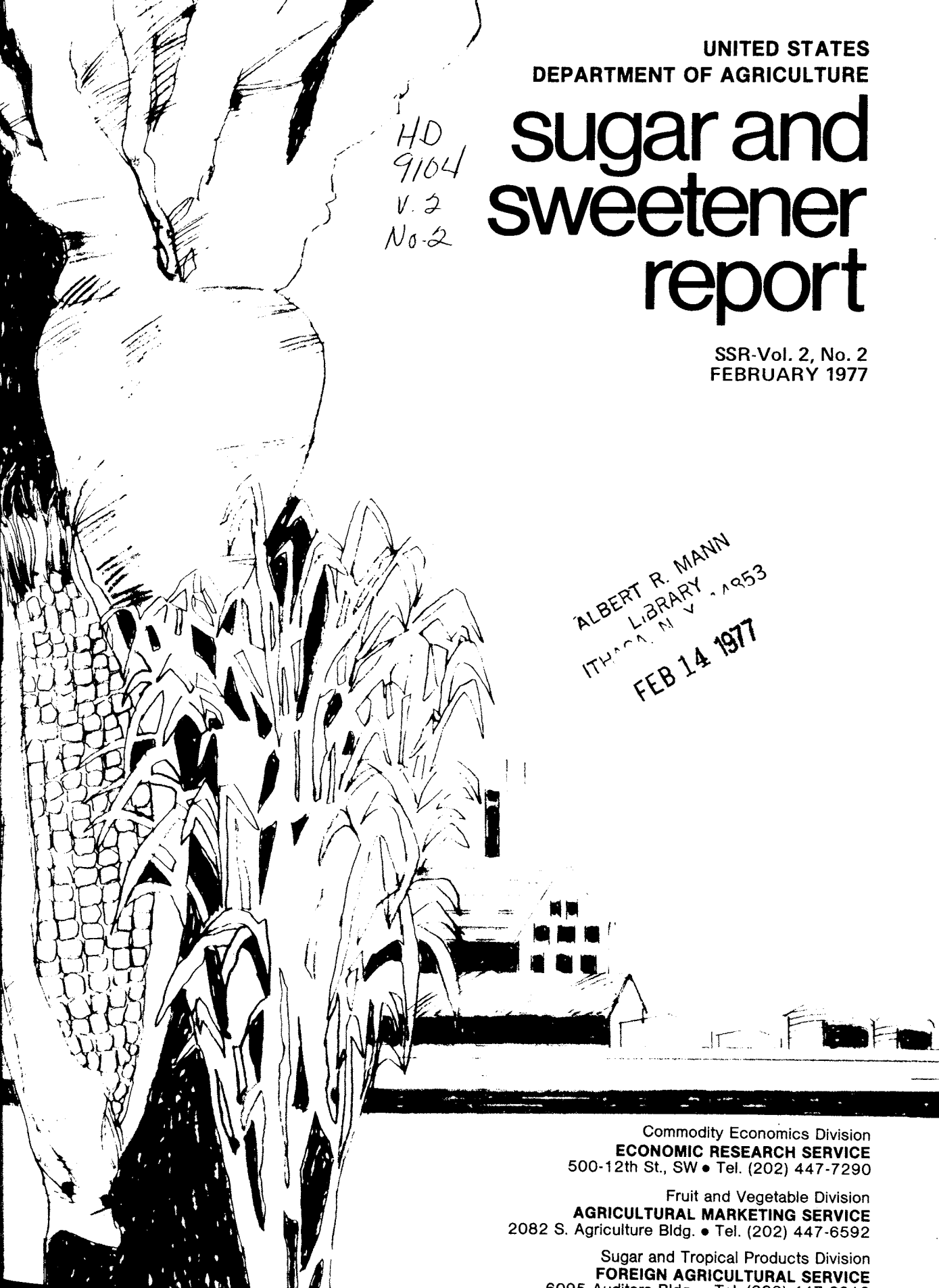

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UNITED STATES
DEPARTMENT OF AGRICULTURE

sugar and sweetener report

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FEBRUARY 1977

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Sugar: World and U.S. situation at a glance

Item	Unit	1974	1975	1976
World[1]				
Production	Mil. tons, raw value	86.2	90.3	95.9
Consumption	do.	88.2	89.1	91.3
Ending stocks	do.	17.7	18.9	23.5
U.S.[2]				
Production[3]				
Beet	Thou. tons, raw value	3,221	3,473	4,051
Cane[4]	do.	2,442	2,829	2,808
Consumption[3]				
Total	do.	10,946	10,304	10,949
Per capita	Pounds, refined	96.6	90.2	95.1
Ending stocks[3]				
Beet	Thou. tons, raw value	1,406	1,596	1,730
Cane[4]	do.	1,448	1,260	1,517
U.S. Imports	do.	5,770	3,867	4,492
Prices				
World, stowed Caribbean				
October	Cts. per lb., raw sugar	39.63	14.09	8.03
November	do.	57.17	13.40	7.91
December	do.	44.97	13.29	7.54
New York spot				
October	do.	38.83	15.45	10.65
November	do.	57.30	15.03	10.46
December	do.	46.74	14.80	10.22
Northeast, cane				
October	Cts. per lb. wholesale refined	43.59	21.15	16.90
November	do.	60.69	20.84	16.28
December	do.	60.41	20.53	15.97
Chicago-West, beet				
October	do.	40.17	20.44	14.93
November	do.	54.68	18.98	14.28
December	do.	56.02	18.42	14.12

[1] Year beginning May 1. [2] Calendar year. [3] Preliminary for 1975 and estimated for 1976. [4] Includes Hawaii.

CORRECTION

The date on *Sugar and Sweetener Report* Vol. II No. 1 should read January 1977.

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SUMMARY

Sugar Prices Strengthen in January

While world supplies are relatively large, U.S. raw sugar prices strengthened in January. The 1- to 1.5-cents-a-pound increase from the 10.28-cent average (New York spot) recorded during the last 4 months of 1976 occurred in response to recent crop and market developments.

Major developments which pushed up the price include:

•Reports of large purchases of Philippine sugar by the USSR and the People's Republic of China.

•The announced withdrawal of Cuba from the Free World export market.

•An indicated 7-percent reduction in 1977/78 sugarbeet acreage in the United States.

•And a potential reduction in the expected outturn of the 1976/77 Florida sugarcane crop due to recent frosts.

Supply-demand estimates for sugar suggest both world and U.S. sugar prices could remain near their late January levels during the first half of 1977, if unforeseen weather and foreign crop reports do not lead to significant revisions in current crop estimates, and if policy reviews do not lead to increased expectations of price-enhancing actions.

Important policy developments which are making the future direction of sugar prices especially uncertain include:

•The U.S. legislative and executive review of domestic sugar policy and problems—in particular the International Trade Commission's investigation of whether increased sugar imports are hurting the U.S. industry.

•And the upcoming April 18 negotiating conference on an International Sugar Agreement which, if adopted, might limit world trade after January 1, 1978.

Current estimates indicate the 1976/77 world sugar crop will likely total near 87 million metric tons, in excess of estimated world consumption. Thus, global stocks at the beginning of the upcoming September-August 1977/78 crop year are expected to represent about a fourth of world consumption—up significantly from about a fifth a year ago.

Conditions for the 1976/77 domestic sugarbeet and sugarcane crops have differed sharply. Sugarbeet harvesting and processing conditions have been good to excellent and, as a result, the prospective 1976/77 U.S. beet sugar crop of 3.9 million short tons (raw value) is second only the 1975/76 record 4-million-ton crop.

In contrast, bad weather has slowed most mainland cane area campaigns. The 1976/77 U.S. cane sugar crop could be down 200,000 to 250,000 short tons (raw value) from fall estimates. If normally warm temperatures prevail, the decline in production in Florida may approach 200,000 tons as a result of a mid-January freeze. Louisiana's estimated outturn has also been reduced—by 25,000 to 50,000 tons—as a result of a severe freeze in late November coupled with heavy rainfall in December.

Even though prices have strengthened slightly, they still remain below estimated costs of production in most growing areas. As a result, prospective market prices will have a big influence on farmer's 1977 plantings. As of January 1, U.S. beet growers reported intentions to cut total plantings by 7 percent from 1976, with changes ranging from decreases of nearly a fifth in some Western States to a small increase in the Red River Valley. However, low water levels in the western irrigated areas and dry soil conditions in nonirrigated areas could reduce sugarbeet plantings this spring from the January indications.

In contrast, sugarcane acreage for harvest in 1977/78 may not change much from the 772,000 acres grown for processing in 1976/77, and the cane areas are generally starting the 1977 growing season with good to excellent soil moisture conditions.

On a global basis, present indications are that there may not be much, if any, cutback in world sugarcane acreage in 1977/78. Much of the current crop was planted prior to the recent low price situation and once planted, cane will usually produce several crops. Historically it has taken 2 to 5 years

before cane acreage in exporting countries fully responds to low world sugar prices.

Sugarbeet growers could react to low sugar prices in a much shorter period since beets are an annual crop. But in the European markets (including the Soviet Union), sugarbeet production is largely insulated from changes in world price levels through government policies. As a result, these policies usually operate to encourage adequate supplies of domestically produced beet sugar, at relatively stable but comparatively high prices. The United States and Canada are the only areas in which sugarbeet producers may noticeably respond to current low world sugar prices.

U.S. sugar deliveries in calendar 1977 may approximate the 10.9-million-short-ton level of 1976. Per capita consumption of refined sugar may range within 2 pounds of the 95 pounds posted in 1976.

The smaller prospective sugarbeet crop tentatively indicated for this fall means U.S.-grown sugar production in calendar 1977 will likely be down from the 1976 record 6.7 million short tons (raw value). With U.S. production declining, U.S. imports could be up 100,000 to 300,000 tons from the preliminary estimate of over 4.5 million short tons (raw value) for calendar 1976.

Total corn sweetener shipments for food use in 1977 may top 3.6 million short tons (dry basis), up from around 3.3 million tons in 1976. Most of the increase is expected to come from high-fructose corn sirup. Calendar year shipments of conventional corn sirup for food use will probably fall short of 2 million tons, about the same as in 1976. Similarly, dextrose deliveries for food use will probably be slightly above 500,000 tons this year, nearly the same as in 1976.

U.S. honey production is estimated at 200 million pounds for 1976, about the same as a year earlier. U.S. honey prices are expected to remain near the average level received by producers in 1976.

SUGAR

THE WORLD SUGAR OUTLOOK FOR 1977[1]

The prospective large 87 million metric ton (raw value) 1976/77 world sugar crop is presently expected to exceed world consumption by about 4 million metric tons (table S-1). Since a disproportionate share of the increase is in exporting countries, significant increases in carryover stocks are expected there. Such increases could induce exporting countries to adopt a fairly aggressive marketing policy, particularly if prospects for a large 1977/78 crop seems likely.

Current world and U.S. raw sugar prices seem consistent with reported global supplies, prospective consumption, and recent crop and market developments. It seems clear that 1976/77 world consumption will fall significantly short of world production. With the 1976/77 Northern Hemisphere sugarbeet campaigns nearing completion, and the cane areas of the region having completed over half their campaigns, 1976/77 prospective supplies appear fairly well discounted by the market. In addition, most refiners are reported to have largely covered their import requirements through the first half year, and into the third quarter.

[1]Values shown in the world sugar outlook for 1977 are metric values. To convert metric tons to short tons, multiply metric tons by the factor 1.1023.

THE U.S. SUGAR OUTLOOK FOR 1977

U.S. Raw Sugar Prices Strengthened in January

The U.S. raw price averaged $13.32 per cwt. (New York spot) in calendar 1976, down sharply from the yearly average of $22.47 in 1975 and the record $29.50 per cwt. in calendar 1974. The December 1976 average of $10.22 per cwt. was down significantly from the $14.80 posted in December 1975. In the last four months of 1976, U.S. raw sugar prices held relatively steady, with the monthly average price varying no more than 50 cents per cwt. from the four-month average of $10.28 per cwt.

Recent Crop and Market Developments

But the U.S. raw price recently increased $1 to $2 per cwt. in January from the former level of about $10 per cwt. The increase was associated with several new crop and market developments:

•Reports of large purchases of Philippine sugar by both the Soviet Union and Mainland China have impacted the market.

Table S-1—Sugar: World production, consumption, and stocks, raw value, 1970-76[1]

Year beginning May 1	Production				Consumption		Ending stocks		Ending stocks as a percent of consumption
	Cane	Beet	Total	Change from previous year	Total	Change from previous year	Total	Change from previous year	
	Million short tons	*Million short tons*	*Million short tons*	*Million short tons*	*Million short tons*	*Million short tons*	*Million short tons*	*Million short tons*	*Percent*
1970	45.7	32.0	77.7	-1.7	80.2	2.1	22.9	-2.5	28.55
1971	44.1	33.7	77.8	.1	82.5	2.3	18.2	-4.7	22.06
1972	49.8	33.4	83.2	5.4	83.2	.7	18.2	.0	21.88
1973	52.7	36.0	88.7	5.5	87.2	4.0	19.7	1.5	22.59
1974	54.2	32.0	86.2	-2.5	88.2	1.0	17.7	-2.0	20.07
1975	54.7	35.6	90.3	3.4	89.1	.9	18.9	1.2	21.21
1976[3]	58.4	37.5	95.9	5.6	91.3	2.2	23.5	4.6	25.74
	Million metric tons	*Million metric tons*	*Million metric tons*	*Million metric tons*	*Million metric tons*	*Million metric tons*	*Million metric tons*	*Million metric tons*	*Percent*
1970	41.5	29.0	70.5	-1.6	72.8	2.0	20.8	-2.3	28.57
1971	40.0	30.6	70.6	.1	74.9	2.1	16.5	-4.3	22.03
1972	45.2	30.3	75.5	4.9	75.5	.4	16.5	.0	21.85
1973	47.8	32.6	80.4	4.9	79.1	3.7	17.8	1.3	22.50
1974	49.2	29.0	78.2	-2.2	80.0	.9	16.0	-1.8	20.00
1975	49.6	32.3	81.9	3.7	80.8	.8	17.1	1.1	21.16
1976[3]	53.0	34.0	87.0	5.1	82.8	2.0	21.3	4.2	25.72

[1] Entire crop included for all harvests begun during the indicated May 1-April 30 crop year, regardless of when harvest is completed. [2] Preliminary. [3] Estimated.

Source: Foreign Agricultural Service, USDA.

•An announced withdrawal of Cuba from the Free World Export Market.

•The market's early assessment of the 1977/78 prospective U.S. sugarbeet planting intentions which were recently released by USDA (January 21).

•The anticipated cut in Florida's potential sugar output as a result of the recent damage to its crop by a mid-January freeze.

The sugar industry is also awaiting the International Trade Commission's determination on whether or not U.S. imports of sugar are a substantial cause of injury or a threat of injury, to the domestic industry. Further, the market will likely note the recommendations of a recently formed task force within the Department of Agriculture which will examine the short and longrun legislative and executive policy options which could add stability and support to the domestic market. As an assessment of these developments continues throughout the world, various segments within the sugar market will be deciding whether or not to increase or reduce stocks, a decision which could influence raw sugar prices.

The Domestic Outlook

In both 1975 and 1976, world and U.S. raw sugar prices increased in July. As more complete information became available after midyear on the size of each forthcoming crop, raw sugar prices then later declined before leveling off during the latter part of the year. As calendar 1977 begins, additional developments could affect world raw sugar prices. They include the negotiating conference for an International Sugar Agreement tentatively scheduled to convene in Geneva on

Selected raw and retail sugar price comparisons

Year and month	World sugar price stowed Caribbean[1]	World price New York basis	U.S. sugar price (New York spot)	U.S. average retail
	Cents per pound	*Cents per pound*	*Cents per pound*	*Cents per pound*
1973	9.61	10.99	10.29	15.10
1974	29.99	31.62	29.50	32.34
1975	20.49	21.92	22.47	37.16
1976	11.58	13.34	13.31	23.96
1975:				
October	14.09	15.49	15.45	30.32
November	13.40	14.80	15.03	27.24
December	13.29	14.69	14.80	26.34
1976:				
October	8.03	10.75	10.65	21.82
November	7.91	10.48	10.46	21.62
December	7.54	10.11	10.22	21.22

[1] Sugar stowed at greater Caribbean ports including Brazil.

Source: U.S. average retail, BLS; all other prices, AMS, USD

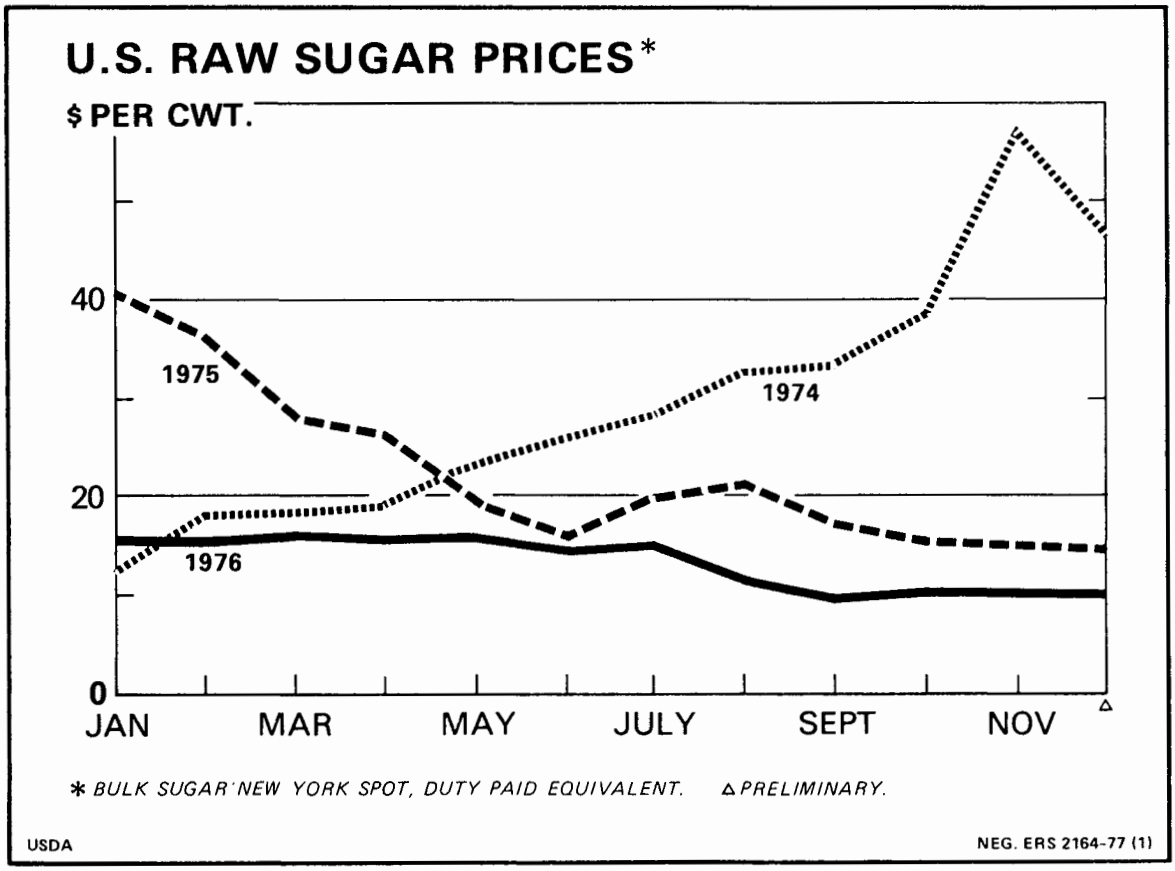

Figure S-1

April 18, and possible U.S. legislative and executive actions.

The U.S. International Trade Commission continues its investigation, as requested by the Senate Finance Committee, with the support of the President under Section 201 of the Trade Act of 1974. The Commission is expected to report to the President in mid-March and will determine whether or not increased imports of sugar are a substantial cause of serious injury or the threat thereof, to the domestic industry producing a like or directly competitive product.

If the Commission's determination is affirmative, it must recommend to the President how this situation can be remedied. The President must respond to an affirmative finding within 60 days. If the President disagrees with an affirmative determination, he must indicate his reasons to Congress which then has the option of overriding his disagreement with a simple majority vote, of both houses. If the International Trade Commission's determination is affirmative, the President's reaction may not be known before May. If the Commission makes a negative finding, the President could, under Headnote 2, Subpart 10A, Schedule 1, of the U.S. Tariff Schedules, reduce the import quota or raise the tariff duty if relief for the domestic industry were deemed necessary.

1977 U.S. Beet Acreage Prospects

In early season planting intentions, beet farmers reported plans to seed about 1.42 million acres to sugarbeets this year down 7 percent from the 1975 level.[2] These plans are tentative since contracts in many areas have not yet been signed. Growers will be surveyed again in April to get an update closer to planting time.

Contributing to the prospective overall 7-percent reduction in U.S. sugarbeet acreage this year are growers in Arizona who intend to cut back plantings 21 percent. Growers intend to reduce acreage in Idaho acreage by a fifth, in Colorado by 19 percent, and in Oregon by 18 percent. Producers in California, the largest producing State, expect plantings to be off by 15 percent. Growers in 6 other States also plan to reduce acreage, but by no more than a tenth.

[2]*Prospective Plantings, January 1977*, Crop Reporting Board, Statistical Reporting Service, USDA.

While growers in 11 States now intend to reduce this year's sugarbeet plantings, farmers in Michigan, Nebraska, Texas, and Wyoming expect to plant about the same acreage as a year ago. And recent plans indicate that growers in the Red River Valley plan on increasing sugarbeet plantings slightly this year, up 3 percent in Minnesota and 2 percent in North Dakota. Acreage in Maine may rise as much as 80 percent. However, Maine is a special case, since 1977 would only be the second year of operation in the 1970's for its sugarbeet factory.

Price expectations for sugarbeets as well as the relative price prospects for alternative crops are influencing growers' decisions concerning the acreage they actually plant. Even though sugar prices are now relatively low, many sugarbeet growers report that price expectations for many alternative crops aren't much more profitable.

If inadequate soil moisture persists, it could become a factor limiting 1977 sugarbeet production in nonirrigated areas such as Michigan and the Southern portion of the Red River Valley. In California, the Northwest and Great Plains States, lack of rainfall has significantly lowered water table levels, reducing water available for irrigation. This could also lower grower planting intentions because sugarbeets require substantial water. In that case, farmers in some Northern irrigated areas may choose to increase small grain acreage which requires less water than sugarbeets. And in California, current cotton prices appear quite attractive to growers who could expand cotton acreage significantly, even though it requires substantial water.

