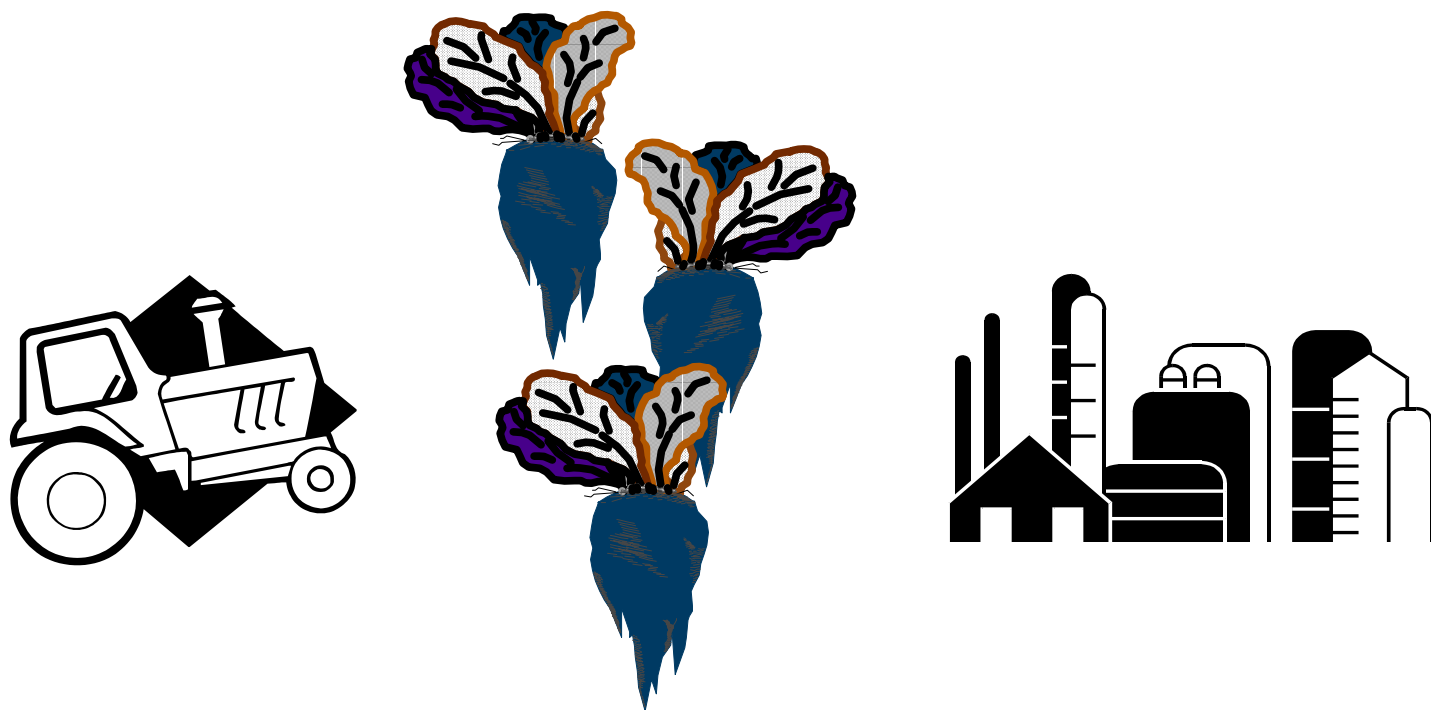


Economic Contribution of the Sugarbeet Industry in Minnesota, North Dakota, and Eastern Montana



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Abstract

Agricultural industries in small geographical areas with limited acreage tend to be overlooked by those not associated with the growing region or industry. Sugarbeets continue to be produced in a relatively small geographic area and on relatively limited acreage in Minnesota, North Dakota, and eastern Montana. These factors, along with continued debate over policies affecting domestic sugar industries and recent industry expansions, help justify a continued assessment of the economic importance of the sugarbeet industry to the regional economy.

Revenues from sugarbeet production and expenditures by processors to Minnesota, North Dakota, and Montana entities in fiscal 2003 represented the direct economic impacts from the industry. Expenditure information was provided by sugarbeet processing and marketing cooperatives. Secondary economic impacts were estimated using input-output analysis.

The sugarbeet industry, which included the growing regions and processing plants located in the Red River Valley, west central Minnesota, and northwestern North Dakota/northeastern Montana, planted 776,348 acres and processed 14.5 million tons of sugarbeets in 2003. Production and processing activities generated \$1.1 billion in direct economic impacts. Gross business volume (direct and secondary effects) from the sugarbeet industry was estimated at \$3.1 billion. Direct and secondary employment in the industry was 2,628 and 29,258 full-time equivalent jobs, respectively. State-level tax revenues generated by the industry in the tri-state region were estimated at \$62.6 million.

In real terms, gross business volume of the sugarbeet industry in Minnesota and eastern North Dakota has increased 76 percent since 1987. Increases in business activity from the industry have resulted from increased production, processing, and marketing activities.

Key words: sugarbeet industry, North Dakota, Minnesota, Montana, economic impact

Highlights

Minnesota and North Dakota planted nearly 54 percent of the nation's sugarbeet acreage and produced over 49 percent of the nation's sugarbeet tonnage in 2002. Despite being the single largest sugarbeet producing region in the United States, sugarbeets are produced on relatively few acres and remain geographically limited within the Upper Midwest. The sugarbeet industry, as described in this report, included production and processing facilities in the Red River Valley of North Dakota and Minnesota, west central Minnesota, and northwestern North Dakota/northeastern Montana. The purpose of this report was to estimate the economic contribution of the sugarbeet industry in Minnesota, North Dakota, and eastern Montana.

Three sugarbeet cooperatives located in eastern North Dakota (Minn-Dak Farmers Cooperative) and Minnesota (American Crystal Sugar Company, which included plants in MN, ND, and a processing plant in Sidney, MT and Southern Minnesota Beet Sugar Cooperative) were surveyed to obtain estimates of expenditures made within Minnesota, North Dakota, and Montana in fiscal 2003. In addition, United Sugars Corporation, which handles the marketing of sugar from the three cooperatives, also was surveyed to obtain estimates of expenditures made within the tri-state region.

Crop enterprise budgets were developed to estimate the direct economic impacts from sugarbeet production. Total direct impacts from sugarbeet production in the three states were estimated to average \$870 per acre or \$675 million. Direct impacts from processing and marketing activities were estimated at \$401 million in fiscal 2003. About 62 percent, 32 percent, and 6 percent of total direct impacts were generated in Minnesota, North Dakota, and Montana, respectively.

Total direct economic impacts from the sugarbeet industry (sugarbeet production, processing, and marketing) were estimated at \$1.1 billion in 2003. The North Dakota Input-Output Model was used to estimate the secondary economic impacts. The \$1.1 billion in direct impacts generated another \$2 billion in secondary impacts. Total economic activity (direct and secondary impacts, also termed gross business volume) was estimated at \$3.1 billion in the tri-state region. Total collections generated by the sugarbeet industry from sales and use, personal income, and corporate income taxes in the tri-state region were estimated at \$62.6 million in 2003. The cooperatives also employed an equivalent of 2,628 full-time workers and indirectly supported an additional 29,258 full-time equivalent jobs in the tri-state region.

The economic effects of sugarbeet production and processing activities in northwestern North Dakota/northeastern Montana were removed from current industry figures to allow appropriate comparison with estimates from previous studies. The sugarbeet industry in Minnesota and eastern North Dakota has experienced substantial physical and economic growth over the past 15 years. Since 1987, planted acreage and tons processed have increased 60 percent and 93 percent, respectively. Correspondingly, in real terms (effects of inflation removed), gross business volume generated by the sugarbeet industry in North Dakota and Minnesota has increased by 6 percent since 1997, 31 percent since 1992, and over 76 percent since 1987.

The characteristics of the sugarbeet-growing area suggest most of the industry's economic activity affects local economies, since expenditures for crop inputs (*Retail Trade* sector) and returns to growers (*Households* sector), which represent a majority of the economic activity, are evenly distributed throughout the growing area. Although the sugarbeet industry in Minnesota and North Dakota is not large in terms of acres or geographic area, the magnitude of key economic measures (i.e., retail trade activity, personal income, gross business volume, and secondary employment) clearly indicates that the industry contributes substantially to the Minnesota, North Dakota, and Montana regional economy.

Economic Contribution of the Sugarbeet Industry in Minnesota, North Dakota, and Eastern Montana

Dean A. Bangsund and F. Larry Leistritz*

INTRODUCTION

Agriculture has historically been a major component of the regional economy of North Dakota and Minnesota (Coon and Leistritz 2004, Senf et al. 1993). Despite the historical importance of agriculture, agriculture is no longer the single largest sector in either Minnesota or North Dakota (Lazarus 2002, Leistritz et al. 2002). Generally, the agriculture sector has not decreased in magnitude in recent decades, rather other sectors of the economy have grown, and now surpass agriculture in terms of economic size. As a result, the relative share of agriculture to the states' economies has decreased over the past decade. While the role of agriculture in the regional economy may be, in relative terms, smaller than in the past decades, specific industries within the agriculture sector often find it advantageous to describe their activities in economic terms. An economic study can be a valuable tool in educating and informing policy makers, public officials, and the general public on the relative importance of specific industries, especially when those industries are important to regional economies, but lack national recognition.

In the past decade a number of studies have attempted to document the relative economic contribution of various commodities to the North Dakota and Minnesota economies. For example, economic contribution studies have been conducted for the wheat industry in North Dakota and Minnesota (Bangsund and Leistritz 1995b, Bangsund et al. 1994), the barley industry in Minnesota, North Dakota, and South Dakota (Bangsund and Leistritz 1998a), and the soybean industry in North Dakota (Bangsund and Leistritz 1999). In some cases, the studies take on a national focus, for example, an assessment of the economic size of the U.S. Sunflower Industry (Bangsund and Leistritz 1995a) and the Sugar and Corn Sweetener Industry (LMC International Ltd. 2001).

