



Economic Implications of Sugarbeets in Idaho

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Introduction

The Idaho sugar industry has existed since 1903 when a processing factory began operating near Idaho Falls. Another factory was soon added at Nampa. Of the many sugar factories constructed since then, only three are in operation today. These are located at Paul, Twin Falls, and Nampa. An additional factory at Nyssa, Oregon, serves a portion of western Idaho.

In terms of cash receipts received by farmers, sugarbeets rank third among Idaho crops, surpassed only by potatoes and wheat. Total farm receipts for sugarbeets for 1990, 1991, and 1992 were \$202, \$194, and \$188 million, respectively, or about 7 percent of all cash receipts received by Idaho farmers during those years.¹ Idaho ranks second nationally in the production of sugarbeets.

Sugarbeets are grown on irrigated land in 15 southern Idaho counties. Acres of beets harvested have increased from about 140,000 in 1980 to 204,000 in 1993 (figure 1).

¹Idaho Department of Agriculture and USDA. 1993 Idaho Agricultural Statistics.

During that same period, yield per acre has averaged between 23 and 26 tons (figure 2). Yields tend to be higher in the longer growing season areas of western Idaho and lower in the eastern part of the state.

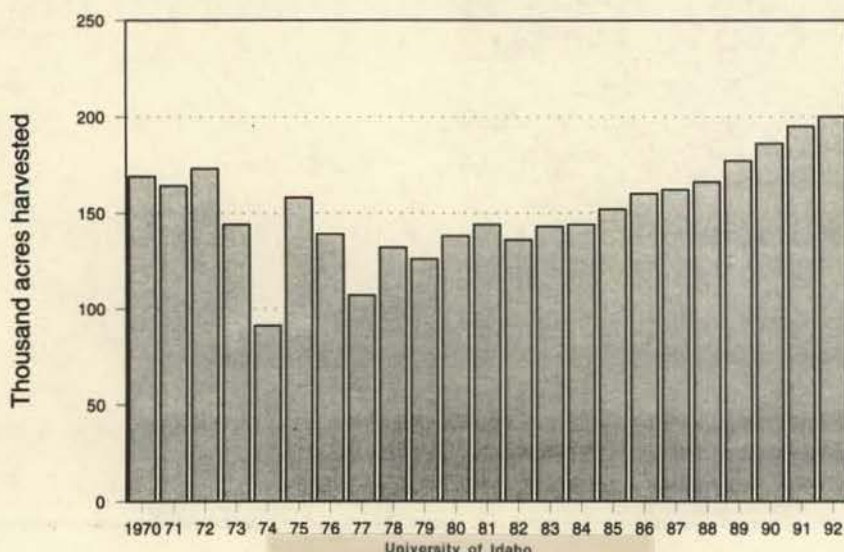
Sugar is the reason for producing sugarbeets, but there are also some valuable by-products. Dried beet pulp and molasses are used primarily for livestock feed. Sugarbeet tops, which are removed in the harvest operation, are grazed by livestock or plowed down for their fertility value.

The purposes of this publication are to discuss the economic significance to farmers of the sugarbeet enterprise, to present updated sugarbeet production costs, and to review current policy affecting sugarbeet producers.

Farm production costs

In Idaho, sugarbeets are seeded in March and April. Following emergence, they are thinned or trimmed either by hand or machine and are cultivated a variable number of times for weed control. The sugarbeets may also be weeded again using hand labor. Irrigation begins as soon as needed and continues

Fig. 1. Acres of sugarbeets harvested in Idaho, 1970-92.



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Table 1. Sugarbeet costs and return per acre in southcentral and eastern Idaho, 1991.

	Subtotals (\$)	Totals (\$)
Value of crop		
24.0 tons @ 38.30 per ton		919.20
Total crop value		919.20
Variable costs		
Seed	28.33	
Fertilizer	72.19	
Chemicals	54.15	
Irrigation water (includes power and water)	65.13	
Labor (hired)		
Perquisites	7.73	
Employee insurance	2.47	
FICA	4.50	
Wages	62.98	
Total hired labor	77.68	
Labor (unpaid \$7 per hour)	67.57	
Labor (contract)	74.98	
Machine costs		
Fuel and repairs	122.30	
Leased equipment	10.84	
Custom	31.67	
Total machine costs	164.81	
Freight charge ¹	5.93	
Haul allowance ¹	-2.18	
Interest on operating cost (@ 9%)	19.36	
Miscellaneous		
Dues	3.67	
Utilities	6.11	
License fees	2.97	
Office supplies	0.55	
Accounting	2.32	
Other	11.06	
Total miscellaneous	26.68	
Total variable costs		654.63
Fixed costs		
Machine costs		
(depreciation, interest, etc.)	167.37	
Insurance	10.70	
Real estate tax	9.18	
Net rent (rent minus landlord expense)	128.57	
Total fixed costs		315.82
Total costs		970.45
Return to risk and management		-51.25

¹This is the average extra freight charge by the processor for hauling beets to the factory. The haul allowance is an amount that the processor refunds to the grower who hauls beets directly to the factory, saving the processor hauling expense.

until shortly before harvest. During the harvest operation, the tops are removed from the roots. The roots are lifted from the soil, loaded into trucks, and transported directly to the factory or a piling station where they are stored until they can be processed.

A survey of sugarbeet growers was taken for the 1987 crop year. A random sample of about 200 growers in Idaho and eastern Oregon was drawn, and information usable for cost estimates was obtained from 151 sugarbeet growers. Costs for the 1987 pro-

Table 2. Sugarbeet costs and return per acre in western Idaho and eastern Oregon, 1991.