1977 U.S. Cane Acreage Prospects

Since the quantities of sugarcane used for new plantings during the past three years including 1976, have remained near 1.1 million tons annually, this year's U.S. sugarcane acreage may not change much from the 722,000 acres grown for processing in 1976/77.[3] While the total hasn't changed much in three years, Louisiana farmers have increased the quantity of sugarcane used for planting new acreage for the 1977 crop by 25 percent. Conversely, new cane plantings were reduced 17 percent in Florida, 4 percent in Hawaii, and substantially in Texas.

Winter rains in Florida, Louisiana, and Texas have added additional moisture to the fields and raised water table levels. Thus, mainland cane areas generally start the 1977 growing season with much higher soil moisture in contrast to most sugarbeet areas.

[3]Values shown in the U.S. Sugar Outlook are short tons (2,000 pounds per ton). To convert short tons to metric tons, multiply short tons by the factor .9072.

Mid-January Florida Freeze Reduces Production Prospects

There was a very severe freeze in Florida during January 18-21. During this 4-day period, temperatures dipped into the mid- and low-twenties (F°). Between half and 60 percent of Florida's 300,000 acres of cane for processing had been harvested when the freeze hit. But, virtually all of the remaining cane was subjected to low temperatures. While it is too early to accurately assess the extent of the damage, some reports suggest that losses could approach 200,000 tons of sugar, raw value.

With only 6 to 8 weeks or less of harvesting campaign remaining, sugar losses could be minimized as long as the daytime temperatures do not climb much above 50 F°. This, however, may be asking a lot in an area which normally enjoys warm winter weather. The freeze has also set back cane to be harvested in 1977/78. This coming fall's Florida cane crop will depend on both temperatures during the rest of the campaign and the amount of sunlight during the forthcoming summer growing period.

U.S. Sugar Use and Imports in 1977 Will Likely Match 1976 Levels

U.S. sugar deliveries in 1977 are tentatively expected to approximate the 10.9 million level of 1976 (table S-2). Per capita consumption of refined sugar this year is expected to range between 93 to 97 pounds. Further significant prospective increases in use of high-fructose corn sirup could limit gains in total sugar consumption.

With prospects for a smaller U.S. beet crop this fall, both deliveries and per capita consumption of beet sugar may decline slightly this year. Beet sugar's share of sugar deliveries will probably be around 32 percent, down from 35 percent last year. Per capita beet sugar consumption could fall about 2 pounds below the 32 pounds consumed in 1976. Both cane sugar's share of deliveries, and its per capita consumption are expected to increase.

U.S. imports of sugar are expected to be up 100,000 to 300,000 tons in 1977, from the more than 4.5 million tons in 1976. The increase will depend largely on the level of domestic use, U.S. production, and exports. Prospective increases in high fructose corn sirup (HFCS) shipments this year may also limit the prospective increase in U.S. sugar imports.

The World Sugar Situation[4]

Record Large 1976/77 World Crop

Prospects continue for a bumper world sugar crop during the 1976/77 (September-August) year.

Production is expected to establish an all-time record of 87 million metric tons (raw value), 6-percent above 1975/76. While large increases are being realized this year in many countries—particularly Brazil, Argentina, South Africa, Australia and the USSR—declines in output are expected in Cuba, France, and the U.S. beet crop (table S-3).

The USSR's Central Statistical Agency recently announced that the 1976 sugarbeet crop totaled 98.6 million metric tons, compared with the earlier estimate of 88 million tons, and a new Russian record. If the new estimate of sugarbeet production proves to be correct, the sugar outturn may be considerably above the 9.2 million metric tons (raw value) estimated in November for 1976/77. The sugar outturn will also depend on the amount of production that is procured by the Soviet Government for processing, as well as the sugar recovery per ton of beets. Apparently, growing conditions for the 1976/77 Russian harvest were more favorable than had been anticipated earlier.

World carryover stocks at end of 1976/77 are now expected to total over 20 million tons, about a fourth of annual world consumption, and up significantly from about a fifth a year ago.

The Remarkable Comeback of the 1976 EC Sugarbeet Crop

Despite a prolonged and severe drought in several countries in the European Community (EC) in the first half of last year's growing season, sugar production may equal the 1975/76 EC level of 10.1 million metric tons. Only Belgium and France are reported to have lower output than in the previous year.

The remarkable recovery of sugarbeets in the drought stricken areas of England, Belgium, West Germany, and France in 1976 attests to the undeniable stamina of the sugarbeet plant. Many thought when the rains finally came late last summer, it was too late for the drought stunted West European sugarbeets to more than partially recover. But sugarbeet tap roots, which extend downward several feet searching for moisture, provided sufficient sustenance. And when the rains came in late summer the wilted plants quickly revived. By harvest, beets had grown to near normal size. In addition, sugar recovery was noticably higher. The result was a larger outturn than earlier expected, and nearly matching that of a year earlier.

[4]Values shown in the world sugar situation are metric values. To convert metric tons to short tons, multiply metric tons by the factor 1.1023.

World Trade in Sugar

The United States, the world's largest importer of sugar, will likely import over 4.1 million metric tons (4.5 short) of sugar in 1977, slightly more than in 1976. Reports from the Soviet Union indicate its imports in calendar 1977 may not exceed 2 million tons, a level somewhat lower than recorded in 1976 though this may not include the recent large purchases from the Philippines. In contrast, the EC will be trying, as usual, to find a market for about 1 million tons of white sugar.

There have been recent announcements that the Soviet Union and mainland China have each purchased 500,000 to 600,000 tons of sugar from the Philippines. While some think mainland China may be buying sugar mostly for re-export, others believe some expansion in consumption and/or stock building may occur.

The reported Russian purchase of Philippine sugar may also suggest that (1) Russian per capita consumption of sugar is increasing; (2) Russian imports from Cuba, due to Cuba's summer drought, may be lower than earlier expected; (3) imports may be made for re-export in an attempt to build history as a sugar exporter, in case an International Sugar Agreement is reached in forthcoming negotiations; and/or (4) some stock accumulation is thought prudent at current low price levels.

Prices Remain Low

Raw sugar prices though still depressed, increased slightly in January. World prices (sugar stored at Greater Caribbean Ports, including Brazil), for the month of December and into January ranged between 7 and 9 cents per pound. This is below their reported cost of production in most producing countries. But for many countries, variable costs would be covered by such a price. Recent low prices will probably slow the expansion of production in some countries, but may not quickly result in much decline of cane sugar production from acreage previously planted.

In the Philippines, farmers producing cane on marginal lands are now being encouraged to diversify into other crops. In this connection, Philippine President Marcos recently issued a decree providing for lands previously devoted to sugarcane which shift to rice, corn, feed grains, cotton, fruits and vegetables, crops for livestock use, and similar crops as approved shall be exempt from the land reform act. To support and encourage growing other crops, the Development Bank of the Philippines announced that it will extend production loans to sugarcane planters who diversify into other crops.

International Sugar Agreement Negotiating Conference Scheduled

In the next few months an International Sugar Agreement will be considered. A Preparatory Committee to work further on a draft Agreement met in London, January 31-February 4. A negotiating conference is to be held in Geneva beginning April 18 and lasting through May 27, if necessary, to consider limiting world trade. If an agreement is reached and ratified by a sufficient number of countries, the earliest it could take effect would be January 1, 1978.

THE U.S. SUGAR SITUATION

Production

1976/77 U.S. Beet Sugar Production Down Slightly

U.S. sugarbeet harvesting conditions for 1976/77 were generally good to excellent (table S-4). Few fields were too wet to harvest and there were very few reports of sugarbeets frozen in the fields. In Michigan, where some fields were very dry, a timely rain fell making it easier to remove beets. And in California, a very dry winter allowed beet sugar factories to process sugarbeets right through the end of the year (December 31). Normally, they shut down earlier because of wet field conditions.

The 1976/77 beet crop will produce an estimated 3.9 million short tons of sugar (raw value)—down about 3 percent from a year earlier (table S-5).[5] Nearly a third of our U.S. production will come from the Southwest—California and Arizona. About one fourth will come from the seven Great Plains States which grow sugar beets, and nearly a fifth from the four Northwest States. Production in the Red River Valley (Minnesota and North Dakota) will contribute 17 percent to U.S. production and Eastern production nearly 8 percent (Maine, Michigan and Ohio). Beet processors in many areas report good sugar recovery.

And despite the second largest crop on record, the 1976/77 U.S. beet sugar campaign has progressed with few bottlenecks. Many beet sugar factories have already completed their campaigns, and of those still operating, most will be through with their winter campaign by March 1. The last facility expecting to be operating in the Red River Valley is expected to finish by mid-March.

And as the winter campaign is nearing completion, California's spring sugarbeet campaign begins around March 1. Also, factories with thick juice storage tanks have either began or are almost ready to begin campaigns to recover sugar from the thick juice. This will extend the sugar recovery campaigns another 2 weeks to 3 months at these facilities.

Colorado Facilities Closing

One U.S. beet sugar company announced it will close two beet sugar processing factories and a molasses plant, all in Colorado. Reasons given for closing the facilities, include: (1) high costs of operating the older plants, (2) decreasing sugarbeet acreage in North Central Colorado, (3) impact of urbanization, and (4) the cost of converting two of the facilities to coal. The firm's remaining beet sugar facilities are said to be ample to process the sugarbeets grown on the firms contracted Colorado acreage. Another U.S. company recently announced it will close its facility in West Colorado, which reportedly has been losing money. The growers in the area are now deciding whether they want to subsidize the plant to keep it operating.

1976/77 Sugarcane Crop Also Smaller

Assuming a normal sugar recovery rate for each area (including the estimated impact of the January freeze in Florida), a U.S. grown production total of 2.7 million short tons of cane sugar (raw value) is indicated for 1976/77, down over 7 percent from 1975/76 (table S-5). Hawaii will produce about 38 percent of the 1976/77 domestic cane sugar crop, Florida about 33 percent, Louisiana 24 percent, and Texas 5 percent.

U.S. harvested acreage of sugarcane for processing will total no more than 722,000 acres in 1976/77, down at least 2 percent from 1975/76 (table S-4). Acreage for harvest remained about the same in Texas, and declined in Louisiana and Hawaii. Production increased in Louisiana, while it is expected to be down in Florida because of its recent January freeze. Production was also off in Hawaii due to both slightly lower yields and reduced acreage.

The mainland cane area was beset with wet weather during the processing season. The pace of processing sugarcane in Florida was noticeably slowed in December because of very wet fields. Florida's mills continue to operate and most will reportedly complete their campaigns by early April. In Texas, harvest came to a standstill for awhile. The raw cane mill in Texas was closed because of unseasonably wet fields, for most of December and January. But the rains finally slowed and the mill resumed operations in late January after losing nearly two months of crush-

[5]Values shown in the U.S. Sugar Situation are short tons (2,000 pounds per ton). To convert short tons to metric tons, multiply short tons by the factor .9072.

ing time. The mill may be operating into May, much later than usual.

In Louisiana, a severe freeze on November 29th and 30th seriously damaged its remaining crop, which, when coupled with a very wet December, resulted in an estimated net loss of 25,000 to 50,000 tons of sugar, raw value.

Foreign Trade—Imports Up, Exports Down

U.S. imports in calendar 1976 totaled more than 4.5 million short tons (raw value), up over 600,000 tons from 1975 (tables S-11 and S-12). The increase resulted from a sizable increase (900,000 tons) in sugar deliveries. Even though domestic deliveries rose sharply, the potential increase in imports was limited by a corresponding larger U.S. production.

Before 1974, U.S. sugar exports seldom exceeded 10,000 short tons (raw value) annually. But in 1974, due in large part to tight world supplies and very high prices, U.S. exports exceeded 70,000 tons. In calendar 1975 sugar exports exceeded 206,000 tons. In 1976, U.S. exports fell sharply to only 75,000 tons, largely because of a falloff in exports to Western Europe and Japan. Canada received more than half of our crystalline sugar exports and more than 90 percent of U.S. liquid sugar exports.

The level of exports for 1977 is not expected to return to pre-1974 levels and probably will be comparable with exports in 1974 and 1976, of around 70,000 tons annually.

U.S. Deliveries and Consumption Up

Sugar deliveries for calendar year 1976 totaled 10.9 million tons (raw value), up about 900,000 tons from the very low level of 1975. While deliveries were up slightly in the second quarter, most of the 1976 increase occurred in the first quarter. Total U.S. deliveries in 1976 while up sharply from 1975, fell over 350,000 tons short of the 1974 level.

Beet sugar deliveries totaled a record 3.82 million tons in 1976, up 550,000 tons from calendar

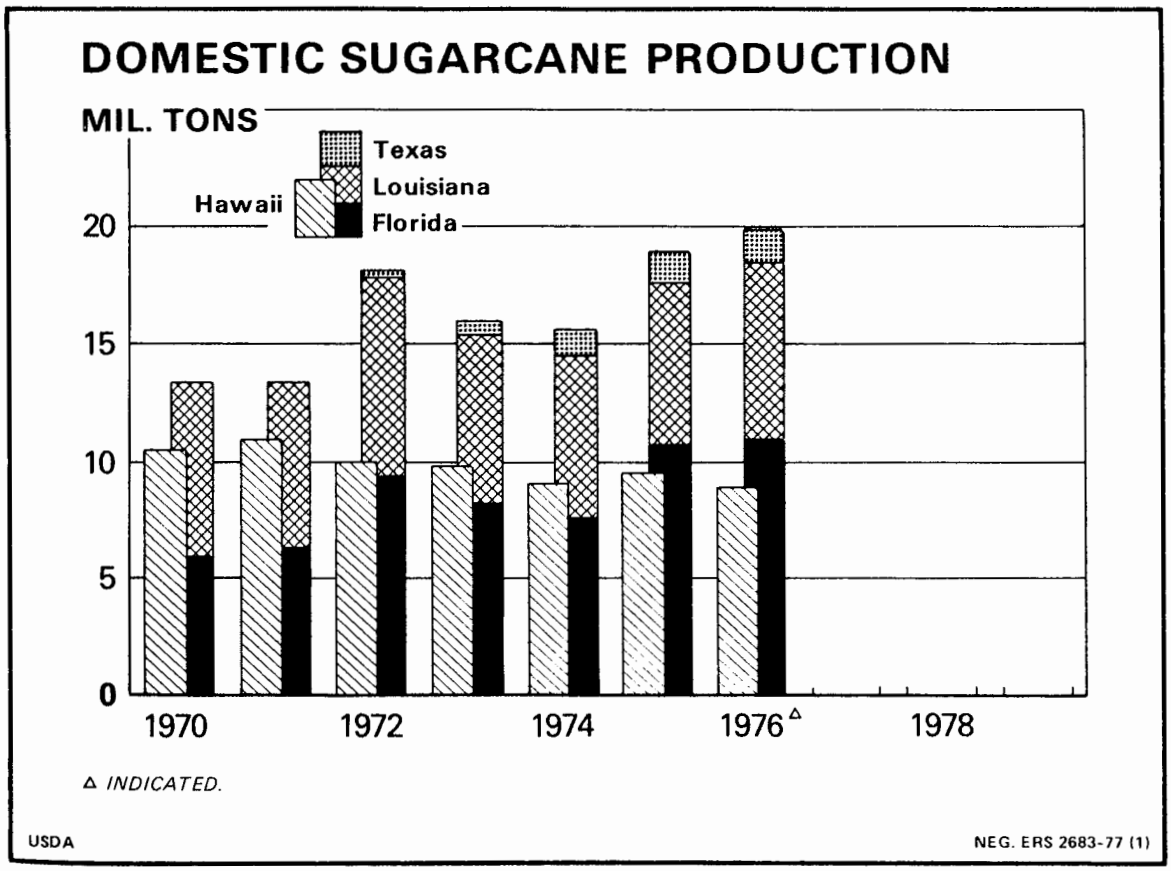

Figure S-2

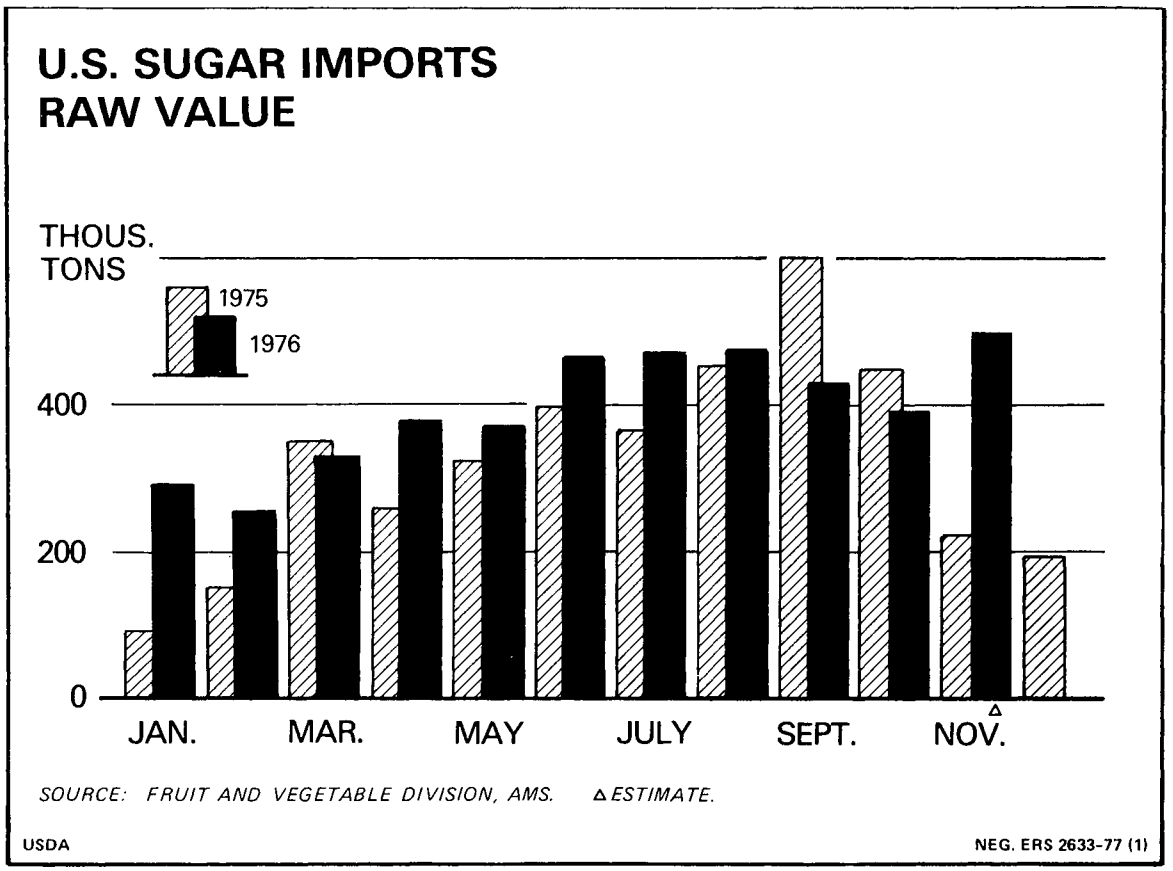

Figure S-3

year 1975 because of increased availability. Consequently, beet sugar accounted for 35 percent of U.S. sugar deliveries in 1976 compared with 33 percent in 1975, and only 27 percent in 1974. Cane sugar deliveries of 7.1 million tons were up 350,000 tons.

Per capita consumption of sugar totaled about 95 pounds in 1976. This level compares with 90 pounds in 1975, and 97 pounds in 1974. Prior to the sharp rise in sugar prices in 1974, consumption averaged over 100 pounds annually, during 1970-73.

January 1 U.S. Sugar Stocks A Record High

On January 1, 1977, total mainland sugar stocks roughly totaled over 3.5 million short tons, up about 420,000 tons (15 percent) from a year ago (table S-8). This is a new record exceeding the previous high of 3 million tons on January 1, 1969.

Refiners' cane sugar stocks totaled over a million tons, up over 360,000 tons from January 1, 1976. This was the highest monthly refiner stock level since February 1, 1975. It suggests the possibility of a significant change in U.S. refiner inventory policy which recently has been to keep inven-

Refined Sugar Deliveries, by type of Container

Year or period	Industrial			Consumer size packages[3]
	Liquid sugar[1]	Bulk dry	Large packages[2]	
	1,000 tons			
Calendar year:				
1970	2,753	2,952	2,371	2,544
1971	2,716	3,003	2,280	2,610
1972	2,709	3,290	2,163	2,557
1973	2,706	3,417	2,168	2,530
1974	2,436	3,320	2,203	2,581
1975	2,089	3,112	1,608	2,463
First 3 quarters[4]				
1975	1,548	2,235	1,162	1,762
1976	1,654	2,494	1,328	1,852
Change	106	259	166	90
Percent change	6.8	11.6	14.3	5.1

[1] Sugar solids basis. [2] 50 lb. and over. [3] Under 50 pounds. [4] Preliminary data do not include 224,200 tons in 1975 and 399,150 tons in 1976 of unspecified best sugar deliveries.

Source: AMS, USDA.

