.0 percent of the total inventory of cattle. These data reflect the size of operations for all cattle and calves operations, including feedlots and cow-calf and dairy operations.

Figure B-3
Cattle: Operations and Inventory by Size Groups,
Nebraska, January 1, 2001



Source: Nebraska Agricultural Statistics Service, 2002 *Nebraska Agricultural Statistics*.

Table B-3
Cattle and Calves on Feed: Number of Feedlots and Marketings
by Size Groups, Nebraska, 1997-2001

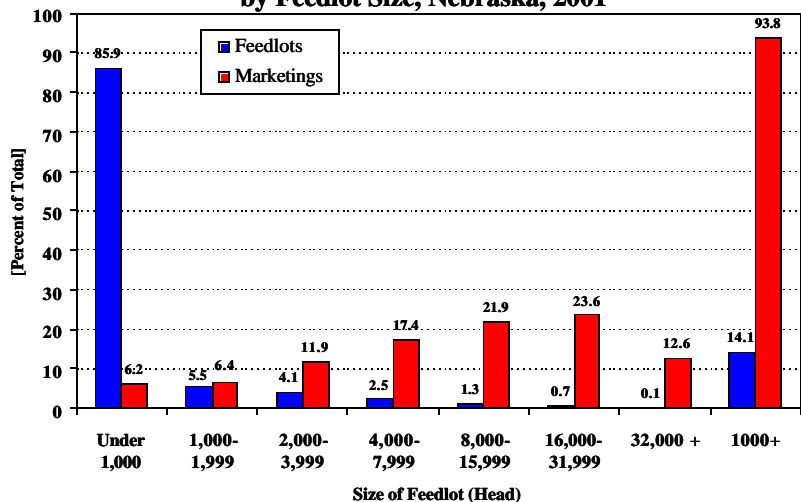
Year	----- Feedlot Capacity -----								Total All Feedlots
	Under 1,000	1,000-1,999	2,000-3,999	4,000-7,999	8,000-15,999	16,000-31,999	32,000 and over	Total 1,000+	
	----- Feedlots - Number -----								
1997	4,435	270	181	118	64	25	7	665	5,100
1998	4,335	270	178	118	65	26	8	665	5,000
1999	4,335	275	184	125	66	28	7	685	5,020
2000	4,505	265	200	126	65	32	7	695	5,200
2001	4,380	280	209	126	64	34	7	720	5,100
Year	----- Marketings - Thousand Head -----								
1997	280	310	510	850	1,160	975	625	4,430	4,710
1998	260	300	510	840	1,140	945	705	4,440	4,700
1999	290	310	540	880	1,280	1,070	690	4,770	5,060
2000	300	320	570	930	1,200	1,230	635	4,885	5,185
2001	300	310	580	850	1,070	1,150	615	4,575	4,875

Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics, (www.agr.state.ne.us/agstats).

Table B-3 and Figure B-4 show production data by size of feedlot for cattle on feed. As the data indicate, 4,380, or 85.9 percent of the feedlots in operation in 2001 had a capacity of fewer than 1,000 head. Moreover, these feedlots accounted for only 300,000 (6.2 percent) of the 4,875,000 fed cattle marketed during 2001. At the other extreme, there were only 7 (0.1 percent) of the 5,100 Nebraska feedlots with a capacity of 32,000 or more head. However, these 7 feedlots accounted for marketings of fed cattle of 615,000 head, or 12.6 percent of the total fed cattle marketed.

The feedlot size category with the largest number of fed cattle marketed was the category of 16,000-31,999 head. There were 34 Nebraska feedlots in this group (0.7 percent of feedlots) accounting for marketings of fed cattle of 1,150,000 head, or 23.6 percent of the total fed cattle marketed.

Figure B-4
Cattle on Feed, Percent of Feedlots and Marketings,
by Feedlot Size, Nebraska, 2001

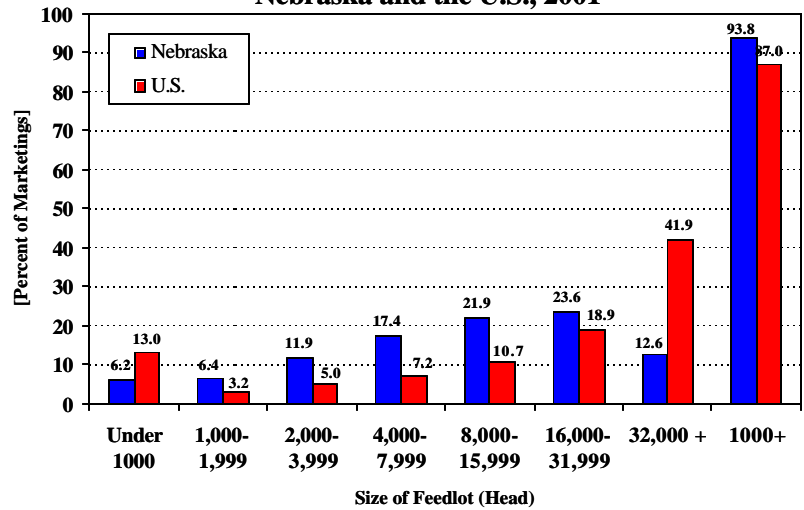


Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics.

Finally, the data on fed cattle marketings indicate the 720 feedlots (14.1 percent of the total) with a capacity of more than 1,000 head accounted for fed cattle marketings 4,575,000 head, or 93.8 percent of the total 4,875,000 fed cattle marketed in Nebraska in 2001.

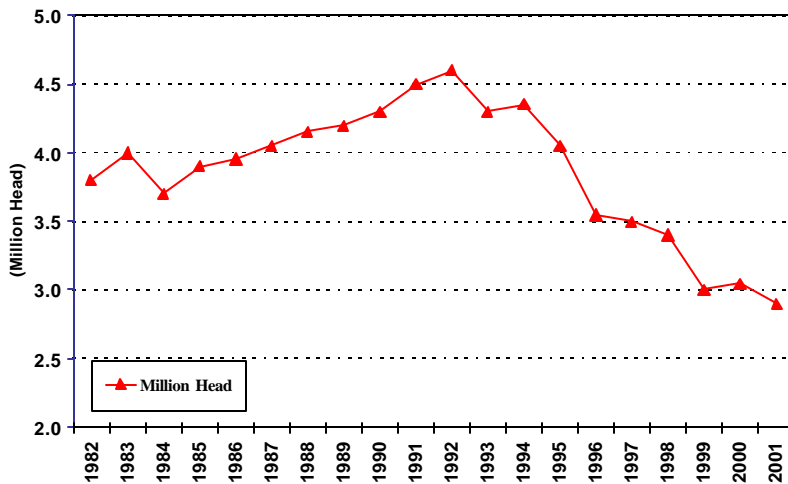
Figure B-5 compares the distribution of marketings by feedlot size for Nebraska with the U.S. distribution. As the chart shows, the major deviation between the two distributions occurs in the feedlot size group of more than 32,000 head. Nebraska operators in this size group marketed 12.6 percent of the total Nebraska fed cattle marketed in 2001, while for the U.S. as a whole, 41.9 percent of fed cattle marketings were from this feedlot size group.

Figure B-5
Cattle on Feed, Percent of Marketings by Feedlot Size, Nebraska and the U.S., 2001



Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics.

Figure B-6
Hogs and Pigs Inventory, Nebraska, December 1, 1982-2001



Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics.

Hogs and Pigs

The data and charts presented in this section provide information related to the characteristics and trends for swine production in Nebraska.

Figure B-6 shows the longer-term trend in the number of hogs and pigs on Nebraska farms (December inventory) for the 1982-2001 review period. As the data represented in the chart illustrate, the number of hogs and pigs in Nebraska increased by 800,000 head, or 21.1 percent, between 1982 and 1992 and has since declined by 1,700,000 (-33.6 percent) from 4,600,000 head in 1992 to 2,900,000 head in December of 2001.

Table B-4
Hogs: Operations and December 1, Inventory,
by Size Groups, Nebraska, 1997-2001

- - Part A - -

Year	Operations Having						Total Operations
	1-99	100-499	500-999	1,000-1,999	2,000-4,999	5,000+	
	- - - - - Number - - - - -						
1997	1,900	2,800	1,050	480	195	75	6,500
1998	1,550	2,700	925	450	200	75	5,900
1999	1,450	2,200	620	450	200	80	5,000
2000	1,400	1,400	580	300	230	90	4,000
2001	1,100	1,000	630	380	200	90	3,400

- - Part B - -

Year	Inventory on Operations Having						Total Inventory (1,000 Head)
	1-99	100-499	500-999	1,000-1,999	2,000-4,999	5,000+	
	- - - - - Percent of Total Inventory - - - - -						
1997	2.0	19.5	19.5	17.5	15.5	26.0	3,500
1998	1.5	18.5	18.0	17.0	17.0	28.0	3,400
1999	1.5	16.5	13.0	17.0	18.0	34.0	3,000
2000	1.5	12.0	12.5	13.0	25.0	36.0	3,050
2001	1.0	8.0	13.5	15.5	21.0	41.0	2,900

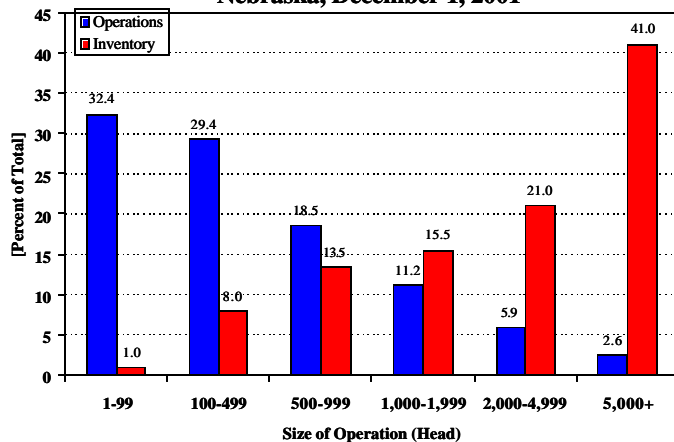
Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics,
(www.agr.state.ne.us/agstats)

-Hog Numbers and Operations by Size

Table B-4 and Figure B-7 provide information showing the distribution of Nebraska hog operations and the hogs and pigs inventory by size of operation. As the data for 2001 indicate, there were 1,100 operations, or 32.4 percent of the total Nebraska operations, having between 1 and 99 head. These operations accounted for only 1.0 percent of the total inventory of Nebraska hogs as of December 1, 2001. Conversely, the 90 operations (2.6 percent of total operations) with more than 5,000 head accounted for 41.0 percent of the total inventory of hogs and pigs in Nebraska.

