BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Sugar And Other Sweeteners: An Industry Assessment

This report describes the principal elements of the U.S. sugar industry, the corn sweetener industry, the sugar industries of major U.S. trading partners, and the International Sugar Agreement. It also discusses some of the issues involved in developing sugar legislation.

GAO is recommending that the Congress enact comprehensive sugar legislation and direct the Secretary of Agriculture to obtain needed information on sugar and corn sweeteners.

CED-79-21

FEBRUARY 26, 1979

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-118622

To the President of the Senate and the
Speaker of the House of Representatives

This report describes the principal elements of the U.S. sugar producing industry, the corn sweetener industry, the sugar industries of major U.S. trading partners, and the International Sugar Agreement. It also discusses some of the issues involved in developing sugar legislation.

We made the review to help the Congress understand the sugar and corn sweetener industry and evaluate the information presented to it in the course of developing sugar legislation.

We are sending copies of this report to the Director, Office of Management and Budget, and to the Secretaries of Agriculture and State.

Comptroller General
of the United States

Contents

		Page
DIGEST		i
CHAPTER		
1	INTRODUCTION	1
	Sugar in demand worldwide	1
	World carryover sugar stocks affect sugar prices	3
	Many governments play a key role in their sugar industries	7
	United States protects its sugar industry	7
	The Congress faces key decisions	10
2	THE BEET SUGAR INDUSTRY	11
	Many States produce sugar beets	11
	Sugar beets important at local level	12
	Economics of beet sugar production	14
	Industry condition	16
	Conclusion	19
3	THE SUGARCANE INDUSTRY	21
	Five areas produce sugarcane	21
	Sugarcane important at State level--crucial to local communities	23
	Economics of cane sugar production	24
	Industry condition	27
	Conclusion	31
4	THE SUGARCANE INDUSTRY IN HAWAII	32
	Description of the Hawaiian sugar industry	32
	Sugar critical to Hawaii's economy	33
	Production economics	37
	Industry condition	38
	Conclusion	40
5	CORN SWEETENERS	41
	The wet-milling process	41
	Types of corn sweeteners	41
	HFCS, a sugar substitute, grows rapidly	43
	The economics of corn sweeteners	45
	The industry's capacity and condition	45
	Conclusion	50

CHAPTER		Page
6	THE SUGAR INDUSTRY IN OTHER COUNTRIES	51
	Sugar marketing and the role of government	52
	How the United States is perceived as a sugar trading partner and the perceptions of ISA	60
	Production profile	65
	Conclusion	74
7	THE INTERNATIONAL SUGAR AGREEMENT	76
	Agreement objectives	76
	Administering the Agreement	79
	Can ISA improve prices?	82
	Will nonmembership hurt the Agreement?	83
	Implementing legislation required for U.S. membership	84
	Will ISA work?	85
	Conclusion	85
8	CONCLUSIONS AND RECOMMENDATIONS	87
	Need exists to consider alternative sweeteners	88
	Data is lacking	88
	Other countries tightly control sugar	89
	ISA may not achieve its objectives	89
	Questions to consider	89
	Options available to the Congress	94
	Recommendations to the Congress	98
	Agency comments and our evaluation	99
9	SCOPE OF REVIEW	101
APPENDIX		
I	Sugar: net profit or (loss) before income taxes or net proceeds paid or payable to cooperative members for U.S. grower, processors, millers, and refiners on their sugar operations, accounting years 1972-76	102
II	Letter dated January 29, 1979, from the Department of Agriculture	103

ABBREVIATIONS

EC	European community
EPA	Environmental Protection Agency
GAO	General Accounting Office
HFCS	high fructose corn syrup
IAA	Sugar and Alcohol Institute
INAZUCAR	Dominican Sugar Institute
INESPRE	Price Stabilization Institute
ISA	International Sugar Agreement
ISO	International Sugar Organization
USDA	United States Department of Agriculture

D I G E S T

The Congress should enact comprehensive legislation for a national sweetener policy that provides necessary assistance for an efficient domestic sugar industry, recognizes the effect of sugar legislation on the increasingly important high fructose corn syrup industry, and gives appropriate consideration to the economic affect on U.S. foreign trading partners.

The United States is among the world's largest sugar consumers; it produces slightly more than one-half its domestic consumption and imports the balance. In 1977, the United States used an estimated 11.2 million tons of sugar but produced only 6.2 million tons. Since the U.S. Government does not set domestic sugar prices, as many other governments do, the world sugar price influences both imported and domestic prices. Without the quotas for domestic and foreign suppliers, which expired after 1974, the domestic price is limited by the world price. U.S. sugar users will shift to imported sugar if domestic prices are relatively higher than world prices.

DOMESTIC SUGAR INDUSTRY FINANCIALLY PRESSED

Many domestic sugar processors and farmers have reported losing money due to the current low sugar prices, although with Government support payments added for the 1977 crop this was not always the case. Efficiency varies widely in the industry, consequently continued low prices could cause the more costly operations to close. The results could be severe in some parts of the country.

HIGH FRUCTOSE CORN SYRUP--A NEW ALTERNATIVE

High fructose corn syrup, an alternative for some sugar uses, can be produced at a cost generally believed to be less than the cost for refined sugar. While high fructose corn syrup sales are currently depressed due to low sugar prices, this sweetener can potentially increase its share of the sweetener market, at sugar's expense, and provide a counter weight to high sugar prices. High fructose corn syrup accounted for more than 8 percent of U.S. sweetener consumption in 1978 compared with less than 1 percent 6 years earlier. The Secretary of Agriculture has predicted that corn sweeteners may account for 40 percent of the U.S. sweetener market within 20 years. Despite the sweetener's growing importance, Department of State and Agriculture officials consistently speak of a U.S. sugar policy without giving appropriate consideration to the effect of a sugar policy on high fructose corn syrup.

CURRENT COST DATA LACKING

Available 1978 sugar production cost data is a projection of studies done as long as 10 years ago. Estimates vary for the same year, raising questions on what production costs really are in any area. Some sugar industry elements have rebuffed recent Department of Agriculture efforts to conduct a sugar production cost study because this data is not available from other industry sectors. There is no verifiable data on high fructose production costs because most producers have consistently resisted efforts to obtain it. Such data is needed, however, to help the United States determine the price level needed to support the industry.

INTERNATIONAL SUGAR AGREEMENT SUCCESS IN 1979 UNCERTAIN

An International Sugar Agreement, designed to stabilize world sugar prices within an 11- to 21-cent per pound range, became

effective January 1, 1978. Department of State and Agriculture officials have testified at several congressional hearings that the agreement is the cornerstone of the Administration's sugar policy. The executive branch has signed the agreement, but it must be ratified by the U.S. Senate. Given the world sugar market's depressed state and the question of U.S. Senate ratification, the degree to which the International Sugar Agreement will strengthen world prices in 1979 is uncertain.

RECOMMENDATIONS TO THE CONGRESS

The United States needs a comprehensive sweetener policy that

--insures a viable and efficient domestic sugar industry,

--recognizes the importance of corn sweeteners as well as sugar, and

--reduces the sharp fluctuations in world sugar prices.

The Congress should enact legislation setting forth a national sweetener policy. It should also

--instruct the Secretary of Agriculture to obtain representative production cost data for all sweetener industry elements;

--require that all persons in the sweetener industry provide the Secretary of Agriculture with the information he deems necessary; and

--direct the Secretary to identify those sugar industry segments most likely to be adversely affected by shifts between sugar and fructose, assess the alternatives available to assist these segments, and report the results to the Congress 1 year from the legislation's enactment.

To help the Congress choose a national sweetener policy, GAO has analyzed a number of policy options. A summary of two

Tear Sheet

key elements--the price support level and the method of assuring it--is provided here. Establishing a relatively high price support level will protect more producers, encourage more domestic sugar production, and accelerate competing sweeteners' growth. Establishing a relatively low price support level will encourage higher cost producers to leave the industry, limit competing sweeteners' growth, and raise consumer prices to a lesser extent than would a higher support level.

The price support level can be achieved by import quotas, which could result in a gradual decline in imports and contain foreign policy implications for the United States. Quotas on domestic production as well as imports would provide greater protection for the less efficient portions of the sugar industry, retard competing sweeteners' growth, and dampen competition between competing sweeteners. Tariffs and fees, the method used in 1978, would provide revenues to the Treasury and allow more industry competition, but its effectiveness could be limited. Government support payments, another method, would entail Treasury outlays, not raise domestic prices, put competing sweeteners at a disadvantage, and require the concurrent use of import protection.

AGENCY COMMENTS AND GAO'S EVALUATION

The Department of Agriculture agrees with the recommendations but suggests that the sugar legislation's impact on growers, consumers, inflation, and costs to taxpayers should be recognized.

The Department believes that the report would be more useful if further analysis were provided. GAO believes this should be the primary responsibility of the Department.

The Department of State agrees with GAO's recommendation that any domestic legislation recognize the important position of

high fructose corn syrup and agrees that an extensive sweetener production cost survey could be very useful. The Department, however, believes it is unfortunate that the report lacks specific recommendations on policy actions for fructose. GAO has examined the effect of various policy actions on both fructose and sugar but believes that specific policy actions should be determined through the legislative process.

The Department of State also believes that the report does not recognize that the International Sugar Agreement has improved prices over levels which would have prevailed in the agreement's absence. GAO believes that this is a matter of judgment and that it is uncertain whether the International Sugar Agreement has had this effect.

CHAPTER 1

INTRODUCTION

Sweeteners can be obtained from various plants, including palm species, sorghum, corn, and maple; but, until recently, only sugar from sugarcane and sugar beets has been important in U.S. commercial production.

During the last 5 years, sweeteners from corn have become a major substitute for sugar in the United States. The importance of these sweeteners is likely to grow. Corn has been a raw material for dextrose and liquid corn syrup for many years, but the discovery of an enzyme isomerization process to produce high fructose corn syrup (HFCS) has produced a new market for corn production. If sugar prices rise substantially, HFCS production may be stimulated further because it is a relatively inexpensive sugar substitute. Figure 1-1 on page 2 provides details on U.S. sweetener consumption and recent shifts in various sweeteners' market share.

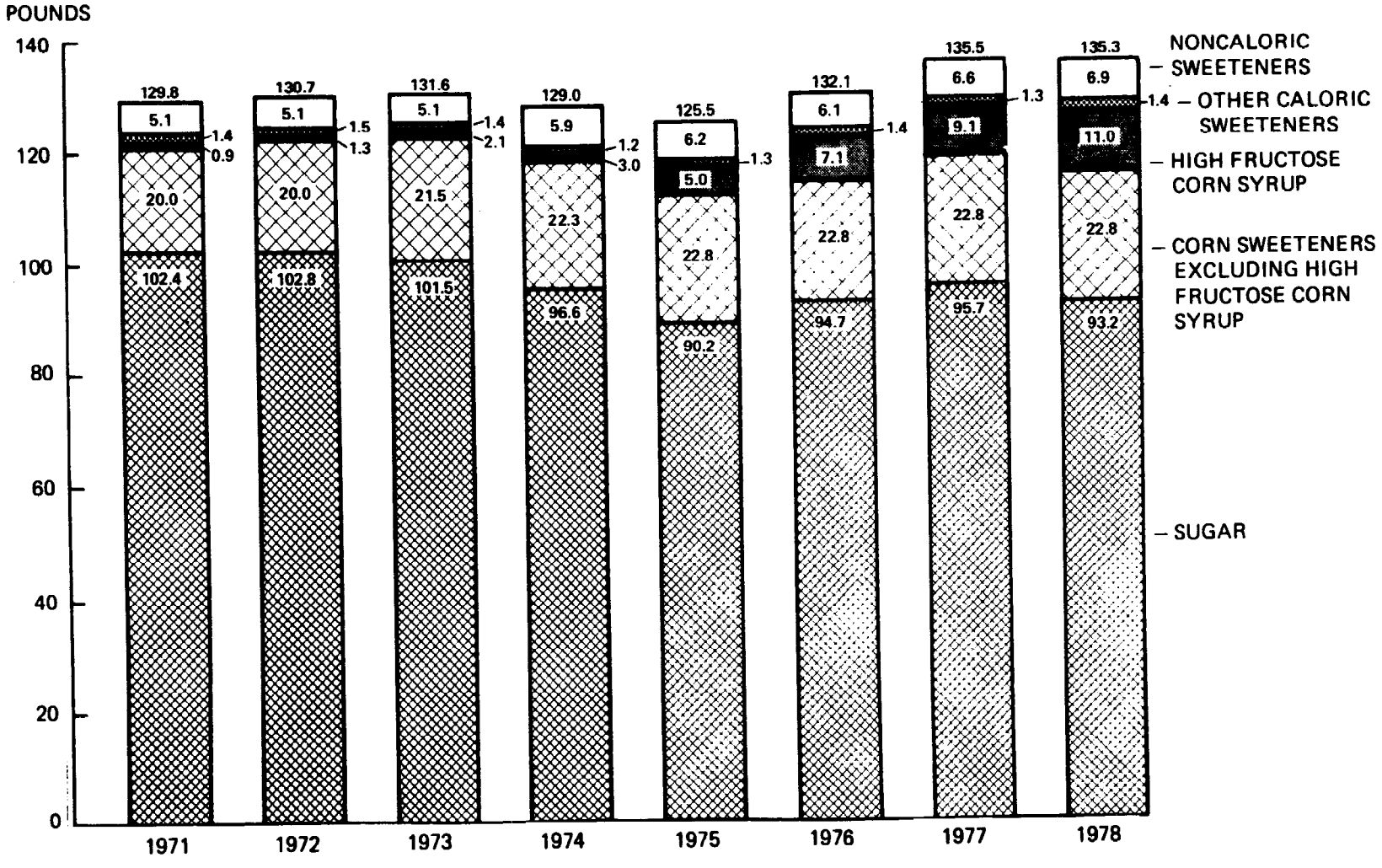
SUGAR IN DEMAND WORLDWIDE

The cane plant, which probably originated in the South Pacific, is now cultivated in almost every country between 35 degrees north and south latitudes. The beet plant, which probably originated in the Mediterranean region, is cultivated in temperate zone countries. According to the International Sugar Organization (ISO), over 100 countries produce some sugar.

WHAT IS SUGAR?

Sugar is a sweet, crystallizable material that consists wholly or essentially of sucrose. Sucrose, fructose, dextrose (glucose), and starch belong to the chemical group known as carbohydrates. Dextrose and fructose are known as monosaccharides and have identical chemical formulas. Because of slightly different molecular structures, however, the two have different physical characteristics. Sucrose is a disaccharide, consisting of a glucose molecule and a fructose molecule linked together. Starch is a polysaccharide, consisting of many linked glucose molecules.

FIGURE 1–1 SUGAR AND OTHER SWEETENERS: U. S. PER CAPITA CONSUMPTION, 1971– 1978



SOURCE: PREPARED BY GAO FROM DATA OBTAINED FROM THE U.S. DEPARTMENT OF AGRICULTURE

Social and economic changes related to industrialization and improved living standards, as well as improved communication have created new markets and unprecedented demand for sugar. Consequently, production, which reached 9.2 million tons by 1900, has increased more than tenfold, with 1977-78 production estimated at about 100 million tons. Average per capita world consumption, which was around 12 pounds at the end of the 19th century, was 49.5 pounds in 1978. World sugar consumption is affected by four major factors--per capita income; population; price; and more recently, the price and availability of substitutes. Sugar has been increasingly used as a condiment and, especially in low-income countries, as a source of relatively inexpensive calories. Studies have shown that in low-income countries sugar consumption increases as personal income rises.

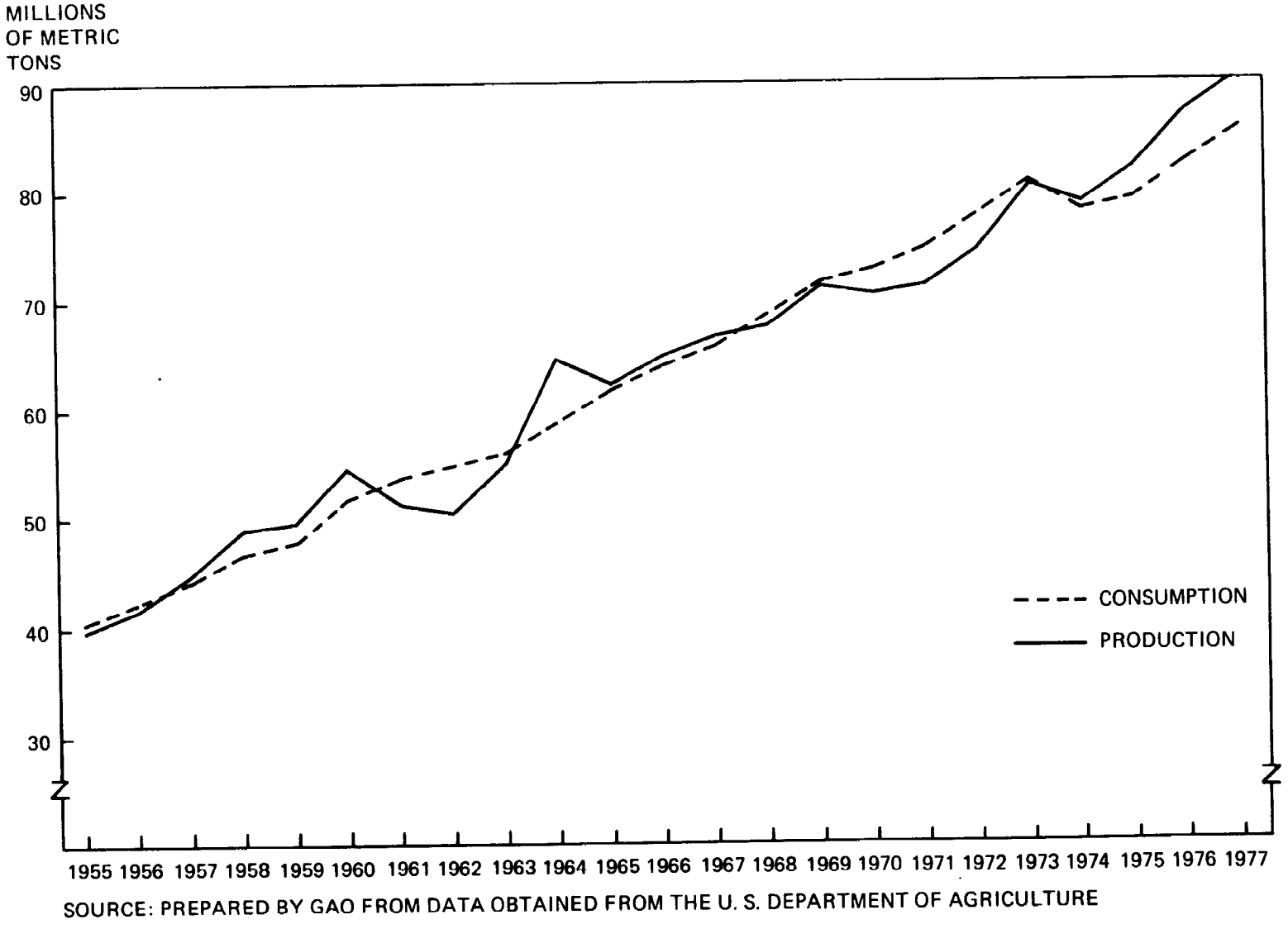
Only 1.5 percent of tilled land and land under permanent crops is devoted to cane and beet cultures. Although only about one-fourth of world sugar production is involved in world trade, sugar production and export is important to many developing countries because it is vital to their economies.

Although world consumption has grown steadily over the years, averaging about a 3-percent increase per year, production is erratic. Production has responded significantly to world prices. Other factors affecting production include crop acreage; yield and sugar content, which are both influenced by several other factors; milling capacity; trade policies; and profits. Figure 1-2 on page 4 portrays world consumption and production from 1955-77. Although the production rate is likely to decline in the immediate future due to low world prices during the past several years, population growth and rising income in low-income countries is causing an increased demand for sugar. Various surveys of production expansion plans indicate that world sugar production will range from 105 million to 125 million tons by 1985 compared with world consumption of 113 million to 117 million tons.

WORLD CARRYOVER SUGAR STOCKS AFFECT SUGAR PRICES

Responding to changes in sugar supply, world sugar prices have fluctuated sharply over the years. Since consumption has increased steadily but production has been

FIGURE 1-2 WORLD SUGAR PRODUCTION AND CONSUMPTION



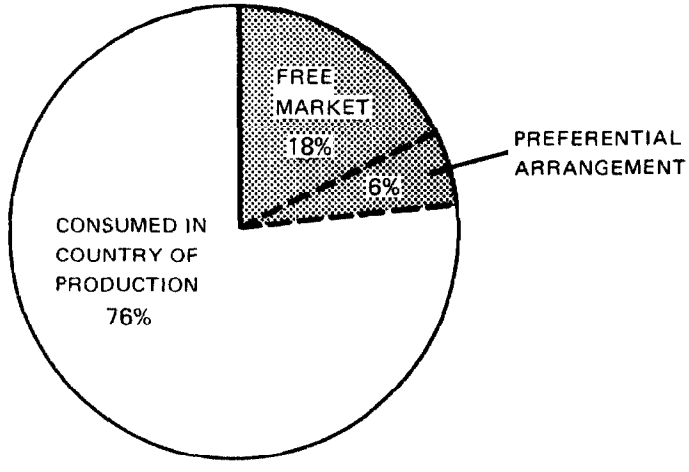
SOURCE: PREPARED BY GAO FROM DATA OBTAINED FROM THE U. S. DEPARTMENT OF AGRICULTURE

erratic, stocks have similarly fluctuated. World carryover stocks expressed as a percentage of consumption are considered to be the measure of the sugar supply's adequacy. Stocks of 23 to 25 percent of consumption traditionally have been associated with stable prices; lower stocks with higher prices; and higher stocks with lower prices. Figure 1-3 on page 6 compares world prices and carryover stocks from 1955-77 and shows that prices are a mirror image of stocks.

The world sugar market is much smaller than world production and consumption. This is because approximately 76 percent of consumption occurs in the producing country. Trade under preferential agreements accounts for approximately 6 percent of consumption, leaving approximately 18 percent for the world free market, as shown in figure 1-4 below.