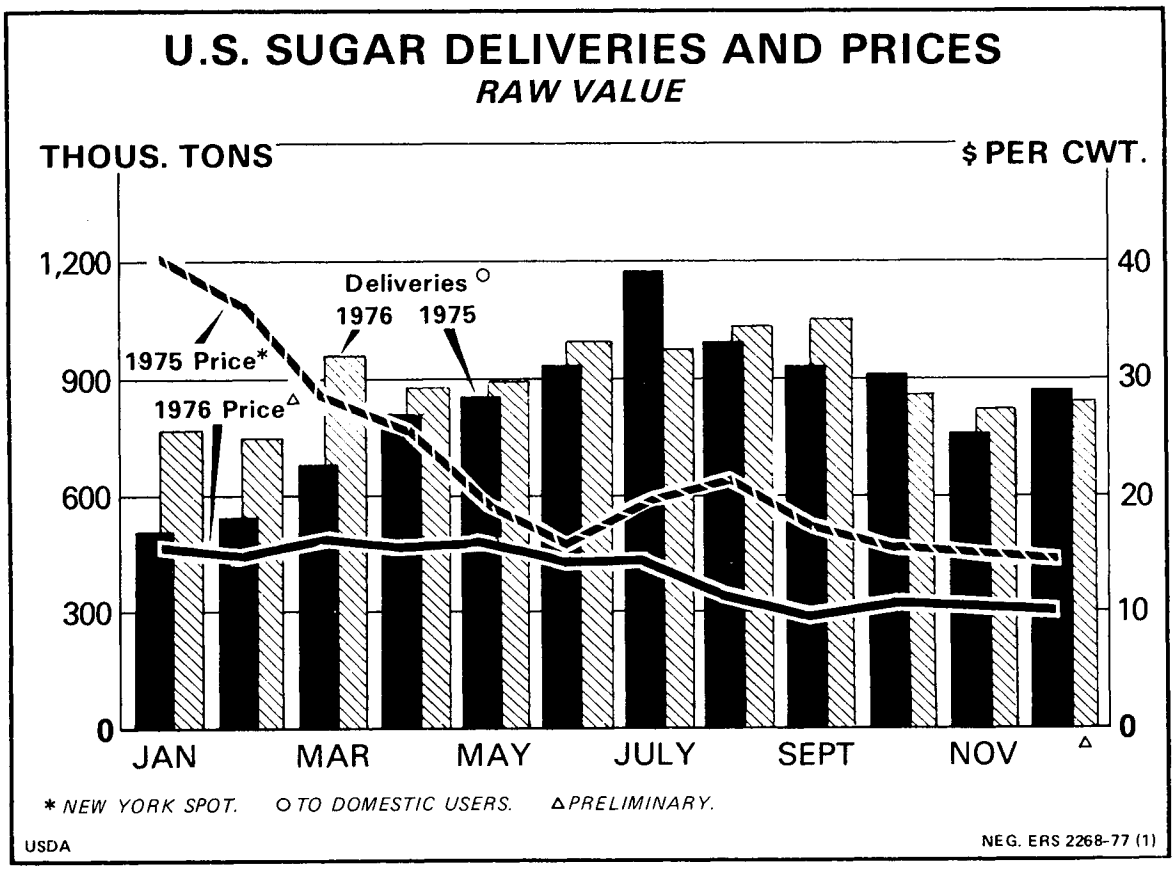

Figure S-4

Table S-2—Sugar, cane and beet: Supply and utilization, United States, calendar years, 1966-76[1]

Year	Supply						Utilization						
	Production	Offshore receipts			Beginning stocks	Total supply	Total use	Exports	Net change in invisible stocks	Balancing items[2]	Domestic disappearance		
		Foreign	Territories	Total							Livestock, feed, and alcohol	Military and civilian	
												Total	Per capita
	1,000 short tons, raw value												*Pounds, refined*
1966 ...	5,279	4,495	717	5,212	2,805	13,296	10,538	65	101	58	79	10,235	97.2
1967 ...	5,297	4,804	705	5,509	2,758	13,564	10,623	72	-188	66	199	10,474	98.3
1968 ...	5,627	5,130	505	5,635	2,941	14,203	11,160	79	291	51	82	10,657	99.0
1969 ...	5,483	4,886	342	5,228	3,043	13,754	10,885	82	-273	57	68	10,951	100.7
1970 ...	5,874	5,296	353	5,649	2,869	14,392	11,557	66	185	60	83	11,163	101.9
1971 ...	5,815	5,587	144	5,731	2,835	14,381	11,558	89	-7	70	61	11,345	102.4
1972 ...	6,015	5,459	149	5,608	2,823	14,446	11,623	50	-21	45	62	11,487	102.8
1973 ...	6,060	5,329	79	5,408	2,823	14,291	11,645	26	91	69	31	11,428	101.5
1974 ...	5,663	5,770	157	5,927	2,646	14,236	11,382	77	300	51	8	10,946	96.6
1975[3] ..	6,302	3,867	96	3,963	2,854	13,119	10,263	206	-282	29	6	10,304	90.2
1976[4] ..	6,859	4,492	220	4,712	2,856	14,427	11,180	75	91	55	10	10,949	95.1

[1] Deliveries by primary distributors for consumption in the United States can be derived by adding the net change in invisible stocks to quantities used for food by military and civilians. [2] Calculated as a residual. [3] Preliminary. [4] Estimate.

tories as low as possible, while at the same time keeping marketing channels full.

January 1, beet sugar stocks of 1.73 million tons were up about 135,000 tons from a year ago. With a slightly smaller crop expected this fall, beet sugar companies may choose to market sugar slightly less aggressively this year. If this occurs, U.S. beet sugar inventory levels may tend to be somewhat higher than a year ago for the first half of this year, and slightly lower during the last half, as beet companies attempt to market their sugar in an orderly manner.

U.S. Sugar Prices

U.S. Wholesale Refined Prices Follow Raw Prices

U.S. wholesale refined sugar prices follow changes in U.S. raw sugar prices. Wholesale refined sugar prices declined in September when raw prices weakened, and then increased in October when raw prices rose reflecting the impact of

Refined sugar: Selected wholesale price comparisons[1]

Year and month	Cane Sugar	Beet Sugar		
	Northeast	Chicago-West	Pacific Coast	Bulk dry
	Cents per pound	*Cents per pound*	*Cents per pound*	*Cents per pound*
1973	14.07	12.38	12.38	11.40
1974	34.35	32.07	31.90	28.46
1975	31.42	27.61	27.87	27.47
1976	19.20	16.93	17.48	16.50
1975:				
October	21.15	20.44	20.77	19.75
November	20.84	18.98	20.13	19.53
December	20.53	18.42	19.55	18.29
1976:				
October	16.90	14.93	15.38	14.61
November	16.28	14.28	14.94	13.70
December	15.97	14.12	14.97	13.97

[1] These are basis prices in 100-pound paper bags, not delivered prices. To obtain delivered prices, add "Freight Prepays" deduct discounts and allowances.

Source: Bulk dry beet sugar, BLS; all other prices, AMS, USDA.

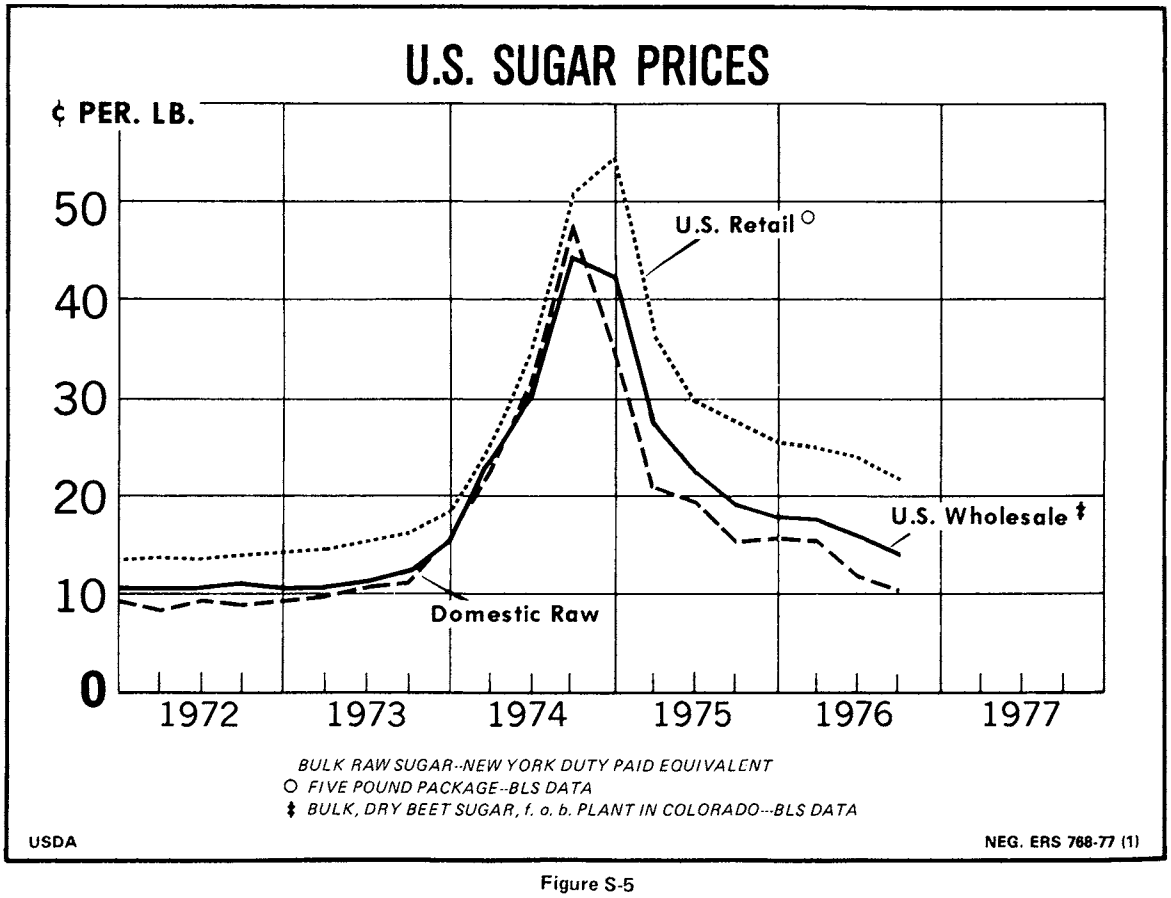

Figure S-5

the September 21 increase of $1.25 per cwt. in the duty. Wholesale refined sugar prices later declined along with raw sugar prices in December and early January, but since about mid-January have increased again as raw prices strengthened.

Present wholesale list prices for refined sugar range from current lows of $15 per cwt. for refined beet sugar in the Chicago-West and Pacific Coast marketing territories to a high of $17 per cwt. for refined cane sugar in the Northeast. Actual prices are probably slightly below list prices because of competition.

U.S. Grower Prices Drop Again

The preliminary estimate of U.S. sugarbeet grower's 1976 season average price is $19.80 per short ton, down considerably from last year's $27.60, and sharply below the record high of $46.80 per ton for 1974 beets.[6] The current estimate of grower receipts for the 1976 crop is nearly $600 million, down from the $800 million in 1975, and the more than $1 billion in 1974. The final level for 1976 could still change slightly since a significant part of the 1976 crop has yet to be marketed.

The present estimate of grower receipts for the 1976 mainland cane crop of about $250 million is down considerably from the 1975 level and a third of the record 1974 level. Similarily, the preliminary estimate of the 1976 average mainland cane price received by U.S. growers is $13.40 per ton, down significantly from the 1975 price of $19.60 and off sharply from the $48.50 per ton posted in 1974.

Retail Prices Still Slowly Declining

Retail sugar prices have been following wholesale refined sugar prices down. The yearly average U.S. price of 24 cents per pound for a 5-lb. bag of sugar in calendar 1976 was down sharply from the annual average of 37 cents in calendar 1975 (table S-10). The December 1976 monthly average price of 21 cents per pound was down from 26 cents in December 1975. More recently, The U.S. average retail price for a 5-lb. package of sugar declined from 25 cents per pound last August to 21 cents per pound in December.

Since raw prices strengthened in January, retail prices are expected to eventually follow. But because of normal time lags, the increase may not appear before March or April, even if raw prices don't change much from curent levels.

[6]More complete data may be found in *Crop Values: 1974-1975-1976 Season Average Prices Received by Farmers and Value of Production*, CrPr 2-1-1 (77). Crop Reporting Board, Statistical Reporting Service, U.S. Dept. of Agriculture, Washington, D.C. January 27, 1977 p 2 and 21. This data was not available in time to be included in a table in this issue but will be carried in the May issue.

Why Are Speciality Sugar Prices High?

Many people have been surprised that while white sugar has been available in a local supermarkets for around 20 cents a pound, specialty sugars (brown, confectioners, and cubed sugars) were available only at sharply higher prices, around 35 to 50 cents per pound.

Several factors account for the difference:

- Supermarkets frequently use white sugar to promote store sales, especially in recent months.
- White sugar is available in larger package sizes, while specialty sugars are usually limited to only 1 or 2 lb. boxes at retail.
- Brown sugar may be modified to make it more pourable, which entails additional processing costs.
- Specialty sugars are not a volume item, and account for 5 percent or less of total consumer package sales of sugar.
- Specialty sugar prices frequently lag white sugar price movements by 2 to 6 months or more, because of their slower turnover.

THE U.S. CORN SWEETENER SITUATION

Corn Sweetener Shipments Up In 1976

Preliminary information indicates corn sweetener shipments for food use in calendar 1976 totaled about 3.3 million short tons (dry basis), up about 10 percent from 1975 according to trade sources. Conventional corn sirup shipments totaled less than 2 million tons (dry basis), about the same as in 1975, while dextrose shipments for food use totaled over 500,000 tons in 1975, up slightly from the previous year.

Calendar 1976 marked a year of revised expectations for high fructose corn sirup (HFCS) shipments. Early last year, the corn sweetener industry anticipated a U.S. market of at least one million short tons (dry basis) for HFCS. But as the year progressed and sugar prices declined, the original expectations were scaled down. And by mid-year, it was apparent the 1-million-ton goal for 1976 was unlikely to be reached. Based on incomplete information from trade sources, total U.S. HFCS shipments in 1976 probably totaled near 800,000 tons, up about 300,000 tons from 1975, a substantial increase, but significantly under earlier expectations.

Early in 1976, the U.S. corn sweetener industry tentatively projected a domestic U.S. market of 3 million short tons of HFCS (dry basis) by 1980 if not before. But current low sugar prices may delay this achievement. A reduced HFCS market of 2 to 2.5 million tons by 1980 now seems more readily attainable. Trade sources suggest that by this year-

end, the U.S. corn refining industry may have a production capacity of near 2.5 million tons of HFCS annually. Annual shipments of HFCS in 1977 at best will probably not total over 1.3 million tons, about half the estimated annual capacity.

Sharply lower sugar prices and excess HFCS capacity which emerged in 1976 have severely shaken the U.S. corn refining industry. Plants which previously produced HFCS around the clock, have more recently shut down at times waiting for new orders. There are currently six HFCS producers, with another one or two scheduled to come on stream this year. Indications are that some new HFCS capacity expected to be available later this year may be held back from production for awhile. Moreover, three firms have deferred plans to start building new HFCS capacity, because of both current low sugar prices and existing excess capacity. In contrast, excess capacity for dextrose is reportedly negligible, and for conventional corn sirup, probably no more than a fifth to a third of HFCS excess capacity.

Little growth in dextrose shipments is anticpated in 1977, consistent with trends in earlier years. HFCS may be replacing dextrose as well as sugar. Dextrose has always been priced under sugar to encourage dextrose use. On the other hand, since dextrose is the most costly corn sweetener to produce, it has always been priced sufficiently above corn sirup to encourage industrial users to use corn sirup instead in those products where it adequately provides the desired characteristics.

Not much growth is expected in conventional corn sirup shipments in 1977. As conventional corn sirup consumption was annually rising in the late 1960's and early 1970's, much of its increased use was in commercially prepared foods and beverages. Where HFCS use is consistent with desired product characteristics, it may now be competitively priced with either regular or high dextrose equivalent (D.E.) corn sirups, particularly the latter, and may be replacing a significant portion of the potential growth of regular corn sirup.

There has been virtually no growth in the confectionery industry in recent years and consequently conventional corn sirup sales to the candy industry have also reflected little growth. Moreover, there is some indication that the regular corn sirup contents of many sweetener-containing products are already near maximum acceptable levels. Thus, conventional corn sirup's potential growth would appear limited to: (1) nonfood use, (2) the brewing industry, (3) newly developed foods and beverages, and (4) those few remaining food and beverage products whose corn sirup contents are not yet at maximum acceptable limits.

Corn Sweeteners Consumption Also Up In 1976

Per capita consumption of corn sweeteners totaled nearly 30 pounds (dry basis) in calendar 1976, up about 9 percent from 1975 (table S-9). Most of the increase came from HFCS consumption of 7 pounds, up from under 5 pounds in 1975. Last year was the first year in which per capita HFCS consumption totaled higher than the 5-pound dextrose consumption. Conventional corn sirup consumption totaled nearly 18 pounds last year, about the same as in 1975.

In 1977, both dextrose and regular corn sirup consumption are expected to nearly match and could perhaps slightly exceed last year's per capita levels. HFCS consumption is expected to increase 2 to 4 pounds per capita this year, with the extent of the increase depending on how much sugar prices rise from current levels.

Corn Sweetener Prices Follow Sugar Prices

As U.S. wholesale refined sugar prices declined in the third and fourth quarters of 1976 and as corn prices decreased in the fourth quarter, corn sweetener prices also declined. The Chicago quotation for regular corn sirup was $9.34 per cwt. (dry basis) in the last quarter, down over $3 per cwt. from the first quarter levels. Similarly, the Decatur, Illinois, HFCS price of $11.51 in the last quarter of 1976 was down over $3.50 per cwt. from the first quarter. Dextrose prices have also declined but

Corn sweetener price comparisons (dry basis)

Year, quarter, or month	Corn sirup		High-fructose corn sirup	Dextrose
	Chicago	New York	Decatur, Illinois	New York
	Dollars per cwt.	*Dollars per cwt.*	*Dollars per cwt.*	*Dollars per cwt.*
1970	6.78	8.46	([1])	10.20
1971	6.43	8.77	([1])	10.71
1972	4.52	5.78	([1])	10.07
1973	7.06	8.53	([1])	10.79
1974	11.43	13.21	([1])	25.50
1975	15.39	18.07	23.11	22.44
1976	11.10	14.44	13.85	16.36
1976 Quarters:				
I	12.45	15.56	15.14	16.84
II	12.04	16.37	15.04	16.96
III	10.80	13.93	14.35	16.36
IV	9.13	11.91	11.51	15.27

[1] Price data on high-fructose corn sirup not available before 1975.

Source: Corn sirup, Chicago, from BLS; all other data from *Journal of Commerce*.

apparently not as much as prices of regular corn sirup and HFCS.

Corn sweetener prices may not change greatly from present levels for some time unless sugar prices change. Corn sweetener prices, especially corn sirup prices, are also responsive to corn prices, particularly when corn prices increase. Corn prices have strengthened about 30 cents a bushel from their harvesttime low last fall. Because of continual strong domestic and export demand, tight soybean supplies, and concern about dry weather in the grain belt, some further seasonal increase in corn prices is likely until new crop prospects become available.

SWEETENER-CONTAINING PRODUCT TRENDS

Sugar Deliveries by Type of Use

Use in commercially prepared foods and beverages represented 63 percent of total sugar deliveries in the first nine months in 1976. Beverage use (largely in soft drinks), accounted for nearly 23 percent of total sugar use, and food use, the remaining 40 percent. Cereal and bakery products took the largest commercial food use share—13 percent. Other important industrial food uses were in confectionary, processed foods, and dairy products.

Refined sugar deliveries for use in commerically prepared foods and beverages totaled 4.88 million short tons during January-September, up 11 percent from the same period in 1975 (table S-10). Sugar use in beverages and in foods increased about the same amount. However, within food categories, the increases varied from only a near 2-percent increase in processed foods to up more than a fifth for sugar use in confectionary.

Refined sugar deliveries for nonindustrial food use accounted for 36 percent of total U.S. deliveries during the first nine months of last year. Total deliveries of 2.77 million short tons for this use were up 13 percent from the same period in 1975. The data for nonindustrial food use suggests there may have been some rebuilding of distribution stocks in 1976. For example, while deliveries to wholesalers increased over 16 percent during the first 9 months of 1976, deliveries to retailers increased only 8 percent, while deliveries of consumer-size packages were up only 6 percent. This suggests that wholesalers as well as smaller nonhousehold users (such as small bakers or confectioners) may now be willing to carry larger inventories.

Soft Drink Trends

Container shipments to soft drink bottlers and canners increased significantly during the first half of 1976 over the first half of 1975, suggesting soft drink consumption in calendar 1976 may have increased over calendar 1975. While can companies and to some extent bottle companies were absorbing cost increases in 1976, it appears likely that soft drink container prices will increase again in 1977. The increases, may range from 5 to 7 percent for cans and 8 to 10 percent for bottles.

Thus, even though sugar, HFCS, and saccharin prices continue relatively low, prices of bottles and cans and other factor costs will likely increase. If this occurs, cola soft drink prices will likely increase in 1977 compared with a slight decline in 1976, while carbonated fruit drink prices which increased slightly in 1976, may increase again this year.

Cocoa Outlook for 1977--Higher Prices, Reduced Use

U.S. imports, grind and consumption in 1977 will be limited by two factors, (1) available cocoa supplies, and (2) prevailing price levels for cocoa, sugar, and milk solids. Cocoa prices are likely to remain high, at least until the size of the 1977/78 crop is known. Current high prices are already being reflected in higher priced imports from Latin America where purchases are made 30 to 60 days ahead of shipment. But prices of cocoa imported from Africa have yet to increase much, since U.S. imports from Africa usually reflect contracts made 6 months to a year prior to shipments.

With cocoa prices record high, U.S. imports, grindings, and consumption will probably decline some from the 1976 levels. But because of the time lag between purchases and shipments, the decline may be tempered during the first half of 1977. However, the prospective increase from 15 cents to 20 cents for candy bars can be expected to exert downward pressure on cocoa consumption. Higher cocoa prices coupled with prospective lower sweetener product consumption means that sweetener deliveries for use in confectionary in 1977 will probably decline signficantly from the 1976 level.

OTHER SWEETENERS

Honey

World Honey Output Up

World honey production totaled over 596,000 metric tons in 1976—a new record. The previous record of 574,000 tons in 1973 was followed by a slight decline to 562,000 tons in both 1974 and 1975. Most of the 1976 increase was contributed by Western Europe and the Soviet Union. Western Europe experienced a wet spring followed by prolonged summer drought which severely reduced

potential output of many crops but apparently ended in time for a good honey flow, particularly in France and West Germany.

Honey production in the four largest exporting countries in 1976—Mexico, Argentina, Australia, and Mainland China—either matched output in 1975, or increased slightly. Honey production in the four largest importers—West Germany, the United States, Japan, and the United Kingdom—varied from declining slightly in Japan to increasing sharply in West Germany. The Soviet Union is the worlds largest honey producer—125,000 metric tons in 1976. West Germany is the world's largest importer—importing 51,000 tons in 1975. And Mexico is the world's largest exporter—exporting 30,000 tons in 1975.

U.S. Production Up Slightly

U.S. honey production totaled 200 million pounds in 1976 (91,000 metric tons) up slightly from the previous year and second only to the Soviet Union (table S-15). The 1976 U.S. honey crop was produced by 4.31 million colonies, up 2 percent from the previous year. Average honey yield per colony was 46 pounds, 2 percent below 1975 but up 1 percent from 1974.