The fact that 41.0 percent of the hogs and pigs in Nebraska are found on the 2.6 percent of total operations having more than 5,000 head leads to the question of whether there may be significant economies of scale associated with this sector.

Figure B-7
Hogs: Operations and Inventory by Size Groups,
Nebraska, December 1, 2001



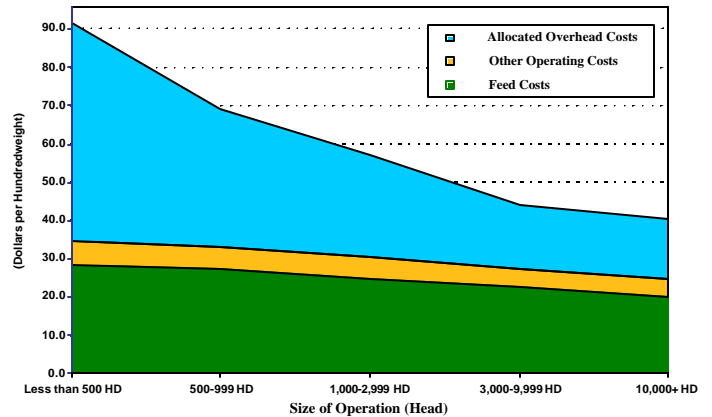
Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics.

Figure B-8 provides information showing the average hog production costs for “farrow-to-finish” operations. As the data presented in the chart indicate, production costs decline substantially as the size of operation increases. Closer inspection of the data indicates a decline in production costs per hundredweight of \$51.25, or 55.8 percent as the scale of operation increases in size from an operation of less than 500 head to an operation with more than 10,000 head.

The chart also indicates the greatest decline in production costs, as a function of size, occurs for the category of “allocated overhead costs.” Of the total decline in average costs (-\$51.25) per hundredweight over the scale of operations shown, \$41.68 of the decline occurs in the overhead costs category. The decline in feed costs over the size range of operations was reported to be \$8.09 (28.6%) and other operating costs decreased by \$1.48, or 24.4 percent.

The data showing the Nebraska inventory of hogs and pigs by operation size along with the chart showing the relationship between production costs and size of operation suggest that actions taken to restrict the size of Nebraska pork production facilities may subject Nebraska producers to competitive or cost disadvantages.

Figure B-8
Farrow-to-Finish Production Costs,
by Size of Operation, 1998



Source: U.S.D.A. Economic Research Service, Hogs Costs and Returns Data, www.ers.usda.gov/data/FarmIncome/car/hogs3.htm

-Geographic Shifts in Pork Production

Table B-5 provides data showing the inventory of market hogs in the U.S. and for the leading producer states for 1992 and 2001 along with the change in hogs (number and percent) for the intervening period. For the U.S. as a whole, the inventory of market hogs increased from 51,093,000 in 1992 to 53,594,000 in 2001, or by 2,501,000 head (4.9 percent). Iowa led the states in terms of the inventory of market hogs with 14,270,000 hogs as of December 1, 2001. This number accounted for

Table B-5
Market Hogs: December 1, Inventory, Nebraska, U.S.,
and Selected States, 1992 and 2001

U.S./State	1992	2001	Change, 1992-2001		Percent of U.S. 2001 Inventory
	- - (1,000 Head) - -		Number (1,000 Head)	Percent	
U.S.	51,093	53,594	2,501	4.9	100.0
Iowa	13,200	14,270	1,070	8.1	26.6
North Carolina	4,000	8,800	4,800	120.0	16.4
Minnesota	4,120	5,230	1,110	26.9	9.8
Illinois	5,200	3,800	-1,400	-26.9	7.1
Indiana	4,000	2,860	-1,140	-28.5	5.3
Missouri	2,475	2,620	145	5.9	4.9
Nebraska	4,020	2,530	-1,490	-37.1	4.7
Oklahoma	205	2,140	1,935	943.9	4.0
Kansas	1,280	1,400	120	9.4	2.6

Source: U.S.D.A., National Agricultural Statistics Service, Agricultural Statistics Database, www.nass.usda.gov:81/ipedb/.

26.6 percent of the total U.S. inventory. Moreover, the number of market hogs in Iowa grew by 1,070,000, or by 8.1 percent, between 1992 and 2001.

North Carolina and Oklahoma had the greatest growth in market hogs over the 1992-2001 review period. In the case of North Carolina, the number of market hogs grew from 4,000,000 in 1992 to 8,800,000 in 2001, or by 120 percent. North Carolina accounted for 16.4 percent of the U.S. inventory in 2001. Oklahoma recorded the fastest rate of growth for the review period, with the number of market hogs growing more than tenfold (943.9 percent), from 205,000 in 1992 to 2,140,000 in 2001.

Of the major hog producing states, Nebraska recorded the largest decline in the number of market hogs for the review period. The Nebraska inventory declined from 4,020,000 in 1992 to 2,530,000 in 2001, a decline of 1,490,000 hogs (-37.1 percent). Illinois experienced a decline 1,400,000 (-26.9 percent) in the number of market hogs and Indiana recorded a decline of 1,140,000, or 28.5 percent, between 1992 and 2001.

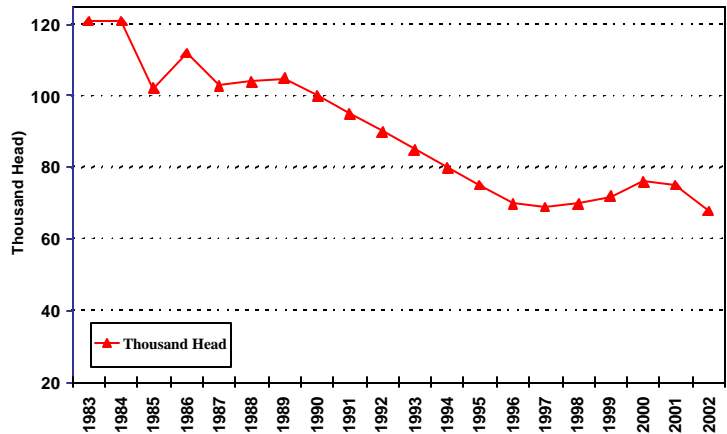
Other Livestock and Livestock Products

Other livestock products of interest lead to a review of data on milk cows and milk production as well as data on egg production in Nebraska.

-Milk Cows and Milk Products

Data showing the trends in the number of milk cows in Nebraska were presented in Table B-1, and are also portrayed in Figure B-9. As these data indicate,

Figure B-9
Milk Cows Inventory, Nebraska,
January 1, 1983-2002



Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics.

the number of milk cows (January 1 inventory for each year) decreased by 53,000, or 43.8 percent, from 121,000 in 1983 to 68,000 in 2002. It is of interest to note that while the overall trend in the number of milk cows was one of decline, there was a three-year period (1997-2000) during which the number of milk cows in Nebraska experienced some growth. The number grew from 69,000 in 1997 to 76,000 in 2000, before declining once again in 2001 and 2002.

The quantity and value of Nebraska milk production is shown in Table B-6. Milk production grew 11.1 percent from 1,040 million pounds in 1997 to 1,156 million pounds in 2001. For the same period, the value of milk produced increased 23.7 percent, from \$137,280,000 in 1997 to \$168,776,000 in 2001.

Table B-6
Milk Production and Value, Nebraska, 1997-2001

Year	Milk Cows ^(a) (1,000 Head)	Total Production		Total Value of Milk Produced (\$1,000)
		Milk	Milkfat	
		- - Million Pounds - -		
1997	69	1,040	38.4	137,280
1998	70	1,050	38.7	158,550
1999	74	1,139	42.3	152,626
2000	76	1,255	46.4	146,835
2001	72	1,156	42.9	168,776

(a) Average number during year.

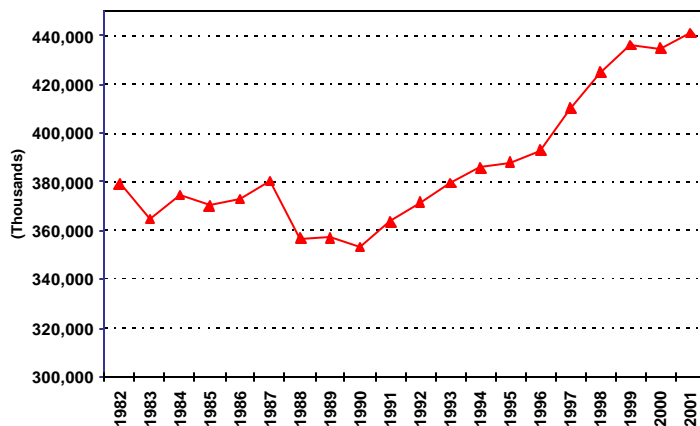
Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics,
(www.agr.state.ne.us/agstats)

-Chickens and Egg Production

Data showing the inventory of chickens in Nebraska is portrayed in Figure B-10. As indicated by the chart, the number of chickens in Nebraska (December 1 inventory for each year) has grown consistently since 1990. The 2001 inventory of Nebraska chickens grew by 87.9 million (25 percent), from 353.2 million in 1990 to 441.1 million in 2001.

The quantity and value of Nebraska egg production is shown in Table B-7. Egg production grew 21.5% from 2,469 million eggs in 1997 to 3,001 million eggs in 2001. For the same period, the value of eggs produced declined by \$14.5 million (-10.7 percent), from \$107.0 million in 1997 to \$95.5 million in 2001, reflecting a 26.5 percent decrease in average prices (gross income per unit).

Figure B-10
Chickens Inventory, Nebraska,
December 1, 1982-2001



Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics.

