# OUTLOOK '87

## PROCEEDINGS



**Dec. 2-4, 1986 • U.S. Department of Agriculture**
**Washington, D.C.**

*ANNUAL AGRICULTURAL OUTLOOK CONFERENCE*
United States Department of Agriculture
Washington, D.C.

Outlook '87, Session #9 For Release: Wednesday, December 3, 1986

# 1987 OUTLOOK FOR SUGAR AND SWEETENERS

Robert D. Barry
Economic Research Service

At a conference in October, I asked a speaker about the market potential of a product innovation. He replied that he was simply a scientist and could not respond to the economics. (Perhaps he was also well-schooled by his company!)

Today I shall address some facts, figures, and economics of sugar but, like that scientist, cannot foretell, or guess, future policy. And, of course, I don't know the U.S. sugar import quota! Still there is much we can discuss.

Let us start with a brief look at world market prospects for sugar. Then, we can go on to the U.S. sugar outlook and outline some of the pressures on the U.S. sugar program.

## WORLD OUTLOOK

World sugar production tends toward surplus. When the surplus is burdensome enough, further production is discouraged. Consumption then starts to catch up with excess stocks and, should there be an unexpectedly large shortfall, a price spike occurs. Such is the typical sugar "cycle."

Is the recent strengthening of world sugar prices the start of a sustained price upswing? The evidence does not seem convincing. Stocks continue to be large and may be headed up again in 1987/88. To appreciate the possibility of a stock rise, let us look at production and consumption of 1986/87 and the last several years.

World centrifugal sugar production in 1986/87 is estimated by USDA at 100.1 million metric tons (MMT), raw value, up 2 percent from the previous year. The increase continues the trend of intended production in the 1980's. Since the record crops of 1981/82 and 1982/83, each at 101 MMT, world sugar output has declined twice, in 1983/84 and 1985/86. However, the declines were largely the result of poor weather, not intent.

World beet sugar output in 1986/87 is estimated at 35.7 MMT, down from 36.4 MMT, mostly from downturns in USSR and France. USSR output is currently placed at 7.7 MMT, a half-million down from last year, as a result of dry conditions. Drought also cut Eastern Europe's output by some 200,000 tons.

European Community production is estimated to drop 300,000 tons, as France's output fell by some 700,000 tons. However, EC farmers' returns have not been inadequate: Netherlands has a record output; Italy is up 250,000

tons, and West Germany is holding steady at 3.4 MMT, up from 2.7 in 1983/84 and 3.1 in 1984/85. U.S. production is also up, for both beet and cane sugar.

In world cane sugar output, we see not a cutback but a record output of 64.4 MMT this year, up 2.7 MMT from 1985/86. Brazil's output may turn out to be less than the current estimate of 9 MMT because of the drought, but would still be up from 8.2 MMT in 1985/86. Caribbean production is estimated to rise nearly a half million. A large increase is expected in India, up 750,000 tons, as a result of higher support prices to producers and better weather. Sugar production is estimated to rise in four of the six largest producers in Asia: India, Pakistan, Indonesia, and the Philippines.

The trend in world sugar output is significant when compared with consumption. Sugar consumption has exhibited some spurts, notably in China and the Middle East, but the world aggregate has increased at an average annual rate of only 2 percent a year since 1980/81. In the six-years 1981/82-1986/87, annual average consumption is estimated at 95.7 MMT a year compared with 99.5 MMT of world sugar production, resulting in an extraordinary surplus of over 22 million tons of sugar on top of initial stocks. (About 5 MMT of potential consumption were lost to starch-based sweeteners.)

The stocks buildup is reflected in the drop in world "free" market prices, from an already low 8.5 cents a pound in 1983 to 5.2 cents in 1984, 4.0 cents in 1985, and 5.1 cents in 1986 (Jan. - Oct.)--prices that cannot cover cost without some compensatory support. We are all familiar with the reasons production has continued to grow despite the low price: the "free" market accounts for less than 15 percent of world production and most production is insulated from the dumping-ground price in the "free" market, by preferential trade arrangements, government-administered prices, and other forms of production incentives. Pressure to keep production going is also felt because of sugar's importance as a foreign exchange earner for many countries, the need to maintain employment, and, simply, producers' political power. (Here is a rich field of research for Nobel Laureate James Buchanan!)

