

The Role of Agriculture in the North Dakota Economy

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The purpose of this report is to assess the role of agriculture in the North Dakota economy. This analysis is both statewide and regional in perspective (data are provided for each of the state's eight planning regions [Figure 1]). Key indicators used in the analysis include sales for final demand (i.e., sales to out-of-state markets), gross state product (value added), and employment for each economic sector.

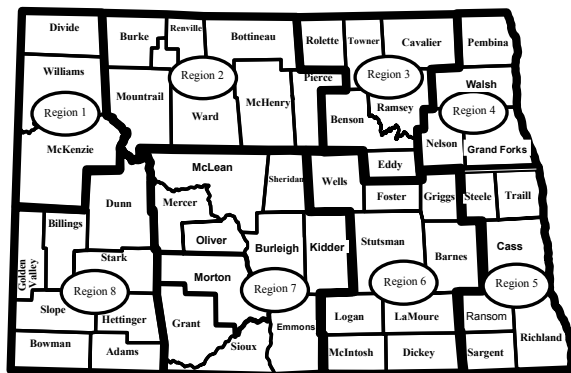


Figure 1. North Dakota State Planning Regions

Sales for Final Demand (Economic Base)

North Dakota's sales for final demand (economic base) can be described as those activities that produce products or services sold to markets outside North Dakota, thus bringing money into the state. These basic sector (or *primary sector*) activities include agriculture, federal government outlays,

manufacturing, tourism, energy extraction/conversion, and exported services (Coon and Leistritz 2001).

The composition of North Dakota's economic base in 2000 is illustrated in Figure 2, where the components of the state's sales for final demand are categorized by the type of economic activity generating the flow of funds. Thus, agricultural crop and livestock sales (including commodity program payments) are grouped together as *agriculture*, expenditures by out-of-state visitors are categorized as *tourism*, exports of energy products are described as *energy extraction/conversion*, exports of manufactured products (including food products and farm inputs) are described as *manufacturing*, while activities involving service activities primarily serving out-of-state markets or clients are classified as *exported services*. *Federal payments* is a category that includes not only salaries and wages of federal employees and federally funded construction and related purchases of goods and services, but also payments to landowners participating in land retirement or easement programs (e.g., the Conservation Reserve Program) and transfer payments. In 2000, federal payments constituted 30 percent of North Dakota's

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economic base, agricultural commodity exports constituted 24.9 percent, the tourism industry accounted for 19.8 percent, energy extraction/conversion – 12.5 percent, manufacturing – 10.1 percent, and exported services – 2.7 percent.

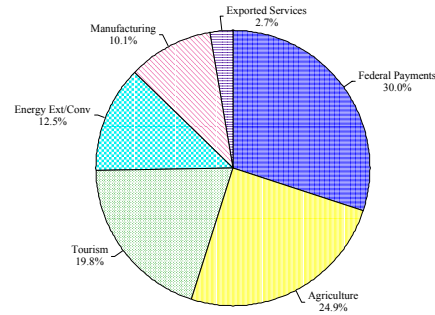


Figure 2. Composition of North Dakota's Economic Base, 2000

Table 1 presents the North Dakota sales for final demand for the basic economic sectors for the 1960-2000 period, expressed in constant year 2000 dollars. (Similar tables for State Regions 1-8 are presented in the full report.) The importance of

Table 1. Sales for Final Demand, by Major Industry, North Dakota, Million constant 2000 dollars, 1960-2000

Year	Agriculture			Manu- facturing	Energy Extract & Conv	Tourism	Export Serv	All Primary Industry	Federal Pymts	Total
	Crops	Lvstk	Total							
1960	1,885.7	846.1	2,731.8	318.9	135.0	96.0	--	3,281.7	1,064.2	4,345.9
1965	2,495.5	1,113.9	3,609.4	352.8	193.1	198.0	--	4,353.3	1,766.0	6,119.3
1970	2,471.5	1,003.7	3,475.2	545.5	230.2	420.7	--	4,671.6	2,761.5	7,433.1
1975	4,159.9	1,210.7	5,370.6	819.8	366.3	401.1	--	6,957.8	3,020.8	9,978.6
1980	3,230.6	1,466.3	4,696.9	1,055.0	1,225.5	361.6	--	7,339.0	3,369.4	10,708.4
1985	3,756.8	1,014.4	4,771.2	848.8	1,620.7	368.1	--	7,603.8	3,352.3	10,961.1
1990	2,807.8	1,006.6	3,814.4	864.4	1,443.6	433.7	--	6,556.1	3,720.2	10,276.3
1995	3,147.1	617.2	3,764.3	1,106.8	1,329.3	883.9	--	7,084.3	4,125.6	11,209.9
2000	3,220.9	339.4	3,560.9	1,788.2	2,829.7	2,829.7	381.6	10,008.0	4,282.9	14,290.3

