

HAWAIIAN  
SUGAR  
MANUAL  
1985/86

Hawaiian  
Sugar  
Planters'  
Association



## HAWAIIAN SUGAR COMPANIES (Listed according to principal owners)

### ALEXANDER & BALDWIN, INC.

HAWAIIAN COMMERCIAL & SUGAR CO.  
R. F. Cameron, Gen. Mgr.  
P. O. Box 266  
Puunene, Hawaii 96784  
Phone: 877-0081

McBRYDE SUGAR CO., LTD.  
D. P. Scott, Vice Pres. & Gen. Mgr.  
P. O. Box 8  
Eleele, Hawaii 96705  
Phone: 335-5333

### AMFAC, INC.

KEKAHA SUGAR CO., LTD.  
L. A. Faye, Jr., Pres. & Mgr.  
P. O. Box 549  
Kekaha, Hawaii 96752  
Phone: 337-1472

THE LIHUE PLANTATION CO., LTD.  
Hiroshi Kawazoe, Pres. & Mgr.  
P. O. Box 751  
Lihue, Hawaii 96766  
Phone: 245-2112

OAHU SUGAR CO., LTD.  
W. D. Balfour, Jr., Pres. & Mgr.  
P. O. Box 0  
Waipahu, Hawaii 96797  
Phone: 677-3577

PIONEER MILL CO., LTD.  
R. T. Vorfeld, Pres. & Mgr.  
P. O. Box 727  
Lahaina, Hawaii 96761  
Phone: 661-0592

### C. BREWER AND CO., LTD.

HILO COAST PROCESSING CO.<sup>a</sup>  
E. A. Kennett, Pres. & Gen. Mgr.  
P. O. Box 18  
Pepeekeo, Hawaii 96783  
Phone: 963-5516; 963-6669

KA'U AGRIBUSINESS CO., INC.  
I. W. Bowman, Vice Pres. & Mgr.  
P. O. Box 130  
Pahala, Hawaii 96777  
Phone: 928-8311

MAUNA KEA AGRIBUSINESS CO., INC.<sup>b</sup>  
J. A. Sasan, Vice Pres. & Mgr.  
P. O. Box 68  
Papaikou, Hawaii 96781  
Phone: 964-1025

OLOKELE SUGAR CO., LTD.  
R. B. Cushnie, Vice Pres. & Mgr.  
P. O. Box 156  
Kaunakani, Hawaii 96747  
Phone: 335-5337

WAILUKU AGRIBUSINESS CO., INC.<sup>c</sup>  
D. B. Cataluna, Vice Pres. & Mgr.  
P. O. Box 520  
Wailuku, Hawaii 96793  
Phone: 244-7079

### CASTLE & COOKE, INC.

WAIALUA SUGAR CO., INC.  
J. H. Hewetson, Pres. & Gen. Mgr.  
P. O. Box 665  
Waialua, Hawaii 96791  
Phone: 637-6284

### HAMAKUA SUGAR CO., INC.

J. A. Poppe, Exec. Vice Pres. & Gen. Mgr.  
P. O. Box 250  
Paauilo, Hawaii 96776  
Phone: 775-7261

### GAY & ROBINSON, INC.<sup>d</sup>

W. S. Robinson, President  
Makaweli, Hawaii 96769  
Phone: 338-8233

<sup>a</sup> Sugarcane milling company cooperatively owned by United Cane Planters' Cooperative and Mauna Kea Agribusiness Co., Inc.

<sup>b</sup> Mauna Kea Agribusiness Co., Inc. is a grower which delivers its cane to Hilo Coast Processing Co.

<sup>c</sup> Wailuku Agribusiness Co., Inc. is a grower whose cane is milled by Hawaiian Commercial & Sugar Co.

<sup>d</sup> Gay & Robinson, Inc. is a grower whose cane is milled by Olokele Sugar Co., Ltd.

# HSPA SUGAR MANUAL 1986

A Handbook of Statistical Information  
PUBLISHED BY

## Hawaiian Sugar Planters' Association

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## SUGAR IN HAWAII

Hawaii's sugar industry in 1985 observed its 150th year of commercial raw cane sugar production. Sugar, more than any other activity over the past century-and-a-half, helped create modern Hawaii.

The first successful plantation was started at Koloa, Kauai in 1835. Its first harvest in 1837 produced 2 tons of raw sugar which sold for \$200. Other pioneers, predominantly from the United States, soon established sugar on the islands of Maui, Oahu, and Hawaii.

Early sugar planters shared many common problems—lack of water, lack of labor, lack of markets, and trade barriers. These, along with Hawaii's isolated mid-Pacific location, created a spirit of cooperation continuing today.

Between 1852 and the end of World War II, labor shortages were eased by bringing to Hawaii contract workers from Europe, North America, and Asia. In all, nearly 385,000 workers were brought to Hawaii. Many thousands stayed, establishing Hawaii's unique ethnic mix.

Pioneer sugar planters relieved water shortages in the dry, leeward areas by developing irrigation systems which included aqueducts (beginning in 1856), artesian wells (1879), and tunnels and wells in mountains which tapped sources of fresh water (1898). This water development opened up

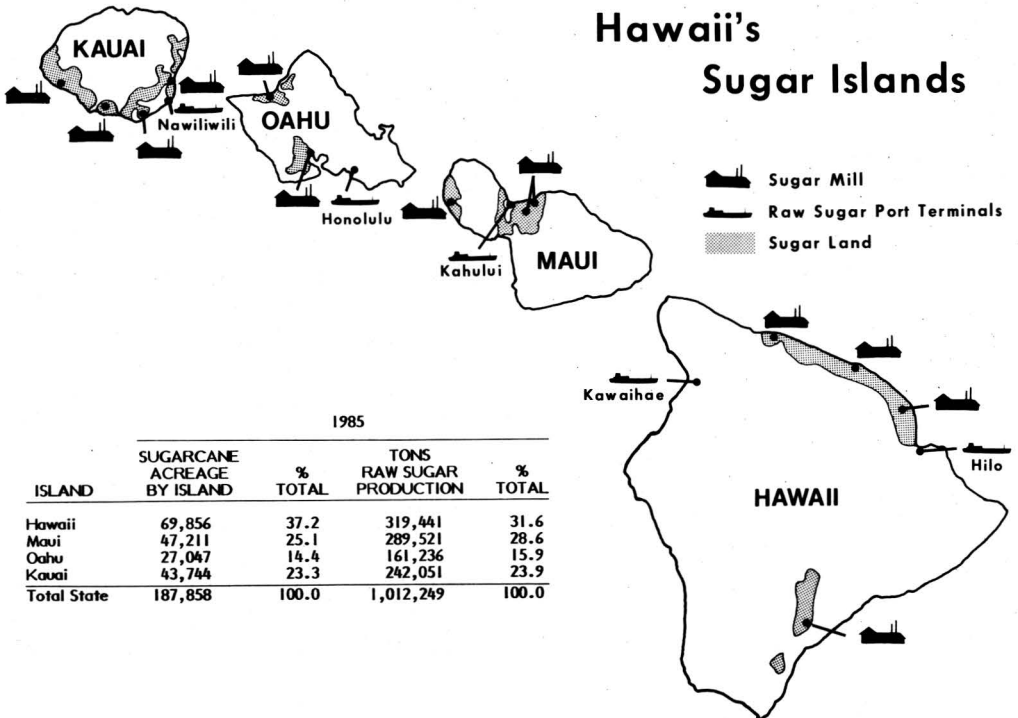
more than 100,000 acres of arid land to sugarcane cultivation.

The major trade barrier to Hawaii's closest and major market for its raw sugar was eliminated with the 1876 Treaty of Reciprocity between the U. S. and the Kingdom of Hawaii. America received a Pacific coaling station and Hawaiian sugar duty-free U. S. entry. This market was confirmed with U. S. annexation of Hawaii in 1898 following the Spanish-American War.

From 2 tons of sugar in 1837, Hawaiian production had reached only 13,000 tons by 1876; but reciprocity and annexation changed that drastically. By annexation in 1898, production had grown to 225,000 tons and would grow to 1 million tons by 1932, a level Hawaii has since averaged.

The State of Hawaii has few natural resources and must import most of its essentials—food, fuel, machinery, building materials, etc. Thus, activities capable of bringing new dollars into the economy are critical to Hawaii's balance of trade and its standard of living.

For nearly 100 years, sugar production and other agriculture was the leading economic activity, providing Hawaii its major sources of employment, tax revenues, and new capital through "exports" of raw sugar and other products.



## FACTS & FIGURES

- Sugarcane is a "monoculture" in Hawaii. Some fields have been in continuous production for 150 years.
- Hawaii is one of the few sugar areas in the world where the crop age averages two years at time of harvest.
- Hawaii yields of sugar are among the highest in the world, exceeding 12 tons an acre in 1985 (6 tons on an annual basis).
- Approximately 113,000 of Hawaii's 188,000 acres of sugarcane are irrigated, producing two-thirds of Hawaii's sugar.
- Hawaiian sugar's water system includes 115 fresh and brackish wells; 247 reservoirs with a total capacity of 10.3 billion gallons; 11 hydro-electric installations; 350 miles of major ditches; and 120 miles of tunnels.
- Replacement of the sugar water system would cost \$1.25 billion. All was built without any government subsidy.
- Hawaiian sugar provides about 25,000 direct and indirect jobs in the state.
- Direct sugar payroll, including the cost of employee benefits, exceeded \$134 million in 1985.
- Hawaii's sugar field workers have the highest standard of living of any agricultural workers in the world, with daily earnings (including benefits) averaging \$104.12 in 1985.
- Principal products of the Hawaiian sugar industry are raw sugar, molasses and electricity (primarily from biomass).
- Hawaii's sugar industry generates about 10 percent of all electricity produced in Hawaii.

However, with statehood in 1959 and the almost simultaneous introduction of jet aircraft, Hawaii's tourist industry began an extended period of rapid growth and, within a decade, became Hawaii's largest economic sector.

Today, Hawaii's economy can be likened to a three-legged stool, with the legs being tourism, federal expenditures (primarily defense-related), and agriculture. The stability of Hawaii's economy can be critically disturbed by a sudden

change or reduction in any one area.

In 1985, state tourism revenues were estimated at \$5 billion, federal defense expenditures at \$2 billion, and agriculture about \$800 million.

In the agriculture sector, sugar revenues were \$359 million, pineapple \$223 million, and diversified agriculture (macadamia nuts, papaya, flowers, etc.) revenues were estimated at \$215 million.

## HAWAIIAN SUGAR COMPANIES PRODUCTION - 1985 (Raw Value)

	Total Cane/land Acreage	Acreage Harvested	Production (short tons)	Tons Sugar Per Harvested Acre
<b>ALEXANDER &amp; BALDWIN, INC. (A&amp;B)</b>				
Hawaiian Commercial & Sugar Co. (Maui)	35,844	16,903	219,468	12.98
McBryde Sugar Co., Ltd. (Kauai)	12,512	6,001	57,065	9.51
<b>TOTAL A&amp;B</b>	<b>48,356</b>	<b>22,904</b>	<b>276,533</b>	<b>12.07*</b>
<b>AMFAC, INC. (Amfac)</b>				
Kekaha Sugar Co., Ltd. (Kauai)	8,359	3,985	50,410	12.65
The Lihue Plantation Co., Ltd. (Kauai)	15,380	7,439	82,586	11.10
Oahu Sugar Co., Ltd. (Oahu)	14,263	6,084	90,297	14.84
Pioneer Mill Co., Ltd. (Maui)	8,005	3,963	49,712	12.54
<b>TOTAL AMFAC</b>	<b>46,007</b>	<b>21,435</b>	<b>273,005</b>	<b>12.74*</b>
<b>C. BREWER AND CO., LTD. (Brewer)</b>				
Ka'u Agribusiness Co., Inc. (Hawaii)	16,012	5,678	63,708	11.20
Mauna Kea Agribusiness Co., Inc. (Hawaii)	15,852	6,980	91,937 <sup>a</sup>	13.17
Olokele Sugar Co., Ltd. (Kauai)	4,815	2,296	31,187	13.58
Wailuku Agribusiness Co., Inc. (Maui)	3,361	1,575	20,341 <sup>b</sup>	12.92
<b>TOTAL BREWER</b>	<b>40,040</b>	<b>16,529</b>	<b>207,173</b>	<b>12.53*</b>
<b>CASTLE &amp; COOKE, INC. (C&amp;C)</b>				
Waialua Sugar Co., Inc. (Oahu)	12,784	4,776	70,939	14.85
<b>HAMAKUA SUGAR CO., INC. (HSC) (Hawaii)</b>	<b>34,852</b>	<b>14,509</b>	<b>147,244</b>	<b>10.15</b>
<b>GAY &amp; ROBINSON, INC. (G&amp;R) (Kauai)</b>	<b>2,678</b>	<b>1,334</b>	<b>20,803<sup>c</sup></b>	<b>15.59</b>
<b>HILCO COAST PROCESSING CO. (HCPC) (Hawaii)</b>				
				d
<b>UNITED CANE PLANTERS' COOP. (UCPC)</b>				
(112-member growers) (Hawaii)	3,140	1,497	16,552 <sup>a</sup>	11.06
<b>TOTAL ALL COMPANIES</b>	<b>187,858</b>	<b>83,029</b>	<b>1,012,249</b>	<b>12.19</b>

a Grower only; processing by Hilo Coast Processing Co.  
 b Grower only; processing by Hawaiian Commercial & Sugar Co.  
 c Grower only; processing by Olokele Sugar Co., Ltd.  
 d Produced 108,489 tons raw sugar for growers "a."  
 \* Company average.