Nonetheless, as surplus stocks mount, costs become increasingly burdensome, and the low price in the "free" market starts to bite. Are we at the point where disincentives can be expected to roll back production? Although 1987/88 production plans have not yet been firmed, the representative country producer seems to say, " Sugar production really must be cut back; you first."

Some analysts have estimated a decline in stocks in 1986/87. USDA estimates show an increase, not because of significant differences in production, nor in the percent rise in consumption in 1986/87, but in the 1985/86 consumption level. Note, however, that if, indeed, stocks decline in 1986/87 (and world futures prices seem to support that estimate), it may only postpone a necessary production restraint. But even if the USDA stock estimate is correct, there seems no evidence that producers are prepared to halt further increases in output. In fact, the recent slight price rise may not only

postpone production restraint but actually induce a spurt in output, thereby extinguishing the price spark.

Concern about world market price prospects have renewed discussions toward an International Sugar Agreement (ISA). An ISA basically aims at controlled prices and market shares, agreeable (as much as possible) to the major sugar importers. An ISA, on balance, may or may not be a good idea, but certain questions perhaps should be considered: If an administered market is "bad" nationally, is it good internationally? If the aim is to enlist as large a membership as possible, does this imply a price target high enough to accommodate the least efficient suppliers? Would not high prices encourage the use of alternative sweeteners? Would an ISA divert sugar exporters from necessary production shifts away from sugar?

## U.S. OUTLOOK

Implementation of the sugar provisions in the Food Security Act of 1985 is the dominant facet of the outlook for U.S. sugar in 1987. The 1986/87 crop is the first to be covered by the legislation which extends to 1990/91.

For the 1986/87 crop, the loan rate is the minimum prescribed by the Act, 18 cents a pound (21.09 cents for refined beet sugar), the same as last year. A major difference from last year is that the price-support loan program must be administered at no cost to the Federal government "by preventing the accumulation of sugar acquired by the Commodity Credit Corporation." This means market prices have to be high enough to discourage borrowers from defaulting on their loans and forfeiting their sugar loan collateral. Prices, that is, have to be high enough to cover market expenses and the interest charge on the loan.

On the basis of standard procedures, a market stabilization price (MSP) of 21.78 cents a pound has been calculated for 1986/87. That price, if achieved in the market, would certainly avoid forfeitures. Note, however, that since 1985 the MSP is required only to establish bond and set maximum liabilities for the quota-exempt U.S. import programs (mainly the re-export program). Some sugar trade analysts have indicated that 1986/87 loan forfeitures can be avoided with a price below 21 cents. The precise 1986/87 price target is to be decided by the Administration through the Interdepartmental Sugar Working Group.

The price for raw sugar achieved in the market will set the tone for prices at lower levels in the marketing chain. In fiscal 1985/86, the U.S. raw sugar price (nearby futures contract, New York) averaged 20.46 cents a pound, down from 20.89 cents in 1984/85. Wholesale refined sugar prices (Chicago-West) averaged 23.32 cents a pound, down from 23.55 cents in 1984/85 and 26.24 cents in 1983/84. At the retail level the national average price declined a half-cent this past fiscal year to 35.12 cents a pound.

In forecasting sugar prices for the U.S. market, attention is usually focused on the sugar import quota. The quota, based on tariff headnote authority, is intended to give "due consideration" to the interests of domestic sugar producers and materially affected contracting parties to the General Agreement on Tariffs and Trade. The quota will be announced by December 15. However, we can discuss some of the major factors entering the quota decision.

U.S. sugar production is estimated to be up over 5 percent in 1986/87 to 6.35 million short tons (ST), raw value. Sugarbeet harvested area is up nearly 8 percent. Acreage expanded particularly in Minnesota-N.Dakota, Michigan, and Idaho. Even with the damage from prolonged rain in Michigan, beet sugar production is still expected at about 3.2 million tons, raw value, the highest in five seasons. Cane sugar production, estimated at 3.15 million tons, will be the highest in a decade.

Domestic deliveries of sugar for U.S. use during the last fiscal year fell 3.4 percent, largely from continued loss to high-fructose corn sirup (HFCS) in beverages. Deliveries also declined in processed foods, and slightly in bakery and cereal products. In 1986/87, deliveries could be down almost 2 percent or 145,000 tons, as a result of losses to alternative sweeteners and imported sugar-containing products.

