



International Agricultural Trade and Policy Center

NEAR TERM PROSPECTS FOR THE U.S. SUGAR INDUSTRY

By

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Abstract: Expanding domestic production, increasing imports and international commitments under the WTO and NAFTA have severely weakened the U.S. sugar Program and are wreaking havoc on the industry. The consequences have been: prices in the domestic market plummeting to 22-year lows; closure of several mills; bankruptcy of the nation's largest seller of refined sugar; forfeitures of sugar loans commitments; government purchases of sugar; and extremely high stocks to usage ratio. Moreover, the longer-term prospects for the industry are not encouraging. New rounds of agricultural trade negotiations under the umbrella of the WTO set to restart later in 2001, the likely formation of an FTAA in 2005, the creation of a single sugar market between Mexico and U.S. by the year 2008, the formation of a free trade area with APEC by 2010, and impending trade with Cuba create a wave of uncertainty over the future of the U.S. sugar industry.

This paper discusses some of these major developments but focuses its analysis on the likely near term impacts, a period covering the next five years, of likely developments within the industry. Use is made of a modified version of a World Sugar Policy Simulation Model to facilitate the analysis.

Keywords: U.S. sugar program, sugar model, U.S. sugar and sweetener industry, U.S and Mexico sugar dispute, NAFTA

NEAR TERM PROSPECTS FOR THE U.S. SUGAR INDUSTRY

Edward Evans, Sikavas Na Lampang and John VanSickle¹

The U.S. is the world's largest single-country market for sugar and corn sweeteners. It is currently the fourth largest sugar producer and by far the largest producer of corn sweeteners. Its sweetener industry spans 42 states, generates approximately \$26.2 billion in economic activity annually and accounts for as many as 420 thousand direct and indirect full time jobs (VanDriessche).

The U.S. sugar industry has had a long history of government support and regulation dating back to the Sugar Act of 1934. The current sugar program has its origins in the Food and Agriculture Act of 1981. This Act followed a seven-year period in which the market was relatively open to foreign sugar imports, and growers and processors were exposed to volatile world market prices. Although the Act has undergone several modifications, in 1985, 1990 and 1996, the intent of the provisions has more or less remained the same. The stated objective of the Program is to ensure the reliable supply of sugar to American consumers at competitive prices, *while providing some stability for American sugar interests (growers and processors)* [Evans and Davis].

Since the reinstatement, the Program is now facing its biggest challenge in providing stability to the American sugar interests and appears to have lost the ability to operate at no cost to the government treasury. It is now at a major crossroad with no clear indication of the direction it will follow. Expanding domestic production, increasing imports and international commitments under the WTO and NAFTA have severely

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weakened the Program and are wreaking havoc on the industry. The consequences have been: prices in the domestic market plummeting to 22-year lows; closure of several mills; bankruptcy of the nation's largest seller of refined sugar; forfeitures of sugar loans commitments; government purchases of sugar; and an extremely high stocks to usage ratio. Moreover, the longer-term prospects for the industry are not encouraging. New rounds of agricultural trade negotiations under the umbrella of the WTO, the likely formation of Free Trade Area of the Americas (FTAA) by 2005, the creation of a single sugar market between Mexico and U.S. by year 2008, the likely formation of a free trade area encompassing the Asian Pacific Economic Cooperation countries (APEC) by 2010, and impending trade with Cuba, all create a wave of uncertainty over the future of the U.S. sugar industry.

This paper discusses some of the major developments within the U.S. sugar market, but focuses its analysis on the likely near term prospects for the industry—a period covering the next five years. Use is made of a modified version of a World Sugar Policy Simulation Model to facilitate the analysis.

Section I of the paper recalls the main provisions of the U.S. sugar program and explains how it operates. Section II provides evidence of the growing ineffectiveness of the current U.S. sugar program by examining some of the major trends within the U.S. sugar market and the impact of recent developments on the US sugar industry. In section III we discuss some of the current issues that are likely to impact the industry. A brief overview of a World Simulation Model used in the analysis is presented in Section IV and the policy scenarios considered in the analysis are also outlined. The simulation results are

presented and discussed in section V. The paper is concluded with a few brief remarks in section VI.