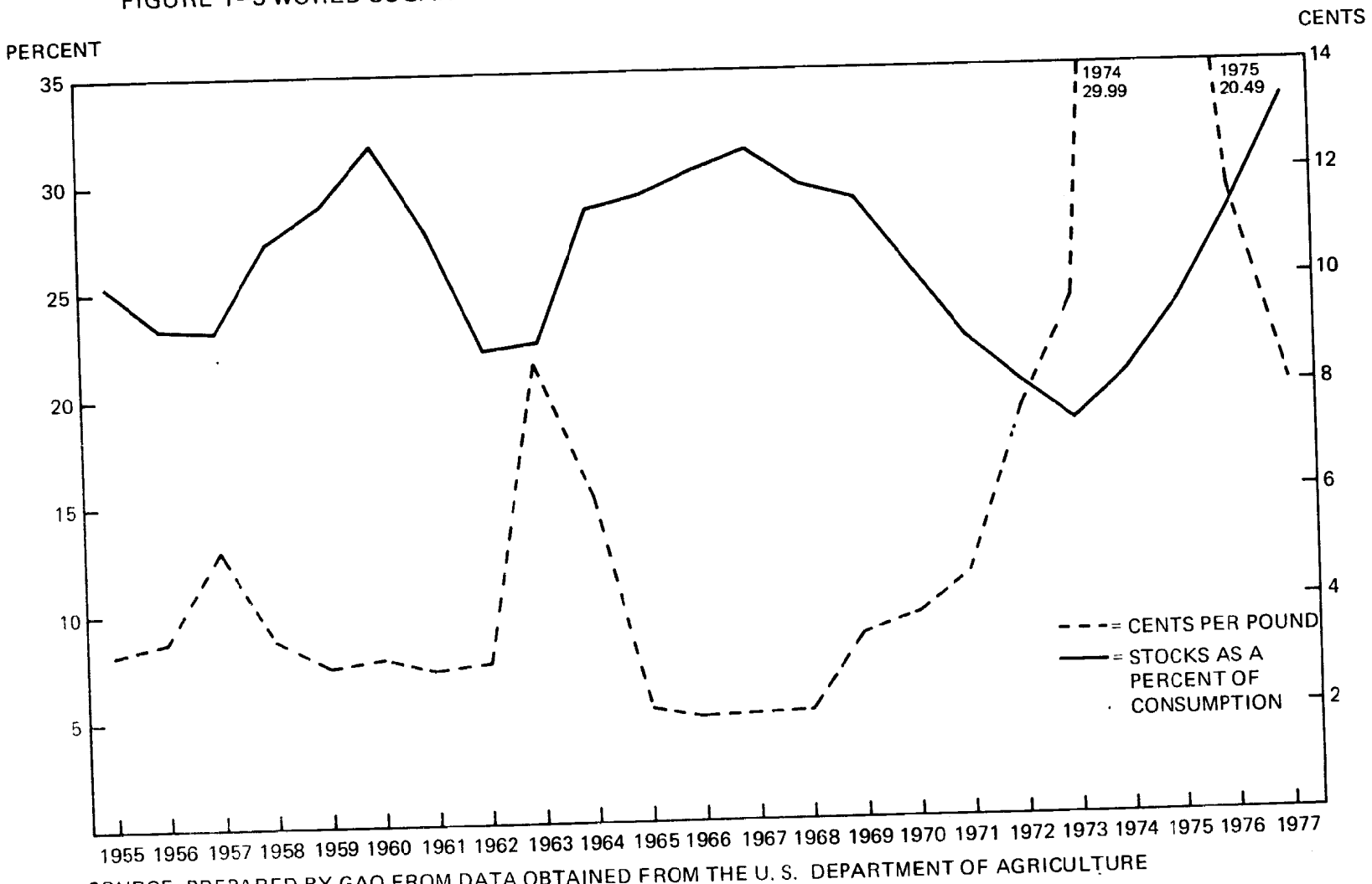
In the past, the world market has been a residual market for excess sugar. However, there are countries that produce sugar for export. As such it bears the brunt of world surpluses and shortages. These surpluses and shortages are magnified by the small nature of the world market as compared to world consumption.

FIGURE 1-4 DISTRIBUTION OF WORLD SUGAR PRODUCTION



Source: Prepared by GAO from data obtained from the U.S. Department of Agriculture

FIGURE 1–3 WORLD SUGAR PRICES ARE A MIRROR IMAGE OF WORLD CARRY-OVER STOCKS



SOURCE: PREPARED BY GAO FROM DATA OBTAINED FROM THE U. S. DEPARTMENT OF AGRICULTURE

The United States is among the world's largest sugar consumers, currently producing slightly more than one-half of its domestic consumption and importing the balance. In 1977, the United States used an estimated 11.2 million tons of sugar--it produced only 6.2 million tons. 1977 imports totaled 6.1 million tons, more than was needed to meet domestic needs, leading to an increase in stocks. Since the U.S. Government does not set domestic sugar prices, as many other governments do, the world sugar price influences both imported and domestic sugar prices. Without the quotas for domestic and foreign suppliers, which expired after 1974, the world price limits the price domestic producers can charge since U.S. sugar users will shift to imported sugar if domestic prices are relatively higher than world prices.

MANY GOVERNMENTS PLAY A KEY ROLE IN THEIR SUGAR INDUSTRIES

Sugar production and marketing is regulated by more governments and to a greater degree than any other commodity. In producing countries governmental directions pertain to production levels, prices, factory and field workers' wages, and often to prices at various stages of distribution.

In importing countries, imports are regulated in various ways to prevent upsetting the economic structure of domestic industries, to derive revenue, or to keep consumption down. In many countries sugar is still considered a luxury, whose consumption is to be restricted to save foreign exchange. If government regulations did not control the national sugar economics, world prices would set the price pattern, at least in countries which largely depend on imports for their supplies. Consequently, consumer prices in only a few countries fairly reflect the world market price.

UNITED STATES PROTECTS ITS SUGAR INDUSTRY

As noted in our report, "Review of U.S. Import Restrictions--Need to Define National Sugar Goals", ID-75-80, issued July 10, 1975, U.S. policy since 1894 has been "to preserve within the United States the ability to produce a substantial portion of our sugar requirements." Sugar policy was predicated on the belief that it was

> "* * * unlikely any significant quantity of sugar would be grown in the United States if American producers had to compete on the open world market with sugar produced with cheap tropical labor or under subsidy in other countries."

To achieve its objective, the United States has used various protectionist devices, including tariffs and quotas.

Before 1934, U.S. sugar producers were protected solely through a tariff on foreign imports. The Jones-Costigan Act of 1934 established a quota system for domestic and foreign sugar producers. Its broad purpose was to provide U.S. consumers with an ample sugar supply at prices which would maintain the domestic industry, be fair and reasonable to consumers, and promote U.S. export trade. The Congress has periodically reviewed and changed sugar legislation since 1934. However, succeeding laws--the Sugar Acts of 1937 and 1948--maintained the Jones-Costigan Act's three basic objectives.

Anticipating the expiration of the Sugar Act on December 31, 1974, a November 16, 1974, Presidential proclamation limited sugar imports to 7 million short tons, raw value, annually effective January 1, 1975. This amount was believed high enough to not affect U.S. imports since the Nation's import needs are below 7 million tons. The proclamation was issued to avoid an increase in the sugar tariff which would have occurred with the Sugar Act's expiration. As our 1975 report noted, the Presidential action did not clearly define long term U.S. policy objectives on sugar.

On December 31, 1974, the Sugar Act expired, ending 40 years of U.S. Government regulation at a time of world sugar shortages and rising prices in both U.S. and world markets. Quotas established for foreign suppliers and domestic producers, intended to protect the U.S. sugar industry's welfare and to provide consumers with ample sugar supplies at reasonable prices, terminated with the act.

In late 1976, a second Presidential proclamation increased the duty on sugar but did not change the 7 million ton quota.

We noted in our 1975 report that the United States needed to strike a balance between the two domestic conflicting interests--industry and consumers--and U.S. foreign interests. To achieve such a balance, effects of different policies and programs on domestic and foreign interests, as well as their costs, had to be carefully weighed. We further stated that we believed it to be an opportune time to consider the sugar program alternatives available. Any sugar program should be flexible enough to deal with changes in supply and demand on U.S. and world economies.

World sugar prices averaged a record 57 cents per pound raw value in November 1974 and then declined. They averaged about 8.1 cents per pound in 1977 and about 7.8 cents per

pound in 1978. The low price led to the March 17, 1977, U.S. International Trade Commission report to the President which stated that sugar imports were injuring the domestic industry and recommended specific import quotas. On May 4, 1977, the President declared that limiting imports was not in the national interest and instead recommended an income support program under existing legislation. On September 15, 1977, the U.S. Department of Agriculture (USDA) instituted a sugar price support payment program. This was the first program for sugar producers, other than the tariff adjustment in late 1976, since the Sugar Act expired on December 31, 1974.

The Congress, however--as part of the Food and Agriculture Act of 1977--provided for a sugar loan program for 1977 and 1978 crop year sugar which replaced the price support payment program. The President subsequently imposed an import fee on sugar and increased the duty rate to insure a minimum U.S. price just slightly above the 13.5 cents per pound, raw value, loan rate established for 1977 crop raw cane sugar. Effective January 1, 1979, import fees were increased to raise the market price of raw sugar to 15 cents per pound.

On January 1, 1978, a new International Sugar Agreement (ISA) entered into force. The agreement aims at stabilizing world market sugar prices within an 11 to 21 cents per pound range. It contains an export quota system to support prices at the lower end of the price range while sugar stocks accumulated during times of export quotas are released at the upper end of the price range to maintain the price ceiling. The United States is a provisional member of ISA, for the Senate has not yet ratified the agreement.

Administration spokesmen have testified before the Congress on several occasions that the ISA of 1977 is the foundation of the administration's sugar policy. The Assistant Secretary of State for Economic and Business Affairs testified before the House Committee on Agriculture on May 24, 1978, that:

> "Domestic programs can maintain a domestic sugar production base, but they do not give effective protection against very high sugar prices. It is basically for this reason that the administration decided to integrate the U.S. sugar market with the large world market and to seek an International Sugar Agreement as the foundation of the administration's sugar policy.
>
> "I must make clear at this point that, just as a domestic program cannot provide complete

assurance of price stability, neither can an international agreement provide an absolute guarantee that its price objectives will be met under all circumstances. The administration thus supports the adoption of a contingent domestic sugar program as a complement to the International Sugar Agreement."

Administration testimony in 1978 has always been in terms of a sugar policy. It has not included HFCS, which has an expanding market, although USDA has informed the Congress of the effect of various legislative options on fructose as well as sugar.

There are Federal programs to assist corn farmers but none, to our knowledge, that provide direct assistance to corn sweetener manufacturers. Recent proposed legislation--the International Sugar Stabilization Act of 1978--specifically deals with sugar and only touches on other sweeteners without identifying them by name. USDA has addressed the impact of sugar legislation on sweetener production but has not, to our knowledge, stated a broader policy on sweetener objectives. USDA also provides information on all sweeteners in its Sugar and Sweetener Report series.

THE CONGRESS FACES KEY DECISIONS

Domestic sugar producers have asked the Congress to assist the domestic industry beyond the Food and Agriculture Act of 1977 by providing a higher price level and mechanism to insure its achievement. The 95th Congress, however, did not approve such major sugar legislation. The Chairman of the House Agriculture Committee said that he will attempt to see that "comprehensive sugar legislation (is) the first order of business when the Agriculture Committee convenes in January 1979."

- - - -

The following chapters describe the principal elements of the U.S. sugar producing industry, the corn sweetener industry, the sugar industries of selected major U.S. suppliers and the International Sugar Agreement, to assist the Congress in evaluating relevant information and developing sugar legislation. The information is drawn from our evaluation of various materials relating to the sugar and corn sweetener industries and from material we developed during our field work. To further assist the Congress, the report also reviews some of the legislative options likely to be considered and their probable effects.

CHAPTER 2

THE BEET SUGAR INDUSTRY

The beet sugar industry, operating in about one-third of the States in 1977, is economically important at the community level but is usually only a small part of each State's crop income and employment. Prices in early 1978 were below reported production costs for many processors, leaving them in serious difficulty. Growers, however, appeared to do better with the 1977 crop. Nevertheless, six plants have closed since 1976 and there is a possibility that as many as 5 more will close in 1979.

MANY STATES PRODUCE SUGAR BEETS

Sugar derived from domestically produced sugar beets accounts for about 30 percent of total U.S. sugar consumption. In 1977, the 17 States listed in table 2-1 produced sugar beets.

Table 2-1

States That Grew Sugar Beets in 1977

Arizona	Nebraska
California	New Mexico
Colorado	North Dakota
Idaho	Ohio
Kansas	Oregon
Michigan	Texas
Minnesota	Utah
Montana	Washington
	Wyoming

Due to the large number of producing States, our discussion is of the production in all States rather than on a State-by-State basis.

Sugar beet processing plants, which produce refined sugar directly from U.S. beets, are located near the growing area to avoid expensive transportation costs.

Sugar beet processors contract with growers who agree to plant beets on a specified amount of land. Sugar beets are a rotation crop, so farmers usually do not contract their entire farms in sugar beets. The balance of their land is planted in various crops, depending on the location. The contracts between processors and growers allow growers to be paid for their beets at rates reflecting the selling

price of processed sugar and the beets' volume and sugar content. Some growers are also paid for byproducts such as molasses and pulp. Growers agree to be paid incrementally for their production over the course of the crop year based on price estimates until the final price is determined. In many locations, standardized contracts are approved in advance by beet grower associations.

SUGAR BEETS IMPORTANT AT LOCAL LEVEL

Only a small portion of available land is used for growing sugar beets. Growing and processing sugar beets provides a small part of the growing State's income and full-time employment. Yet, local officials consider the crop important primarily because of the local employment and spending it provides.

Sugar beet planting area and revenue are relatively small

In 1977, total sugar beet acreage was 1.28 million acres--less than 1 percent of the total 166 million growing acres--in the 17 sugar beet producing States. Beet sugar production in the 1977 crop year was 3.14 million tons, raw value. 1/ Although sugar beet acreage was more important in some States, no State exceeded 4 percent sugar beet acreage, and in 14 States acreage was no more than 2 percent.

Sugar beet production values indicate that the sugar beet crop is more important to States than the acreage indicates. Its value was 2.4 percent of all crop values in 1976, when planted sugar beet acreage was less than 1 percent of total acreage planted. The 1976 sugar beet crop was valued at $616 million while all crops produced in the 17 States were valued at $25.4 billion. For 11 States the value was less than 3 percent of all crop values, but for 1 State, Wyoming, it was 13.7 percent. Sugar beet values for 1977 will not be known until after fall 1978, when some companies make their final settlement with growers.

1/The term raw value for beet sugar is theoretical, designed to provide a basis for comparison between beet and cane sugar.

Sugar beet industry employs relatively few people

Sugar beet growing and processing also does not appear to contribute significantly to States' employment. Sugar beet production involves growers, field workers, and processing plant employees.

In 1977 there were about 12,100 sugar beet farms with about 4,400 full-time employees working partly on sugar beets. About 6,500 full-time employees worked in processing plants. In addition, about 22,000 seasonal field workers and 12,400 seasonal processing plant workers were employed.

The processing plants operate 24 hours a day, 7 days a week until the harvest is completed--about 3 to 7 or more months. Although the number of employees during the peak period remains the same the length of their employment changes.

In 1977, sugar beet producing States' total work force averaged 35.9 million with a 6.92 percent unemployment rate. Agricultural employment in these States was 1.4 million, of which 1.9 percent were employed in raising sugar beets. If all full-time sugar beet employees were unemployed, the unemployment rate would be 6.95 percent. If seasonal employees were added, this rate would be 7.04 percent or only slightly more than one-tenth of a percent higher. Using an employment multiplier provided by the Bureau of Labor Statistics, losing all sugar beet employees would generate the loss of about 52,500 additional jobs, raising the unemployment rate to 7.55 percent. Since producers grow other crops, they were not included in our unemployment estimates.

Sugar beets are important to local communities

One-half of the 50 sugar beet processing plants are located in towns of less than 7,000 people. The plants employed approximately 130 year-round employees and 248 temporary employees during the processing periods. Plant employees may not have been employed if other crops had been grown, since alternative crops would probably not be processed near the fields.

Local officials consider the industry a significant factor in their communities. Reasons given include the employment level, wage and tax value, and the byproducts' importance as cattle feed. Some officials expected that losing local plants would have drastic or devastating effects. One official pointed out, however, that the larger

the community, the less the effect of losing a processing plant.

ECONOMICS OF BEET SUGAR PRODUCTION

The 1977 beet sugar crop is being produced and processed into refined beet sugar for about 17.81 cents a pound. Additional costs--estimated by USDA at 2.5 cents a pound--are incurred to sell beet sugar after production. These costs vary according to the processor's marketing practices.

Cost elements of beet sugar production

There are two key cost elements in the beet sugar industry: the costs of (1) growing sugar beets and (2) processing them. Two methods to analyze grower costs include determining (1) sugar beets' cost per ton or (2) the grower's cost per pound for sugar produced from sugar beets. We have chosen to use the latter method throughout this report because it allows comparison with other figures expressed in cents per pound.

In this method, the cost is computed from production costs for a ton of sugar beets and the amount of sugar recovered from the beets. Our data was derived from a 1978 USDA study containing estimates on sugar beet growing costs per ton, industry-supplied data, and our computations based on these sources. The weighted average grower cost for sugar extracted from sugar beets, including management fees and land charges, was reported at 10.83 cents per pound. The weighted average processing cost, computed from information obtained from 10 of the 12 sugar beet processing companies, was about 6.98 cents per pound.

A cost breakdown is shown in table 2-2.

Table 2-2

Estimated Beet Sugar Costs For Crop Year 1977

Production costs	Costs per pound of sugar
Variable	6.60
Machinery ownership	1.09
Farm overhead	.28
Taxes and insurance	.21
Management	.75
Land allocation	1.90
Total production cost	10.83
Processing costs	
Factory operations	5.22
Profit from byproduct sales	(1.33)
General and administration	1.23
Depreciation	.78
Interest	.69
Other costs	.39
Total processing costs	6.98
Total production and processing costs	17.81

Several points must be noted in examining these costs. Management fees, which from a business standpoint usually come from profit, are considered a cost in the USDA study we used in our computations. The USDA study said there was no theoretical guide for establishing a management fee since management is usually rewarded residually by "profit." Since the Agriculture and Consumer Protection Act of 1973 specified that a "return for management comparable to the

normal management fee charged by other comparable industries" be included in production cost studies for other commodities, however, it was included in USDA's study for consistency.

According to USDA, the land charge we derived from USDA data is frequently omitted from the commodity production cost. The farmers' yearly decision on what to produce may be made without considering the land's cost. USDA, however, claimed that a land charge for rented land and long-range analysis is an appropriate part of the total production cost.

Costs of individual processing companies plus those of their growers vary widely from the average. Five processors plus their growers have costs below the average, while five processors plus their growers have costs above the average. The range between the highest and lowest cost of producing refined beet sugar was 6.25 cents per pound.

No generally accepted method exists to convert refined beet sugar costs (shown in table 2-2) to a basis equivalent to raw cane sugar. This is because beet sugar does not have a production stage in the United States similar to raw cane sugar. Selling cost, a cost element not shown above, is not included in raw cane sugar cost and varies according to the processor's marketing practices. A USDA official estimated selling cost at 2.5 cents per pound; this should be added to production costs for a total refined beet sugar cost.

INDUSTRY CONDITION

Both growers and processors have reported losing money. They claim that Government programs have not helped adequately, that plants have been closing, and that growers have been turning to other crops. When plants close, costly processing and growing equipment is idled and loses value because it cannot be used on other crops.

The industry is unprofitable

To make a profit, processors should receive a price for their sugar exceeding marketing, processing, and growing expenses. Processors reported they sold nearly 45 percent of their 1977 crop for an average 15.05 cents per pound. This price yielded a loss of more than 5 cents per pound since total cost averaged 17.81 cents for processing and growing and an estimated 2.5 cents for marketing. The loss was partly offset by Government payments, but only for sugar sold before November 8, 1977. Government price support payments totaled $88 million through May 1978. These payments include a 10-percent holdback which had not been paid as of February 1979.

On June 1, 1978, a spokesman for many beet sugar companies testified before the House Committee on Agriculture that the industry is in serious financial trouble. The spokesman stated that:

> "* * * each and everyone of the Nation's beet sugar processing firms for whom I speak is in serious financial straits--indeed jeopardy * * *."

The spokesman said that one company lost $6.1 million on revenue of $152.9 million during its most recent fiscal year, and a cooperative failed to meet its contractual obligations to its grower-owners for the 1976 crop by $14 million. This processor loss was passed on to growers who also had to absorb any individual losses resulting from growing beets. In a case we identified, a recently established cooperative with a relatively new plant had been unable to pay interest on its debt for 2 years, while another processor told us his company has reported financial losses for the last four quarters.

Growers also claimed they were losing money on sugar beets and that USDA payment and loan programs for price support, which required that growers be paid at least $22.84 per ton of average quality sugar beets from the 1977 crop, had not proved sufficient. Grower representatives in all sugar beet growing areas considered the payment insufficient because it was less than the production cost. Grower representatives who expected more than minimum payments told us that those payments would still be inadequate because they would be less than production costs.

There are no estimates on the 1977 sugar beet crop's production cost, but USDA has prepared estimates for the 1978 crop. Those estimates indicate a $26.82 per ton average production cost on a farm weighted basis with a $24.20 to $31.99 per ton range, including land charges. Without land charges the average production cost is $21.93 per ton with a $19.32 to $26.85 per ton range. Assuming it costs no more to produce the 1977 crop than it did the 1978 crop, the minimum payment of $22.84 per ton would have covered average production costs, excluding land charges. USDA has told us that the revenue estimate on the 1977 U.S. sugar beet crop was $26.50 per ton, including price support payments for sales through June 30, 1978. The $26.50 would cover average production costs, excluding land charges in most sugar beet producing areas, and would cover average production costs, including land charges in some sugar beet producing areas. The selling price data indicates that grower claims may no longer be valid with respect to the 1977 crop. The replacement of the price support payment

program with a loan program, and likely increases in production costs, should affect industry profitability from the 1977 and 1978 crops.

The revenue estimates for 1977 sugar beets include Federal payments made on part of the crop, which provided additional revenues. The balance of the 1977 crop and the entire 1978 crop are eligible for Federal loans but not payments. Defaults on the 1977 crop loans, whose rate was 15.57 cents per pound, indicate that market prices were not sufficient to justify loan redemption in some cases, although some loans have been redeemed. Effective January 1, 1979, import fees were increased to raise the market price of raw sugar to 15 cents per pound, which should consequently also raise refined beet sugar prices. The loan program is for the 1977 and 1978 crops. Whether a loan program will be established for the 1979 crop depends on whether USDA decides to establish one with its existing authority or the Congress legislates it.

Some processors told us that the USDA temporary price support payment program had allowed them to reduce their losses to less than otherwise possible. At least one processor was reported to be profitable. It should be noted, however, that all industry elements made substantial profits in 1974 and 1975, a period of high prices, as shown in appendix I.

Efficiency could be improved

While some processors told us the industry was efficient, some said improvements could be made in both processing and growing by applying more technology. Improvements would require more capital investment, which is not likely given current low prices and market instability.

Alternatives to beet sugar are limited

When processors are under financial pressure, their alternatives include shutting down costly and less efficient plants. According to some processors the plants have no other use, although two processors have converted plants to process cane sugar or both cane and beet sugar. Once closed, plants seldom reopen and staff and crews are usually lost. Even if plants are mothballed, maintenance must be continued. Processors closed six sugar beet plants between 1976 and 1978, including a converted one. According to some processors, the depreciated value of 38 of the plants was over $308 million as of 1978.

We were told that an additional plant will be closed once processing of the 1978 crop is completed. A major processor has also announced that it plans to close its four plants upon completing processing of the 1978 crop. These four plants accounted for 9 percent of 1977 beet sugar production. While no irreversible steps have been taken that could prevent the company from changing its decision and operating in 1979, we were told that the company is not negotiating with farmers for 1979 sugar beet acreage. Another processor has indicated an interest in contracting with farmers for some of the acreage. Most of the acreage will not be contracted by this other processor and so will not be usable for growing sugar beets since there would be no plants to process the crop. Since the processor planning to close operates the only mills in Washington and Utah, those States would no longer be able to grow sugar beets.

When the sugar beet crop is unprofitable, growers may choose to produce other crops. As of 1978, those alternate crops were already surplus and their prices also declined. In addition, since sugar beet plants require a minimum of sugar beets to operate economically, if enough farmers switch to other crops, sufficient sugar beets may not be grown to justify the processors operating plants. In those cases, even some profitable growers could not continue producing sugar beets without a nearby plant available as a market, and they too would have to turn to alternative crops. As a result, all sugar beet acreage in the area of the plant is lost to beet production.