The economic contribution of the sugarbeet industry in Minnesota and North Dakota has been periodically assessed since 1987. Coon and Leistritz (1988), Bangsund and Leistritz (1993), and Bangsund and Leistritz (1998b) estimated the economic contribution of the sugarbeet industry in North Dakota and Minnesota in previous years. However, continued debate over the future of national sugar policies, recent unilateral and bilateral trade negotiations involving sugar, and increased sugarbeet production and processing capacity in the region, have prompted a re-evaluation of the industry's economic importance. A re-assessment of the industry's economic importance to the region would be helpful to demonstrate the economic implications of future policy changes affecting domestic sugar industries and document the economic effect of recent industry expansions.

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OBJECTIVES

The purpose of this report was to estimate the economic contribution (direct and secondary effects) of the sugarbeet industry to the economy of Minnesota, North Dakota, and Montana. Specific objectives include:

- 1) quantify sugarbeet acreage and production in Minnesota, North Dakota, and eastern Montana,
- 2) estimate the direct economic impacts of the sugarbeet industry to the tri-state economy of Minnesota, North Dakota, and eastern Montana, and
- 3) estimate the secondary economic impacts of the sugarbeet industry to the tri-state economy of Minnesota, North Dakota, and eastern Montana.

PROCEDURES

An economic contribution analysis, as defined in this study, represents an estimate of all relevant expenditures and returns associated with an industry (i.e., economic activity from sugarbeet production, processing, transportation, and marketing). The economic contribution approach to estimating economic activity has been used for several similar studies (Bangsund and Leistritz 1999, Bangsund and Leistritz 1998b, Bangsund and Leistritz 1995a, Coon and Leistritz 1988). The methods and analyses used in this report paralleled those used by Bangsund and Leistritz (1998b).

Analysis of the sugarbeet industry required several steps. Discussion of the procedures used in the study was divided into the following sections: (1) sugarbeet production in Minnesota, North Dakota, and eastern Montana, (2) sugarbeet production expenditures, (3) sugarbeet processor and marketing alliance expenditures, and (4) application of input-output analysis to estimate secondary impacts.

Sugarbeet Production

Sugarbeet production and associated processing facilities are concentrated in the Red River Valley of North Dakota and Minnesota, west central Minnesota, and northwestern North Dakota/northeastern Montana (Figure 1). Sugarbeet production is centered around processing plants operated by three producer-owned cooperatives: American Crystal Sugar Company with headquarters in Moorhead, Minnesota; Minn-Dak Farmers Cooperative located in Wahpeton, North Dakota; and Southern Minnesota Beet Sugar Cooperative located in Renville, Minnesota. In previous studies, sugarbeet production in western North Dakota and eastern Montana was excluded; however, since American Crystal Sugar Company acquired Sidney Sugars Incorporated in Sidney, MT in 2002, production and processing activities from that growing region were included in this study.

Generally, the growing conditions in the Red River Valley, west central Minnesota, and in select areas of western North Dakota/eastern Montana are conducive to sugarbeet production. Sugarbeets, unlike most traditional crops (e.g., small grains, corn, beans), are difficult and expensive to transport long distances. They also have unique storage problems not found with most crops (i.e., they are bulky, require specialized handling equipment, have limited storage life, and must be stored in cold conditions). As a result, processing facilities and sugarbeet production are located in close proximity to each other. The geographic concentration of sugarbeet production and processing accentuates the industry's economic impact on local economies within the growing regions.

Seven counties in eastern North Dakota collectively produced about 4.5 million tons of sugarbeets for American Crystal Sugar Company and Minn-Dak Farmers Cooperative in 2002 (Table 1). Two counties in western North Dakota produced about 300,000 tons of sugarbeets for Sidney Sugars Incorporated, located in Sidney, Montana. Minnesota had over 23 counties that collectively produced 8.8 million tons of sugarbeets in 2002 (Table 1). In northeastern Montana, five counties produced about 530,000 tons of sugarbeets for Sidney Sugars Incorporated. The combined growing regions in eastern Montana, western and eastern North Dakota, and Minnesota planted nearly 800,000 acres of sugarbeets in 2002. One-third of the region's planted acreage was in North Dakota, 63 percent in Minnesota, and the remaining 4 percent in eastern Montana. The three sugar cooperatives reported processing about 14.5 million tons of sugarbeets and reported 776,348 planted acres of sugarbeets in 2003. Crop acreage, yield, and production for the 2003 sugarbeet crop was not available from respective state reporting agencies when this study was conducted.

Sugarbeet acreage in Minnesota and North Dakota has steadily expanded since 1970 (Figure 2). Similarly, sugarbeet tonnage also has steadily increased over the last three decades (Figure 3). U.S. sugarbeet tonnage declined gradually from 1970 through the early 1980s, but has gradually increased since the mid 1980s. Overall, U.S. sugarbeet tonnage in recent years has been similar to levels in the early 1970s. As a result of U.S. production remaining relatively stable since 1970 and production in Minnesota and North Dakota consistently increasing over the same period, the share of U.S. production raised in Minnesota and North Dakota has continued to increase (Figure 2, Figure 3). In 2002, Minnesota and North Dakota accounted for nearly 54 percent of U.S. planted acreage and 49 percent of total U.S. sugarbeet production.

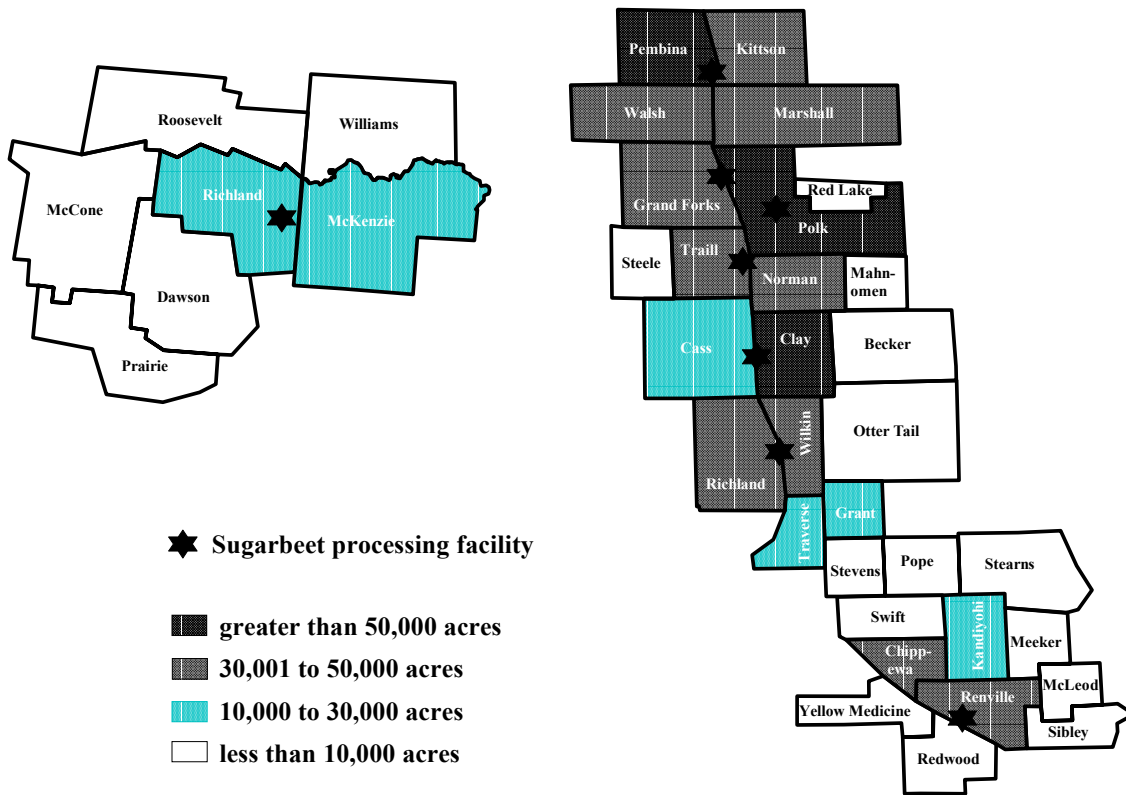
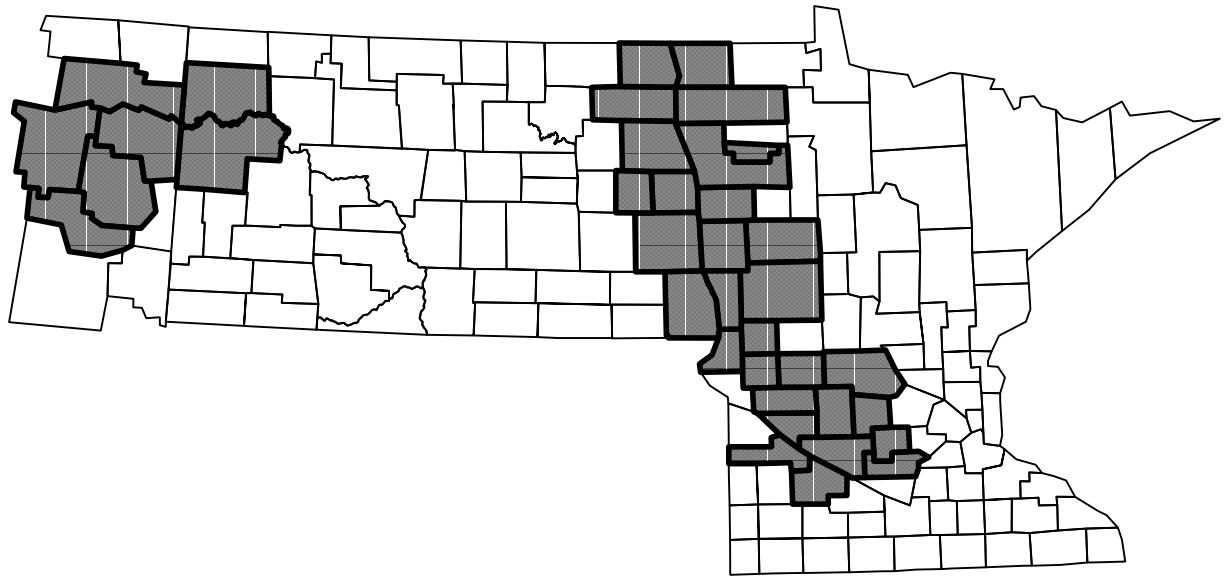


Figure 1. Distribution of Sugarbeet Production and Processing Facilities in Minnesota, North Dakota, and Eastern Montana, 2002

Sources: North Dakota Agricultural Statistics Service (*various years*), Minnesota Agricultural Statistics Service (*various years*), and Montana Agricultural Statistics Service (*various years*).