I. Elements of Current U.S. Sugar Program

The main component of the U.S. Sugar Program is a loan rate. The 1996 Farm Act legislated that sugar processors can take out non-recourse loans from the government using sugar as collateral². The average loan rate borrowers received for raw cane sugar is 18 cents per pound, and for refined beet sugar the average rate is 22.9 cents per pound. These loans can be taken out for a period of 9 months and repaid along with interest charges before September of each year, or the collateral can be forfeited. To avoid forfeiting of loan commitments, it has been estimated that the U.S. domestic price for raw and refined (beet) sugar must be at a minimum 19.60 and 24.84 cents a pound, respectively (Haley). These minimum prices were calculated on the basis of the loan rates, transportation and other marketing charges. Hence, the loan rate guarantees producers a minimum price.

In order to be effective and keep to a minimum government administrative cost, the program requires trade policies to restrict imports. This has been made possible by a set of bilateral tariff rate quotas (TRQ), managed by the United States Department of Agriculture (USDA, May), which limits the amount of sugar imported into the country. The TRQ is allocated to 41 quota-holding countries based on sugar exports from those countries to the U.S. during the period 1975-1981. A lower tier tariff of 0.625 cent a

²A non-recourse loan implies that the processor may forfeit the collateral in lieu of repaying the loan, and the government has no recourse but to accept the sugar as full payment. On the other hand, a recourse loan must be repaid. The 1996 Farm Bill stipulated that the sugar tariff rate quota (TRQ) be established higher than 1.5 million STRV as a condition for non-recourse loans, however, the FY 2001 Agricultural Appropriation Act eliminated the TRQ trigger for non-recourse loans and all references to recourse loans (Haley).

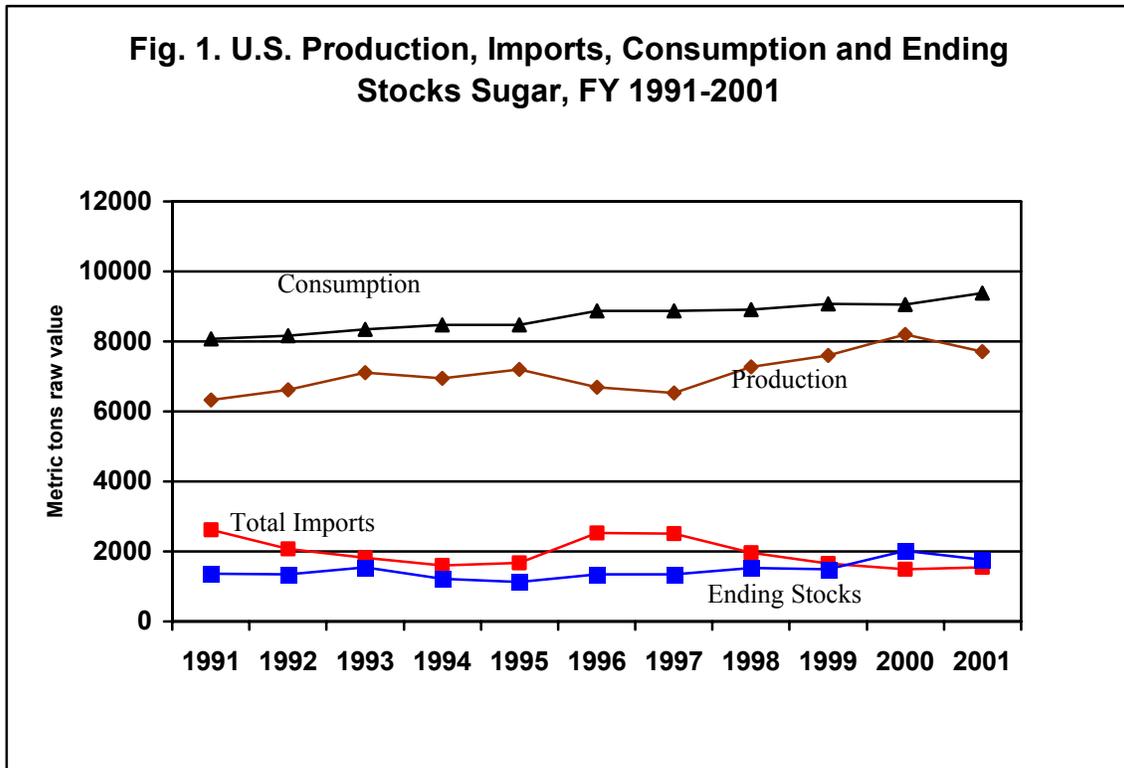
pound raw value is applied to quota imports. However, the duty is waived for most countries under the General System of Preferences (GSP) or the Caribbean Basin Initiative (CBI). Although the total quota can vary from year to year, the U.S. in keeping with its WTO commitments has agreed to import a minimum quantity of raw and refined sugar of 1.13 million metric tons raw value equivalent (MMTRV) each marketing year (October/September). Countries wishing to export an amount above their quota must pay a higher tariff in accordance with a declining tariff schedule (See Attachment 1 for Schedule).