agriculture to the state's economy can be evaluated by determining the percentage of the total that is comprised of livestock and crop sales. (Crop sales include federal government farm program payments.) Prices and production in the agricultural sectors will vary from year to year, thus affecting the percentage of the total economic base attributed to agriculture. The intent of this report is not to analyze yearly variation but rather to evaluate agriculture's role in the state economy and salient trends over the long term.

Agricultural sales for final demand have grown from just over \$2.7 billion in 1960 to over \$3.5 billion in 2000, during which time total sales for final demand went from \$4.3 billion to \$14.3 billion (Table 1). Among the years selected for examination, the

agricultural sales for final demand (inflation-adjusted) were highest in 1975 (\$5.4 billion).

The changes in North Dakota's economic base that occurred from 1990 to 2000 are summarized in Figure 3. North Dakota's total sales for final demand (adjusted for inflation) increased from \$10.3 billion in 1990 to \$14.3 billion in 2000, an increase of 39 percent. All the major types of primary sector activity increased except agriculture, which registered a 6.6 percent drop in constant dollar sales for final demand over the decade. As a result, agriculture's share of state sales for final demand fell from 37 percent in 1990 to 25 percent in 2000. The tourism sector grew from 4 percent of sales for final demand in 1990 to 20 percent in 2000, while manufacturing grew from 8 percent in 1990