Table B-7
Egg Production and Value, Nebraska, 1997-2001

Year ^(a)	Average Number of Layers ^(a) (1,000)	Eggs per Layer (Number)	Eggs Produced (Million)	Gross Income (\$1,000)
1997	9,525	259	2,469	106,990
1998	10,398	260	2,706	97,416
1999	11,167	254	2,837	93,385
2000	11,909	252	2,999	93,719
2001	11,650	258	3,001	95,532

^(a) Average number during year (December previous year through November).

Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics, (www.agr.state.ne.us/agstats)

Nebraska Livestock Slaughter

As Section C of this report will document, the meat processing industry is Nebraska’s largest manufacturing sector and plays an important role in the creation of employment opportunities for our

population. Obviously, a vital and growing meat processing industry relies on the continued production of livestock and livestock products and on the presence of substantial livestock slaughtering operations in the state.

-Cattle Slaughter

Table B-8 provides data identifying the number of plants and cattle and hogs slaughtered for Nebraska and the U.S. for the 1992-2001 review period. In the case of the data for cattle, the number of cattle

slaughtered in Nebraska grew by 17.7 percent, from 6.5 million in 1992 to 7.65 million in 2001. This growth was nearly double the growth rate of 8.9 percent for the U.S. as a whole.

Table B-8
Cattle and Hog Slaughter: Federally Inspected Plants and Head Slaughtered
United States and Nebraska, Selected Years

Year	Cattle				Hogs			
	United States		Nebraska		United States		Nebraska	
	Plants	Number Slaughtered	Plants	Number Slaughtered	Plants	Number Slaughtered	Plants	Number Slaughtered
	(Number)	(1,000 Head)	(Number)	(1,000 Head)	(Number)	(1,000 Head)	(Number)	(1,000 Head)
1992	971	31,849	46	6,498	921	91,871	33	5,819
1993	934	33,062	45	6,690	891	92,323	31	5,677
1994	882	33,482	40	6,501	830	93,435	28	5,746
1995	836	34,879	39	6,742	802	94,203	28	5,813
1996	812	36,070	39	7,333	770	91,337	28	5,752
1997	822	36,011	36	7,470	770	91,494	24	5,836
1998	795	34,650	33	7,254	757	98,882	22	6,235
1999	759	35,415	29	7,394	728	99,555	20	6,311
2000	738	35,631	32	7,592	721	96,436	22	6,252
2001	723	34,684	32	7,649	699	96,232	23	6,643
% Change, 1992-2001	-25.5	8.9	-30.4	17.7	-24.1	4.7	-30.3	14.2

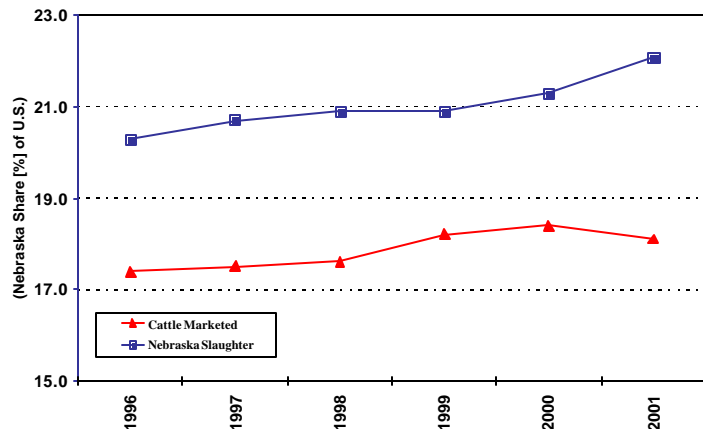
Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics, (www.agr.state.ne.us/agstats).

Figure B-11 compares the trend in cattle slaughter (Nebraska as a percent of U.S.) with the relative trend in fed cattle marketed for the 1996-2001 review period. As shown by the data portrayed in this chart, Nebraska cattle slaughter has continued to increase, as a percent of the U.S. total, during the review period. In 2001, Nebraska cattle slaughter (7,649,000 head) accounted for 22.1 percent of the U.S. total. This number compared with the Nebraska number of fed cattle marketed of 4,875,000 head, or 18.1 percent of the U.S. total.

-Hog Slaughter

Table B-8 also included data showing the number of hogs slaughtered in Nebraska and the U.S. for the 1992-2001 period. As indicated by the table, the number of hogs slaughtered in Nebraska grew by 14.2 percent, from 5.82 million in 1992 to 6.64 million in 2001. This growth rate was significantly greater than the U.S. growth of 4.7 percent in the number of hogs slaughtered nationwide.

Figure B-11
Fed Cattle Marketed and Cattle Slaughter, Nebraska as a Percent of U.S., 1996-2001



Source: Nebraska Agricultural Statistics Service, 2002 Nebraska Agricultural Statistics.

Figure B-12 compares the trend in Nebraska hog slaughter (Nebraska as a percent of U.S.) with the relative trend in the inventory of hogs and pigs for the 1993-2001 review period. As shown by the data portrayed in the chart, Nebraska's share of U.S. hog slaughter has increased while the Nebraska share of the U.S. inventory of hogs and pigs has experienced a significant decline.

In 2001, Nebraska hog slaughter (6,643,000 head) accounted for 6.9 percent of the U.S. total. This number compared with the Nebraska inventory of hogs and pigs of 2,900,000, representing 4.9 percent of the U.S. total inventory.

The declining trend in the number of hogs and pigs in Nebraska, relative to other areas, raises a concern about the sustainability of Nebraska's share of hog slaughter. Over the longer term, the decline in the Nebraska's share of the nation's pork supply must be reversed if the state is going to continue to maintain its pork processing industry at its present level.

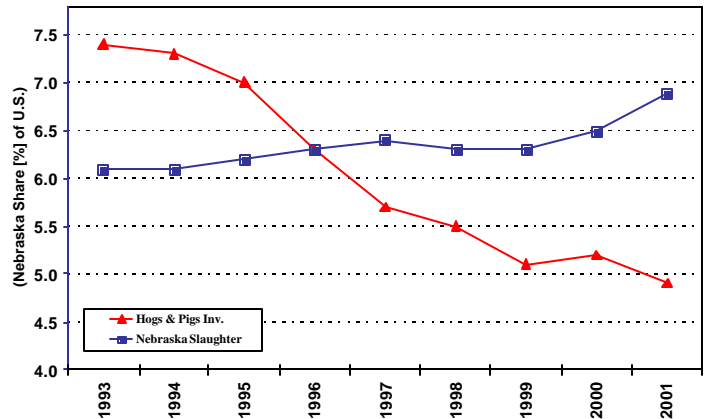
Concluding Comments

Livestock and livestock products are the largest contributor to cash receipts for Nebraska's farmers. The importance of the livestock sector becomes even more evident when one considers its role as a market for Nebraska's feed crops.

The trends in livestock production suggest economies of scale play an important role in defining the structure of this agricultural sector. In the case of cattle on feed, there were 4,380 Nebraska feedlots in 2001 with a capacity of less than 1,000 head. These 85.9 percent of the total feedlots provided only 6.2 percent of the fed cattle marketed from Nebraska feedlots. At the other extreme, there were only 7 (0.1 percent of the total) Nebraska feedlots with a capacity of 32,000 or more head. These 7 feedlots accounted for 12.6 percent of the total fed cattle marketed in 2001.

The national trends exhibit an even greater concentration in cattle feeding resulting from apparent scale economies. In the case of the U.S., 41.9 percent of the fed cattle marketed originated from feedlots with a capacity of more than 32,000 head compared to the Nebraska experience with only 12.6 percent of fed cattle marketed originating from this feedlot size category.

Figure B-12
Hogs and Pigs Inventory and Slaughter,
Nebraska as a Percent of U.S., 1993-2001



Source: Nebraska Agricultural Statistics Service, 2002 *Nebraska Agricultural Statistics*.

The data on swine production by size of operation provides evidence that substantial scale economies are also at work in this sector. For all Nebraska swine operations as of December 2001, 41.0 percent of the inventory hogs and pigs were found at operations with a capacity of greater than 5,000 head. Moreover, research undertaken by the Economic Research Service of U.S.D.A. reports average hog production costs decline substantially as the size of operation increases. Average production costs for "farrow-to-finish" facilities are reported to be \$51.25 per hundredweight greater (126.4 percent more) in operations with a capacity of less than 500 head than for operations with more than 10,000 head.

Swine production has also experienced significant geographic shifts over time. Restrictions on the location and expansion of production facilities due to concerns about industry concentration and environmental impacts has resulted in swine production not being able to grow in areas where it may enjoy its most favorable cost advantages. As a case in point, of the major hog-producing states, Nebraska recorded the greatest decline (-37.1 percent) in its inventory of market hogs over the 1992-2001 review period.

Nebraska continues to maintain a significant share of the U.S. livestock slaughter—particularly cattle slaughter. This is an important factor affecting the continued expansion of Nebraska's meat processing (manufacturing) industry.

In 2001, Nebraska led the Nation in cattle slaughter (7,649,000 head), accounting for 22.1 percent of the U.S. total. This compared with the Nebraska number of fed cattle marketed of 4,875,000 head, or 18.1 percent of the U.S. total.

Nebraska hog slaughter accounted for 6.9 percent of the U.S. total for 2001. However, the declining trend in the number of hogs and pigs in Nebraska, relative to other areas, raises a concern about the sustainability of Nebraska's share of hog slaughter.

The continued viability of livestock slaughter and the meat processing industry in Nebraska will be dependent on the ability of the livestock industry to continue to maintain its competitive position and to provide the essential material inputs required by this industry. Over the longer term, one would expect the location patterns in livestock slaughter and meat processing to reflect the geographic dispersion of livestock production.

