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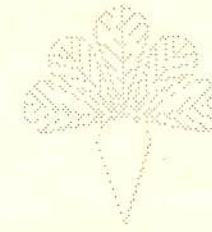
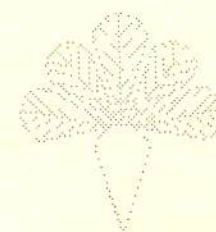
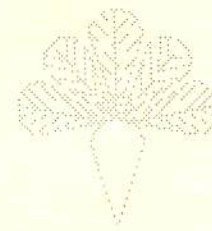
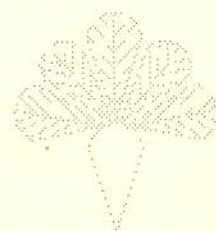
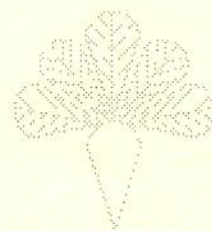
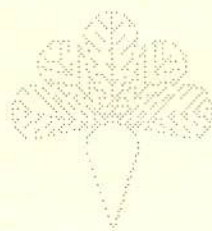
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# **Sugarbeet Production Costs in the Red River Valley, 1987**

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## PREFACE

The authors thank the sugarbeet producers who gave information on costs and production practices. The full cooperation of the American Crystal Sugar Company and Minn-Dak Farmers Cooperative in providing information and lists of producers is appreciated. Dr. Allen Cattanach helped with technical information. The producer interviews were conducted by the fieldmen for the cooperatives.

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## SUGARBEET PRODUCTION COSTS IN THE RED RIVER VALLEY, 1987

Roger G. Johnson and Bradley B. Clow\*

Sugarbeets were produced on 392,800 acres by about 1,385 farming units in the Red River Valley area of North Dakota and Minnesota in 1987 (Minnesota and North Dakota Agricultural Statistics Service 1988). An additional 66,200 acres were produced in an adjoining area of southern Minnesota. The combined area accounts for about 40 percent of the sugarbeet acreage in the United States (Clauson and Hoff 1988).

Sugarbeets in the Red River Valley are processed in five American Crystal Sugar Company factories and one Minn-Dak Farmers Co-op factory. Costs per acre were determined for a sample of producers shipping sugarbeets to each of the six factories.

Current and accurate production costs are desired for a variety of uses. Producers can compare their costs with the averages to identify possible cost savings in their operations. Producer costs are needed in evaluating the economic impact of the industry on the regional economy (Coon and Leistritz 1988). Production cost data are also used in evaluating sugar price policy proposals.

### Sample of Producers

Information needed to calculate production costs was obtained from a randomly chosen group of producers. Factory fieldmen completed questionnaires with the selected producers. Preharvest cost information was collected during the summer of 1987, and harvesting costs were reported following harvest. Additional information was obtained after the farmer had filed his 1987 income tax returns. Budgets were prepared for each of the 147 farm units who supplied complete information.

Production costs were determined by operating unit. An operating unit often involves several sugarbeet contract holders who farm jointly. An operating unit was defined as any farming enterprise in which members are jointly farming all their crop enterprises. Sugarbeet contract holders who own sugarbeet harvesting equipment together were considered separate sugarbeet operations if they separately operated their overall farming operations.

Sugarbeet companies' lists of contract holders were grouped into operating units from which a 14 percent sample was randomly drawn. The operating units were stratified by factory and fieldman (subarea) to obtain

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proportional numbers from each factory and each subarea within a factory district. Some fieldmen did not complete all assigned contacts, resulting in fewer producers surveyed than intended. Number of operating units, sample goal, and surveys completed by factory area are presented in Table 1.