U.S. corn sweeteners deliveries (virtually all for industrial food and beverage use) exceeded sugar deliveries for the first time in 1985. While HFCS displacement of sugar use is almost complete, we expect some further substitution here and there. HFCS-55 consumption (mostly in beverages where it is now 95 percent of all caloric sweeteners used), may be limited to growth of less than 2 percent a year. HFCS-42, with a wider variety of potential application, could increase 3-4 percent a year. U.S. deliveries of HFCS is estimated at 5.4 million tons, dry basis, in 1987, but imports of over 200,000 tons from Canada would put U.S. use at over 5.6 million tons.

Total U.S. sugar use for all categories, including re-exports and the 177,000-ton sale to China, amount to 8.362 million tons in the estimated supply and use table for 1986/87. No figures can be given for total supply at this time because quota imports have not yet been announced. Whatever the size of the quota, the quota year starts January 1. It has not been ascertained whether the quota will be for nine or twelve months.

As we are all aware, there is a growing pressure on the U.S. sugar program. The problem boils down to declining U.S. sugar imports and the multifaceted implications of that, not only in terms of sugar as a commodity of commerce but as a matter of foreign policy and U.S. strategic interests. Quota imports have dropped from 2.98 million tons in fiscal 1983 (the first full year since quotas were imposed in May 1982) to 1.85 million in fiscal 1986. Only in outline, here are some of the factors, both on the supply and the use side, which are tending to reduce imports.

- o U.S. sugar production is rising. Without bad weather this year, output would have reached 6.4 million tons, up 400,000 tons from 1985/86. Increased sugarbeet acreage reflects the better returns relative to other crops. In the 1985 crop year, returns to management and risk were $100 an acre for sugarbeets compared with minus $29 for wheat, minus $39 for cotton, minus $44 for barley, and minus $7 for soybeans. For both beet and cane sugar, at prospective prices associated with the 1985 Farm Act, farm and factory production capacities point to a potential output of 6.6 to 6.8 million tons.

- o Domestic sugar deliveries face potentially larger losses from alternative sweeteners and the expanding imports of sugar-containing products. These imports are perfectly legal; they are profitable because of the large disparity between world-priced sugar and U.S. sugar. Between 1981 and 1985, the amount of sugar entering the U.S. through sugar-containing products rose by about 150,000 tons. While various strictures have been applied, and this world-sourced sugar inflow has slowed, there is continued potential for further displacement.

- o At least through 1987, estimated displacement of sugar use by crystalline fructose appears very modest. There may not be a major substitution even over the next five years. However, one can never be too sure in betting against technological progress.

- o Noncaloric sweeteners appear to be moving beyond complementary use and starting to be competitive with sugar and HFCS. No hard data are available, but caloric sweeteners use fell from an estimated 131.2 pounds per capita in 1985 to 129.5 pounds in 1986. We can expect some further decline in 1987.

Table 1.--World Sugar production, consumption, and apparent ending stocks 1975/76 to 1986/87

| Crop Year 1/ | Production | Consumption | Apparent ending stocks 2/ |
|---|---|---|---|
| | Million metric tons, raw value | | |
| 1975/76 | 81.7 | 79.2 | 21.0 |
| 1976/77 | 86.3 | 81.9 | 24.8 |
| 1977/78 | 92.7 | 86.2 | 30.0 |
| 1978/79 | 91.3 | 89.6 | 31.0 |
| 1979/80 | 84.6 | 89.5 | 24.2 |
| 1980/81 | 88.5 | 88.5 | 24.2 |
| 1981/82 | 100.6 | 90.5 | 34.3 |
| 1982/83 | 101.3 | 93.8 | 41.8 |
| 1983/84 | 96.5 | 95.8 | 42.5 |
| 1984/85 | 100.2 | 96.7 | 46.0 |
| 1985/86 | 98.1 | 97.7 | 46.4 |
| 1986/87 3/ | 100.1 | 99.7 | 46.8 |

1/ Crop year September/August, but includes the outturn of Southern Hemisphere countries which begin harvests prior to September. 2/ Starting in 1981/82, ending stocks reflect the difference between production and consumption and do not take into account import and export estimates.
3/ Preliminary estimate.

SOURCE: Foreign Agricultural Service (FAS), USDA.