Farmers who stop growing sugar beets are left with unusable equipment, as is the processor who discontinues operations. Growing sugar beets requires specialized equipment to plant, thin, defoliate, and harvest the beets. In 1978, the equipment's value was estimated by processors and growers to be worth $8,000 to $26,000 per farmer. If an entire area stops growing sugar beets, this equipment might have no resale market and become worthless. Not all growers, however, have all the specialized sugar beet equipment. For example, growers in Michigan may use planters which are adaptable to other crops and plant sugar beets in a way that makes thinning equipment unnecessary.

CONCLUSION

For the 1977 beet sugar crop, the production cost was, on the average, 5 cents below the average selling price reported by processors. Almost no sugar beet processors were reported as profitable in 1978. Many growers also claim to be unprofitable, but recent data indicates that claim may no longer be valid. Preliminary USDA data on 1977 U.S. sugar

beet receipts indicates that prices were above average production costs in many areas. The replacement of the payment program and likely increases in production costs, should affect industry profitability from the 1977 and 1978 crops. However, 6 plants have closed recently out of a nationwide total of 56 and there is a possibility that as many as 5 more will close in 1979. Since growers and processors are interdependent, both must cover their costs for the industry to survive. Plant closings could sharply affect local communities, which are heavily dependent on their sugar beet plants. The effect would not be significant at the State level, since sugar beets use only a small part of State land and provide a comparatively small part of State agricultural income and employment.

CHAPTER 3

THE SUGARCANE INDUSTRY

Sugarcane, a large perennial grass, is grown in tropical or semitropical climates. Sugar is produced from the cane's juice, with the sugar in the form of dissolved sucrose. Sugar derived from domestically produced cane accounts for about 25 percent of total U.S. sugar consumption.

Cane stalk cuttings, rather than seed, are used to propagate the crops, and many crops may normally be cut from the same roots. These succeeding crops, called ratoon crops, are generally harvested 12 to 24 months after planting.

At harvesting, the stalk is cut near the ground and the tops and leaves, called "trash," are removed before it is transported to a nearby raw sugar mill for processing into sugarcane juice. Through a filtering, evaporating, and centrifuging process, this juice is reduced to large sucrose crystals coated with molasses, called raw sugar. Although this raw sugar is the principal sugar actually shipped in world trade, the refineries that purchase it must process it further for most domestic uses.

Raw sugar byproducts are (1) molasses, used mainly as a binding and sweetening agent in livestock feeds and (2) bagasse, a fibrous residue from grinding used principally as a fuel for generating power in the raw sugar factory and secondarily as a raw material in building materials and certain chemicals.

The sugarcane industry is necessary to the economic viability of the domestic communities it serves and, excluding Texas, the cane sugar industry significantly contributes to the total farm revenues of the States and Commonwealth it serves.

FIVE AREAS PRODUCE SUGARCANE

Sugarcane is grown domestically in Florida, Louisiana, Texas, Hawaii, and Puerto Rico, and the industry is vertically integrated, to a large degree, from growing through processing. Excluding Hawaii, which is covered in chapter 4, 52 mills produced more than 1.9 million short tons of

raw sugar 1/ from cane purchased from over 3,900 farmers during the 1977 crop year, as shown in table 3-1.

Table 3-1

Area Statistical Data on Sugarcane Industry

Area	Number of farms	Area harvested	Number of mills	Raw sugar production
		(acres)		(short tons)
Florida	141	301,500	7	886,766
Louisiana	1,141	318,000	33	667,595
Texas	109	33,400	1	86,198
Puerto Rico	2,547	112,800	11	267,586
Total	3,938	765,720	52	1,908,145

In many cases raw sugar processing mill operators own their own farmland and grow their own cane, which is called administration cane, but farming cooperatives which grow and mill their own cane are also common.

Four of the six Florida processors grow administration cane, which accounted for more than 65 percent of that State's total 1977 crop acreage. The two remaining processors are growing cooperatives, which mostly accounted for the rest of Florida's 1977 crop production. Less than 10 percent is grown by independent producers.

Administration cane accounts for over 50 percent of Louisiana's annual production. This amount continues to increase while the number of farms continues to decrease, indicating that smaller farms are being taken over by the larger grower/processors.

The Texas sugarcane industry is relatively new, harvesting its first crop in 1973. One grower-owned raw sugar mill, which grinds all the cane grown on 33,394 acres in the Lower Rio Grande Valley, comprises the industry.

1/The actual weight of raw sugar produced in a raw sugar mill is called its commercial weight. Raw sugar weights generally used by the industry and USDA, however, reflect raw sugar which tests 96 degrees by the polariscope, an instrument used to measure sugar's purity, and all raw sugar weights used in this report will be based on this determination.

The Sugar Corporation of Puerto Rico, a government company, intervened in the Commonwealth's sugar industry in 1973, after the private sector abandoned it, to prevent the industry's elimination on the island. The Sugar Corporation operated all 11 raw sugar processing plants on the island during the 1977 crop year, but has since closed four plants. Puerto Rican acreage and production continues to decline due to increasing industrialization and urbanization and high costs.

SUGARCANE IMPORTANT AT STATE LEVEL-- CRUCIAL TO LOCAL COMMUNITIES

Domestic sugarcane production is limited to rather small geographic areas in the three mainland areas because of soil and climate conditions. The industry is widespread in Puerto Rico. The industry is crucial to these local communities, being the primary crop grown and contributing heavily to the areas' total employment and revenues. Excluding Texas, the industry contributes significantly to the States and Commonwealth's total agricultural economies.

Sugarcane areas are relatively small--but revenues are significant

Sugarcane is the dominant crop in the local areas where the industry is located but, except for Puerto Rico, accounts for only a small percentage of the total agricultural acreage in those States. Revenues, however, account for 6 to 10 percent of the States total farm income, except in Texas where the industry is relatively new.

In the 1977 crop year, sugarcane acreage accounted for 2 and 3 percent, respectively, of total agricultural acreage in Florida and Louisiana and only two-hundredths of 1 percent in Texas. Conversely, almost 35 percent of Puerto Rico's total agricultural acreage was devoted to sugarcane in 1975, the last year for which such statistics were available.

Income data for the 1977 crop was unavailable due to incomplete marketings, but data for the 1976 crop indicates that sugarcane revenues in the three mainland States were about 2.9 percent of total farm revenues. Revenues were much higher for Florida and Louisiana--6 and 8 percent, respectively. This percentage relationship was significantly reduced by sugarcane's low contribution to farm revenues in Texas--less than one-half of 1 percent. Again, the latest data available for Puerto Rico--from the 1975 crop year--indicated that sugarcane accounted for almost 10 percent of the island's total farm income.

Sugarcane industry employs few people

In the three mainland cane-producing States--Florida, Louisiana, and Texas--more than 27,000 workers are involved in producing and processing sugarcane. Almost 5,000 full-time and more than 17,000 seasonal workers were employed in 1977 sugarcane production. Almost 3,000 full-time and more than 2,000 seasonal employees worked in raw sugar factories. The employment multiplier shows the sugar industry supporting about 18,000 jobs, exclusive of Puerto Rico. There were about 24,000 sugar employees in Puerto Rico.

Assuming a 3-month processing season, we converted seasonal employees to a full-time equivalent basis to determine the percent of workers in each mainland State involved in producing and processing raw sugar. The raw cane sugar industry accounts for a significant share of agricultural employment in Florida and Louisiana, 11.9 and 9.7 percent, respectively, but accounts for less than 0.5 percent in Texas. The industry, however, accounts for less than 0.5 percent of total employment in each State and, if production or processing were significantly reduced, unemployment rates would be only slightly affected.

Sugarcane is crucial to local communities

Because the sugarcane industry is generally located in small communities, it is often the primary or only crop grown, and the processing plants that necessarily have to locate nearby are often the area's only industrial facility.

The employment generated by the industry is vital to these small communities' well-being, since few alternatives to sugarcane production and processing exist.

ECONOMICS OF CANE SUGAR PRODUCTION

According to USDA's latest cost estimates and costs supplied by the Sugar Corporation of Puerto Rico, the total production cost for one pound of raw sugar from the 1977 crop varied from 14.204 cents in Florida to 29.55 cents in Puerto Rico.

Cost of producing and processing raw cane sugar

Production cost estimates for raw cane sugar are shown in table 3-2. For Florida and Louisiana they were obtained from USDA; for Texas, from Rio Grande Valley Sugar Growers, Inc., which processes all of that State's raw sugar; and for Puerto Rico, from the Sugar Corporation of Puerto Rico,

which controls the Puerto Rico industry. The Texas and Puerto Rico data presumably represents actual costs incurred in producing raw sugar from the 1977 crop. Other cost estimates, some of which are cited later in this chapter, are also available from University studies.

Table 3-2

Cost to Produce One Pound of Raw Value Sugar (96-Degree Basis)

1977 crop

	Florida	Louisiana	Texas	Puerto Rico
Producing	$.08221	$.08306	$.07909	$.20060
Land rent	.00727	.01046	.01647	a/
Processing	.05256	.05938	.06327	.09490
Total	$.14204	$.15290	$.15883	$.29550

a/The Sugar Corporation of Puerto Rico did not identify land charges.

It should be noted that neither the above costs nor other estimates cited later in this chapter include a molasses credit, which would yield a lower net production cost. USDA estimates the molasses credit to be $.00771 per pound for Florida, $.00651 for Louisiana, and $.00898 for Puerto Rico on the 1977 crop. Applied to the production cost estimates in table 3-2, they would yield a net production cost of $.13433 per pound in Florida, $.14639 in Louisiana, and $.28652 in Puerto Rico. We had no similiar estimate for Texas.

During our review we obtained additional cost estimates for Florida and Louisiana based on studies performed by the University of Florida and Louisiana State University, respectively. A University of Florida researcher, D. L. Brooke, estimates production costs of 15.79 cents per pound, raw value, in Florida for 1977 on a net cash rent for land basis and 16.54 cents on a current market value of land basis. A Louisiana State University researcher, Joe R. Campbell, estimates a break-even cost of 14.8 cents per pound, raw value, for Louisiana in 1977. Dr. Campbell has told us that the Louisiana cost estimate is based on a 500-acre operation, which would maximize use of a mechanical harvester, and would represent a reasonably efficient farm's production cost. USDA data indicates that only about 14 percent of

Louisiana sugarcane farms are 500 acres or more, but that they produce about 65 percent of the State's sugar. We learned of no cost studies for Florida or Louisiana based on actual 1977 crop year data.

USDA and university cost estimates for Florida and Louisiana and the Texas cost data include a "land rent," which is a rate of return based on the land's current market value. The University of Florida costs for Florida also include an alternative land charge based on net cash rent or opportunity cost, although USDA notes that their cost and the Universities' may not be comparable. The method of determining the land rent or alternatively the land charge will affect the production cost estimate.

A considerable difference exists between USDA's cost estimates and the University of Florida's and Louisiana State University's. USDA estimates are indexed projections based on accounting data. The data bases were obtained from 1969-71 Agricultural Stabilization and Conservation Service field studies from financial records of processors and producers growing 100 or more acres, while the University estimates for the two States are projections based on actual costs for the 1975 crop. USDA estimates show Louisiana's costs to be much higher than Florida's, while the University studies, which do not relate to all producers, indicate Louisiana's costs are slightly lower. USDA officials told us they had approached Florida and Louisiana producers several years ago about doing a cost study and were rebuffed because these producers felt that similar data should be available from all industry sectors, including corn sweetener producers, who have consistently resisted efforts to obtain cost data.

The Florida industry is generally considered to be much more efficient than Louisiana's because of climate, soil conditions, age of processing facilities, and economies of size, which would appear to justify USDA's higher cost projections for Louisiana.

Louisiana's industry, however, is characterized by unpaid family labor and debt-free ownership of land and facilities, which seems to justify the lower costs projected in the University study.

It is important to note that all the figures are estimates. The University of Florida, Louisiana State University, and USDA estimates are based on projections of data developed in earlier studies, with various base years. USDA noted in testimony before the Subcommittee on Trade, House

Committee on Ways and Means, that differences in cost concepts, computational methods, and yield assumptions for sugar and other crops frequently cause differences in cost estimates. The diverse estimates raise questions as to what the production cost is in any area.

INDUSTRY CONDITION

Comparing the average selling price of sugar reported to USDA through May 1978 and USDA and university studies on production cost data, it seems that without Government price support payments the U.S. raw cane sugar industry would probably lose money on the 1977 crop. Sugar from this crop was still being marketed in the fall of 1978.

Through May 1978, Government price support payments totaled $13.4 million for Florida, $28.2 million for Louisiana, and $6.2 million for Puerto Rico. These payments include a 10-percent holdback which had not been paid as of February 1979. The Texas processor received no price support payments because it did not meet eligibility requirements for the payment program. In addition, Florida processors have defaulted on $36.9 million in price support loans and the Texas processor on $13.6 million in price support loans. Tables 3-3 and 3-4 indicate profit or loss based on a comparison of production costs and selling price plus support payments.

Table 3-3

A Comparison of Production Costs Based on University and Industry Data, Prices, and Federal Support Payments--1977 crop

	Average selling price	Average Government support payment	Total price including support payment	Production cost	Profit (loss)
	(cents per pound)				
Florida	12.36	2.55	14.91	15.79	(0.88)
Louisiana	11.79	2.97	14.76	14.80	(0.04)
Texas	11.00	0	11.00	15.88	(4.88)
Puerto Rico	10.90	2.59	13.49	29.55	(16.06)

Table 3-4

A Comparison of USDA Cost Data For Florida and Louisiana and Prices, Including 1977 Crop Support Payments (note a)

	Total price including support payment (note b)	Production cost	Profit (loss)
	(cents per pound)		
Florida	14.91	14.20	.71
Louisiana	14.76	15.29	(.53)

a/No USDA cost data available for Texas and Puerto Rico.

b/Price data from table 3-3.

The tables indicate that, on the average, without Government support payments no processor would be profitable. Based on USDA estimated production cost data, however, Florida processors receiving support payments were profitable. Louisiana processors would be unprofitable based on USDA estimated production cost data but would almost break even based on Louisiana State University data. The industry generally expects the Government to provide support. Without that support at the prices and production costs shown in table 3-3 the industry would, on the average, not be viable. Not receiving support, however, would not preclude more efficient firms, which might have substantially lower costs, and firms selling sugar for more than the average price from profiting. Inclusion of the molasses credit could also reduce the losses shown in the tables, increase the profits, or at least in one case potentially result in a profit instead of a loss.

As a result of the generally poor financial situation, no industry expansion is anticipated. However, we believe the industry will decline very little, if at all, because viable alternatives are lacking and there is a reluctance to abandon the commitment in fixed investment.

Large farms may become larger, taking over their smaller and less efficient neighbors, and more old and inefficient processing mills in Louisiana may be closed or consolidated. The processing mill in Texas and those in Florida are relatively new, large, and efficient, and no mill closings are foreseen in those States. The Puerto Rico sugarcane industry has declined over the years because of spiraling costs. In

the last year, the industry experienced a 15,000-acre reduction in planted sugarcane, four processing plant and two refinery closings, and over 1,000 worker layoffs.

Efficiency varies in different areas

Many reasons exist for the varying efficiency of the domestic sugarcane producing areas. The Texas industry is relatively new and has a modern, efficient processing mill, but adverse weather conditions reduced production yields in its first years of operation. Long-range predictions show that Texas will be an efficient sugarcane producer, on a par with Florida. Government involvement in the Puerto Rico sugarcane industry is extensive, and because of unique labor and union agreements that prevent using mechanical harvesters, it is difficult to compare the island's efficiency with the three mainland cane-producing States.

Florida and Texas are believed to be the most efficient domestic mainland cane sugar producers and Louisiana the least efficient.

The Florida sugarcane industry is concentrated on the southern shores of Lake Okeechobee where the soil is highly fertile. The area generally has mild winters, which favor sugarcane production, resulting in a long growing season. A much larger farm size than is typical in other mainland areas allows Florida's producers to take advantage of economies of size.

Florida's processing mills are much more efficient than those in other cane-producing areas owing to their capacity, as indicated by 1977 crop production data shown in table 3-5. Most harvesting operations (about 70 percent), however, are still performed by hand by offshore workers brought to Florida from the British West Indies during the harvesting season. Soft muck soil and the tendency to recumbant growth (growing along the ground rather than upright) make mechanical harvesting in Florida complicated.

Table 3-5

1977 Crop Production of Raw Sugarcane Mills

	Raw sugar production	Number of mills	Average production per mill
	(tons)		(tons)
Florida	886,766	7	126,681
Louisiana	667,595	33	20,230
Texas	86,198	1	86,198
Puerto Rico	267,586	11	24,326

Many Louisiana sugarcane growers still operate small-scale farms and are not able to realize the economies of size that cane growers in other areas achieve, although the industry is highly mechanized. Despite the warm climate in Louisiana's Delta region, where sugarcane is grown, freezing weather occurs every year, resulting in a shorter growing season and lower yields than in other domestic cane growing areas. The short harvesting season (75 to 90 days) also results in Louisiana's raw sugar mills standing idle for a longer time period than do mills in other areas. The sugarcane mills also tend to be old, small, and relatively inefficient.

Alternatives to cane sugar are limited

Industry officials told us that raw cane sugar processing plants are not adaptable to other uses and, in the event of closure, will probably sit idle or be dismantled and sold to other processors as spare parts. Facing this dilemma, industry officials told us that many processors who would consider leaving the industry because of heavy losses are reluctant to do so because of the significant loss they would sustain on their investment.

As discussed earlier, growers are precluded from shifting to other crops because viable alternatives do not exist. Southern Florida's soil and climate are adapatable to growing winter vegetables, but Florida producers equate such a change to "shooting craps," due to the volatile nature of the vegetable market. Florida producers also feel that further expanding winter vegetable acreage would depress the market, making the crop unprofitable.

Soybeans are most often mentioned as a crop alternative in Louisiana but, again, producers feel that expanding soybean acreage would flood the market and depress prices below a profitable level. The Louisiana Delta region's damp climate, which causes mildew damage to soybeans, also discourages producers from switching to that alternative crop.

Cotton, sorghum, and perhaps citrus, are possible alternative crops in the Lower Rio Grande Valley of Texas, but a danger of freezes, as well as an already crowded market, makes a shift to these crops unlikely.

According to USDA officials, no alternatives are being considered in Puerto Rico due to the apparent Puerto Rico government effort to support a substantial sugar industry there.

A further disincentive for producers to switch to other crops is their previous large investment in specialized equipment that is unique to sugarcane production and cannot be used to farm other crops.

CONCLUSION

Without Government price support payments, on the average, the raw cane sugar industry in the continental United States would probably be losing money, although some more efficient firms may be profitable. With Government payments one State on the average showed total prices above the cost estimates. According to industry representatives, the industry generally expects the Government to provide support. At today's prices, without that support the industry, on the average, would probably not be viable. Diverse estimates between USDA and university studies raise questions, however, as to what the production cost is in any area. We believe that current, verifiable cost data is important in assessing the industry's viability; however, that data is not available and USDA's attempts to conduct cost studies have been rebuffed.

The industry is necessary to the economic viability of the domestic communities it serves and generally contributes about 6 to 8 percent of total farm revenues, but it makes a relatively small employment contribution.

CHAPTER 4

HAWAII'S SUGARCANE INDUSTRY

Hawaii produced more than 1 million tons of raw cane sugar in 1977, making it the Nation's largest sugar producing State. Sugar is critical to Hawaii's economy, while in the other producing States it is important at the local level but far less so at the State.

DESCRIPTION OF THE HAWAIIAN SUGAR INDUSTRY

The Hawaiian sugar industry, which is characterized by a high concentration of ownership, has maintained its competitive U.S. market position through capital intensive and high yield production methods and cooperatively refining and marketing the final product.

Five major firms own the 15 sugar companies accounting for about 95 percent of Hawaii's production and acreage. Ownership changes since 1947 have occurred primarily among these major firms. Total acreage devoted to sugar has not changed dramatically, but the number of plantations and mills has declined through consolidations and closings. In 1947 there were 27 raw sugar mills in Hawaii; as of June 1978, there were 15. As shown in table 4-1, the island of Hawaii is the State's most important sugar growing area and Oahu the least.

Table 4-1

Hawaiian Sugar Production, By Island--1977

Island	Cane land acreage	Raw sugar production
		(tons)
Hawaii	93,084	373,527
Maui	47,528	265,193
Kauai	45,900	231,685
Oahu	34,217	163,334
State total	220,729	1,033,739

All Hawaii's raw sugar is marketed and approximately 80 percent of it is refined by the cooperatively owned California and Hawaiian (C&H) Sugar Company. Organized as a nonprofit agricultural marketing association as defined by the Capper-Volstead Act, all C&H stock is owned by the 15-member sugar producing companies in Hawaii in substantially the same proportions as the tonnage each markets through the association.

In addition to the major producers, there are about 500 independent producers accounting for about 5 percent of the State's acreage and production. Many of these independent growers work for the large sugar plantations and their farms do not provide full-time employment. Holdings range from 2 to 535 acres. The largest single independent group--some 365 members--have combined to operate a mill in equal partnership with a major producer. The independent growers rely on the sugar companies in varying degrees to assist in farm operations. These independent growers, however, are less capable of surviving extended periods of depressed prices than the sugar companies. Hawaii has already made $1.5 million available for low-interest loans in 1977 to independent growers and is providing an additional $750,000 in 1978 to help cover previous losses and to supplement new crop financing.

SUGAR CRITICAL TO HAWAII'S ECONOMY

The sugar industry's importance to Hawaii's economy rests on many factors:

- --Hawaii's small market demands that it export substantial goods and services to generate sufficient income to purchase what it cannot produce.

- --Sugar is Hawaii's prime agricultural export and no viable agricultural alternatives exist to take its place.

- --Sugar production is concentrated on the State's rural islands where the industry's decline would be felt the most.

Hawaii's relatively small population (894,700 residents in 1977) and distance from the mainland prohibits local production of many consumer and capital goods at efficient economies of scale.

Therefore much must be imported, which requires that the State have viable exports capable of generating sufficient income to offset imports.

Since World War II Hawaii's economy has depended on four primary income sources--Federal expenditures, the tourist industry, and sugar and pineapple exports. The sugar industry is its third largest source of income.

Table 4-2

Direct Income From Major Industries--1973-77

	Federal expenditures	Visitor expenditures	Sale value	
			Sugar	Pineapple
	(millions)			
1973	$1,494.4	$1,020	$222.2	$142.4
1974	1,657.3	1,225	676.6	127.1
1975	1,934.6	1,270	366.1	136.7
1976	2,139.3	1,450	257.0	144.5
1977	2,336.1	1,639	226.8	161.6

The State does not consider the sugar industry as one which will largely stimulate future growth. Tourism and Federal expenditures are now and are expected to remain the dominant income sectors. State officials are emphasizing, within the framework of a State Economic Development Plan, further diversity in economic activities. Sugar, however, remains an important economic asset. As shown in table 4-3, on page 35, sugarcane acreage is the major agricultural acreage on each island and almost three-fourths of the State's total agricultural acreage. Unprocessed sugarcane is also the major contributor to the State's agricultural production.