## SUGAR IN HAWAII—1985

During 1985, Hawaii's sugar industry successfully continued its intense efforts to increase productivity and reduce costs. While the program achieved significant gains, economic benefits were nullified by low sugar prices which continued a decline beginning in early 1984.

Hawaiian sugar's productivity and cost-cutting program began during 1981, a year in which uncontrolled entry of foreign, subsidized sugar flooded the domestic market, and caused an unprecedented \$90 million pre-tax loss for Hawaii's sugar producers.

Operations in 1985 benefited from this program. Per-acre yields of sugar set a third consecutive annual record, rising 2.8 percent above the 1984 yield to 12.2 tons. Yields in 1985 were 13.5 percent above 1981 yields.

These yield increases resulted from improved sugarcane varieties developed by HSPA's Experiment Station; from better use of water through drip irrigation (at the end of 1985, approximately 60 percent of all Hawaiian sugarcane fields were irrigated with 80 percent of them under drip); from improved agricultural and cane ripening practices; from efforts to reduce sugar losses in

cane harvesting and transportation; and from increasing recovery in processing operations.

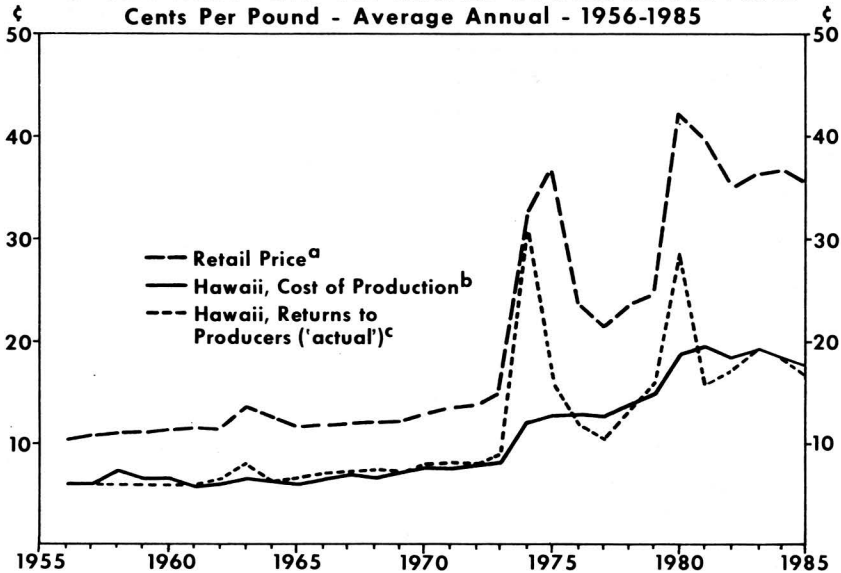
In 1985, the Hawaiian industry produced 1,012,249 tons of raw cane sugar, compared with 1,061,814 tons in 1984. The primary reason for the year-to-year reduction was harvesting 6,500 fewer acres.

Molasses production was 271,645 tons, compared with 314,202 tons in the prior year.

Electricity produced and sold to utility companies for public consumption increased 18.5 percent to 333,000 megawatt hours. In 1984, 281,000 megawatt hours were sold. The principal reason for the year-to-year increase was the end of the 1984 drought which increased mountain water ditch flows and reduced power requirements to operate irrigation systems.

Production costs were reduced. The average industry direct cost of raw sugar production was \$20 a ton below 1984 costs. Per-pound costs in 1985 were 17.3 cents-a-pound--5.5 percent less than the 18.3 cents of prior year, and 13.4 percent below those of 1981. (During the same five-year period inflation increased 13.6 percent).

**HAWAIIAN RAW SUGAR COST OF PRODUCTION, RETURN TO GROWERS AND U.S. REFINED SUGAR RETAIL PRICE**  
Cents Per Pound - Average Annual - 1956-1985



<sup>a</sup> U.S. price granulated sugar at retail.

<sup>b</sup> Hawaii cost of production (raw value basis) is weighted average annual cost of producers who grow and mill sugarcane. Source: HSPA. (Note: From 1956-1971, cost of transportation of raw sugar and molasses was paid by the producers; since 1972 by C & H; thus costs have been slightly lower than they would have been without the change, but returns have been reduced by the same amount.)

<sup>c</sup> Returns to Hawaii producers represents sales of raw sugar and molasses by C & H. Does not include compliance payments made under the U. S. Sugar Act which terminated in 1974. Such payments averaged less than 1/2 cent per pound. Does not include payments under the 1977 U.S. program which amounted to 2-3/4 cents per pound for one crop only. Sources: 1956-76, USDA Agricultural Statistics; 1977-85, USDA Sugar and Sweetener Reports; HSPA.

Gains in productivity and cost control, however, were more than offset by prices which declined faster than the industry could lower costs.

Reason for the price decline, which substantially reduced grower returns, was a surplus of available sugar in the domestic market.

This was caused by a number of factors, including excessive foreign sugar import quotas, an underestimation of domestic production, imports of sugar blends and high-sugar content products. The situation was compounded in November 1984 when major soft drink manufacturers switched their product sweetening formulas to all high-fructose corn syrups, eliminating the use of sugar.

Raw sugar prices fell below the Farm Act's market stabilization price in November 1984 and remained below it throughout 1985. This intensified price competition among domestic producers, especially in the western U. S. where Hawaiian cane sugar competes with western beet sugar.

As a consequence, total Hawaiian sugar industry revenues declined to \$358.8 million, 11.5 percent less than in 1984 (\$405.4 million). Almost all island sugar planters lost money in 1985 and the industry posted a net loss greater than the year before.

During 1985, the Hawaiian industry authorized C&H Sugar Co. to construct 100,000 tons of additional raw sugar storage capacity in Hawaii.

C&H is the cooperative marketing and refining organization proportionately owned by Hawaii's sugar companies. It also is responsible for storage and transportation of raw sugar.

C&H constructed a 60,000-ton warehouse at Puunene, Maui adjacent to a mill operated by Hawaiian Commercial & Sugar Co., and a 40,000-ton sugar house at Haina, Hawaii near a mill operated by Hamakua Sugar Co. The new storage capacity, when combined with the industry's existing five bulk sugar shipping terminals, increased total capacity to 340,000 tons, a third of a normal year's production.

Benefits expected from this \$2.9 million investment include:

1. Larger and more readily available supplies to assist C&H raw sugar sales programs.
2. Greater shipping flexibility and more efficient use of ships required to move Hawaiian raws to mainland markets.
3. More available storage space for Hawaiian growers with which to utilize the Farm Act's sugar loan program when market prices are depressed below the price support level.
4. Permit Hawaiian sugar harvesting and milling operations to continue longer in the event of prolonged work stoppages outside the industry.

## Sugar Lands

The Hawaiian Islands make up America's fourth smallest state. The Islands are the tops of volcanic mountains, some still active. Only certain low lands near the coasts are tillable because of the rugged terrain and character of the soils. The balance is in forest, pasture, conservation, or unuseable land.

Hawaii's sugar companies are located along the coastlines of four islands and push upwards into foothills and mountains.

In 1985 nearly 188,000 acres were devoted to sugarcane cultivation with another 21,000 acres used for mill sites, private roads, irrigation systems, etc.

### Island Land Areas with Sugar

Island	Length Miles	Width Miles	Area		1985 Total Sugar Acres <sup>b</sup>
			Square Miles <sup>a</sup>	Acres 000's	
Hawaii . . .	93	76	4,038	2,584	69,856
Maui . . . .	48	26	729	466	47,211
Oahu . . . .	44	30	608	388	27,047
Kauai . . . .	33	25	553	354	43,744
Molokai . . .	38	10	261	167	--
Lanai . . . .	18	13	139	89	--
Niihau . . .	18	6	73	46	--
Kahoolawe .	11	6	45	28	--
Minor Islands . . .	--	--	4	2	--
Total . . . . .			6,450	4,128	187,858

<sup>a</sup> Includes inland water.

<sup>b</sup> Excludes mill sites, roads, etc.

## WAGES & WORKING CONDITIONS

Hawaii's sugar workers, both field and factory, are members of the International Longshoremen's and Warehousemen's Union (ILWU). A contract negotiated with the ILWU, from February 1, 1983 through January 31, 1985, and extended to January 31, 1986, included wage rates from a minimum (Grade I) of \$7.00 to \$9.79 (Grade XI) per hour. Effective February 1, 1986 wage rates were extended to February 1, 1987, at which time they will increase 3.3 percent, with Grade I employees receiving \$7.23 per hour and Grade XI employees earning \$10.115 an hour.

Unlike some farming areas where crops are seasonal, Hawaii's sugar industry provides year-round, long-term employment.

In 1985 the payroll for all Hawaii's sugar workers amounted to \$134,176,100, with daily earnings (wages and benefits) averaging \$104.12.

Year-round employees receive up to four weeks

vacation with pay, 10 paid holidays a year; paid sick leave for up to 54 days plus a temporary disability supplement for extended illness, a medical plan, a family dental care plan, retirement pensions, severance pay, and many other benefits.

**Approximate Employment by Occupation at Sugar Companies**

Factory . . . . .	1,440
Field . . . . .	3,750
Clerical . . . . .	200
Miscellaneous . . . . .	650
Supervisors. . . . .	870
Total . . . . .	6,910

**AVERAGE RAW SUGAR PRICE, EARNINGS, EMPLOYEES & MAN-DAYS**

**All Hourly Rated Employees Only, On Hawaiian Sugar Plantations**

	Average New York Raw Sugar Price cents per pound (Hawaiian Basis) <sup>a</sup>	Average Daily Wages <sup>b</sup>	Value Average Daily Employee Benefits	Total Value Average Daily Wages/Benefits	Adult Hourly Rated Employees <sup>c</sup>	Total Man-Day: Hourly Rated Employees
1940	2.78	\$ 2.18	NA	NA	35,062	9,994,863
1945	3.75	5.10	NA	NA	20,806	6,350,489
1950	5.93	8.30	NA	NA	19,340	5,069,682
1955	5.95	10.62	NA	NA	15,935	3,896,761
1960	6.31	13.18	4.40	17.58	12,111	2,917,459
1965	6.75	18.40	6.50	24.90	10,346	2,505,839
1970	8.08	24.24	10.00	34.23	8,908	2,139,183
1971	8.52	26.08	10.27	36.35	8,610	2,077,011
1972	9.10	29.09	11.23	40.32	8,127	1,934,563
1973	10.30	30.86	12.48	43.34	7,900	1,897,369
1974	29.43	34.41	15.81	48.73	7,700 <sup>d</sup>	1,744,346 <sup>d</sup>
1975	22.49	37.34	15.66	53.00	7,800	1,937,973
1976	13.31	43.12	17.28	60.40	7,500	1,854,272
1977	11.11 <sup>e</sup>	43.92	19.97	63.89	7,200 <sup>f</sup>	1,660,298 <sup>f</sup>
1978	13.74	47.06	21.28	68.34	7,200	1,771,530
1979	15.20 <sup>g</sup>	50.49	22.21	72.70	7,065	1,762,838
1980	30.18	56.72	24.68	81.40	7,076	1,793,237
1981	19.74	61.51	27.71	89.22	7,282	1,806,020
1982	19.94	65.11	30.83	95.94	6,816	1,519,732
1983	22.04	66.80	32.00	98.80	6,543	1,565,928
1984	21.74	68.88	34.71	103.59	6,319	1,467,127
1985	20.39 <sup>h</sup>	68.72	35.40*	104.12*	5,751	1,323,525

<sup>a</sup> Hawaiian basis is the average New York raw sugar price computed over all the days in the year. The New York price is computed for days the New York market is operating.