Total U.S. honey consumption of about 260 million pounds in 1976 was up 22 million pounds from 1975. Per capita consumption of 1.2 pounds last year was up slightly from 1.1 pounds in 1975. Honey exports totaled about 4.6 million pounds in calendar 1976 up from 4 million pounds in 1975. U.S. honey imports totaled about 65 million pounds in 1976, nearly 20 million pounds more than the year before (table S-14).

U.S. Prices Declined Fractionally in 1976

U.S. beekeepers received an overall average price of 50 cents per pound for honey during 1976, nearly matching the 1974-75 average, the highest on record. These prices include all sales: both wholesale, and retail from roadside stands, and comb, chunk, and extracted honey, from apiaries owned by commercial and backyard beekeepers. Sales of processed bulk honey averaged 45 cents per pound, down 3 cents from a year earlier.

Processed package sales averaged 62 cents per pound compared with 63 cents in 1975. Average retail prices received for extracted honey in 1976 averaged 73 cents per pound, up 2 cents from 1975. U.S. honey prices received by beekeepers have declined only fractionally from record highs in 1974 and 1975, and held up surprisingly well in 1976, considering the record large volume of honey imports, coupled with current low sugar price levels.

Honey Outlook for 1977—Potential Problems

U.S. honey prices will likely continue near present levels for some time. The large 1976 world crop will provide sufficient supplies in the first half of 1977 for U.S. imports to supplement U.S. production. Early indications for prospective 1977 honey production seem on balance somewhat negative at this time. Though the South and Northeast generally start the spring with adequate moisture for floral crops, conditions through January were extremely dry in the Midwest and West.

In addition, the nation has been gripped by the coldest winter in many years. Winter losses of bees especially in the Northern tier States, may be greater than usual if beekeepers, because of recent mild winters have relaxed their practice of wrapping bees. Deliveries of package bees from the South may be delayed because of cold weather. The timing of package deliveries for peak colony population to coincide with the start of the major honey flow is essential for maximum honey production, particularly this year.

Maple Sirup

The weather has been exceptionally cold in most pure maple sirup producing regions. In Canada, the industry believes they may match their 1976 production of 1.83 million Imperial gallons (13.25 pounds per gallon). Along with the cold weather there is considerable snow, and *the more snow in the bush, the better the crop.* Also, needed are sufficient bright and sunny days during the previous summer to allow trees to manufacture sugar. Finally, there must be sunny days and frosty nights during the maple sap run.

The Canadian season starts about the middle of March and is generally completed by the end of April. While the 6-week season is possible, there is considerable variation in output and a 2- to 4-week season in Canada is more the norm. Generally, about half to two-thirds of Canadian pure maple sirup production is exported to the United States, mostly for use in blended cane, maple, and corn table sirups.

Noncaloric Sweeteners

Saccharin

The Food and Drug Administration (FDA) continues to permit saccharin use in foods and beverages. A report from the National Academy of Sciences/National Research Council concluded that additional studies needed to resolve whether or not saccharin may cause cancer. Studies now being conducted in Canada, are scheduled for completion early in 1977. The FDA will apparently await

availability of the Canadian studies before acting further.

One of the concerns is whether it is saccharin, per se, that may cause cancer, or an impurity, ortho-toluene-sulfonamide, commonly called OTS that appears suspect. Because of this, the FDA is reportedly preparing an amendment to its interim food additive regulations, stating that the impurity, OTS, shall not appear in any food or beverage product in other than extremely minute quantities.

Saccharin imports last year ran behind levels imported in 1975. When data are complete, 1976 imports will likely total around 2.5 million pounds compared with 3.1 million pounds in 1975.

Cyclamate

The Food and Drug Administration recently turned down a petition by the largest U.S. cyclamate manufacturer to produce cyclamate for food use in the United States. Its present output is exported to those countries where cyclamate use in foods and beverages is legally permissible.

According to FDA, studies by cancer experts were unable to prove or disprove whether or not cyclamate is safe for use as a food additive. It is reported the firm will likely request a full hearing concerning FDA's denial of its petition.

SWEETENER BYPRODUCTS

Industrial Molasses

Recent data indicate that 1976/77 world industrial molasses production will be up 7 percent (1.8 million metric tons) over 1975/76. Countries which show the largest increases in production are Brazil, the USSR and Thailand. Decreases in output are expected in Turkey, West Germany and U.S. beet molasses. The USSR, with an estimated 3.3 million ton outturn in 1976/77 continues to be the world's largest industrial molasses producer. Brazilian industrial molasses output is expected to expand in 1976/77 following a poor year when frost reduced cane production. The production increase in Thailand is resulting from the larger cane crop.

In India, industrial molasses output, primarily used for industrial alcohol production, will be about on a par with 1975/76. Utilization is increasing in Japan, while in Mexico industrial molasses consumption has been rising faster than production, thereby reducing the exportable surplus. In the United States, while beet molasses production in 1976/77 is expected to be down, total output (including domestic offshore—Hawaii and Puerto Rico—production) may be up 5 percent.

U.S. Corn Gluten Feed and Meal

According to trade sources, 330 to 360 million bushels of corn were wet-milled by the U.S. corn refining industry in calendar 1976, up from 300 to 320 million bushels in 1975. The larger grind last year resulted in an increased supply of corn gluten feed and meal and corn oil.

Overseas and domestic markets have been good for corn gluten feed (21 percent protein) reflecting some lack of feeds and fodders for cattle feed, both in the United States and particularly in Western Europe. The domestic market for corn gluten meal (60 percent protein) is expected to expand in first half 1977 as poultry numbers expand, coupled with its growing acceptance as an ingredient in pet food.

Corn gluten feed and meal prices began to rise during last year's third quarter, bouncing back from a seasonal second quarter low. The increase in both gluten feed and meal prices continued in the last quarter of 1976, and appears likely to carry into the first quarter this year, possibly the second quarter. Rising gluten feed and meal, and corn oil prices, are helping corn refiners partially offset current low corn sweetener prices.

Selected price comparisons: Corn and corn refiner by-products

Year or quarter	No. 2 yellow corn	By-products		
		Corn gluten		Crude corn oil[3]
		Feed[1]	Meal[2]	
	Chicago, Illinois			Decatur, Illinois
	Dollars per bu.	*Dollars per ton*	*Dollars per ton*	*Dollars per cwt.*
1970	1.38	49.07	138.07	16.56
1971	1.39	47.11	130.29	19.81
1972	1.30	50.97	139.11	16.37
1973	2.20	84.45	259.19	22.72
1974	3.20	90.50	229.93	41.30
1975	2.91	86.01	215.60	32.53
1976	2.70	100.15	249.09	25.63
Quarters:				
1976:				
I	2.69	87.58	250.93	28.84
II	2.87	90.20	200.97	21.31
III	2.83	109.30	273.87	25.54
IV	2.47	113.53	270.60	26.77

[1] 21 percent protein. [2] 60 percent protein. [3] Tank car, f.o.b. plant.

Source: No. 2 yelllow corn, Chicago Board of Trade; Corn gluten feed and meal, *Feed Market News*; Crude corn oil, National Provisioner.

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NOTE

The above references follow the special article, *The Louisiana Sugar Industry: It's Past, Present, Prospects,* by Glenn Zepp, beginning page 44.

Table S-3—World centrifugal sugar production in specified countries, raw value, 1972/73 to 1976/77[1]

Region and country	1972	1973	1974	1975	1976[2]
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
North America:					
United States:					
Mainland cane	1,620	1,420	1,470	1,830	1,775
Hawaii	1,129	1,041	1,107	1,025	1,100
Puerto Rico	255	290	299	308	310
Total U.S. cane	3,004	2,751	2,875	3,163	3,185
Sugarbeets	3,663	3,197	3,006	4,033	3,750
Total U.S.	6,667	5,948	5,881	7,196	6,935
Caribbean:					
Cuba	5,787	6,393	6,283	6,614	6,393
Dominican Republic	1,259	1,316	1,251	1,300	1,378
Other countries	957	973	897	940	992
Total Caribbean	8,003	8,682	8,431	8,854	8,763
Other Mainland:					
Mexico	3,053	3,125	3,006	3,003	3,031
Canada	161	126	103	132	143
Central America	1,092	1,269	1,451	1,711	1,841
Total Other Mainland	4,306	4,520	4,560	4,846	5,015
Total North America[3]	18,976	19,150	18,872	20,895	20,713
South America:					
Argentina	1,426	1,819	1,689	1,487	1,764
Brazil	6,795	7,672	8,157	6,834	8,267
Colombia	898	937	1,001	1,086	1,113
Peru	1,014	1,125	1,091	1,091	1,047
Venezuela	571	637	584	538	590
Other countries	1,031	1,159	1,281	1,546	1,658
Total South America[3]	11,735	13,349	13,803	12,583	14,439
Europe:					
Western Europe:					
E.C.-9					
Belgium-Luxemburg	758	865	683	801	750
Denmark	377	405	457	466	480
France	3,290	3,492	3,250	3,562	3,235
West Germany	2,690	2,707	2,687	2,792	2,809
Ireland	186	208	158	219	220
Italy	1,381	1,250	1,113	1,606	1,737
Netherlands	833	917	856	1,008	1,048
United Kingdom	1,062	1,154	681	768	871
Total E.C.-9[3]	10,577	10,999	9,885	11,222	11,150
Non E.C.					
Austria	428	408	438	564	431
Greece	142	177	206	338	359
Spain	915	899	659	1,030	1,186
Sweden	322	291	336	305	340
Other countries	196	208	190	183	208
Total Non EC.[3]	2,002	1,983	1,829	2,420	2,524
Total Western Europe[3]	12,579	12,982	11,715	13,643	13,674
Eastern Europe:					
Czechoslovakia	859	947	937	827	772
East Germany	794	777	772	716	661
Poland	2,016	2,003	1,716	2,149	2,205
Romania	636	753	618	617	772
Yugoslavia	471	532	611	539	647
Other countries	639	672	656	685	779
Total Eastern Europe[3]	5,413	5,685	5,310	5,534	5,836
Total Europe[3]	17,993	18,666	17,025	19,177	19,510
U.S.S.R.	8,984	10,549	8,521	8,488	10,141

See footnotes at end of table.

Table S-3—World centrifugal sugar production in specified countries, raw value, 1972/73 to 1976/77[1] —Continued

Region and country	1972	1973	1974	1975	1976[2]
	1,000 short tons—	*1,000 short tons—*	*1,000 short tons—*	*1,000 short tons—*	*1,000 short tons—*
Africa:					
Egypt	650	658	595	683	744
Mauritius	756	768	767	547	799
Mozambique	402	430	441	268	386
South Africa	2,111	1,909	2,076	1,986	2,205
Other countries	2,081	2,274	2,382	2,577	2,703
Total Africa[3]	6,002	6,041	6,261	6,061	6,837
Asia:					
China-Peoples Republic	2,708	2,899	2,646	2,756	2,866
China-Rep. of Taiwan	860	983	828	901	959
India	5,040	5,456	6,387	6,019	6,063
Indonesia	981	1,047	1,102	1,157	1,268
Iran	689	734	711	755	777
Japan	716	720	527	519	520
Pakistan	518	701	614	694	728
Philippines	2,673	2,772	2,717	3,260	3,194
Thailand	716	1,025	1,168	1,767	1,984
Turkey	894	811	919	1,087	1,202
Other countries	333	464	476	489	558
Total Asia[3]	16,129	17,614	18,096	19,404	20,117
Oceania:					
Australia	3,015	2,923	3,219	3,230	3,770
Fiji Islands	413	386	397	408	419
Total Oceania[3]	3,428	3,309	3,616	3,638	4,189
TOTAL WORLD[3]	83,247	88,679	86,194	90,246	95,946

[1] Crop-year beginning May 1. All campaigns which begin not earlier than May of one year nor later than April of the following year, are included in the same crop year. Each country's total annual production is credited to the May/April year in which sugar production began. [2] Estimate. [3] May not add due to rounding. E.C. Economic Community.

Source: Foreign Agricultural Service, USDA.

Table S-4—Domestic sugar crops: Acres harvested, yield per acre, and production, 1974-76, State and area share of 1976 U.S. production, and change from 1975/76[1]

State and area	Acres harvested			Yield per acre			Production			Share of production	Change from 1975/76	
	1974	1975	1976[2]	1974	1975	1976[2]	1974	1975	1976[2]			
	1,000 acres	*1,000 acres*	*1,000 acres*	*Tons*	*Tons*	*Tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*Percent*	*1,000 tons*	*Percent*
Cane for seed												
Florida	14.9	10.5	9.5	27.8	41.3	38.1	414	434	362	33.2	-72	83.4
Louisiana	23.0	21.0	22.0	21.3	21.0	25.0	490	441	550	50.5	109	124.7
Texas	.8	.5	.1	32.4	28.0	35.0	26	14	4	.4	-10	28.6
Total mainland	38.7	32.0	31.6	24.0	27.8	29.0	930	889	916	84.1	27	103.0
Hawaii	5.5	6.4	6.2	29.3	28.3	27.9	161	181	173	15.9	-8	95.6
Total	44.2	38.4	37.8	24.7	27.9	28.8	1,091	1,070	1,089	100.0	19	101.8
Cane for sugar												
Florida	258.4	287.5	260.0	27.8	35.7	32.7	7,184	10,264	8,500	32.9	-1,764	82.8
Louisiana	308.0	308.0	290.0	21.3	21.0	25.0	6,558	6,468	7,250	28.1	782	112.1
Texas	27.7	35.0	35.8	32.4	35.3	37.7	898	1,236	1,350	5.2	114	109.2
Total mainland	594.1	630.5	585.8	24.6	28.5	29.2	14,640	17,968	17,100	66.2	-868	95.2
Hawaii	95.8	105.1	98.4	94.8	90.2	88.6	9,081	9,485	8,718	33.8	-767	91.9
Total	689.9	735.6	684.2	34.4	37.3	37.7	23,721	27,453	25,818	100.0	-1,635	94.0
Total Cane												
Florida	273.3	298.0	269.5	27.8	35.9	32.9	7,598	10,698	8,862	33.0	-1,836	82.8
Louisiana	331.0	329.0	312.0	21.3	21.0	25.0	7,048	6,909	7,800	29.0	891	112.9
Texas	28.5	35.5	35.9	32.4	35.2	37.7	924	1,250	1,354	5.0	104	108.3
Total mainland	632.8	662.5	617.4	24.6	28.5	29.2	15,570	18,857	18,016	67.0	-841	95.5
Hawaii	101.3	111.5	104.6	91.2	86.7	85.0	9,242	9,666	8,891	33.0	-775	92.0
Total U.S. cane	734.1	774.0	722.0	33.8	36.9	37.3	24,812	28,523	26,907	100.0	-1,616	94.3
Beet												
Maine	—	—	7.0	—	—	8.6	—	—	60	.2	60	—
Michigan	80.4	91.4	91.4	17.0	19.2	16.8	1,364	1,755	1,536	5.2	-219	87.5
Ohio	32.7	39.2	36.5	15.9	19.8	16.9	519	777	617	2.1	-160	79.4
Great Lakes[3]	113.1	130.6	134.9	16.6	19.4	16.4	1,883	2,532	2,213	7.5	-319	87.4
Minnesota	182.7	196.0	248.0	11.6	14.2	12.2	2,116	2,783	3,026	10.3	243	108.7
North Dakota	139.9	130.9	150.0	11.2	13.9	13.8	1,562	1,820	2,070	7.0	250	113.7
Red River Valley	322.6	326.9	398.0	11.4	14.1	12.8	3,678	4,603	5,096	17.3	493	110.7
Colorado	125.7	154.9	121.0	18.0	17.2	19.1	2,261	2,661	2,303	7.8	-358	86.5
Kansas	35.1	43.0	38.0	17.2	15.5	19.7	602	667	749	2.6	82	112.3
Nebraska	75.5	96.0	84.5	18.3	18.5	20.0	1,382	1,776	1,690	5.7	-86	95.2
Wyoming	53.5	57.7	56.4	18.4	18.4	20.7	983	1,060	1,167	4.0	107	110.1
Montana	43.9	48.5	46.1	18.7	17.1	21.0	820	829	968	3.3	139	116.8
Texas	19.7	33.7	23.6	17.7	13.1	21.6	349	440	510	1.7	70	115.9
New Mexico	.4	.9	.9	19.8	16.7	22.2	8	15	20	.1	5	133.3
Great Plains	353.8	434.7	370.5	18.1	17.1	20.0	6,405	7,448	7,407	25.2	-41	99.4
Oregon	11.6	17.9	14.2	23.0	23.8	25.1	267	426	356	1.2	-70	83.6
Washington	63.3	82.4	76.5	24.5	26.0	24.5	1,554	2,142	1,874	6.4	-268	87.5
Idaho	90.8	158.3	139.4	20.3	18.6	20.7	1,845	2,942	2,879	9.8	-63	97.9
Utah	17.0	22.5	18.0	17.4	15.7	17.7	296	353	319	1.1	-34	90.4
Northwest	182.7	281.1	248.1	21.7	20.9	21.9	3,962	5,863	5,428	18.5	-435	92.6
Arizona	10.4	17.0	17.0	23.8	21.5	23.0	247	366	391	1.3	25	106.8
California	230.0	326.3	312.0	25.9	27.3	28.5	5,948	8,892	8,892	30.2	0	100.0
Southwest	240.4	343.3	329.0	25.8	27.0	28.2	6,195	9,258	9,283	31.5	25	100.3
Total U.S. Beet	1,212.6	1,516.6	1,480.5	18.2	19.6	19.9	22,123	29,704	29,427	100.0	-277	99.1

[1] Crop year. [2] Due to the recent freeze in Florida, the 1976 Florida, total mainland, and total cane crop values have been adjusted. These adjustments reflect a preliminary assessment of the impact of the freeze and differ from *Crop Production, 1976 Annual Summary* values. [3] Includes Maine.

Source: Crop Production, Annual Summary, SRS, USDA.

Table S-5—U.S. sugarcane, sugarbeets, and sugar, raw value: Acres harvested, recovered sugar, yield per acre, production, crops years 1974-76

Area	Sugarcane and sugarbeets			Sugar, raw value		
	1974	1975	1976[1]	1974	1975	1976[1]
	ACRES HARVESTED			RECOVERED SUGAR		
	1,000 acres	*1,000 acres*	*1,000 acres*	*Percent*	*Percent*	*Percent*
Cane[2]						
Florida	258.4	287.5	260.0	11.2	10.3	10.6
Louisiana	308.0	308.0	290.0	9.1	9.9	9.0
Texas	27.7	35.0	35.8	8.2	10.2	9.7
Total mainland	594.1	630.5	585.8	10.0	10.2	9.8
Hawaii	95.8	105.1	98.4	11.5	11.7	12.0
Total cane	689.9	735.6	684.2	10.6	10.7	10.6
Total beet	1,212.6	1,516.6	1,480.5	13.2	13.5	12.3
	YIELD PER ACRE					
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Cane[2]						
Florida	27.8	35.7	32.7	3.1	3.7	3.5
Louisiana	21.3	21.0	25.0	1.9	2.1	2.2
Texas	32.4	35.3	37.7	2.7	3.6	3.7
Total mainland	24.6	28.5	29.2	2.5	2.9	2.9
Hawaii	94.8	90.2	88.6	10.9	10.5	10.7
Total cane	34.4	37.3	37.7	3.6	4.0	4.0
Total beet	18.2	19.6	19.9	2.4	2.7	2.6
	PRODUCTION					
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Cane[2]						
Florida	7,184	10,264	8,500	803	1,061	900
Louisiana	6,558	6,468	7,250	594	640	650
Texas	898	1,236	1,350	74	126	131
Total mainland	14,640	17,968	17,100	1,471	1,827	1,681
Hawaii	9,081	9,485	8,718	1,041	1,107	1,050
Total cane	23,721	27,453	25,818	2,512	2,934	2,731
Total beet	22,123	29,704	29,427	2,916	4,019	3,906

[1] Due to the recent freeze in Florida, the 1976 Florida, total mainland, and total cane crop values have been adjusted. These adjustments reflect a preliminary assessment of the impact of the freeze and differ from *Crop Production 1976 Annual Summary* values. [2] Excludes sugarcane for seed.

Source: Crop Production, Annual Summary, SRS, USDA.