Table 2.--World centrifugal sugar production, by region, 1984/85 to 1986/87

| Region | 1984/85 | | 1985/86 | | 1986/87 1/ | |
|---|---|---|---|---|---|---|
| | Beet | Cane | Beet | Cane | Beet | Cane |
| | 1,000 metric tons, raw value | | | | | |
| North America 2/ | 2,766 | 6,081 | 2,781 | 6,386 | 3,025 | 6,525 |
| Caribbean | 0 | 9,696 | 0 | 8,475 | 0 | 8,969 |
| Central America | 0 | 1,815 | 0 | 1,792 | 0 | 1,816 |
| South America | 390 | 14,251 | 385 | 12,834 | 458 | 13,726 |
| European Community | 14,413 | 11 | 14,423 | 14 | 14,131 | 17 |
| Other Western Europe | 1,095 | 0 | 1,039 | 0 | 888 | 0 |
| Eastern Europe | 5,631 | 0 | 5,538 | 0 | 5,365 | 0 |
| USSR | 8,587 | 0 | 8,250 | 0 | 7,700 | 0 |
| North Africa | 510 | 1,278 | 512 | 1,390 | 510 | 1,420 |
| Other Africa | 0 | 6,045 | 0 | 5,928 | 0 | 5,975 |
| Middle East | 2,196 | 200 | 1,941 | 270 | 2,191 | 300 |
| Asia | 1,620 | 19,570 | 1,493 | 20,936 | 1,473 | 21,890 |
| Oceania | 0 | 4,028 | 0 | 3,692 | 0 | 3,750 |
| Total, by type | 37,208 | 62,975 | 36,362 | 61,717 | 35,741 | 64,388 |
| Total, centrifugal sugar | 100,183 | | 98,079 | | 100,129 | |

1/ Preliminary estimate.
2/ United States includes Hawaiian cane, but excludes Puerto Rico cane (which is listed under Caribbean).

SOURCE: FAS, USDA

Table 3.--World centrifugal sugar consumption, by region, 1983/84 to 1986/87

| Region | 1983/84 | 1984/85 | 1985/86 | 1986/87 1/ |
|---|---|---|---|---|
| | Million metric tons, raw value | | | |
| North America | 12.0 | 11.9 | 11.8 | 11.8 |
| Caribbean | 1.4 | 1.4 | 1.5 | 1.4 |
| Central America | 0.9 | 0.9 | 0.9 | 1.0 |
| South America | 10.8 | 10.8 | 10.9 | 11.2 |
| European Community | 11.5 | 11.6 | 11.5 | 11.5 |
| Other Western Europe | 1.4 | 1.3 | 1.3 | 1.3 |
| Eastern Europe | 6.0 | 6.2 | 6.0 | 6.2 |
| USSR | 13.3 | 13.3 | 13.3 | 13.5 |
| Africa | 8.0 | 8.0 | 8.1 | 8.3 |
| Middle East | 4.8 | 5.1 | 5.2 | 5.3 |
| Asia | 24.7 | 25.1 | 26.1 | 27.2 |
| Oceania | 1.0 | 1.0 | 1.0 | 1.0 |
| Total | 95.8 | 96.7 | 97.7 | 99.7 |

1/ Preliminary estimate.

SOURCE: FAS, USDA

Table 4.--World sugar imports, by region, 1982/83 to 1985/86

| Region | 1982/83 | 1983/84 | 1984/85 | 1985/86 |
|---|---|---|---|---|
| | Million metric tons, raw value | | | |
| North America | 4.4 | 4.5 | 3.6 | 3.2 |
| Caribbean | 0.1 | 0.2 | 0.1 | 0.1 |
| South America | 1.0 | 0.8 | 0.6 | 0.2 |
| European Community | 2.5 | 3.1 | 3.0 | 3.0 |
| Other Western Europe | 0.6 | 0.5 | 0.5 | 0.5 |
| Eastern Europe | 1.0 | 1.3 | 1.1 | 1.0 |
| USSR | 5.9 | 5.6 | 5.3 | 5.5 |
| North Africa | 2.2 | 2.2 | 2.2 | 2.1 |
| Other Africa | 1.0 | 1.3 | 0.9 | 1.0 |
| Middle East | 2.7 | 2.8 | 2.8 | 2.8 |
| Asia | 6.4 | 5.6 | 7.5 | 7.8 |
| Oceania | 0.3 | 0.2 | 0.2 | 0.2 |
| Total | 27.9 | 28.2 | 27.9 | 27.5 |

SOURCE: FAS, USDA.