	Subtotals (\$)	Totals (\$)
Value of crop		
28.4 tons @ 37.80 per ton		1,073.52
Total crop value		1,073.52
Variable costs		
Seed	33.84	
Fertilizer	115.37	
Chemicals	82.18	
Irrigation water (includes power and water)	56.88	
Labor (hired)		
Perquisites	6.05	
Employee insurance	9.32	
FICA	4.92	
Wages	67.73	
Total hired labor	88.02	
Labor (unpaid \$7 per hour)	68.52	
Labor (contract)	86.35	
Machine costs		
Fuel and repairs	102.46	
Leased equipment	9.55	
Custom	71.47	
Total machine costs	183.48	
Freight charge ¹	3.76	
Haul allowance ¹	-5.36	
Interest on operating cost (@ 9%)	21.85	
Miscellaneous		
Dues	2.85	
Utilities	9.75	
License fees	1.79	
Office supplies	1.46	
Accounting	4.73	
Other	20.88	
Total miscellaneous	41.46	
Total variable costs		776.35
Fixed costs		
Machine costs		
(depreciation, interest, etc.)	116.29	
Insurance	9.95	
Real estate tax	13.30	
Net rent (rent minus landlord expense)	162.64	
Total fixed costs		302.18
Total costs		1,078.53
Return to risk and management		-5.01

¹This is the average extra freight charge by the processor for hauling beets to the factory. The haul allowance is an amount that the processor refunds to the grower who hauls beets directly to the factory, saving the processor hauling expense.

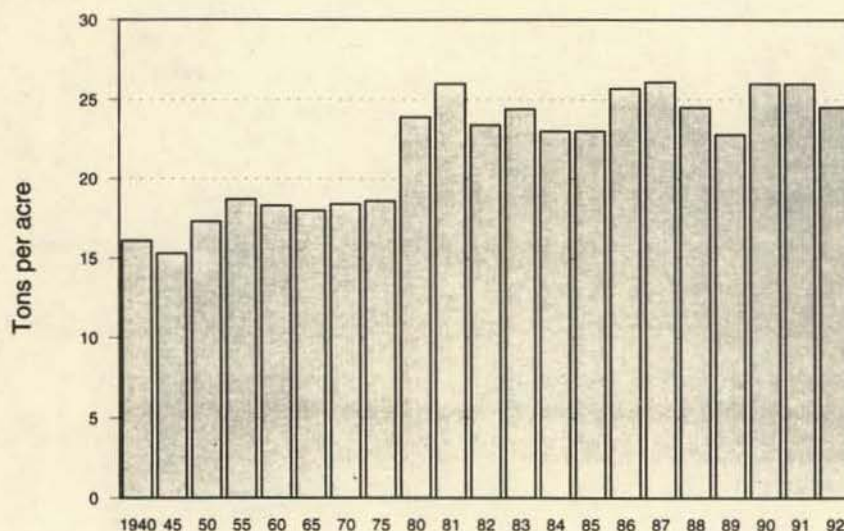
duction year were estimated and reported in an earlier publication.² These costs were adjusted to 1991 using USDA cost index numbers for various farm cost categories.³

Adjusted production cost figures for the two areas studied are given in tables 1 and 2. According to USDA cost figures, production costs increased about

²Withers. "1987 Sugarbeet Production Costs on Idaho and Eastern Oregon Farms," October 1989.

³USDA, NASS. *Agricultural Prices, 1991 Summary*, June 1992.

Fig. 2. Average sugarbeet yield per acre in Idaho, 1940-92.



17 percent between 1987 and 1991, or around 4 percent per year. While most expenses increased, interest rates declined over this period. Return to risk and management was negative for both areas, reflecting slightly reduced yields and a modest price. Cash returns were positive, but receipts failed to cover all economic costs for the average operator.

Records for each of the 151 farms providing information were sorted by yield and by acreage to see if these were related to return per acre of sugarbeets. Southcentral and western production areas were kept separate for this analysis. There were four categories: southcentral and western by acreage, and southcentral

and western by yield of sugarbeets. The results are shown in tables 3 and 4. The southcentral area included growers in the Paul and Twin Falls factory districts. The western area, consisting of southwestern Idaho and eastern Oregon, was served by the Nampa and the Nyssa, Oregon, factories.

In both areas, higher returns per acre were associated with larger acreages and higher yields. However, there was no noticeable relationship between acreage and yield as evidenced by the average yield column in table 3. Cost of production per acre was highest for smaller acreages and for higher yields. The lesson here is that a sugarbeet enterprise should be large

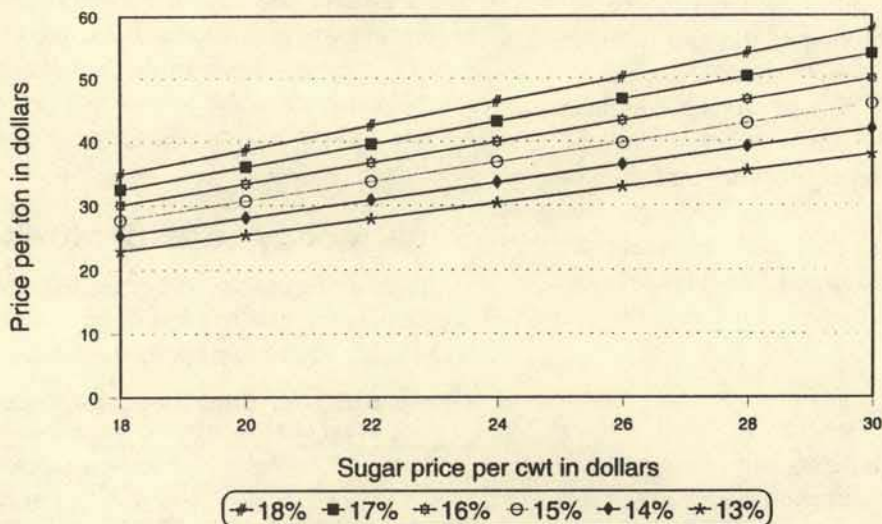
Table 3. Returns to risk and management by acreage of sugarbeets for southcentral and western Idaho, 1987.