Table 1. Sugarbeet Production, by County, Minnesota, North Dakota, and Eastern Montana, 2002

State/County	Acreage		Yield ^a	Production
	Planted	Harvested		
North Dakota	----- acres -----		- tons/acre -	----- tons -----
Grand Forks	34,300	32,900	17.78	610,000
McKenzie	10,800	10,800	20.19	218,000
Pembina	82,200	81,200	16.91	1,390,000
Richland	34,200	33,900	20.61	705,000
Traill	31,200	28,800	16.54	516,000
Walsh	46,600	46,000	18.86	879,000
Williams	5,100	5,100	17.84	91,000
Other Counties ^b	<u>20,600</u>	<u>19,300</u>	<u>18.93</u>	<u>390,000</u>
State	265,000	258,000	18.11	4,799,000
Minnesota				
Becker	9,000	8,900	17.96	161,600
Chippewa	34,300	29,500	18.44	632,600
Clay	57,500	56,200	16.37	941,500
Grant	11,200	11,100	20.23	226,600
Kandiyohi	14,400	10,600	16.24	233,800
Kittson	38,400	37,800	17.28	663,600
McLeod	1,500	1,500	18.93	28,400
Mahnomen	4,600	4,500	12.11	55,700
Marshall	46,600	44,600	16.21	755,400
Meeker	1,500	800	10.00	15,000
Norman	46,100	42,100	13.57	625,700
Otter Tail	4,000	3,900	19.33	77,300
Polk	102,900	99,400	17.15	1,764,700
Pope	3,100	3,100	19.97	61,900
Red Lake	1,300	1,300	14.77	19,200
Redwood	3,900	3,500	15.97	62,300
Renville	43,300	39,000	19.40	839,900
Sibley	3,600	3,200	17.42	62,700
Stearns	2,100	1,600	14.57	30,600
Swift	6,200	5,400	18.53	114,900
Traverse	10,500	10,400	20.80	218,400
Wilkin	49,500	49,000	21.77	1,077,700
Yellow Medicine	3,300	2,900	20.85	68,800
Other Counties ^b	<u>2,400</u>	<u>2,000</u>	<u>13.50</u>	<u>32,400</u>
State	505,000	476,000	17.53	8,854,000
Montana				
Dawson	3,130	3,010	19.62	61,400
McCone	330	330	13.03	4,300
Prairie	2,360	2,330	18.90	44,600
Richland	18,450	18,220	18.72	345,400
Roosevelt	<u>4,840</u>	<u>4,230</u>	<u>15.41</u>	<u>74,600</u>
Region Total	29,110	28,120	18.22	530,300

^a Yield per planted acre.

^b A breakdown of the counties in those groups was not available.

Sources: Minnesota Agricultural Statistics Service (*various years*), North Dakota Agricultural Statistics Service (*various years*), and Montana Agricultural Statistics Service (*various years*).

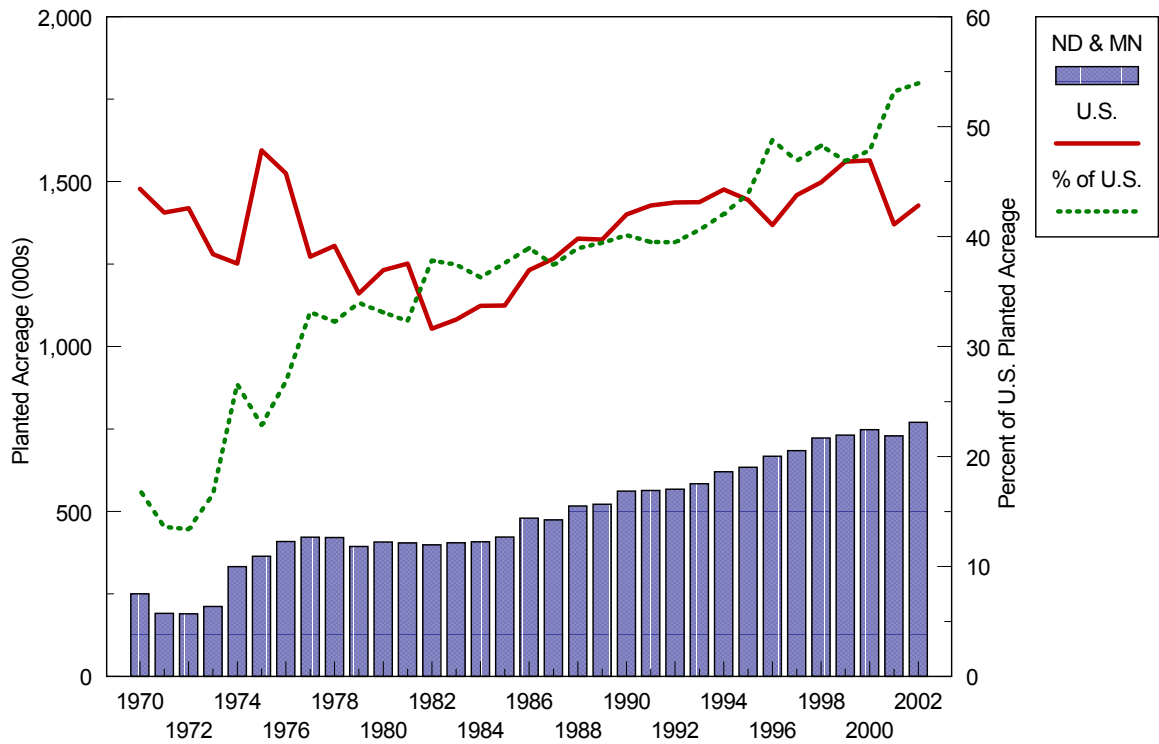


Figure 2. Planted Sugarbeet Acreage, United States, Minnesota and North Dakota, 1970 through 2002

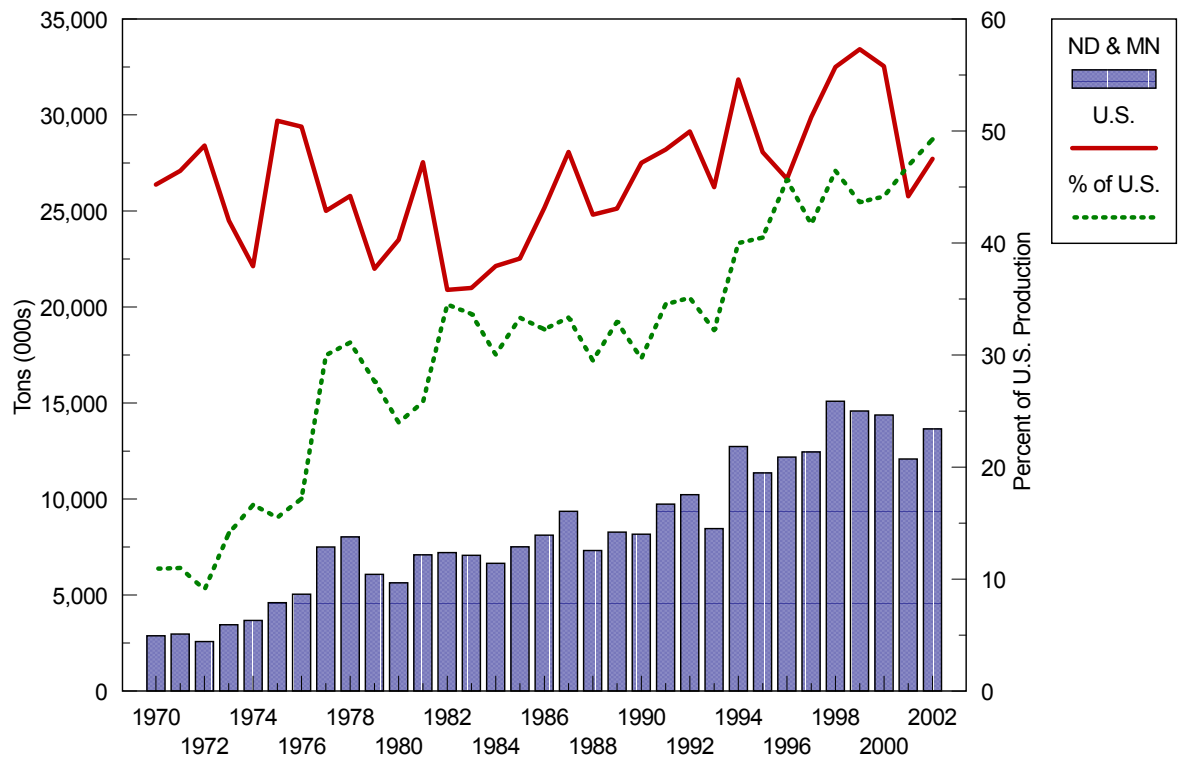


Figure 3. Sugarbeet Production, United States, Minnesota and North Dakota, 1970 through 2002

Sugarbeet Production Expenditures

Crop expenses were obtained from the Farm Business Management Programs in North Dakota and Minnesota (Minnesota Farm Business Management Education 2004, North Dakota Farm and Ranch Business Management Education 2004). Budgets obtained were for sugarbeet production on owned land and rented land in the Red River Valley in North Dakota and Minnesota, and for owned and rented land in west-central Minnesota. Expenses were averaged between budgets for sugarbeets produced on owned land and rented land by the ratio of owned and rented farm land in the sugarbeet producing counties (U.S. Department of Commerce 1999). Revenues from sugarbeet production were derived from the survey of processors, which listed payments made to producers.