Table 4-3

Hawaiian Sugar Industry, Economic Indices--1977

	Island (note a)				Total
	Hawaii	Kauai	Maui	Oahu	State
	--------(Thousands of acres)--------				(Percent)
Acres planted in crops					
Sugar	93.1	45.9	47.5	34.2	220.7
All crops	112.3	47.0	83.3	54.5	297.3
Percent in sugar	82.9	97.7	57.0	62.8	74.2
Production value	--(Million of dollars and percent)--				
Sugar (unprocessed cane)	$51.9	$32.2	$37.1	$23.0	$144.2
All crops	79.9	35.1	76.9	67.6	259.5
Percent sugar	65.0	91.7	48.2	34.0	55.6
Employment					
Direct jobs--sugar (note b)	2,920	2,011	2,039	1,561	8,531
Employment multiplier	----------1.64 jobs per direct job----------				
Direct and indirect--sugar	4,789	3,298	3,344	2,560	13,991
Civilian labor force (note c)	35,520	16,220	27,300	320,060	399,100
Percent in sugar	13.5	20.3	12.2	0.8	3.5
Unemployment rate (percent) (note c)	10.0	7.8	7.8	7.3	7.6

a/Island names are county designations. Maui county includes Lanai, Molokai, and Maui Islands. Kauai includes Kauai and Niihau Islands. Oahu Island is the city and county of Honolulu.

b/Does not include firm of Gay and Robinson, Hawaii Sugar Planters Association, parent firm employees, or independent growers. Industry officials estimate total current employment at about 9,000.

c/Data for second quarter 1977.

Reducing employment in the sugar industry would increase Hawaii's mid-1977 7.6 percent unemployment rate. While Oahu would be little affected, the neighboring islands of Hawaii, Kauai, and Maui would suffer more because a higher proportion of their work force is employed in sugar.

A leading Hawaiian bank study estimates an overall unemployment rate of 15 percent, a 10-percent drop in Hawaii's general fund tax revenues, and a minimum 50-percent increase in State welfare costs to nearly $200 million per year, if the entire sugar industry were to close. The report concludes "* * * the closing of the sugar industry would be devastating to the State's economy and would result in the almost complete collapse of the neighbor island economies."

Even under favorable assumptions about the industry's future, Hawaii State planning officials expect employment to decline due to continued mechanization. Under less favorable assumptions (urban land use pressures and loss of markets to high fructose corn syrup), industry employment could drop as much as 56 percent between 1975 and 1990, although this would likely be moderated somewhat by accelerated development of aquaculture and diversified agriculture.

No viable alternative crop to sugarcane

There are no viable alternative crops which could replace the sugar industry in Hawaii. While diversified agriculture has grown, even under the most favorable assumptions, Hawaii State planning officials do not expect it to match sugar sales or acreage. Total self-sufficiency in vegetables and fruits which can be grown in Hawaii (regardless of cost) would occupy only an additional 3,500 acres. In 1977 sugar occupied 220.7 thousand acres, or 74.2 percent, of Hawaii's cultivated cropland; pineapple occupied 47.0 thousand acres, or 15.8 percent; and diversified agriculture (principally vegetables, fruits, coffee, and macadamia nuts) occupied 29.6 thousand acres, or about 10 percent, of cropland.

Diversification, however, faces serious obstacles in Hawaii, including a small market which cannot support large-scale operations; competition from overseas producers with lower production costs; and high costs in supplying overseas markets due to transportation costs and high labor, land, and material costs. Moreover, the tropical agricultural technology developed in Hawaii could well be applied in overseas areas having lower production costs as has happened in macadamia nuts and pineapples.

Plantations that closed in the past have dismal records of finding a replacement for sugar growing. State and county

officials have remained firm about keeping the land in agriculture--preventing highly demanded urban or resort areas from growing. Various enterprises, such as feed grain operations, small farms, a plastic firm, and a hay growing enterprise have either gone bankrupt or are barely surviving. Cattle ranching is too unprofitable and pineapple farming is too marginal to expand acreage, so the abandoned sugar lands are mostly lying idle.

Aquaculture may be an ideal use of former sugarcane land that is now unused or underutilized. Under the State plan, however, only 12,000 to 48,000 acres are expected for aquaculture land utilization by 1990.

Another option is to find alternative uses for sugarcane rather than for the land. Cane can be used to produce alcohol for fuel. The world's energy situation makes it logical to develop cane as an alternative energy source. Market and economic considerations, however, limit the full use of cane byproducts for the present time. According to one study, it would take a petroleum cost of $26 per barrel to make sugar production for energy economical.

PRODUCTION ECONOMICS

Based on industry data, average production costs for Hawaii were 12.55 cents per pound in 1977 and 13.16 cents per pound in 1978. This may be an understatement of cost if imputed land values, inadequate depreciation allowances, and other factors are included. Major factors in cost increases have been labor, energy, and materials costs. Labor, although it has not increased as rapidly as energy and materials costs, accounts for about 47 percent of total cost.

Industry officials expect 1979 costs to increase even more due to negotiation of a new labor contract and to continued increases in other categories--especially energy and capital equipment costs. Depreciation has been inadequate to cover equipment replacement costs and an estimated $55 million in capital investment in the 1973-77 period has been to satisfy Environmental Protection Agency (EPA) requirements. EPA-related investments have been for construction and equipment to meet water and air quality control standards. Industry officials noted that these investments have accelerated the trend to consolidate raw sugar mills.

USDA has estimated that 1977 Hawaiian production costs are equal to 13.732 cents per pound of raw sugar and 1978 production costs are equal to 14.584 cents per pound of raw sugar. This represents an indexed projection based on

accounting data from financial records of Hawaiian producers and processors during field surveys by the Agricultural Stabilization and Conservation Service in 1969.

Cost data supplied to us by the Hawaiian industry does not include certain items included in the USDA estimate for 1978, particularly imputed land values for directly owned land. The 1977 USDA estimate does not include imputed land values but does contain land rent. Adding an estimate for such imputed land costs and for capital investments not covered by depreciation to 1978 industry data would yield a production cost of 14.3 cents per pound, much closer to but still below the USDA estimate.

INDUSTRY CONDITION

In 1974 and 1975, when prices were at historically high levels, the Hawaiian sugar industry realized sizable profits. Since then prices have fallen markedly. The 1977 crop would have resulted in losses except for the Federal direct support payments. Following are extracts from major Hawaiian sugar firms' annual reports.

1976 and 1977

--The deliberate shift away from almost total reliance on sugar was key to a net income of $19,139,000.

--A loss of $9,624,000 from the sugar subsidiaries--(1976).

--At yearend, prices were below production costs of most domestic producers.

--In addition to the devastating price decline, some crop loss occurred because of drought; however, a modest profit was realized.

--Price support payments contributed about $6,300,000 to 1977 net income, or 32 percent of the total.

Table 4-4 below presents the Hawaiian industry's profits and losses for the period 1972-77 based on industry-supplied cost data and USDA-reported data on the production value.

Table 4-4

Hawaiian Sugar Industry

Profits (Losses) 1972-77

Year	Net cost of raw sugar production	Production value	Profit (loss)	Government payments	Profit (loss)	Profit (loss)
	(millions)					(cents per pound)
1972	$172.3	$176.6	$ 4.3	$ 9.7	$ 14.0	0.6
1973	170.5	203.8	33.3	9.5	42.8	1.9
1974	239.4	659.2	419.8	8.6	428.4	20.6
1975	271.2	354.6	83.4	0	83.4	3.8
1976	263.6	245.5	(18.1)	0	(18.1)	(0.9)
1977	259.5	219.1	(40.4)	48.7	8.3	0.4

As seen above, on the average the industry made a slight profit as a result of Government payments, but it would have sustained a $40 million loss in 1977 without the payments.

Total Government payments for the direct support program in the Hawaiian industry amount to about $56 million on the 1977 crop; however, only 90 percent of that has been paid to the industry. The final 10 percent will be paid upon receiving final weights and polarizations from all participating firms.

Hawaii's small independent growers less able to withstand depressed prices

There is concern that Hawaii's small independent producers are less able than the major firms to ride out depressed price periods. About 500 small independent growers exist on the island of Hawaii; they account for only 5 percent of Hawaii's production. Most independents grow sugar as a part-time venture and work for the sugar companies as their main employment. Some are reducing sugarcane acreage or leaving sugarcane production. Hawaii appropriated $1.5 million in 1977 and $750,000 in 1978 for low interest loans to independent growers to (1) help pay off commercial loans covering the 1977 crop, (2) lend up to 20 percent over commercial loan amounts for the 1978 crop, and (3) help cover 1977 losses.

Hawaiian industry considered one of the most technologically advanced

The Hawaiian sugar industry is considered one of the more technologically advanced in the world. Its economies of scale and high yields have enabled it to maintain its competitive position despite the distance to markets and high labor, land, and materials costs.

Sugarcane in Hawaii, at the time of harvest, is an average of 24 months old so that about one-half of the acreage is harvested in any 1 year. Hawaii's climate and year-round growing season have allowed for very high yields. Industry representatives have said that improving yields through technical development and increasing economies of scale by combining plantations and mills have largely been realized and that further advances will be achieved slowly and at high cost.

Mechanizing the industry has proceeded to the point where virtually no hand labor is used in planting or harvesting sugarcane. Canefields are burned just before harvesting. Rather than cutting, the tractor pushrake is the most common harvesting method--one which requires extensive cleaning of the cane at the mills due to the high content of field trash, dirt, and rocks. From two to four ratoon crops are obtained before replanting.

CONCLUSION

Sugar is critical to Hawaii's economy. Without it, unemployment would rise to higher levels, particularly on the islands of Hawaii, Kauai, and Maui. Viable alternative crops have not yet been found which could replace sugar. Plantations that have closed in the past have dismal records of finding a replacement for sugar growing. Without Federal support payments, Hawaiian producers would reportedly have lost more than $40 million in 1977.

CHAPTER 5

CORN SWEETENERS

A new sweetener which is a substitute for sugar--high fructose corn syrup--first appeared commercially in 1967 and its use has grown rapidly. HFCS sells for less than sugar to provide an incentive to sugar users to substitute the new sweetener. Industry representatives believe that, due to low sugar prices and corn sweetener industry overcapacity, no HFCS manufacturer profited in 1978. The impact of this sweetener's increasing consumption should be considered when the Congress develops a U.S. sweetener policy.

THE WET-MILLING PROCESS

Corn sweeteners are produced from starch which is derived from corn through the wet-milling process. Figure 5-1 on page 42 is a simplified illustration of this process. Wet-milling basically involves breaking the corn kernel down into its component parts. As figure 5-1 indicates, the process uses each component, efficiently yielding many products.

The ultimate yield is almost equally distributed between feed products, starch products, and sweeteners. Among the feed products produced are corn gluten feed, corn gluten meal, and corn germ meal. Starch products include malto-dextrins, food starch, and industrial starch. The primary sweeteners produced from starch are conventional corn syrup, HFCS, and dextrose.

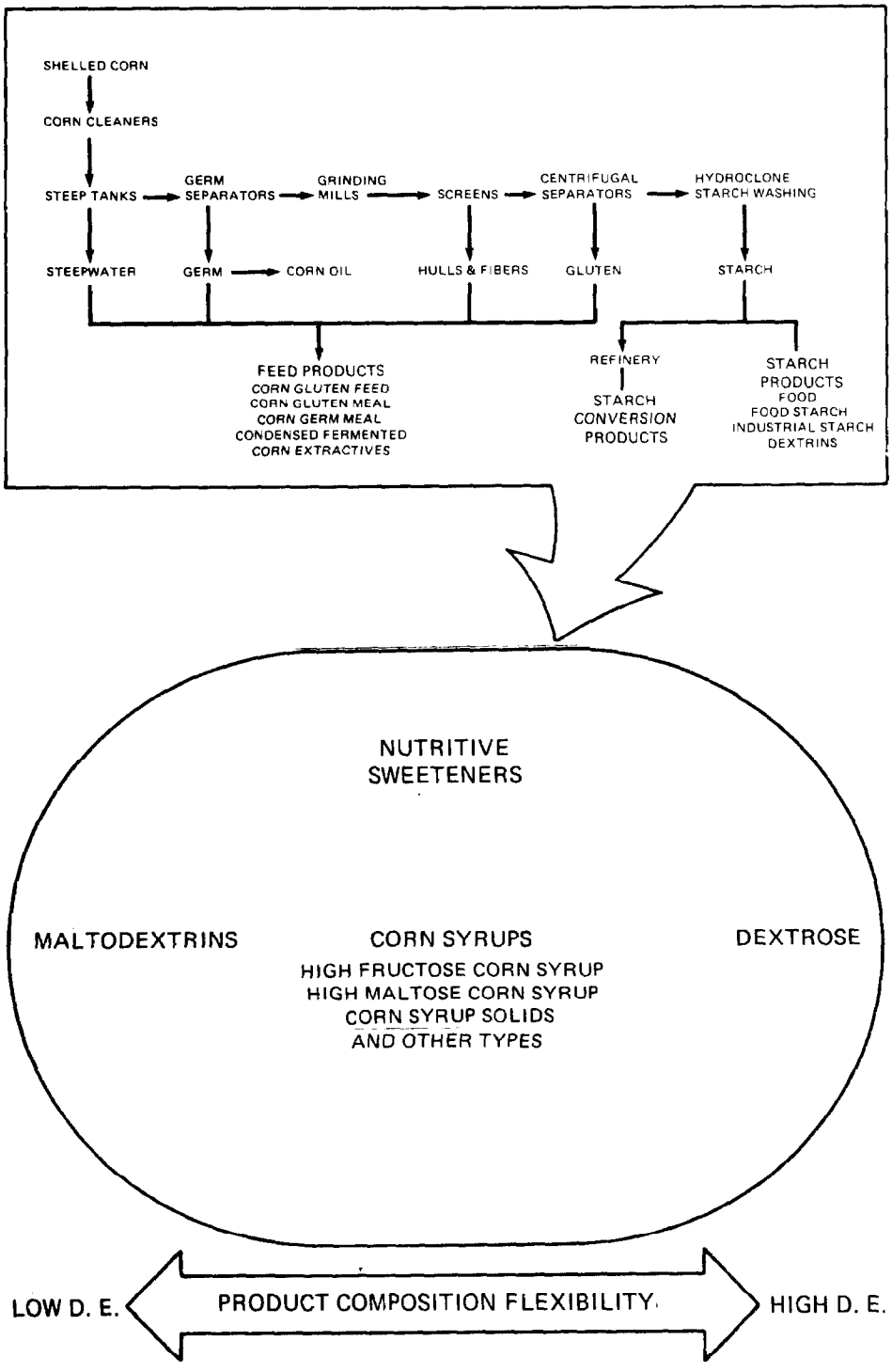
The corn-refining industry is the third largest user of the U.S. corn crop. The industry, however, consumes a relatively small portion, roughly 9 percent for 1974-77, of the total annual U.S. corn crop. Due to increased corn syrup, corn starch, and HFCS production, the quantity of corn used by the wet-milling industry increased from 155 million bushels in 1960 to 380 million in 1977.

TYPES OF CORN SWEETENERS

Conventional corn syrup

Corn syrup is produced in both solid and liquid forms, and various types are available. The types are differentiated by their dextrose equivalent (d.e.), which is a measure of the percentage of sugars the product contains. Low d.e. corn syrups are used, for example, in coffee whiteners; middle d.e. products may be used in dog food, brewing, and ice cream; and very high d.e. products are primarily used in baking. Conventional corn syrup is used to a far greater extent worldwide than HFCS.

FIGURE 5–1
CORN WET-MILLING PROCESS



SOURCE: CORN REFINERS ASSOCIATION, INC.

Dextrose

Unlike corn syrup, dextrose is 100 percent sugar (though it is less sweet than ordinary sugar, sucrose) and is available in dry form only. While the market for this sweetener is relatively small compared to corn syrups, it is an extremely versatile sweetener and has various uses. Its most important uses, especially regarding future growth, are as the prime fermenting agent in light beer and dry mix products such as beverages, and nonfood uses, especially in the chemical and pharmaceutical industries. For example, dextrose is used in intravenous feeding solutions.

HFCS

HFCS is the only corn sweetener whose sweetness compares favorably with sugar's. Therefore, it is competitive with sugar and has in fact replaced it in many uses. The Secretary of Agriculture predicted in late 1978 that corn sweeteners may account for 40 percent of the U.S. sweetener market within 20 years. A more detailed discussion of HFCS follows.

HFCS, A SUGAR SUBSTITUTE, GROWS RAPIDLY

In the late 1960s, Japanese scientists developed a production process known as glucose isomerization by which dextrose (glucose) could be converted into fructose. The product obtained, known in the United States as high fructose corn syrup, was sweeter than conventional corn sweeteners.

The first commercially manufactured HFCS became available in the United States on a limited basis in 1967. 1/ Since 1972, HFCS consumption in the United States has increased steadily and was boosted considerably by the extraordinarily high 1974 and 1975 sugar prices. HFCS consumption nearly doubled between 1974 and 1975, increasing from 598,000 pounds to 1.1 million pounds, and has continued to increase dramatically in subsequent years. Per capita HFCS consumption in the United States has increased from about 1 pound in 1972 to an estimated 11 pounds in 1978.

The so-called first-generation HFCS is composed of 42 percent fructose and 50 percent dextrose and other sugars and has a sweetness of approximately 90, relative to sucrose at 100. The product's fructose content can vary, as additional steps in the production process can yield syrups with higher fructose levels. Second- and third-generation products, containing roughly 55 percent and 90 percent fructose, respectively, have been developed and are now commercially

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1/Production data, however, did not become available until 1972.

available. The sweetness of 55 percent HFCS is said to be approximately 100 (sugar's equivalent); for 90 percent HFCS estimates range from 130 to 150, again with 100 sugar's equivalent.

HFCS as a substitute for sugar

HFCS's ability to compete with sugar is somewhat limited because it is available only in liquid form. 1/ It thus competes with sugar only in the industrial market, which comprises about two-thirds of the total sweetener market, 2/ and only when the final product does not depend on sugar's crystalline structure. Another limitation of HFCS is that it must be stored at 80 to 100 degrees Fahrenheit, thus making sugar, including liquid sugar, somewhat easier to handle.

Despite these limitations, HFCS's sweetness makes it a viable sugar substitute in many industrial applications. The product's greatest attraction for many users is its price, since HFCS is sold at a discount relative to sugar. In many other respects, however, HFCS's properties are said to be equal or superior to sugar's: high fermentability, high humectancy (moisture retaining ability), low viscosity, reduced tendency to crystallize, and "clean taste" (the more similar a sweetener's taste is to sugar, without bitter aftertaste, the "cleaner" it tastes). Thus, HFCS is said to be capable of replacing sugar, either totally or partially, in many industrial applications. The food industries in which HFCS's potential substitutability is substantial include:

1. Beverages. HFCS is used in many soft drink formulas combined with sucrose-based products, and in some cases may be the sole sweetener. Beverages are said to be the largest potential market for HFCS, and it is estimated that it could replace up to 50 percent of the almost

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1/The technology needed to crystallize HFCS is available today, but the process is extremely costly. Thus, crystalline HFCS is manufactured only in small quantities for use in unique and very expensive applications. A price-competitive crystalline form may become available in the next decade, though current low sugar prices provide little incentive for manufacturers to invest in the necessary research and development.

2/In 1977, U.S. sugar deliveries totaled 10,351,000 tons. Of this total, 6,646,000 tons went to industrial users.

2.5 million tons of sugar the industry uses annually. Sugar's largest use is in beverages, which accounted for almost one-quarter of 1977 U.S. sugar deliveries. In addition, estimates show that with the newer, second-generation, 55-percent fructose product, replacement levels up to 100 percent are possible in many, if not all, formulas.

2. Bakery and cereal products. Many bakeries have already begun totally replacing sucrose with HFCS in yeast-raised goods such as bread, and estimates show that HFCS can replace up to 25 percent of sugar in cakes and other non-yeast-raised goods. This industry currently uses approximately 1.4 million tons of sugar per year.

3. Dairy products and ice cream. Due to its molecular structure, HFCS lowers ice cream's freezing point, making storage and handling more difficult. Despite this, the corn industry claims that up to 50 percent of the more than 550,000 tons of annual sugar used in dairy products can be replaced by HFCS.

4. Canned foods, jams, and preserves. It is estimated that anywhere from 50 percent to 100 percent of sugar is replaceable in this application, which uses 950,000 tons of sugar annually.

THE ECONOMICS OF CORN SWEETENERS

Most HFCS producers have consistently resisted Government efforts to obtain production cost data for the corn sweetener industry. As a result, verifiable data does not exist. Estimates of the production cost vary widely, ranging from 6 cents a pound to over 14 cents a pound. Though we are unable to state with any certainty HFCS's production cost, we can at least isolate the key cost elements. These are capital cost; cost of corn; return from byproducts; and other costs, including enzyme costs, utilities, operating costs, and fixed costs.

THE INDUSTRY'S CAPACITY AND CONDITION

HFCS is, and will probably remain, primarily an American phenomenon; while it is manufactured in the European Community (EC) and Japan, it has failed to achieve the substantial market share that it has in the United States. The primary reason for this is that only the United States is both a net exporter of corn and importer of sugar. Both the EC and Japan are mostly dependent on imports for corn and, therefore, the incentive to develop such a substitute is not present.

Further, all major corn producers except the United States are also sugar exporters; again, the development incentive is lacking. In the EC, moreover, HFCS has been limited severely by legislative protection of the sugar industry. Little potential for HFCS exists in the developing countries because its usefulness is limited to industrial applications, most of which do not exist in these areas.

Recognizing HFCS as an American phenomenon, the balance of this chapter applies to HFCS in the United States.

Conventional corn syrups' use will expand, dextrose's may decline

Conventional corn syrups are currently produced by eight companies in the United States, with a combined production capacity of approximately 2.75 million tons. Product consumption is growing at an approximate 2- to 3-percent a year rate and is expected to reach 2.25 million tons in 1978. Supply and demand for the product are expected to balance in the early 1980s.

The three U.S. dextrose producers have an 800,000-ton total capacity, with consumption expected to reach 600,000 tons in 1978. It is felt that little potential for further expansion exists, due to relatively stable demand and the product's capital intensive nature. 1/ A dextrose and HFCS manufacturer told us that he actually expected dextrose consumption to decrease over the next decade, due to HFCS substitution. This is discussed further below.

HFCS overcapacity, some unavoidable, plagues industry

HFCS is currently produced in the United States by 10 companies, with another expected to become operative by the end of 1978. Estimates showed that by the end of 1978 the producers' combined finishing capacity would be approximately 2.65 million tons. This figure, however, may be somewhat misleading for several reasons. First, capacity estimates tend to assume ideal conditions under which HFCS plants function smoothly year round. We have been told that this is not the case. HFCS production is said to be a highly orchestrated process, vulnerable to slowdowns or shutdowns from various causes. According to one producer

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1/Dextrose is the industry's most capital intensive product, with plants costing more than $2 million per thousand bushels of daily grind capacity.

interviewed, these slowdowns occur rather frequently, thus decreasing real capacity. Second, most corn refiners are said to have more finishing capacity than grind capacity. Thus, according to an industry source, often finishing capacity cannot be fully utilized because an adequate supply of raw starch is unavailable.

HFCS shipments to industrial users in 1977 totaled around 1 million tons, and in 1978 demand for the product is expected to increase by 200,000 to 300,000 tons. The industry is currently experiencing significant overcapacity even with the caveats previously noted. This overcapacity is said to have resulted from overinvestment during the 1975-77 period, induced by the 1974-75 high sugar prices. Lack of information about the sugar market and the industry's failure to recognize the 1974-75 sugar price phenomenon's temporary nature are partial explanations for the overinvestment.