<sup>b</sup> Cash wage only. Does not include "employee benefits."

<sup>c</sup> Prior to 1947 included only male adults.

<sup>d</sup> 1974: industry-wide strike, 6 weeks.

<sup>e</sup> New York spot price discontinued Nov. 2, 1977; after that date based on Clearing Association settlement prices.

<sup>f</sup> 1977: industry-wide strike, 3 weeks.

<sup>g</sup> New York spot price reinstated on Aug. 20, 1979.

<sup>h</sup> New York spot price "nearby futures," effective June 1985.

\* Estimated.

NA = Not available.



# INDUSTRY ORGANIZATION

## Hawaiian Sugar Planters' Association

On March 23, 1882, sugar growers in the then Kingdom of Hawaii met and organized the Planters' Labor and Supply Company. This organization evolved into the Hawaiian Sugar Planters' Association, with a change in name and bylaws in 1895, but with no break in the objectives, membership, etc., from the Planters' Labor and Supply Company.

The Association is a voluntary, nonprofit, incorporated association organized for the maintenance, advancement, improvement, and protection of the sugar industry in Hawaii and the support of a sugarcane research station. Companies engaged primarily in the business of growing sugarcane and manufacturing sugar from it are plantation members of the Association; individuals who are directly connected with the direction, management, or operation of the sugar companies are individual members.

The Association compiles information, answers inquiries, and coordinates activities on problems of common interest and concern to its members. In addition to the Association's staff, many of these functions are carried out through the following standing committees: Accounting, Energy, Environmental Standards, Experiment Station Advisory, Industrial Relations, Insurance, Land and Water, Legal Advisory, Legislative, Public Relations, Raw Sugar Technical, Retirement Plans, and Tax.

The Association has maintained an office in Washington, D. C. since 1898. A vice president represents member company interests in federal legislative, administrative, and regulatory activities.

### HSPA Experiment Station

The Association's single largest program is research conducted through its Experiment Station. The station conducts research on sugarcane for the benefit of all sugarcane growers and processors in Hawaii. Industry research began in 1895 and has made consistent and substantial improvements in methods of growing and processing sugarcane.

The largest, single program in the Experiment Station is the development of new sugarcane varieties. The station has been a world leader in developing methods of breeding sugarcane. Other important contributions have been development of irrigation systems and methods of insect, disease, weed, and rat control. It has improved sugarcane factory processes and methods of factory process control, and its work has resulted in higher sugar recovery and in improvements on raw sugar quality. Although its research is directed at practical problems in growing and milling sugarcane, it performs basic research on the basic physiology and biochemis-

try of the sugarcane plant when such information is not available from other sources.

The Experiment Station provides many important services to its member companies, such as analyses of raw sugar and molasses; plant and soil analyses to determine fertilizer needs; repair and calibration of sugar factory instruments; field, factory, and factory laboratory audits; and training courses for employees of member companies.

In addition to its headquarters, offices and laboratories in Aiea on Oahu, the Experiment Station has substations on each of the four islands on which sugarcane is grown--Oahu, Maui, Kauai, and Hawaii. One of its principal substations on the Island of Oahu exists specifically for the purpose of maintaining breeding varieties and for crossing them to develop improved varieties. The Experiment Station also has a large and complete library, with a collection of reference books and periodicals on sugarcane growing and milling, as well as a comprehensive collection of journals and reference books on agriculture, chemistry, and engineering.

## California and Hawaiian Sugar Company

The California and Hawaiian Sugar Company (C & H) was founded in 1906 and has been an agricultural cooperative marketing association since 1921. It is proportionately owned by its 13 member sugar producing companies in Hawaii. It also serves the approximately 125 independent sugarcane farmers in Hawaii.

C & H is the nation's leading sugar brand. The company operates refineries at Crockett, California, and Aiea, a suburb of Honolulu, Hawaii. The company markets all raw sugar and molasses produced in Hawaii. Except for some raw sugar sold to other refineries, C & H refines, packages and markets the output of Hawaii's 13 sugar factories.

C & H's primary market is the western United States, although some sugar is sold as far east as the Mississippi River. More than 100 types, grades, and package sizes are sold within two major groupings of grocery and industrial products.

Over the past decade, annual sales of C & H have averaged \$507 million, returning an average of \$362 million a year to Hawaii's raw sugar producers. The company employs approximately 1,300 persons in mainland refining and marketing operations and about 70 persons at its Aiea refinery. The C & H payroll totals about \$39 million annually.

John B. Bunker is president and chief executive officer of C & H. Company headquarters are at One California Street, San Francisco, CA 94111.



## U. S. SWEETENER INDUSTRY

More than 15.5 million tons of natural, caloric sweeteners--virtually all cane and beet sugar and corn syrups--were consumed in the U.S. during 1985. On a per capita basis, that means an estimated 239.7 million Americans each consumed 129.8 pounds of caloric sweeteners.

Consumption is increasing. In the 1970s it averaged 123.2 pounds per person. In the first

Of the 5.97 million tons of (raw basis) sugar produced in the U. S. in 1985, approximately 2.95 million tons were from sugar beets and 3.0 million from sugarcane. Imported raw cane sugar totaled 2.5 million tons. Sugar deliveries for all uses totaled 7.5 million tons (refined).

### Cane Sugar Production

Sugarcane is grown and milled in the states of

## U. S. CALORIC SWEETENER USE 1975, 1981-1985 Millions Short Tons - Dry Basis

	Sugar Raw <sup>a</sup>	Sugar Refined	High Fructose Corn Syrup	Total Corn Sweeteners HFCS, Glucose & Dextrose	Honey & Edible Syrups	Total
1975	10.30	9.63	0.54	2.97	0.15	12.75
1981	9.77	9.13	2.67	5.12	0.14	14.39
1982	9.16	8.56	3.10	5.60	0.15	14.31
1983	8.92	8.33	3.60	6.12	0.15	14.61
1984	8.57	8.01	4.30	6.84	0.17	15.02
1985	8.11	7.58	5.20	7.77	0.17	15.52

<sup>a</sup> Raw sugar figure obtained by multiplying refined sugar by conversion factor of 1.07.

Source: USDA Sugar and Sweetener Outlook and Situation Report, Vol. 11(1), March 1986.

six years of the 1980s, per capita use averaged 125.8 pounds.

The balance of national sweetener needs were met by chemical low- and non-caloric sweeteners--aspartame and saccharin, respectively. Combined per capita consumption of the two chemicals in 1985 has been estimated at 17 pounds (sugar equivalent basis).

Total per capita consumption of all types of sweeteners in 1985 is estimated at 146.8 pounds.

Approximately 80 percent of all caloric sweeteners is consumed as ingredients in industrial products--cereal and bakery products, confections, ice cream and other dairy products, beverages, prepared foods, and jams and jellies.

The remaining 20 percent of consumption is direct--purchased from wholesalers, jobbers, etc., and retailers for use in homes, restaurants, by government and other institutions.

In 1985, slightly less than half of all caloric sweeteners used was sugar--domestic and imported cane sugar, and domestic beet sugar. A little more than half was corn sweeteners--high-fructose, glucose and dextrose corn syrups. Also, small amounts (about 1.4 pounds per capita) of edible syrups and honey were consumed.

### SUGAR INDUSTRY

American sugar needs are met from domestic and foreign sources. In 1985, the U. S. produced nearly 70 percent of its sugar needs. The balance was imported from 39 nations.

Florida, Hawaii, Louisiana and Texas, and in the Commonwealth of Puerto Rico.

Sugarcane is a one-year crop (10 to 15 months) in all but Hawaii where it averages two years.

Florida is the leading raw cane sugar producing state (1.4 million tons estimated in 1985), followed by Hawaii (1.0 million tons), Louisiana (0.5 million tons), Texas (0.07 million tons) and Puerto Rico (0.1 million tons).

Hawaii produces the most sugar per acre. In 1985, yields were 12.2 tons an acre (6.1 tons on an annualized basis). Hawaii was followed by Florida (3.68 tons), Louisiana (2.35 tons), Texas (2.30 tons) and Puerto Rico (1.8 tons).

In 1985, 47 raw sugar factories were reported operating; in 1975--62.

U. S. raw sugar production increased from an average of about 2.7 million tons (1975-77) to 3.0 million in 1985, due chiefly to the expansion of the Florida industry (803,000 tons in 1975 versus 1.4 million tons in 1985). During the same time frame, Puerto Rico production declined about 200,000 tons and Hawaii production dropped about 60,000 tons.

### Beet Sugar Production

Sugarbeets in 1985 were grown on 1.1 million acres in 12 mid-west, great plains, and western states.

The leading sugarbeet-producing states in 1985

were Minnesota, California, Idaho, and North Dakota.

In 1985, 22.6 million tons of harvested sugarbeets were processed in 35 beet sugar factories. Production was 2.95 million tons (raw value) of beet sugar. Production averaged 3.8 million tons during 1975-77. Thirty-five beet sugar factories were reported in operation in 1985, compared with 56 in 1975. Two Colorado factories may reopen in 1986.

Although beet sugar production is converted to a raw basis for comparison purposes, beets are processed in a single operation to refined sugar. This is unlike sugarcane which is first processed into raw sugar and then shipped in bulk to refineries serving large urban centers.

Cane sugar refined tonnage has dropped in recent years reflecting a reduction of foreign imports.

### CORN SWEETENERS INDUSTRY

Corn is grown in significant quantities in 26 states. In 1985, the USDA estimated 500 million bushels of corn were used to produce 7.8 million tons (dry weight basis) of corn sweeteners for food, other uses, and for export. That

production was 14 percent greater than in 1984 and 27 percent above 1983.

The dominant corn sweetener product is high-fructose corn syrup (HFCS), a relatively new product that has taken almost all of the U.S. liquid sweetener market from sugar producers. Glucose syrup and dry dextrose also are produced from corn.

HFCS manufacturers have been able to make rapid strides in dominating the liquid sweetener market because they have been able to price the product consistently under sugar. HFCS is one of a group of co-products produced by corn wet millers. Co-products include starch, crude corn oil, gluten feed, and gluten meal.

HFCS is mostly sold as HFCS-55 or HFCS-42. The numerals indicate the percent of fructose in the mixture, with "55" being the equivalent sweetness of sugar. There is also a HFCS-90.

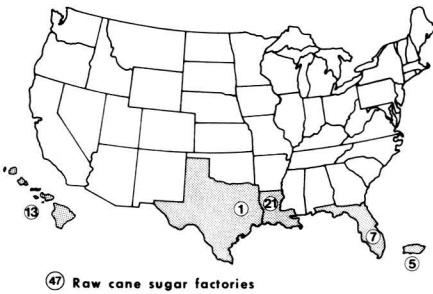
Actual price discounts of HFCS to refined sugar will vary due to a number of factors, foremost of which is the price of sugar. Other factors include demand, excess or limited plant capacity, and variable stocks of corn, soybeans and

(continued on p. 16)

## U.S. SOURCES OF CALORIC SWEETENERS

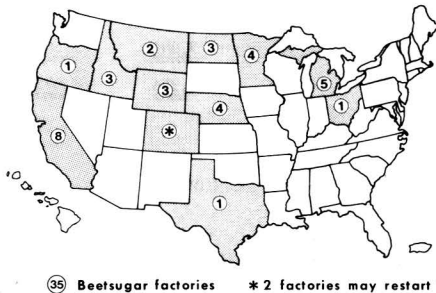
### SUGARCANE STATES-4

plus Puerto Rico



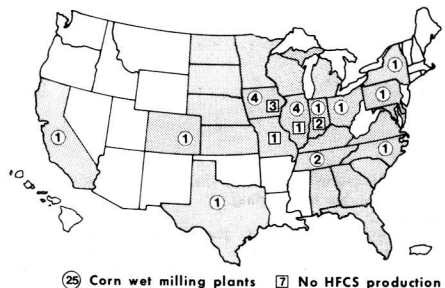
Thirty-two states produce sugarcane, sugar beets and corn used to manufacture caloric sweeteners for America. Sugarcane is processed into raw sugar in 47 mills located in four states plus Puerto Rico. Sugar beets are refined to beet sugar in 35 factories operating in 15 states. Corn is processed into corn syrup products in 25 plants located in 12 states. Raw sugar is refined to a finished state in 16 refineries located in 10 states (See map, page 16). About 30 percent of the sugar consumed in the U. S. is imported.