Sugarbeet acreage	Average acres (per farm)	Average yield (tons)	Average price (per ton)	Total value (per acre)	Total cost (per acre)	Net return (per acre)
Southcentral Idaho						
low (1/3)	53.2	24.0	39.36	945	1,030	-85
medium (1/3)	138.3	24.1	39.57	954	987	-33
high (1/3)	465.1	24.1	39.33	948	950	-2
Western Idaho (includes eastern Oregon)						
low (1/3)	42.8	32.8	37.16	1,219	1,174	45
medium (1/3)	110.5	30.4	36.95	1,123	1,048	75
high (1/3)	413.8	29.8	38.7	1,154	1,062	92

Table 4. Returns to risk and management by yield of sugarbeets for southcentral and western Idaho, 1987.

Sugarbeet yield	Average yield (tons)	Average acres (per farm)	Average price (per ton)	Total value (per acre)	Total cost (per acre)	Net return (per acre)
Southcentral Idaho						
low (1/3)	19.6	229.1	39.77	779	929	-150
medium (1/3)	24.6	232.5	39.33	966	960	6
high (1/3)	28.1	195.1	39.16	1,100	1,056	44
Western Idaho (includes eastern Oregon)						
low (1/3)	25.0	229	37.91	948	1,021	-73
medium (1/3)	31.8	197	38.08	1,211	1,081	130
high (1/3)	36.1	141	36.82	1,330	1,182	148

Fig. 3. Prices per ton of sugarbeets by sugar price and percent content in Idaho, 1993.



enough to make efficient use of resources, and that one should aim for high yields and sugar content by following recommended cultural practices as closely as possible.

Marketing sugarbeets

Idaho farmers grow sugarbeets only under contract with the processor. Sugarbeet growers' associations negotiate the contract with the processor on behalf of individual farmers who grow sugarbeets. The contract specifies the responsibilities of the grower and the processor and states how the price of sugarbeets will be established.

Essentially, the grower agrees to produce sugarbeets on a designated acreage according to guidelines established. The processor provides field men to check on the crop and to assist growers with any problems that may occur. The grower agrees to deliver beets to the factory or to a piler storage area. The processor agrees to accept the sugarbeets that are delivered according to the terms of the contract, to store and process the beets, and to market refined sugar.

The sugarbeet price to the grower is based on the percent of sugar in the beets and the price received by the processor for sugar sold. Figure 3 illustrates the relationship between sugar price and the percent of sugar in beets, as specified by the 1993 contract. For example, if the wholesale sugar price were \$24 per hundredweight (cwt), the price per ton of sugarbeets would be as follows for selected sugar percentages: 18 percent, \$46.30; 17 percent, \$43.12; 16 percent, \$39.94; 15 percent, \$36.76; and 14 percent, \$33.58. Each 1 percent gain in sugar content adds about \$3.18

to the price per ton of beets when the sugar price is \$24 per cwt.

Prices are also adjusted based on the quality of beets delivered. If nitrate levels are above the average of the district, the grower price is reduced. If these levels are below the running average for the district, then the grower receives a premium. Nitrate levels are influenced by nitrogen fertilizer added to the crop and to some extent by weather conditions.

Some growers are allowed extra acres of sugarbeets if they agree to deliver them before the regular season. This allows the factory to begin operating earlier than otherwise and make better use of the facilities. These "early beets" are priced the same as other beets. Depending on the season, early beets may yield a little below regular beets because they lose a few days of the growing season, and sugar content could be less than those harvested later after cooler weather.

Sugarbeet prices received by growers may also be reduced if the sugarbeet acreage in any given year falls below an amount designated in the contract. If acreage falls below this level, the efficiency of processing facilities could be reduced. If the 1994 acreage on September 1 is below 160,000 acres for the four factory districts, a deduction in the price ranging from 20 to 80 cents per ton could be made. This is not likely to happen under normal circumstances.

The processor markets the sugar as efficiently as possible in order to get the best returns for the company and for the growers. Dried beet pulp and molasses become the property of the processor and are not considered, except indirectly, in the price of beets received by the grower.

As the grower price for beets is determined by the price for which sugar is sold, the final price is determined only after sugar is marketed. Payments to growers are distributed throughout the year following harvest with the largest payment shortly after delivery of the beets in the late fall. The payment schedule and percentages are specified in the contract. Initial payments are based on a percentage of the sugar support price, which was recently 18 cents of raw sugar equivalent. Later payments are based on actual net selling value of the refined sugar. The final payment is made before the end of the year following the year of harvest.

Processing costs

Sugar is extracted from the root of the sugarbeet plant. The tops are removed from the root in the field during the harvest operation. The harvested roots are delivered to a local piler station or taken directly to the factory. Harvested sugarbeet roots usually contain between 12 and 18 percent sugar.