Various HFCS manufacturers revealed that some overcapacity is unavoidable. HFCS is a highly seasonal product, with most sales occurring between April and October. Since HFCS cannot be stored indefinitely, plant capacity must be sufficient to meet demand during peak periods. In the offseason, an overcapacity situation necessarily results. According to several people interviewed, producers never expect to operate at 100-percent capacity year round. Thus, for example, a producer might have to build a plant with an annual capacity of 9 billion pounds to meet an average demand for 7 billion pounds of HFCS. Still, this does not account for all the overcapacity within the industry. While it is difficult to determine how much overcapacity is needed and expected, we do know that the unneeded overcapacity is substantial enough to create serious profitability problems for manufacturers at this time.

HFCS profitability

Our interviews with HFCS producers revealed a unanimous belief that at 1978 sugar and corn prices, no manufacturer is able to produce HFCS at a profit. HFCS's current unprofitability results from a cost-price squeeze created by industry overcapacity, which increases unit costs, as large fixed-cost investments must be spread over less production and low sugar prices.

Sugar prices affect the profitability of HFCS in several ways. First, low sugar prices provide little incentive for potential users to convert to HFCS. Conversion to HFCS

invariably requires extensive testing, lasting from 6 months to over 1 year. It also requires reformulating the final product's recipe to account for HFCS's different sweetness and solids content. The need for new equipment varies from user to user, depending on whether liquid or dry sugar was previously used (if dry sugar was used, storage tanks must be installed). In short, conversion to HFCS is a time consuming and, in some cases, very costly process. Without the incentive of high sugar prices to increase substitution, HFCS's market is inhibited.

Second, HFCS prices are keyed to sugar prices. In an effort to increase HFCS's market share and keep it competitive with the sugar industry, manufacturers have traditionally sold HFCS at a discount relative to sugar. The discount varies from region to region. For one manufacturer, the discount for the 45-percent product ranged from almost 20 percent in the West to slightly more than 30 percent in the Midwest in mid-1978. Because the production cost for 55 percent HFCS is significantly higher than for 42 percent, it is priced somewhere between sugar and 42 percent HFCS. Obviously, as sugar prices, and consequently HFCS prices, decline, so do profit margins when production cost remains constant. Though HFCS cannot be produced profitably at 1978 sugar prices, manufacturers told us that it is cheaper to continue producing and selling the product, and thereby cover at least out-of-pocket (variable) costs, than it is to shut down completely.

Industry efficiency

The HFCS industry's competitive nature requires that manufacturers have the potential to operate efficiently. Efficient operation is said to be impossible at this time due to the overcapacity situation. Newer plants are said to be at an advantage, as they are more energy efficient and less labor-intensive than older plants. Newer plants are at a disadvantage, however, in terms of cost, due to higher capital investment and higher interest rates and depreciation.

Future outlook

Industry analysts generally agree that nutritive sweeteners' annual per capita consumption will continue to increase in the near future, and that all or nearly all the projected increase will come from corn sweeteners. One study estimated that nutritive sweeteners' per capita consumption will increase from approximately 129 pounds in 1977 to 138 pounds in 1985. The same study projected a decrease in per capita sugar consumption from 96 pounds in 1977 to 88 pounds in 1985, a result of increased HFCS substitution.

At the aggregate level, most estimates place HFCS growth at around 200,000 to 300,000 tons a year for the next few years. At this rate, HFCS consumption would approach 3 million tons in the early 1980s. USDA, in 1978, estimated that the 3-million-ton figure could be reached as early as 1980, but as of early 1979 USDA revised its estimate to 1.7 million to 2.0 million tons, reflecting low sugar prices and technological problems.

The HFCS manufacturers interviewed revealed some disagreement within the industry over the total potential market for HFCS. One manufacturer has estimated that, from the technical standpoint, total potential HFCS consumption could be approximately 4 million tons a year. This figure assumes that HFCS will be substituted for sugar in every application where it is technically feasible to do so. Realistically, the manufacturer did not believe that all this substitution would ever occur. Another manufacturer was more optimistic, estimating that HFCS can ultimately displace one-half the total sugar market, or approximately 5.5 million tons a year.

USDA notes that this projected growth may not totally materialize. Industry observers have stated that the 42-percent product, for which demand was originally expected to total 1.5 million to 2.0 million tons annually, may have exhausted its market potential with sales of around 1.0 million tons. Observers believe that this indicates that the market for higher fructose products may also be smaller than anticipated. The manufacturers we interviewed do not concur with this suggestion. None felt that the market for 42 percent HFCS is saturated, though there was general agreement that much of HFCS's future growth will come from the 55-percent product.

Not all of HFCS's consumption growth will occur at sugar's expense. Depending on such factors as sweetener cost as a percentage of total product cost, user location, and quality requirements, HFCS will sometimes also be substituted for other corn sweeteners. A study performed in June 1976 by a World Bank staffer indicated that HFCS had already been substituted for approximately 9.5 percent of the other corn sweeteners. Estimates show that HFCS could substitute for an additional 19 percent, or roughly 0.7 million tons, of corn syrup and dextrose currently in use. Table 5-1 shows one source's estimates of total potential HFCS substitution for sugar and other corn sweeteners.

Table 5-1

Forecast of Sugar and HFCS Demand in the United States, 1980 and 1985

(1 million short tons)

	1980	1985
Sugar consumption without competition from HFCS	13.1	14.0
HFCS substitution for sugar	2.2	3.5
Total consumption of other corn sweeteners	2.7	3.0
HFCS substitution for other corn sweeteners	0.7	0.8
Total demand potential, HFCS (note a)	2.9	4.3
Total demand potential, sugar (note b)	10.9	10.5

Source: E. M. Brook, International Bank for Reconstruction and Development.

a/This is the sum of the HFCS substitution for sugar column and the HFCS substitution for other corn sweeteners column.

b/This is the difference between the sugar consumption without competition from HFCS column and the HFCS substitution for sugar column.

CONCLUSION

While HFCS's potential is not unlimited, consumption can be expected to maintain a significant growth rate over the next few years. Consequently, HFCS will become an increasingly important factor in the U.S. and world sweetener market. The product's actual growth rate will be closely related to sugar price trends, as rising sugar prices will induce more potential users to seek less expensive sugar substitutes, consequently expanding HFCS sales. The Congress should consider the impact of HFCS's increasing consumption on the U.S. sugar industry in its future deliberations on a U.S. sweetener policy. If informed decisions are to be made on a sweetener policy, however, HFCS production cost data, which the industry has refused to make available, is needed.

CHAPTER 6

THE SUGAR INDUSTRY IN OTHER COUNTRIES

Sugar production and marketing is regulated by more governments and to a greater degree than any other commodity.

In 1977, of the 136 countries for which sugar statistics were available, all but 29 produced some sugar within their borders, although not all were self-sufficient. Many countries have encouraged domestic production but still depend on imports to varying degrees. In 1977, there were 93 net importing and 43 net exporting countries.

In producing countries, governmental directions pertain to the production level, prices to be paid for the beets or cane, factory and field workers' wages, and often to prices at various stages of distributing the finished product. Export taxes are no longer common; but in years of high world market prices, some exporting countries' governments, or their designated special sugar agencies, have set aside part of the profits to finance expansion and modernization schemes or to establish funds to be used in lean years.

In importing countries, imports are regulated in various ways to (1) prevent upsetting the domestic industries' economic structure (2) derive revenue, or (3) keep consumption down. In many countries sugar is still considered a luxury, whose consumption is to be restricted to save foreign exchange.

Governmental fiscal production and distribution regulations are numerous and complex. In some countries, for example, import duties are at various rates depending on origin, but export drawbacks (i.e., exporting a product previously imported) are given at the highest duty level, thus providing a subsidy to refining for export. Differences in regulations concerning degree of polarization (a measure of the sugar's purity) between exports and imports is another form of indirect subsidization.

If governmental regulations did not control the national sugar economies, the world price would set the domestic price pattern, at least in countries which largely depend on imports for their supplies; in fact, in very few countries do consumer prices fairly reflect the world market price.

Governmental influence can take forms other than those described in laws and administrative regulation. Thus, while few countries have legislation prohibiting imports, unwritten practices are often applied which are as effective as if such

prohibitions had been spelled out in the law. One common practice is to place sugar under general license and simply not take action on import applications if and when submitted. This technique, which used to be practiced by some European countries, is known as prohibition by misfiling.

In some countries, governmental agencies are responsible for administering the regulations; in many countries, day-to-day administration is entrusted to special boards, commissions, or parastatal organizations; in some countries the chosen instrument is sometimes a private corporation with close and direct governmental relations.

United States largest sugar importer

The United States is the world's largest sugar importer. Approximately 45 percent of U.S. consumed sugar comes from foreign sources--in 1977, a record high 6.1 million tons. We visited four of the U.S. major sugar trading partners--Australia, Brazil, the Dominican Republic, and the Philippines. The sugar industry in each of these countries was examined to assess the government's role, U.S. importance as a sugar trading partner, how the International Sugar Agreement is perceived, and the production profile.

Sugar is a dominant industry in each of the four countries visited. All four produce sugarcane and as a group account for a significant proportion of export in free world trade. In 1977, the United States imported 1.4 million tons from the Philippines, 975,000 tons from the Dominican Republic, 660,000 tons from Brazil and 494,000 tons from Australia. In total they accounted for 58 percent of U.S. imports in 1977.

SUGAR MARKETING AND THE ROLE OF GOVERNMENT

In each country we visited the Government played a key role in the sugar industry. Each country controlled the amount of sugar grown; set the domestic sugar wholesale and/or retail price; Brazil and the Philippines purchased all sugar for export from their domestic producers; governmental bodies in the Philippines and Australia owned all sugar produced in the country; and in one country--the Dominican Republic--the Government owned the mills producing a majority of the sugar. Consequently, the sugar industry in each country does not operate in a competitive environment. Table 6-1 contrasts each Government's role in certain sugar activities with similar information for the United States.

Table 6-1

The Role of Selected Governments in the Sugar Industry

Country	Production level	Sugar ownership	Industry ownership	Domestic sugar prices	Exports
Australia	Controlled by Government Board	Queensland Government acquires all raw sugar produced	Privately held	Government sets wholesale price	Government contracts sole export rights to a private company
Brazil	Controlled by Government Agency	Government body purchases all sugar for export; domestic sugar privately held	Privately held	Government sets retail price	Government sole exporter
Dominican Republic	Set by Presidential decree	Export sugar privately held, Government body purchases all sugar for domestic consumption	Government owns the mills producing 60 percent of the country's sugar	Government sets wholesale price	Private parties arrange sales, but the Government evaluates and approves all bids and contracts and monitors shipments
Philippines	Government introducing quota control system	Government sole purchasing and marketing agent	Privately held	Government sets maximum wholesale and retail price	Government sole exporter
United States	Individual farmers and processors decide	Privately held	Privately held	Set by market forces	Negligible

A description of the four governments' role in their respective sugar industries follows.

Australia

The relationship between the Commonwealth (Australian Government) and the sugar industry has been described as one in which the government has enacted legislation enabling the sugar industry to run itself. Under an agreement with the Queensland State Government (Queensland grows 95 percent of Australia's sugar), the Commonwealth places an embargo on all sugar imports and the Queensland government regulates sugar production, acquires all raw sugar produced in Queensland, purchases all raw sugar from New South Wales (which grows the remaining 5 percent), and guarantees the delivery of refined sugar for the domestic market at specified wholesale prices. The Queensland government controls production through the Central Sugar Cane Prices Board and controls marketing through the Sugar Board.

The Central Sugar Cane Prices Board has five members. Essentially the Board's function is to deal with all areas involving growers and millers.

The Sugar Board consists of four members; two full-time members appointed by the Queensland government and two part-time members representing the cane growers and mill owners. Simply stated, the Board's function is to dispose of all raw sugar. Production and marketing controls these two boards exercise reflect the emphasis on stability by developing assured markets at predictable prices and controlling production in relation to demand.

Production is controlled by the Central Sugar Cane Prices Board through "assignment" and "peak" systems. The assignment system limits the authorized area in which cane can be grown. The peak (quota) system is a more detailed production control that is superimposed on the assignment system and limits the amount of raw sugar that individual mills and individual growers may produce. The assigned acreage is reviewed periodically in relation to production and market trends to determine if expansion is justified. The last expansion was in 1975 in response to the long term contract signed with Japan. Currently, no future expansion is being considered. The peaks are reviewed every year and adjusted for market demand. The peaks have come to be regarded as an amount which is virtually guaranteed for the present and the future.

The Queensland government, as owner of all sugar produced, contracts with CSR, Ltd., and Millaquin Sugar Company to refine and distribute sugar for the domestic

market. CSR also has a contract to annually finance the sugar crop and is the sole exporter.

The Commonwealth/Queensland agreement sets Australia's refined sugar wholesale price. The maximum level was 13.8 cents per pound as of May 1978. The government does not fix refined sugar's retail price. Normal competition has kept the retail price in Australia one of the lowest in the world.

Historically, Australia has had a stable market by belonging to the British Commonwealth Sugar Agreement and being a quota recipient under the U.S. Sugar Act. This market stability was lost in 1974 when the United Kingdom joined the European Economic Community and the U.S. Sugar Act expired. To replace this loss, Australia developed long term export contracts with certain customers. These contracts as negotiated in 1974 were:

Country	Minimum tonnage	Inclusive years
	(millions)	
Japan	3.00	1975-79
Republic of Korea	1.00	1975-79
Malaysia	1.65	1975-80
Singapore	.49	1975-80
New Zealand	.32	1975-78

The domestic market and the long term contracts assure Australia a stable market over the next 4 or 5 years for about 2 million metric tons of sugar per year, which is about two-thirds of industry productive capacity. The remaining raw sugar was expected to be sold at ruling world prices on the free market. Several of these contracts have been renegotiated, with a general decline in the tonnages covered.

Brazil

The Government's presence is quite marked in the Brazilian sugar industry. The Sugar and Alcohol Institute (IAA), a semiautonomous governmental agency, is charged with implementing and executing the Government's policy to control sugar production and exportation. Effective June 1, 1978, the Government of Brazil set the production and export quotas.

IAA prepares a crop plan for each year--based on world market trends, international stock levels, changes in domestic consumption, and local stock levels--which establishes the total sugar output for that year. Once fixed, the planned crop level is distributed regionally and,

ultimately, individually to each sugar mill. The quotas for each mill are adjusted quarterly during the crop year to account for market changes and average industrial yield. If a given mill falls short of its quota another mill may exceed its quota to maintain regional balance.

IAA recommends sugarcane and raw and refined sugar prices; these prices are set by the National Monetary Council, in accordance with certain standard values determined for each producing region. The retail price is set by the Interministerial Price Commission. The prices may be adjusted during the harvest and processing period to reflect changes in production cost. For the 1976-77 crop year the price of raw sugar, free on board mill, ranged from 8.4 to 9.3 cents per pound depending on the producing region.

Although the sugar supply for the national market is set by IAA, marketing and distributing this sugar is left to the individual mills or agencies they may designate. Despite IAA's control, the sugar industry itself is privately owned. Nearly all the mills are corporately held, although a few are owned by individuals or partnerships. Lands are also privately owned, with control more or less equally divided among the mills and the independent growers.

IAA has dictated that 60 percent of the cane processed by sugar mills be purchased from independent growers with the mills supplying 40 percent from their fields. If sufficient cane is not available from the independent suppliers, however, the ratio may be waived.

Only IAA may sell sugar for export; it purchases the export sugar as it is produced and stores it (at terminals it owns and operates at Recife and Maceio) for later shipment. Determining IAA acquisition price is unrelated to the prevailing price of sugar sold on the international market. When international prices are higher than IAA's price, the profits are allocated to a Special Export Fund.

Export sales are made on bids from Brazilian firms which usually act for foreign buyers. Prices float freely (unless there is an export agreement) according to supply and demand. Upon accepting a bid, IAA releases the sugar and makes it available for export. According to the Brazilian subsidiary of the Chase Manhattan Bank, during the fourth quarter of 1977, IAA was losing about $100 for every ton of sugar exported at the 8 cents per pound world price.

IAA is responsible for modernizing and expanding both the industrial and the agricultural phases of the industry. Industrial modernization and expansion is accomplished through loans and other financial assistance, planning, technical assistance, and other means of enhancing efficiency and productivity. This effort is financed from IAA's Special Export Fund.

The fund also finances agricultural improvements through a research and extension program (National Program for the Improvement of Sugar Cane). The national program continuously researches sugarcane cultivation, through regional and state offices and laboratories, and recommends to growers methods for improving productivity.

The Special Export Fund benefited greatly from the 1974 high world prices, as evidenced by the more than $1 billion from the fund which was invested in the sugar industry during 1975. Since then, however, the fund's financial activity has been relatively low, so much so that the Brazilian Government had to provide some financial assistance through loans to the fund.

The Dominican Republic

The Dominican Republic's sugar industry encompasses three producers and 16 sugar mills. The producers include:

--State Sugar Council. The council is a publicly owned corporation which operates 12 sugar mills and produces about 60 percent of the country's sugar. In the early 1950s the Government (under General Rafael Trujillo) organized a company to purchase, construct, and operate sugar mills. After Trujillo's death, the Government company became the State Sugar Council and was charged with owning and operating the mills for the benefit of the people.

--Gulf and Western Americas Corporation. This division of Gulf and Western Industries, Inc., operates one sugar mill (considered to be the world's largest) and accounts for about 30 percent of total sugar produced.

--Vicini Group. Vicini, a family-owned operation, operates three mills (they are among the country's smaller mills) and produces about 10 percent of the Dominican Republic's sugar.

The Dominican Sugar Institute (INAZUCAR), supervises the sugar industry. INAZUCAR is composed of Government,

producer, and labor representatives. It exercises the Government's regulatory and control powers over the industry, including the 12 council-operated mills.

Each year INAZUCAR considers the three producers' productive and processing capacities and recommends a production plan, which includes domestic consumption, export, and stocks levels, to the President of the Republic. The President then issues a decree establishing the coming year's goals. Market shares--percentage of total production and sugar destined for domestic consumption, export, and stock--have evolved historically and are approximately 60 percent for the State Sugar Council, 30 percent for the Gulf and Western Corporation, and 10 percent for Vicini.

In November 1974, the Government's Price Stabilization Institute (INESPRE) was placed in charge of distributing, between the mills and wholesalers, sugar for domestic consumption. The three producers must sell domestic consumption sugar to INESPRE at the set price--about 6 cents and 8 cents per pound for raw and refined sugar, respectively. INESPRE, in turn, sells the sugar to the wholesalers at prices of about 12 and 14 cents, respectively. Ultimately the price to consumers is 14 cents per pound for raw sugar and 17 cents per pound for refined sugar. These prices were in effect in June 1978. Ninety-five percent of the difference between INESPRE's purchase price to the producers and its sales prices to the wholesalers is transferred to the national electric company to subsidize imported fuel costs.

According to various officials, the price INESPRE pays the producers is below the production cost. Since these "losses" are not being recouped by the producers in the export market, producers have expressed their concern to INESPRE, which was considering alternatives to the subsidy in mid-1978.

INAZUCAR officials informed us that although they do not get directly involved in the export market--the producers locate markets and negotiate with importers--they do evaluate and approve all bids and contracts and monitor shipments. If an importer approaches INAZUCAR concerning a sale, it is authorized to approve the sale and allocate the transaction among the producers using the historical ratio 60:30:10.

The Philippines

Since February 1974, the Philippine Government has been the sole purchasing and marketing agent for sugar. At that time legislation establishing the Philippine Sugar Commission (Philsucom) was enacted. Effective control was established

in November 1974 by designating the Philippine Exchange Co., a subsidiary of the Government-owned Philippine National Bank, as the sole buyer-seller of sugar. The exchange company and national bank functioned in an interim capacity until Philsucom assumed all responsibilities on July 11, 1977. As of June 1978, Philsucom was the only agency authorized to trade sugar in both the domestic and export market. At the time of our visit, in June 1978, the Government was also introducing a production quota control system to (1) rationalize the industry, (2) assure adequate domestic supplies, and (3) meet its obligations under the International Sugar Agreement.

The Philippine Government establishes the price at which it will purchase sugar. The June 1978 price was 8.7 cents per pound. The sugar is then allocated to the domestic and export markets.

Most domestic sugar is allocated to local traders who make arrangements for refining. Philsucom sells the refined sugar to wholesalers who in turn sell to retailers. As of June 1978, the Philippine Government set the maximum price to retailers at 13.6 cents a pound and the maximum price to consumers at 14.1 cents a pound. These prices were in effect in June 1978.

Philsucom sells raw sugar for export by selling direct to importing countries or to a broker or a buyer through an agent on a fee basis. Philsucom does not favor long term contracts, which it considers too inflexible, but has entered into several participatory contracts. A participatory contract is a marketing method under which an exporting country agrees to supply a specified quantity of raw sugar to a refinery. The return to the importing country depends on the price at which the refined sugar is sold. The Philippines signed three 5-year contracts with U.S. refineries in 1975 totaling an annual shipment of 1.35 million metric tons as shown below:

Refinery	Metric tons per year
	(000 omitted)
Sucrest	650
Great Western	500
Imperial	200

The Great Western contract was canceled in 1977 due to administrative difficulties, but the other two contracts were still in effect in June 1978.

HOW THE UNITED STATES IS PERCEIVED AS A SUGAR TRADING PARTNER AND THE PERCEPTIONS OF ISA

We noted in our previously mentioned report "Review of U.S. Import Restrictions--Need to Define National Sugar Goals" that:

> "The events in 1974 leading to the demise of the quota system provided by the Sugar Act caused foreign sugar producers great uncertainty about future U.S. sugar policy objectives and needs. The Sugar Act historically provided an economic benefit to these countries and, until 1974, they made an effort to fill their quota to the assured U.S. market.
>
> "Government and industry officials from the Philippines, Brazil, the Dominican Republic, Mexico, Australia, and Thailand indicated that their industries' development plans were contingent on export earnings gained from such preferential sugar markets as the United States * * *. As a result of the market uncertainty created in 1974, many of these sugar producers have made and continue to seek long term bilateral and multilateral sugar-trading arrangements."

The United States importance as a sugar trading partner in 1978 varied considerably among the four countries we visited, ranging from the principal customer for the Dominican Republic to "just another customer" for Brazil. The role of the United States as a trading partner is discussed below and summarized in table 6-2.

The various countries are hopeful for ISA's success but believe U.S. participation is critical for success.

Table 6-2

The United States as a Sugar Trading Partner

Country	1977 exports to the United States (note a)	Percent of country's total sugar exports going to United States	Comments obtained in each country
	(000 tons)		
Australia	494	b/c/12	United States an important customer
Brazil	660	c/27	United States "just another market"
Dominican Republic	975	c/82	United States principal customer, looked to as "patron"
Philippines	1,443	b/c/50	United States significant, but sugar sales being diversified

a/Based on USDA data.

b/Based on 1976-77 exports, the latest data available at the time of May/June 1978 visit.

c/Based on host Government statistics.

Australia

The central feature of Australian sugar policy is maintaining assured markets at predictable prices to support an expanding yet controlled production level. To achieve this, Australia has entered into various long term supply contracts and actively supported the ISA. Australia has consistently shipped large quantities of sugar to the United States, even during the 1974-75 high world prices. The absence of a U.S. sweetener policy, however, has made export planning difficult.

Australia has always considered the United States, the world's largest free market importer, to be an important customer. Australia expanded exports to the United States

after the U.S. Sugar Act expired and country-by-country import quota limitations were consequently removed. Since the act's expiration, however, the U.S. sugar market has not been predictable. We were told that Australia has been unable to plan exports to the United States under these conditions.