### SUGARBEET STATES-12



### CORN STATES-26

(more than 500,000 bushels each)



# U. S. SUGAR SUPPLY SOURCES 1981 - 1985

(1,000 Short Tons - Raw Value, Calendar year)

DOMESTIC	1981	1982	1983	1984	1985
<b>Cane Sugar:</b>					
Florida . . . . .	963	1,307	1,223	1,412	1,400
Hawaii . . . . .	1,048	983	1,044	1,062	1,012
Louisiana . . . . .	712	675	603	452	530
Texas . . . . .	110	98	60	81	72
<b>Total Cane</b> . . . . .	<u>2,833</u>	<u>3,063</u>	<u>2,930</u>	<u>3,007</u>	<u>3,014</u>
<b>Beet Sugar:</b> . . . . .	<u>3,388</u>	<u>2,737</u>	<u>2,699</u>	<u>2,905</u>	<u>2,952</u>
<b>Subtotal</b> . . . . .	<u>6,221</u>	<u>5,800</u>	<u>5,629</u>	<u>5,912</u>	<u>5,966</u>
<b>FOREIGN</b>					
<b>WESTERN HEMISPHERE:</b>					
<b>Caribbean Islands:</b>					
Dominican Republic . . . . .	761	363	457	533	474
Other <sup>a</sup> . . . . .	<u>30</u>	<u>55</u>	<u>86</u>	<u>93</u>	<u>56</u>
<b>Total<sup>b</sup></b> . . . . .	<u>791</u>	<u>418</u>	<u>543</u>	<u>626</u>	<u>530</u>
<b>Central America:</b>					
Belize (British Honduras) . . . . .	56	48	31	29	14
Costa Rica . . . . .	82	57	64	92	3
El Salvador . . . . .	46	68	78	68	77
Guatemala . . . . .	224	61	150	151	113
Honduras . . . . .	95	74	108	100	50
Nicaragua . . . . .	80	51	62	6	6
Panama . . . . .	104	93	150	61	68
<b>Total<sup>b</sup></b> . . . . .	<u>687</u>	<u>452</u>	<u>643</u>	<u>507</u>	<u>331</u>
<b>Other North America:</b>					
Canada . . . . .	3	35	13	15	19
Mexico . . . . .	(c)	(c)	33	(c)	18
<b>Total<sup>b</sup></b> . . . . .	<u>3</u>	<u>35</u>	<u>46</u>	<u>15</u>	<u>37</u>
<b>South America:</b>					
Argentina . . . . .	444	171	219	221	163
Bolivia . . . . .	8	36	52	9	19
Brazil . . . . .	1,099	273	363	356	340
Colombia . . . . .	166	36	73	58	181
Ecuador . . . . .	55	26	--	19	28
Peru . . . . .	--	76	90	108	100
Other <sup>d</sup> . . . . .	<u>146</u>	<u>52</u>	<u>58</u>	<u>45</u>	<u>11</u>
<b>Total<sup>b</sup></b> . . . . .	<u>1,863</u>	<u>670</u>	<u>855</u>	<u>816</u>	<u>842</u>
<b>Total Western Hemisphere<sup>b</sup></b> . . . . .	<u>3,344</u>	<u>1,575</u>	<u>2,087</u>	<u>1,964</u>	<u>1,740</u>
<b>EASTERN HEMISPHERE:</b>					
Australia . . . . .	715	169	217	256	134
China, Taiwan . . . . .	(c)	62	33	35	26
Fiji Islands . . . . .	24	19	35	32	--
India . . . . .	(c)	(c)	30	(c)	20
Malagasy . . . . .	12	--	16	16	12
Malawi . . . . .	88	28	5	37	40
Mauritius . . . . .	--	19	30	34	11
Mozambique . . . . .	40	22	28	28	10
Philippines . . . . .	239	203	262	416	347
South Africa . . . . .	--	36	47	83	58
Swaziland . . . . .	192	82	40	48	18
Thailand . . . . .	262	322	16	43	37
Zimbabwe . . . . .	92	102	34	43	16
Other <sup>e</sup> . . . . .	<u>98</u>	<u>--</u>	<u>60</u>	<u>8</u>	<u>38</u>
<b>Total Eastern Hemisphere<sup>b</sup></b> . . . . .	<u>1,670</u>	<u>1,064</u>	<u>853</u>	<u>1,079</u>	<u>767</u>
<b>TOTAL U. S. IMPORTS<sup>b</sup></b> . . . . .	<u>5,014</u>	<u>2,639</u>	<u>2,940</u>	<u>3,047</u>	<u>2,507</u>
<b>TOTAL U. S. SUPPLY</b> . . . . .	<u>11,235</u>	<u>8,439</u>	<u>8,569</u>	<u>8,956</u>	<u>8,473</u>

<sup>a</sup> Other 1985 - with tons in ( )--includes Barbados (18), Jamaica (23), St. Kitts (5), and Trinidad (10).

<sup>b</sup> May not add due to rounding.

<sup>c</sup> Less than 0.5.

<sup>d</sup> Other 1985 - with tons in ( )--Guyana (6), Uruguay (5).

<sup>e</sup> Other 1985 - with tons in ( )--Congo (9), Gabon (4), Ivory Coast (12), Papua, New Guinea (13), and Belgium, France, United Kingdom, West Germany and Hong Kong all less than 0.5.

Source: Imported Sugar--Domestic Sugar -- USDA Sugar and Sweetener Outlook and Situation Report, Vol. 11(1), March 1986; 1984, Vol. 10(2), July/1985; 1981-83 Vol. 9(1), March 1984.

## U.S. PER CAPITA CONSUMPTION OF ALL SWEETENERS IN POUNDS - 1970 - 1985

CALORIC SWEETENERS												NON- & LOW CALORIC SWEETENERS			Total all	
Cal. Year	Refined cane and beet sugar				Corn Sweeteners <sup>a</sup>				Minor Caloric <sup>a</sup>			Total caloric <sup>b</sup>	Saccharin	Aspartame		Total non & low caloric <sup>c</sup>
	U. S. A.		Im-ported (Cane)	Total	Syrups			Total	Honey	Edible syrup	Total					
	Beet	Cane			High fructose	Glu-cose	Dex-trose									
1970	31.3	25.0	45.4	101.7	0.7	14.0	4.6	19.3	1.0	0.5	1.5	122.5	5.8	0	5.8	128.3
1971	30.6	22.9	48.6	102.1	0.9	14.9	5.0	20.8	0.9	0.5	1.4	124.3	5.1	0	5.1	129.4
1972	30.3	25.3	46.7	102.3	1.3	15.4	4.4	21.1	1.0	0.5	1.5	124.9	5.1	0	5.1	130.0
1973	30.2	24.7	45.9	100.8	2.1	16.5	4.8	23.4	0.9	0.5	1.4	125.6	5.1	0	5.1	130.7
1974	25.8	20.8	49.0	95.6	3.0	17.2	4.9	25.1	0.7	0.4	1.1	121.9	5.9	0	5.9	131.5
1975	30.1	24.6	34.4	89.1	5.0	17.5	5.0	27.5	1.0	0.4	1.4	118.1	6.1	0	6.1	124.2
1976	32.0	22.4	39.0	93.4	7.2	17.5	5.0	29.7	0.9	0.4	1.3	124.4	6.1	0	6.1	130.5
1977	29.8	22.9	41.5	94.2	9.5	17.6	4.1	31.2	1.0	0.4	1.4	126.8	6.6	0	6.6	133.4
1978	27.4	22.9	41.2	91.5	12.1	17.8	3.8	33.7	1.1	0.4	1.5	126.6	7.1	0	7.1	133.7
1979	26.5	21.1	41.7	89.3	14.9	17.9	3.6	36.4	1.0	0.4	1.4	127.1	7.4	0	7.4	134.3
1980	26.9	24.3	32.5	83.6	19.1	17.6	3.5	40.2	0.8	0.4	1.2	125.1	7.7	0	7.7	132.8
1981	25.6	21.5	32.4	79.4	23.2	17.8	3.5	44.5	0.8	0.4	1.2	125.1	8.0	0.2	8.2	133.3
1982	25.4	23.5	24.9	73.7	26.7	18.0	3.5	48.2	0.9	0.4	1.3	123.2	8.4	1.0	9.4	132.6
1983	23.1	24.0	23.9	71.1	30.7	18.0	3.5	52.2	1.0	0.4	1.4	124.6	9.5	3.5	13.0	137.6
1984	21.5	21.8	24.2	67.7	36.3	18.0	3.5	57.9	1.0	0.4	1.4	126.9	10.0	5.8	15.8	142.7
1985	NA	NA	NA	63.4	43.5	18.0	3.5	65.0	1.0	0.4	1.4	129.8	6.0	11.0	17.0	146.8

<sup>a</sup> Dry basis.

<sup>b</sup> May not add precisely due to rounding.

Source: 1970-83 USDA Sugar and Sweetener Outlook and Situation Report, Vol. 9(4), December 1984; 1984-85 USDA Sugar and Sweetener Outlook and Situation Report, Vol. 11(1), March 1986.

<sup>c</sup> Assumes saccharin 300 times as sweet as sugar; aspartame 200 times.

Source: USDA Sugar and Sweetener Outlook and Situation Report: 1970-77 - Vol. 4(5), May 1979; 1978-79 - Vol. 10(2), July 1985; 1975, 1980-85 - Vol. 11(1), March 1986.

other feed and oil products. Nonetheless, HFCS always remains priced under sugar.

In 1985, HFCS production was 5.2 million tons (dry weight basis). Combined glucose and dextrose production was 2.6 million tons.

Twenty-five plants in 12 states produce corn syrups. HFCS is produced in 18 factories in 11 states. The seven other plants produce only glucose and/or dextrose.

**Cane Sugar Refining**

Sixty-three percent of all refined sugar consumed in the U. S. comes from sugarcane. In 1985, 3.0 million tons of domestic and 2.2 million tons of imported raw sugar were refined in 16 U. S. refineries located in 10 states. Most U. S.

cane sugar is refined in 13 refineries located in seven Gulf and East coast states. The large C&H refinery located near San Francisco handles Hawaiian raw sugar while the C&H refinery in Honolulu meets Hawaii State granulated and liquid sugar needs.

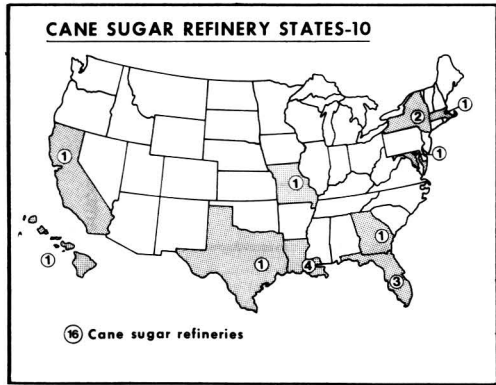
**SWEETENER MARKET**

The U. S. caloric sweetener market, which has undergone considerable change over the past decade, may be entering a period of relative stability with both sugar and corn sweetener growth tied to increases in the population.

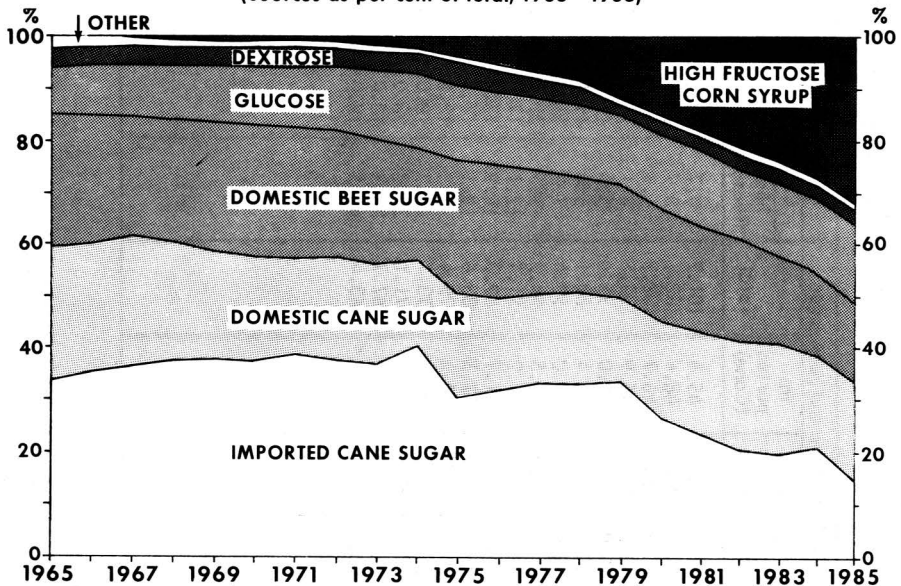
Further market gains by corn sweeteners, especially HFCS, which, on the basis of price, has taken the liquid sweetener market from sugar, appears limited under present technology.