Cash outlays by sugarbeet farmers represent money spent for fuel, seed, fertilizer, chemicals, machinery, and other items which impact local economies. The budget contained some noncash expenditures, which are considered appropriate production costs, but do not represent a cash expenditure. All other non-cash expenditures were treated as revenues retained by the producer (Appendix A).

Sugarbeet Cooperative Expenditures

The three sugarbeet cooperatives located in eastern North Dakota (Minn-Dak Farmers Cooperative) and Minnesota (American Crystal Sugar Company and Southern Minnesota Beet Sugar Cooperative) were asked to provide the amount of processing, research, distribution, and administrative cash expenditures made within Minnesota, North Dakota, and Montana in the last fiscal year (Appendix B). Expenditures made in Minnesota, North Dakota, and Montana by United Sugars Corporation were also obtained. Non-cash outlays or expenditures made to entities outside of the three-state area were not included. Itemization of expenditures for each cooperative were not included due to confidentiality.

Input-output Analysis

Economic activity from a project, program, or policy can be categorized into direct and secondary impacts. Direct impacts are those changes in output, employment, or income that represent the initial or first-round effects of a project, program, or event. Secondary impacts (sometimes further categorized into indirect and induced effects) result from subsequent rounds of spending and respending within an economy. This process of spending and respending is sometimes termed the multiplier process, and the resultant secondary effects are sometimes referred to as multiplier effects (Leistritz and Murdock 1981).

Input-output (I-O) analysis is a mathematical tool that traces linkages among sectors of an economy and calculates the total business activity resulting from a direct impact in a basic sector (Coon et al. 1985). The North Dakota I-O Model has 17 economic sectors, is closed with respect to households (households are included in the model), and was developed from primary (survey) data from firms and households in North Dakota. Empirical testing has shown the North Dakota I-O Model is sufficiently accurate in estimating economic impacts in neighboring states (Coon and Leistritz 1994; Coon et al. 1984; Leistritz et al. 1990).

ECONOMIC IMPACTS

The economic contribution from the sugarbeet industry was estimated from production and processing expenditures. Both production and processing expenditures represent the direct economic impacts from the sugarbeet industry. Subsequently, the direct impacts were used with an input-output model to estimate the secondary impacts. Secondary impacts result from the turnover or respending of direct impacts within the area economy. The following section is divided into five major parts: (1) direct impacts, (2) secondary impacts, (3) tax revenue, (4) total economic impacts, and (5) previous industry impacts.

Direct Impacts

From an economic perspective, direct impacts are those changes in output, employment, or income that represent the initial or first-round effects of a project, program, or event. The direct impacts from the sugarbeet industry on the local economies in Minnesota, North Dakota, and eastern Montana include (1) expenditures and returns in the production of sugarbeets, (2) expenditures from processing sugarbeets into refined sugar, and (3) expenditures incurred through marketing activities associated with the sugarbeet industry. The following sections describe these direct economic impacts.

Sugarbeet Production

Farmers and producers generate direct economic impacts to the area economy through (1) expenditures for production outlays and (2) net returns from production. Direct economic impacts from sugarbeet production (i.e., production outlays and producer returns) were estimated using cost-of-production budgets and payments to sugarbeet growers, as reported by the cooperatives. Separate budgets were developed for sugarbeet production in the Red River Valley, west central Minnesota, and northwestern North Dakota/northeastern Montana. Each budget contained estimates of gross revenue, variable and fixed costs, and returns to unpaid labor, management, and equity (Appendix A). Gross revenue per acre was calculated by dividing sugarbeet payments (i.e., payments made by the cooperatives to the growers) by estimated planted sugarbeet acreage from each cooperative and adding an average uncoupled fixed farm program payment (i.e., payments stemming from provisions of the 2002 Federal farm bill). Variable and fixed costs represented an average of actual production costs incurred on owned and rented land in each respective growing region in 2003 (North Dakota and Minnesota Farm Business Management Education 2004).

Cash and non-cash expenses (e.g., depreciation) from sugarbeet production represented direct impacts. Returns to invested resources (i.e., unpaid labor, management, and equity) also were considered direct impacts, even though net returns do not represent a cash expenditure. Net returns were considered retained by the producer, eventually resulting in personal or business purchases in the regional economy.

Total direct impacts per acre from sugarbeet production should be equal to the gross revenue per acre, providing all economic activity (production expenses and returns to unpaid labor, management, and equity) remains in the tri-state region. All expenses and returns associated with sugarbeet production in 2003 were assumed to initially be made to entities within

the tri-state economy. For example, sugarbeet growers were residents of the regional economy, and production inputs were purchased from entities located within the tri-state region. Total direct impacts from sugarbeet production were estimated at \$870.02 per acre or \$675.4 million (Table 2).

Total direct impacts of \$870 per planted acre were further broken into variable costs, fixed costs, and returns to unpaid labor, management, and equity. Variable costs (i.e., outlays for seed, herbicide, fertilizer, chemical, custom hire, etc. that change with the level of production) were estimated at \$468.47 per acre. Fixed costs (i.e., expenses that do not change with the level of production, such as land debt payments, farm utilities, and machinery overhead) were estimated to be \$168.47 per acre. Total expenses were estimated at \$636.94 per acre. Net returns were estimated at \$233.08 per acre (Table 2).

Table 2. Direct Economic Impacts from Sugarbeet Production in Minnesota, North Dakota, and Eastern Montana, 2003

Expense>Returns ^a	Direct Impacts	
	Per Acre	Total
Payments to Growers		\$663,626,449
Misc Farm Program Payments		\$11,809,025
Planted Acreage		776,348
Revenue per Acre		\$870.02
	--- \$ ---	- 000s \$ -
Variable Costs	468.47	363,697
Fixed Costs	168.47	130,791
Total Costs	636.94	494,488
Net Returns	233.08	180,947
<u>Direct Impacts</u>	<u>870.02</u>	<u>675,435</u>

^a See Appendix A for complete budgets.

Sugarbeet Processing and Marketing

Sugarbeet cooperatives and their processing facilities impact local economies through expenditures for production and processing inputs, labor, and investment in facilities and capital. American Crystal Sugar Company, Minn-Dak Farmers Cooperative, Southern Minnesota Beet Sugar Cooperative, and United Sugars Corporation were surveyed to estimate their fiscal 2003 cash expenditures (Appendix B). Only cash expenditures and outlays made within the tri-state economy were included.

Total cash expenditures made to entities in the tri-state area by the processing cooperatives and sugar marketing alliances in Minnesota, North Dakota, and eastern Montana were \$1.1 billion in fiscal 2003. However, \$663.6 million of the \$1.1 billion represented payments to growers and was reflected in the direct impacts attributable to sugarbeet production. Direct economic impacts from the cooperatives were \$401.5 million (Table 3). Approximately 60 percent of the direct impacts from the processing component of the industry were generated in Minnesota. North Dakota and Montana received about 30 percent and 10 percent of processor expenditures, respectively. The processing and marketing cooperatives also were directly responsible for 2,628 full-time equivalent jobs in fiscal 2003.

Direct Impacts by State

Total direct impacts from the sugarbeet industry (production, processing, and marketing) in Minnesota, North Dakota, and eastern Montana were estimated at \$1.1 billion in fiscal 2003 (Table 4). Sugarbeet production accounted for 63 percent (\$675.4 million) of all direct impacts, while sugarbeet processing and marketing accounted for 37 percent (\$401.5 million) of all direct impacts. Based on planted sugarbeet acreage in the study region, about 63 percent, 33 percent, and 4 percent of the direct impacts from sugarbeet production were generated in Minnesota, North Dakota, and eastern Montana, respectively. Similarly, based on expenditures made in each state by the processing cooperatives, about 60 percent, 30 percent, and 10 percent of the direct impacts from processing and marketing were captured in Minnesota, North Dakota, and eastern Montana, respectively (Table 4).

Total direct impacts in Minnesota were estimated at \$665.6 million (\$240.1 million from processors and \$425.5 million from growers). Total direct impacts in North Dakota were estimated at \$342.3 million (\$120.2 million from processors and \$222.1 million from growers). Total direct impacts in Montana were estimated at \$68.9 million (\$41.1 million from processors and \$27.8 million from producers) (Table 4).

Direct Impacts by Economic Sector

Sugarbeet production expenditures, returns to sugarbeet growers, and production outlays by sugarbeet cooperatives were allocated to various economic sectors of the North Dakota I-O Model. Seed, herbicide, fungicide, insecticide, fertilizer, fuel, lubrication, repairs, and machinery depreciation were allocated to the *Retail Trade* sector. Custom hire expenses were allocated to the *Business and Personal Services* sector. Crop insurance, interest expense, and machinery and building leases were allocated to the *Finance, Insurance, and Real Estate* sector. Property taxes were allocated to the *Government* sector. Utility expenses were allocated to the *Communication and Public Utilities* sector. Hired labor, land rent, beet stock charges, and net returns were allocated to the *Households* sector. Dues and fees were allocated to the *Professional and Social Services* sector.