As can be seen from the Schedule, in the case of Mexico and under NAFTA the over quota tariff rates are much less and the decline steeper than those for other countries. For 2002, raw sugar tariff rates are 9.07 cents a pound and 15.36 for Mexico and other countries, respectively. The refined sugar tariff rates for the same year are 9.61 and 16.21, respectively. Consequently, Mexico has been the only country so far to utilize this venue to gain market access.

II. Evidence of Ineffectiveness of Current Sugar Program

Figure 1 shows the trends in U.S. domestic production, consumption, total imports and ending stocks, over the period FY 1991-2001. The Figure shows that over the period there has been a slight upward trend in the U.S. domestic consumption of sugar. This upward trend reflected the general buoyancy of the U.S. economy, the decline in sugar prices and the consequential increase in per capita consumption of sugar and sugar related products. The U.S. production trend has been slightly upward. Noticeable however, was the sharp upturn in sugar output that began in 1997 and continued through

2000. Several factors were responsible for the rise in this output. Chief among such factors was the area harvested. This increase was due to higher expected returns to



sugarcane cultivation compared with other crops, which compete with sugar for land use. Between 1996 and 2000, acreage planted in sugar beet and sugarcane increased from 1,368 thousand and 914 thousand acres, respectively to 1,565 and 954 thousand acres (USDA, September). The switch in production patterns was facilitated by the increased planting flexibility under the 1996 Farm Bill coupled with depressed commodity prices of the alternative crops. In addition to expanded acreage, the growth in sugar output was due to higher yields from good weather and investments in improved factory and field technologies. Yields of sugar beet increased from 18.2 MT (metric tons) per acre in 1996 to 21.2 in 2000, and those for sugarcane, from 32.4 to 35.2 MT per acre. Over the same time period, there was also a slight increase in the sugar recovery ratio (tons of sugar to

tons of sugarcane) in the factory from 12.03 to 12.16 percent (USDA, September). As a consequence of these trends, the share of domestic consumption of sugar attributed to domestic production increased from 78.4 percent in 1991 to 90.1 percent in 2000—the highest level in recent times.

The drop in sugar output in FY 2001 was due to government intervention, particularly the Sugar Payment-In-Kind (PIK) Program. This Program offers sugar beet and sugarcane producers the option of diverting from production a portion of their crop in exchange for government-held sugar. As a consequence of the Program, 102 thousand acres of sugar beet, the equivalent of approximately 300 thousand MT of beet sugar was diverted in FY 2001 (USDA Fact Sheet).