Australia's basic export tonnage under ISA is below its recent mill peaks (total production quota). However, stock building requirements will allow for production to remain at stable levels for the next 1 to 2 years. Further expansion will depend on taking up other countries' production shortfalls and eventual increases in ISA quotas to reflect growth in the world market.

The industry does not expect to see any immediate price increase resulting from ISA. But if the major importing and exporting countries cooperate, the market should stabilize at higher prices in several years. Industry officials believe U.S. support, as the world's largest importer, is essential for ISA's success.

Brazil

According to Sugar and Alcohol Institute officials, the U.S. market was important when a price advantage existed under the now defunct Sugar Act, but due to the present low world market price and the U.S. import tariffs, the United States will be a less attractive market to Brazil. Brazil's important market is domestic and it is not dependent on sugar exports for significant amounts of foreign exchange.

According to U.S. officials, Brazil hopes to have the online capability to produce 10 million metric tons of sugar annually by 1980 primarily to satisfy increasing domestic consumption. Current annual production capacity is approximately 9 million metric tons. Although the United States was considered an important export market while the Sugar Act was in operation, it is now seen as "just another market" and, as such, has little impact on Brazil's sugar industry. It should be noted, however, that the United States accounted for more than one-fourth of Brazil's 1977 sugar exports.

Among the officials interviewed, there was unanimous agreement on ISA's potential for success. They believe success is predicated on the United States ratifying the agreement and EC compliance with the respective provisions.

The Brazilian Government views ISA as a way to balance supply and demand in 2 to 3 years. In the meantime, it believes that worldwide consumption should continue to increase, resulting in increasing prices. Brazilian officials

believed that either ISA will work or it will fail--there will be no middle ground.

Given IAA's virtually total control of the sugar industry, Brazil should have little problem (institutionally) in fulfilling its quota and stock commitments under ISA. Officials stated that although the quotas and stock allocations may hurt Brazil in the short term, due to the large supplies of sugar on hand, it is willing to make the sacrifice in hope of higher prices in the long term.

The Dominican Republic

Historically, the United States was the Dominican Republic's traditional market, and with the quotas under the U.S. Sugar Act the United States contributed significantly to the Republic's economic development. With the current protectionism Dominican officials perceived, however, U.S. policies are viewed as detrimental to the Republic. In 1977, as in previous years, the United States was the Republic's principal customer, taking about 82 percent of the sugar produced.

The sugar industry is the Dominican Republic's chief economic activity, and the United States is overwhelmingly its traditional and present sugar market. The Dominican Republic has no secondary export market since it has no historical market position with anyone but the United States. Consequently, U.S. policies have a significant impact on the Dominican Republic's economy and its ability to plan.

According to the Economic Counselor, Embassy/Santo Domingo, the Dominican Republic looks to the United States as its "patron;" consequently, anything the United States does regarding sugar is considered a "super critical and life and death issue" which creates much emotion and concern. Without alternative export markets, the situation is viewed by the Dominican Republic as the United States or nothing. Also, since unilateral U.S. actions are seen as further depressing world sugar prices, they will have secondary effects on the Dominican Republic sugar sales elsewhere. In effect, the Dominican Republic cannot escape being negatively affected.

The Dominican Republic's plans for its sugar industry seem to be directly related to the continued ability to export its product to the United States and to ISA's impact. If either or both of these turn up short (decreased exports and/or continued low world prices), the effects on the industry and to the economy could, in our opinion, be severe. This is a sharply different situation from

Australia and Brazil, where the United States is not as critical a customer.

According to INAZUCAR officials, the industry's primary goal is to maintain production and domestic consumption, while seeking export markets at prices which cover costs and produce a reasonable profit. To this end, a Government decree is in effect, forbidding additional (the limit is 650,000 acres) plantings of cane. Also, each producer has or is modernizing its industrial operations in an effort to improve efficiency and reduce production costs.

The country's dependence on the sugar industry as a provider and generator of employment is a major problem. Industry officials indicated that employment must be maintained, since reducing either employment or salaries would be politically and economically damaging. According to one producer representative, despite the modernization program, more employment opportunities have been created. Another producer stated that the Government has few viable options in terms of closing a sugar mill, reducing employment, or allowing the State Sugar Council to go bankrupt.

The Philippines

Special concessions for the entry of Philippine sugar into the United States were important in the industry's early expansion. The Philippine sugar industry has consistently exported a significant portion of its raw sugar to the United States. Beginning near the turn of the century until the U.S. Sugar Act expired in 1974, Philippine sugar entered the U.S. market free of tariffs. The United States remained the major market for Philippine sugar until the act's expiration.

When the U.S. quota system was dropped, the Philippines diversified its export sales, largely to other Asian markets. Officials indicated that such diversification will continue according to national policy establishing friendly trade and diplomatic relations with all nations. Trade with the United States will continue to be significant because of contracts entered into with U.S. refineries, which were described earlier.

In June 1978, Philsucom was introducing a production quota control system to rationalize the industry, assure adequate domestic supplies, and meet its obligations under ISA. This system will assign quotas to growers, specify the mill to which the cane must be delivered, and set raw sugar production levels for each mill. These controls were not to take effect until production had reached the levels needed to meet domestic demand, stock requirements, and ISA's basic export tonnage quota.

Industry representatives were not optimistic that ISA will raise prices soon. If prices do increase, growers and millers may not benefit fully if the Philippine Government decides to recover funds spent on industry subsidies.

Despite diversifying export markets, the Philippine Government looks to the United States, with its influence on world prices, as a key element in determining a most important Philippine industry's future.

PRODUCTION PROFILE

The sugar industries in each country we visited vary in size, efficiency, wages paid, and other respects. To provide insight into the various sugar industries, we prepared a production profile for each country's sugar industry. Table 6-3 summarizes the information for each country and for the United States as a comparison.

Australia

In 1977, Australia was the world's third largest raw sugar exporter. Sugar is Australia's fourth most valuable export crop after wool and sheepskins, beef and veal, and wheat. Australian sugar exports in 1976-77 were valued at over $727 million, which represented 5.5 percent of total exports.

In addition to generating a significant amount of export income, the sugar industry employs at least 80,000 people of the 6.2 million labor force, and approximately 200,000 of 13 million Australians depend directly on the sugar industry for their livelihood. Australian sugar production and exports have expanded under a highly organized, regulated, and technically efficient industry.

About 95 percent of Australian sugarcane, which has a 12- to 18-month crop cycle, is grown in Queensland, and the other 5 percent is grown in northern New South Wales. The cane land stretches in a 30-mile wide strip for over 1,125 miles along the eastern coastline. About 865,000 acres are devoted to sugarcane production; beet sugar is no longer produced in Australia. In 1976-77, production totaled 3.4 million metric tons of sugarcane, with 805 thousand tons consumed domestically and 2.6 million tons exported.

There are about 7,200 growers and the average farm is about 111.2 acres. The grower and his family usually own their own farm. The Commonwealth and each State government must approve the use of agricultural chemicals. There have

Table 6-3

Sugar Statistics for Countries Visited and the United States (note a)

Country	1977 sugar production (million metric tons)	1977 sugar acreage planted (000)	Number of sugar mills	Employment	Population dependent on sugar and total population
			(As of May/June 1978)		
Australia	3.4	865	33	80,000	200,000 of 13 million
Brazil	8.3	5,000	200	750,000	3.5 million of 117 million
Dominican Republic	1.2	650	16	100,000	500,000 of 5 million
Philippines	2.7	1,200	41	400,000	3 million of 46 million
United States	5.5	2,032	117	105,000	180,000 (note b) of 218 million

a/Figures provided are approximate.

b/Direct industry employment plus additional employment the sugar industry generates.

not been any problems in having adequate varieties of chemicals approved. Australia follows U.S. Environmental Protection Agency standards to preclude the possibility that the United States may require sugar imports to meet the same standards as U.S.-produced sugar. However, raw sugar is not tested after it is milled.

Australia has 33 raw sugar mills; 12 are cooperatively owned by cane farmers, and 21 are owned by private companies. Many factories were initially constructed many years ago and have been enlarged and improved nearly every year over the past 15 to 20 years.

Australian sugar fieldworkers' wages are above those specified for U.S. agricultural sugar workers under the Department of Agriculture price support loan program. U.S. sugar fieldworkers received $3 to $3.20 per hour for work on the 1978 crop, and mechanical equipment operators received $3.30 to $3.60 per hour; effective February 27, 1978, Australian sugar fieldworkers received $184.08 to $185.27 per week if hired by the week, and $4.63 to $4.66 per hour otherwise. Youths 14 to 19 years of age received 50 to 75 percent of the fieldworkers rate depending on age. Canecutters received $4.79 to $4.82 per hour, and harvesting equipment drivers earned $5.17 to $5.20 per hour.

Industry officials claim that through research and the application of modern techology, Australia has become one of the most efficient sugar producers in the world. Australian sugarcane production has been almost completely mechanized. In 1977, 99.9 percent of the crop was mechanically harvested and 100 percent mechanically loaded.

Brazil

In 1977, Brazil was the world's fourth largest raw sugar exporter. On a dollar basis exports of manufactured goods, coffee, and soybean products among others were much greater than sugar. In 1977, Brazilian sugar exports were valued at $463 million and accounted for 3.8 percent of exports.

Approximately 3.5 million people, about 3 percent of Brazil's population, are estimated to be supported by the industry, including about 750,000 who are directly employed. We were told that Brazil produces sugar to assure domestic supply, provide employment, and generate foreign exchange from exports, in that order.

In 1977, Brazil was one of the world's largest sugarcane producer and the third largest total sugar producer, producing almost 10 percent of the world's sugar, with about

5 million acres devoted to sugarcane production. In 1977, production totaled 8.3 million metric tons, with 4.8 million tons consumed domestically and 2.5 million tons exported, with the balance leading to an increase in stocks. All sugar produced in Brazil is from sugarcane.

There are two distinct sugarcane growing areas--the north-northeast, producing about one-third of the sugar with Pernambuco and Alogoas the most important States, and the central south, producing about two-thirds of the sugar with Sao Paulo, Rio de Janeiro, and Minas Gerais the most important States.

Sugarcane acreage has been increasing by about 5 percent annually since 1972. The country's ecology and climate make two sugar harvests possible each year, so Brazil produces sugar year round. Independent farmers produce approximately 60 percent of the cane processed by sugar mills; the balance is produced by the mills' fields. Many independent farmers are small, with more than three-fourths supplying no more than 1,000 tons of cane each but producing less than one-fourth of the cane. The large independents, however, produce a significant amount of the cane, with less than one-fourth of the farmers producing more than three-fourths of the cane.

Brazil has approximately 200 operating sugar mills, reduced from the about 250 operating several years ago. This was accomplished primarily by merging small, uneconomical, and low yield mills into more efficient operations. According to the Assistant to the President of IAA, about 85 percent of the industry has been modernized by installing new equipment. The modernization program was temporarily stopped in May 1978, because the low world sugar price had severely limited the funds available to IAA's Special Export Fund.

Brazil has a minimum wage and labor legislation for all workers. Although these laws do not apply solely to sugar, the industry is covered along with most others in the nation.

In November 1976, the estimated average sugar workers' monthly wages were: (1) sugarcane fieldworkers in the northeast earned $55.24 and in the south $70.42 and (2) sugar mill workers in the northeast earned $55.74 and in the south $73.59.

Each sugarcane producer, mill, and refinery established its own wage rates and benefits package. According to sugar industry representatives, the industry's wages are higher than the Government-established wages. Additionally, a mill representative stated that to establish a steady labor force, the mill wages are made comparable in the same areas.

The sugar industry does not have strict ecological controls and, although there is some ecological concern, it was not an important factor in May 1978. For example, in producing alcohol, a byproduct results which is a pollutant if dumped into the streams. This byproduct is used as a fertilizer. If this continues, the sugarcane fields will get saturated, necessitating the byproduct to be disposed in some other way.

Productivity in Brazil is significantly lower than in other major cane producing countries. According to a U.S. Foreign Agricultural Service official, Brazil's productivity is low because (1) topographic features preclude much mechanization, (2) fertilizer cost is prohibitive for many producers, and (3) effective extension services to transmit improved technology to the producers are lacking, limiting productivity.

We were informed by officials of two major producing cooperatives in the central south region that while soil preparation is mechanized, planting and harvesting are primarily labor intensive. They stated that the land's topography, equipment cost, and readily available hand labor were factors influencing limited mechanization.

Another factor affecting productivity is the practice of cutting cane for several years rather than replanting annually, as is the case in Hawaii. According to a crop official, new cane is planted after the fourth successive harvest. He estimated that cane yields after the first harvesting decrease by approximatley 20, 40, and 50 percent, respectively.

Brazil's alcohol conversion program

Brazil produces alcohol as a byproduct of the sugar producing process. Traditionally, alcohol has provided a significant marketing complement for Brazil's sugar industry and it was most important during World War II.

Recognizing the combined impact of increased petroleum prices and depressed sugar prices, the Brazilian Government, in December 1975, began a comprehensive program aimed at developing an alternative and renewable energy source and absorbing excess sugar industry production. In addition, the program is expected to save foreign exchange and to provide various other social and economic benefits, such as increased employment and greater use of the country's vast agricultural resources. The national alcohol program is designed to promote alcohol production expansion with the objective of gradually substituting alcohol for petroleum.

By the year 2,000 it is expected that a pure alcohol fuel could be economically feasible.

Brazil has long been a large alcohol producer and, in recent years, a significant exporter. In the past, virtually all alcohol was manufactured from the residual molasses resulting from the sugar refining process. One metric ton of sugarcane will produce a total of 70 liters (about 18 gallons) of alcohol directly, or it can produce about 90 kilos of sugar and 10 liters (about 2-1/2 gallons) of alcohol.

The alcohol conversion program's ultimate impact on the sugar industry depends, to a large degree, on whether or not the Brazilian Government continues to support the program's expansion. If it does, Brazil could expand its sugarcane production to accommodate needed increases. Another possibility would be to continue the program at its current level and look to it as an industry complement or "relief valve" for excess cane production.

The Dominican Republic

Sugarcane is the Dominican Republic's dominant industry; it accounts for about 50 percent of the country's gross national product. In 1977, the Dominican Republic was the world's sixth largest sugar exporter. Other important exports were minerals, coffee, and cocoa. Sugar exports totaled $218 million in 1977, or 28 percent of all exports. About 85 percent of the sugar is exported and the other 15 percent is consumed domestically. During 1974-77 sugar export earnings averaged about 44 percent of total exports.

It is estimated that some 500,000 people, or about 10 percent of the Republic's population, are supported by the industry, including about 100,000 who are directly employed. According to Government officials, the sugar industry is the second largest employer after the Government, and reducing employment would be politically and economically intolerable.

Sugar is produced because it (1) is an established industry with an installed economic capacity, (2) generates foreign exchange earnings, (3) generates employment, and (4) supplies the domestic market.

The Dominican Republic sugar industry is composed of 3 producers that cultivate and process sugarcane at 16 mills. Additional sugarcane lands, which are owned by independent growers, are also harvested by the producers. All sugar produced is from sugarcane, grown mainly in the country's north, south, and southeast regions. Government statistics show that in 1977 about 650,000 acres were planted with

sugarcane, but only about 425,000 acres were actually harvested. In 1977, production totaled 1.2 million metric tons with 171,000 tons consumed domestically and 1.1 million tons exported, leading to a drawdown of stocks since consumption plus exports exceeded production.

The three sugar processors have substantial land holdings. According to a USDA report, as of 1976, the State Sugar Council owned about 280,000 acres, Gulf and Western about 140,000 acres, and the Vicini group about 30,000 acres. Both the State Sugar Council and Gulf and Western's lands produce about 75 percent of the sugarcane processed by their respective mills. The Vicini group owns land producing practically all the sugarcane processed in its mills.

The Government is not involved in the industry's modernization and research and development efforts--each producer makes its own decisions in these matters although the Government, as the owner of mills through the State Sugar Council, is indireclty involved. In June 1978, the State Sugar Council was in the final stages of discussions leading to a possible $75 million World Bank loan for modernizing its mills. During the past 5 years, Gulf and Western has invested about $60 million ($18 million for new boilers alone) in modernizing its operations. Resulting from high sugar prices in 1974-75, Vicini financed a $24 million modernization program, the results of which were "coming on stream" at the time of our visit.

Dominican Republic sugar is primarily produced using traditional methods, including manual cane cutting and using oxen for hauling. Once the cane leaves the fields, techniques become more modernized--mills are mechanized and transportation from the fields to the mills is by rail or truck.

Factory wages vary substantially with skills, and most agricultural work is paid by piecework. Sugar producers establish the wage rates paid to their workers and, according to them, such wages are higher than the Government-established wage rates. A wage analysis was not available. For selected work categories, producers provided the following in June 1978: cane cutters were paid $1.35 to $1.40 per ton of cane cut; cane cultivators received from $.75 to $1.50 per unit (1 acre equals 5-1/2 units); tractor operators earned from $12 to $20 per day; nonskilled millworkers earned from $4 to $5 per day; and mill operators received from $4.50 to $15 per day.

According to industry representatives, the industry provides fringe benefits which approximate between 22 and

31 percent of employee salaries. These benefits include pensions, insurance, housing, medical care, transportation to cane fields, and subsidized food. Workers may also be provided yearly bonuses based on price, profits, and amount of sugar produced.

Subcontractors and imported hired labor (from Haiti) are used in field operations. In the past, about 15,000 workers were officially brought into the country annually, although the actual number was estimated to be as high as 30,000. In an effort to alleviate unemployment, the Dominican Republic announced that beginning with the 1977 harvest, only about 6,000 Haitians would be brought in annually to work the cane harvest. The intensive use of labor in the fields has provided a distinct advantage for the Dominican Republic; because of the low proportion of trash, leaves, and tops, and because the cane fields are not burned before harvesting, the cane's sugar content is among the highest in the world.

According to industry representatives, the industry has no strict pollution controls because it is not considered a major polluter. Environmental problems are being discussed, although nothing is being done at the present time.

The Philippines

In 1977 the Philippines was the world's fifth largest raw sugar exporter. Sugar is the most important industry in the Philippine economy; cococnut oil is the only comparable export followed by copper concentrates, logs and lumber, and copra. Export sugar was the top money earner over the 5-year period 1972-77 during which time sugar contributed an average of $476 million to the economy or 21.4 percent of all exports. Aside from sugar's importance as a major money earner, it also employs some 400,000 people of the 16 million work force and supports more than 3 million of the 46 million population.

Sugarcane is grown on an 11-month crop cycle in four major regions--Negros, Luzon, Eastern Visayas/Mindanao, and Panay. No commercial sugar beet production exists. Sugarcane covers over 1.2 million acres of land, which are nearly all held by individual growers. Because of multiple ownership, around 30,000 growers own over 37,000 sugarcane farms; 55 percent of the farms are 12.4 acres or less and only 2 percent are 247 acres or more. The average farm size in the Philippines is slightly less than 35 acres. In 1976-77, production totaled 2.7 million metric tons with 860 thousand tons consumed domestically and 2.1 million tons exported, resulting in a drawdown of stocks.

There are 41 raw sugar mills in the Philippines, of which 23 have been rehabilitated since World War II and 18 have been built since 1963. For the most part it is the older mills with rail cane transport systems which are in better financial condition. The newer mills, categorized by Philsucom as "distressed," have high capital costs and a greater proportion of cane hauled by truck, which is a more costly transportation method.

The production cost has been increased by environmental concerns at the mills, most significantly water pollution concerns.

Labor costs are a significant factor in the sugar industry because the lack of mechanization results in higher manpower requirements. The minimum wage, as increased on July 1, 1978, for farm workers was $1.09 a day and for mill workers $1.36 a day. The actual wages, however, were somewhat higher because farms and mills provided employees with various fringe benefits, such as rice and corn supply, housing and utilities, medical attention, life insurance and pension plans, recreational facilities, and community activities. The average farm wage including benefits has ranged from $1.09 to $1.36 a day; the average mill wage including benefits is about $2.18 a day.

A major problem for growers was a lack of adequate and timely financing. This has adversely affected the level of inputs (such as fertilizers) and resulted in more ratooning. To combat these problems, in 1977 Philsucom capitalized the Republic Planters' Bank with an initial fund of about $50 million to provide more timely financing than was possible under the Philippine National Bank's crop loans.

In June 1978, the Philippine Government was purchasing sugar at 8.7 cents per pound. Philsucom derived the current support level as the maximum the Philippine Government could afford to pay, yet the minimum to prevent a mass exodus from the industry. In addition to the purchase price, Philsucom had to pay transportation, insurance, warehousing, freight, wharfage, and duties and customs premiums on export sugar which raised the total cost to around 10.5 cents per pound. Since the world market price was considerably less, the Philippine Government is expected to lose between $68 million and $82 million on the 1978 crop. There is major concern as to how long the Philippine Government can absorb such losses. Despite subsidization of sugar at above world market prices, expanding milling capacity as well as critical shortages in crop financing are further increasing production costs and adversely affecting production levels.

The average tonnage yield of cane per acre is affected by a few factors; for example, (1) in some areas soil problems have developed from prolonged cane planting and (2) during periods of high prices, cane is often grown on unsuitable land such as mountainsides. The sugar yield is considered low because, compared with other tropical areas, Philippine sugarcane is relatively low in sucrose. Also, growers tend to favor rapid grinding rates, resulting in lower extraction rates.

Philippine sugarcane production is characterized by a lack of mechanization. Overall, land preparation, planting, fertilization, and harvesting are usually done by hand or with animals. The lack of mechanization is emphasized by the Philippine Government's August 1976 figures showing that there were less than 2,500 tractors and 5,800 trucks for over 37,000 farms; industry officials say cooperative use of equipment is practically unheard of. Industry officials stated that machinery is still only used minimally but, according to the U.S. Embassy, current statistics have not been published.

CONCLUSION

In 1978, the U.S. sugar industry operated in a far freer environment, in our opinion, than did the sugar industries of its major trading partners.

While under the Sugar Act, which expired in 1974, the U.S. Government set domestic production and controlled imports to maintain a desired price. Since the act's expiration, U.S. production and import decisions have been left in private hands. In 1978, U.S. Government involvement was limited to price support payment and loan programs designed to guarantee a certain price to producers through payments and loans and to impose fees and higher duties on imported sugar to raise U.S. prices.

Producing and marketing sugar in other countries is regulated by more governments and to a greater degree than any other commodity. Production, exports, prices, and wages are commonly regulated. The Governments of the four countries we visited--Australia, Brazil, the Dominican Republic, and the Philippines--play key roles in their sugar industries. They control production, set prices, and handle or oversee all exports. The Dominican Republic Government owns the mills producing a majority of the sugar. This contrasts sharply with the U.S. Government's role in 1978 with respect to the domestic sugar industry.

The United States importance as a trading partner varies widely from country to country. The United States is the Dominican Republic's principal customer and a drop in exports could, in our opinion, have a severe effect on the Dominican industry. Philippine sugar trade with the United States is significant, but the Philippines have diversified their export sales since the U.S. quota system expired. Australia considers the United States an important customer, but with the Sugar Act's expiration it finds the U.S. market far less predictable. Brazil sees the United States "as just another market" since the Sugar Act expired, and as such it has little impact on Brazil's sugar industry. The various countries are hopeful for ISA's success, but believe U.S. participation is critical if the agreement is to succeed.

CHAPTER 7

THE INTERNATIONAL SUGAR AGREEMENT

On October 6, 1977, representatives of the United States and more than 70 other nations concluded negotiations for a new International Sugar Agreement. United States participation is subject to U.S. Senate ratification of the agreement.