SECTION C
THE NEBRASKA MEAT PROCESSING INDUSTRY
by Dr. Donis N. Petersan⁽¹⁾

Nebraska Employment in Meat Products Manufacturing

Value added processing of Nebraska's agricultural products, and particularly livestock products, has played a important role in creating jobs in the manufacturing sector and sustaining the Nebraska

economy. In the case of the non-metropolitan portion of Nebraska, manufacturing employment in the meat-processing sector has been even more important than is true for the state as a whole. Data presented in Table C-1 and Figure C-1 provide a review of employment trends for non-farm wage and salary and manufacturing employment for the

Table C-1
Non-farm Wage & Salary and Manufacturing Employment, Nebraska, Metropolitan and Non-Metro Areas, 1993-2001

Year	Nebraska		Metro Area ^(a)		Non-Metro Area ^(b)	
	NF W&S Emp.	Mfg. Emp.	NF W&S Emp.	Mfg. Emp.	NF W&S Emp.	Mfg. Emp.
1993	767,212	103,784	446,385	46,315	320,827	57,469
1994	796,194	108,753	463,426	48,452	332,768	60,301
1995	816,367	112,216	478,173	50,179	338,194	62,037
1996	834,768	113,635	493,697	51,038	341,071	62,597
1997	854,217	116,412	506,014	52,228	348,203	64,184
1998	876,261	118,956	518,574	54,420	357,687	64,536
1999	892,699	118,230	536,337	54,496	356,362	63,734
2000	908,893	119,787	540,783	54,190	368,110	65,597
2001	909,406	117,289	543,162	51,456	366,244	65,833
Change, 1993-2000						
Number	142,194	13,505	96,777	5,141	45,417	8,364
Percent	18.5	13.0	21.7	11.1	14.2	14.6

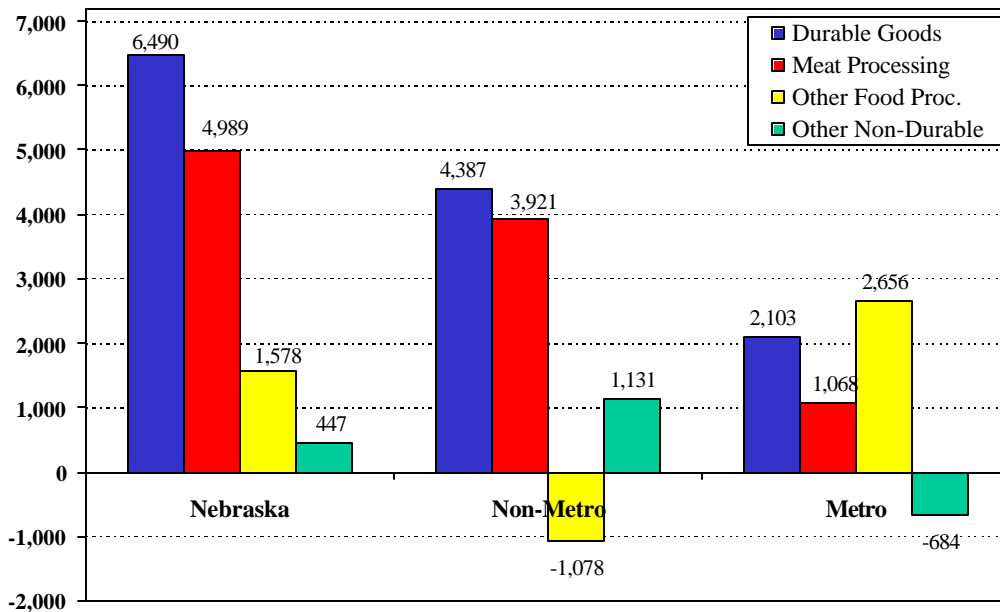
^(a) Metropolitan Area includes the Nebraska portion of the Omaha MSA (Douglas, Cass, Sarpy, and Washington Counties) and the Lincoln MSA (Lancaster County).
^(b) The Non-Metro Area includes the 88 Nebraska counties outside of the metropolitan areas.
Source: Nebraska Workforce Development, Labor Market Information WEB site (www.dol.state.ne.us/nwd/).

As the data presented in Table C-1 indicate, non-farm wage and salary employment in Nebraska grew by 142,194 jobs (18.5 percent) over the 1993-2001 review period. Manufacturing jobs increased by 13,505, or 13.0 percent. Although non-farm employment grew at a significantly faster rate in the metropolitan areas (21.7 percent compared to 14.2 percent for non-metro), manufacturing employment grew at a faster pace in the non-metro areas of Nebraska (14.6 percent compared to 11.1 percent for the metro areas).

Further disaggregation of manufacturing employment shows the contribution of the selected industry sectors of interest to the changes in manufacturing employment over the review period. The data presented in Table C-2 disaggregates manufacturing employment into the subsectors of durable goods, meat processing, other food processing, and other non-durable goods manufacturing. Moreover, the data is presented for Nebraska as a whole (Part A), the metropolitan areas (Part B), and non-metropolitan Nebraska (Part C).

⁽¹⁾Section C prepared by Dr. Donis N. Petersan, Economic Research Supervisor, Nebraska Public Power District.

Figure C-1
Change in Employment, Selected Manufacturing Sectors,
Nebraska, Non-Metro, and Metro Areas, 1993-2001



Data presented in Table C-2 and portrayed in Figure C-1 indicate employment growth in the value-added meat processing industry has played an important role in adding new employment opportunities and sustaining manufacturing employment levels in Nebraska—particularly in the non-metropolitan areas of the state. As these data indicate, Nebraska employment in meat processing grew by 4,989 between 1993 and 2001, with 3,921 (78.6 percent) of the added jobs located in the non-metropolitan areas of the state.

An examination of the graphical presentation of these data (Figure C-1) reveals that, for non-metropolitan Nebraska, the growth in meat processing (+3,921 jobs) accounted for 46.7 percent of the total increase in manufacturing employment (+8,361 jobs) between 1993 and 2001. Moreover, of the total growth in value-added meat processing employment in Nebraska (+4,989 jobs), 78.6 percent occurred in non-metropolitan areas.

Table C-2
Manufacturing Employment for Selected Industry Sectors,
Nebraska, Metropolitan and Non-Metro Areas, 1993-2001

Part A - Nebraska

Year	Durable	Meat Products	Other Food	
			Products	Other Nondurable
1993	48,752	21,488	10,724	22,820
1994	51,999	21,267	12,105	23,382
1995	54,017	22,602	11,918	23,679
1996	54,780	24,129	11,711	23,015
1997	57,039	24,188	12,101	23,084
1998	58,082	24,030	12,743	24,101
1999	57,216	24,487	12,680	23,847
2000	58,572	24,897	12,640	23,679
2001	55,242	26,477	12,302	23,267
Change, 1993-2000				
Number	6,490	4,989	1,578	447
Percent	13.3	23.2	14.7	2.0

Part B - Nebraska Metropolitan Areas^(a)

Year	Durable	Meat Products	Other Food	
			Products	Other Nondurable
1993	21,554	3,858	5,457	15,444
1994	22,519	3,179	7,114	15,641
1995	23,963	3,270	7,201	15,746
1996	24,507	4,081	7,678	14,772
1997	25,426	4,002	7,839	14,961
1998	26,295	4,336	8,263	15,525
1999	26,055	4,479	8,324	15,640
2000	26,012	4,850	8,367	14,961
2001	23,657	4,926	8,113	14,760
Change, 1993-2000				
Number	2,103	1,068	2,656	-684
Percent	9.8	27.7	48.7	-4.4

Part C - Non-Metro Nebraska^(b)

Year	Durable	Meat Products	Other Food	
			Products	Other Nondurable
1993	27,198	17,630	5,267	7,376
1994	29,480	18,088	4,991	7,741
1995	30,054	19,332	4,717	7,933
1996	30,273	20,048	4,033	8,243
1997	31,613	20,186	4,262	8,123
1998	31,787	19,694	4,480	8,576
1999	31,161	20,008	4,356	8,207
2000	32,560	20,047	4,273	8,718
2001	31,585	21,551	4,189	8,507
Change, 1993-2000				
Number	4,387	3,921	-1,078	1,131
Percent	16.1	22.2	-20.5	15.3

^(a) Metropolitan Area includes the Nebraska portion of the Omaha MSA (Douglas, Cass, Sarpy, and Washington Counties) and the Lincoln MSA (Lancaster County).

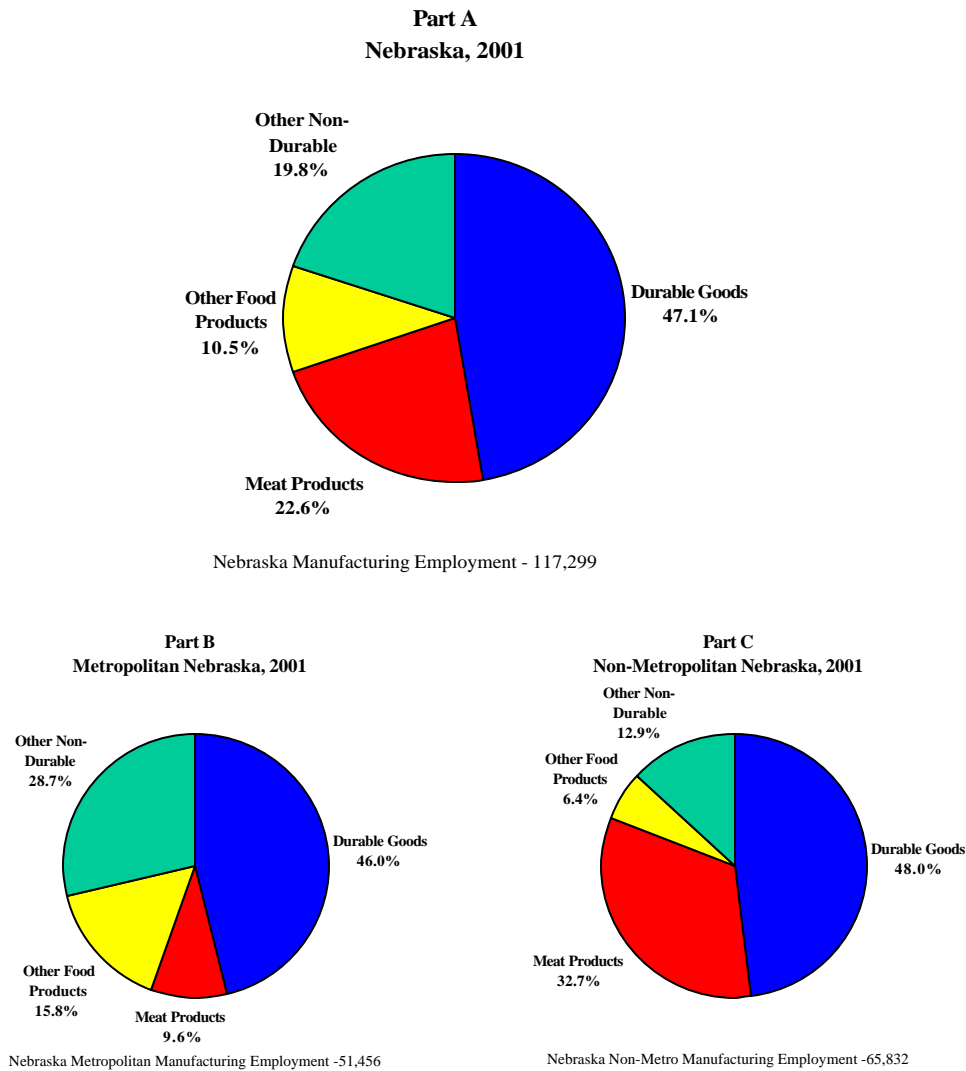
^(b) The Non-Metro Area includes the 88 Nebraska counties outside of the metropolitan areas.