Table 3. Direct Economic Impacts from Sugarbeet Processing and Marketing Activities in Minnesota, North Dakota, and Eastern Montana, 2003

Expenditure Category	Expenditures in Minnesota, North Dakota, and Montana ^a
	-- 000s \$ --
Total payments to sugarbeet growers	663,626
Contract construction	58,371
Plant maintenance and overhaul	5,939
Transportation	54,642
Communication	461
Public Utilities	3,601
Miscellaneous manufacturing	22,230
Wholesale trade	12,854
Retail trade	9,259
Finance, insurance, and real estate	17,897
Business and personal services	6,821
Professional and social services	6,722
Energy ^b	42,601
State and local taxes ^c	3,881
Labor ^d	155,573
Other expenses	608
Total cash expenditures	1,065,086
Direct impacts from processors ^e	401,459
Full-time equivalent jobs	2,628

^a Only expenditures made within the three states were included.

^b Included coal, electricity, natural gas, and petroleum.

^c Included sales and use, property, and miscellaneous taxes.

^d Included wages and salaries, workman's compensation, unemployment contributions, and employee benefits.

^e Direct impacts were calculated by subtracting payments to sugarbeet growers from total expenditures. Payments made to sugarbeet growers were considered direct impacts attributable to sugarbeet production.

Table 4. Total Direct Impacts of the Sugarbeet Industry, by State and Component of the Industry, 2003

Industry Component	Minnesota	North Dakota	Eastern Montana	Totals ^a	
	----- 000s \$ -----				
Processing/Marketing	240,136	120,184	41,139	401,459	37.3%
State Share	59.8%	29.9%	10.2%		
Production	425,493	222,094	27,849	675,436	62.7%
State Share	63.0%	32.9%	4.1%		
Total (all activities) ^a	665,628	342,278	68,988	1,076,895	
State Share	61.8%	31.8%	6.4%		

^a Columns and rows may not sum due to rounding.

The survey of processors was designed to collect information on expenditures made by processing and marketing activities in the tri-state region. Both individual expenditures and expenses that can be grouped together into broad categories, based on Standard Industrial Classification (SIC) codes, were included in the survey. Major expense types based on SIC codes were organized to match several existing sectors in the North Dakota I-O Model. Those expenditure categories were directly allocated to the same sectors in the North Dakota I-O Model (see Appendix B for more detail). The remaining expenses collected from the survey of processing and marketing activities were allocated to appropriate sectors of the North Dakota I-O Model in the same manner as production outlays.

Miscellaneous manufacturing, wholesale trade, and 40 percent of plant maintenance and overhaul expenses were allocated to the *Agricultural Processing and Miscellaneous Manufacturing* sector. Twenty percent of plant maintenance and overhaul expenses were allocated to *Business and Personal Services* sector. Forty percent of plant maintenance and overhaul expenses were allocated to the *Retail Trade* sector. Expenses for petroleum, natural gas, coal, and communications were allocated to the *Communications and Public Utilities* sector. Employee benefits, insurance, and interest expenses were allocated to the *Finance, Insurance, and Real Estate* sector. Sugarbeet research was allocated to the *Professional and Social Services* sector. All taxes, unemployment, and workman's compensation were allocated to the *Government* sector. Salary and wage expenses were allocated to the *Households* sector.

The *Households* and *Retail Trade* sectors collectively accounted for about 65 percent of all direct impacts (Table 5). The *Finance, Insurance, and Real Estate* sector accounted for 11 percent, while direct impacts in the *Construction* and *Transportation* sectors accounted for over 10 percent of all expenditures. Noticeable direct impacts were also generated in the *Communications and Public Utilities*, *Agricultural Processing and Miscellaneous Manufacturing*, and *Business and Personal Services* sectors (Table 5).

Table 5. Direct Economic Impacts of Sugarbeet Industry in Minnesota, North Dakota, and Eastern Montana, by Economic Sector, 2003

Economic Sector	Industry Activity		Total
	Production	Processing and Marketing	
	----- 000s \$ -----		
Construction	0	58,371	58,371
Transportation	1,271	54,641	55,912
Communication and Public Utilities	5,887	46,663	52,550
Ag Processing and Misc Mnfg	0	38,251	38,251
Retail Trade	277,488	10,843	288,331
Finance, Insurance, and Real Estate	62,087	60,925	123,012
Business and Personal Services	17,815	8,009	25,824
Professional and Social Services	4,043	7,331	11,374
Households (personal income)	298,308	109,977	408,285
Government	8,536	6,449	14,985
Total	675,435	401,460	1,076,895

Secondary Impacts

The secondary impacts of the sugarbeet industry were estimated using the North Dakota Input-Output Model. The North Dakota Input-Output Model traces linkages among sectors of an economy and calculates total business activity resulting from a direct impact in a basic sector (Coon et al. 1985). The model embodies interdependence coefficients or multipliers that measure the level of total gross business volume (gross receipts) generated in each sector of the regional economy from an additional dollar of sales to final demand in a given sector. The model was developed from primary data from North Dakota firms and households and is closed with respect to households (meaning that measurements of economy-wide personal income are included within the model). The input-output model applies the expenditures from the sugarbeet industry to these interdependence coefficients. Resulting levels of business activity were used to estimate secondary (indirect and induced) employment, based on historic relationships.

This process of spending and respending can be explained by using an example. A single dollar from an area sugarbeet producer (*Households* sector) may be spent for a bag of sugar at the local store (*Retail Trade* sector); the store uses part of that dollar to pay for the next shipment of sugar (*Transportation* and *Agricultural Processing* sectors), part to pay the store employee (*Households* sector) who shelved or sold the sugar, and part to pay operating expenses for the store (*Communications and Public Utilities, Business and Personal Services, Finance,*

Insurance, and Real Estate); the sugar processor uses part of that dollar to pay for the sugarbeets used to make the sugar (*Agriculture-Crops* sector); the sugarbeet grower in turn uses a portion of the sugarbeet payment to purchase production inputs (*Retail Trade* and *Business and Personal Services* sectors)... and so on.

Total direct impacts of \$1.1 billion from the sugarbeet industry in Minnesota, North Dakota, and eastern Montana generated about \$2 billion in secondary impacts (Table 6). Secondary economic impacts were greatest in the *Households* (\$1.1 billion), *Retail Trade* (\$874 million), *Finance, Insurance, and Real Estate* (\$253 million), *Communications and Public Utilities* (\$148 million), and *Construction* (\$128 million) sectors. The economic activity in the *Households* sector represents economy-wide personal income resulting from industry expenditures and their subsequent secondary effects. Each dollar of direct impacts generated \$1.85 in secondary impacts.

Table 6. Direct, Secondary, and Total Economic Impacts of the Sugarbeet Industry in Minnesota, North Dakota, and Eastern Montana, 2003

Economic Sector	Industry Impacts		
	Direct	Secondary	Total
	----- 000s \$ -----		
Construction	58,371	69,733	128,104
Transportation	55,912	10,945	66,857
Communication and Public Utilities	52,550	95,217	147,767
Ag Processing and Misc Mnfg	38,251	72,065	110,316
Retail Trade	288,331	585,966	874,297
Finance, Insurance, and Real Estate	123,012	129,781	252,793
Business and Personal Services	25,824	49,593	75,417
Professional and Social Services	11,374	70,578	91,952
Households (personal income)	408,285	671,469	1,079,754
Government	14,985	97,396	112,381
Other sectors ^a	0	135,331	135,331
Total	1,076,895	1,988,074	3,064,969
Direct Employment (full-time jobs)			2,628
Secondary Employment (full-time jobs)			29,258

^a Includes Agriculture-crops, Agriculture-livestock, and Nonmetal Mining sectors.

Tax Revenue

Tax collections are another important measure of the economic impact of an industry on an economy. Tax implications have become an increasingly important measure of local and state-level impacts. Some of the interest in estimating tax revenue generated by an industry has stemmed from public awareness of the importance of tax revenue to local and state governments. In an era of reduced federal funding, revenue shortfalls, and growing public demand on governments to balance their budgets while providing constant or increased levels of services and benefits, tax collections have become an important factor in assessing economic impacts.

Business activity alone does not directly support government functions; however, taxes on personal income, retail trade, real estate property, and corporate income are important revenue sources for local and state governments. Total economic impacts in the *Retail Trade* sector were used to estimate revenue from sales and use taxes. Economic activity in the *Households* sector was used to estimate personal income tax collections. Similarly, corporate income tax revenue was estimated from the economic activity in all business sectors (excluding the *Households*, *Government*, and *Agriculture* sectors). The sugarbeet cooperatives and growers paid an estimated \$11.5 million in property taxes in Minnesota, North Dakota, and eastern Montana in 2003. Property taxes were included in the direct impacts.

Tax collections were estimated separately for Minnesota, North Dakota, and Montana. Direct economic impacts, those from sugarbeet production and processing, were estimated for each state. I-O analysis was used to estimate total business activity in each state. Total business activity, which is comprised of personal income, retail trade, and other business activity, was used to estimate tax revenue. Tax revenue generated by the sugarbeet industry in North Dakota included \$12.8 million in sales and use taxes, \$4.4 million in personal income taxes, and \$1.7 million in corporate income taxes in fiscal 2003 (Table 7). The sugarbeet industry in Minnesota generated \$15.5 million in sales and use taxes, \$23.3 million in personal income taxes, and \$3.1 million in corporate income taxes in fiscal 2003 (Table 7). Tax collections in Montana included \$1.5 million in personal income taxes and \$0.3 million in corporate income taxes. Total tax collections generated by the sugarbeet industry in fiscal 2003 from sales and use, personal income, and corporate income taxes in the tri-state region were about \$62.6 million (Table 7).

Table 7. Estimated Tax Collections Generated by the Sugarbeet Industry in Minnesota, North Dakota, and Eastern Montana, 2003

Tax	Minnesot a	North Dakota	Eastern Montana	Total
	----- 000s \$ -----			
Sales and Use	15,521	12,826	na	28,347
Personal Income	23,280	4,417	1,514	29,211
Corporate Income	3,118	1,671	264	5,053
Total	41,919	18,914	1,778	62,611

na—not applicable.