The process of extracting sugar from sugarbeets takes several steps. The beets are brought to the factory where they are washed and cleaned. Then they are conveyed to a slicer where they are cut into thin strips called cossettes. The cossettes are immediately run into a diffuser where water percolates through the mass, leaching out the sugar. The depleted cossettes are called pulp and are usually dried and pelleted to be used as livestock feed. The juice from the diffusion process contains 10 to 15 percent sugar.

This juice is filtered to remove any remaining cossette particles, and then is purified with a liming agent. After the lime is removed by carbonation the liquid is called thin juice. This is evaporated, raising the sugar content to 50 to 65 percent. The sugar is crystallized through a series of steps that produce granulated sugar. The remaining product is molasses, which has been used primarily for livestock feed.

The 1991 sugarbeet crop in the U.S. produced an average of 257 pounds of refined sugar per ton sliced or 248 pounds per ton harvested. The difference is due to weight loss of sugarbeets in storage. Average molasses per ton of beets sliced is 90 pounds. Additional sugar can be extracted from molasses using the ion exclusion process. Molasses is about 48 percent sugar, and approximately 75 percent of this can be recovered. Thus, over 30 extra pounds of sugar can be recovered from the molasses in a ton of beets sliced (90 lb x .48 x .75 = 32.4). This adds value since the sugar has a higher value than the molasses from which it was obtained.⁴

Processing costs for individual companies are proprietary information and are not available for publication. However, the USDA does publish an average processing cost estimate for the United States with estimates for states east of the Mississippi River and for the area west of the Mississippi (see table 5). Production and processing costs combined are given in table 6.

Sugar policy considerations

Sugar is one of the most regulated agricultural products in the world. Most sugar is subsidized or taxed, and very little sugar is traded in the world mar-

Table 5. Beet sugar: processing costs per pound of refined sugar and per net ton of sugarbeets, 1991 crop.

	Cents per pound of refined sugar		
	East	West	U.S.
Variable cash expenses	7.765	9.615	8.818
Fixed expenses	1.966	.906	1.364
General administrative	.801	.705	.747
Pulp drying and marketing	1.762	1.081	1.375
Total processing costs	12.294	12.307	12.304
Recovery per ton of beets (lb of refined sugar)	246	250	248
	Dollars per net ton of sugarbeets		
	East	West	U.S.
Variable cash expenses	19.10	23.99	21.87
Fixed cash expenses	4.84	2.26	3.38
General administrative	1.97	1.76	1.85
Dried pulp	4.33	2.70	3.41
Total processing costs	30.24	30.71	30.51

Source: USDA, ERS. *Sugar and Sweetener Situation and Outlook Report*, March 1993.

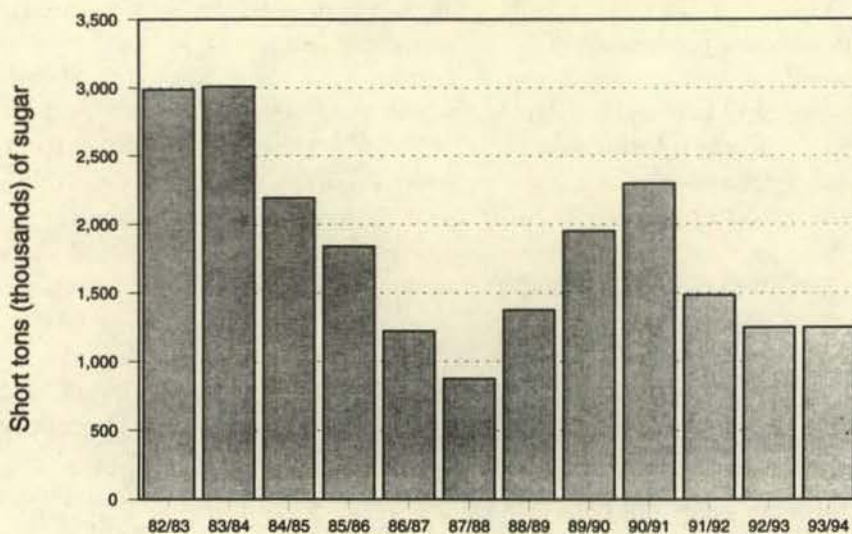
Table 6. Production and processing costs per ton of sugarbeets and per pound of refined sugar, 1991 crop, U.S. average.

	Dollars per ton	Cents per pound
Production costs		
Variable cash costs	20.66	8.33
Other costs	18.32	7.39
Total production costs	38.98	15.72
Processing costs		
Variable cash costs	21.87	8.82
Other costs	8.64	3.48
Total processing costs	30.51	12.30
Total production and processing costs	69.49	28.02
Credits		
Dried pulp	7.80	3.14
Molasses	1.77	.72
Other	0.42	.17
Total credits	9.99	4.03
Net production and processing costs	59.50	23.99
Average yield per acre (tons):	20.3 tons	
Recovery of refined sugar per ton of beets:	248.0 lb	

Source: USDA, ERS. *Sugar and Sweetener Situation and Outlook Report*, March 1993.

⁴USDA, ERS. *Sugar and Sweetener Situation and Outlook Report*, December 1992, and unpublished USDA data, June 1994.

Fig. 4. Sugar quota imports, fiscal years.



ket that is not under some quota or agreement. Sugar in the U.S. is not an exception. The U.S. sugar market has been affected by government policies and politics most of the time since British colonization. A brief summary of recent sugar legislation is presented as background to our current policies.