HFCS sales rose almost 900,000 tons in 1985 primarily because of decisions made in November 1984 by Coca-Cola, Pepsi-Cola to switch from a combination of sugar and HFCS sweetening formulas to all-HFCS. The USDA estimates HFCS production may increase 100,000 to 150,000 tons in 1986 due to some continued sugar substitution and population increase. Total HFCS gains, however, may be reduced by additional non- and low-caloric sweetener use, particularly in soft drinks.

Saccharin use in 1985 is estimated at 6.0 pounds a person (sugar equivalent basis), down from 10.0 pounds in 1984. This was due to many soft drink bottlers switching to all-aspartame-sweetened



**UNITED STATES PER CAPITA CALORIC SWEETENERS CONSUMPTION**  
(Sources as per cent of total, 1965 - 1985)



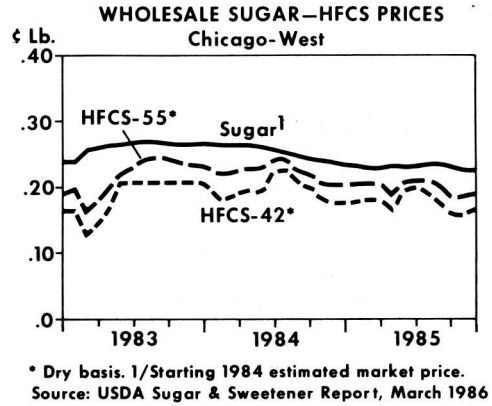
Source: 1962-1982: Based on data from USDA Sugar and Sweetener Report, Vol. 8(2), June 1983. 1983; 1983-1985: Vol. 11(1), March 1986: Based on data received from USDA Economic Research Service, April 1984.

products. Aspartame consumption in 1985 has been estimated at 11 pounds (sugar equivalent basis), mostly through diet soft drinks. Further market gains of these two sweeteners appears limited to soft drinks because of technological limitations and government approvals needed for use in other products.

Total sugar deliveries in 1985 again declined--by 390,000 tons. But gains in some industrial and non-industrial classifications of use helped offset a loss of 569,000 tons in beverage deliveries.

Gains were reported in bakery and cereal products and in ice cream and dairy products--2.3 percent in total food products use if beverage losses are excluded. In the non-industrial use category, overall increases were 2.9 percent.

U. S. raw sugar prices were depressed in 1985 as a result of Federal Administration decisions on the size of the 1984/85 and 1985/86 foreign sugar import quotas. A fourth-quarter 1985 raw sugar average price of 19.15 cents a pound, was the lowest quarterly price average since the first



quarter of 1982, a period without foreign sugar quotas.

Prices for corn sweeteners also were lower in 1985, in part because of continued price-positioning of HFCS beneath the price umbrella

### U.S. SUGAR DELIVERIES TO INDUSTRIAL & NON-INDUSTRIAL USERS 1981 - 1985

1,000 Short Tons - Refined

	1981	1982	1983	1984	1985
<u>INDUSTRIAL USE</u>					
Food Products:					
Bakery/Cereals	1,306	1,296	1,387	1,404	1,499
Confectionery	983	940	1,087	1,115	1,060
Processed Foods	484	450	454	433	422
Dairy	459	404	385	408	441
Other	581	526	431	416	438
Subtotal	3,813	3,616	3,744	3,776	3,860
Beverages	1,852	1,583	1,284	908	339
Total Industrial	5,665	5,199	4,992	4,684	4,199
<u>NON-INDUSTRIAL USE</u>					
Institutions <sup>a</sup>	259	177	195	209	204
Wholesalers, Jobbers <sup>b</sup>	2,001	1,951	1,713	1,744	1,884
Retail Grocery	1,161	1,086	1,168	1,100	1,061
Total Non-Industrial	3,421	3,214	3,076	3,053	3,149
Total Food/Beverage Use	9,086	8,413	8,068	7,736	7,341
Other Use <sup>c</sup>	126	106	131	127	131
TOTAL USE	9,212	8,519	8,199	7,863	7,472
Consumer-size Packages <sup>d</sup>	2,425	2,310	2,314	2,274	2,184
Redistributed to industrial, other users <sup>e</sup>	737	727	567	570	761
TOTAL <sup>f</sup>	3,162	3,037	2,881	2,844	2,945

<sup>a</sup> Includes eating, drinking places, government and military.

<sup>b</sup> Includes sugar dealers.

<sup>c</sup> Largely pharmaceuticals and some tobacco.

<sup>d</sup> Less than 50 pounds.

<sup>e</sup> Includes some institutions.

<sup>f</sup> Equal to total of wholesalers and retail.

Source: USDA Sugar and Sweetener Outlook and Situation Report, Vol. 11(1), March 1986.



of sugar, and because of lower corn prices, added plant capacity, and competition from aspartame and saccharin.

## U. S. SUGAR LEGISLATION

Sugar in the U. S.—and elsewhere in the world—has always been under some form of government control.

A tariff on sugar to support federal government activities was the first piece of general legislation enacted by the first U. S. Congress in 1789. Tariffs on sugar imports remained an important source of government revenue until enactment of federal income and corporate taxes early in this century.

### U. S. Sugar Act

From 1934 to 1974, sugar production, wages and working conditions, and other aspects of U. S. sugar, were governed by a series of laws known as the Sugar Act. This separate legislation was in contrast to omnibus farm law which encompassed other major commodity programs, also enacted during the great depression of the 1930s.

The Sugar Act also was unique in that it was self-supporting. A refiners' tax of 1/2-cent a pound supported the cost of administering the law and of compliance payments made to sugar farmers who agreed to operate under the legislation.

During the 40 years of successive sugar laws, the U. S. Treasury collected more than \$500 million above its cost of administration.

Additionally, American consumers benefited from a stable supply of sugar at reasonable prices. Only twice during the four decades of this law's life did price increases of refined sugar substantially exceed increases of the Department of Labor's annual index of all food prices at wholesale. That was in 1963 and again in 1974 when world shortages caused sugar prices—fueled by speculative buying—to rise sharply. The same index reveals sugar prices were generally above the index and more volatile between 1860 and 1934.

With defeat of the Sugar Act in 1974, the U. S. abandoned a cohesive national sugar policy until 1981. This seven year period was chaotic for American sugar producers. Excess world production, failure to achieve an effective International Sugar Agreement, and little control of subsidized sugar imports into the U. S. threatened survival of the domestic sugar industry, the nation's sixth largest farm-tonnage crop. Concurrently, high-fructose corn syrup began taking away the liquid sweetener market from sugar, intensifying price competition within a shrinking market.

### U. S. Farm Act of 1981

In 1981, Congress, for the first time, included sugar as a permanent program with other major farm commodities in national farm policy

legislation—the Agriculture and Food Act of 1981—known as the Farm Act. This was in recognition of two primary concerns:

- 1) uncontrolled imports of foreign subsidized sugar represented unfair competition for American farmers and threatened the survival of the domestic industry.
- 2) the national interest could be best served by the country maintaining some self-sufficiency in sugar production as a means of providing U. S. consumers with an ample supply of sugar at reasonable prices.

Enacted by Congress and signed into law in December 1981, Title IX, the Sugar Provision of the Farm Act, provides protection for our nation's sugar producers until September 30, 1986.

The law is designed to keep efficient U. S. producers in business by protecting them from unfair competition from subsidized foreign sugar imports. No cash payments or other government grants are involved, and it was the intent of Congress that the program be administered without cost to the government.

Major elements of the program include:

A nonrecourse sugar loan program under which sugar processors of raw cane or refined beet sugar can place sugar under loan to the Commodity Credit Corporation with the sugar as full collateral for the loan.

Loan rates, set at an average of 17 cents per pound of raw sugar and for refined beet sugar at a rate "fair and reasonable" in relation to the raw cane sugar loan rate, for the 1982 crop. The loan rate was to increase at small annual increments to 18 cents per pound for raw sugar for the 1985 crop. A 16.75 cents per pound purchase program was included to provide temporary support until October 1, 1982.

Existing authority under Section 22 of the Agriculture Adjustment Act of 1933 to impose fees or quotas to protect the program, plus Headnote 2 authority under the Tariff Schedule of the United States also are utilized.

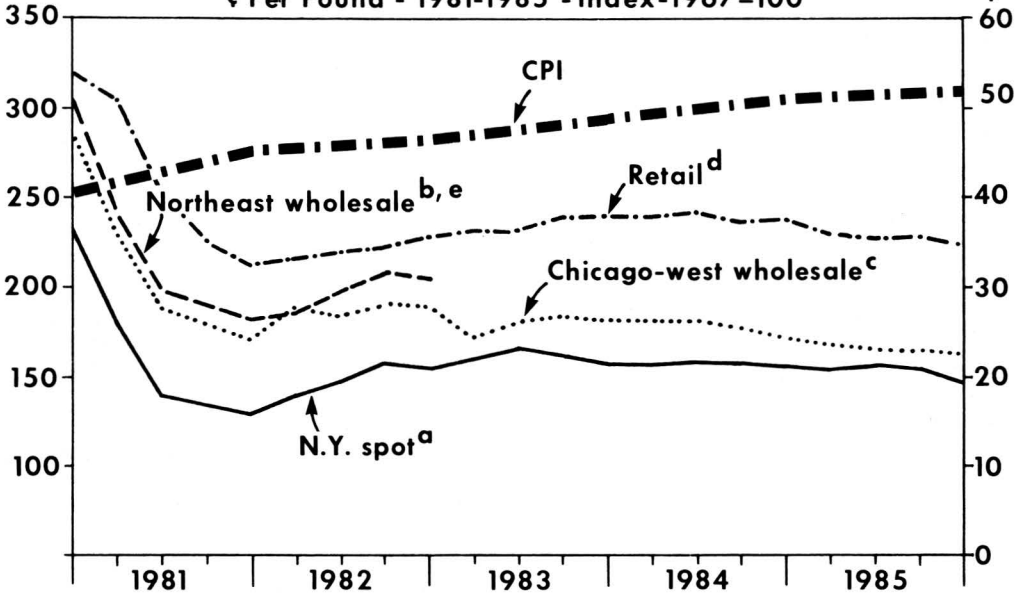
### 1985 Farm Act

The sugar price support program in the 1981 law was extended until September 30, 1990 in the Food Security Act of 1985, with some minor changes:

The minimum loan rate was maintained at 18 cents per pound of raw sugar through the five-year life of the bill but with Administration authority to increase the loan rate annually based upon changes in the cost of sugar products, the cost of production, and other circumstances adversely affecting domestic sugar production.

Congress directed the Administration to extend the 1985/86 quota by not less than 3 months, or to take such other steps as may be necessary to

**CPI U.S. SUGAR PRICES & CONSUMER PRICE INDEX - ALL FOOD**  
 ¢ Per Pound - 1981-1985 - Index-1967=100



- a Raw sugar, C.I.F., duty-free paid, contract No. 12. Starting June 1985 prices are "nearby futures."
- b 1981 - 100 lb. paper bags; bulk thereafter. Price not available, beginning 1983.
- c 1981 - 100 lb. paper bags; bulk thereafter. Starting 1983 prices are estimated, not "list."
- d U.S. retail average refined.
- e Not available after 1982.

Sources: USDA Sugar and Sweetener Report, Vol. 11 (1), March 1986; CPI - U. S. Bureau of Labor Statistics. Compiled by HSPA.

limit loan forfeitures by an equal amount. The Administration has extended the current 10-month 1.85 million ton quota for 3 additional months.

For the 1987 fiscal year and beyond, Congress specified that "the President shall use all authorities . . . to enable the Secretary of Agriculture to operate the program . . . at no cost to the Federal Government.

New provisions protecting cane and beet farmers from nonpayment for their crop due to processor bankruptcies and from natural disasters.

**Farm Act Administration**

Proper administration of the sugar support program required restrictions upon the entry of foreign source sugar to our market sufficient to make the marketplace more attractive to domestic producers than forfeiture of sugar placed under loan to the Commodity Credit Corporation (CCC). To determine the necessary price objective, the Administration developed a Market Stabilization Price (MSP), at a level equal to the loan rate plus accrued interest, transportation and handling cost, and an incentive factor.