Total Economic Impacts

Total business activity from sugarbeet industry expenditures and returns in Minnesota, North Dakota, and eastern Montana was estimated at nearly \$3.1 billion in fiscal 2003 (see Table 6). The sectors of the tri-state economy with the greatest total economic impact included the *Households* (economy-wide personal income) (\$1.1 billion), *Retail Trade* (\$874 million), *Finance, Insurance, and Real Estate* (\$253 million), *Communications and Public Utilities* (\$148 million), *Construction* (\$128 million), and *Government* (\$135 million) sectors.

The North Dakota I-O Model also estimates secondary employment. Employment estimates represent the number of full-time jobs generated as a result of total business activity. The sugarbeet cooperatives and marketing alliances were directly responsible for 2,628 full-time equivalent jobs and indirectly supported an additional 29,258 full-time equivalent jobs. The sugarbeet industry also generated about \$18.9 million in tax revenue in North Dakota, another \$41.9 million in tax revenue in Minnesota, and \$1.8 million in tax revenue in Montana (not including property taxes).

The number of jobs created directly from sugarbeet production is difficult to estimate because most sugarbeet farmers also raise other crops. This complicates the employment estimate since if they did not raise sugarbeets, they likely would remain employed raising other crops. Also, sugarbeet labor requirements are seasonal, requiring substantial additional labor during planting, weeding, thinning, and harvesting. Thus, estimating full-time employment equivalents is difficult. Although full-time employment equivalents for additional part-time hired labor are unknown, most of the seasonal employment (i.e., migrant workers, harvest labor, and truck drivers) is captured in the input-output analysis. Secondary employment was calculated based on total business activity and expressed in full-time equivalents. Seasonal employment, measured in terms of individuals employed, would be higher than the number of full-time equivalents, since those workers are employed for short time periods.

Previous Industry Impacts

Previous estimates of the economic contribution of the sugarbeet industry were compared to analyze the changing economic importance of the industry (Table 8). Three prior studies examining the economic contribution of the sugarbeet industry in eastern North Dakota and Minnesota have employed similar methodologies at various points in time. Thus, comparisons of previous estimates can be made by adjusting previous industry estimates to reflect real dollars (effects of inflation removed). Previous estimates from Coon and Leistritz (1988), Bangsund and Leistritz (1993), and Bangsund and Leistritz (1998b) were adjusted using the Consumer Price Index (U.S. Department of Labor 2004) to reflect 2003 equivalent dollars.

Using a survey of sugarbeet processors to obtain processing, research, and distribution expenditures and using crop budgets to estimate farmers' production expenditures, Coon and Leistritz (1988) estimated the overall business activity generated from the sugarbeet industry in eastern North Dakota and Minnesota in 1987. Using similar methodologies, Bangsund and Leistritz (1993) also surveyed sugarbeet processors to obtain their operating expenditures and producer payments in eastern North Dakota and Minnesota. However, Bangsund and Leistritz (1993) included producer (grower) net returns associated with sugarbeet production in their study, an item not included in the study by Coon and Leistritz (1988). Methodologies used by

Bangsund and Leistriz (1998b) were similar to those of Bangsund and Leistriz (1993), except expenditures by United Sugars Corporation to entities in Minnesota and North Dakota were included. The methods used in this study are similar to those used by Bangsund and Leistriz (1993, 1998b). The most salient difference between this study and the three previous studies was the inclusion of expenditures from Sidney Sugars Incorporated in Sidney, MT, expenditures and returns from sugarbeet production in northwestern North Dakota and northeastern Montana, and expenditures in Montana by processors in eastern North Dakota and Minnesota. All other aspects of the four studies remained similar.

Table 8. Economic Size of the Sugarbeet Industry in Minnesota, North Dakota, and Eastern Montana, Selected Years

Economic Indicators	Sugarbeet Industry Activity in Various Years ^a			
	1987	1992	1997	2003
Gross Business Volume (000s nominal \$)	985,709	1,635,800	2,321,500	3,064,969
Gross Business Volume (000s 2003 \$) ^b	1,596,600	2,145,300	2,661,400	3,064,969
Direct Employment (full-time jobs)	2,175	2,410	2,486	2,475
Secondary Employment (full-time jobs)	14,898	20,914	26,848	29,258
Tax Revenue Generated (000s 2003 \$)	34,050	44,070	58,470	62,611
Planted Acreage	460,000	554,400	654,400	776,300
Economic Impact per Acre (2003 \$)	3,471	3,870	4,067	3,948
Tons of Sugarbeets Processed ^c	7,000,000	9,273,819	11,690,823	14,525,889
Economic Impact per Ton (2003 \$)	228.09	231.33	227.65	211.00
Gross Business Volume by State (2003 \$)				
Minnesota	na	1,426,600	1,715,200	1,918,909
North Dakota	na	718,700	946,200	949,261
Eastern Montana	na	na	na	196,799

na--not available.

^a Sources for previous studies: 1987, Coon and Leistriz (1988); 1992, Bangsund and Leistriz (1993); 1997, Bangsund and Leistriz (1998b). Producer net returns and expenditures made by marketing activities were excluded from Coon and Leistriz (1988). Expenditures made by marketing activities were excluded from Bangsund and Leistriz (1993). Estimates of industry impacts in 2003 differ from previous studies by including sugarbeet production in northwestern North Dakota and northeastern Montana, expenditures in the tri-state region by Sidney Sugars Incorporated, and expenditures in Montana by processing and marketing cooperatives in eastern North Dakota and Minnesota.

^b Adjusted for inflation using the Consumer Price Index (U.S. Department of Labor 2004).

^c Exact tonnage of sugarbeets processed was not available from Coon and Leistriz (1988).

In order to provide meaningful comparisons of industry growth over time, the economic effects of production in northwestern North Dakota and northeastern Montana, processing expenditures associated with Sidney Sugars Incorporated, and expenditures made to Montana entities by processors in eastern North Dakota and Minnesota were removed from current estimates of industry impacts. By removing the influences of sugarbeet production and processing associated with Sidney Sugars Incorporated, the general scope of the sugarbeet industry is consistent with past studies.

Adjusting previous estimates of industry size for inflation, and removing the influences of Sidney Sugars Incorporated from current figures, revealed that the sugarbeet industry exhibited real growth (size has increased after adjusting for inflation) over the last 15 years. Since 1987, planted acreage and tons processed have increased 60 percent and 97 percent, respectively. Planted acreage in 1987 was about 460,000 acres, while planted acreage in 2003 increased to 735,348 acres. Correspondingly, in real terms (inflation removed), gross business volume generated by the sugarbeet industry in eastern North Dakota and Minnesota has increased by nearly 6 percent since 1997, 31 percent since 1992, and over 76 percent since 1987. Tax revenue generated by the industry has increased by 93 percent since 1987, 35 percent since 1992, and 2 percent since 1997.

Changes in direct employment were mixed from 1987 to 2003. Direct employment within the industry grew by nearly 11 percent from 1987 to 1992, and by 3 percent from 1992 to 1997. However, employment in 2003, after removing the effects of Sidney Sugars Incorporated, was 4 percent lower than in 1997.

Changes in secondary employment over the same period were similar. Secondary employment supported by the business activity generated by the sugarbeet industry increased by nearly 41 percent from 1987 to 1992 and increased by 28 percent from 1992 to 1997. However, secondary employment decreased by 24 percent from 1997 to 2003. The decrease in secondary employment was not due to less overall economic activity (e.g., gross business volume increased by 6 percent in real terms over the same period), but rather the decrease was reflective of changes in productivity ratios¹ used to estimate secondary employment. The relative change in productivity ratios from 1997 to 2003 was greater than the relative change in the industry's gross business volume. For example, the average amount of economy-wide business activity required to support one secondary job rose from \$86,500 (average of all sectors influenced by the sugarbeet industry) in 1997 to \$135,500 in 2003, a 60 percent increase. Thus, even though the industry generated a 6 percent increase in inflation-adjusted gross business volume, the number of secondary jobs supported by the industry decreased because, in percentage terms, the average amount of business activity required to support a secondary job increased by 60 percent.

Recent changes in the economic impact of the industry have not been proportional in North Dakota and Minnesota. The economic size of the sugarbeet industry in North Dakota increased 32 percent in real terms from 1992 to 1997, while the size of the industry in Minnesota increased 20 percent over the same period. However, the economic contribution of the sugarbeet industry in North Dakota, excluding effects of Sidney Sugars Incorporated, decreased in real

¹ A measure of the amount of gross business volume needed in an economic sector to support one full-time job within that sector.

terms by 5 percent from 1997 to 2003. The economic size of the sugarbeet industry in Minnesota; however, increased over the same period by nearly 12 percent. While changes in planted acreage from 1997 to 2003 between the two states were similar in percentage terms (16.7 percent increase in ND and 14.5 percent increase in Minnesota), in physical terms, increased acreage in Minnesota was nearly double that of North Dakota over the period (an increase of 35,700 acres in ND compared to 64,000 acres in MN). While some of the change in gross business volume between the two states can be attributed to planted acreage, the distribution of expenditures by processing and marketing activities also account for the differences in economic activity between the two states. Excluding the economic effects associated with Sidney Sugars Incorporated, 68 percent of the industry-wide gross business volume was generated in Minnesota and 32 percent was generated in North Dakota. By comparison, in 1997 about 36 percent of the industry's economic activity was generated in North Dakota and 64 percent in Minnesota.

The economic size and importance of the sugarbeet industry in eastern North Dakota and Minnesota has increased substantially in the last 15 years. However, the rate of change over time has not necessarily been equally distributed between North Dakota and Minnesota. Bangsund and Leistriz (1998b) showed subtle shifts in economic growth favoring North Dakota over Minnesota in the mid 1990s, while current figures show recent shifts in economic growth favoring Minnesota over North Dakota.