Table S-6—Monthly, quarterly, and annual sugar deliveries to domestic users, change from year ago, previous month, and previous quarter, and 1976 compared with 1973-75[1]

Month and quarter	Deliveries[2]						1976 compared with					
					Change from		Cumulative			Monthly		
	1973	1974	1975	1976	Year ago	Previous month & quarter	1973	1974	1975	1973	1974	1975
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
						BEET						
January	268	249	152	275	123	-9	102.6	110.4	180.9	102.6	110.4	180.9
February	266	226	165	268	103	-7	101.7	114.3	171.3	100.8	118.6	162.4
March	329	214	208	366	158	98	105.3	131.9	173.1	111.2	171.0	176.0
1st quarter	863	689	525	909	384	175	---	---	---	105.3	131.9	173.1
April	278	224	279	334	55	-32	108.9	136.1	154.6	120.1	149.1	119.7
May	318	255	292	333	41	-1	108.0	134.9	143.8	104.7	130.6	114.0
June	366	228	313	365	52	32	106.4	139.0	137.8	99.7	160.1	116.6
2nd quarter	962	707	884	1,032	148	123	---	---	---	107.3	146.0	116.7
July	338	306	446	370	-76	5	106.8	135.8	124.6	109.5	120.9	83.0
August	401	341	365	357	-8	-13	104.1	130.6	120.2	89.0	104.7	97.8
September	305	292	319	355	36	-2	105.4	129.5	119.1	116.4	121.6	111.3
3rd quarter	1,044	939	1,130	1,082	-48	50	---	---	---	103.6	115.2	95.8
October	269	309	257	271	14	-84	105.0	124.6	117.8	100.7	87.7	105.4
November	246	254	193	251	58	-20	104.8	122.3	118.6	102.0	98.8	130.1
December	253	122	284									
4th quarter	768	685	734									
January-November	3,384	2,898	2,989	3,545	556	---	104.8	122.3	118.6	---	---	---
Annual	3,637	3,020	3,273	---	---	---	---	---	---	---	---	---
						CANE[4]						
January	585	715	366	488	122	-106	83.4	68.3	133.3	83.4	68.3	133.3
February	535	644	390	509	119	21	89.0	73.4	131.9	95.1	79.0	130.5
March	724	711	478	607	129	102	87.0	77.5	130.0	83.8	85.4	127.0
1st quarter	1,844	2,070	1,234	1,604	370	-209	---	---	---	87.0	77.5	130.0
April	611	678	533	545	12	-62	87.5	78.2	121.6	89.2	80.4	102.3
May	669	785	563	598	35	53	87.9	77.8	117.9	89.4	76.2	106.2
June	697	763	622	632	10	34	88.4	78.7	114.5	90.7	82.8	101.6
2nd quarter	1,977	2,226	1,718	1,775	57	179	---	---	---	89.8	79.7	103.3
July	691	756	732	611	-121	-21	88.4	79.0	108.3	88.4	80.8	83.5
August	801	795	635	680	45	69	87.9	79.9	108.1	84.9	85.5	107.1
September	721	709	614	700	86	20	89.0	81.9	108.9	97.1	98.7	114.0
3rd quarter	2,213	2,260	1,981	1,991	10	216	---	---	---	90.0	88.1	100.5
October	671	736	655	584	-71	-116	88.8	81.7	106.5	87.0	79.3	89.2
November	645	625	568	567	-1	-17	88.7	82.4	105.9	87.9	90.7	99.8
December	662	336	594									
4th quarter	1,978	1,697	1,817									
January-November	7,350	7,917	6,156	6,521	365	---	88.7	82.4	105.9	---	---	---
Annual	8,012	8,253	6,750	---	---	---	---	---	---	---	---	---
						TOTAL[4]						
January	853	964	518	763	245	-115	89.4	79.1	147.3	89.4	79.1	147.3
February	801	870	555	777	222	14	93.1	84.0	143.5	97.0	89.3	140.0
March	1,053	925	686	973	287	200	92.8	91.1	142.9	92.4	105.2	141.8
1st quarter	2,707	2,759	1,759	2,513	754	-34	---	---	---	92.8	91.1	142.9
April	889	902	812	879	67	-94	94.3	92.7	131.9	98.9	97.5	105.3
May	987	1,040	855	931	76	52	94.3	92.0	126.2	94.3	89.5	108.9
June	1,063	991	935	997	62	66	94.2	93.5	122.0	93.8	100.6	106.6
2nd quarter	2,939	2,933	2,602	2,807	205	302	---	---	---	95.5	95.7	107.9
July	1,029	1,062	1,178	981	-197	-16	94.4	93.3	113.8	95.3	92.4	83.3
August	1,202	1,136	1,000	1,037	37	56	93.2	93.0	112.2	86.3	91.3	103.7
September	1,026	1,001	933	1,055	122	18	94.3	94.3	112.3	102.8	105.4	113.1
3rd quarter	3,257	3,199	3,111	3,073	-38	266	---	---	---	94.4	96.1	98.8
October	940	1,045	912	855	-57	-200	94.0	93.1	110.3	91.0	81.8	93.8
November	891	879	761	818	57	-37	93.8	93.1	110.1	91.8	93.1	107.5
December	915	458	878									
4th quarter	2,746	2,382	2,551									
January-November	10,734	10,815	9,145	10,066	921	---	93.8	93.1	110.1	---	---	---
Annual	11,649	11,273	10,023	---	---	---	---	---	---	---	---	---

[1] Raw value. [2] Deliveries in December, 1972-74, excludes some sales contracted for at a later date and are included in January and February of the following year. [3] Preliminary. [4] Includes Hawaii.

Source: Fruit and Vegetable Division, AMS, USDA.

Table S-7—U.S. sugar deliveries to industrial and non-industrial users, calendar years 1970-75 and nine month totals 1975-76

Type of buyer	Calendar year						First nine months	
	1970	1971	1972	1973	1974	1975	1975	1976
	1,000 tons, refined sugar							
Industrial users:								
Food use								
Bakery and cereal products	1,420	1,361	1,449	1,454	1,443	1,241	912	1,002
Confectionery products	1,098	1,056	1,057	1,035	1,018	795	574	691
Processed foods	969	1,027	987	1,025	949	743	590	599
Dairy products	537	561	599	595	570	511	383	435
Other	433	493	508	502	514	486	369	408
Total food use	4,456	4,498	4,600	4,611	4,494	3,776	2,828	3,135
Beverage use	2,356	2,365	2,437	2,469	2,350	2,074	1,578	1,742
Total industrial users	6,812	6,863	7,037	7,080	6,844	5,850	4,406	4,877
Non-industrial users:								
Institutions								
Eating and drinking	90	79	85	94	91	72	57	49
Other[1]	99	95	88	106	121	85	65	94
Total institutions	189	174	173	200	212	157	122	143
Wholesale and retail								
Wholesalers, jobbers, and sugar dealers	2,206	2,156	2,103	2,064	2,002	1,919	1,412	1,644
Retail grocers, chain stores, and supermarkets	1,330	1,324	1,316	1,316	1,353	1,261	913	986
Total wholesale and retail	3,536	3,480	3,419	3,380	3,355	3,180	2,325	2,630
Minus consumer size packages[2]	2,544	2,610	2,557	2,530	2,581	2,463	1,779	1,889
Redistributed to industrial and other users[3]	992	870	862	849	774	716	546	741
Total non-industrial user	3,725	3,654	3,592	3,580	3,567	3,337	2,447	2,773
Total food use	10,538	10,517	10,629	10,669	10,411	9,187	6,853	7,650
Non-food use[4]	84	93	91	111	128	86	60	77
Total food and non-food use	10,621	10,610	10,720	10,771	10,539	9,273	6,913	7,727

[1] Includes deliveries to government agencies and the military. [2] Less than 50 pounds. [3] Includes some deliveries to and eating and drinking places and institutions. [4] Used largely for pharmaceuticals and some tobacco.

Source: Fruit and Vegetable Division, AMS, USDA.

Table S-8—U.S. mainland sugar stocks held by primary distributors, January 1, 1960, 1965, 1970-77, and January 1-December 1, 1976-76[1]

Year and month	Cane sugar						Beet processors	Total mainland[2]
	Refiners			Mainland cane mills	Importers refined	Total		
	Refined	Raw	Total[2]					
	--- 1,000 short tons, raw value ---							
	JANUARY 1, BEGINNING STOCKS							
1960	317	407	724	19	39	782	1,223	2,005
1965	230	598	828	151	25	1,004	1,696	2,700
1970	269	695	964	412	10	1,386	1,413	2,799
1971	253	804	1,057	376	4	1,437	1,355	2,792
1972	273	785	1,057	283	1	1,341	1,346	2,687
1973	249	972	1,222	116	3	1,341	1,369	2,710
1974	275	998	1,273	100	1	1,374	1,210	2,583
1975	295	886	1,181	211	1	1,393	1,406	2,800
1976	237	415	651	484	0	1,135	1,596	2,731
1977	249	768	1,017	[3]400	0	1,417	1,730	3,147
	JANUARY 1-DECEMBER 1, BEGINNING STOCKS							
1975:								
January	295	886	1,181	211	1	1,394	1,406	2,800
February	288	756	1,044	373	1	1,418	1,649	3,067
March	279	600	879	513	1	1,393	1,578	2,971
April	262	601	863	552	([4])	1,415	1,421	2,836
May	274	494	768	437	---	1,205	1,316	2,521
June	259	491	750	330	---	1,080	1,219	2,299
July	275	423	698	238	---	936	1,010	1,946
August	211	272	484	139	---	623	652	1,275
September	251	319	569	62	---	631	400	1,032
October	265	434	699	13	---	712	246	958
November	477	262	738	60	---	798	617	1,415
December	275	493	768	238	---	1,006	1,082	2,088
1976:								
January	236	431	667	449	---	1,116	1,596	2,712
February	280	461	741	515	---	1,256	1,915	3,171
March	277	421	698	596	---	1,294	1,907	3,201
April	362	237	599	684	---	1,233	1,700	2,933
May	261	410	671	545	---	1,216	1,562	2,778
June	286	429	715	419	---	1,134	1,435	2,569
July	298	522	820	299	---	1,119	1,195	2,314
August	311	588	899	220	---	1,119	919	2,038
September	284	585	869	141	---	1,010	679	1,689
October	252	513	765	62	---	827	496	1,324
November	290	439	729	105	---	834	826	1,660
December	277	631	907	[3]300	---	1,207	1,296	2,504

[1] Beginning stocks approximately first day of the month. [2] May not add due to rounding. [3] Estimate. [4] Less than 500 short tons.

Source: Fruit and Vegetable Division, AMS, USDA.

Table S-9—Caloric and noncaloric sweeteners: Per capita U.S. consumption, 1960-76

Calendar year	Refined cane and beet sugar						Corn sweeteners[1]				Minor caloric[1]			Total caloric	Noncaloric sweeteners[2]		
	U.S. grown sugar			Cane sugar		Total	Corn sirup		Dex-trose	Total	Honey	Edible sirups	Total		Sacc-harin	Cycla-mate	Tota non-caloric
	Beef sugar	Cane sugar	Total	Im-ported	Total		High-fructose	Other									
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
1960	25.2	28.1	53.3	44.3	72.4	97.6	—	8.2	3.4	11.6	1.2	0.8	2.0	111.2	1.9	0.3	2.2
1961	26.1	28.7	54.8	43.0	71.7	97.8	—	8.6	3.4	12.0	1.1	.8	1.9	111.7	2.1	.4	2.5
1962	23.9	28.0	51.9	45.4	73.4	97.3	—	9.3	3.6	12.9	1.1	.9	2.0	112.2	2.5	.4	2.9
1963	27.2	27.8	55.0	41.7	69.5	96.7	—	9.9	4.3	14.2	1.1	.7	1.8	112.7	3.0	.7	3.7
1964	28.5	30.3	58.8	37.9	68.2	96.7	—	10.9	4.1	15.0	1.0	.7	1.7	113.4	3.5	1.3	4.8
1965	29.4	30.3	59.7	37.1	66.4	96.8	—	11.0	4.1	15.1	1.1	.7	1.8	113.7	4.0	1.7	5.7
1966	28.3	28.6	56.9	40.3	69.2	97.2	—	11.2	4.2	15.4	1.0	.7	1.7	114.7	4.5	1.9	6.4
1967	26.6	29.9	56.5	41.8	71.7	98.3	—	11.9	4.2	16.1	.9	.5	1.4	115.8	4.8	2.1	6.9
1968	27.8	26.5	54.3	44.7	71.2	99.0	—	12.6	4.3	16.9	.9	.7	1.6	117.5	5.0	2.2	7.2
1969	30.1	25.2	55.3	45.4	70.6	100.7	—	13.2	4.5	17.7	1.0	.6	1.6	120.0	5.3	1.6	6.9
1970	31.4	25.0	56.4	45.5	70.5	101.9	—	14.0	4.6	18.6	1.0	.5	1.5	122.0	6.2	([3])	6.2
1971	31.1	22.8	53.9	48.5	71.3	102.4	—	15.0	5.0	20.0	.9	.5	1.4	123.8	5.7	([3])	5.7
1972	30.4	25.4	55.8	47.0	72.4	102.8	0.9	15.6	4.4	20.9	1.0	.5	1.5	125.2	5.7	([3])	5.7
1973	30.4	24.9	55.3	46.2	71.1	101.5	1.4	16.7	4.8	22.9	.9	.5	1.4	125.8	5.7	([3])	5.7
1974	26.1	21.0	47.1	49.5	70.5	96.6	2.3	17.4	4.9	24.6	.8	.4	1.2	122.4	7.0	([3])	7.0
1975[4]	30.5	24.9	55.4	34.8	59.7	90.2	4.7	17.7	5.1	27.5	.9	.4	1.3	119.0	7.0	([3])	7.0
1976[5]	33.3	23.5	56.8	38.3	61.8	95.1	7.1	17.7	5.1	29.9	1.0	.4	1.4	126.4	8.0	([3])	8.0

[1] Dry basis. Recent corn sweetener consumption may be under stated due to incomplete data. [2] Sugar sweeteness equivalent—assumes saccharin is 300 times as sweet as sugar, and cyclamate is 30 times as sweet as sugar. [3] Cyclamate food use was banned by the Food and Drug Administration, effective in 1970. [4] Preliminary. [5] Estimate.

Table S-10—Sugar and products containing caloric sweeteners: Retail prices, U.S. average, 1965-76, and by month 1975 to date

Year and month	Sugar, granulated 5-pounds	Bread, white, 1-pound	Cookies, cream sandwich, 1-pound	Ice cream, ½-gallon	Chocolate bar, 1-ounce	Chocolate syrup, 16-ounces	Cola drink, 72-ounces	Carbonated fruit drink, 72-ounces	Lemonade concentrate, frozen, 6-ounces	Fruit[1] drink, canned, 46-ounces	Fruit cocktail, canned, 303 can	Pears, canned, 2½ can	Peaches, canned, 2½ can	Grape[2] jelly, 10-ounces	Relish sweet pickle, 12-
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1965	59.0	20.9	50.7	78.7	5.1	23.0	54.8	53.6	12.8	34.1	26.1	47.0	31.9	31.2	31.5
1966	60.2	22.2	51.2	80.6	4.6	23.1	56.6	54.8	12.5	33.2	26.9	48.6	34.1	[3]31.5	32.5
1967	60.5	22.2	51.8	80.9	5.0	22.7	60.8	57.0	12.3	32.0	26.1	45.3	32.1	26.2	33.1
1968	60.9	22.4	50.9	80.7	5.3	23.2	65.1	60.5	12.4	32.2	28.3	53.4	35.2	26.6	33.9
1969	62.0	23.0	49.9	81.3	5.9	24.1	68.9	63.1	12.7	33.8	27.8	50.3	34.4	27.9	35.0
1970	64.8	24.3	52.2	84.5	6.5	25.1	72.6	69.1	13.2	35.3	28.3	49.5	35.2	29.9	36.9
1971	68.1	25.0	54.5	85.4	6.7	25.5	75.8	72.6	13.9	36.2	30.7	52.9	36.7	31.4	39.1
1972	69.5	24.7	55.2	85.8	6.7	25.2	83.3	73.2	14.4	36.8	31.6	53.5	37.5	32.9	41.8
1973	75.5	27.6	57.8	91.0	7.0	26.6	86.1	75.5	14.7	38.0	33.8	56.6	41.0	35.3	44.0
1974	161.7	34.5	73.5	107.6	9.8	36.5	108.9	93.7	17.2	43.7	40.8	65.2	52.2	45.2	48.9
1975	186.2	36.0	94.0	122.3	12.5	48.0	132.8	115.2	23.0	54.3	46.2	74.9	59.2	61.2	57.7
1976	119.8	35.3	95.5	127.1	12.2	47.8	127.2	116.6	22.7	55.6	46.0	71.4	N.A.	58.6	60.6
1975															
January	299.1	37.2	92.7	121.6	11.9	47.3	134.0	116.4	21.4	52.0	46.3	75.2	59.5	58.0	55.9
February	268.0	37.4	96.2	122.3	12.2	47.7	137.9	117.7	22.7	52.9	46.4	75.6	59.1	60.3	57.0
March	247.6	37.3	100.6	123.0	12.5	48.3	139.2	118.9	23.1	53.8	46.6	75.8	59.2	61.5	58.2
April	209.0	36.8	99.8	122.0	12.5	48.3	139.0	118.6	23.8	54.4	46.3	76.0	59.8	61.8	58.6
May	184.3	36.2	95.2	121.5	12.5	47.9	134.3	116.6	23.9	53.7	46.1	75.1	59.5	61.7	57.6
June	157.2	35.6	92.1	121.3	12.6	48.1	132.5	115.2	23.6	54.4	46.1	75.2	59.7	61.9	57.2
July	134.4	35.6	92.8	121.3	12.6	48.0	132.7	114.1	22.6	54.9	46.3	75.3	59.5	62.4	56.8
August	154.5	35.1	93.4	121.1	12.6	47.9	129.9	113.4	22.8	55.3	46.2	74.2	59.9	62.3	57.2
September	160.4	35.0	89.8	120.8	12.6	48.2	129.4	113.0	22.9	54.7	46.5	74.3	58.2	61.8	57.3
October	151.6	35.2	92.5	123.3	12.7	48.1	128.6	113.0	23.0	55.6	45.9	73.9	56.6	61.7	58.4
November	136.2	35.3	90.3	123.8	12.6	48.0	128.8	112.6	23.3	54.7	46.0	73.9	60.4	60.6	59.1
December	131.7	35.1	92.6	126.0	12.7	47.9	127.7	112.5	23.4	55.1	45.9	73.7	59.0	60.0	59.5
1976															
January	127.7	35.5	93.2	124.8	12.7	48.1	129.8	116.8	23.6	55.3	45.7	73.0	57.9	59.6	60.4
February	126.9	35.2	95.6	126.8	12.7	48.1	129.6	116.8	23.5	54.9	45.5	72.4	58.7	59.5	61.2
March	125.2	35.2	95.0	125.6	12.6	47.7	129.0	116.0	23.6	55.2	45.3	71.7	58.6	59.1	61.7
April	125.3	35.1	95.1	125.8	12.3	47.8	129.4	115.9	23.3	55.3	45.3	71.4	58.6	59.0	61.4
May	124.0	35.3	96.0	125.3	12.2	47.7	129.9	116.2	23.0	54.9	45.1	70.8	58.1	58.8	60.0
June	124.5	35.6	96.2	126.7	12.1	47.7	130.5	116.7	22.3	55.4	45.9	70.8	58.6	58.8	59.3
July	122.4	35.4	96.4	125.2	12.1	47.6	130.8	116.2	21.9	55.6	45.9	71.1	59.1	58.3	58.7
August	123.6	35.3	94.7	126.3	12.1	47.5	130.8	117.1	21.9	55.8	46.3	71.3	59.1	58.0	59.1
September	114.4	35.4	96.4	128.4	12.0	47.9	121.0	116.9	22.1	56.4	46.9	71.0	59.4	58.2	59.6
October	109.1	35.3	96.8	130.2	12.1	48.0	121.2	117.4	22.4	56.2	46.8	71.0	59.7	58.4	61.5
November	108.4	35.3	94.6	128.7	12.0	48.0	121.7	116.9	22.7	56.0	46.3	70.9	59.7	58.0	62.4
December	106.1	35.2	96.5	131.1	12.0	47.5	122.6	116.9	22.6	56.7	47.0	71.2	N.A.	57.5	62.4

[1] Pineapple-grapefruit. [2] 12-ounces through 1966. [3] 9 month average. n.a.—not available.

Source: Bureau of Labor Statistics.

Table S-11—U.S. sugar imports by country, annual 1970, 1973-75 and eleven month totals, 1975-76

Country	Calendar year				Eleven month totals	
	1970	1973	1974	1975	1975	1976
	1,000 short tons, raw value					
Western Hemisphere:						
Caribbean Islands:						
Bahamas	10	—	—	—	—	—
Dominican Republic	727	745	818	775	766	882
French West Indies	68	—	—	—	—	—
Haiti	22	15	19	12	12	6
West Indies	215	41	282	238	220	225
Netherlands Antilles	—	—	—	1	1	—
Total[1]	1,042	801	1,119	1,026	999	1,113
Central America:						
Belize (British Honduras)	16	48	63	46	46	14
Costa Rica	75	100	79	56	56	65
El Salvador	47	60	65	107	107	135
Guatemala	69	63	96	61	61	320
Honduras	11	—	8	6	6	7
Nicaragus	76	76	53	58	58	153
Panama	37	52	66	98	94	95
Total[1]	331	398	429	432	428	789
North America:						
Canada	—	—	—	40	38	47
Mexico	650	637	538	42	42	1
Total[1]	650	637	538	81	80	48
South America:						
Argentina	80	85	110	112	89	87
Bolivia	—	—	—	—	—	47
Brazil	667	652	783	197	197	—
Colombia	69	75	105	159	133	84
Ecuador	90	93	60	47	18	28
Peru	455	407	471	215	150	295
Venezuela	34	32	—	—	—	—
Other	8	15	14	7	3	15
Total[1]	1,402	1,359	1,543	737	590	556
Total Western Hemisphere[1]	3,424	3,195	3,629	2,276	2,097	2,506
Eastern Hemisphere:						
Australia	211	265	242	464	464	355
China, Republic of	86	86	90	140	140	87
Fiji Islands	44	45	46	—	—	—
India	79	81	85	188	173	194
Korea	—	—	—	11	11	1
Malagasy, Republic of	10	12	13	13	13	13
Malawi	—	16	10	27	27	18
Mauritius	18	45	46	27	27	29
Mozambique	—	—	—	15	15	12
South Africa	78	74	69	134	134	98
Swaziland	7	30	41	36	36	34
Thailand	20	19	26	124	124	70
Other	21	6	—	—	—	18
Total Eastern Hemisphere excluding Philippines[1]	574	679	669	1,179	1,164	929
Philippines	1,298	1,454	1,472	413	413	860
Total Eastern Hemisphere[1]	1,872	2,134	2,141	1,592	1,577	1,789
Total U.S. imports[1]	5,296	5,329	5,770	3,867	3,674	4,298

[1] May not add due to rounding. [2] Less than 5.

Source: Fruit and Vegetable Division, AMS, USDA.

Table S-12—Sugar imports: Monthly, quarterly, and annual raw value totals 1973-76, with comparisons[1]

Month and quarter	Imports						1976 compared with					
					Change from		Cumulative			Monthly		
	1973	1974	1975	1976	Year ago	Previous month & quarter	1973	1974	1975	1973	1974	1975
	1,000 short tons						*Percent*					
January	293	260	90	292	202	95	100.0	112.3	324.4	100.0	112.3	324.4
February	398	465	152	257	105	-35	79.5	75.7	226.9	64.5	55.3	169.1
March	411	580	347	333	-14	76	80.0	67.6	149.7	81.0	57.4	96.0
1st quarter	1,102	1,305	589	882	293	4	---	---	---	80.0	67.6	149.7
April	571	400	260	380	120	47	75.4	74.0	148.6	66.5	95.0	146.2
May	423	602	323	373	50	-7	78.0	70.9	139.5	88.2	62.0	115.5
June	444	637	397	463	66	90	82.6	71.3	133.7	104.3	72.7	116.6
2nd quarter	1,438	1,639	980	1,216	236	334	---	---	---	84.6	74.2	124.1
July	589	523	366	471	105	8	82.1	74.1	132.8	80.0	90.1	128.7
August	425	505	458	478	20	7	85.7	76.7	127.3	112.5	94.7	104.4
September	315	531	598	431	-167	-47	89.9	77.2	116.1	136.8	81.2	71.5
3rd quarter	1,329	1,559	1,422	1,380	-42	164	---	---	---	103.8	88.5	96.7
October	439	445	458	400	-58	-31	90.0	78.4	112.4	91.1	89.9	87.3
November	409	386	225	420	195	20	91.1	80.6	117.0	102.7	108.8	186.7
December	612	436	194									
4th quarter	1,460	1,267	877									
January-November	4,717	5,334	3,674	4,298	624	---	91.1	80.6	117.0	---	---	---
Annual[1]	5,329	5,770	3,867	---	---	---	---	---	---	---	---	---

[1] May not add due to rounding.