Source: Nebraska Workforce Development, Labor Market Information WEB site, (www.dol.state.ne.us/nwd/).

Figure C-2 provides a comparative overview of the distribution of manufacturing employment by selected industry sectors for 2001. As the chart illustrates, manufacturing employment in value-added meat processing accounted for 22.6 percent of total manufacturing employment for Nebraska as a whole. For non-metropolitan Nebraska, employment in meat

processing represented 32.7 percent of total manufacturing employment and for the metropolitan areas the comparable figure was 9.6 percent. Obviously, the non-metropolitan areas of Nebraska have a much greater reliance on the value-added meat processing sector as a source of manufacturing jobs.

Figure C-2
Manufacturing Employment for Selected Industry Sectors,
Nebraska, Metropolitan and Non-Metro Areas, 2001



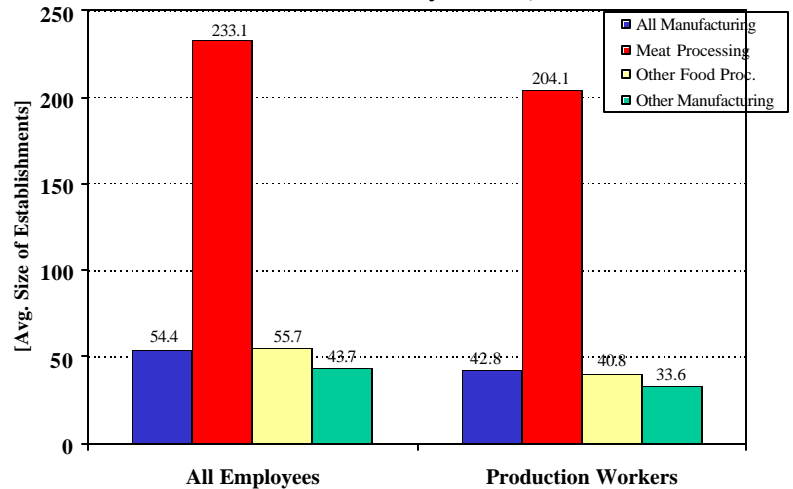
The Nebraska Meat Products Manufacturing Sector

Table C-3 provides data reviewing selected measures of manufacturing activity in Nebraska for the meat products industry sector (NAICS 3116), other food products manufacturing (food products other than meat), other manufacturing (manufacturing other than food products) and for all manufacturing. These data clearly illustrate the importance of the meat products manufacturing sector to the Nebraska manufacturing sector as a whole and also for the Nebraska economy.

The data provided in Table C-3 and in Figure C-3 indicate that meat processing establishments have, on average, significantly more workers per establishment than other manufacturing sectors. In the case of the meat products manufacturing sector, 54.1 percent of the Nebraska establishments had more than 20 employees in 1997 (see Table C-3), while for all manufacturing only 31.2 percent of establishments had more than 20 employees. Moreover, as the data presented in Figure C-3 illustrate, the average size of establishment in the meat products sector was significantly larger than is true for other manufacturing sectors.

In 1997, Nebraska manufacturing establishments in the meat products sector had an average of 233 total employees and 204 production workers. With respect to total employees, the meat products establishments were, on average, 4.3 times the average size for all manufacturing establishments (54.4 employees). Comparing the average number of production workers per establishment, the disparity was even

Figure C-3
Average Size of Establishments for Selected
Nebraska Industry Sectors, 1997



greater with meat products establishments having 4.8 times the average size for all manufacturing establishments (42.8 production workers).

The data in Table C-3 presents additional information describing characteristics of the meat products manufacturing sector, as well as the selected other manufacturing sectors. As the data in the table illustrate, value added by Nebraska meat products manufacturers totaled \$2,196.7 million in 2000, an increase of 64.1 percent from 1997 (also see Figure C-4). The total value of shipments by the meat products industry was \$11,296.0 million in 2000 and the value of purchased inputs (primarily livestock products) was \$9,112.6 million.

Table C-3
Characteristics of Selected Manufacturing Sectors,
Nebraska, 1997-2000

	31-33 - Manufacturing			3116 - Meat Prod. Mfg.			Other Food Products Mfg. (Exc. Meat Prod.)			Other Manufacturing (Except Food Prod.)		
	1997	2000	% Chg.	1997	2000	% Chg.	1997	2000	% Chg.	1997	2000	% Chg.
Establishments	1,960	N/A	N/A	98	N/A	N/A	194	N/A	N/A	1,668	N/A	N/A
w. 20+ Employees	612	N/A	N/A	53	N/A	N/A	75	N/A	N/A	484	N/A	N/A
(Percent 20+ Emp.)	31.2	N/A	N/A	54.1	N/A	N/A	38.7	N/A	N/A	29.0	N/A	N/A
Employees	106,556	110,332	3.5	22,839	23,431	2.6	10,813	9,074	-16.1	72,904	77,827	6.8
Payroll (\$1,000)	3,034,134	3,447,545	13.6	511,708	628,126	22.8	314,702	330,264	4.9	2,207,724	2,489,155	12.7
Production Workers	83,975	87,019	3.6	20,004	20,724	3.6	7,906	6,666	-15.7	56,065	59,629	6.4
Wages (\$1,000)	2,129,405	2,393,485	12.4	421,650	510,804	21.1	217,656	234,941	7.9	1,490,099	1,647,740	10.6
Value Added (\$1,000)	10,460,265	12,376,905	18.3	1,338,702	2,196,744	64.1	1,842,389	1,610,964	-12.6	7,279,174	8,569,197	17.7
Cost of Materials (\$1,000)	17,459,386	18,767,739	7.5	8,377,905	9,112,555	8.8	2,776,358	2,314,930	-16.6	6,305,123	7,340,254	16.4
Value of Shipments (\$1,000)	27,939,376	30,968,819	10.8	9,697,353	11,295,972	16.5	4,622,780	3,913,453	-15.3	13,619,243	15,759,394	15.7
Capital Expenditures (\$1,000)	721,776	774,230	7.3	77,079	143,376	86.0	164,728	86,899	-47.2	479,969	543,955	13.3

N/A -- Not Available

Source: U.S. Bureau of the Census, *1997 Economic Census, Manufacturing, Geographic Area Series* (EC97M31A-NE), and *Annual Survey of Manufactures, Geographic Area Statistics: 2000* (M00[AS]-3).

It is also of interest to note average pay per employee and average wages per production worker grew significantly between 1997 and 2000, reflecting, in part, the substantial growth in value added in the meat products sector. While the number of employees in the meat products sector increased by 3.5 percent between 1997 and 2000, total payroll grew by 22.8 percent. Similarly, as production workers increased 3.6 percent between 1997 and 2000, total wages paid to production workers grew by 21.1 percent. Figure C-4 provides additional comparisons of growth for selected measures of manufacturing activity for the meat products sector, for other selected industrial sectors, and for all manufacturing.

The importance of Nebraska's meat products manufacturing sector, relative to other industrial sectors, is further illustrated by the

Figure C-4
Percent Change in Selected Measures of Manufacturing Activity, Selected Industry Sectors, 1997-2000

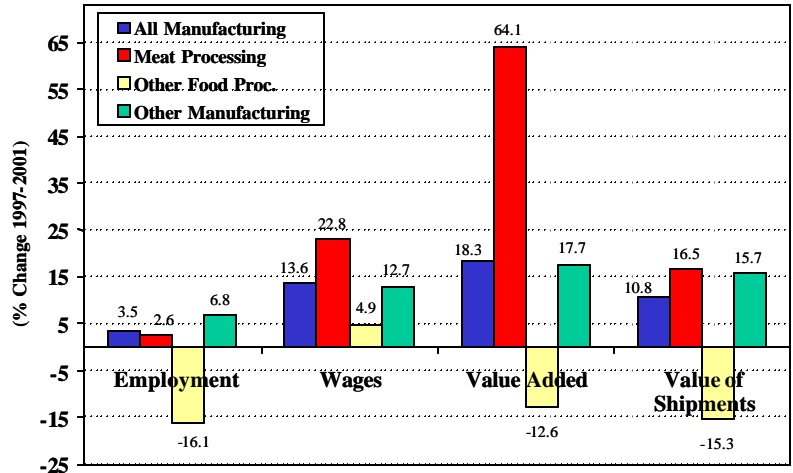
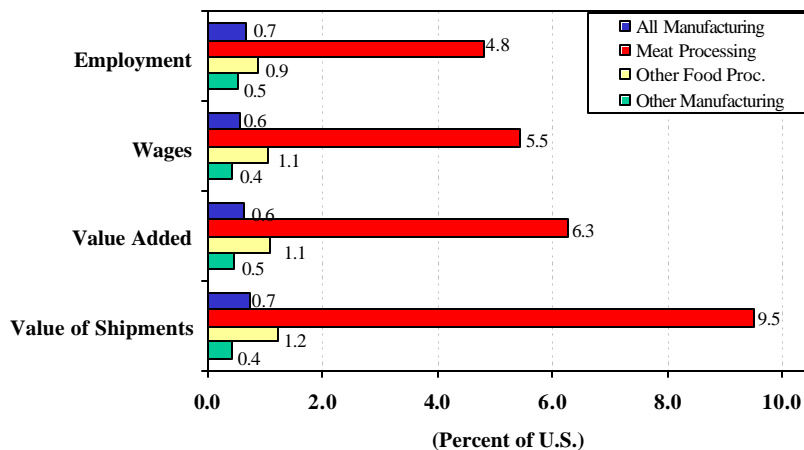