With regard to trade, total sugar imports (TRQ and Non-TRQ)³ have been trending downward. From a high of 2,536 thousand MT recorded in 1996, the volume decreased steadily to a low of 1,484 thousand MT (Figure 1). Imports for FY 2001 showed a slight increase of 56 thousand MT over the previous year. Two points regarding the trend in imports in order: first, the decline in imports of sugar can be traced back to the late 1970s and the successful development and marketing of High Fructose Corn Syrup (HFCS), a sugar substitute manufactured from cornstarch. So, in order to support domestic sugar price and at the same time accommodate the increasingly available domestic sweeteners, sugar imports had to be curtailed. Second, non-TRQ imports have increased due primarily to an increase in the import of sugar syrup known as “stuffed molasses” from which sugar is recovered, and high tier sugar imports from Mexico. Indeed, imports of sugar obtained from the import of “stuffed molasses” increased from

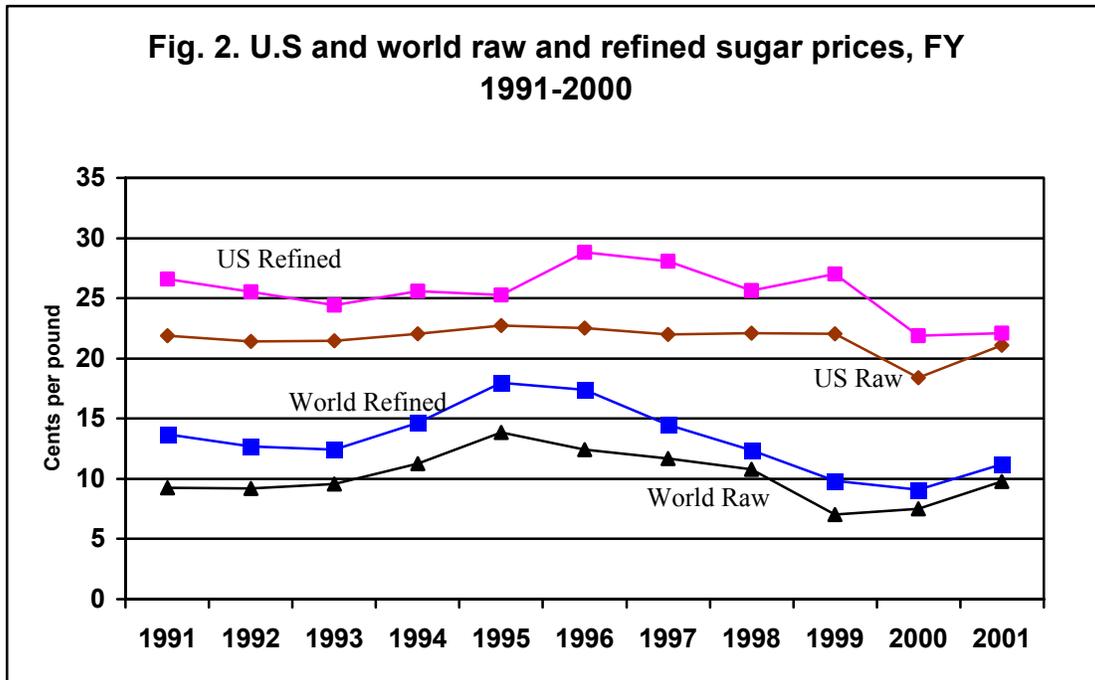
³ Non-TRQ sugar imports include imports under the combined Refined Sugar Re-export Program, sugar extracted from sugar syrups under HTS 17029040 and high-tier tariff imports from Mexico.

an estimated 72 thousand MT in FY 95/96 to 112.5 thousand MT in FY 2001 (VanDriessche) and imports from Mexico under the high tier which amounted to 8 thousand MT in FY 2000 is projected to reach 25 thousand MT in FY 2001. However, because of a recent U.S. Court of Appeals decision to ban the import of “stuffed molasses” sugar imports from this source are expected to fall substantially (USDA Fact Sheet). Further, high tier sugar imports from Mexico will depend on the U.S. domestic price and the world market price for sugar.

The culmination of increased US sugar supply and the modest growth in consumption have caused the stocks-to-usage ratio to reach its highest level in recent times. Ending stocks, which have been more or less constant, increased from 1,371 thousand MT in 1991 to 2,013 in FY 2000, before falling slightly to 1,764 thousand MT in FY 2001. Over the same time frame, the end stocks-to-use ratio increased from 15.7 percent to a record 22.0 percent before falling to 18.7 percent. Hence, stocks-to-use ratios are well above the USDA trigger level of 15.7 percent.