Source: Fruit and Vegetable Division, AMS, USDA.

Table S-13—Trends in corn refinery exports, annual 1970-75 and first eleven months, 1976

Calendar Year	Primary products			Other by-products					Total corn refiners exports
	Corn starch	Glucose	Dextrose	Corn oil	Corn oil cake and meal	Corn, by products			
						Gluten feed	Other	Total	
	Quantity								
	Thousand pounds	*Thousand pounds*	*Thousand pounds*	*Thousand pounds*	*Thousand pounds*	*Thousand pounds*	*Thousand pounds*	*Thousand pounds*	*Thousand pounds*
1970	52,163	15,468	28,802	12,715	6,536	N.A.	N.A.	1,329,372	1,445,056
1971	46,311	15,469	24,968	15,551	7,090	N.A.	N.A.	1,244,548	1,353,937
1972	56,150	14,068	52,608	25,870	5,312	1,556,296	157,520	1,713,816	1,867,824
1973	69,221	16,080	66,032	20,608	78,306	1,761,582	230,362	1,991,944	2,245,191
1974	93,686	20,343	65,953	61,717	15,388	1,426,260	83,690	1,509,950	1,767,037
1975	70,730	12,543	64,875	45,422	2,799	2,210,500	163,988	2,374,488	2,570,857
1976	62,482	17,982	51,349	68,294	3,598	2,051,428	395,138	2,446,566	2,650,271
	Value								
	Thousand dollars	*Thousand dollars*	*Thousand dollars*	*Thousand dollars*	*Thousand dollars*	*Thousand dollars*	*Thousand dollars*	*Thousand dollars*	*Thousand dollars*
1970	6,015	1,171	2,605	2,923	233	N.A.	N.A.	37,137	50,084
1971	5,343	1,104	2,311	4,213	223	N.A.	N.A.	35,010	48,204
1972	6,364	927	4,622	5,799	165	48,000	5,344	53,344	71,221
1973	8,676	1,445	6,608	5,471	5,330	84,837	9,537	94,374	121,904
1974	15,355	2,604	9,395	27,418	953	73,131	4,391	77,522	113,247
1975	14,652	2,063	12,590	22,920	197	97,985	9,347	107,332	159,754
1976	13,901	1,654	8,432	24,897	183	116,614	20,825	137,439	186,506

N.A.—Not available.

Source: U.S. Department of Commerce.

Table S-14—Imports of selected sweeteners and molasses, annual 1970-75 and eleven months total 1976

Calendar year	Corn sweeteners		Maple		Honey	Saccharine	Molasses	
	Glucose sirup	Dextrose	Sugar	Sirup			Edible	Inedible
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 gallons*	*1,000 gallons*
1970	262	593	3,561	10,549	8,864	1,398	2,052	381,859
1971	339	214	4,096	6,360	11,446	1,433	2,333	399,762
1972	1	447	2,223	7,829	38,960	1,368	1,623	407,933
1973	700	691	2,613	8,860	10,658	2,072	2,857	448,139
1974	326	2,453	1,179	8,836	25,999	3,415	2,469	415,668
1975	2,499	4,185	1,443	6,670	46,380	3,088	2,483	315,706
1976	4,076	195	1,275	9,038	46,521	[1] 2,191	2,543	414,598

[1] Ten months total.

Source: BLS.

Table S-15—Honey: Supply and utilization, calendar years 1970-76

Year	Colonies		Supply				Utilization			
	Number of colonies	Yield per colony	Production	Carryin	Imports	Total supply	Carryout	Exports	Domestic disappearance	
									Total	Per capita[1 2]
	Thous.	*Pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Pounds*
1970	4,290	51.7	221.8	62.7	8.9	293.4	50.6	8.1	234.7	1.15
1971	4,110	48.0	197.4	50.6	11.4	259.4	30.9	7.6	220.9	1.07
1972	4,068	52.6	214.1	30.9	39.0	284.0	29.8	4.1	250.1	1.20
1973	4,103	57.9	237.7	29.8	10.7	278.2	37.7	17.6	222.9	1.06
1974	4,195	44.1	185.1	37.7	26.0	248.8	33.7	4.6	210.5	.99
1975	4,181	47.3	197.9	33.7	46.4	278.0	33.0	4.0	241.0	1.13
1976[3]	4,311	46.4	199.8	33.0	65.0	297.8	34.4	4.6	258.8	1.20

[1] Military and civilian. [2] To convert to dry weight basis multiply by .83. [3] Estimate.

Source: ERS, USDA.

Table S-16—Molasses: Blackstrap, beet, citrus, and corn (hydrol), annual average 1971-75, with quarterly averages 1976, price f.o.b. tank car or tank truck[1]

Year	Blackstrap			Beet molasses		Citrus molasses	Corn molasses
	New Orleans	Baltimore	California Ports	Colo., Mont., and Wyom.	Ore., Utah, and Idaho	Florida	Chicago
	Dollars per ton	*Dollars per ton*	*Dollars per ton*	*Dollars per ton*	*Dollars per ton*	*Dollars per ton*	*Dollars per ton*
1971	25.56	28.13	28.13	37.00	37.00	19.00	32.05
1972	27.10	29.67	29.50	36.55	37.00	21.75	32.80
1973	57.30	60.62	58.31	50.85	45.25	30.00	50.45
1974	68.40	72.15	70.80	78.70	71.25	45.90	66.25
1975[2]	45.40	51.35	50.00	58.80	59.70	41.95	47.45
1976[3]							
Quarter:							
I	53.58	58.38	52.77	64.77	61.81	32.00	51.23
II	49.46	54.96	48.31	64.31	59.27	36.85	48.46
III	51.80	57.53	54.50	65.72	61.50	41.38	50.23
IV	53.87	59.54	56.75	68.43	64.85	48.04	53.16

[1] Per ton prices are based on 171 gallons for blackstrap, beet and corn molasses and on 175 gallons for citrus molasses. Prices represent sales f.o.b. terminal to the general feed trade and do not include sales made under various pricing arrangements above or below prices generally available to the ultimate user. Ton - 2,000 lbs; Gallon - U.S. gallon. [2] Preliminary. [3] Estimated.

Molasses Market News, Annual Summary, AMS, USDA. Denver, Colorado, various issues. Molasses Market News, Weekly, various issues, 1975 and 1976.

Table S-17—Imported cocoa beans and cocoa butter prices[1]

Year, quarter, or month	Cocoa beans		Imported Cocoa butter,
	"Bahia"	"Accra"	
	Cents per pound		
1972	31.1	32.3	72.2
1973	61.1	64.4	140.2
1974	88.1	98.3	187.6
1975	65.0	74.9	140.2
1976	105.0	109.6	195.0
1976:			
I	71.6	75.6	147.5
II	93.6	97.1	187.6
III	109.4	116.6	202.9
IV	145.5	149.2	242.0

[1] New York Spot.

Source: New York *Journal of Commerce.*

Table S-18—Cocoa and chocolate: Selected comparisons for U.S. imports, grind and consumption (bean equivalent)

Description	1974	1975	First 11 months	
			1975	1976
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*
U.S. Imports:				
Cocoa beans	495	522	448	490
Minus reexports	51	16	14	19
Net imports	444	506	434	471
Semiprocessed[1]				
Unsweetened chocolate	33	27	24	50
Cocoa butter	49	45	41	61
Unsweetened cocoa	167	167	151	171
Other products	3	3	3	2
Total	252	242	219	284
Consumer products[1]	18	11	10	11
TOTAL IMPORTS	714	761	663	766
U.S. grind	506	458	N.A.	497[2]
U.S. consumption	781	690	---	---
Per capita (pounds)	3.7	3.3	---	---

[1] Reexports of semiprocessed and consumer products are relatively insignificant. [2] Annual total.

Source: Import and grind data. Bureau of Census: Consumption data, Economic Research Service, USDA.

N.A. = Not available.

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SUGAR MARKET HIGHLIGHTS

Deliveries

Sugar deliveries last December were 4 percent lower than in December 1975, according to preliminary data. Deliveries in calendar 1976 totaled 8¼ percent higher than in 1975.

Inventories

Sugar stocks held by primary distributors on January 1, 1977, were 3.15 million short tons, raw value, up nearly 26 percent from the previous month and over 15 percent higher than a year ago.

Domestic Production

Sugar production for the mainland United States totaled 4.5 million short tons, raw value, through November 1976, up 16 percent from the first 11 months of 1975. Hawaiian sugar production through December 25, 1976, totaled 1,047,680 tons, down nearly 7 percent from the 1969-73 average.

Imports

Imported raw sugar receipts for January-November were 4.2 million short tons, raw value, a 17-per-

Table 1—Sugar supply and disposition by primary distributors January-November 1976

Item	Beef processors	Importers	Mainland cane processors[1]	Refiners		Net total
				Raw	Refined	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Short tons, raw value					
	SUPPLY					
Inventory Jan. 1, 1976	1,595,783	0	457,749	427,540	249,742	2,730,814
Production and movement						
Received direct-consumption sugar	0	84,629	0	0	14,488	99,117
Produced from beets or cane	3,255,091	0	1,145,193	127,061	0	
Less deliveries to refiners	0	0	1,291,839	0		[2] 3,235,506
Receipts of raws by refiners	0	0	0	[3] 6,589,850	0	
Less raws melted	0	0	0	6,503,019	0	[4] 86,831
Refined from raws melted	0	0	0	0	6,451,214	6,451,214
Adjustments	-2,710	0	+4,102	+1,032	-6,985	-4,561
Sub-total	3,252,381	84,629	-142,544	214,924	6,458,717	9,868,107
Net total supply	4,848,164	84,629	315,205	642,464	6,708,459	12,598,921
	DISPOSITION					
Distribution for						
Continental consumption[5]	3,545,837	84,629	14,628	11,880	6,375,539	10,032,513
Export	6,475	0	106	0	56,115	62,696
Livestock feed	0	0	0	0	0	0
Alcohol	0	0	0	0	0	0
Sub-total	3,552,312	84,629	14,734	11,880	6,431,654	10,095,209
Inventory Nov. 30, 1976	1,295,852	0	300,471	630,584	276,805	2,503,712
Total distribution and inventory	4,848,164	84,629	315,205	642,464	6,708,459	12,598,921

[1] Establishments that acquire no raw sugar from others for refining. Processor-refiners are included with refiners. [2] Production less deliveries of raw sugar to refiners. [3] Includes 1,291,839 tons received from mainland cane processors. [4] Receipts of raw sugar by refiners less molt. [5] Includes deliveries for United States Military forces at home and abroad.

cent increase over the same period a year ago. Refined sugar imports for the period were 30 percent ahead of 1975. Imports from nine countries have already topped the 100,000-ton mark in the first 11 months of this year. And two others are closing fast—South Africa is within 1,600 tons of the mark, while Panama is about 5,000 tons short.

Raw Sugar Prices

World.—Volume on the New York Coffee and Sugar Exchange increased nearly 27 percent in December over November—a total amount of 65,993 transactions. The December average spot price was 7.54 cents per pound, down 0.37 cents from November. The December high was 8.03 cents on the 10th while the low was 7.15 cents per pound on December 27. The average for the first 2 weeks of January was 7.73 cents per pound, a slight increase from December.

Domestic.—Trading volume in December increased by 126 percent over November with a total volume of 3,116 contracts. The domestic spot price averaged 10.22 cents per pound for December, down 0.24 cents from November. The monthly high occurred on the 3rd and 30th with a spot of 10.50 cents. The low was on the 27th, (same day as the world) with a price of 9.85 cents per pound. The average for the first two weeks of January was 10.49 cents.

Refined Sugar Prices

Wholesale.—Prices were down slightly in most parts of the country in December. Refiners in the Northeast showed a decrease of 2 percent in December compared to November, while prices in the Southeast declined less than 1 percent. Cane and beet prices in the Chicago West region dropped 1 percent, while on the Pacific Coast the decline was negligible.

Retail.—The average U.S. retail price for a 5-pound bag of granulated sugar was 21.22 cents per pound in December.

Table 2—Distribution of sugar by primary distributors, January-November 1976 and 1975

Item	1976	1975	Change 1975 to 1976
		Short tons, raw value	
Continental United States			
Refiners' raw	11,880	12,220	-340
Refiners' refined	6,431,654	6,093,513	+338,141
Sub-total	6,443,534	6,105,733	+337,801
Beet processors' refined	3,552,312	2,997,939	+554,373
Importers' direct consumption	84,629	82,865	+1,764
Mainland sugarcane processors'	14,734	63,746	-49,012
Total	10,095,209	9,250,283	+844,926
For:			
Alcohol	0	2,998	-2,998
Export	62,696	139,330	-76,634
Livestock feed	0	2,597	-2,597
Continental consumption[1]	10,032,513	9,105,358	+927,155
Puerto Rico	[2]128,000	121,885	+6,115
Hawaii	35,244	31,669	+3,575

[1] Includes deliveries for United States Military forces at home and abroad. [2] Estimated.

Table 3—Stocks of sugar held by primary distributors in the continental United States, November 30, 1976 and 1975

Item	1976	1975	Change 1975 to 1976
		Short tons, raw value	
Refiners' raw	630,584	493,385	+137,199
Refiners' refined	276,805	274,855	+1,950
Sub-total	907,389	768,240	+139,149
Beet processors' refined	1,295,852	1,082,153	+213,699
Importers' direct consumption	0	0	0
Mainland sugarcane processors	300,471	237,993	+62,478
Total	2,503,712	2,088,386	+415,326

Table 4—Distribution of sugar by primary distributors in the continental United States, December and January-December 1976 and 1975

	1976[1]		1975	
	December	Jan.-December	December	Jan.-December
	Short tons, raw value			
Refiners	562,163	7,005,697	579,731	6,685,464
Beet Processors' refined	270,220	3,822,532	285,156	3,283,095
Importers' direct consumption	5,090	89,719	6,121	88,986
Mainland sugarcane processors'	[2]2,500	17,234	5,735	69,481
Total	839,973	10,935,182	876,743	10,127,026
For:				
Alcohol	N.A.	0	0	2,998
Export	N.A.	62,696	7,957	147,287
Livestock feed	N.A.	0	0	2,597
Continental consumption[3]	839,973	10,872,486	868,786	9,974,144

[1] Preliminary. [2] Estimated. [3] Includes deliveries for U.S. military forces at home and abroad.

Table 5—Stocks of sugar held by primary distributors in the continential United States, January 1, 1977 and December 31, 1975

Item	1976[1]	1975	Change 1975 to 1976
	Short tons, raw value		
Refiners' raw	767,719	414,808	+352,911
Refiners' refined	248,982	236,682	+12,300
Sub-total	1,016,701	651,490	+365,211
Beet processors' refined	1,730,453	1,595,783	+134,670
Importers' direct consumption	0	0	0
Mainland sugarcane processors'	[2]400,000	483,541	-83,541
Total	3,147,154	2,730,814	+416,340

[1] Preliminary. [2] Estimated

Table 6—Mainland Sugar: Production and marketings January-November 1976 and 1975

Item	1976	1975	Change 1975 to 1976
	Short tons, raw value		
Production			
Cane			
Florida	813,029	735,990	+77,039
Louisiana	377,125	399,973	-22,848
Texas	84,371	80,429	+3,942
Sub-total	1,274,525	1,216,392	+58,133
Domestic Beet	3,252,381	2,673,890	+578,491
Total	4,526,906	3,890,282	+636,624
Marketings			
Mainland cane			
Florida	941,742	725,648	+216,094
Louisiana	407,629	379,691	+27,938
Texas	115,215	80,874	+34,341
Sub-total	1,464,586	1,186,213	+278,373
Beet Processors[1]	3,552,312	2,997,939	+554,373
Total	5,016,898	4,184,152	+832,746

[1] Includes 6,475 tons marketed for export in 1976 and 17,020 tons in 1975.

Table 7—Refined sugar production and month-end stocks

	Production				Month-end stocks	
	Cane sugar refiners	Beet sugar processors			Cane sugar refiners	Beet sugar processors
		Old crop[1]	New crop	Total		
	1,000 short tons, raw value					
1971-75 average	638			283	285	1,075
1974 monthly average	678			268	272	987
1975 monthly average	551			268	261	1,066
1976						
January	517	595	--	595	280	1,915
February	484	261	--	261	277	1,906
March	562	161	--	161	237	1,700
April	563	196	--	196	261	1,562
May	612	207	--	207	285	1,435
June	635	125	--	125	298	1,195
July	618	54	41	95	311	919
August	634	34	83	117	284	679
September	663	7	166	173	252	496
October	616	--	601	601	290	826
November[2]	555	--	721	721	277	1,296
December[3]	534	--	704	704	249	1,730
Last 12-month average	583	--	--	330	275	1,305

[1] Beet sugar made from sugarbeets of the prior crop year in the month and year shown. [2] Revised. [3] Preliminary.

Table 8—Sugar receipts of refiners and importers by source of supply January-November 1976 and 1975

Source of supply	Raw sugar		Direct consumption sugar		Total	
	1976	1975	1976	1975	1976	1975
	Short tons, raw value					
OFFSHORE						
Foreign						
Argentina	86,728	89,229			86,728	89,229
Australia	355,420	464,049	—	9	355,420	464,058
Austria	—	—	16	—	16	—
Belgium	—	—	1,129	1	1,129	1
Belize	14,350	46,155	—	—	14,350	46,155
Bolivia	47,331	—	—	—	47,331	—
Brazil	—	197,131	—	—	—	197,131
Canada	—	—	46,670	38,447	46,670	38,447
China, Republic of	86,529	139,963	4	—	86,533	139,963
Colombia	84,256	128,937	198	4,285	84,454	133,222
Costa Rica	65,025	56,240	50	—	65,075	56,240
Denmark	—	—	—	2	—	2
Dominican Republic	881,948	765,931	33	—	881,981	765,931
Ecuador	28,441	18,062	—	—	28,441	18,062
El Salvador	135,156	107,466	40	—	135,196	107,466
Fiji Islands	—	—	—	1	—	1
France	—	—	13,340	—	13,340	—
Germany, West	—	—	990	1	990	1
Guatamala	319,797	60,606	—	—	319,797	60,606
Haiti	6,218	11,622	—	—	6,218	11,622
Honduras	7,483	6,073	—	—	7,483	6,073
India	179,901	172,554	13,918	—	193,819	172,554
Korea	—	—	777	10,615	777	10,615
Malagasy Republic	13,400	13,022	—	—	13,400	13,022
Malawi	17,629	26,585	—	—	17,629	26,585
Mauritius	29,214	26,741	—	—	29,214	26,741
Mexico	—	36,190	507	5,846	507	42,036
Mozambique	11,979	15,090	—	—	11,979	15,090
Netherlands	—	—	1,501	22	1,501	22
Netherlands Antilles	—	—	—	1,279	—	1,279
Nicaragua	153,269	57,960	59	2	153,328	57,962
Panama	95,013	92,925	—	872	95,013	93,797
Paraguay	10,187	3,328	—	—	10,187	3,328
Peru	295,118	150,126	—	—	295,118	150,126
Philippines	860,258	413,034	—	—	860,258	413,034
South Africa	98,471	134,082	1	—	98,472	134,082
Swaziland	34,246	35,795	—	—	34,246	35,795
Sweden	—	—	1	2	1	2
Switzerland	—	—	745	—	745	—
Thailand	70,059	123,512	—	—	70,059	123,512
United Kingdom	—	—	71	29	71	29
Uruguay	5,229	—	—	—	5,229	—
Venezuela	—	—	—	24	—	24
West Indies	225,195	219,842	—	132	225,195	219,974
Total foreign	4,217,850	3,612,250	80,050	61,569	4,297,900	3,673,819
Domestic						
Hawaii	879,547	887,055	[1] 9,639	[1] 7,940	889,186	894,995
Puerto Rico	197,927	81,099	9,088	12,786	207,015	93,885
Total Domestic	1,077,474	968,154	18,727	20,726	1,096,201	988,880
Total Offshore	5,295,324	4,580,404	98,777	82,295	5,394,101	4,662,699
Mainland cane area	1,418,900	1,127,259	[2] 0	[2] 0	1,418,900	1,127,259
Acquired for reprocessing and samples	2,686	2,931	0	0	2,686	2,931
GRAND TOTAL	6,716,910	5,710,594	98,777	82,295	6,815,687	5,792,889

[1] Refined sugar received by refiners. [2] Refined sugar produced direct from cane by processor-refiners.

Table 9—Primary distribution of sugar, continental United States, by Regions January-November 1976

Region	Cane sugar refiners	Beet sugar processors	Mainland cane sugar mills	Total	Imports of direct-consumption sugar[1]
	Hundred weights[2]				
New England	6,754,039	128,744	0	6,882,783	486,917
Mid-Atlantic	28,737,688	2,085,680	19,171	30,842,539	472,985
North Central	24,760,109	39,940,590	229,277	64,929,976	67,806
Southern	51,320,025	3,179,694	17,636	54,517,355	119,748
Western	8,433,665	20,886,081	0	29,319,746	7,614
Grand total	120,005,526	66,220,789	266,084	186,492,399	1,155,070

[1] Source: Bureau of Census. Available only by Customs district or port of entry. Sugar of foreign origin polarizing over 99 degrees by polariscope, not included in total listribution by states. Data in this column are for January-October only. [2] Reported as produced or imported and delivered except liquid sugar which is on a sugar solids content basis.

Table 10—Primary distribution of sugar, continental United States, by Region,[1] January-November 1976 and 1975

Region	Cane sugar refiners		Beet processors		Total all primary distributors[2]	
	1976	1975	1976	1975	1976	1975
	Thousands of hundredweights[3]					
New England	6,754	6,043	129	137	6,883	6,229
Mid-Atlantic	28,738	26,387	2,086	2,188	30,842	28,737
North Central	24,760	25,915	39,940	28,975	64,930	55,084
Southern	51,320	45,631	3,180	2,517	54,517	48,971
Western	8,434	8,304	20,886	17,155	29,320	25,468
Unspecified	---	---	---	4,746	---	4,746
Grand total	120,006	112,280	66,221	55,718	186,492	169,235

[1] New England States include Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. Middle Atlantic States - include New York, New Jersey, and Pennsylvania. North Central States - include Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. Southern States - include Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas. Western States - include Alaska, Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, and California. [2] Includes deliveries by mainland cane sugar mills. [3] Reported as produced or imported and delivered except liquid sugar which is on a sugar solids content basis.