From 1934 to 1974, sugar acts required the U.S. Department of Agriculture to regulate and divide the market by assigning quotas to foreign countries and U.S. growers. The market was relatively free from 1974 until the enactment of the Agriculture and Food Act of 1981 when a mandatory price support for sugar was instituted. Even with these programs, the U.S. continued to be a net importer of sugar, historically importing nearly half of the needed supply. However, as high fructose corn syrup (HFCS) replaced sugar in soft drinks and other uses, imports decreased dramatically. Between 1981 and 1988, while domestic sugar production was gradually increasing, average domestic consumption of sugar fell by 18 percent, primarily due to the increased use of HFCS.⁵

Current program

The 1990 farm act covers sugar policy through 1995. Under this act, the Commodity Credit Corporation (CCC) is required to make non-recourse loans available to sugar processors who use the program at not less than 18 cents per pound for raw cane sugar. The rate for refined sugar has been 3 to 5 cents above the raw sugar rate. Processors could forfeit sugar to the CCC if market prices were below the loan rate. However, the intent is to operate the program at no cost to the government. The sugar supply is regulated by controlling the amount of imports, thus controlling

the supply to maintain a market price above the loan rate. The actual loan rate is announced each year after the Secretary of Agriculture has determined the amount of sugar necessary to maintain a stable market.

Import quotas are also determined after the amount of sugar needed to supply the market for the next year has been estimated. Quotas are usually given only to countries that have traditionally shipped sugar to the United States, currently about 40 nations. The 1990 farm act requires that the total annual quota can be no less than 1.25 million short tons. If estimated needs fall below this, marketing allotments will be triggered for domestic processors. Imports under quotas since 1982 are shown in figure 4.

In response to negotiations in the General Agreement on Tariffs and Trade Council (GATT), President Bush announced a tariff rate quota. The tariff rate quota does away with import quotas but the effect is similar, as a high tariff is required on all sugar imports exceeding the allotment of a specific nation. Nations are given quotas upon which tariffs are low or zero. Above this quota, nations can still sell sugar in the United States but are required to pay a tariff of 16 cents per pound. Very little sugar has come in under this high tariff and likely will not unless the world price drops to around 5 cents per pound.

Pros and cons of the sugar program

Considerable controversy has been associated with the current sugar program. Arguments in favor of the program include:

- Improved farm income for sugarbeet and cane growers, corn growers, and others who produce sweeteners.
- Sugar supplies and prices are stabilized.

⁵Jurenas. *Sugar Policy Issues*, May 27, 1992.

- The sugar production and processing industry provides jobs and income in areas where sugar is grown and produced.
- The program is needed to maintain the industry. When growers reduce production in response to lower prices, processing facilities close and usually never reopen. For example, processing facilities of the Utah and Idaho Sugar Company were never reopened after the company discontinued its operation in the late 1970s.
- The program operates at no cost to the government.
- The program encourages HFCS production by keeping sugar prices higher than the cost of producing HFCS. This also improves income for corn growers.

Arguments opposing the program include:

- Consumers pay higher prices for sugar and sugar products than in an unregulated market. Even so, domestic U.S. retail sugar prices compare favorably with those of many other nations. A comparison of retail sugar prices in selected national capitals is given in table 5 in the appendix.
- Food processors and manufacturers are required to pay more for sugar, and these increases are passed on to consumers of products that contain sugar.
- The program reduces sugar imports from foreign countries. These are often developing nations who need the sugar market to maintain or improve their economies.
- Jobs in the food industry are lost to foreign suppliers of sugar-containing products.
- The program may give the wrong signal to sugar producers, encouraging surplus production.

Sugar legislation in the next farm bill is important to the industry. Additional concerns of sugar producers and processors center on GATT regulations and the effects of the North American Free Trade Agreement (NAFTA). While both of these agreements have been signed, Congress must ratify GATT, which is expected in 1994. Changes made just before passage of NAFTA will prevent Mexico from dumping sugar replaced by HFCS in soft drinks into the U.S. market. This made the agreement more acceptable to the U.S. sugar industry.

Effect on Idaho

What are the policy implications for Idaho? What effect would a free sugar market have on Idaho farmers? The answer to this is unknown, but the general attitude of the industry is that this would be economically damaging. What would be the results of losing the sugar industry and how would farmers and agriculture in general be affected? A random sample of Idaho sugarbeet growers was asked, "If you quit rais-

ing sugarbeets, what would you grow on the land you now have in sugarbeet production?" Fifteen percent of those contacted said they did not know what they would do. Another 10 percent said they would quit farming. The other 75 percent indicated which crops would likely be increased in acreage (table 7).

Thirty percent of the growers who indicated which crops would be affected reported that they would expand grain acres. Wheat and barley were the grain crops most mentioned. Twenty-seven percent of the respondents would increase acreages of dry edible beans and 16 percent would grow more potatoes. Thus, it is likely that there would be substantial increases in the production of grain, beans, and potatoes in Idaho. Wheat prices may not be affected noticeably, as Idaho produces only 4 percent of the nation's wheat. However, Idaho produces over 12 percent of the barley, 9 percent of the dry edible beans, and over one-fourth of the nation's potatoes.

For example, if all 200,000 acres of Idaho's most productive cropland that is now in sugarbeets was made available for other crops, and 16 percent of this land was planted to potatoes, there would be an increase of about 32,000 acres, roughly an 8 percent increase in potato acreage—enough to adversely affect potato prices.