Marketplace prices are measured by the New York Coffee and Sugar Exchange domestic spot price for raw sugar. The New York spot price

**1981 FARM ACT SUGAR LOAN RATE, MARKET STABILIZATION PRICE & U.S. RAW SUGAR PRICE**  
 (cents per pound)

Year	Sugar year by quarter	Farm Act		N.Y.* price
		Loan rate	M.S.P.	
1982	Jan.-March	16.75+	NA	17.69
	April-June	16.75+	NA	19.50
	July-Sept.	16.75+	NA	21.83
	Oct.-Dec.	17.00	20.73	20.69
1983	Jan.-March	17.00	20.73	21.62
	April-June	17.00	20.73	22.52
	July-Sept.	17.00	20.73	22.28
	Oct.-Dec.	17.50	21.17	21.75
1984	Jan.-March	17.50	21.17	21.80
	April-June	17.50	21.17	22.03
	July-Sept.	17.50	21.17	21.77
	Oct.-Dec.	17.75	21.57	21.35
1985	Jan.-March	17.75	21.57	20.67
	April-June	17.75	21.57	21.11
	July-Sept.	17.75	21.57	20.44
	Oct.-Dec.	18.00	21.50	19.15
1986	Jan.-March	18.00	21.50	20.88
	April-June	18.00	21.50	20.91†
	July-Sept.	18.00	21.50	

\* No. 12 contract to June 1985; thereafter, "nearby futures."

† Sugar purchase program.

NA - Not Applicable. † Estimated

**Market Stabilization Price  
1985/86**

<u>Pricing Factors</u>	<u>Cents/Pound</u>
Loan Rate	18.00
Transportation/Handling	2.51
Interest Cost	.79
Incentive to Market	<u>.20</u>
<b>TOTAL MSP</b>	<b>21.50</b>

includes payment for sugar free and clear, landed at a refinery in New York City. Adjustments are made -- plus or minus -- for refineries in other parts of the nation. Thus all costs for moving the sugar from the "farm gate" to the market are for the account of the farmer.

Initially, the Administration sought to defend the program through imposition of fees and duties on sugar imports. With sharply dropping prices in early 1982 the 50 percent ad valorem fee limit under Section 22 authority and the 2.8125 cent maximum duty authority, soon made those measures insufficient, and country-by-country import quotas were established in May 1982 based upon each country's sales to the U. S. market from 1975 through 1981.

The imposition of these quotas brought prices up to, and somewhat above the MSP, where they remained until the third quarter of 1984. Since then the price has remained below the MSP as a result of several factors. Excessive quotas, sugar blends, increased high sugar content product imports, illegal diversion of non-quota sugar imports from the re-export to the domestic market, earlier than anticipated switch by the major soft drink companies to high fructose corn sweetener, and underestimation of domestic sugar production all played a role in reducing prices below the MSP.

A number of actions were taken in an effort to defend the program and avoid forfeitures of sugar under loan.

In November 1984, U. S. Customs Service ruled that sugar blends would be considered commingled merchandise and included under

quota restraints. In January 1985 the quota year was extended for an additional two months. Additionally, the President signed an executive order that month establishing quotas on certain high sugar content products. Additional actions reducing the duty to the .625 cent minimum and suspending the fee on raw sugar imports benefited the exporters of sugar to the U. S. market. Indictments were handed down on companies and individuals for abuse of the reexport program, with 11 individuals and 12 companies subsequently entering guilty pleas. Sugar loan maturity dates were extended in an effort to avoid forfeitures.

On September 13, 1985, import quotas for the 1986 fiscal year were announced at 1.85 million tons for the 10 months remaining -- some 600,000 to 800,000 tons in excess of the market's needs. This caused a sharp reduction in the price of sugar to almost 3 cents below the MSP and resulted in the forfeiture of 303,000 tons of Florida sugar to the CCC at a governmental cost of \$107 million. This was the first and only forfeiture of sugar under the 1981 Farm Act except for sugar forfeited due to processor bankruptcy.

The excessive quota announced in September 1985 followed heavy lobbying by foreign sugar suppliers, particularly Caribbean countries, for a bigger share of the preferred, higher priced U. S. market.

On April 30, 1986 the Administration announced the extension of the fiscal year 1986 quota by 3 months in response to the Congressional directive. This caused the price of sugar to improve somewhat, but it lingers approximately half a cent below the MSP of 21.50 cents per pound. Meanwhile sugar loans have again been extended beyond the six-month time limit in the hope that prices will improve so as to make the marketplace once again more attractive than forfeitures to the CCC. In addition, the Administration has sold 122,000 tons of forfeited sugar to an ethanol manufacturer for just over 3 cents per pound, imposing a \$36 million cost on the program. Oversight hearings were conducted by a House Government Affairs Oversight Subcommittee on the propriety of this action.

## WORLD SUGAR

Sugar is produced in about 100 nations in both temperate and tropic regions. It is one of the world's most traded food commodities as well as one of the most regulated.

Total world production in the 1984/85 sugar year (ending September 30, 1985) was 100.7 million metric tons, according to the USDA.

Sixty-three million tons (Note: All sugar tonnages reported in this section are in metric

29.5 million tons to an estimated 118 countries relying on imports to meet all or part of their sugar needs. Some importing nations also exported sugar, and net world exports were estimated at 24.3 million tons.

Most world sugar producers are protected from market price fluctuations through a variety of domestic sugar programs which include import restrictions or embargoes, price supports, grower and/or export subsidies and other means in a

### WORLD'S 10 LARGEST PRODUCING, EXPORTING, IMPORTING & CONSUMING NATIONS

1984 - Metric Tons, Millions							
Producers		Exporters		Importers		Consumers	
Country	Tons	Country	Tons	Country	Tons	Country	Tons
EEC	13.3	Cuba	7.0	USSR	5.7	USSR	13.2
Brazil	9.3	EEC	4.4	USA	3.0	EEC	10.7
USSR	8.8	Brazil	3.0	Japan	1.9	India	8.2
Cuba	7.8	Australia	2.6	EEC	1.6	USA	7.7
India	6.6	Thailand	1.4	China	1.3	Brazil	6.2
USA	5.3	Philippines	1.2	Canada	1.0	China	5.5
China	4.3	Dom. Rep.	0.9	Egypt	0.9	Mexico	3.3
Australia	3.6	S. Africa	0.7	S. Korea	0.8	Poland	2.0
Mexico	3.3	Turkey	0.6	Iran	0.6	Indonesia	1.7
Philippines	2.6	Mauritius	0.6	Algeria	0.6	Egypt	1.6
	64.9		22.4		17.4		60.1

Source: International Sugar Organisation, Statistical Bulletin, Vol. 44(9), September 1985.

tons.) was produced from sugarcane and 37.6 million tons was from sugarbeets.

A total of 96.8 million tons was consumed, with the excess of production over consumption (3.9 million tons) added to large existing world stockpiles, now estimated at 45.7 million tons—a price-depressing surplus of between 15 to 20 million tons more than necessary.

Approximately 75 nations exported a total of

variety of combinations.

Approximately 75 percent of world consumption occurs within the countries where the sugar was produced.

Of the balance, it is estimated that of 1984/85 total world net exports of 24.3 million tons, only about 11.6 million tons was actually traded on the so-called world sugar market.

### WORLD SUGAR PRODUCTION, CONSUMPTION, IMPORTS & EXPORTS

1984-1985

Millions, Metric Tons - Raw Value

Region	Production			Consumption	Imports	Exports
	Beet	Cane	Total			
North America . . . . .	2.7	6.1	8.8	11.7	3.1	0.3
South America . . . . .	0.4	14.3	14.7	1.4	0.4	3.7
Central America . . . . .	0.0	1.8	1.8	0.9	0.0	0.8
Caribbean . . . . .	0.0	9.7	9.7	10.9	0.2	8.4
European Community . . . . .	13.6	0.0	13.6	10.2	2.7	5.5
Other West Europe . . . . .	2.2	0.0	2.2	2.8	0.9	0.2
East Europe . . . . .	5.7	0.0	5.7	6.3	0.9	0.8
U.S.S.R. . . . .	8.6	0.0	8.6	13.4	5.4	0.3
North Africa . . . . .	0.5	1.3	1.8	3.7	2.2	2.6
Other Africa . . . . .	0.0	6.0	6.0	4.4	2.0	2.6
Middle East . . . . .	2.2	0.2	2.4	5.1	2.8	0.6
Asia . . . . .	1.6	19.6	21.2	24.9	6.1	3.3
Oceania . . . . .	0.0	4.0	4.0	1.0	0.2	3.1
Total* . . . . .	37.6	63.1	100.7	96.8	25.9	29.5

\* Rounded

Source: FAS, ERS/USDA Agricultural Outlook, Dec. 1985.

The larger share of exports--12.7 million tons--was traded or bartered under long-term agreements or preferential trade arrangements. These include the European Economic Community's (EEC) Lome Convention with African, Caribbean, and Pacific nations; barter agreements between Cuba and Soviet Bloc countries, and various trade agreements between major exporting and importing nations.

Under preferential and trade agreements, prices averaged 21 cents a pound (\$463 a metric ton). In contrast, sugar traded on the world market averaged just over 5-cents a pound (\$110 a metric ton) through the New York and London sugar exchanges--about one-third or less than its cost of production.

The USDA estimates the average price of all sugar exported in 1984/85 was 13.5 cents when trade agreement and world sugar market prices are averaged out.

#### World Sugar Market

The term "world sugar market" misleads and confuses the uninitiated, many of whom often believe it represents a competitive price for all sugar sold throughout the world. But, in fact, raw sugar prices quoted on the New York and London exchanges are sold FOB Caribbean, a price that includes neither shipping and insurance costs to, nor duties and fees at, the port of delivery; nor does it reflect refining and distribution costs to deliver refined sugar to the end user.

"World residual sugar market" would be a more descriptive name.

The world market's chief characteristic is price volatility, and its chief purpose is to act as the world's sugar reserve stockpile. When supplies are low, prices rise sharply, fueled by speculative trading; when high, prices are severely depressed as in recent years.

It is only when stocks in this residual market are at about 25 percent of world consumption that prices then begin to reflect the average cost of sugar production.

#### World Sugar Surplus

World production has climbed substantially in recent years; in part because of population growth and increasing demand in developing countries, but also because world shortages--an actual one in 1974/75 and a phantom shortage in 1980/81--increased prices to levels encouraging added production capacity in many nations.

As a consequence, world production has been excessive, with stocks climbing to 45.4 percent of total consumption in 1984/85.

A significant contributor to this price-depressing excess has been the EEC, which up to the mid-1970s was a net importer of sugar. Sugar production by the then 10-member EEC has been encouraged by its common agricultural policy (CAP), which provides price supports, import controls and export subsidies. Currently, the

(continued on p. 26)

## WORLD SUGAR PRODUCTION, CONSUMPTION & STOCKS & IMPACT ON WORLD SUGAR MARKET<sup>a</sup> PRICES

1972-1985 - Raw Value

Sugar year Oct./Sept.	Metric tons production	Metric tons consumption	Stocks, metric tons			World sugar market No. 11 contract cents per lb.*
			actual	desirable <sup>b</sup>	surplus	
1972/73	75.1	77.7	17.2	19.4	(2.2)	7.43
1973/74	80.0	80.0	17.3	20.0	(2.7)	9.61
1974/75	78.5	77.1	18.9	19.3	(0.4)	29.99
1975/76	81.7	79.2	21.0	19.8	11.2	20.49
1976/77	86.3	81.9	24.8	20.5	4.3	11.58
1977/78	92.7	86.2	30.0	21.6	8.4	8.11
1978/79	91.3	89.6	31.0	22.4	8.6	7.82
1979/80	84.6	89.5	24.2	22.4	1.8	9.66
1980/81	88.5	88.5	24.2	22.1	2.1	29.04
1981/82	100.6	89.4	34.0	22.4	11.6	16.93
1982/83	101.3	93.8	41.4	23.5	17.9	8.42
1983/84	96.7	95.9	42.2	24.0	18.2	8.49
1984/85 <sup>c</sup>	100.7	96.8	45.7	24.2	21.5	5.18
1985/86 <sup>d</sup>	98.0	97.5	46.2	24.4	21.8	

<sup>a</sup> World market for surplus, "homeless" sugar, f.o.b. Caribbean.

<sup>b</sup> Based on 25% "rule of thumb" held to be desirable.

<sup>c</sup> Preliminary.

<sup>d</sup> Estimate.

\* Calendar year, average.

Source: Compiled by HSPA; data from USDA Sugar and Sweetener Outlook and Situation Report, Vol. 11(1), March 1986; FAS/ERS, USDA Agricultural Outlook, Dec. 1985.