Table 5.--World sugar exports, by region, 1982/83 to 1985/86

| Region | 1982/83 | 1983/84 | 1984/85 | 1985/86 |
|---|---|---|---|---|
| | Million metric tons, raw value | | | |
| North America | 0.3 | 0.5 | 0.5 | 0.7 |
| Caribbean | 8.0 | 8.3 | 8.8 | 7.6 |
| Central America | 1.1 | 0.8 | 0.8 | 1.0 |
| South America | 4.3 | 4.1 | 4.5 | 3.2 |
| European Community | 6.8 | 6.0 | 5.7 | 6.6 |
| Other Western Europe | 0.3 | 0.2 | 0.1 | 0.1 |
| Eastern Europe | 0.8 | 0.8 | 1.1 | 0.9 |
| USSR | 0.2 | 0.3 | 0.3 | 0.3 |
| Africa | 2.6 | 2.1 | 2.7 | 3.0 |
| Middle East | 0.2 | 0.5 | 0.5 | 0.1 |
| Asia | 3.9 | 3.6 | 3.8 | 3.3 |
| Oceania | 3.1 | 2.9 | 3.2 | 3.0 |
| World Total | 31.6 | 30.0 | 31.9 | 29.8 |

SOURCE: FAS, USDA.

Table 6.--World and U.S. raw sugar prices, 1975 to 1986

| Year/Month | International Sugar Agreement world price 1/ | Coffee, Sugar & Cocoa Exchange World price 2/ | Coffee, Sugar & Cocoa Exchange United States 3/ |
|---|---|---|---|
| | Cents per pound | | |
| 1975 | 20.37 | 20.49 | 22.47 |
| 1976 | 11.51 | 11.58 | 13.31 |
| 1977 | 8.10 | 8.11 | 11.00 |
| 1978 | 7.81 | 7.82 | 13.93 |
| 1979 | 9.65 | 9.66 | 15.56 |
| 1980 | 28.66 | 29.02 | 30.11 |
| 1981 | 16.89 | 16.93 | 19.73 |
| 1982 | 8.40 | 8.42 | 19.92 |
| 1983 | 8.46 | 8.49 | 22.04 |
| 1984 | 5.21 | 5.18 | 21.74 |
| 1985 | 4.06 | 4.04 | 20.34 |
| 1986 (Jan.-Sep.) | 5.55 | 6.18 | 20.87 |
| 1985: | | | |
| Jan-March | 3.72 | 3.68 | 20.67 |
| April-June | 3.01 | 2.96 | 21.11 |
| July-September | 4.24 | 4.21 | 20.44 |
| Oct.-Dec. | 5.28 | 5.30 | 19.15 |
| 1986: | | | |
| January | 4.86 | 4.87 | 20.67 |
| February | 5.57 | 5.55 | 21.01 |
| March | 6.95 | 7.07 | 20.95 |
| April | 8.33 | 8.36 | 20.85 |
| May | 7.63 | 7.64 | 20.88 |
| June | 6.33 | 6.36 | 20.99 |
| July | 5.55 | 5.58 | 20.97 |
| August | 5.57 | 5.50 | 20.87 |
| September | 4.68 | 4.67 | 20.87 |
| October | 5.39 | 5.42 | 21.03 |

1/ The International Daily Price is the arithmetical average of the (New York) Coffee, Sugar & Cocoa Exchange Contract No. 11 spot price and the London Daily Price after conversion of the latter to U.S. cents per pound avoirdupois f.o.b. and stowed Caribbean port in bulk or, if the difference between these two f.o.b. prices is more than ten points, the lower of the two prices plus five points. 2/ 1975-Oct. 1977 and 1979-1986, Contract No. 11, f.o.b. Caribbean (inc. Brazil), bulk. Nov. 1977-1978, International Sugar Agreement, f.o.b. Caribbean, bulk. 3/ 1975-Oct. 1977 and 1979-May 1985, Contract No. 12, c.i.f., duty/paid, New York. Nov. 1977-1978, London Daily price, c.i.f. U.K., converted to duty/paid, New York. June-Dec. 1985, No. 12 nearby futures. 1986, No. 14 nearby futures.