The United States has belonged to previous international sugar agreements but was not a member of the 1968 agreement. The 1968 agreement, scheduled to expire in 1973, was extended annually to provide statistical data and a forum for negotiating a new agreement. Its economic provisions, however, were suspended in 1973. The current agreement, which became effective on January 1, 1978, is designed to stabilize world sugar prices in an 11- to 21-cent-a-pound range through export quotas and reserve stocks. It is believed that ISA has prevented prices from being lower than they were in 1978. However, the uncertain adequacy of the Agreement's economic provisions to overcome the current depressed state of the world sugar market and the unsettled question of U.S. Senate ratification, raises a question as to the Agreement's ability to achieve the minimum price in the near future.

AGREEMENT OBJECTIVES

The 1977 agreement is designed to balance sugar supply and demand within a framework of expanded sugar trade, thereby

--achieving stable price levels which are fair to both consumers and producers and

--increasing developing exporting countries' earnings by raising the level of international sugar trade.

Agreement designed to benefit consumers and producers

In 1978, world sugar prices remained substantially below 10 cents a pound, which is considered to be approximately the production cost of the world's more efficient cane producers.

The 1977 ISA is intended to assure sufficient production by protecting a reasonable minimum price. Initially, consumers might pay slightly higher prices relative to the 1978 depressed price. Sustained prices below the production cost, however, will probably lead to production declines and much

higher prices instead of stimulating production consistent with future projected demand.

The United States took the position that the minimum price level is of crucial importance to consumers. It was felt that consumer protection is best achieved by establishing a minimum price high enough to assure an adequate sugar supply at reasonable prices and to give some confidence that the maximum price will not be exceeded. The State Department concluded that a minimum price slightly above world production cost would result in an equilibrium of supply and demand over the agreement's 5-year period.

Combination of export quotas and stocks to support price range

ISA established an export quota and reserve stocks system to support world prices in an 11- to 21-cent-per pound range, raw sugar, free on board Caribbean. To maintain prices in this range, various responses are triggered at specified prices as follows.

Three zones were established within the agreement to keep prices within the 11- to 21-cent range. They vary slightly depending on whether prices are rising or falling. The zones are:

--A quota range, 11 to 15 cents as prices are rising, 11 to 14 cents as they are falling, in which quotas are in effect and adjusted based on the sugar's price.

--A free trade zone, basically 15 to 19 cents, in which there are no actions taken under the agreement.

--A stock release zone, 19 to 21 cents, in which reserve stocks are released incrementally as prices rise toward the upper end of the price range.

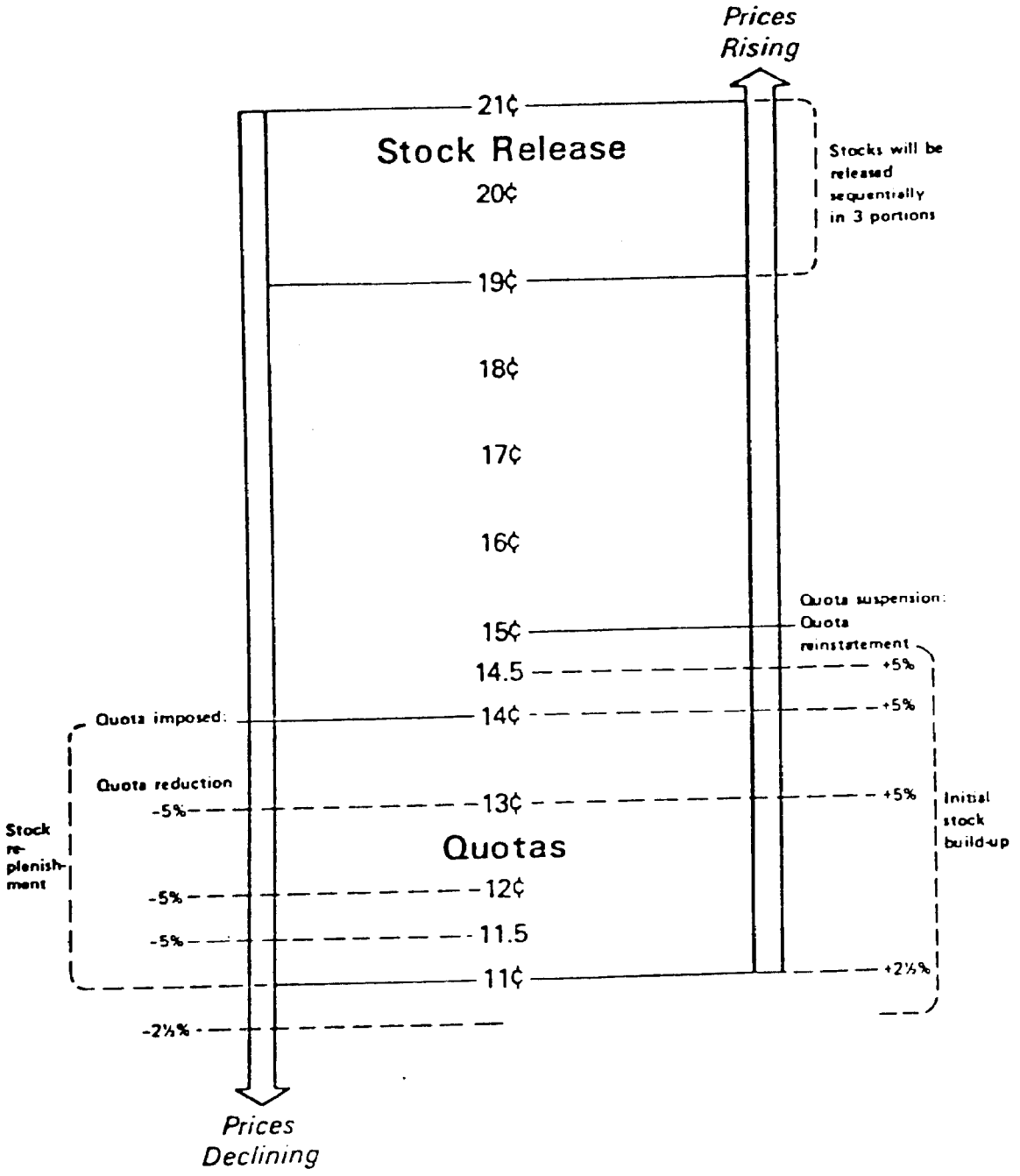
Export quotas are intended to raise prices above the minimum established by the agreement by reducing the supply of sugar available to free world trade. These quotas are based on basic export tonnages, which is the amount of sugar exports major exporting countries were allocated through negotiation. Basic export tonnages were based roughly on productive capacity, export performance history, and dependency on export earnings from sugar.

As figure 7-1 illustrates, export quotas are established in 5-percent intervals with a total reduction of 15 percent of the basic export tonnage when the price is at 11 cents.

Figure 7-1

INTERNATIONAL SUGAR AGREEMENT

PRICE STABILIZATION MECHANISM



Source: U.S. Department of Agriculture

An additional 2.5-percent reduction is to occur when prices remain below the 11-cent minimum for 75 consecutive market days. The minimum quota would entail an average 17.5 percent reduction from each country's basic export tonnage.

Export quotas, which are to be eased as prices rise, are to be completely suspended when prices reach 15 cents. When prices fall they are to be reimposed at the same increments, beginning when the price reaches 14 cents. The difference in trigger points was designed to prevent frequent quota changes when the market is fluctuating around a certain price. The absence of actions continues until prices reach 19 cents per pound, at which point reserve stocks, built up during quota periods, are to be released.

Reserve stocks of 2.5 million metric tons are to be accumulated during ISA's first 3 years. They are to be held by exporting countries in amounts roughly proportional to their export entitlements. If prices rise above 19 cents, stocks are to be released sequentially in three portions, as noted in figure 7-1, until at 21 cents all stocks will have been released. Releasing the stocks is designed to increase world supply to hold the ceiling price.

Stocks are to be financed from a special levy initially set at 0.28 cents per pound imposed on sugar traded in the free market. The stock financing fund will make interest-free loans to ISA members holding reserve stocks under the agreement, to be repaid when stocks are released.

ADMINISTERING THE AGREEMENT

The International Sugar Organization is a body composed of sugar producers and consumers. It provides a forum for discussing issues affecting sugar and collects and publishes various statistics related to sugar production, consumption, and trade. ISO's highest authority is the Sugar Council, which consists of representatives from all member countries. The council is responsible for carrying out ISA's provisions and, in this regard, adopts necessary rules and regulations and enforces compliance by exporters and importers. Failure to abide by ISA's provisions leads to various penalties, depending on the infraction, including reductions in a country's quota.

Exporters' and importers' responsibilities

Exporters have various responsibilities under ISA. These include:

--Insuring that exports do not exceed entitlements beyond the tolerance ISA permits.

--Informing ISO of intentions to use full quotas and, if not, what portion.

--Accumulating, maintaining, and certifying stocks as well as permitting verification of stocks by independent inspections commissioned by ISO.

Importing members also have obligations under the agreement. Each importing member, for each quota year, is to limit its sugar imports from nonmember countries, as a group, to a percentage of the sugar imported in a base period specified in ISA. This percentage is substantially below the amount members are allowed to export. The restrictions do not apply when the prevailing price is above 21 cents per pound, but they do apply when the price falls below 19 cents per pound. Imports by a member in excess of the quantity allowed will be deducted from the quantity which that member would otherwise be permitted to import under the agreement's provisions.

Members are required to provide ISO with reports on the quantities of sugar imported from nonmembers.

Importers also are not to allow sugar entry from member exporters unless it is accompanied by a certificate stating that the stock fund levy has been paid.

Table 7-1 illustrates the data comparison that will continually be examined throughout ISA's course.

Table 7-1

Sugar Available to the Free Market-1978 and 1979

	1,000 metric tons raw value	
	1978 (note a)	1979 (note b)
Basic export tonnage	15,275	15,275
less maximum cut permitted by ISA	2,673	2,673
Global export quota	12,626	12,626
Exports by annex II countries	226	290
U.S.S.R.	-	-
German Democratic Republic	(c)	75
Hardship reserve	118	d/200
	12,970	13,191
Less shortfalls	-250	-200
Available from members	12,720	12,991
Exports by nonmembers	4,600	4,100
Total availabilities	17,320	17,091
Estimated net import requirements	16,388	17,056

a/Totals for 1978 as of January 16, 1979.

b/First estimate for 1979. It will be revised in May 1979.

c/Figures for the German Democratic Republic are included in nonmember exports in 1978. The have now joined the agreement and are shown separately for 1979.

d/As of January 16, 1979, only 55,000 metric tons of this estimated amount has been granted.

The first line represents the total basic export tonnage assigned to major exporters. In 1978, the market situation activated the maximum 17.5-percent quota cut which reduced the global quota to 12.6 million metric tons and is expected to do so again in 1979. After including exports from smaller sugar producers; from the hardships reserve, which is an amount designed to assist developing countries experiencing special difficulties; and from nonmember countries; and after deducting shortfalls, which represent the failure of some countries to fill their quotas for various reasons, total availabilities to the world sugar market in 1978 were about 17.3 million metric tons. This was substantially

above the amount required by the free market. For 1979, the first estimates indicate that total availabilities to the world sugar market with ISA will be close to the amount required by the free market. These estimates will be revised in May 1979 and it is possible that substantial revisions could be made.

Compliance

ISA has provisions designed to ensure that all parties meet their obligations. For example, importing members might be concerned that exporters will ship less than their quota allocation to boost price. Since the formula to be used in renegotiating the export entitlements 2 years into the Agreement relies heavily on actual performance, however, it is unlikely that this will happen. Exporters are also encouraged to fulfill stockholding obligations since failure to do so can result in a reduced export quota.

Generally, it appears that the relative benefits received by consumers and producers are balanced and of sufficient magnitude to offset the burden imposed on each group. Exporters received price supports during surplus periods at the expense of carrying a large reserve stock. Importers will pay slightly more in the beginning, but will benefit both through the prevention of disincentives that create high prices and through the operation of the reserve stock to keep prices down.

Compliance, however, finally rests on the good faith of exporters and importers. If countries ignore their quotas or if assessed penalties are not abided by, there is little that can be done under the agreement.

CAN ISA IMPROVE PRICES?

The 1978 market situation impeded ISA's success. ISA became effective during a surplus period when prices were below the minimum established in the agreement. It was hoped that the export restrictions stipulated in ISA would help bring prices up to the floor level. This has not happened as of October 1978; in fact the average price was 8.95 cents in October 1978, about 2 cents below the ISA floor level. World sugar supplies are far in excess of demand for the third consecutive year, and U.S. Department of Agriculture statistics as of November 1978 show that sugar output is outstripping consumption requirements.

It is believed that without ISA prices would have been lower. This is because ISA took about 1 million tons of sugar off the world market in 1978, according to the State Department. Supporters of this view believe that without ISA this sugar would have been put on the market, increasing the surplus and depressing prices. It should be noted, however, that USDA estimated that 1978 world ending stocks will be 30.2 million metric tons, up from 29 million in 1977. The 1 million ton stock accumulation represents 3 percent of the 1978 stock estimate.

The price shoring effect attributed to ISA is also credited with assisting the domestic sugar price support program. The import fee, established to prevent low priced sugar imports from interfering with USDA's sugar price support operations, could not exceed 50 percent ad valorem. If the price of sugar were too low the import fee would have to be lowered so that it would not exceed 50 percent ad valorem. For example, the November 1977 Presidential proclamation on sugar set an import fee of 3.32 cents per pound on sugar valued at 6.67 cents per pound. If the price had fallen to 6 cents, the import fee could not exceed 3 cents; if it had fallen to 5 cents the fee could not exceed 2.5 cents.

It is difficult to forecast what will happen in the coming years. Much will depend on the weather, Government policies affecting sugar production, and the response of consumption to depressed prices. If producing countries have average or better beet and cane yields in 1978-79, according to one industry study, it is assured that there will be further stock accumulation. Even an increase in world consumption above historical growth levels will not prevent further stock accumulation because world production is expected to exceed consumption.

Many countries have indicated their willingness to cut back on production. Several major producing countries have taken steps to cut back output in 1978-79. In many countries sugar production is an economic and social way of life and alternative crops are not a realistic proposition, as is the case in the Dominican Republic and the Philippines.

WILL NONMEMBERSHIP HURT THE AGREEMENT?

Although most major producers and consumers are members of the current ISA, two major exporters are outside the agreement, and there are doubts as to whether the United States will join as an importing member.

Taiwan is excluded because it is not a member of the United Nations. ISA, however, does provide an allowance for Taiwan's exports. The absence of the European Community from the agreement raises more serious problems.

EC membership is intricately tied to economic considerations and treaties unique to the EC. EC domestic sugar production meets its entire internal demand plus an exportable surplus, which, depending on weather conditions, may have reached 1.6 million metric tons in 1978. Imports under special arrangements amount to an additional 1.4 million metric tons; therefore, EC needs assured export outlets for 3 million metric tons per year.

Although EC did not join the agreement, it has indicated it would accept a special status as an exporter. With this status EC accepts no export quota obligation but would be prepared to help stabilize the world sugar market through self-imposed, although unspecified, mechanisms compatible with its own market and organization and parallel to the commitments other exporters accepted.

ISA can work without the EC, but it would be stronger with EC participation. The effect of nonmembership will depend on how responsibly the community markets its sugar and meets any parallel obligations. An EC spokesman stated that the community has a moral imperative not to undercut the world sugar price. It should be noted, however, that the large exportable surpluses the EC had in 1978 and is likely to have in 1979 is exerting a downward effect on world prices. The EC also has obligations to its member states to sell their sugar, and this obligation would in our opinion probably take precedence in any decision on special status obligations under ISA.

At the United States request, the ISA ratification date, originally set for July 1, 1978, has been extended until June 30, 1979. The U.S. Senate did not ratify the agreement before it adjourned for 1978. The absence of the United States as the major importing nation would probably destroy the effectiveness of the agreement's economic provisions.

IMPLEMENTING LEGISLATION REQUIRED FOR U.S. MEMBERSHIP

If the Senate ratifies the agreement, the United States will have certain obligations under ISA. Specifically, these include contributing to the ISO administrative budget, bearing administrative costs associated with restricting imports

from nonmembers, and ensuring that all sugar imports are accompanied by stock fund certificates. The State Department has estimated that these obligations will cost the U.S. Government about $160,000 per year, from the Department of State administrative budget.

The United States has been allocated a 68,000-ton import quota from nonmembers other than the Republic of China for 1978. Enabling legislation is required for the U.S. Customs Service to begin its procedures to assure that sugar coming into the United States has the necessary certification.

WILL ISA WORK?

Whether or not ISA can effectively stabilize sugar production and prices will depend largely on participation, incentives for producers and consumers, and the market situation. The 1977 ISA provision for special stocks and its relatively wide price range differentiate it from its predecessors. The current ISA also operates in a larger market than before. The U.S. Sugar Act's expiration and the Commonwealth Sugar Agreement's demise have placed more sugar in the free market. The 1977 agreement will cover at least 60 percent of all sugar traded.

As of late 1978, USDA predicted that several leading producers would have smaller crops for 1978-79; however, world production is expected to exceed consumption by more than 1 million metric tons. Production for 1978-79 is expected to be below the record 1977-78 crop. World stocks, however, remain at record highs and should increase in 1979 given the predicted world production and consumption estimates. Under these circumstances, the degree to which ISA will strengthen world prices in 1979 is uncertain.

CONCLUSION

The optimism for ISA's success at the conclusion of its negotiation in October 1977 has somewhat dissipated as prices remain below the floor level and the United States has not yet ratified the agreement.

After the negotiations were successfully concluded, exporters had sold aggressively on the world market to reduce stocks before ISA became effective. Importers, faced with possible higher prices resulting from quotas and reserves, took advantage of the prevailing low price and imported larger quantities of sugar.

At the same time, the United States created a situation that distorted normal U.S. import patterns. The Food and Agriculture Act of 1977 guaranteed a significant rise in domestic sugar prices. In response, sugar users and refiners increased stocks. Consequent heavy shipments in late 1977 to the United States and other consuming countries made calendar year 1978 trade appear artificially low. In terms of ISA effectiveness, this situation is bad because minimum export quotas did not appear to sufficiently restrict export availability relative to anticipated demand to a point where an 11-cent price floor could be defended.

The net import requirement to be apportioned among ISA quota holders in 1978 was 11.8 million metric tons--almost 1 million tons below the actual amount available. Although ISA may help achieve a higher price, it may not bring the price to the 11-cent minimum in 1979. However, first estimates for 1979, subject to revision, indicate that world sugar market availability will closely match free market requirements.

On July 1, 1978, the export quotas became effective, resulting in some sugar being taken off the market. However, implementing the stock financing scheme was postponed; we believe that this resulted in ISA being less effective than it might have been. Certain mitigating factors, such as the world surplus and the United States not ratifying the agreement raise questions as to ISA's potential success. As indicated in chapter 6, several countries view U.S. participation as critical to the agreement's success.

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

In response to the large increase in sugar carryover stocks, world sugar prices have fallen substantially from an average 57 cents per pound in November 1974 to 9 cents per pound in October 1978. Stocks have increased from the equivalent of one-fifth of world consumption in 1974 to more than one-third in 1977. This is part of a cycle having long periods of low prices and excess supplies and short periods of high prices and tight supplies. Tight supplies cause prices to rise, generating an increase in production, which increases supplies and precipitates a decline in prices, which in turn causes production to slacken.

World consumption normally increases annually and gradually reduces large stocks when production fails to keep pace. As stocks fall, prices begin to rise until reaching a trigger point when they rise rapidly, bringing a sharp increase in production and beginning the oversupply and low price cycle again. Each new tight supply cycle has raised prices to new heights. In response to the 1974 high prices, world production expanded, leading to the present surplus, which has brought world prices to low levels.

Low world sugar prices, which influence the U.S. sugar price, have affected domestic sweetener producers, including beet and cane sugar producers and processors and HFCS producers. Many sweetener producers and processors claim to have been unprofitable in 1977 and 1978 although data on average production costs and prices do not always support such claims when Government price support payments are included in the comparisons. Several plants have closed in various parts of the industry.

The domestic sugar industry is primarily important at the local level, except in Hawaii where the industry is critical to the State economy, and plant closings severely affect local communities. Continued low prices also threaten the viability of the U.S. sweetener industry.

Since 1894, U.S. policy has been "to preserve within the United States the ability to produce a substantial portion of our sugar requirements." For a 40-year period ending in 1974 this was accomplished through legislation establishing a quota system for domestic and foreign sugar producers. In 1978, the United States had a system of duties and fees to insure a minimum U.S. sugar price and a loan program for 1977 and 1978 domestic crop year sugar.

Legislation providing further assistance to the domestic sugar industry by requiring a higher domestic price objective and a mechanism to bring imported sugar's price up to that objective was not approved by the 95th Congress. The cornerstone of the Administration's sugar policy is the International Sugar Agreement, but appropriate consideration has not been given to what affect a sugar policy would have on alternative sweeteners.

NEED EXISTS TO CONSIDER ALTERNATIVE SWEETENERS

The United States can no longer think in terms of sugar alone. The domestic sweetener market is changing due to the development and production of HFCS. This product, which is primarily a U.S. phenomenon, is being substituted for sugar in various industrial applications. Its greatest attraction for many users is its price, since HFCS is sold at a lower price than sugar. HFCS will become an increasingly important factor in the U.S. sweetener market. Its growth will be closely related to sugar price trends, as rising sugar prices will induce more potential users to seek less expensive sugar substitutes. HFCS's growth is expected to be at sugar's expense, because it is expected to account both for all or nearly all the projected increase in sweetener consumption and to substitute for sugar in existing uses.

Higher sugar prices will accelerate HFCS growth, which can consequently serve as a counter weight to high sugar prices. If sugar's price is too low the viability of the U.S. HFCS industry will be jeopardized. The higher the price of sugar, the faster the HFCS industry will grow and compete with the U.S. sugar industry. Consequently, the impact of increased HFCS consumption on the U.S. sugar industry, and HFCS's ability to compete with sugar, should be an important consideration in future U.S. policy determinations.

DATA IS LACKING

We believe that verifiable data on each sweetener's production cost is needed if informed sweetener policy decisions are to be made. Current data on actual production costs, however, is lacking for most sweetener industry elements. Cane sugar's production cost is primarily based on projections of data obtained in various studies conducted by USDA from 1969-71 and the University of Florida and Louisiana State University in 1975-76. Each estimate provides different figures. The diverse estimates raise questions as to what the production cost is in any

area. USDA officials approached Florida and Louisiana officials a few years ago about doing a cost study and were rebuffed.

Beet sugar's production cost is based on USDA projections of sugar beet growing costs obtained in a USDA survey and beet sugar processing costs we developed.

Verifiable data on HFCS production costs does not exist, for most HFCS producers have consistently resisted efforts to obtain production cost data for the corn sweetener industry.

OTHER COUNTRIES TIGHTLY CONTROL SUGAR

Sugar production and marketing is regulated by more governments and to a greater degree than any other commodity. The governments of the four largest suppliers of U.S. sugar--Australia, Brazil, the Dominican Republic, and the Philippines--play key roles in their sugar industries.

ISA MAY NOT ACHIEVE ITS OBJECTIVES

On January 1, 1978, a new International Sugar Agreement came into force. The new ISA is aimed at stabilizing world sugar prices within an 11- to 21-cent per pound range supported by a system of export quotas to maintain the lower end of the range and sugar stocks to maintain the upper end. The United States is a provisional member of ISA, which must be ratified by the Senate. Given the current market situation--large surpluses and low prices--and the unsettled question of U.S. Senate ratification of ISA, the degree to which ISA will strengthen world prices in 1979 is uncertain.