Table 7. Crops that Idaho farmers would increase if they did not raise sugarbeets.

Crop	Number of responses	% of respondents who would increase
Grain (wheat, barley, oats)	41	30
Beans (dry edible)	36	27
Potatoes	22	16
Alfalfa hay	12	9
Seed crops	8	6
Field corn	5	4
Other crops	11	8
Total	135	100

Table 8. Acreage and production of sugarbeets by state and for the U.S., 1990.

State	Acres (1,000 acres)	Production (1,000 tons)	Average yield per acre (tons)
California	168	4,334	25.8
Colorado	40	944	23.6
Idaho	186	4,836	26.0
Michigan	157	3,266	20.8
Minnesota	364	5,387	14.8
Montana	55.1	1,240	22.5
Nebraska	71	1,491	21.0
North Dakota	193.2	2,782	14.4
Ohio	19.2	355	18.5
Oregon	16.7	488	29.2
Texas	41	1,017	24.8
Wyoming	63.8	1,308	20.5
Washington and New Mexico	2.2	65	29.5
U.S. total	1,377.2	27,513	20.0

Source: USDA. *Agricultural Statistics 1992.*

There are currently 14 states producing sugarbeets (table 8). These 14 states also produce 96 percent of the nation's dry edible beans and 77 percent of the potatoes (based on 1989 and 1990 production).⁶ Each individual farm crop is part of a system, and when major changes in the acreage of one occur, repercussions are felt throughout the system. Policy makers and trade negotiators are painfully aware of the complications that follow from a bad decision.

Supply and demand for sugar in the U.S.

Sources for sugar for any one year include domestic production, imports from other countries, and carryover from the previous year. Uses of this supply include domestic consumption, exports, and ending stocks to be carried over to the next year. Figure 5 illustrates the supply and use of sugar in the United States for calendar year 1991.

Sugar exports are primarily from sugar that was brought in as raw sugar, then refined and exported. This category of sugar is not included in import allotments under the sugar program.

Sources of supply for 1982 to 1992 are illustrated in figure 6. Note that as domestic production increases, imports decline. When production decreases, imports increase. This is due to the workings of the sugar program that attempts to keep supply in balance and to maintain prices at levels adequate to maintain production. Total supply and carryover of stocks have been fairly consistent over the years. Actual numbers are included in the appendix, table 3.

⁶USDA, *Agricultural Statistics 1992*.

It is instructive to note that even though sugar imports have declined considerably over the past several years, domestic production has not increased a great deal. The big factor in dwindling imports has been the substitution of high fructose corn sugar for refined sugar. The corn sweetener industry has grown from small beginnings to become a major factor in the sweetener supply and has developed into a significant outlet for corn produced in the U.S.

Per capita use of caloric sweeteners is illustrated in figure 7. Total per capita use has been increasing gradually from 123 pounds in 1982 to nearly 145 pounds in 1993. Use of HFCS increased rapidly until about 1985. Since then, its use has stabilized and has been gradually increasing. Refined sugar use has also increased slightly since 1986, rising from 60 pounds per capita in that year to an expected 65 pounds in 1993. More details relative to per capita consumption are shown in the appendix, table 1.

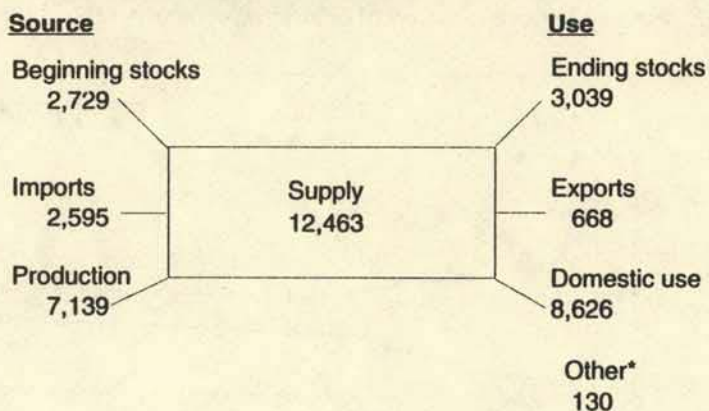
Summary

Sugarbeets rank third among Idaho crops when measured in terms of farm receipts, accounting for 7 percent of all cash farm receipts. Between 1986 and 1992, acres of sugarbeets harvested in Idaho increased from 160,000 to 200,000. Total production increased from about 4 million tons to over 5 million.

Sugarbeets are expensive to produce. Average estimated variable costs per acre were \$655 in eastern Idaho and \$776 in western Idaho and eastern Oregon in 1991. Total costs except management and risk were \$970 and \$1,078 in the two areas, respectively.

Sugarbeet processing costs were estimated by the

Fig. 5. Supply and use of sugar, U.S., calendar year 1991 (all figures are in 1,000 tons raw sugar equivalent).



*Adjustments for refining loss, statistical differences, transfer to sugar-containing products under the re-export program, and transfer to polyhydric alcohol.

Source: USDA, ERS. *Sugar and Sweetener Situation and Outlook Yearbook*, June 1993.

U.S. Department of Agriculture. Average processing costs for the U.S. in 1991 were \$30.51 per ton. After the value of dried beet pulp and molasses was subtracted, the net processing cost was \$20.52. Total net production and processing costs came to \$59.50 per ton, or 23.99 cents per pound of refined sugar.

Sugarbeets are marketed under contract with the processor. The farm price per ton of sugarbeets is determined by sugar content, quality, and the price for which sugar was sold.