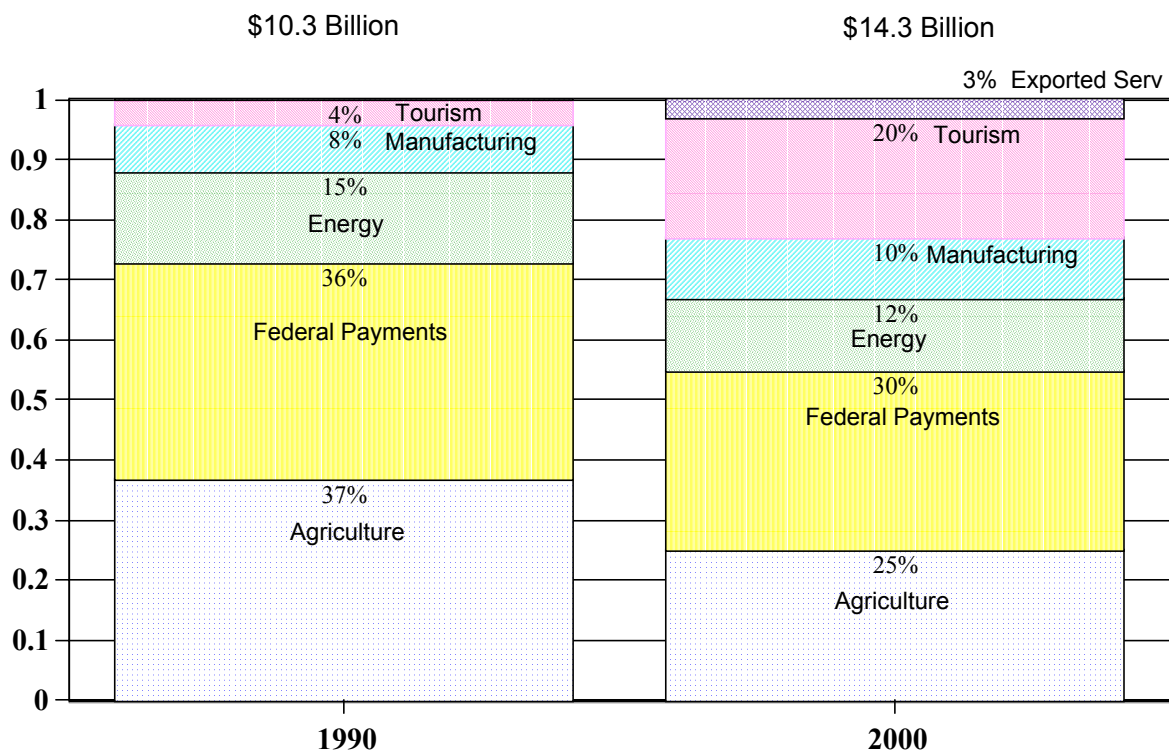


Figure 3. North Dakota's Economic Base, 1990 and 2000 (2000 dollars)

to 10 percent in 2000. The exported services sector, which accounted for a negligible share of state exports in 1990, had grown to 3 percent of sales for final demand in 2000.

Table 2 presents a summary of the relationship that exists between agricultural and total sales for final demand for the state and each region. The portion of North Dakota's total economic base attributable to agriculture was 62.9 percent in 1960, dropped to 46.8 percent in 1970, declined further to 43.9 percent in 1980 and 37.1 percent in 1990, and was only 24.9 percent in 2000. Although these percentages reflect only selected years, a pattern is apparent. North Dakota's dependence on agriculture has been reduced from nearly two-thirds in 1960 to only one-fourth in 2000. However, agriculture remains an essential cornerstone of the state economy. In 2000, agriculture was still substantially the largest goods and services exporting sector of the North

Dakota economy, accounting for almost 36 percent of all exports of goods and services (federal payments, other than commodity program payments, are not included in this calculation). Further, much of the growth of the manufacturing sector over the decade of the 1990s has been associated with expanded processing of North Dakota's agricultural commodities (a.k.a. value-added processing) and with farm input manufacturing. The state regions show substantial variation in their level of dependence on agriculture. The most agriculturally-dependent regions in 1960 were Regions 6, 8, and 3, in each of which agricultural commodities accounted for more than 70 percent of sales for final demand. In 2000, the most agriculturally-dependent regions were 6, 5, and 4 with agriculture accounting for 43, 33, and 30 percent of sales for final demand, respectively.

Table 2. Agricultural Sectors' Percentage of Total Sales for Final Demand, by Region, Selected Years 1960-2000

Area	1960	1970	1980	1990	2000
	-----Percent-----				
Region 1	39.0	45.1	21.4	17.7	19.4
Region 2	52.3	38.8	34.5	28.9	20.0
Region 3	70.5	60.0	59.5	36.3	28.1
Region 4	58.8	32.0	48.1	38.1	30.1
Region 5	59.7	45.4	52.8	46.5	33.2
Region 6	75.2	64.7	66.0	62.1	42.6
Region 7	48.0	41.9	28.0	17.4	13.4
Region 8	74.5	55.2	23.7	29.8	23.3
State	62.9	46.8	43.9	37.1	24.9

Employment

Employment estimates corresponding with the major sectors of the North Dakota economy have been developed. These employment values, which consist of proprietors and wage and salary workers, can also be used to show agriculture's contribution to the state economy from a different perspective. (Detailed employment tables for each state region and the state are presented in the main report.)

Expressing the number of workers (proprietors plus wage and salary employees) associated with the state's agricultural sectors (livestock and crops) as a percent of the total employment for all sectors provides another perspective concerning the role of agriculture in the

economy. Agricultural employment in the state declined from 37.8 percent of all employment in 1960 to 10.9 percent in 2000 (Table 3). Again, this reflects only direct employment in agriculture (i.e., farmers, ranchers, and farm wage and salary employees). As would be expected, State Region 5 (the Fargo trade area) had the lowest percentage of agricultural employment for each of the five years. Regions with major trade centers, such as Region 4 (Grand Forks), Region 5 (Fargo), and Region 7 (Bismarck), had the lowest percentage of workers employed in direct agricultural jobs. The trends shown in Table 3 are to be expected with increasing farm size, but interestingly, three state regions (3, 6, and 8) still had over one-fifth of their workers directly employed in agriculture in 2000.