QUESTIONS TO CONSIDER

In considering new sugar legislation, the Congress will probably address many of the questions that were important in the 1978 debate over sugar legislation. Some of these questions are discussed below.

Should the United States have a domestic sweetener industry?

The House Committee on Agriculture's report on the proposed Sugar Stabilization Act of 1978 and the Committee on Ways and Means' report on the proposed International Sugar Stabilization Act of 1978 both stated that it was desirable

to have a domestic sugar industry. U.S. policy since 1894 has been to preserve within the United States the ability to produce a substantial portion of the Nation's sugar needs. While the data we have developed indicates that the industry is relatively small--about 17,000 farms and approximately 50 companies operating about 110 plants--it does provide almost 200,000 jobs. The industry is primarily important at the local level, except in Hawaii where it is crucial to the State economy. The loss of these jobs would significantly affect the employees and their local communities. If the Congress decides to not support a domestic industry when market conditions threaten its viability, should the affected employees and communities be provided some type of assistance?

The U.S. sugar industry currently operates without the high level governmental protection found in many other sugar producing countries that are net exporters, although the United States is a net importer. Governments in some net exporting countries prohibit sugar imports, purchase all or some of the sugar produced at a price unrelated to the market price, and set the wholesale and/or retail price of sugar. As a matter of equity should the U.S. sugar industry, which produces a majority of the Nation's sugar needs but relies on the world market for the balance, operate in a higher risk environment than the sugar industries of other countries?

While much attention has been focused on sugar, little has been focused on the role the United States should play with respect to HFCS. In 1974, while extension of the Sugar Act was being debated, HFCS was relatively new. The industry has grown substantially since then and is likely to grow much more in the years ahead. Since HFCS competes directly with sugar, congressional action that affects sugar also affects HFCS. High sugar support prices are likely to spur HFCS growth and, in the long run, could lead to HFCS replacing more of the sugar market. Since HFCS competes with domestic sugar beets and sugarcane, the position of the Federal Government toward emerging HFCS technology is a major concern; should the Government encourage it, discourage it, or be neutral?

How dependent should the United States be on foreign sugar supplies?

Implicitly associated with the question of whether to have a viable domestic industry is that of how dependent the United States should be on imported sugar. Without a domestic industry, or with a significantly smaller industry, the United States would be more dependent on imports. The

effect of increased imports on the U.S. balance of payments is an immediate concern. Without a domestic sugar industry, the United States would have had to import 5.1 million tons of additional sugar based on 1977 sugar consumption of 11.2 million tons and 1977 imports of 6.1 million tons. At the 1977 average world price of 8.11 cents, this would represent about an $827 million increase in U.S. imports.

Related to the issue of a viable domestic industry is what effect the U.S. import level would have on the world sugar market. The world sugar market has in the past been a residual market for sugar not consumed in the producing country or sold under preferential arrangement. However, there are countries that produce sugar for export. This market bears the brunt of world surpluses and shortages. These surpluses and shortages assume greater importance due to the smaller nature of the world market as compared to world consumption. This magnifies the impact of relatively small changes in world stocks. A United States more dependent on imports would increase the size of the market and so possibly help reduce its volatility, by reducing the relative effect of small changes in world stocks. However, in periods of shortage this might not be true since there would be a greater demand for a scarce product. A United States less dependent on imports would reduce the world market's size and so possibly increase its volatility by magnifying the relative effect of small changes in world stocks. The market's volatility ultimately affects the price consumers would eventually have to pay for sugar.

A more import dependent Nation would mean smaller U.S. sugar production capacity and, therefore, less world production unless other countries increased their output. This could mean higher sugar prices at least until output increased in other sugar producing countries. The contraction of the U.S. sugar beet industry in particular, where beet acreage can be adjusted annually, would reduce the world's annual production response capacity, which would be of significance during periods of adverse weather and world sugar shortages.

If a domestic industry is to be supported, how high should that support be?

Much of the debate on the 1978 sugar legislation centered on the price at which to support the industry. Industry production costs and efficiency vary widely. A high support level would maintain a larger number of producers, including less efficient ones, while a lower support level would sustain fewer, but probably more efficient,

producers. A higher price support level would also result in greater profits for the more efficient producers. The support level chosen will also have an impact on HFCS production.

Industry support under both the recent price support and loan programs provided assistance through processors, who shared moneys received with the producers. The sugar industry is symbiotic--with producers requiring nearby processing facilities to handle their crop and processors requiring a minimum of crop acreage to allow them to operate. Low sugar prices affect both producers and processors and any support program should recognize the importance of their interdependence.

In choosing a support level, knowing the average cost of production and the distribution of production costs by producer helps in assessing the number of producers and productive capacity covered at any given support level. Such data is not available at this time; however, USDA could compute it if it could obtain the necessary data from producers.

Another matter to be considered is what should be included in determining a price support level. The USDA studies of production costs and the University of Florida and Louisiana State University studies include a land charge. Some sugar producers probably own all or most of their land outright, while others probably recently purchased their land at the high farmland prices of the past several years. The year to year decision of farmers on what to produce may be made without considering the cost of owned land. Other producers rent some land, which is an expense they must bear. A key question becomes to what extent land charges should be used in determining the price support level. Similarly, the USDA study of beet sugar production costs includes management fees. From a business standpoint, such fees are usually rewarded from profit. If the program's purpose is to support the industry over periods of low prices, should support levels be based on the typical producers cash flow, providing just enough support to cover actual expenses or should it also be based on land and management elements?

What effect will a sugar policy have on consumers?

The sugar policy the Congress adopts will affect consumer prices. Policies which support the domestic industry through raising the market price are ultimately paid for by the consumer in the form of higher prices. Those that provide for Federal payments to sugar producers are

paid for by the taxpayer. Federal payments can adversely affect HFCS producers. Such payments would assist the sugar industry without raising sugar prices. This would result in a competitive advantage for the sugar industry.

To the extent that increasing import dependence is accompanied by reduced tariffs and fees, sugar's domestic price will fall while the world price remains low. If increased U.S. demand increases the world price by more than the decrease in import duties and fees, the domestic price would rise. When the world price is high, consumers will pay more for sugar regardless of whether the industry is protected since the domestic price is influenced by the world price. When the world price is high, domestic producers can raise their price without fearing that sales will shift to lower priced imports. Since the world market is characterized by long periods of low prices and short periods of high prices, an important question is whether consumers would pay less in the long run by paying the world price at all times.

What role should ISA play in U.S. policy?

According to Administration spokesmen, ISA is the foundation of U.S. sugar policy. This report notes that there is a question, partly due to the unsettled question of U.S. Senate ratification, as to whether ISA can fully achieve its objectives. The Senate will be asked to ratify ISA in 1979. Ratification will increase ISA's ability to succeed since the United States is a major importer and a number of countries view U.S. participation as critical to ISA's success.

ISA's success would result in higher world prices, which if accompanied by reductions in the import fee on sugar would not raise domestic consumer prices. ISA's success would, however, assist the domestic industry, reducing the need for direct Federal support. Current legislation recognizes this. The Food and Agriculture Act of 1977 states that the sugar loan program it required for crop years 1977 and 1978 may be suspended when the Secretary of Agriculture determines that an ISA is in effect which assures a certain minimum price. ISA's success, in terms of encouraging more orderly production growth to keep pace with increased consumption, can play an important role in balancing world production and consumption, and so reduce the possibility of sharp price swings. This would protect consumers against a recurrence of prices similar to the

record highs of late 1974 while protecting producers against unprofitably low prices. To the extent U.S. participation bolsters confidence in ISA and aids its success, ISA offers gains for sugar producers and consumers.

Should ISA fail, world prices may fall due to the surplus of sugar and the likelihood that the sugar ISA took off the market through the end of 1978 would probably be put back on the market. Lower prices will intensify pressure on the Congress to assist the domestic industry and on the President to further raise import fees to compensate for a lower world price. If world prices fall, the American consumer would not benefit, while the Congress would still probably be called on to provide greater assistance to the domestic industry.

OPTIONS AVAILABLE TO THE CONGRESS

We believe that the United States needs a comprehensive sweetener policy that will

--insure a viable and efficient domestic sugar industry,

--recognize the role of corn sweeteners as well as sugar, and

--reduce the sharp fluctuations in world sugar prices.

There are several key elements to consider in establishing a national sweetener policy. To help the Congress choose among alternatives for a national policy, we have prepared the following analysis.

Price support level

Establishing a relatively high price support level will

--protect a larger number of producers, given the wide range of production costs;

--encourage an expansion of domestic sugar production;

--allow higher cost producers to continue producing sugar;

--accelerate the growth of HFCS, which competes with sugar and sells at a lower price;

--reduce the level of imports needed to meet domestic needs; and

--raise the domestic price of sugar above current levels.

Establishing a relatively low sugar price will

--encourage higher cost producers to leave the industry, having an adverse impact on their local communities but leaving a more efficient industry in place;

--reduce domestic sugar production, which would be offset by increased imports;

--limit growth of HFCS with less competition for the sugar industry; and

--raise consumer prices to a lesser extent than would be the case with a higher support level.

Price support escalators

Including an adjustment provision to revise the price support level on the basis of changes in production costs will

--result in higher support prices in the future if inflation continues to increase production costs, with the amount of the increases partly dependent on the method used to adjust the support price;

--tend to sustain inflation since sugar is mostly used in processed foods, which is likely to increase such foods' prices, and once prices increase they are not likely to decline; and

--raise the absolute price consumers pay for sugar.

Achieving a price support level

Another element is the method to be used to assure that the price support level is achieved. One method is to use quotas. Quotas, which may be difficult to apportion, can be established for imports as the difference between expected domestic consumption and production. If properly determined the quota will:

--Be highly effective in maintaining the price support level.

--Result in a gradual decline of imports if HFCS and domestic sugar production expand in response to the price support level. If this expansion exceeds the increase in sweetener consumption, resulting from changes in population and per capita consumption, domestic production would provide a larger share of U.S. needs. This could also occur with import fees.

--Contain foreign policy implications both in determining which countries should be allowed to provide sugar to the United States and in the effect a disappearing U.S. market would have on foreign sugar producers.

Applying the quota system to domestic production as well as to imports, as was done under the now defunct Sugar Act, would

--provide greater protection for the less efficient portions of the domestic sugar industry;

--retard HFCS growth, assuming a quota would put a ceiling on the amount of this product that could be produced; and

--dampen competition between the corn syrup and sugar industries.

Tariffs and fees is a second possible method to support the price level. This is the method currently in use. Its use would:

--Provide revenues to the Treasury.

--Allow more competition in the industry, both between different domestic sweeteners and foreign suppliers, because relative sugar and sweetener prices would still influence decisions on whether to change sweeteners or whether to purchase domestic or imported sugar.

--Contain the potential, if world prices were declining or foreign suppliers were reducing their price, to undercut the U.S. support price which encourages increased imports. This would occur unless fees were continually adjusted so that the combined foreign transaction price plus U.S. duties and fees would be above the support price level. This possibility, however, can be mitigated by the type of action contained in the January 1, 1979, Presidential proclamation.

--Result in consumers paying a price above the world price, the exact amount depending on the level of tariffs and fees.

Government support payments to pay the difference between the market price and the support price is a third method. The Government did make support payments on part of the 1977 crop and in testimony before the House Subcommittee on Trade, Committee on Ways and Means on August 14, 1978, a Department of Agriculture spokeman expressed the Department's intention to make support payments almost immediately if the Congress permitted suspension of the loan program on 1977 and 1978 crop sugar. The use of support payments will:

--Be costly to the Treasury.

--Not raise domestic prices to the consumer since the price to the producer will be supported through the Treasury rather than in the marketplace.

--Place HFCS producers at a competitive disadvantage if payments are limited to sugar producers and processors since they will be competing in part with a Federal subsidy rather than only with the sugar industry.

--Require some form of import protection, such as quotas or fees in conjunction with a support payment program. This is because if the world price of sugar, which influences the price of U.S. imports and ultimately the price of domestic sugar, is below even the lowest support price, it would create the potential for lower price imports to displace domestic sales and lower domestic prices. Consequently, the effectiveness of a price support program would be endangered. If fees were chosen, the revenues they generated could be used to pay for the support payments.

Government loan programs could also be used to provide support, with the producers having the option of repaying the loan, with interest, or forfeiting the sugar under loan to the Government. The 1978 and part of the 1977 crop were eligible for a price support loan program under the Food and Agriculture Act of 1977. Beginning in December 1978 substantial amounts of 1977 crop sugar were being forfeited as loans went into default. The continued use of loans will:

--Depend on the world price of sugar and the level of tariffs and fees to succeed. If prices were too far below the loan rate plus interest the loans would be defaulted, leaving the Government as the owner of substantial amounts of additional sugar.

--Probably result in the consumer paying a sugar price somewhat greater than the loan rate because the Government would probably raise import fees to make prices high enough to prevent forfeitures of sugar.

--Provide low cost working capital to sugar producers and processors placing HFCS producers at a competitive disadvantage if loans are limited to sugar producers.

International considerations

The United States, as a major sugar importer, is important to the world sugar market. The adoption of a policy that reduces U.S. imports would, as previously noted, contain foreign policy implications. Additional international considerations include:

--Loss of foreign exchange earnings on the part of U.S. sugar suppliers. Many suppliers are developing countries. The loss of foreign exchange earnings would have an adverse effect on their economies, some of which are heavily dependent on sugar. This would have a potential impact on the political stability of those countries.

--The possibility that the United States will be asked to increase foreign aid to offset reduced sugar earnings.

--Further depressed prices as a result of a smaller world market.

--Similar demands for protection from imports from other U.S. industries competing with imports.

--The negative impact of restricting imports on broader U.S. trade policy, agricultural sales, and U.S. efforts to reduce trade barriers.

RECOMMENDATIONS TO THE CONGRESS

We recommend that the Congress enact comprehensive legislation setting forth a national sweetener policy that provides necessary assistance for an efficient domestic sugar industry, recognizes the effect of sugar legislation on the increasingly important HFCS industry, and considers the economic affect on U.S. foreign trading partners.

To determine a reasonable price level at which to support the domestic industry, we recommend that the

Congress (1) instruct the Secretary of Agriculture to obtain representative production cost data for all sweetener industry elements, (2) require that all persons in the sweetener industry provide the Secretary of Agriculture with information he deems necessary, and (3) require that any data collected be made available in a way that does not publicly reveal information provided by any one person.

In view of the growth of corn sweeteners, principally HFCS, its price advantage relative to sugar, corresponding shifts in market shares between sugar and HFCS, and the wide variations in estimated production costs, we further recommend that legislation direct the Secretary of Agriculture to identify those sugar industry segments most likely to be adversely affected by such shifts, assess the alternatives available to assist these segments, and report the results to the Congress 1 year from the date of the legislation's enactment.

AGENCY COMMENTS AND OUR EVALUATION

The Department of Agriculture

The Department of Agriculture believes that our report provides a useful overview of the U.S. sweetener industry and identifies the important policy issues. The Department believes that it would be more useful if further analysis and evaluation of the economic impacts of alternative policy options were provided. We believe that the report provides a useful analysis of various policy options and that further analysis should be the primary responsibility of the Department, which has substantial expertise in this area.

The Department agrees with our recommendations. The Department has indicated its willingness to work with the Congress in developing legislation providing for an efficient domestic sugar industry consistent with ISA. It also agrees that better data is needed and notes that it has the capability to conduct the recommended assessment and could report the results to the Congress within a reasonable period. The Department suggests that we recognize the impact of sugar legislation on growers, consumers, inflation, and costs to taxpayers in our recommendation.

The Department of State

The Department of State agrees with our recommendation that any domestic legislation recognize the important position of HFCS in the U.S. sweetener market and agrees that an extensive sweetener production cost survey could be very useful in determining the future domestic sugar price

support levels. The Department believes it is unfortunate that the report lacks specific recommendations on what policy actions the Administration might take concerning HFCS. We have examined the effects of various policy actions on both HFCS and sugar, and believe that specific policy actions should be determined through the legislative process.

The Department believes that the report does not adequately recognize that through ISA's export quota system considerable quantities of sugar have been removed from the world market, consequently improving prices over levels which would have prevailed in the absence of the agreememt. It also believes that ISA has significantly improved the operation of the domestic sugar price support program. We believe that it is speculative to contend that ISA has improved prices over levels which would have prevailed in its absence. ISA removed 1 million tons of sugar in 1978, about 3 percent of estimated 1978 world ending stocks of 30.2 million metric tons. The average price of sugar on the world market, 7.81 cents per pound in 1978, declined slightly from the 1977 average of 8.11 cents. To contend that prices would have been even lower is a matter of judgment.

The Department states that it continues to oppose the use of quotas in regulating sugar prices. We make no recommendations concerning which specific policy action, including quotas, should be adopted by the Congress.

CHAPTER 9

SCOPE OF REVIEW

In conducting this study we met with officials of the U.S. Department of Agriculture, the Department of State, and the governments of several sugar producing States. To review the domestic industry's current condition we met with sugar processors and producers and corn sweetener processors, as well as with officials of sugar and corn sweetener trade associations. We interviewed Government and industry officials in four countries--Australia, Brazil, the Dominican Republic, and the Philippines--to discuss their sugar industries and determine the Governments' role in the industry. We also met with International Sugar Organization officials to discuss the International Sugar Agreement's operation.

We reviewed data on reported production costs and prices, gathered additional cost data where available, and compared cost with price data. We examined material on trade in sugar and sweetener consumption and evaluated the likelihood of the International Sugar Agreement's success.

Sugar: Net profit or (loss) before income taxes or net proceeds paid or payable to cooperative members for U.S. growers, processors, millers, and refiners on their sugar operations, accounting years 1972-76

(In thousands of dollars)

Item	1972	1973	1974	1975	To Sept. 30 1/-- 1975	To Sept. 30 1/-- 1976
Sugar beet growers and beet sugar processors:						
27 growers (total farm)	2/	2/	2/	2/	2/	2/
10 processors	45,534	108,229	395,402	234,419	3/ 111,117	3/ 37,987
Total	45,534	108,229	395,402	234,419	111,117	37,987
Sugar cane growers:						
19 Florida growers	***	***	***	***	***	***
23 Louisiana growers	***	***	***	***	***	***
14 Hawaiian growers	***	***	***	***	***	***
Total	7,342	20,533	72,996	75,945	4/	4/
Sugar cane millers:						
6 Florida millers	***	***	***	***	***	***
26 Louisiana millers	***	***	***	***	***	***
1 Texas miller	***	***	***	***	***	***
14 Hawaiian millers	***	***	***	***	***	***
Total	55,187	121,613	641,553	357,405	40,887	16,267
Cane sugar refiners:						
8 refiners	***	***	***	***	***	***
1 Florida cooperative refiner	***	***	***	***	***	***
California & Hawaiian Sugar Co.	***	***	***	***	***	***
Total	169,757	202,535	438,851	367,150	225,943	193,977
Grand total	277,820	452,910	1,548,802	1,034,919	377,947	248,231

1/ The interim 1975 and 1976 accounting periods for each of the reporting concerns range from 1 month to 12 months and end no later than Sept. 30. 2/ Data are insignificant in terms of the total for all U.S. sugar beet growers. 3/ Data are for 7 processors. 4/ Not available.
5/ The 14 Hawaiian growers are also millers. Their sugar cane is transferred to their mill at cost.
6/ Commenced operation on Dec. 8, 1973. 7/ Data are for 6 refiners.

Source: Compiled from data submitted to the U.S. International Trade Commission by U.S. growers, processors, millers, and refiners.

APPENDIX I

APPENDIX II

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

29 JAN 1975

Mr. Henry Eschwege, Director
Community and Economic Development Division
General Accounting Office
Washington, D. C. 20548

Dear Mr. Eschwege:

We have reviewed the report, "Sugar and Other Sweeteners: An Industry Assessment," as you requested. Since sugar legislation is again being considered by Congress, this is indeed an opportune time to provide information about the sweetener industry and to identify the important economic, social, and political issues which the Congress must consider in formulating national policy. We find the report, however, to focus primarily upon short-run impacts. It provides little new analytical information. Its major merit is the convenient compilation of a rather detailed description of the sugar and sweetener industry and a short review of major policy issues.

Various agencies of this Department provided substantial suggestions and technical comments on an earlier draft. The major concerns focused on lack of identification and elaboration of the major policy issues inherent in formulating a national policy. These issues included:

- Identification of policy objectives.
- Rationale for government intervention in the sugar and sweetener industry.
- Extent of industry coverage (sugar only or sugar and sweeteners) of any domestic program.
- The level of support needed to meet the policy objectives.
- Domestic price stability.
- U.S. reliance on the world market.
- Consistency of domestic programs with foreign development assistance and U.S. international trade policy.
- Impact of programs on domestic supplies and consumer expenditures.
- Assistance needed by communities and companies if economic adjustments are required.

- The relative market shares of the high fructose corn syrup industry under alternative programs.
- Implications of domestic policy and programs for the success of the International Sugar Agreement.
- The inclusion of labor provisions in a domestic program.
- Consumer and inflationary impacts of policy alternatives.

However, the present report is expanded and more adequately addresses the important policy issues. The GAO staff has been responsive to many of the major concerns and technical comments expressed by the Department through informal exchanges. While the report still contains only limited analysis on difficult policy choices, it is much improved and does provide a useful description of the industry and the issues. The report is still limited in its discussion of the economic consequences of various policy alternatives. There is no analysis of the distributional impacts of the adoption of a sweetener policy upon the various segments of the industry, government, taxpayers, and consumers.

The Department has no major disagreement with the general recommendation of the report. We have indicated our willingness to work with the Congress to develop legislation, to provide assistance for an efficient domestic sugar industry, that is consistent with the International Sugar Agreement. However, impacts of legislation on growers, consumers, inflation, and costs to taxpayers are important and we suggest these issues should be recognized by GAO in the general recommendation.

We fully agree that the need exists for better cost of production information on sugar and sweeteners. The Department is taking steps to improve the present cost of production data and information base. However, the extent to which the Department can do so is largely dependent on obtaining the cooperation of the various components of this industry.

Historically, we have preferred to rely on the voluntary cooperation of respondents in obtaining information rather than mandatory reporting of data. However, the lack of cooperation by sugarcane producers has in the past prevented us from getting the data we need. At present we are relying upon indexing procedures to update a primary data base established in the early 1970's. We also need more current information from the beet processing and cane milling industry, and from the high fructose corn syrup industry.

APPENDIX II

The need for reliable data is paramount if sugar programs are in some way to be linked to the costs of production and processing. This is especially true where substantial Treasury expenditures are made and the cost of small errors can result in unnecessary but significant transfers of funds or not enough disbursement from the Government. If these data cannot be obtained through voluntary cooperation, then the Congress may have no alternative but to enact legislation providing stand-by authority for mandatory reporting.

The report's final recommendation is for legislation directing the Secretary to identify those segments of the sweetener industry most likely to be adversely affected by competition between sugar and high fructose corn syrup and to assess the alternatives available to assist these segments. The Department has the capability for such an assessment and could report the results to the Congress within a reasonable period from the date of enactment of legislation as proposed.

In conclusion, the report provides a useful overview of the U.S. sweetener industry and identifies the important policy issues. It would be much more useful if further analysis and evaluation of the economic impacts of alternative policy options were provided.

Sincerely,

Howard W. Hjort

HOWARD W. HJORT
Director of Economics, Policy
Analysis and Budget

(09716)

*U.S. GOVERNMENT PRINTING OFFICE: 1979 620-167/74 1-3

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