SOURCE: International Sugar Organization, and Coffee, Sugar & Cocoa Exchange, Inc.

Table 7-- U.S. sugar production and harvested area, 1975 to 1986 crop years

| Year | Production | | | Harvested area | |
|---|---|---|---|---|---|
| | Beet | Cane | Total | Beet | Cane |
| | 1,000 short tons, raw value | | | 1,000 acres | |
| 1975-80 average | 3,390 | 2,730 | 6,120 | 1,298 | 705 |
| 1981-85 average | 2,945 | 2,973 | 5,918 | 1,102 | 715 |
| 1985 | 2,997 | 3,033 | 6,030 | 1,102 | 723 |
| 1986 forecast | 3,200 | 3,150 | 6,350 | 1,188 | 754 |
| Percent Change: Average 1975-80 to 1981-85 | -13.1 | 8.9 | -3.3 | -15.1 | 1.4 |
| 1985 to 1986 | 6.8 | 3.9 | 5.3 | 7.8 | 4.3 |

SOURCE: NASS and ERS, USDA.

Table 8--U.S. sugar deliveries to industrial and nonindustrial users, 1980, 1985 and Jan.-Sept. 1985 and 1986

| Item | Calendar year | | Jan.-Sept. | | Fiscal year (FY) | | Percent change, FY 1985 to FY 1986 |
|---|---|---|---|---|---|---|---|
| | 1980 | 1985 | 1985 | 1986 | 1985 | 1986 | |
| | Thousand short tons, refined 1/ | | | | | | |
| Bakery/cereal | 1,337 | 1,494 | 1,131 | 1,084 | 1,471 | 1,447 | -1.6 |
| Confectionery | 932 | 1,059 | 788 | 782 | 1,052 | 1,053 | .1 |
| Processed Foods | 535 | 428 | 351 | 313 | 439 | 390 | -11.2 |
| Ice cream/Dairy | 450 | 456 | 356 | 347 | 449 | 448 | -.1 |
| Other | 589 | 441 | 322 | 318 | 420 | 437 | 4.0 |
| Beverage | 2,161 | 340 | 276 | 211 | 436 | 274 | -37.2 |
| Nonindustrial | 3,353 | 3,123 | 2,282 | 2,250 | 3,124 | 3,091 | -1.1 |
| Total, including non-food | 9,477 | 7,472 | 5,609 | 5,407 | 7,520 | 7,270 | -3.3 |

1/ U.S. deliveries data do not include Hawaii. To convert to raw value, multiply by 1.$\overline{07}$.

SOURCE: Sugar Market Statistics, NASS and ERS, USDA.

Table 9.--U.S. sugar supply
and use, fiscal 1985, 1986, and 1987

| Description | 1984/85 | 1985/86 | 1986/87 |
|---|---|---|---|
| | | 1,000 short tons, raw value | |
| Beginning stocks 1/ | 1,611 | 1,759 | 1,652 |
| Total production | 5,832 | 6,019 | 6,350 |
| Beet sugar | 2,914 | 2,989 | 3,200 |
| Cane sugar | 2,918 | 3,030 | 3,150 |
| Total offshore receipts | 2,707 | 2,404 | -- |
| Quota sugar | 2,677 | 1,850 | -- |
| Quota shortfall | -30 | -- | -- |
| Quota transfer | -455 | -- | 455 |
| Quota-exempt for reexport | 419 | 467 | 350 |
| Quota-exempt for polyhydric alcohol | 22 | 29 | 30 |
| Total foreign | 2,633 | 2,346 | -- |
| Puerto Rico | 74 | 58 | 50 |
| Total supply | 10,150 | 10,182 | -- |
| Total exports | 464 | 507 | 430 |
| Quota-exempt | 390 | 463 | 375 |
| Puerto Rico | 60 | 55 | 55 |
| Export adjustment | 14 | -11 | -- |
| CCC disposal | -- | 127 | 177 |
| Polyhydric alcohol | 22 | 29 | 30 |
| Refining loss adjust. | 48 | 50 | 50 |
| Stat. adjust. 2/ | -240 | -3 | -- |
| Total deliveries | 8,097 | 7,820 | 7,675 |
| Total use | 8,391 | 8,530 | 8,362 |
| Ending stocks 1/ | 1,759 | 1,652 | -- |
| | | Million | |
| Population | 238.8 | 241.0 | 243.2 |
| | | Pounds, refined | |
| Per capita sugar deliveries | 63.4 | 60.7 | 59.0 |
| | | Percent | |
| Ending stocks/total use | 21.0 | 19.4 | -- |

1/ Stocks in hands of U.S. primary distributors and CCC.
2/ Calculated as a residual. Largely consists of invisible stocks change of wholesalers, retailers, and industrial users.