Table 3. Agricultural Employment as a Percent of Total Employment, by State Region, Selected Years 1960-2000¹

Area	1960	1970	1980	1990	2000
	-----Percent-----				
Region 1	35.9	28.0	18.0	20.0	19.4
Region 2	35.8	21.3	17.2	16.0	12.7
Region 3	54.8	37.2	31.3	28.2	22.2
Region 4	30.8	15.7	12.7	8.4	6.7
Region 5	27.2	14.7	9.6	7.3	4.9
Region 6	49.6	32.8	28.0	26.1	21.0
Region 7	39.4	23.8	15.3	13.3	9.9
Region 8	49.5	34.1	24.3	25.1	21.2
State	37.8	22.8	16.8	14.3	10.9

¹ Proprietors and wage and salary employment in the livestock and crops sectors.

Gross State Product

Another measure of the role of various sectors in the state economy is gross state product. The Bureau of Economic Analysis (BEA), U. S. Department of Commerce reports estimates of Gross Domestic Product (GDP) for the United States at periodic intervals (Lum and Moyer, 2001). GDP estimates the value-added by each industry and government to the Nation's economic activity. GDP accumulates the market value of all goods and services produced by labor and property in the United States. State economic activity is reported in a similar measure termed Gross State Product (GSP). GSP is the value added to intermediate inputs by the labor and capital resources located in a state (Panek and Downey 2002). In addition to state level economic activity, economic activity by individual industries within each state is determined by the BEA. An industry's GSP, referred to as its "value added", is equivalent to its gross output (the value of shipments and other income, taxes, and inventory change) net of purchases of intermediate inputs used in production.

Growth of the major economic sectors, as well as the average share of real (inflation-adjusted) GSP for each sector in 1977-1979 and 1998-2000, is presented in Table 4. The largest real growth occurred in the manufacturing sectors, as durable goods manufacturing GSP increased more than four-fold over the period while GSP in nondurable goods manufacturing more than doubled. Within durable goods manufacturing, the greatest growth occurred in industrial machinery manufacturing, which accounted for about 59 percent of GSP in the durable goods manufacturing sector in 1998-2000. Within nondurable goods manufacturing, food and kindred products accounted for about 60 percent of total value-added over the entire 24-year period.

The shares of total state GSP for 1977-1979 and 1998-2000 reflect the relative growth of the various sectors over the 24-year period. The three largest sectors in 1977-1979 were government, finance,

**Table 4. Shares of North Dakota Gross State Product, 1977-79 and 1998-2000
(based on constant dollars)**

Sector	1977-1979		1998-2000		Change	
	\$ mill.	Percent	\$ mill.	Percent	\$ mill.	Percent
Total Gross State Product	12,272 ^a	100.0 ^a	16,975 ^a	100.0 ^a	4,703 ^a	38.3 ^a
Agriculture, forestry, and fish	1,107	9.0	1,393	8.2	286	25.8
Farms	1,065	8.7	1,277	7.5	212	19.9
Ag. Services	41	0.3	109	0.6	68	165.9
Mining	510	4.2	584	3.4	74	14.5
Construction	1,156	9.4	782	4.6	-374	-32.4
Manufacturing	473	3.9	1,594	9.4	1,121	237.0
Durable goods	214	1.7	1,076	6.4	862	402.8
Nondurable goods	267	2.2	537	3.2	270	101.1
Transportation and utilities	947	7.7	1,622	9.6	675	71.3
Wholesale	860	7.0	1,647	9.7	787	91.5
Retail	1,075	8.6	1,742	10.3	667	62.0
Finance, insurance, and real estate	2,109	17.2	2,313	13.6	204	9.7
Services	2,014	16.4	2,966	17.5	952	47.3
Government	2,360	19.2	2,325	13.7	-35	-1.5

^a Sum of sectors may not add to totals due to sector-specific constant dollar adjustments

insurance, and real estate (FIRE), and services, accounting for 19.2, 17.2, and 16.4 percent of total GSP, respectively. In 1998-2000, the same three sectors again accounted for the largest shares of GSP, but their relative positions had changed with services now the largest sector (17.5 percent), followed by government (13.7 percent), and FIRE (13.6 percent). The greatest growth occurred in manufacturing, which accounted for 9.4 percent of state GSP in 1998-2000 compared to only 3.9 percent in 1977-1979. The agriculture, forestry, and fisheries sector accounted for 9 percent of GSP in 1977-1979 and 8.2 percent in 1998-2000. Although the real GSP originating in this sector grew by 26 percent over the period, total state GSP grew more (38 percent), resulting in a slight

decrease in share.