Sugar programs and policies established by the government are of great significance to the sugar industry. The farm bill enacted in 1990 shapes sugar policy through 1995. The purpose of this bill is to stabilize domestic sugar prices when world prices are low. The federal government operates a support price

through non-recourse loans to sugar processors and restricts the amount of imports from foreign countries. Price supports put a floor under the price of sugar, reducing the risk for the grower. The program continues to operate by limiting the sugar supply to that amount that can be sold at or above the support price. In this way the program is operated at no cost to the government, but consumers are required to pay more than they would otherwise.

High fructose corn syrup has replaced some consumption of sugar in recent years, particularly in the soft drink market. Sugar consumption fell to 60 pounds per capita but has increased to about 65 pounds over the past 5 years. Consumption of HFCS also continues to increase as the total caloric sugar use in the U.S. expands.

Fig. 6. Sugar supply, U.S., 1982-92.

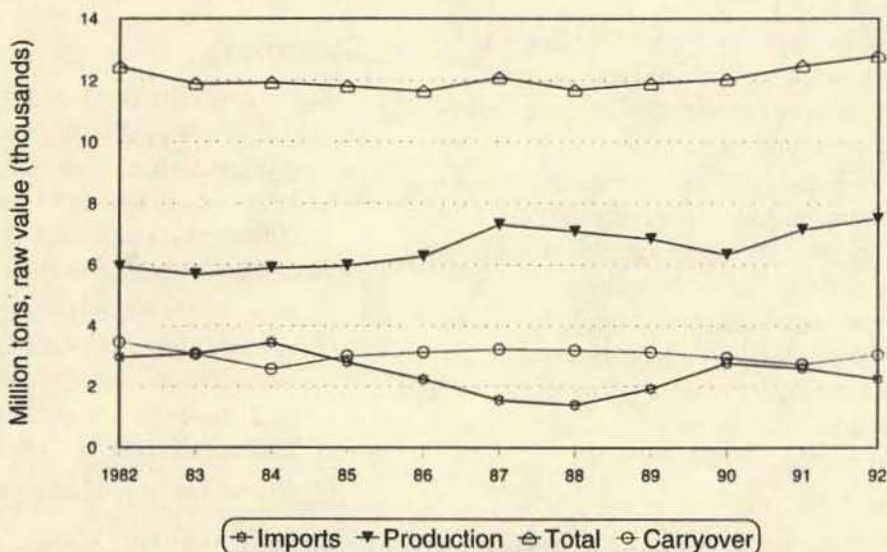
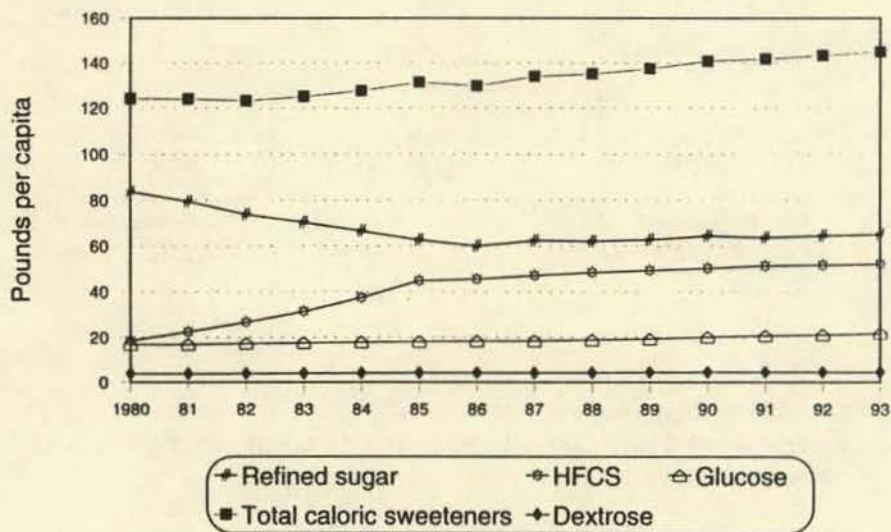


Fig. 7. Per capita consumption of caloric sweeteners, U.S., 1980-93.



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Appendix

Table 1. Per capita consumption of caloric sweeteners in the U.S., 1980-93, in pounds (dry basis).

Year	Refined sugar	Corn sweeteners			Total	Total caloric sweetener ¹	U.S. pop. (million)
		HFCS	Glucose	Dextrose			
1980	83.6	18.5	16.8	3.8	39.1	123.9	227.7
1981	79.4	22.5	16.9	3.8	43.2	123.8	230.0
1982	73.7	26.8	17.3	3.9	48.0	123.0	232.2
1983	70.3	31.5	17.6	4.0	53.1	124.8	234.3
1984	66.6	37.5	17.9	4.1	59.5	127.4	236.3
1985	62.7	44.9	18.1	4.2	67.2	131.2	238.5
1986	60.0	45.6	18.3	4.2	68.1	129.6	240.7
1987	62.4	47.2	18.4	4.2	69.8	133.9	242.8
1988	62.1	48.5	18.8	4.3	71.6	135.0	245.0
1989	62.8	49.4	19.3	4.4	73.1	137.3	247.3
1990	64.4	50.3	20.1	4.5	74.9	140.7	249.9
1991	63.7	51.4	20.7	4.5	76.6	141.7	252.7
1992	64.5	51.7	21.1	4.5	77.3	143.2	255.5
1993	65.0	52.1	21.7	4.5	78.3	144.8	258.1

¹Total includes 1 to 1.7 pounds of honey and edible syrup that are not shown in the table.