TABLE 1. NUMBER OF SUGARBEET OPERATIONS, SAMPLE GOAL, AND SURVEYS COMPLETED, BY FACTORY, 1987 SURVEY

Factory	Sugarbeet Operations	Sample Goal	Surveys Completed
Drayton	321	45	19
East Grand Forks	243	34	33
Crookston	179	25	21
Hillsboro	186	26	26
Moorhead	271	38	22
Wahpeton	<u>185</u>	<u>26</u>	<u>26</u>
Total	1,385	194	147

#### Size of Farm

Average acres of land owned, rented, and devoted to sugarbeets are presented in Table 2. The average sugarbeet operation surveyed included 1,760 acres of land with 337 acres of sugarbeets. Rented land accounted for 63 percent and owned land 37 percent of the land farmed. Owned land was more intensively cropped to sugarbeets with one-fourth in sugarbeets while only one-sixth of rented land was in sugarbeets. Because not all land farmed is suitable for sugarbeet production, the portion of land in sugarbeets is not an accurate measure of the length of the crop rotation. Most farmers grow sugarbeets on the same field every three or four years.

#### Calculation of Costs

A computer program generated budgets of per acre costs for each farm unit surveyed (Kletke 1979). Seed, fertilizer, and pesticide application rates were multiplied by prices paid to arrive at costs per acre. Hand labor, crop insurance, and custom work costs were easily determined as they are normally paid on a per acre basis. Total miscellaneous sugarbeet expenses were divided by sugarbeet acres to obtain per acre cost. Migrant

TABLE 2. AVERAGE LAND AND SUGARBEET ACREAGE OWNED AND RENTED, BY FACTORY, 1987 SURVEY

Factory	Total Land			Land in Sugarbeets		
	Owned	Rented	Total	Owned	Rented	Total
Drayton	556	1,119	1,675	77	166	243
East Grand Forks	539	1,046	1,585	124	167	291
Crookston	702	1,076	1,778	244	213	457
Hillsboro	613	962	1,575	164	160	324
Moorhead	541	1,103	1,644	151	194	345
Wahpeton	946	1,345	2,291	222	159	381
All factories <sup>a</sup>	652	1,108	1,760	163	174	337

<sup>a</sup>Average of all farms studied.

housing cost was the sum of annual depreciation, interest on investment, utilities, and upkeep expenses divided by acres of sugarbeets. Social Security was 7.15 percent of hired machine labor cost. Interest on operating capital was calculated from the month an input was used until November. Interest rate applied for operating capital was 11.1 percent, the rate charged by the Farm Credit Service and banks on farm operating loans.

The budget generator program calculates costs associated with machinery operation and ownership by applying engineering coefficients and cost formulas to the data on individual machinery ownership and use (Kletke 1979). Farmers supplied information on field operations followed, width of machine used, and speed of travel. Farmers also reported purchase price of each machine, year purchased, acres covered annually, and years of intended use.

Machinery operating costs include repairs, fuel, and lubricants. Repair costs were based on their relation to hours of use for various types of machines. Fuel consumption was calculated from rates based on tractor horsepower and truck type. A price of \$.93 per gallon for gasoline and \$.63 per gallon for diesel was used. Lubricant costs were assumed to be 15 percent of fuel costs.

Hours of machinery labor were based on type and width of machinery used and speed of travel. Machine hours were increased 10 percent to reflect time required for adjusting equipment, lubrication, and



maintenance. Trucking hours were influenced by distance to piling station. Hours of labor hired to operate machinery and trucks were subtracted from total hours of machinery labor to determine unpaid (operator and family) machine labor hours. Hired labor cost an average of \$6.00 per hour. Unpaid labor was charged a cost of \$4.50 per hour. The lower rate reflects the smaller portion of unpaid labor employed during the higher wage harvesting campaign.

Machinery replacement cost was calculated like straight-line depreciation including a salvage value. However, replacement cost is based on current machinery values, not cost at time of purchase. All machinery prices were indexed to 1987 dollars using the GNP implicit price deflator. Interest cost was calculated by multiplying the average machinery capital invested by a 7.0 percent rate of interest.<sup>1</sup>

The land charge for each factory area was the average cash rent reported by farmers surveyed. No additional land charge was made for summer fallow. The average price paid for co-op shares times 7.0 percent was used to impute an opportunity cost of this investment. Farm overhead expenses were allocated to the sugarbeet enterprise based on proportion of gross income from sugarbeets. The management charge was calculated as 10 percent of all costs except land and co-op investment.