Subtle changes in physical measures (i.e., impact per ton, impact per acre) of the industry's impact occurred from 1987 to 2003. Gross business volume per planted acre increased in real terms from 1987 to 1992 and from 1992 to 1997. However, gross business volume per planted acre, after adjusting for inflation, decreased from 1997 to 2003. The amount of business activity per planted acre, excluding effects associated with Sidney Sugars Incorporated, was estimated at nearly \$3,824 in 2003, a 6 percent decrease from inflation-adjusted figures for 1997. Similarly, in real terms, the gross business volume per ton of sugarbeets processed went from \$228 per ton in 1997 to \$208 per ton in 2003. In previous studies, the gross business volume per ton (in real terms) of sugarbeets processed was higher than current estimates. Both measures, gross business volume per ton processed and per acre planted, after correcting for inflation, showed decreases from 1997 to 2003. Potential reasons for the change might be attributable to such things as annual difference in yield, shrink, and spoilage, varying levels of sugar content, spending patterns by the industry within the study region, and changes in sugar prices.

Physically, the sugarbeet industry in eastern North Dakota and Minnesota has grown in the last decade as evidenced by increases in acres planted, tons of sugarbeets harvested and processed, and volume of sugar marketed. Recent expansions have been substantial as sugarbeet acreage increased by 81,000 acres or by 12 percent in eastern North Dakota and Minnesota from 1997 to 2003. Also, sugarbeets processed increased by 1.85 million tons or by 16 percent over the same period. Yet, the gross business volume associated with the industry within the study region increased by only 6 percent. Physical growth, in percentage terms, of the industry in recent years has exceeded economic growth.

Several reasons contribute to the situation where physical growth exceeds economic growth. First, not all physical measures of the industry (acreage, tonnage) translate into linear changes in economic size, as processors do not incur proportional increases in all expenditures

with proportional increases in processing activity. Second, the degree to which processors purchase inputs and services from entities outside of the study region can affect the impact of the industry since the primary mechanism used to measure the economic contribution of the sugarbeet industry is an assessment of expenditures made within the study region. If the volume of those purchases changes, or if additional inputs, once available locally, now require purchasing from entities outside of the study region, the net effect can lead to slippage in the amount of expenditures made in the regional economy. Third, changes in sugar prices can lead to changes in revenues for processors and growers. The economic size of the industry over time has been adjusted to reflect changes in the purchasing power of the dollar (inflation). If the same correction for inflation is performed on wholesale prices of refined beet sugar in the Midwest, average annual sugar prices show a 16 percent decrease from 1997 to 2003 (U.S. Department of Agriculture 2004). Finally, yields can influence the economic and physical measures of the industry. Although published sugarbeet yields were not available for 2003, an examination of yields from 1997 through 2002 reveal little change in average production per acre in both North Dakota and Minnesota. As a result, production per acre has remained mostly unchanged from 1997 to 2002. Stagnant yields, combined with lower real prices, also have contributed to slippage between physical and economic measures of the industry. Thus, future changes in the economic importance of the sugarbeet industry not only hinge on physical size, such as acreage and tonnage produced, but will also rely on prices received for industry outputs and spending patterns by industry processors within the regional economy.

SUMMARY and CONCLUSIONS

The sugarbeet industry analyzed in this study is geographically limited to the Red River Valley of North Dakota and Minnesota, west central Minnesota, and northwestern North Dakota/northeastern Montana. Within these areas, sugarbeets are produced and processed into refined sugar. The industry is concentrated geographically and structurally, which boosts the economic effect of the industry on local economies. However, because sugarbeets are produced in a relatively small area compared to other traditional crops and livestock within the three states and with relatively few acres, the economic impact generated by the industry can be overlooked or underestimated.

The purpose of this study was to estimate the economic contribution of the sugarbeet industry to the economies in Minnesota, North Dakota, and eastern Montana in 2003. An economic contribution analysis, as used in this study, represents an estimate of all relevant expenditures by a specific industry and the subsequent secondary effects of those expenditures.

Sugarbeet enterprise budgets were developed to estimate costs of production and returns from growing sugarbeets in the three states. The sugarbeet processing cooperatives and joint marketing entities in Minnesota and North Dakota were surveyed to obtain estimates of their in-state expenditures. Expenditures from processing and marketing activities and combined expenditures and net returns from sugarbeet production in the tri-state region were estimated at \$1.1 billion in fiscal 2003. The \$1.1 billion in direct impacts, based on input-output analysis, generated another \$2 billion in secondary impacts. The sugarbeet industry employed 2,628 full-time equivalent workers and, based on total business activity, supported an additional 29,258 full-time equivalent jobs in the tri-state area. Total economic activity (direct and secondary impacts) was estimated at \$3.1 billion in 2003, including \$1.1 billion in economy-wide personal income and \$874 million in annual retail sales. Also, the sugarbeet industry generated about \$62.6 million in tax revenue, including tax collections of \$41.9 million in Minnesota, \$18.9 million in North Dakota, and \$1.8 million in Montana. Minnesota had the largest share of the industry's gross business volume (\$1.9 billion or 63 percent), followed by North Dakota (\$945 million or 31 percent) and Montana (\$197 million or 6 percent).

For every dollar the sugarbeet industry spent in Minnesota, North Dakota, and Montana, \$1.85 in additional business activity was generated. Each acre of sugarbeets planted generated about \$3,948 in total business activity (production, processing, marketing, and secondary impacts) or, expressed alternatively, each ton of sugarbeets processed generated about \$211 in total business activity.

Examinations of previous studies of the economic contribution of the sugarbeet industry revealed that the industry has experienced substantial real growth (i.e., effects of inflation were removed) in the last 15 years. When removing acreage, production, and economic activity associated with Sidney Sugars Incorporated, in Sidney, Montana, planted acreage in eastern North Dakota and Minnesota has increased 60 percent from 1987 to 2003, and increased 12 percent from 1997 to 2003. Correspondingly, tons of sugarbeets processed increased by 93 percent from 1987 to 2003 and by 16 percent from 1997 to 2003. In real terms, gross business volume generated by the industry in Minnesota and North Dakota has increased 6 percent since 1997 and 76 percent since 1987.

The sugarbeet industry in Minnesota, North Dakota, and eastern Montana contributes substantially to the tri-state economy. Not only was the dollar volume of business activity considerable, but most processing plants are located in rural areas of the three states. Even though the sugarbeet industry has processing plants located throughout the sugarbeet-growing area, the size of the sugarbeet-growing area suggests much of its economic activity affects local economies. Expenditures for crop inputs and returns to growers, which represent a majority of the economic activity, are evenly distributed throughout the growing area. Substantial impacts in two major sectors of the economy, *Households* and *Retail Trade*, help to support this conclusion. In contrast, economic activity in other sectors of the economy may represent a concentration of economic activity in one or two major cities or with a few large firms (e.g., *Communications and Public Utilities*).

Although the sugarbeet industry in Minnesota, North Dakota, and eastern Montana is not large in terms of acres or geographic area, if measured in terms of personal income, retail sales, gross business volume, tax revenue collections, and employment (direct and secondary), its economic contribution is highly apparent. The industry is an important and substantial contributor to both local economies and the tri-state regional economy.

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APPENDIX A

Sugarbeet Production Budgets

Budget Sources and General Composition

Sugarbeet production budgets were compiled for the three main growing regions: Red River Valley, west central Minnesota, and northwestern North Dakota/northeastern Montana. Production budgets were used to estimate the economic contribution of sugarbeet production, and were used to allocate production expenses to various sectors of the North Dakota I-O Model.

Revenues

Payments to farmers and planted acreage in each major growing area were obtained from the survey of sugarbeet processors (Appendix B). Estimates of per-acre Federal farm program payments (uncoupled) provided for in the 2002 Federal farm bill were obtained from the North Dakota Farm and Ranch Business Management Education (2004) and Minnesota Farm Business Management Education (2004). Payments from sugarbeet processors and farm program payments were combined to estimate gross revenues from sugarbeet production.

Expenses

Expenses for sugarbeet production on owned and rented land in the North Dakota and Minnesota Red River Valley were obtained from Minnesota and North Dakota Farm Business Management Education (2004). Similarly, expenses for sugarbeet production in west central Minnesota were obtained from Minnesota Farm Business Management Education (2004). Expenses available from the Farm Business Management Education programs represented an average of actual production costs incurred by the farmers/producers who are enrolled in the program. Expenses for sugarbeet production in northwestern North Dakota/northeastern Montana represented a combination of cost estimates compiled from Sidney Sugars Incorporated (2003), North Dakota Farm and Ranch Business Management Education (2004), U.S. Department of Agriculture (2001), and Hill (2004). Expenses for sugarbeet production in the Red River Valley and west central Minnesota represented an average of operating costs for both rented and owned land. Expenses for sugarbeet production in northwestern North Dakota/northeastern Montana were representative of operating costs on owned land. The ratio of rented to owned land in the Red River Valley and west central Minnesota sugarbeet growing regions was obtained from the U.S. *Census of Agriculture* (U.S. Department of Commerce 1999) and used to average production costs between owned and rented land.

Net Returns

Producer net returns from sugarbeet production were estimated by subtracting variable and fixed costs from gross revenue. All expenses represented cash costs, except depreciation charges, which were used a proxy for machinery purchases. As a result, the budgets excluded non-cash costs associated with owned land, return on invested equity, management charges, and income tax liability. The producer net returns estimated in the budgets should not be confused with economic profit. Instead, the returns to unpaid labor, management, and equity simply represent gross revenues less cash expenses. Economic costs of production were not estimated.