Source: USDA, ERS. *Sugar and Sweetener Situation and Outlook Yearbook*, June 1993.

Table 2. Idaho sugarbeets: Acres harvested and average yields, 1970-92.

Year	Acres harvested (000)	Yield per acre (tons)	Total production (000 tons)
1970	169	18.4	3,109.6
1971	164	19.5	3,198.0
1972	173	20.5	3,546.5
1973	144	20.2	2,908.8
1974	91	20.3	1,847.3
1975	158	18.6	2,938.8
1976	139	20.7	2,877.3
1977	107	19.5	2,086.5
1978	132	20.9	2,758.8
1979	126	22.4	2,822.4
1980	138	23.9	3,298.2
1981	144	26.0	3,744.0
1982	136	23.4	3,182.4
1983	143	24.4	3,489.2
1984	144	23.0	3,312.0
1985	152	23.0	3,496.0
1986	160	25.7	4,112.0
1987	162	26.4	4,276.8
1988	166	24.6	4,083.6
1989	177	22.8	4,035.6
1990	186	26.0	4,836.0
1991	195	26.0	5,070.0
1992	200	25.4	5,080.0
1993	204	23.2	4,732.8

Source: Idaho Agricultural Statistical Service and Idaho Department of Agriculture.

Table 3. Sugar supply and use, U.S., 1982-92.

Year	Beginning stock	Imports	U.S. production	Total available	Ending stock	Exports	Domestic use	Other use & adjustment ¹	Total use
(1,000 short tons, raw value)									
1982	3,461	2,964	6,014	12,439	3,068	137	9,153	81	12,439
1983	3,068	3,080	5,747	11,895	2,570	300	8,812	213	11,895
1984	2,570	3,444	5,914	11,928	3,005	429	8,428	66	11,928
1985	3,005	2,797	6,003	11,805	3,126	464	8,003	212	11,805
1986	3,126	2,223	6,298	11,647	3,227	557	7,731	132	11,647
1987	3,227	1,546	7,321	12,094	3,195	567	8,103	229	12,094
1988	3,195	1,388	7,106	11,689	3,132	415	8,136	6	11,689
1989	3,132	1,913	6,853	11,898	2,947	584	8,304	63	11,898
1990	2,947	2,765	6,327	12,039	2,729	618	8,615	77	12,039
1991	2,729	2,595	7,139	12,463	3,039	668	8,626	130	12,463
1992	3,039	2,236	7,501	12,776	3,225	590	8,828	133	12,776

¹Includes adjustments for refining loss, statistical differences, products containing sugar in re-export program, and transfer to polyhydric alcohol.

Source: USDA, ERS. *Sugar and Sweetener Situation and Outlook Yearbook*, June 1993.

Table 4. Percentages of selected crops grown in the 17 sugar producing states, 5-year average, 1984-88.

Crop	Acreage (million)	Production (million)	% of U.S. production
Wheat	62.7	2,206.0 bu	54.8
Alfalfa hay	26.3	84.2 ton	50.8
Soybeans	61.6	1,872.0 bu	25.9
Corn (for grain)	66.7	7,356.4 bu	34.1
Barley	10.5	523.8 bu	84.7
Potatoes	1.3	374.8 cwt	73.0
Dry edible beans	0.2	22.3 cwt	97.1
Onions	0.1	45.2 cwt	88.7
Rice	2.6	139.4 cwt	49.8
Sugarbeets	1.2	24.6 ton	99.9
Sugarcane	0.7	28.5 ton	100.0

Source: USDA. *Agricultural Statistics*, selected years. (Includes sugarbeet and sugarcane producing states; cane is grown in Florida, Louisiana, Texas, and Hawaii.)

Table 5. World average retail sugar prices in selected capitals, 1985-92, in U.S. cents per pound.¹

City	1985	1986	1987	1988	1989	1990	1991	1992
Bern ²	24.49	34.47	39.46	44.00	38.56	59.88	53.52	58.51
Bonn	27.22	40.37	48.99	51.71	48.99	58.06	49.90	53.98
Brasilia	14.97	14.52	19.96	20.87	21.32	11.79	23.13	24.04
Buenos Aires	24.49	20.41	34.02	48.54	21.32	33.57	36.74	32.21
London	25.86	32.66	36.29	45.36	43.55	56.70	52.62	42.64
Madrid	24.49	35.38	41.73	49.44	47.17	60.78	53.52	52.62
Mexico City	14.06	9.98	7.26	15.88	17.69	22.68	26.76	27.22
Paris	24.49	41.28	49.90	52.62	49.44	67.13	58.97	68.49
Pretoria	25.86	24.49	24.04	25.40	24.04	29.03	26.76	35.83
Rome	29.48	39.01	46.27	48.99	44.91	58.97	52.62	50.35
Seoul	36.74	35.83	34.02	36.74	32.66	38.56	37.20	36.29
Stockholm	37.20	47.63	51.71	55.34	51.26	61.24	55.34	56.70
Tokyo	49.90	68.04	74.39	88.91	81.19	85.28	75.75	92.53
Washington, D.C.	38.56	43.09	34.93	39.01	38.10	43.09	44.33	43.09

¹U.S. dollars per kilogram converted from local currencies at existing exchange rates and then converted to cents per pound: 1 kilogram = 2.2046 lb.

²1992 survey conducted in November/December 1992.

Source: USDA, ERS. *Sugar and Sweetener Situation and Outlook Yearbook*, June 1993.

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