Table 11—World and U.S. raw sugar prices: Annual, 1965-75, and monthly 1975-76

(Source of spot prices: New York Coffee and Sugar Exchange)

Year and Month	World sugar price stowed Caribbean[1]	Transportation, Insurance and duty to New York[2]	World price New York basis	U.S. sugar price (New York spot)	Difference[3] between U.S. and world prices New York basis
	Cents per pound	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*
1965	2.12	.95	3.07	6.75	3.68
1966	1.86	.96	2.82	6.99	4.17
1967	1.99	.96	2.95	7.28	4.33
1968	1.98	.98	2.96	7.52	4.56
1969	3.37	1.00	4.37	7.75	3.38
1970	3.75	1.13	4.88	8.07	3.19
1971	4.52	1.13	5.65	8.52	2.87
1972	7.43	1.11	8.54	9.09	.55
1973	9.61	1.38	10.99	10.29	-.70
1974	29.99	1.63	31.62	29.50	-2.12
1975	20.49	1.43	21.92	22.47	.55
1976	11.58	1.76	13.34	13.31	-.03
1975:					
January	38.32	1.47	39.79	40.15	.36
February	33.72	1.50	35.22	36.07	.85
March	26.50	1.50	28.00	28.52	.52
April	24.06	1.50	25.56	26.07	.51
May	17.38	1.43	18.81	19.27	.46
June	13.83	1.42	15.25	15.96	.71
July	17.06	1.42	18.48	19.89	1.41
August	18.73	1.37	20.10	21.11	1.01
September	15.45	1.39	16.84	17.36	.52
October	14.09	1.40	15.49	15.45	-.04
November	13.40	1.40	14.80	15.03	.23
December	13.29	1.40	14.69	14.80	.11
1976:					
January	14.04	1.38	15.42	15.42	—
February	13.52	1.38	14.90	15.04	.14
March	14.92	1.45	16.37	16.27	-.10
April	14.06	1.45	15.51	15.58	.07
May	14.58	1.45	16.03	15.97	-.06
June	12.99	1.43	14.42	14.40	-.02
July	13.21	1.43	14.64	14.59	-.05
August	9.99	1.41	11.40	11.32	-.08
September	8.16	1.89	10.05	9.80	-.25
October	8.03	2.72	10.75	10.65	-.10
November	7.91	2.57	10.48	10.46	-.02
December	7.54	2.57	10.11	10.22	.11

[1] Sugar stowed at greater Caribbean ports including Brazil. [2] Includes duty. [3] Positive values indicate U.S. price is higher than World price.

Table 12—U.S. cane and beet sugar prices: Various marketing territories, annual 1970-75 and monthly 1975-76

Year and Month	Retail U.S.	Refined cane sugar[1] (Wholesale)					Refined beet sugar[1] (Wholesale)			
		Northeast	Southeast	Gulf	Chicago-West	Pacific Coast	Eastern	Chicago-West	Pacific Coast	North-West
	Cents per pound	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*	*Cents per pound*
1970	12.97	11.97	11.41	11.04	11.08	10.79	11.08	11.08	10.80	10.78
1971	13.61	12.48	12.07	11.57	11.59	11.37	11.59	11.59	11.37	11.32
1972	13.91	13.09	12.74	12.14	11.82	11.65	11.81	11.82	11.65	11.68
1973	15.10	14.07	13.78	13.14	12.48	12.38	12.36	12.38	12.38	12.47
1974	32.34	34.35	34.34	34.16	34.27	32.12	32.19	32.07	31.90	30.64
1975	37.16	31.42	31.03	31.44	31.58	27.97	27.48	27.61	27.87	27.82
1976	23.98	19.20	18.85	19.20	16.93	17.55	16.95	16.93	17.48	17.48
1975:										
January ...	58.92	52.95	52.95	52.95	52.95	46.35	46.69	46.69	46.35	47.26
February ..	53.60	48.96	48.96	48.96	48,96	41.68	41.99	41.99	41.68	41.99
March	49.52	40.50	40.50	40.50	40.50	34.30	33.88	33.88	34.30	33.88
April	41.80	37.01	36.70	37.01	37.01	31.80	30.80	30.80	31.80	30.88
May	36.86	32.23	29.40	32.23	32.23	26.73	25.33	25.33	26.73	25.73
June	31.44	25.57	24.37	25.57	25.57	21.64	21.14	21.14	21.64	21.64
July	26.88	26.89	26.46	27.18	26.89	23.28	22.17	22.17	22.02	22.02
August	30.90	27.05	27.31	27.10	28.19	25.95	26.09	26.18	25.95	26.28
September .	32.08	23.30	23.41	23.28	26.38	23.47	23.73	25.35	23.47	23.97
October ...	30.32	21.15	21.14	21.15	21.80	20.77	20.50	20.44	20.77	21.31
November .	27.24	20.84	20.68	20.79	19.75	20.13	19.76	18.98	20.13	19.16
December ..	26.34	20.53	20.47	20.53	18.71	19.55	18.42	18.42	19.55	19.17
1976:										
January ...	25.88	21.31	21.33	21.31	18.30	19.45	18.30	18.30	19.45	19.05
February ..	25.38	20.86	20.61	20.86	18.30	18.95	18.30	18.30	18.95	19.05
March	25.04	22.20	21.87	22.20	18.30	18.95	18.65	18.30	18.95	19.05
April	25.06	21.41	21.01	21.41	18.30	18.95	18.46	18.30	18.95	19.05
May	24.80	21.87	21.55	21.87	18.70	19.37	18.68	18.68	19.37	19.40
June	24.90	20.22	19.82	20.22	18.51	18.86	18.55	18.47	18.71	18.80
July	24.48	20.46	20.19	20.46	18.72	19.56	18.48	18.76	19.11	18.83
August	24.72	17.04	16.69	17.04	16.23	16.64	16.30	16.30	16.44	16.64
September .	22.88	15.85	15.06	15.85	14.45	14.49	14.38	14.45	14.49	14.50
October ...	21.82	16.90	16.24	16.90	14.93	15.43	14.91	14.93	15.38	15.42
November .	21.62	16.28	15.95	16.28	14.28	14.94	14.23	14.28	14.94	14.94
December ..	21.22	15.97	15.89	15.97	14.12	14.97	14.13	14.12	14.97	14.97

[1] These are basis prices in 100-pound paper bags, not delivered prices. To obtain delivered prices, add "Freight Prepays" and deduct discounts and allowances.

Table 13—Wholesale price quotations for sugar, corn sirup and dextrose (Source of dextrose and corn sirup prices—Journal of Commerce)

Period	Refined Sugar wholesale Northeast[1]	Corn sirup New York[3]		Corn sirup relative to refined sugar		Dextrose New York[4]		Dextrose relative to refined sugar	
		Quoted	Dry Basis[2]	Quoted	Dry Basis	Quoted	Dry Basis[2]	Quoted	Dry Basis
	Cents per pound			*Percent*		*Cents per pound*		*Percent*	
Average 1970-73	12.90	6.33	7.89	40	61	9.60	10.43	74	81
1974 average*	34.35	10.61	13.21	31	38	11.26	12.24	46	50
1975 average*	31.42	14.48	18.03	46	57	19.35	21.03	74	81
1976									
January	21.31	13.11	16.33	62	77	15.37	16.71	72	78
February	20.86	12.19	15.18	58	73	15.55	16.90	75	81
March	22.20	12.19	15.18	55	68	15.55	16.90	70	76
April	21.41	12.19	15.18	57	71	15.55	16.90	73	79
May	21.87	12.19	15.18	56	69	15.55	16.90	71	77
June	20.22	15.05	18.74	74	93	15.72	17.09	78	85
July	20.46	11.83	14.73	58	72	15.75	17.11	77	84
August	17.04	11.64	14.50	68	85	15.36	16.70	90	98
September	15.85	10.09	12.56	63	79	14.05	15.27	88	96
October	16.90	9.64	12.00	57	71	14.05	15.27	83	90
November	16.28	9.73	12.12	60	74	14.05	15.27	86	94
December	15.97	9.32	11.61	58	73	14.05	15.27	88	96
Last 12-month average	19.20	11.60	14.44	60	75	15.05	16.36	79	86

[1] Gross basis price in 100-pound bags subject to a 2 percent cash discount. [2] Assumes price is for 80.3 percent solids for corn sirup and 92 percent solids for dextrose. Thus dry basis price is quoted price divided by 0.803 for corn sirup and divided by 0.92 for dextrose. [3] For regular conversion sirup (38-49 D.E.) in tank cars, N.Y. quoted 43 degree baume unmixed. [4] Hydrate: commercial 600-bag carload F.O.B. New York City.

*Annual data incomplete for dextrose.

Table 14—Weekly spot prices*and trading volume - 1976. Source: (New York Coffee and Sugar Exchange

Week	Trading volume		Average spot price	
	World sugar contract no. 11	U.S. sugar contract no. 12	World sugar contract no. 11	U.S. sugar contract no. 12
September:				
1-3	13,889	317	8.67	9.57
6-10	21,464	210	8.28	9.17
13-17	18,405	1,130	8.09	9.29
20-24	21,660	1,121	7.72	10.18
27-30	21,712	239	8.29	10.78
Total September	97,130	3,017		
October:				
1	3,120	274	8.10	11.20
4-8	20,126	247	8.81	11.29
11-15	10,205	27	8.45	10.92
18-22	14,240	421	7.37	10.17
25-29	16,323	371	7.54	10.15
Total October	64,014	1,340		
November:				
1-5	11,133	353	7.54	10.01
8-12	13,462	287	7.93	10.48
15-19	11,843	196	8.03	10.62
22-26	10,437	474	8.05	10.64
29-30	5,213	66	8.00	10.55
Total November	52,088	1,376		
December:				
1-3	7,882	208	7.75	10.42
6-10	15,719	858	7.70	10.33
13-17	14,219	659	7.57	10.21
20-24	12,673	743	7.38	10.08
27-31	15,500	648	7.31	10.10
Total December	65,993	3,116		

*U.S. Sugar - No. 12 bulk contract of the New York Coffee and Sugar Exchange, duty paid and delivered to New York. World Sugar - No. 11 bulk contract to the New York Coffee and Sugar Exchange - F.O.B. and stowed at greater Caribbean Ports.

THE LOUISIANA SUGAR INDUSTRY

Its Past, Present, Prospects

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ABSTRACT: Louisiana's commercial sugar industry has a long history, rich in tradition. The industry has experienced periods of growth, decline, and rebuilding. Today, Louisiana supplies about 10 percent of domestic sugar. The outlook is for a stable industry continuing its efforts toward more efficient energy use, maintenance of air quality, and costs of producing sugar cane and cane sugar.

KEYWORDS: Louisiana, sugar cane, cane sugar production, and sugar industry.

Past

Birth of a New Industry

The first successful venture of the Louisiana colony in commercial sugar production was in 1794 when Etienne de Bore produced a profitable crop of sugar worth $12,000. Sugarcane culture eventually spread north along the rivers and bayous (figure A-1), when the U.S. took possession of the Louisiana territory. By 1861, Louisiana sugar production had increased to 264,191 tons (table A-1).

Sugar production fell precipitously during the civil war, reaching a low of 5,400 tons in 1864 (2, p. 250). When rebuilt, the industry was characterized less by individualists and more by cooperation and joint actions for the advancement of all. The Louisiana Sugar Planters' Association was formed in 1877 to support research and education in cane culture and sugar manufacture, and to secure favorable federal legislation. By 1904, the Louisiana industry was producing almost 400,000 tons of sugar.

Following the 1904 and 1908 banner crops, a decline occurred that lasted 20 years. Sugarcane mosaic (a virus disease) spread at an unprecedented rate, and by 1926, sugar production had fallen to a mere 47,166 tons. Partly as a result of the common adversity faced by various branches of the industry, the Louisiana Sugar Planters Association joined the American Cane Growers' Association and the Producers and Manufacturers' Protective Association in forming a single organization, the American Sugar Cane League to promote the interests of the region's cane sugar industry. This latter organization has continued to function to the present.

Growth of the industry in recent years is illustrated in table A-2. The all-time record crop of 759,000 tons of raw sugar was processed during 1963. Since 1971 the acreage of sugarcane harvested for sugar has ranged between 300,000 and 320,000 acres.

Present

The present sugarcane region extends from the Gulf of Mexico in the south to the Red River in the north and from the Mississippi River on the east to the Vermilion River on the west (figure A-1). Its climate is subtropical. During the winter, freezes usually occur that kill the young growth of summer

Table A-1—Sugar production of Louisiana, selected years, during the antebellum period

Year	Short tons	Year	Short tons
1802	2,500	1841	51,165
1810	4,835	1844	113,700
1823	17,055	1847	136,440
1826	25,583	1850	120,068
1829	27,288	1853	255,441
1832	39,795	1856	40,686
1835	17,055	1859	127,558
1838	39,795	1861	264,161

Source: Reference 4, page 28 and reference 2, page 250.

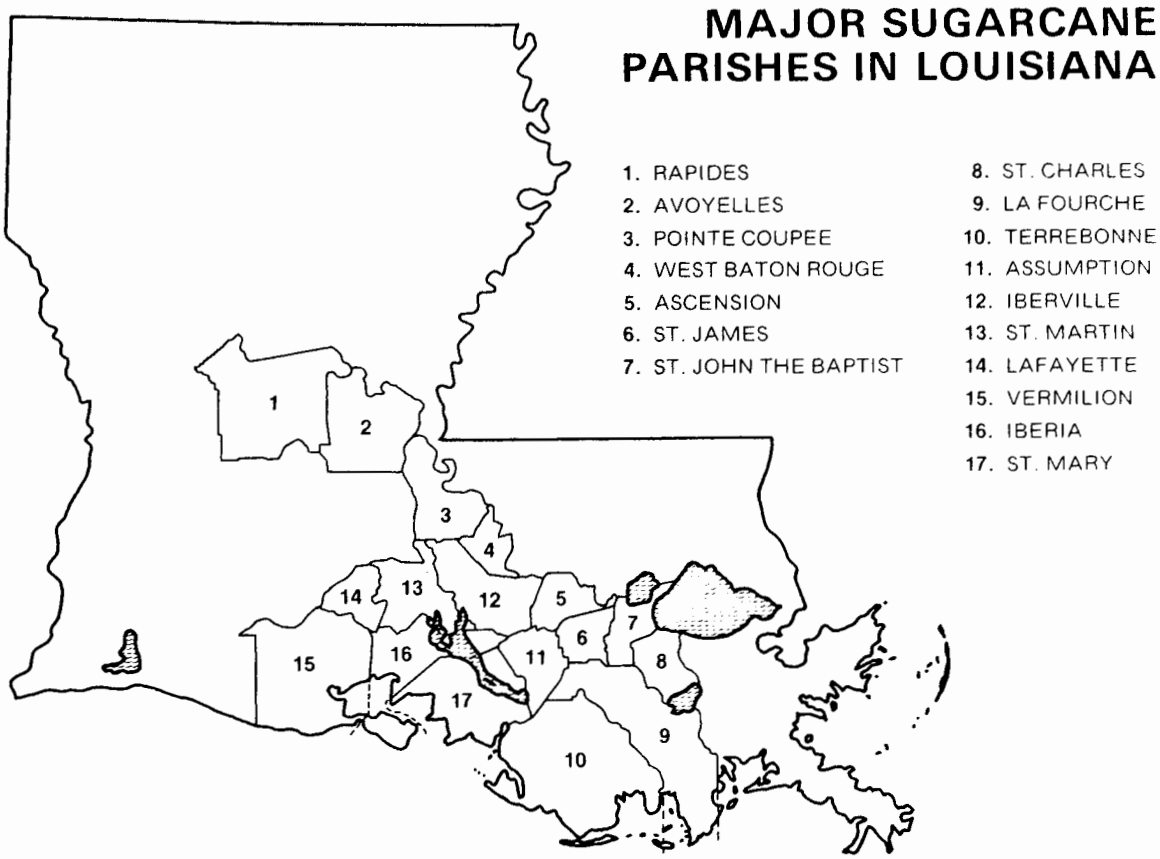

Figure A-1

and fall planted cane, and damage mill cane standing in the field. Since sugarcane must be processed soon after a killing frost, freezes limit the harvest season. Processors in Louisiana usually complete their grinding season which begins in October by January 1 of each year. Since it takes about 9 months for the area's cane to mature, the grinding season lasts only 2 to 3 months.

Culture

Sugarcane in Louisiana is planted beginning in August and is harvested the following fall. A new crop of cane grows from the roots (ratoons) the following spring and is harvested the following fall. Typically one plant crop and two ratoon crops are harvested from a single planting.

Due to the relatively short growing season, cane production per acre and sugar yields per ton of cane tend to be less in Louisiana than in Florida, Texas, and Hawaii. Although Louisiana's average cane yield reached a 28.9 tons per acre level in 1963, 23 tons is more representative. Sugar production of 2 tons per acre (raw value) is typical for the State.

Most sugarcane growing and harvesting tasks are mechanized, with the exception of the planting operation where seed cane stalks are placed in furrows by hand. In harvesting, the cane is mechanically cut and placed in rows. Cane in Louisiana is burned immediately following the cutting operation[1] and the stalks are then loaded into cane carts or trucks and transported to the sugar factory for processing.

Industry Consolidation

Mechanization and the need for larger acreages to make efficient use of machinery has resulted in consolidation of many farm units. In 1939, there were 10,918 farms with an average of 27.8 acres of cane in Louisiana. In 1975, the area's 1,180 farms averaged 280 acres of cane.

A similar consolidation has occurred among the sugar factories over the last 35 years. In 1939, 68

[1] Sugarcane is burned to reduce the amount of leaf material harvested. All of the sugar is in the cane stalk. Leaves make the harvesting operation more difficult and reduce the recovery of the potentially available sugar.

Table A-2—Acreage, yeild, and production of sugarcane and sugar in Louisiana, 1934,1939,1944,1949,1954,1959-1975

Year	Area harvested for sugar	Yield per acre	Sugarcane production for sugar[1]	Sugar produced (raw value)			Molasses produced (80 Brix)	
				Total	Per acre harvested	Per ton of cane	Total	Per ton of cane
	1,000 acres	*Tons*	*1,000 tons*	*1,000 tons*	*Tons*	*Pounds*	*1,000 gal.*	*Gallons*
1934	222.0	14.3	3.164	234	1.05	148	17,718	5.60
1939	234.3	21.7	5,084	436	1.86	172	33,758	6.64
1944	245.9	20.0	4,929	369	1.50	150	35,883	7.28
1949	278.9	17.9	4,984	414	1.48	166	31,121	6.24
1954	247.1	22.8	5,625	478	1.93	170	34,198	6.07
1959	249.8	20.3	5,073	440	1.76	174	31.918	6.29
1960	255.4	21.9	5,583	471	1.84	169	37,671	6.74
1961	277.3	25.7	7,118	648	2.33	182	47,263	6.63
1962	253.7	21.0	5,315	471	1.85	177	37,917	7.13
1963	295.5	28.9	8,554	759	2.56	177	60.302	7.04
1964	325.2	22.7	7,383	570	1.75	154	55,998	7.58
1965	288.3	22.7	6,542	550	1.90	168	46,339	7.08
1966	288.5	22.7	6,563	565	1.95	172	42,938	6.54
1967	293.8	27.6	8,111	743	2.52	183	54,632	6.73
1968	282.4	26.1	7,377	666	2.35	181	50,626	6.86
1969	235.1	24.1	5,676	539	2.29	190	39,550	6.96
1970	265.7	26.1	6,927	603	2.26	174	45.811	6.61
1971	301.4	21.4	6,438	570	1.89	177	43.407	6.74
1972	311.4	25.8	8,022	658	2.11	164	54,786	6.82
1973	318.9	20.6	6,570	556	1.74	169	43,807	6.66
1974	307.7	21.4	6,558	594	1.93	181	41,956	6.39
1975	308.0	21.1	6,488	643	2.08	195	([2])	([2])

[1] Actual net tons. [2] Not available at time of writing.

Source: Reference 5 for years before 1975. Estimates for 1975 based on unpublished USDA estimates.

Table A-3—Louisiana production as a proportion of domestic consumption of sugar, 1960-1975, (raw value)

Year	Domestic consumption	Domestic production[1]	Louisiana production	Louisiana's proportion of	
				Domestic consumption	Domestic production
	1,000 tons	*1,000 tons*	*1,000 tons*	*Percent*	*Percent*
1960	9,261	5,045	471	5.0	9.0
1961	9,611	5,388	648	6.0	12.0
1962	9,752	5,413	471	4.0	8.0
1963	9,989	5,889	759	7.0	12.0
1964	9,671	6,578	570	5.0	8.0
1965	10,020	6,273	550	5.0	8.0
1966	10,299	6,170	565	5.0	9.0
1967	10,245	6,103	743	7.0	12.0
1968	10,927	6,273	666	6.0	10.0
1969	10,655	5,981	539	5.0	9.0
1970	11,311	6,321	603	5.0	9.0
1971	11,288	6,140	570	5.0	9.0
1972	11,415	6,309	658	5.0	10.0
1973	11,482	6,313	556	4.0	8.0
1974	11,237	5,953	594	5.0	10.0
1975	9,980	6,564	643	6.0	10.0

[1] Difference between domestic production and domestic consumption is provided by imported sugar.

Source: Reference 7.

raw sugar factories were operating in Louisiana, but in 1975 there were only 35 (table A-4). Louisiana sugar factories tend to be older and smaller than factories in Florida and Texas. During the 1974 season, the last year for which factory data are available, the area's factories processed an average of about 200,000 tons of cane per mill—the largest mill processed 384,000 tons. In Florida, the smallest mills processed at a rate of over 600,000 tons and the largest, more than 1.6 million tons during the 1974-75 season.

Nearly all of the companies operating raw sugar factories grow part or all of the cane processed in the factory. Although precise data are not available, it has been estimated that about half of the cane grown in Louisiana is "administration cane"—i.e., is grown by the owner of the factory (*1*).