#### Production Costs by Area

Average production costs for American Crystal, Minn-Dak, and the Red River Valley are presented in Table 3. Minn-Dak growers' total costs were 12.8 percent higher than the average for American Crystal growers. Higher fertilizer, herbicide, and hand labor costs accounted for most of the \$30.00 per acre greater variable costs incurred by Minn-Dak growers. Minn-Dak growers had higher machinery and land costs than American Crystal growers.

Average per acre costs for each American Crystal factory area are given in Table 4. Hillsboro growers had the highest total costs while Moorhead growers had the lowest. High cost for fungicides was the single most important item accounting for the higher costs for Hillsboro growers. Hand thinning costs were \$6 to \$10 per acre higher for Hillsboro and Drayton growers than for other factories. Custom hauling was most used by the Drayton and East Grand Forks growers. Land costs (cash rent) averaged the lowest in the Drayton area and highest in the Crookston area. Other cost items were similar among factory areas.

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<sup>1</sup>Based on the rate of return on government securities.

TABLE 3. AVERAGE SUGARBEET COSTS PER PLANTED ACRE FOR MINN-DAK, AMERICAN CRYSTAL, AND ALL RED RIVER VALLEY GROWERS, 1987 SURVEY

Item	Minn-Dak	American Crystal	Red River Valley
-----dollars-----			
Variable Costs:			
Beet seed	28.64	28.45	28.48
Fertilizer	29.12	17.82	19.79
Custom fertilizer application	0.58	0.90	0.84
Insecticide	7.32	10.92	10.29
Herbicide	39.68	32.42	33.69
Custom herbicide application	0.46	1.66	1.45
Fungicide	10.85	6.27	7.07
Custom fungicide application	3.23	3.01	3.05
Hand thinning	10.46	7.28	7.83
Hand weeding	24.19	16.27	17.65
Migrant housing	4.31	2.29	2.64
Hired machine labor	14.60	18.08	18.25
Unpaid machine labor	14.36	9.93	9.44
Social Security	1.05	1.28	1.30
Custom hauling	2.12	4.35	3.96
Fuel and lube	21.30	22.50	22.31
Repairs	21.91	22.40	22.29
Crop insurance	4.85	2.30	2.75
Miscellaneous <sup>a</sup>	11.48	6.95	7.60
Interest on operating capital	10.58	7.97	8.43
Total variable costs	261.09	223.05	229.11
Fixed Costs:			
Machinery replacement	60.08	52.66	53.95
Interest on machinery investment	34.11	31.90	32.28
Farm overhead <sup>b</sup>	25.02	17.96	20.56
Co-op share	38.29	41.60	41.30
Management charge	38.71	32.51	33.59
Land charge	62.55	63.41	63.75
Total fixed costs	258.76	240.04	245.43
Total costs	519.85	463.10	474.54

<sup>a</sup>Includes soil sampling, crop monitoring, beet hoes, interest, and depreciation on unused beet equipment, machine rent, other custom work, and micronutrients.

<sup>b</sup>Includes insurance, utilities, vehicle license and tax, bookkeeping, and other items.