Figure C-5
Nebraska Percent Share of U.S. Manufacturing Activity, Selected Industry Measures, 2000



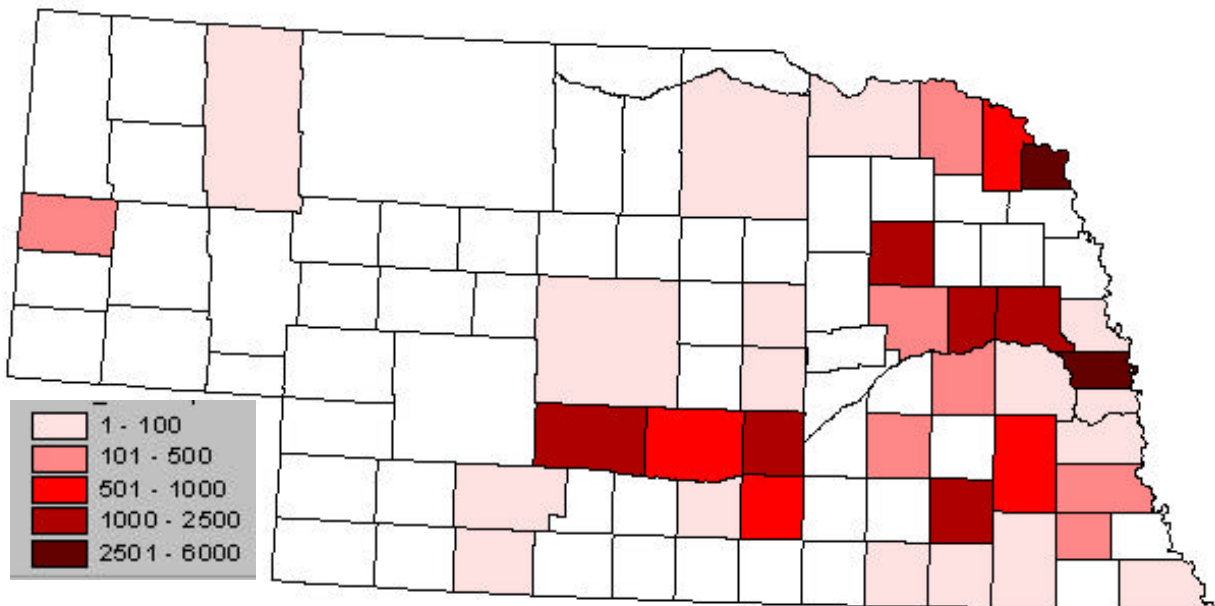
data portrayed in Figure C-5. As these data indicate, Nebraska's share of the U.S. manufacturing activity (for all manufacturing) is approximately seven tenths of one percent (0.7 percent), with 0.7 percent of U.S. manufacturing employment in Nebraska, 0.6 percent of total U.S. wages paid by manufacturers, 0.6 percent of value added, and 0.7 percent of the total U.S. value of shipments by manufacturing establishments.

A review of similar metrics for the meat products industry illustrates that Nebraska's meat processing sector is substantially more important in terms of its relative share of U.S. manufacturing activity. Nebraska meat products manufacturing accounted for 4.8 percent of U.S. employment in this sector, 5.5 percent of total U.S. wages paid in meat processing, 6.3 percent of value added and 9.5 percent of the total value of shipments of processed meat products.

According to the *2002 Nebraska Manufacturers' Directory*, there were 106 Nebraska establishments in the meat or dairy processing manufacturing sectors. These establishments reported total employment of 26,950 in 2001. Figure C-6 provides

an overview of the geographic distribution of this employment, indicating that these manufacturing establishments were located throughout Nebraska in 36 of the State's 93 counties.

**Figure C-6
Employment Levels in the Meat Processing and Dairy Industry Sector
for Nebraska Counties**



Source: Nebraska Department of Economic Development, *2002 Nebraska Manufacturers' Directory*

Further review of the data presented in Table C-4 provides additional insights regarding the geographic distribution of establishments in the meat products and dairy processing industry. As is indicated by these data, there were 32 Nebraska counties that had meat products and dairy processing establishments with 100 or fewer employees; 13 counties with establishments with 101-500 employees; 3 counties with establishments

with 501-1,000 employees; 6 counties with establishments ranging in size from 1,000 – 2,500; and, 1 county (Dakota) with an establishment with more than 2,500 employees.

Clearly, the meat products and dairy processing industry is an important source of jobs and income for workers throughout Nebraska, in rural areas as well as in the metropolitan areas.

Table C-4

Number of Meat and Dairy Processing Establishments^(a), by Employment Size,

County	Total Establishments	Establishments by Employment Size Category				
		1 - 100 Employees	101 - 500 Employees	501 - 1,000 Employees	1,000 - 2,500 Employees	2,501+ Employees
ADAMS	5	4	1			
BUFFALO	5	2	3			
BUTLER	1		1			
CASS	1	1				
CEDAR	2	1	1			
COLFAX	2	1			1	
CUSTER	2	2				
DAKOTA	1					1
DAWSON	2	1			1	
DIXON	1			1		
DODGE	6	4	1		1	
DOUGLAS	26	17	6	1	2	
FRONTIER	1	1				
GAGE	1	1				
GREELEY	1	1				
HALL	2	1			1	
HOLT	1	1				
HOWARD	1	1				
JEFFERSON	3	3				
JOHNSON	1		1			
KEARNEY	1	1				
KNOX	1	1				
LANCASTER	8	5	3			
MADISON	6	5		1		
OTOE	5	4	1			
PLATTE	2	1	1			
RED WILLOW	1	1				
RICHARDSON	2	2				
SALINE	5	2	2		1	
SARPY	1	1				
SAUNDERS	1	1				
SCOTTS BLUFF	3	2	1			
SHERIDAN	1	1				
THAYER	1	1				
WASHINGTON	1	1				
YORK	2	1	1			
Totals	106	72	23	3	7	1

^(a) Establishments classified as dairy processing (NAICS 3115) or meat products manufacturing (NAICS 3116).

Source: Nebraska Department of Economic Development, 2002 *Nebraska Manufacturers' Directory*.

Concluding Comments

Employment growth in the value-added meat processing industry has played an important role in adding new employment opportunities and sustaining manufacturing employment levels in Nebraska—particularly in the non-metropolitan portion of the state. Nebraska employment in meat processing grew by 4,989 between 1993 and 2001, with 3,921 (78.6 percent) of the added jobs located in the non-metropolitan areas of the state.

Manufacturing employment in value-added meat processing accounted for 22.6 percent of total manufacturing employment for Nebraska as a whole in 2001. For non-metropolitan Nebraska, employment in meat processing represented 32.7 percent of total manufacturing employment compared to 9.6 percent for the metropolitan areas of the state.

Value added by Nebraska meat products manufacturers totaled \$2.2 billion in 2000, an increase of 64.1 percent from its 1997 level. The total value of shipments (output) by the meat products industry was \$11.3 billion and the value of purchased inputs (primarily livestock products) was \$9.1 billion. For the year 2000, Nebraska's value of shipments accounted for 9.5 percent of the total value of shipments of processed meat products for the U.S. as a whole.

Nebraska establishments processing dairy or meat products have a wide geographic dispersion throughout the state. There were 106 Nebraska establishments reported by the *2002 Nebraska Manufacturers' Directory* located in 36 of the State's 93 counties. Clearly, the meat products and dairy processing industry is an important source of jobs and income for workers located throughout Nebraska, in rural areas as well as in the metropolitan areas.

SECTION D

ECONOMIC LINKAGES TO LIVESTOCK ENTERPRISES

by Dr. Donis N. Petersan⁽¹⁾

Defining and describing the complex economic relationships that exist among sectors within the agricultural production economy and between the agricultural production sectors and other economic sectors is a task that is well beyond the scope of this report. It is important to recognize, however, that livestock production has an enormous impact on other segments of the Nebraska economy.

The information and analyses presented in this section of the report addresses the economic impact of feedlot and dairy farm operations and the impact associated with the production of pork (hogs, pigs and swine) in Nebraska, and particularly in the non-metropolitan areas of Nebraska. The analysis utilizes a methodology similar to that employed in a South Dakota study prepared for the South Dakota Corn Producers Council by Randall M. Stuefen and Randall E. Waldron of the University of South Dakota in Vermillion, South Dakota. That study, *Proximity Feeding of Distiller's Grain to Cattle and Dairy Herds*, identifies economic impacts associated with cattle feedlots and dairy operations within South Dakota and quantifies the economic impacts associated with the substitution of wet distillers grain for other more traditional sources in the feeding rations.

The analysis provided in this section employs the IMPLAN input-output (I-O) database and analysis model. Specifically, an I-O model has been developed for the non-metropolitan area of Nebraska using the IMPLAN database and modeling software. This model allows one to evaluate the economic impacts in the subject area (geographic region) associated with the production of a specified economic output.

In the I-O analysis, multipliers are derived that describe the economic activity necessary to support the production activity of the respective livestock enterprises. As such, the input-output analysis identifies and quantifies economic linkages associated

with the inputs required to produce the subject output (backward linkages).

Forward linkages are not evaluated. That is, the model does not provide a measure of additional future production made possible by the production of the livestock output. In the case of cattle feedlots, for example, the model would not measure the economic impacts associated with the beef slaughter and processing industry that a supply of fed cattle makes possible, even though we recognize that the processing facilities would likely not be located in Nebraska were it not for the substantial availability of fed cattle in the state.