Sugarbeet Production Budget, North Dakota and Minnesota Red River Valley, 2003

Sugarbeet payments to growers	\$520,525,000
Planted acreage in Red River Valley	616,726

	Owned Land	Rented Land	Average
Amount of land that is rented			58.3%
Farm program payments (uncoupled)	\$15.00	\$14.34	\$14.62
Payments from Sugarbeet Processors			\$844.01
Gross Revenue (\$/planted acre)			\$858.63

Variable Expenses (\$/planted acre)

Seed	46.94	46.92	46.93
Fertilizer	28.10	27.41	27.70
Chemical	127.38	123.67	125.22
Insurance	16.56	15.92	16.19
Fuel and Lubrication	31.18	30.84	30.98
Repairs	63.33	63.49	63.42
Custom Hire	11.49	12.52	12.09
Hired Labor	21.56	21.62	21.59
Machinery and Building Lease	0.60	1.16	0.93
Beet Stock Charge	51.81	91.25	74.79
Interest	10.32	12.14	11.38
Land Rent*	0.00	60.84	35.46
Miscellaneous	2.45	1.93	2.15
Total Variable Costs	411.72	509.71	468.83

Fixed Costs (\$/planted acre)

Custom Hire	6.12	7.86	7.13
Hired Labor	31.83	31.73	31.77
Machinery and Building Lease	9.37	10.28	9.90
Property Tax*	11.21	11.21	11.21
Farm Insurance	5.07	5.42	5.27
Utilities	6.75	6.03	6.33
Dues and Professional Fees	6.40	5.97	6.15
Interest	42.29	14.89	26.32
Machinery & Building Depreciation	52.90	46.27	49.04
Miscellaneous	7.67	8.68	8.26
Total Fixed Costs	179.61	148.34	161.38

Total Costs	591.33	658.05	630.21
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Returns to Unpaid Labor, Management, and Equity	---	---	228.42
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*Property tax expense on owned land was subtracted from cash rent on rented land. Property tax expense was not originally listed in the budget for rented land. By adding property tax expense on rented land, variable expenses were reduced by the amount of property tax and subsequently, fixed costs on rented land were increased by the same amount. This was done to account for property tax expense for all land used to produce sugarbeets.

Sugarbeet Production Budget, West Central Minnesota, 2002

Sugarbeet payments to growers	\$100,412,449
Planted acreage in west central Minnesota	118,622

	Owned Land	Rented Land	Average
Amount of land that is rented			52.1%
Farm program payments (uncoupled)	\$19.37	\$21.39	\$20.42
Payments from Sugarbeet Processors			\$846.49
Gross Revenue (\$/planted acre)			\$866.91

Variable Expenses (\$/planted acre)	Owned Land	Rented Land	Average
Seed	51.58	49.29	50.39
Fertilizer	31.04	25.23	28.01
Chemical	96.73	108.55	102.89
Insurance	15.08	16.37	15.75
Fuel and Lubrication	18.81	20.08	19.47
Repairs	40.62	47.00	43.95
Custom Hire	48.62	24.59	36.10
Hired Labor	27.33	27.05	27.18
Machinery and Building Lease	0.00	3.70	1.93
Beet Stock Charge	3.89	32.09	18.59
Interest	22.20	22.35	22.28
Land Rent*	0.00	81.50	42.48
Miscellaneous	20.89	14.03	17.31
Total Variable Costs	376.80	471.83	426.33

Fixed Costs (\$/planted acre)	Owned Land	Rented Land	Average
Custom Hire	0.00	3.90	2.03
Hired Labor	8.87	22.41	15.93
Machinery and Building Lease	5.87	9.33	7.67
Property Tax*	11.95	11.95	11.95
Farm Insurance	7.50	5.61	6.51
Utilities	4.55	5.94	5.27
Dues and Professional Fees	0.00	4.04	2.11
Interest	128.71	19.57	71.82
Machinery & Building Depreciation	57.44	47.52	52.27
Miscellaneous	8.16	6.81	7.46
Total Fixed Costs	233.05	137.08	183.02

Total Costs	609.35	608.91	609.35
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Returns to Unpaid Labor, Management, and Equity	---	---	257.56
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*Property tax expense on owned land was subtracted from cash rent on rented land. Property tax expense was not originally listed in the budget for rented land. By adding property tax expense on rented land, variable expenses were reduced by the amount of property tax and subsequently, fixed costs on rented land were increased by the same amount. This was done to account for property tax expense for all land used to produce sugarbeets.

Sugarbeet Production Budget, Northwestern North Dakota/Northeastern Montana, 2002

Sugarbeet payments to growers	\$42,689,000
Planted acreage in northwestern ND/northeastern MT	41,000
	Owned Land
Farm program payments (uncoupled)	\$9.03
Payments from Sugarbeet Processors	\$1,041.20
Gross Revenue (\$/planted acre)	\$1,050.23
Variable Expenses (\$/planted acre)	
Seed	45.00
Fertilizer	80.00
Chemical	150.00
Irrigation Water	25.00
Fuel and Lubrication	61.89
Repairs	49.00
Irrigation Repairs	12.00
Custom Hire	13.00
Hired Labor	100.00
Shipping/Hauling	31.00
Utilities	8.11
Miscellaneous	10.00
Total Variable Costs	<u>585.00</u>
Fixed Costs (\$/planted acre)	
General Overhead	44.16
Property Tax	5.00
Insurance	21.39
Machinery & Building Depreciation	78.48
Machinery & Building Lease	9.90
Miscellaneous	8.26
Total Fixed Costs	<u>233.02</u>
Total Costs	818.02
Returns to Unpaid Labor, Management, and Equity	232.21

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APPENDIX B

Sugarbeet Processor Expenditures Survey

Instructions for Sugarbeet Processor Expenditures Survey

Data provided from this survey will be used to estimate the contribution the sugarbeet industry makes to the economies of North Dakota and Minnesota. All the information you provide will be kept strictly confidential. The following general instructions are suggested for completing the questionnaire.

1. Use information from the most recently completed fiscal year.
2. Information should be recorded in dollar terms.
3. Include information for all of the organization's processing facilities on this questionnaire.
4. Include relevant information from all business ventures and other cooperative arrangements (United Sugars, Midwest Agri-Commodities, ProGold, others)
4. If you cannot identify whether expenditures were made to North Dakota or Minnesota entities, please indicate this on the form.
5. When exact information is not available, please estimate.
6. Definitions for selected expenditure items and their corresponding Standard Industrial Classification (SIC) code listing are included to help in determining allocation of expenditures.
7. If you have questions, please contact:

Dean Bangsund (701-231-7471 fax 701-231-7400)
Larry Leistritz (701-231-7455)
Department of Agribusiness and Applied Economics
North Dakota State University
Fargo, ND 58105-5636

DEFINITIONS FOR EXPENDITURE ITEMS
(According to the Standard Industrial Classification Manual)

Construction: Includes building construction--general contractors engaged in construction of residential, farm, industrial, public, and other buildings. (Major Groups 15, 16, and 17)

Transportation: Includes railroad, motor freight, water transportation, air transportation, pipeline transportation of petroleum, and other transportation to include packing and crating services, and rental of transportation equipment. (Major Groups 40, 41, 42, 43, 44, 45, 46, and 47)

Communications: Includes establishments engaged in telephone, telegraph, radio, television, and other communication services. (Major Group 48)

Public Utilities: Includes natural gas companies engaged in the transmission, storage, or distribution of natural gas. Also, water supply and sanitary services are included. (Major Group 49 except Group 491)

Wholesale Trade: Includes establishments primarily engaged in selling merchandise to retailers; to industrial, commercial, institutional, or professional users; or to other wholesalers, or acting as agents in buying merchandise for or selling merchandise to such persons or companies. (Major Groups 50 and 51)

Retail Trade: Includes establishments engaged in selling merchandise for personal, household, or farm consumption, and rendering services incidental to the sale of goods. (Major Groups 52, 53, 54, 55, 56, 57, 58, and 59)

Finance, Insurance, and Real Estate: Includes institutions engaged in banking or other financial institutions, insurance, and real estate. (Major Groups 60, 61, 62, 63, 64, 65, 66, and 67)

Business and Personal Services: Includes firms operating lodging services, repair, laundry, entertainment, other personal services predominantly to private individuals, credit collection, janitorial, and stenographic services. (Major Groups 70, 72, 73, 75, 76, 78 and 79)

Professional and Social Services: Includes establishments engaged in furnishing health, medical, legal, educational, research and development, and other professional services. (Major Groups 80, 81, 82, 83, 84, 86, 88, and 89)

SUGARBEET PROCESSOR EXPENDITURES QUESTIONNAIRE

Cooperative: _____

Location: _____

I. **Listing of expenditures made in _____** (please indicate year).

Items For Which Expenditures were Made	<u>Estimated Annual Expenditure In</u> North Dakota Minnesota	
	dollars	
Payments to sugarbeet growers (sugarbeet production)		
Other payments to sugarbeet growers (capital returns, etc.)		
Contract construction		
Plant maintenance and overhaul		
Transportation		
Communications		
Public utilities		
Miscellaneous manufacturing		
Wholesale trade		
Retail trade		
Finance, insurance, and real estate		
Business and personal services		
Professional and social services		
Coal		
Electricity		
Petroleum/natural gas		
Wages and salaries		
Benefits		
Sugarbeet research funded		

Items For Which Expenditures were Made	Estimated Annual Expenditure In	
	North Dakota	Minnesota
	dollars	
Government (taxes paid in ND and MN only)		
Property taxes		
Sales and use taxes		
Unemployment		
Other taxes (please specify)		
Other Expenses (please specify nature of expense)		

II. **Total annual revenue (from all ventures):** \$ _____

III. **Number of employees in full-time equivalents:** _____ full-time equivalent jobs

IV. **Sugarbeets processed:** _____ tons

V. **Sugarbeet acreage:** _____ acres planted
 _____ acres harvested

VI. **Comments/further explanations (attach supporting material if needed):**