TABLE 4. AVERAGE SUGARBEET COSTS PER PLANTED ACRE BY FACTORY AREA FOR AMERICAN CRYSTAL GROWERS, 1987 SURVEY

Item	East				
	Drayton	Grand Forks	Crookston	Hillsboro	Moorhead
	-----dollars-----				
Variable Costs:					
Beet seed	28.07	26.55	32.21	29.33	27.01
Fertilizer	13.98	16.68	20.44	22.02	15.75
Custom fertilizer application	1.07	1.13	1.00	0.56	0.68
Insecticide	13.08	9.45	11.88	11.38	9.59
Herbicide	28.14	34.25	36.94	35.06	26.35
Custom herbicide application	1.00	1.20	1.98	2.93	1.22
Fungicide	2.56	5.20	5.01	11.85	6.05
Custom fungicide application	1.15	2.21	2.68	5.41	3.49
Hand thinning	12.79	2.91	2.50	13.33	5.96
Hand weeding	16.17	9.32	11.52	23.65	22.61
Migrant housing	4.04	0.56	2.06	2.50	3.19
Hired machine labor	13.87	14.21	21.00	13.42	14.21
Unpaid machine labor	14.25	15.99	11.99	17.50	12.83
Social Security	1.00	1.03	1.51	0.97	1.02
Custom hauling	7.27	7.47	3.68	0.00	2.64
Fuel and lube	22.27	23.00	23.04	23.84	19.65
Repairs	22.50	21.45	24.38	22.57	21.84
Crop insurance	0.75	1.92	1.17	3.29	4.28
Miscellaneous <sup>a</sup>	5.08	6.02	4.18	3.93	3.86
Interest on operating capital	7.58	7.14	8.30	9.35	7.64
Total variable costs	216.62	207.69	227.47	252.89	209.87
Fixed Costs:					
Machinery replacement	53.23	55.58	52.05	49.97	51.48
Interest on machinery investment	31.30	33.69	32.87	29.81	31.31
Farm overhead <sup>b</sup>	15.24	18.99	20.96	10.27	15.24
Co-op share	41.30	41.30	41.30	41.30	41.30
Management charge	31.64	31.60	33.34	34.30	30.79
Land charge	60.83	65.89	67.66	64.07	62.20
Total fixed costs	233.54	247.05	248.18	229.72	232.32
Total costs	451.16	454.74	475.65	482.61	442.19

<sup>a</sup>Includes soil sampling, crop monitoring, beet hoes, interest, and depreciation on unused beet equipment, machine rent, other custom work, and micronutrients.

<sup>b</sup>Includes insurance, utilities, vehicle license and tax, bookkeeping, and other items.

### Production Costs by Size of Enterprise

Producers' costs were arrayed by acres of sugarbeets planted. Average costs per planted acre of producers in the upper and lower 25 percent of sugarbeet acres are compared in Table 5. Total costs were \$34.34 per acre higher for the larger enterprises than for the smaller ones. Yields were 0.4 tons per acre higher for the largest size group, but the percent sugar was lower.

Producers with more acres had \$24.34 higher variable costs and \$8.33 higher fixed costs per acre. Increased variable costs were for fertilizer and pesticides. Custom hauling was the major expense that was higher for smaller acreage producers. Nearly all the differences in fixed costs were due to the higher cash rents paid by the larger farms. Cash rentals were used to establish the land charge on all sugarbeet acres including owned land.

TABLE 5. SUGARBEET PRODUCTION COSTS FOR SUGARBEET ACREAGE IN THE HIGHEST AND LOWEST 25 PERCENTILE OF RED RIVER VALLEY SUGARBEET FARMS, 1987

Item	36 Smallest Farms	36 Largest Farms
Variable Costs:		
Beet seed	\$ 27.29	\$ 29.58
Fertilizer	15.97	21.84
Custom fertilizer application	0.45	1.24
Insecticide	1.26	9.11
Herbicide	31.01	39.19
Custom herbicide application	1.26	1.25
Fungicide	6.66	7.30
Custom fungicide application	2.70	3.13
Hand thinning	11.86	6.02
Hand weeding	15.36	18.99
Migrant housing	2.47	2.04
Hired machine labor	13.78	24.18
Unpaid machine labor	14.74	2.87
Social Security	0.99	1.74
Custom hauling	7.78	2.04
Fuel and lube	21.35	22.54
Repairs	18.47	24.90
Crop insurance	3.16	3.00
Miscellaneous <sup>a</sup>	8.48	7.17
Interest on operating capital	7.77	9.02
Total variable costs	\$212.81	\$237.15
Fixed Costs:		
Machinery replacement	\$ 53.34	\$ 53.47
Interest on machinery investment	33.11	30.54
Farm overhead <sup>b</sup>	10.80	11.23
Co-op share	41.32	40.96
Management charge	31.01	33.24
Land charge	58.85	67.42
Total fixed costs	\$228.43	\$236.86
Total costs	\$441.24	\$474.01
Acreage Range	104-204	437-1,239
Average Acres	157	601

<sup>a</sup>Includes soil sampling, crop monitoring, beet hoes, interest, and depreciation on unused beet equipment, machine rent, other custom work, and micronutrients.

<sup>b</sup>Includes insurance, utilities, vehicle license and tax, bookkeeping, and other items.

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