## SUGAR SUPPLY AND DISTRIBUTION BY COUNTRIES, 1984

(Metric Tons - Raw Value)

(To convert to Short Tons, multiply by 1.1023)

Countries	SUPPLY		DISTRIBUTION	
	Production	Imports	Consumption	Exports
<b><u>NORTH AMERICA</u></b>				
Canada . . . . .	109,608	1,054,208	1,071,660	83,442
U.S.A. . . . .	5,314,506	3,021,302	7,738,289	298,098
TOTAL . . . . .	5,451,114	4,075,510	8,809,949	381,540
<b><u>EUROPE</u></b>				
Albania . . . . .	40,000 <sup>a</sup>	14,673 <sup>b</sup>	48,000 <sup>a</sup>	0
Austria . . . . .	463,635	117	360,247	73,238
Bulgaria . . . . .	110,000 <sup>a</sup>	373,185 <sup>b</sup>	455,000 <sup>a</sup>	30,372 <sup>c</sup>
Cyprus . . . . .	0	20,950	20,854	96
Czechoslovakia . . . . .	833,000 <sup>a</sup>	187,383	800,000 <sup>a</sup>	233,735
E.E.C. <sup>d</sup> . . . . .	13,271,394	1,571,799	10,715,631	4,392,724
Finland . . . . .	129,492	75,623	203,287	30,844
French Terr. <sup>e</sup> . . . . .	0	12,613 <sup>b</sup>	10,000 <sup>a</sup>	0
German Dem. Rep. . . . .	750,447	313,314	733,147	110,665
Gibraltar . . . . .	0	759 <sup>b</sup>	750 <sup>a</sup>	0
Hungary . . . . .	492,846	0	485,019	1,139
Iceland . . . . .	0	13,275	13,000	0
Malta . . . . .	0	12,500	15,000	0
Norway . . . . .	0	167,750	167,279	0
Poland . . . . .	1,932,800	0	2,012,200	300,872
Portugal . . . . .	15,000 <sup>a</sup>	287,914	290,000 <sup>a</sup>	25,738
Romania . . . . .	805,000 <sup>a</sup>	272,125 <sup>b</sup>	712,000 <sup>a</sup>	3,247 <sup>c</sup>
Spain <sup>f</sup> . . . . .	1,221,215	47,132	1,145,830	32,445
Sweden . . . . .	399,224	50,670	382,052	7,173
Switzerland . . . . .	131,460	170,079	286,955	554
Turkey . . . . .	1,654,353	0	1,429,352	580,437
U.S.S.R. . . . .	8,800,000 <sup>a</sup>	5,704,193	13,200,000 <sup>a</sup>	203,563
Yugoslavia . . . . .	930,000 <sup>a</sup>	226,132 <sup>b</sup>	900,000 <sup>a</sup>	0
TOTAL . . . . .	31,979,866	9,522,186	34,385,603	6,026,842
<b><u>CENTRAL AMERICA</u></b>				
Bahamas . . . . .	0	11,534 <sup>b</sup>	7,000 <sup>a</sup>	0
Barbados . . . . .	97,688	40	14,108	85,884
Belize . . . . .	108,576	0	7,267	101,540
Bermuda . . . . .	0	1,800	2,000 <sup>a</sup>	0
Costa Rica . . . . .	245,000 <sup>a</sup>	0	150,000 <sup>a</sup>	83,661 <sup>c</sup>
Cuba . . . . .	7,783,409	0	727,941	7,016,510
Dominican Rep. . . . .	1,133,341	0	258,233	885,112
El Salvador . . . . .	241,701	0	158,518	78,343
Guatemala . . . . .	554,729	0	264,789	304,371
Haiti . . . . .	41,000 <sup>a</sup>	21,440 <sup>b</sup>	53,000 <sup>a</sup>	15,682 <sup>c</sup>
Honduras . . . . .	206,883	0	114,237	93,071
Jamaica . . . . .	187,778	76,409	95,407	160,382
Mexico . . . . .	3,307,940	273,455	3,343,044	0
Neth. Antilles . . . . .	0	12,109 <sup>b</sup>	9,000 <sup>a</sup>	87 <sup>c</sup>
Nicaragua . . . . .	266,596	0	153,847	106,279
Panama . . . . .	176,499	0	75,869	82,429
St. Christopher-Nevis . . . . .	30,612	0	2,086	28,452
Trinidad . . . . .	66,500 <sup>a</sup>	85,708 <sup>b</sup>	66,000 <sup>a</sup>	46,994 <sup>c</sup>
Other C. America <sup>g</sup> . . . . .	0	7,860 <sup>b</sup>	17,000 <sup>a</sup>	0
TOTAL . . . . .	14,448,252	490,355	5,519,346	9,088,797
<b><u>SOUTH AMERICA</u></b>				
Argentina . . . . .	1,544,683	0	1,002,762	528,508
Bolivia . . . . .	201,000 <sup>a</sup>	0	189,000 <sup>a</sup>	8,450 <sup>c</sup>
Brazil . . . . .	9,258,926	0	6,201,430	3,039,508
Chile . . . . .	359,626	188,330	401,760	0
Colombia . . . . .	1,177,169	0	983,034	182,980
Ecuador . . . . .	329,000	153,855	318,900	10,070
Guyana . . . . .	256,481	0	37,439	214,914

## SUGAR SUPPLY AND DISTRIBUTION BY COUNTRIES, 1984 (cont.)

(Metric Tons - Raw Value)

(To convert to Short Tons, multiply by 1.1023)

Countries	SUPPLY		DISTRIBUTION	
	Production	Imports	Consumption	Exports
<b>SOUTH AMERICA (Continued)</b>				
Paraguay . . . . .	92,000 <sup>a</sup>	4,891 <sup>b</sup>	78,000 <sup>a</sup>	0
Peru . . . . .	645,000 <sup>a</sup>	153,924 <sup>b</sup>	650,000 <sup>a</sup>	98,720 <sup>c</sup>
Suriname . . . . .	10,000 <sup>a</sup>	4,144 <sup>b</sup>	15,000 <sup>a</sup>	0
Uruguay . . . . .	100,000 <sup>a</sup>	1,374 <sup>b</sup>	95,000 <sup>a</sup>	7,461 <sup>c</sup>
Venezuela . . . . .	390,000 <sup>a</sup>	233,626 <sup>b</sup>	720,000 <sup>a</sup>	0
<b>TOTAL . . . . .</b>	<b>14,363,885</b>	<b>740,144</b>	<b>10,692,325</b>	<b>4,090,611</b>
<b>ASIA</b>				
Afghanistan . . . . .	3,000 <sup>a</sup>	97,961 <sup>b</sup>	120,000 <sup>a</sup>	0
Bangladesh . . . . .	50,000 <sup>a</sup>	303,313 <sup>b</sup>	230,000 <sup>a</sup>	0
Brunei . . . . .	0	6,365 <sup>b</sup>	6,000 <sup>a</sup>	0
Burma . . . . .	88,000 <sup>a</sup>	0	88,000 <sup>a</sup>	4,000
China . . . . .	4,300,000 <sup>a</sup>	1,347,976 <sup>b</sup>	5,500,000 <sup>a</sup>	130,000 <sup>a</sup>
China (Taiwan) . . . . .	663,440	0	471,695	129,826
Hong Kong . . . . .	0	105,812 <sup>b</sup>	110,000 <sup>a</sup>	321 <sup>c</sup>
India . . . . .	6,634,582	393,602	8,237,218	308,828
Indonesia . . . . .	1,759,000	5,939 <sup>b</sup>	1,726,000	0
Iran . . . . .	600,000 <sup>a</sup>	607,299 <sup>b</sup>	1,250,000 <sup>a</sup>	0
Iraq . . . . .	0	568,847 <sup>b</sup>	600,000 <sup>a</sup>	0
Israel . . . . .	0	318,628 <sup>b</sup>	300,000 <sup>a</sup>	0
Japan . . . . .	876,314	1,902,513	2,746,687	3,477
Jordan . . . . .	0	120,764 <sup>b</sup>	145,000 <sup>a</sup>	0
Kampuchea . . . . .	0	5,000 <sup>a</sup>	5,000 <sup>a</sup>	0
Korea, D.P.R. . . . .	0	120,000 <sup>a</sup>	120,000 <sup>a</sup>	0
Korea, Rep. of . . . . .	0	838,217	523,322	271,141
Kuwait . . . . .	0	84,864 <sup>b</sup>	75,000 <sup>a</sup>	326 <sup>c</sup>
Lao, D.P.R. . . . .	0	6,000 <sup>a</sup>	6,000 <sup>a</sup>	0
Lebanon . . . . .	0	86,845 <sup>b</sup>	60,000 <sup>a</sup>	0
Macao . . . . .	0	3,000 <sup>a</sup>	3,000 <sup>a</sup>	0
Malaysia . . . . .	75,000 <sup>a</sup>	580,432	583,099	130,323
Maldives . . . . .	0	5,435 <sup>b</sup>	5,000 <sup>a</sup>	0
Mongolia . . . . .	0	35,866	40,000 <sup>a</sup>	0
Nepal . . . . .	17,500	18,200	35,000 <sup>a</sup>	0
Pakistan . . . . .	1,200,000 <sup>a</sup>	16,131 <sup>b</sup>	1,300,000 <sup>a</sup>	49,250
Persian Gulf . . . . .	0	133,743 <sup>b</sup>	125,000 <sup>a</sup>	0
Philippines . . . . .	2,577,692	287,234	1,280,915	1,200,236
Saudi Arabia . . . . .	0	522,655 <sup>b</sup>	450,000 <sup>a</sup>	0
Singapore . . . . .	0	128,447	125,000 <sup>a</sup>	4,642
Sri Lanka . . . . .	19,698	237,163	300,000 <sup>a</sup>	22
Syria . . . . .	110,000 <sup>a</sup>	237,207 <sup>b</sup>	330,000 <sup>a</sup>	0
Thailand . . . . .	2,549,692	0	701,330	1,443,644
Vietnam, S.R. . . . .	184,000 <sup>a</sup>	56,806 <sup>b</sup>	220,000 <sup>a</sup>	0
Yemen Arab Rep. . . . .	0	232,010 <sup>b</sup>	150,000 <sup>a</sup>	0
Yemen Dem. Rep. . . . .	0	102,947 <sup>b</sup>	55,000 <sup>a</sup>	0
<b>TOTAL . . . . .</b>	<b>21,707,918</b>	<b>9,517,221</b>	<b>28,023,266</b>	<b>3,676,036</b>
<b>AFRICA</b>				
Algeria . . . . .	7,000 <sup>a</sup>	594,857 <sup>b</sup>	650,000 <sup>a</sup>	0
Angola . . . . .	50,000 <sup>a</sup>	46,576 <sup>b</sup>	105,000 <sup>a</sup>	0
Benin . . . . .	3,000 <sup>a</sup>	32,676 <sup>b</sup>	8,000 <sup>a</sup>	0
Botswana . . . . .	0	36,044	36,044	0
Burkina Faso . . . . .	27,000 <sup>a</sup>	8,612 <sup>b</sup>	31,000 <sup>a</sup>	0
Burundi . . . . .	0	11,284 <sup>b</sup>	8,000 <sup>a</sup>	0
Cameroon . . . . .	54,062	34,643	70,000 <sup>a</sup>	3,344
Cape Verde . . . . .	0	8,460 <sup>b</sup>	8,500 <sup>a</sup>	0
Cent. Afri. Rep. . . . .	0	1,711	2,000 <sup>a</sup>	0
Chad . . . . .	15,000 <sup>a</sup>	15,240 <sup>b</sup>	30,000 <sup>a</sup>	0
Comoros . . . . .	0	3,000 <sup>a</sup>	3,000 <sup>a</sup>	0
Congo . . . . .	30,900	9,655 <sup>b</sup>	18,000 <sup>a</sup>	31,390
Djibouti . . . . .	0	47,477 <sup>b</sup>	8,000 <sup>a</sup>	35,000 <sup>a</sup>
Egypt . . . . .	780,000 <sup>a</sup>	901,302	1,600,000 <sup>a</sup>	0

## SUGAR SUPPLY AND DISTRIBUTION BY COUNTRIES, 1984 (cont.)

(Metric Tons - Raw Value)

(To convert to Short Tons, multiply by 1.1023)