Costs

Estimated average production costs for growing sugarcane and processing it into raw sugar in Louisiana during 1975 was 14 cents per pound (*8*). Costs vary from area to area and from soil type to soil type within the area. Raw sugar produced from cane grown on sandy soils in the southern part of the cane region has the lowest production costs—estimated at 13.7 cents per pound in 1975. Highest costs were in some of the fringe areas where production costs on clay soil were estimated to be 15.4 cents per pound in 1975.

Table A-4—Louisiana raw sugar factories' production data, 1974 crop

Name of factory	Gross tons of cane ground	Tons of raw sugar produced (raw value)	Gallons of molasses produced (80°brix)
Alma	178,351	14,259	865,840
Armant	227,942	18,219	1,106,485
Billeaud	144,325	11,453	829,413
Breaux Bridge	172,928	13,278	941,699
Cajun	384,381	31,392	2,337,347
Caldwell	188,476	15,232	1,085,145
Catherine[1]	82,350	4,005	—
Cedar Grove	136,792	11,015	886,553
Cinclara	235,891	17,955	1,359,660
Columbia (C&G)	106,156	4,567	—
Columbia (F)	100,393	8,509	683,312
Cora-Texas	196,433	15,915	1,324,289
Enterprise	307,028	25,485	1,710,914
Evan Hall	383,349	28,392	2,239,046
Georgia	113,055	8,796	543,832
Glenwood	251,046	19,402	1,299,691
Greenwood	159,242	12,163	844,667
Helvetia	197,259	14,757	1,317,010
Iberia	249,354	20,039	1,602,616
Jeanerette	193,321	16,020	1,177,104
Leighton	275,876	23,179	1,358,060
Louisa	129,226	9,632	678,630
Lula	253,550	21,988	1,430,339
Meeker	211,713	16,236	1,203,802
Oaklawn	244,649	19,856	1,372,642
Raceland	237,465	18,627	1,149,061
St. James	308,692	26,118	1,858,607
St. Martin[2]	226,749	17,905	1,284,615
St. Mary	202,938	15,772	1,168,017
Smithfield	156,619	9,870	785,142
Southdown	130,124	10,165	729,331
Sterling	307,524	26,758	1,684,568
Supreme	185,602	14,702	1,047,571
Terrebonne[3]	147,733	10,587	757,898
Valentine	125,729	8,972	843,719
Westfield	259,791	22,298	1,565,792
Wilbert's Myrtle Grove	154,218	10,404	884,100
TOTAL	7,566,270	593,922	41,956,517

[1] Catherine factory combined with Cedar Grove in 1975. [2] Formerly Levert-St. John. [3] Terrebonne closed in 1975.

Source: Reference 5, page 14-15.

Future

The future of sugarcane in south Louisiana depends upon its profitability. Returns to sugarcane production and manufacturing must be adequate to cover all the costs in growing cane and processing raw sugar. Most of the cropland in the main cane area seems to be best suited to sugarcane production, yet if returns from sugar are not adequate to show a profit, growers will have to turn to other crops, perhaps soybeans or rice. In the fringe areas, crops such as cotton, corn, soybeans, and rice compete strongly with sugarcane for use of cropland if returns to sugar are low.

Expansion Potential

The Louisiana sugarcane industry might be called a "mature" industry in that it is not likely to expand very much beyond its present size. Most of the suitable cropland in the main cane areas is currently devoted to sugarcane. There isn't very much cropland in these areas that can be switched from other crops to cane, nor is there very much woodland which could be cleared and planted to cane.

New lands available for cane tend to lie in the fringes of the cane region. However, cane yields per acre in the fringe areas tend to be lower than in the main areas and more apt to receive freeze damage. In addition to the cane-growing limitation, a further restraint to expansion in the fringes is that most of the current cane processing capacity is fully utilized. Any significant expansion in sugarcane production would have to be accompanied by construction of new processing facilities. Building of new sugar factories is an expensive, long-term investment, and one which investors are unlikely to make in fringe parishes where growing conditions are less than ideal, and especially with the industry currently operating under a period of low prices and longer-term price uncertainty.

Any new land brought into production is likely to be offset by the taking of old land out of sugarcane for residential and industrial uses. Substantial acreage of prime sugarcane land has been used for industrial development in the last 20 years as manufacturing firms seek site locations along the Mississippi River. This gradual but steady loss of sugar land is likely to continue into the future.

The gradual reduction in the number of raw sugar factories in recent years is expected to continue as smaller and less efficient ones shut down. The remaining factories likely will make improvements in their equipment and expand processing capacity.

Energy Needs

Natural gas is used as a supplementary fuel along with the bagasse to power the raw sugar factories. Increasing fuel costs and declining supplies of natural gas will cause factories to look for ways to use bagasse more efficently. Some are experimenting with new bagasse-burning equipment and others are installing oil-burning equipment as a safeguard against the loss of natural gas as a supplementary fuel source.

New Technology

The Louisiana cane sugar industry has been experimenting with air quality control equipment on their power plants. Several mills have installed stack scrubbers and others have added fly ash arresters which have reduced particle emissions into the air.

The industry is continuously working to lower costs of producing raw sugar. Experiments have been conducted with chopper-harvesters in place of whole stalk harvesters to reduce cane handling costs. Subsurface drainage, though an expensive operation, has shown promise of increasing yield per acre and hence lowering cost per ton of cane. Narrow spacing of cane is another technique which the industry is researching as a means of increasing yields and lowering production costs. Regional efforts continue to focus on making Louisiana more competitive with other producing regions and keeping cane sugar competitive with beet sugar and corn sweeteners in the marketplace. As sugar prices rise and fall, the Louisiana industry is expected to continue the adjustment process meeting the challenges it has undergone during its long history.

NOTE

See references on page 20.

Compiled by:
Larry C. Larkin

Commodity Economics Division — Economic Research Service

RECENT SWEETENER PUBLICATIONS*

*The following is a list of recent publications relevant to the sweetener industry. Listing of these articles does not necessarily constitute an endorsement by the USDA. Copies of these articles are not available from this office but should be obtained from your library or the publisher. Whenever possible, we have included the addresses of those foreign publications that may not be available in libraries in the United States. For readers not near large libraries, the addresses of the major American sugar and sweetener publishers are also listed below. The list will be carried in each February's issue of the Sugar and Sweetener Report and may carry additional references to new publishers at that time.

Readers who have articles concerning sweetener economics and wish to have them noted in this publication should submit an abstract and two copies of the article to the Sweetener Group, Economic Research Service, Room 200, 500 12th Street, S.W., Washington, D.C. 20250.

The Australian Sugar Journal
Phoenix House, 333 Adelaide Street, Box 608, G.P.O., Brisbane 4001, Queensland, Australia 31-1881

The Bakers Digest
Siebel Publishing Co., 4049 W. Peterson Avenue, Chicago, Illinois 60646, (312) 463-3404

Beverage Industry
Magazines for Industry Inc., 777 Third Ave., New York, N.Y. 10017, Publishers Printing Co., Box 1494, Louisville, Ky. 40201

Food Engineering
Chilton Company, Chilton Way, Radnor, Pa. 19089

Food Processing
430 N. Michigan Ave., Chicago, Illinois 60611, (312) 644-2020

The International Sugar Journal Ltd.
23a Easton Street, High, Wycombe, Bucks, England, TELEX: 21792 REF 69

La Sucerie Belge
Tate and Lyle, Ltd., Group Research and Development, P.O. Box 68, Reading, England R G6 2BX

National Maple Syrup Digest
Published by: Lloyd H. Sipple, R.D. No. 2, Bainbridge, N.Y. 13733

Sugar y Azucar
24 W. 45th Street, New York, N.Y. 10036, (212) 586-4820

The Sugar Bulletin
416 Whitney Building, New Orleans, Louisiana 70130, (504) 525-3956 or -6848

Sugar Journal
107 Camp Street, P.O. Box 2406, New Orleans, Louisiana 70130, (504) 524-2119

1. Abdulbhan, Pakorn and Suksupha, Khubbol. "GROWTH AND STRUCTURE OF THE SUGAR INDUSTRY IN THAILAND," *International Sugar Journal*, vol. LXXVIII, no. 934, Oct. 1976, pp. 297-299.

   Part II. The paper analyses the sugar industry of Thailand between 1960 and 1975. An attempt is made to determine the structure and growth of the industry using cane production, sugar production, sugar consumption, and export performance.

2. Andreis, Henry J.
"A WATER TABLE STUDY ON AN EVERGLADES PEAT SOIL," *Sugar Journal*, vol. 39, no. 6, Nov. 1976, pp. 8-12.
This article discusses the effect of high and low water tables on: percent yield 96 sugar, tons of cane per acre, cane root distribution, soil subsidence.

3. Andres, Cal.
"SWEETENERS OUTLOOK," *Food Processing*, vol. 37, no. 11, Nov. 1976, pp. 46-48.
A two year turn about finds sugar prices bottoming, over 25 percent of sweeteners are now corn derived-with a 6 billion pound HFCS production capacity.

4. Andres, Cal.
"MCC OVERCOMES PROBLEMS IN DIETETIC AND LOW-SUGAR GEL SYSTEMS," *Food Processing*, vol. 37, no. 11, Nov. 1976, pp. 52-53.
Microcrystalline cellulose improves texture, mouthfeel, spreadability, reduces syneresis.

5. Ballinger, Roy A.
"THE STRUCTURE OF THE U.S. SWEETENER INDUSTRY," USDA, Econ. Res. Ser., AER no. 213, Sept. 1971, Wash., D.C.
The sweetener industry is divided into segments based on geography, plants from which sweeteners are obtained and the functions performed by diffferent producers. (Copies may be obtained from ERS Publications Unit, Room 0054, South Building, USDA, Wash., D.C. 20250.

6. Blake, J. D., Broadfoot, R., and Foster, D. H.
"AN INVESTIGATION OF CONDENSATES AND THEIR CONTRIBUTION TO EFFLUENT DISPOSAL FROM SUGAR MILLS," *International Sugar Journal*, vol. LXXVIII, no. 934, Oct. 1976, pp. 291-295.
Part II. Studies on the removal of ethanol from condensates.

7. Council on Wage and Price Stbility
"THE RESPONSIVENESS OF WHOLESALE AND RETAIL FOOD PRICES TO CHANGES IN THE COSTS OF FOOD PRODUCTION AND DISTRIBUTION," Staff Report, Nov. 1976, 47 pp.
History of price spreads, market structure of food processing and distribution industries; the responsiveness of prices to changes in costs; farm-to-retail spreads and the farmers share of the food dollar; and the speed of adjustment of retail and wholesale food prices for twenty three commodities including sugar, soft drinks, and chocolate bars is discussed. (For copies contact: Council on Wage and Price Stability, 726 Jackson Place, N.W., Washington, D.C. 20506.)

8. Crocco, Stephanie
"HIGH, HIGHER, HIGHEST FRUCTOSE SYRUPS," *Food Engineering*, vol. 48, no. 11, Nov. 1976, pp. 80-81.
Food firms now have a full range of options with high fructose corn syrups--ranging from 42 to 90 percent. This article discusses uses, supply and FDA regulations pertaining to these new syrups.

9. Crocco, Stephanie
"A CLOSER LOOK AT THE NEW "HIGH FRUCTOSE SYRUPS"," *Food Engineering*, vol. 48, No. 12, Dec. 1976, pp. 58-60.
Part II. This article takes a close look at applications for the new high fructose syrups.

10. Duckelman, P. H.
"BASIC CROSSES FOR SUGAR CANE IMPROVEMENT IN LOUISIANA," *The Sugar Bulletin*, vol. 55, no. 4, Nov. 15, 1976, pp. 10-13.
Summarized is the progress made during 1975 in the basic breeding program for sugarcane improvements in Louisiana.

11. Erickson, Robert
"HFCS IN DAIRY PRODUCTS AND FROZEN NOVELTIES," *Food Processing*, vol. 37, no. 11, Nov. 1976, pp. 56-57.
Useage started for economics, retained because of quality improvements and production efficiencies.

12 *Food Processing*
"WASTE TREATMENT SYSTEM RECOVERS 500 GAL./WEEK OF MOLASSES," vol. 39, no. 10, Oct. 1976, p. 173.
Waste treatment system iliminates dust problem in plant manufacturing dried cane molasses and recovers 20 gpm of water formerly wasted to sewer.

13. *Food Processing*
"SWEETENER RAISES MELT POINT, IMPROVES MOUTH FEEL OF FROZEN DESSERTS," vol. 39, no. 10, Oct. 1976, p. 107.
A spray dried maltodextrin made from corn starch has undergone laboratory testing as a partial replacement for corn syrup solids in ice cream, ice milk, and frozen desserts. Results indicate that the melt point is raised significantly resulting in the frozen products having better holding qualities.

14. Genotelle, J. et. al.
"IMPROVEMENTS IN MOLASSES EXHAUSTION," *La Sucrerie Belge*, vol. 95, no. 10, Oct. 1976, pp. 343-356.

The stated purpose of this paper is to try to define a way to enhance molasses exhaustion and not to develop ideas about molasses formation theory. Part 1 is denoted to reminding readers of the principles of exhaustion control and the factors at our disposal. Part II considers the conditions of work with continuous mixing in vertical machines. The influence of crystal content in low-grade massecumtes of discharge is demonstrated. Parameters affecting crystallation are surveyed.

15. Greatbatch, R. J.
"WEIGHT TRANSFER COUPLING USED IN SUGAR CANE TRANSPORTATION," *Sugar y Azucar*, vol. 71, no. 11, Nov. 1976, pp. 42-43, 46-47.

The author discusses the techniques that have been envolved to meet the probelms of greatly increased weights of cane carrying vehicles, tractor axle load limitations and maneurerability of vehicles with payloads of between 20 and 30 tons.

16. Gupta, Auinash C. and Schoenrock, Karl Heinz, W. R.
"NEW ION EXCHANGE SYSTEMS FOR THE BEET SUGAR INDUSTRY. INCREASED EXTRACTION THROUGH TOTAL CATION EXCHANGE," *La Sucrerice Belge*, vol. 95, no. 10, Oct. 1976, pp. 331-339.

A relatively simple ion exchange process leading to increased extraction, improved final sugar quality with reduced recycle and sugar end load is proposed for commercial realization. This process allows cation exchange approaching 100 percent, thereby allowing molasses purities around 40 percent with extractions above 90 percent.

17. *Hawaiian Sugar Planters' Association*
"HAWAIIAN SUGAR MANUAL FOR 1976," 99-193 Aiea Heights Drive, P.O. Box 1057, Aiea, Hawaii 96701.

A handbook of statistical information relating to the sugar industry of the Hawaiian Islands.

18. Larkin, L. C.
"ECONOMICS OF SWEETENER MARKETING: AN ANNOTATED BIBLIOGRAPHY OF SELECTED REFERENCES," USDA, ERS-474, Jan. 1972.

Bibliography lists selected references on the marketing of sweeteners used in the United States. (Copies may be obtained from ERS Publications Unit, Room 0054, South Building, USDA, Washington, D.C. 20250).

19. Minick, Dale E.
"A NEW APPROACH TO VACUUM PUMPING," *National Maple Syrup Digest*, vol. 15, no. 4, Dec. 1976, pp. 14-18.

The article discusses the use of a tube pump as a vacuum pump and results of experiments at Sapsucker Sugar Camp in Western Michigan. Items discussed: what is the pump; the pipeline; sap and data gathering procedures; pump operations and performance. In summary: (1) tube pumps may be successsfully used in the collection of maple sap and have proved to be both simple and reliable; (2) highly significant yield increases are possible over conventional collection techniques; (3) tube pumps are economically feasible.

20. Murray, J. P., Runggas, F. M., and Uanis, M.
"FILTERING QUALITY OF RAW SUGAR," *Sugar Journal*, vol. 29, no. 5, Oct. 1976, pp. 14-20.

In this paper an attempt has been made to clarify the mechanism of starch interference with the carbonation process. Sugars included in the study included very high pol sugar from South Africa, which would be refined overseas, and high pol sugar which did not meet export specifications.

21. Rein, P. W.
"EXTRACTION PERFORMANCE OF A DIFFUSER USING A MATHEMATICAL MODEL," *Sugar Journal*, vol. 39, no. 7, Dec. 1976, pp. 15-22.

This article describes the application of a mathematical model previously developed and tested on a pilot plant scale to a full-scale diffuser of the moving bed type. Through the use of the diffuser model quantative predictions of the effect of changes in the operation of the extraction system were obtained. The results indentified the major variables affecting extraction and serves as a guide to possible gains to be achieved in improving the operations of a diffuser.

22. Roberts, E. J. et. al.
"SOME OBSERVATIONS ON ACID BEVERAGE FLOC," *International Sugar Journal*, vol. LXXVII, no. 935, Nov. 1976, pp. 326-329.

The formation of flocculant precipates in carbonated beverages and acidified syrups has plagued the sugar refining industry for many years. The authors state that floc formulation could be prevented by infiltration,

and by passing the solution through a column of cation exhange resin in the acid form.

23. Rostron, H.
"CHEMICAL RIPENING OF SUGARCANE WITH ETHREL AND POLARIS," *Sugar Journal*, vol. 39, no. 5, Oct. 1976, pp. 22-27.
The article states that data from one pot experiment and two field experiments confirm that Ethrel and Polaris improve the juice, sucrose concentration, and sugar yield of irrigated sugarcane.

24. Schoenrock, Karl, Heinz, W. R., and Gupta, Avinash
"NEW ION EXCHANGE SYSTEMS FOR THE BEET SUGAR INDUSTRY PART I: SOFTENERS," *La Sucrerie Belge*, Vol. 95, No. 9, Sept. 1976, pp. 287-294. (Paper presented at the 19th General Meeting of the American Society of Sugar Beet Technologists, Phoenix, Arizona, Feb. 22-26, 1976.)

This paper is concerned with the development of a modular ion exchange system developed with each phase directed toward the elimination of specifically noxious impurities. The first part details a patented softening process for thin juice. Economies of the process are discussed.

25. Seligsohn, Mel
"1977: A FATEFUL YEAR FOR SACCHARIN AS THE FDA PREPARES TO SAY "YES" OR "NO"," *Food Engineering*, Vol. 48, No. 12, Dec. 1976, pp. 20-21.
Tests now being conducted in Canada will determine the future of saccharin.

26. Singh, Gurbaksh, Sharma, Krishna, and Kanwar, R. S.
"EFFECT OF SOME CHEMICALS ON THE RIPENING OF SUGARCANE," *International Sugar Journal*, Vol. LXXVII, No. 934, Oct. 1976, pp. 295-297.
This article discusses the results of experiments studying the effect of foliar application of chemicals on the ripening of a high-yielding, late maturing cane variety.

27. Slater, Lloyd E.
"ORSAN FERMENTS FOOD BUILDING BLOCKS," *Food Engineering*, Vol. 48, No. 11, Nov. 1976, pp. 63-65.
Using 70,000 tons per year of sugar molasses as its substrate, this French pioneer is first in Europe to biosynthesize amino acids on a commercial scale.

28. Sterlinger, M. and Zdarsky, J.
"MILLING-CUM-CENTRIFUGING OF SUGAR CANE FOR HIGHER EXTRACTION," *International Sugar Journal*, Vol. LXXVIII, No. 935, Nov. 1976, pp. 323-329.
The purpose of this article is to present the results of laboratory experiments and pilot scale tests concerning a process in which sucrose extraction from cells is not temperature-dependent and which can be accomplished in a short period of time.

29. Storr, Nicholas P., Warnken, Philip F., and Walter, Bruce J.
"THE LOCATION OF U.S. SUGARBEET PRODUCTION," University of Missouri—Columbia, Agricultural Experiment Station, Feb. 1976, Special Report 194.
The stated intent of this study is to provide a description of the United States sugarbeet industry in 1973 and to forecast areas in which production would tend to be located by 1980. (Copies available from: Department of Agricultural Economics, University of Missouri—Columbia, Columbia, Missouri.)

30. *Sugar y Azucar*
"THE W. R. CROWLEY SUGAR HOUSE," Vol. 71, No. 11, Nov. 1976, p. 74.
Some comments on the cane carrier at this Texas facility.

31. *Sugar Journal*
"PIONEERS IN SUGAR EQUIPMENT—DORR—OLIVER," Vol. 39, No. 7, Dec. 1976, pp.39-41.
Publishers Note: This article is a continuation on pioneer in the sugar industry who have contributed to the development of sugar processes or equipment over a long period of time.

32. Symes, Richard T.
"WHAT'S NEW IN SUGAR CANE HARVESTERS," *Sugar y Azucar*, Vol. 71, No. 11, Nov. 1976, pp. 21-23.
Briefly discusses the development of the sugarcane harvester.

33. Thompson, H. A.
"DEVELOPMENTS IN CANE HARVESTING AND TRANSPORT IN AFRICA," *Sugar y Azucar*, Vol. 71, No. 11, Nov. 1976, pp. 27-32, 34.
The use of the techniques evolved in Africa could be a useful intermediate step prior to the introduction of sophisticated methods of harvesting, particularly in areas where mechanical skills are in short supply, with the attendant problems of maintenance of

equipment and of major reorganization of cultivation practices.

34. United States Department of Agriculture
"CROP PRODUCTION," Crop Reporting Board, Statistical Reporting Service, Nov. 10, 1976, Washington, D.C.
Area harvested, yield, and production for various crops including sugarcane and sugarbeets, 1974-76. (Copies may be obtained from: SRS Publications, USDA, Room 0005, South Building, Washington, D.C. 20250, (202) 447-7687.)

35. United States Department of Agriculture
"SUGAR—WORLD SUPPLY AND DISTRIBUTION 1954/55-1973/74," Foreign Agricultural Service, Statistical Bulletin No. 562, Oct. 1976.
The publication contains supply and distribution data for sugar for the years 1954/55 through 1973/74 on a crop year basis. The data were developed as part of a world sugar supply and demand supply.

36. United States Senate, Committee on Agriculture and Forestry
"1977 U.S. AGRICULTURAL OUTLOOK," 94th Congress, 2nd Session, Dec. 10, 1976.
Papers presented at the National Agricultural Outlook Conference sponsored by the U.S. Department of Agriculture, Washington, D.C., Nov. 15-18, 1976. (Copies available from: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Price—$3.85.)

37. Valentine, A. C.
"STEAM TURBINES AT BRITISH SUGAR CORPORATION," *Sugar y Azucar*, Vol. 71, No. 11, Nov. 1976, pp. 55, 58-59, 62-64.
This paper contains information on: electrical and steam demands; construction features; instrumentation; controls, operation and maintenance.

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