As a result of a gradual weakening of the Sugar Program, the domestic sugar price began declining in FY 1997 and culminated with a noticeable drop in FY 2000 to levels not seen since FY 1979. Figure 2 shows the trends in U.S. and world raw and refined sugar prices and illustrates the sharp downturn, in both the domestic raw and refined sugar prices (current dollars), that occurred in FY 2000. For the first time since implementing the current Sugar Program, the domestic sugar prices for both raw and refined sugar fell below the loan rates causing some growers to forfeit loans. Sugar beet and sugarcane processors forfeited about 800.4 thousand MT sugar. Prices would have fallen further had it not been that the government intervened into the market in FY 2000

and, in addition to its Payment-in-Kind program, purchased 118.8 thousand MT of sugar to support the domestic price. Hence, in FY 2000, the government acquired in excess of



900 thousand MT, of sugar that was placed into storage at a cost of approximately \$16.1 million annually (USDA Fact Sheet). The end result was that the total cost of administering the sugar program in FY 2000 was about \$141 million or approximately 0.6% of the total Commodity Credit Corporation (CCC) farm budget for that year (VanDriessche). In addition, government incurred lost revenue of approximately \$ 25 million from the suspension of the “marketing assessment cost” on the sale of domestic produced sugar⁴. Sugarcane and sugar beet producers also recorded lost income. Compared with the 1996 sugar prices, between 1997 and 2001, these producers lost an estimated \$ 2,226 million in revenues (\$ 545 million and \$1,681 million, respectively).

⁴ U.S. sugar producers began paying a marketing assessment of 1 percent of the cane and beet loan rates in 1991, for the express purpose of helping to reduce the federal budget deficit. The 1996 Farm Bill had legislated that the fee should be increased to 1.375 percent of the loan rates. It has been estimated that over the period 1991-1999, \$ 279 million was paid to the government (VanDriessche).

Hence, the Sugar Program rather than operating at no or minimum cost to the government, as was the situation in the past, was costing the government both in terms of direct expenditures and lost revenue and was not being effective in stabilizing producer income.

The impact of the downward pressure on U.S. sugar prices have resulted in the closure of several sugar beet and cane processing mills. Between 1996 and present, 17 beet and cane processing mills have closed or announced their closure. In addition, the nation's biggest sugar refinery is in bankruptcy while the nation's second biggest sugar seller is attempting to sell its beet processing and cane refining operation (VanDriessche).

The data for FY 2001 shows that on account of government actions, prices have rebounded somewhat from their previous year's low. In the case of US raw sugar, the 2001 average domestic price rose to 21.07 cents a pound, a level that is slightly above the estimated forfeiture level of 19.60. However, the refined sugar price of 22.11 cents remained below the estimated forfeiture price of 24.84 cents a pound.

For FY 2002, the USDA (September) is projecting a slight decrease in the level of domestic sugar production over the previous year, from 7.8 MMT to 7.5 MMT. The reduction is expected to come largely at the expense of sugar beet cultivation as cane sugar production is forecast to increase by about 3 percent. On the other hand, consumption is expected to increase only marginally, from 9.23 MMT to 9.28 MMT or by half of a percent.

III. Current Issues

With the closing of the loophole in the tariff structure, which allowed sugar to be imported under the guise of imported sugar syrups, the main current issues which are

likely to impact the sugar market in the near future are: 1) the 2002 Farm Bill; 2) the resolution of the controversy over the exact amount of sugar that Mexico is entitled to export to U.S. under the NAFTA and; 3) high tier sugar imports from Mexico. These issues are briefly discussed below and are the ones focused on in defining our policy scenarios below.