SOURCE: Data are from NASS, Sugar Market Statistics. Beginning fiscal 1983, imports based on Customs data for quota sugar and company data for quota-exempt sugar; exports based on Census data. Estimates are from Interagency Estimates Committee.

Table 10.--U.S. caloric sweeteners use, 1980, 1985 to 1987 1/

| Calendar year | Sugar, raw | Sugar, refined | HFCS | Total corn sweeteners, including HFCS, glucose, and dextrose | Honey and edible sirup | Total |
|---|---|---|---|---|---|---|
| | | | Pounds per capita, dry basis | | | |
| 1980 | | 83.6 | 19.1 | 40.2 | 1.2 | 125.0 |
| 1985 | | 63.3 | 45.1 | 66.6 | 1.3 | 131.2 |
| 1986 | | 60.8 | 45.8 | 67.3 | 1.4 | 129.5 |
| 1987 2/ | | 59.1 | 46.4 | 67.9 | 1.5 | 128.5 |
| | | | Million short tons, dry basis | | | |
| 1980 | 10.189 | 9.522 | 2.180 | 4.583 | 0.137 | 14.242 |
| 1985 | 8.110 | 7.579 | 5.385 | 7.962 | 0.156 | 15.697 |
| 1986 | 7.850 | 7.336 | 5.525 | 8.122 | 0.169 | 15.627 |
| 1987 2/ | 7.700 | 7.196 | 5.650 | 8.268 | 0.183 | 15.647 |

1/ Includes sugar in blends/mixtures but not sugar in imported sugar-containing products. Includes HFCS imports.
2/ Forecast.

Table 11.--U.S. use of noncaloric and caloric sweeteners, 1980 to 1986

| Calendar year | Saccharin | Aspartame | Total of noncaloric sweeteners 1/ | Caloric sweeteners | Total all sweeteners |
|---|---|---|---|---|---|
| | | | Pounds per capita, dry basis | | |
| 1980 | 7.7 | 0.0 | 7.7 | 125.0 | -- |
| 1981 | 8.0 | 0.2 | 8.2 | 125.1 | 133.3 |
| 1982 | 8.4 | 1.0 | 9.4 | 123.2 | 132.6 |
| 1983 | 9.5 | 3.5 | 13.0 | 124.6 | 137.6 |
| 1984 | 10.0 | 5.8 | 15.8 | 126.9 | 142.7 |
| 1985 | 6.0 | 12.0 | 18.0 | 131.2 | 149.2 |
| 1986 | 5.5 | 13.0 | 18.5 | 129.5 | 148.0 |

1/ Sugar-sweeteness-equivalent. Assumes saccharin is 300 times as sweet as sugar and aspartame is 200 times as sweet ss sugar.

SOURCE: ERS, USDA estimates.

Table 12.--U.S. sugar imports, fiscal 1980 to 1986

| Fiscal year | All imports 1/ | Quota imports 2/ | All imports minus all exports |
|---|---|---|---|
| | 1,000 short tons, raw value | | |
| 1979/80 | 4,874 | -- | 4,430 |
| 1980/81 | 4,967 | -- | 3,704 |
| 1981/82 | 3,603 | -- | 3,303 |
| 1982/83 | 3,238 | 2,981 | 2,844 |
| 1983/84 | 3,615 | 3,030 | 3,221 |
| 1984/85 | 2,707 | 2,192 | 2,243 |
| 1985/86 | 2,404 | 1,850 | 1,897 |

1/ Includes imports for re-export as refined sugar or in sugar-containing products; and small quantities of imports for polyhydric alcohol and specialty sugars.
2/ Actual Oct. 1 to Sep. 30 fiscal year imports, reflecting quota transfers (plus or minus) between fiscal years, and small quantities of unfilled sugar quota allocations. Restrictive sugar quotas started May 5, 1982.