Because estimates of gross state product are available for all states, this measure of economic activity can be used to compare the relative importance of agriculture to the economies of the various states. In 2000, the agriculture, forestry, and fisheries sector accounted for 5 percent or more of total gross state product in six states. These were:

South Dakota	11.2 percent
North Dakota	7.9 percent
Idaho	6.8 percent
Nebraska	6.6 percent
Iowa	6.0 percent
Montana	5.7 percent

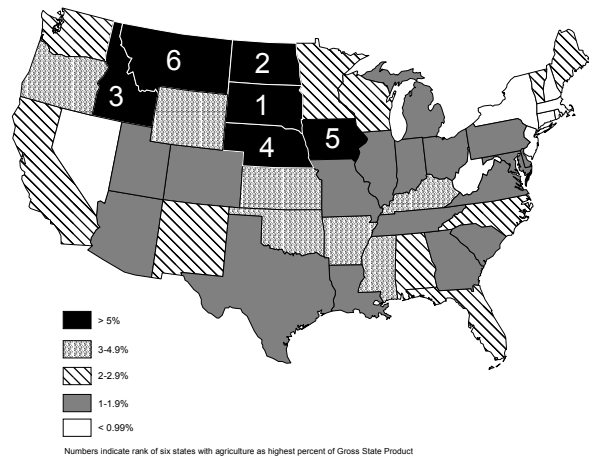
Seven other states depended on agriculture for 3 percent to 4.9 percent of their GSP, while 10 others obtained 2 percent to 2.9 percent of their GSP from agriculture (Figure 4).

A similar comparison by Coon et al. (1992) revealed the same five states to have the highest levels of agricultural dependency, based on 1989 GSP estimates.

Conclusions and Implications

The North Dakota economy has long been dependent on agriculture for growth and vitality. However, variability in agricultural sector returns, together with a long-term trend of agricultural mechanization, has resulted in efforts to diversify the state's economic base. Although its role in the North Dakota economy has been reduced in a relative sense, agriculture remains a cornerstone of the state economy and remains the largest goods and services exporting sector. While agriculture accounts for smaller shares of state sales for final demand, gross business volume, and gross state product than was the case 10 or 20 years ago, the decrease in agriculture's relative importance in most cases merely signifies that other sectors (e.g., manufacturing) have grown more rapidly. Thus, agriculture's decreasing share of sales for final demand or gross state product to a large extent reflects the success of long-term efforts to diversify the North Dakota economy.

The agricultural sector has contributed to North Dakota's economic growth and diversification by serving as a source of commodities for further value-added processing (e.g., durum, potatoes) and as a market for farm input manufacturers. Manufacturing has been the largest single



source of growth in gross state product over

Figure 4. Agricultural Gross State Product as a Percent of Total

the past two decades, and both farm input manufacturing (part of durable goods manufacturing) and food processing (part of nondurable goods manufacturing) have been substantial sources of that growth. [Developing estimates of the economic role of these two agriculturally-linked manufacturing sectors will be the goal of the second phase of this study.]

The importance of agriculture to North Dakota's economy can be highlighted:

- Agriculture accounts for one-fourth of basic economic activity and almost 36 percent of all exports of goods and services
- Agriculture directly employs almost 11 percent of the state's workers and generates more than \$6 billion in business activity (gross receipts)
- North Dakota ranks second in the nation in the percentage of gross state product derived from agriculture

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This document is a summary of a more comprehensive report which contains supplemental information and additional documentation of study results. Copies of this report and a single copy of the main report, *The Role of Agriculture in the North Dakota Economy*, are available free of charge. Please address your inquiry to Carol Jensen, Department of Agribusiness and Applied Economics, North Dakota State University, P.O. Box 5636, Fargo, ND 58105-5636, phone 701-231-7441, fax 701-231-7400, e-mail cjensen@ndsuxt.nodak.edu or these publications are available on the world wide web at <http://agecon.lib.umn.edu/>.

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