In the following analysis, the economic impacts associated with cattle feedlots, dairy operations, and hog operations are presented. In each case, three multiplier effects are identified. These are the output multiplier, the value-added multiplier, and the employment multiplier.

Each of the multipliers in turn, consist of three components: the direct effect, the indirect effect, and the induced effect. The output multiplier defines the change in the total output for the economy associated with the delivery of an additional unit (dollar) of output (beef, dairy, or pork products) to final demand.

For each of the subject sectors, the initial response to a one-dollar change in final demand is the direct effect, and this component of the multiplier always has a value of one. However, as one recognizes that the initial change in sales to final demand represent an incremental increase in output, the respective livestock enterprise will find it must, in turn, purchase additional inputs from other businesses or economic sectors in order to produce the additional output.

The industries supplying additional inputs to the respective livestock enterprise will find they also must

⁽¹⁾Section D prepared by Dr. Donis N. Petersan, Economic Research Supervisor, Nebraska Public Power District.

purchase additional inputs in order to supply the increased inputs demanded by the livestock enterprises. As the increased demand for goods and services associated with the initial increase in sales to final demand works itself through the sectors of the economy, these effects are collected and termed the indirect effects component of each of the economic multipliers.

The induced component of the economic multipliers follows from the increased personal income (payments to households) in the area resulting from the increase in the demand for labor, both with respect to the direct and indirect economic effects. That is, as output is increased in the livestock enterprise (direct effect) and in the economic sectors that supply the additional inputs to the livestock sector (indirect effects), these sectors will add labor inputs and increase their payments to labor. The translation of the additional household income into additional expenditures for goods and services in the subject economy are termed the induced effects. The three effects – direct, indirect, and induced – together represent the economic multipliers utilized to measure the economic impacts associated with the subject livestock enterprises.

As previously noted the output multiplier measures the economic activity that is associated with the direct output for each of the livestock sectors of interest (cattle feeding, dairy farm products, and pork products). The output multiplier assumes that as the respective livestock sectors produce the sector output, they will need to purchase substantial inputs and will thereby provide economic stimulus to the supplying sectors. Obviously, as more inputs are purchased from other economic sectors within the regional economy, the economic impacts (multipliers) will increase.

The value-added impacts (multipliers) associated with the respective livestock enterprises provide a better measure of the true economic value associated with these sectors. Value-added effects consist of payments to the factors of production within the economy and include payments to labor, proprietor income, other property income, and indirect business taxes. The labor income component of value added includes wages and salaries as well as other employee benefits including non-cash compensation. It includes all income to workers paid by employers. Proprietary income includes payments received by self-employed individuals as income. Other property type income consists of payments from interest, rents, royalties, dividends, and profits. Indirect business taxes consist primarily of excise and sales taxes paid by individuals to businesses. These taxes occur during the normal operation of the businesses but do not include taxes on profit or income.

The analysis provided in this section also reports an employment multiplier associated with each of the livestock enterprises evaluated. For the employment multiplier and employment effects, the measure provides an estimate of the total number of direct jobs created by one million dollars of output. As was true for the output and value-added multipliers, the employment multiplier consists of three components. The direct employment effect reports the number of jobs associated with \$1,000,000 of output for each of the livestock enterprises evaluated. The indirect effect is associated with the jobs created in the businesses or economic sectors supplying inputs to the livestock enterprises and the induced component of the employment multiplier reports the number of jobs associated with the increased household demand for goods and services resulting from the increased payments to labor.

Cattle Feedlot Impacts

The estimated direct, indirect and induced components of the economic multipliers associated with cattle feedlots are provided in Table D-1. As indicated in the table, the three multipliers for which values are reported include the output, value-added

and employment multipliers. The output multiplier suggests for each dollar of sales to final demand by feedlots in non-metropolitan Nebraska, there will be an estimated increase in total economic output of \$1.47 (one dollar and forty seven cents) for the non-metropolitan economy.

Table D-1
Input-Output Multipliers for Feedlots, Non-Metropolitan Nebraska, 1999

Multiplier Component	Total Output ^(a)	Total Value Added ^(b)	Total Employment ^(c)
Direct	1.0000	0.1908	2.2114
Indirect	0.3779	0.1660	4.2655
Induced	0.0939	0.0553	1.6891
Total	0.4120	0.4120	8.1660
Multiplier ^(d)	1.4718	2.1597	3.6927

^(a) Increase in output for each dollar of sales to final demand.
^(b) Change in value added for each dollar of sales to final demand.
^(c) Total jobs created per million dollars of sales to final demand.
^(d) Multiplier values equal the total effects divided by the direct effect.
Source: Minnesota IMPLAN Group, Inc., IMPLAN Input-Output Model for Non-Metropolitan Nebraska, 1999 data.

The value-added multiplier estimates there will be total payments to the factors of production of \$0.412 for each dollar of sales of fed cattle to final demand. This total value-added effect includes the direct effect of \$0.1908 associated with the initial sale of one dollar of output to final demand, \$0.166 of payments to the factors of production associated the increase in output (sales) for the intermediate (supplying) sectors, and the induced effect of \$0.0553

because of the increased household demand for goods and services resulting from the increased payments to labor.

Finally, the employment multiplier suggests for each \$1,000,000 of sales to final demand by the feedlot sector, there will be a total of 8.2 jobs supported, including the direct, indirect and induced component of the employment multiplier.

It is of interest to also review the businesses (economic sectors) that are the primary beneficiaries of the economic activity resulting from the cattle feeding activity in the non-metropolitan areas of Nebraska. Table D-2 includes a list of the twenty-five business sectors that are likely to be the most

affected by the production of fed cattle. The impacts presented in the table include the predicted output, value-added, and employment impacts for each of the twenty-five sectors associated with the production and sales to final demand of \$1,000,000 of output by the feedlot sector.

Table D-2
Distribution of Feedlot Economic Impacts for Selected Economic Sectors,^(a)
Non-Metropolitan Nebraska, 1999

Industry	Total Output	% Total Output	Value Added	Employment
Cattle Feedlots	\$1,002,479	68.11	\$191,226	2.2
Feed Grains	75,717	5.14	32,778	0.6
Wholesale Trade	51,481	3.50	36,531	0.7
Range Fed Cattle	47,077	3.20	9,867	0.4
Ranch Fed Cattle	33,505	2.28	7,690	0.3
Motor Freight Transport and Warehousing	33,488	2.28	13,782	0.3
Hay and Pasture	21,171	1.44	8,212	0.5
Real Estate	20,270	1.38	14,535	0.2
Maintenance and Repair Other Facilities	16,627	1.13	9,581	0.3
Banking	13,651	0.93	8,569	0.1
State and Local Electric Utilities	9,988	0.68	3,705	0.0
Other Medical and Health Services	8,068	0.55	3,974	0.2
Owner-occupied Dwellings	6,464	0.44	4,981	0.0
Other State and Local Govt Enterprises	6,277	0.43	1,848	0.0
Eating & Drinking	6,248	0.42	2,985	0.2
Doctors and Dentists	6,223	0.42	4,050	0.1
Agricultural- Forestry- Fishery Services	5,846	0.40	3,597	0.3
Communications- Except Radio and TV	5,752	0.39	3,147	0.0
Hospitals	5,738	0.39	3,443	0.1
Prepared Feeds- N.E.C	5,472	0.37	681	0.0
Automotive Dealers & Service Stations	4,269	0.29	3,379	0.1
Miscellaneous Retail	3,831	0.26	3,183	0.2
Miscellaneous Repair Shops	3,358	0.23	1,472	0.1
Food Stores	2,998	0.20	2,769	0.1
Farm Machinery and Equipment	2,988	0.20	1,029	0.0
Total 25 Sectors	\$1,398,986	95.05	\$377,014	7.0
Total Impacts	\$1,471,807	100.00	\$411,966	8.2

^(a) The selected sectors include the top 25 business sectors impacted by the production \$1,000,000 of fed cattle.
Source: Computed from the IMPLAN Input-Output Model for Non-Metropolitan Nebraska.

Pork (Hogs, Pigs, & Swine) Impacts

The estimated direct, indirect and induced components of the economic multipliers associated with the production of pork (hogs, pigs, and swine) products on Nebraska farms are provided in Table D-3. As indicated in the table, the three multipliers for which values are reported include the

output, value-added and employment multipliers. The output multiplier suggests that for each dollar of sales of pork (hogs, pigs, and swine) products to final demand by Nebraska farmers, there will be an estimated increase in total economic output of \$1.48 (one dollar and forty eight cents) in the non-metropolitan Nebraska economy.

Table D-3
Input-Output Multipliers for the Pork (Hogs, Pigs & Swine) Products Sector,
Non-Metropolitan Nebraska, 1999

Multiplier Component	Total Output ^(a)	Total Value Added ^(b)	Total Employment ^(c)
Direct	1.0000	0.2016	6.6332
Indirect	0.3864	0.1663	4.2016
Induced	0.0914	0.0538	1.6432
Total	1.4777	0.4216	12.4781
Multiplier ^(d)	1.4777	2.0917	1.8812

^(a) Increase in output for each dollar of sales to final demand.
^(b) Change in value added for each dollar of sales to final demand.
^(c) Total jobs created per million dollars of sales to final demand.
^(d) Multiplier values equal the total effects divided by the direct effect.
Source: Minnesota IMPLAN Group, Inc., IMPLAN Input-Output Model for Non-Metropolitan Nebraska, 1999 data.

The value-added multiplier estimates there will be total payments to the factors of production of \$0.4216 for each dollar of sales of pork products to final demand. This total value-added effect includes a direct effect of \$0.2016 associated with the initial sale of one dollar of output to final demand, \$0.1663 of payments to the factors of production associated with the increase in output (and sales) for the intermediate (supplying) sectors, and the induced effect of \$0.0538 associated with the increased household demand

for goods and services resulting from the increased payments to labor.

Finally, the employment multiplier suggests that for each \$1,000,000 of sales to final demand by the pork products sector, there will be a total of 12.5 jobs supported, including the direct (6.6 jobs), indirect (4.2 jobs) and induced (1.6 jobs) components of the employment multiplier.