Countries	SUPPLY		DISTRIBUTION	
	Production	Imports	Consumption	Exports
<b>AFRICA (Continued)</b>				
Ethiopia . . . . .	199,548	0	176,734	38,405
Gabon . . . . .	11,000 <sup>a</sup>	2,181 <sup>b</sup>	13,000 <sup>a</sup>	6,000 <sup>a</sup>
Gambia . . . . .	0	51,296 <sup>b</sup>	40,000 <sup>a</sup>	0
Ghana . . . . .	0	33,003 <sup>b</sup>	30,000 <sup>a</sup>	0
Guinea . . . . .	10,000 <sup>a</sup>	19,934 <sup>b</sup>	30,000 <sup>a</sup>	0
Guinea Bissau . . . . .	0	3,602 <sup>b</sup>	3,500 <sup>a</sup>	0
Ivory Coast . . . . .	121,336	22,703 <sup>b</sup>	118,748	45,528
Kenya . . . . .	387,000 <sup>a</sup>	74,695 <sup>b</sup>	380,000 <sup>a</sup>	4,337 <sup>c</sup>
Liberia . . . . .	3,000 <sup>a</sup>	10,843 <sup>b</sup>	10,000 <sup>a</sup>	8 <sup>c</sup>
Libya . . . . .	0	92,518 <sup>b</sup>	130,000 <sup>a</sup>	0
Madagascar . . . . .	78,643	0	72,333	18,838
Malawi . . . . .	160,427	0	53,441	89,442
Mali . . . . .	10,224	30,000	40,000 <sup>a</sup>	0
Mauritania . . . . .	0	16,429 <sup>b</sup>	25,000 <sup>a</sup>	0
Mauritius . . . . .	609,636	0	39,867	561,859
Morocco . . . . .	441,163	319,349	680,550	0
Mozambique . . . . .	39,256	66,500	89,898 <sup>a</sup>	16,409
Niger . . . . .	0	14,376 <sup>b</sup>	10,000 <sup>a</sup>	0
Nigeria . . . . .	60,000 <sup>a</sup>	439,215 <sup>b</sup>	550,000 <sup>a</sup>	2 <sup>c</sup>
Rwanda . . . . .	2,000 <sup>a</sup>	14,029 <sup>b</sup>	8,000 <sup>a</sup>	0
Senegal . . . . .	46,660	22,347	70,892	0
Sierra Leone . . . . .	5,530	9,254	15,000 <sup>a</sup>	0
Somalia . . . . .	45,000 <sup>a</sup>	61,660 <sup>b</sup>	80,000 <sup>a</sup>	0
South Africa . . . . .	2,275,760	7,154	1,333,530	687,140
Sudan . . . . .	360,000 <sup>a</sup>	39,411 <sup>b</sup>	400,000 <sup>a</sup>	0
Swaziland . . . . .	429,243	0	22,172	390,980
Tanzania . . . . .	129,000 <sup>a</sup>	12,537 <sup>b</sup>	122,000 <sup>a</sup>	11,002 <sup>c</sup>
Togo . . . . .	0	57,929 <sup>b</sup>	35,000 <sup>a</sup>	0
Tunisia . . . . .	16,115	158,398	179,730	0
Uganda . . . . .	33,000 <sup>a</sup>	3,161 <sup>b</sup>	35,000 <sup>a</sup>	0
Zaire . . . . .	58,743	34,208 <sup>b</sup>	75,000 <sup>a</sup>	0
Zambia . . . . .	141,231	0	117,895	6,287
Zimbabwe . . . . .	463,420	5,270	222,556	233,809
Other Africa <sup>h</sup> . . . . .	0	2,792 <sup>b</sup>	3,000 <sup>a</sup>	0
<b>TOTAL . . . . .</b>	<b>7,103,897</b>	<b>3,376,331</b>	<b>7,790,390</b>	<b>2,179,780</b>
<b>OCEANIA</b>				
Australia . . . . .	3,626,519	0	749,547	2,590,613
Fiji . . . . .	484,496	5,992	35,533	385,512
New Zealand . . . . .	0	176,738	165,158	3,305
Papua New Guinea . . . . .	33,708 <sup>a</sup>	352 <sup>b</sup>	27,616 <sup>a</sup>	11,003
Western Samoa . . . . .	0	1,750 <sup>b</sup>	2,600 <sup>a</sup>	0
Other Oceania <sup>i</sup> . . . . .	0	30,778 <sup>b</sup>	12,000 <sup>a</sup>	0
<b>TOTAL . . . . .</b>	<b>4,144,723</b>	<b>215,610</b>	<b>992,454</b>	<b>2,990,433</b>
<b>WORLD TOTAL . . . . .</b>	<b>99,199,655</b>	<b>27,937,357</b>	<b>96,213,333</b>	<b>28,434,039</b>

<sup>a</sup> Estimated.

<sup>b</sup> As reported by countries of origin.

<sup>c</sup> As reported by countries of destination.

<sup>d</sup> European Economic Community--Belgium, Denmark, France (Metropolitan, Guadeloupe, Martinique, Reunion, French Guiana), Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, and United Kingdom.

<sup>e</sup> Including St. Pierre & Miquelon, New Caledonia and French Polynesia.

<sup>f</sup> Peninsula and Balearic Islands only.

<sup>g</sup> Including Leeward and Windward Islands.

<sup>h</sup> Including Equatorial Guinea, St. Helena, Sao Tome and Syschelles.

<sup>i</sup> Including Pacific Islands.

Source: International Sugar Organisation, Statistical Bulletin, Vol. 44(9), September 1985.



EEC is the world's largest sugar producer and the second largest sugar exporter. Also benefitting from the CAP are sugar producers in Lome Convention countries because Lome sugar is imported and paid for at prices related to internal EEC prices. Reform of the CAP thus far has been successfully resisted by EEC farm blocs.

But the EEC is only one example of trade decisions that are political in nature and maintain excess world production. Some examples in other countries: Thailand (where domestic prices, production, and revenue sharing between producers and millers is controlled); Australia (where protection includes an import embargo, controlled prices, and a system for pooling proceeds from higher priced domestic and contract sales with lower priced, government-supported export sales); Japan (where levies on sugar imports are used to subsidize high-cost domestic producers); and Brazil (where a government agency sets prices and is the sole export agent). The U. S. program is discussed in the previous section.

Because of the extent and variety of sugar support programs and because of the relatively small amount (11.5 percent in 1984/85) of sugar traded on world residual market, no substantial reduction of the world surplus and accompanying improvement in price is seen for the near term.

Thus, support programs throughout the world will likely be maintained.

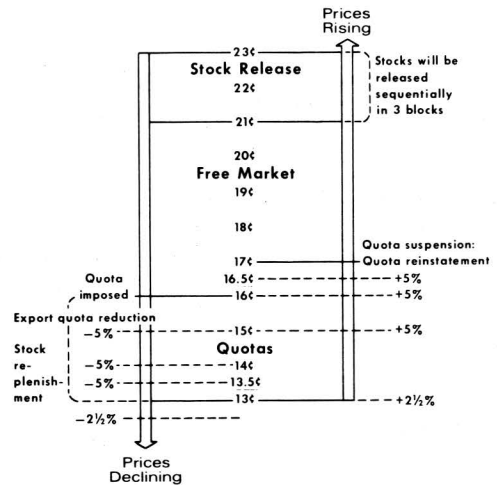
### International Sugar Agreement

Balancing world supply with demand—which suggests a reasonable return on the investment required for sugar production—has been a long sought, but elusive goal for many years.

The most recent attempt was through the International Sugar Organisation. After meetings held in 1976 and 1977, the ISO forged the latest (and to date the last) International Sugar Agreement (ISA). It became provisionally effective January 1, 1978 and ran through 1984, a term that included two years of extension.

Most, but not all, major sugar exporting and importing nations were party to the ISA. Later events were to underscore the need to have every major exporting and importing nation participate.

### INTERNATIONAL SUGAR AGREEMENT PRICE STABILIZATION MECHANISM 1/1/78 - 12/31/84



The objective of the ISA was to maintain world market prices within a specified price corridor—originally 11- to 19-cents a pound for raw sugar, later increased to 13- to 21-cents a pound. An International Sugar Council assigned each member-producing nation an export quota and monitored the market. When prices moved too high, sugar stocks were to be released to moderate prices; when too low, export quotas were to be reduced to lower available supplies.

The ISA's first real test came after the phantom shortage of 1980/81, and it was not effective. A primary cause of this failure was lack of EEC membership. The EEC, a net importer up to the mid-1970s, had in the intervening years become a major world exporter with no restraints on exports to the world residual market.

During the final two years of the ISA, extensive negotiations were conducted to renew it and include the EEC. But major differences between the EEC and other major exporting nations doomed the discussions to failure and the ISA died at the end of 1984. Since that time, the ISO has been maintained as a statistical service with an eventual goal of establishing a new international sugar agreement.

## GLOSSARY

- BAGASSE:** Fibrous residue remaining after sugarcane has been milled to extract the sugar-containing juices.
- BLACKSTRAP MOLASSES:** The final product remaining after all the commercially recoverable sucrose has been removed from the juices expressed from cane. It is a dark colored, heavy, viscous liquid.
- BRIX:** The measure of density of a solution containing sucrose as determined by a hydrometer.
- CALORIE:** Unit expressing the energy-producing value of food. A pound of sugar contains 1,790 calories. A standard teaspoon contains 16.
- DEXTROSE:** A widely occurring crystallizable, simple sugar which contains 6 carbon atoms in contrast to the 12 found in sucrose. It is obtained in commercial quantities by the action of acid on cornstarch. It is less sweet than sucrose.
- FRUCTOSE:** An alternate chemical name for levulose.
- GLUCOSE:** (1) An alternate chemical name for dextrose. (2) A name given to corn syrups which are obtained by the action of acids and/or enzymes on cornstarch. Commercial corn syrups are nearly colorless and very viscous. They consist principally of dextrose and small amounts of maltose, combined with gummy organic materials known as dextrans, in water solution.
- GUR:** Cane juice, concentrated nearly to dryness by boiling over an open fire, without centrifuging and with no purification other than by skimming. This ancient process is still used for producing a large share of the sugar consumed in India and some other countries. The crude product is high in glucose and correspondingly low in sucrose.
- HIGH FRUCTOSE CORN SYRUP:** High fructose corn syrups (HFCS) are produced by the enzymatic conversion of a portion of the glucose in corn syrup to fructose. Composition of presently available products ranges from 7 to 55% glucose and 42 to 90% fructose on dry solids, the balance being other saccharides. Dry solids average about 71% on total weight. The product is roughly comparable to invert syrup made from sucrose in terms of sweetness and physical properties.
- HIGH TEST MOLASSES:** A concentrated, clarified cane juice which has been inverted (usually about 2/3) to prevent sucrose from crystallizing at the high concentrations normally employed.
- INVERT OR INVERT SUGAR:** The mixture of equal parts of dextrose and levulose produced by the action of acid or enzymes on solutions of sucrose.
- LEVULOSE:** A highly soluble, simple sugar, also containing 6 carbon atoms, it is crystallized with great difficulty, is generally considered sweeter than sucrose, and is present in considerable quantities in combination with dextrose and sucrose in invert sugars.
- LIQUID SUGAR:** A concentrated solution of refined sucrose or of a mixture of sucrose and invert sugar.
- MASSECUITE:** A dense mass of sugar crystals mixed with mother liquor, obtained by evaporation.
- MOLASSES:** The mother liquor separated from sugar crystals in massecuite.
- NON-CENTRIFUGAL SUGARS:** Crude sugars made from the sugarcane juice by evaporation and draining off the molasses. Among local names are "muscovado," "panocha," and "papelon."
- PLANT CROP:** The sugarcane crop started with seed pieces (setts).
- POLARIZATION:** The amount of sucrose (sugar) contained in a solution as determined by an optical instrument--either a saccharimeter or polariscope, both of which use polarized light.
- RATOON:** Second and subsequent crops grown from the root systems of previous plantings of sugarcane. Usually one or more ratoon crops are harvested before the fields are plowed and replanted.
- RAW SUGAR:** The impure centrifugal sugar of commerce, a light brown crystalline material, generally containing between 96 and 99% sucrose, plus various impurities and moisture. Other names are "panocha" and "demerara."
- SOFT SUGARS:** Highly refined, dark-colored, molasses-flavored sugars which are frequently called brown sugars. They contain significant amounts of reducing sugars.
- SUCROSE:** Commonly known as sugar, a sweet crystallizable, colorless substance which constitutes the "sugar" of commerce. Refined cane and beet sugar is essentially 100% sucrose.
- SYRUP:** Concentrated clarified cane juice before crystallization.
- TEL QUEL:** Literally, such as (it is). When used describing sugar it means "as made," hence of a polarization usually varying among mills and producing areas.
- TURBINADO:** Direct consumption raw sugar of high polarization which must be dried in a granulator to a very low moisture content.