It is of interest to also review the businesses (economic sectors) that are the primary beneficiaries of the economic activity resulting from the pork (hogs, pigs, and swine) production activity in the non-metropolitan areas of Nebraska. Table D-4 includes a list of the 25 business sectors that are likely to be the most affected by the production of hogs

(pork products) on Nebraska farms. The impacts presented in the table include the predicted output, value-added, and employment effects for each of the 25 sectors associated with the production and sales to final demand of \$1,000,000 of output by pork producers in the non-metropolitan areas of Nebraska.

Table D-4
Distribution of Economic Impacts Associated with the Production of Pork (Hogs, Pigs & Swine) Products,
Economic Effects for Selected Economic Sectors^(a), Non-Metropolitan Nebraska, 1999

Industry	Total Output	% Total Output	Value Added	Employment
Hogs- Pigs and Swine	1,088,762	73.68	219,441	7.2
Feed Grains	75,628	5.12	32,739	0.6
Wholesale Trade	51,309	3.47	36,408	0.7
Motor Freight Transport and Warehousing	33,405	2.26	13,748	0.3
Hay and Pasture	21,147	1.43	8,202	0.5
Real Estate	20,196	1.37	14,482	0.2
Maintenance and Repair Other Facilities	16,583	1.12	9,556	0.3
Banking	13,502	0.91	8,475	0.1
State and Local Electric Utilities	9,911	0.67	3,677	0.0
Other Medical and Health Services	8,015	0.54	3,948	0.2
Owner-occupied Dwellings	6,278	0.42	4,838	0.0
Other State and Local Govt Enterprises	6,222	0.42	1,832	0.0
Eating & Drinking	6,086	0.41	2,908	0.2
Doctors and Dentists	6,053	0.41	3,940	0.1
Agricultural- Forestry- Fishery Services	5,839	0.40	3,593	0.3
Communications- Except Radio and TV	5,700	0.39	3,119	0.0
Hospitals	5,592	0.38	3,355	0.1
Prepared Feeds- N.E.C	5,465	0.37	680	0.0
Automotive Dealers & Service Stations	4,165	0.28	3,297	0.1
Miscellaneous Retail	3,733	0.25	3,102	0.2
Miscellaneous Repair Shops	3,351	0.23	1,469	0.1
Farm Machinery and Equipment	2,985	0.20	1,028	0.0
Food Stores	2,919	0.20	2,696	0.1
Insurance Carriers	2,685	0.18	1,655	0.0
Maintenance and Repair- Residential	2,538	0.17	557	0.0
Total 25 Sectors	\$1,408,069	95.29	\$388,745	11.3
Total Impacts	\$1,477,737	100.00	\$421,579	12.5

^(a) The selected sectors include the top 25 business sectors impacted by the production \$1,000,000 of pork (hogs, pigs and swine) products.

Source: Computed from the IMPLAN Input-Output Model for Non-Metropolitan Nebraska.

Dairy Farm Product Impacts

The estimated direct, indirect and induced components of the economic multipliers associated with dairy farm products are provided in Table D-5. The three multipliers for which values are reported include the output, value-added and employment multipliers. The output multiplier suggests for each dollar of sales of dairy farm products to final demand, there will be an estimated increase in total economic output of \$1.43 (one dollar and forty three cents) in the non-metropolitan Nebraska economy.

The value-added multiplier estimates there will be total payments to the factors of production of \$0.5012 for each dollar of sales of dairy farm products to

final demand. This total value-added effect includes a direct effect of \$0.2788 associated with the initial sale of one dollar of output to final demand, \$0.1456 of payments to the factors of production associated the increase in output (and sales) for the intermediate sectors supplying inputs to the dairy farms, and the induced effect of \$0.0768 associated with the additional household demand for goods and services resulting from the increased payments to labor.

Finally, the employment multiplier suggests that for every \$1,000,000 of sales to final demand by the dairy farm products sector, there will be a total of 9.5 jobs supported, including the direct (3.5 jobs), indirect (3.6 jobs) and induced (2.3 jobs) components of the employment multiplier.

Table D-5
Input-Output Multipliers for Dairy Farm Products,
Non-Metropolitan Nebraska, 1999

Multiplier Component	Total Output ^(a)	Total Value Added ^(b)	Total Employment ^(c)
Direct	1.0000	0.2788	3.4737
Indirect	0.2980	0.1456	3.6452
Induced	0.1306	0.0768	2.3479
Total	1.4285	0.5012	9.4667
Multiplier ^(d)	1.4285	1.7976	2.7253

^(a) Increase in output for each dollar of sales to final demand.

^(b) Change in value added for each dollar of sales to final demand.

^(c) Total jobs created per million dollars of sales to final demand.

^(d) Multiplier values equal the total effects divided by the direct effect.

Source: Minnesota IMPLAN Group, Inc., IMPLAN Input-Output Model for Non-Metropolitan Nebraska, 1999 data.

It is of interest to also review the businesses (economic sectors) that are predicted to be primary beneficiaries of the economic activity resulting from the dairy farm production in the non-metropolitan areas of Nebraska. Table D-6 includes a list of the 25 business sectors likely to be most affected by the production of dairy products on Nebraska farms. The

impacts presented in the table include the predicted output, value-added, and employment effects for each of the 25 sectors associated with the production and sales to final demand of \$1,000,000 of output by the dairy farm products sector in the non-metropolitan areas of Nebraska.

Table D-6

**Distribution of Dairy Farm Products Economic Impacts for Selected Economic Sectors^(a),
Non-Metropolitan Nebraska, 1999**

Industry	Total Output	% Total Output	Value Added	Employment
Dairy Farm Products	\$1,000,279	70.02	\$278,867	3.5
Feed Grains	86,212	6.03	37,321	0.7
Wholesale Trade	55,588	3.89	39,445	0.7
Motor Freight Transport and Warehousing	34,714	2.43	14,287	0.3
Hay and Pasture	24,106	1.69	9,350	0.5
State and Local Electric Utilities	16,828	1.18	6,242	0.0
Banking	14,241	1.00	8,939	0.1
Maintenance and Repair Other Facilities	13,445	0.94	7,748	0.2
Real Estate	11,607	0.81	8,323	0.1
Agricultural- Forestry- Fishery Services	10,032	0.70	6,172	0.6
Owner-occupied Dwellings	8,991	0.63	6,929	0.0
Doctors and Dentists	8,650	0.61	5,630	0.1
Eating & Drinking	8,522	0.60	4,071	0.3
Hospitals	7,967	0.56	4,780	0.1
Prepared Feeds- N.E.C	5,922	0.41	737	0.0
Other State and Local Govt Enterprises	5,726	0.40	1,686	0.0
Automotive Dealers & Service Stations	5,705	0.40	4,516	0.1
Communications- Except Radio and TV	5,470	0.38	2,993	0.0
Miscellaneous Retail	5,216	0.37	4,334	0.2
Other Medical and Health Services	4,450	0.31	2,192	0.1
Food Stores	4,133	0.29	3,817	0.2
Cattle Feedlots	3,520	0.25	671	0.0
Gas Production and Distribution	3,417	0.24	1,674	0.0
Insurance Carriers	3,106	0.22	1,914	0.0
General Merchandise Stores	2,964	0.21	2,386	0.1
Total 25 Sectors	\$1,350,811	94.56	\$465,024	7.9
Total Impacts	\$1,428,538	100.00	\$501,145	9.5

^(a) The selected sectors include the top 25 business sectors impacted by the production \$1,000,000 of dairy farm products.

Source: Computed from the IMPLAN Input-Output Model for Non-Metropolitan Nebraska.

Livestock Impact Summary

Table D-7 provides a summary of the economic and employment impacts associated with livestock production in Nebraska for the selected livestock sectors evaluated. These sectors include the cattle feeding sector, the swine production sector and dairy farm products. As the data provided in the table indicate, the total direct output of these sectors taken together is estimated at \$5.3 billion for 2001 (for non-metropolitan Nebraska). Applying the output

multipliers developed for the fed cattle, swine, and dairy farm product sectors of the input-output model (developed for the non-metropolitan areas of Nebraska), results in an estimated total value of \$7.8 billion in output resulting from the selected livestock sectors. Similarly, the total economic effects (direct, indirect and induced) indicates a total value added of \$2.2 billion and total employment of 46,722 to be associated with the selected livestock sectors.

Table D-7
Total Estimated Economic Impacts Associated with Selected Nebraska Livestock Sectors^(a), 1999, 2001

Year	Total Output		Value Added	Total Employment
	Sector Output ^(b)	Impacts ^(c)	Impacts ^(d)	Impacts ^(e)
	- - - Million Dollars - - -			
1999	4,812.9	7,080.2	2,001.4	41,934
2001	5,297.4	7,793.7	2,204.3	46,722

(a) Selected livestock sectors include cattle feeding, swine producers and dairy farm products.
 (b) Direct value of output estimated from data presented in the tables in Section B.
 (c) Output impacts derived from sector output and output multipliers presented in Section D.
 (d) Value-added impacts derived from sector VA and VA multipliers presented in Section D.
 (e) Employment impacts derived from sector emp. and emp. multipliers presented in Section D.

Concluding Comments

A review of the information provided in this section leads one to the conclusion that Nebraska’s livestock sector has an enormous impact on the Nebraska economy, in terms of job creation, wealth creation (value-added) and total economic activity. It is important to note that the information presented in this section relates only to the economic impacts associated with the production for the targeted livestock sectors (cattle feeding, swine, and dairy farm products) and to the sectors that supply inputs to these sectors (backward linkages).

Other important linkages for Nebraska’s livestock production sectors are the forward linkages to the

value-added meat processing industry, which is the largest segment of Nebraska manufacturing activity. The two principal location factors for value-added meat processing establishments are access to material (livestock and products) inputs and ready access to consumer markets. Obviously, without the significant output of livestock and livestock products by our agricultural sector, the processing industry would not be as attracted to Nebraska locations. Information identifying the importance of this sector is presented in Section C, The Nebraska Meat Processing Industry.