The Farm Security Act of 2001—Although the final version of the 2002 Farm Bill, has not yet been approved by the U.S. Senate, on the basis of the version which has been approved by the 107th Congress, the major provisions which will impact the U. S. sugar industry in the near future, include: a) agreeing to increase the minimum from 1.13 MMT to 1.38 MMT; b) providing the Secretary of Agriculture with the discretion to adjust the loan rates; c) requiring the Secretary of Agriculture to administer the sugar program at no net cost to the federal government to the maximum extent possible; and d) reinstating the marketing allotment for domestically grown sugar (107th Congress H. R. 2646).

With regard to (a) above, the increase in the TRQ is in keeping with the NAFTA commitment that beginning in FY 2001 up until FY 2007, Mexico is entitled to duty-free access to the U.S. market for the amount of its surplus sugar, as measured by the formula (discussed below), up to a maximum of 250 thousand MT. Provision (b) above is a safeguard mechanism to ensure that the U.S. satisfies both its NAFTA and WTO commitments to provide market access for a minimum quantity of sugar. And, in the cases of (c) and (d) above the provisions are aimed at exerting some control over domestic sugar production. Provision (c) authorizes the CCC to accept bids from processors for sugar inventory in exchange for reduced production. The government PIK program therefore appears to be an essential part of the strategy to ensure that domestic

sugar prices remain above the forfeiting levels. Provision (d) deals with the reinstatement of the marketing allotments for domestically grown sugar. Such a provision existed in the U.S. sugar program prior to 1996 and gave the U.S. Secretary of Agriculture the authority to impose controls upon sugarcane and sugar beet processors in cases where it was determined that the domestic guaranteed price could not be maintained without foreign imports falling below a guaranteed minimum of 1.14 MMT. The 1996 Farm Bill eliminated this provision. Interestingly, the call for the reinstatement of some form of inventory management mechanism has the full support of the U.S. sugar producers, notwithstanding that such a provision would mean that the U.S. Government would gain more control over the U.S. sugar market (VanDriessche).

Resolution of the U.S. and Mexico Sugar Dispute—The second major short term issue has to do with resolving the current dispute arising from different interpretations, by the U.S. and Mexico, of the sugar trade agreement under NAFTA. Briefly, the differences in the interpretation lies in the U.S. sticking to a "side letter agreement" which limits the amount of sugar Mexico can export to the U.S. duty free as determined by a formula. This formula computes Mexico's sugar surplus as the difference between its sugar production less its consumption of sugar and HFCS. On the basis of this side letter, beginning in FY 2001 and continuing to FY 2007, Mexico is entitled to ship its surplus sugar, up to a maximum of 250 thousand MT, duty free to the U.S.. Commencing October 31, 2008, all barriers would be removed and there would be a common sugar market between the U.S. and Mexico.

On the other hand, Mexico is contending that the sugar negotiations produced several versions of the "side letter" and there was no agreement on which was the final version,

hence the "side letter" is invalid (Kornis). Consequently, Mexico is sticking with the original provisions of the NAFTA that would have entitled that country, since October 1, 2000, to ship all of its excess sugar (production of sugar less *only* the consumption of sugar) duty free to the U.S.—some 500-600 thousand MT compared with the 116 thousand MT allocated by U.S. on the basis of the "side letter". The dispute is currently being addressed under NAFTA chapter 20 dispute settlement provision.

The above sugar dispute is linked to a dispute of U.S. access to Mexico's market for sale of HFCS. Briefly, Mexico contends that HFCS from the U.S. was being sold at less than fair value in the Mexican market and that such imports were threatening the Mexican sugar industry with material injury (Evans and Davis, Kornis). As a consequence, in 1998⁵, Mexico formally imposed antidumping duties ranging from \$63.75 to \$100.60 per MT on commercial product HFCS-42 and \$55.37 to \$175.50 per MT, payable to the regular 4-percent ad valorem duty (Kornis). This has severely restricted the growth in exports of HFCS from the U.S. to Mexico. Between 1994 and 1998 exports of HFCS increased from 92.8 thousand MT to 218.4 thousand MT, but fell to 202.0 thousand MT in 2001. Although the exact quantity of HFCS consumed by Mexico is not known, the USDA estimates a consumption level of about 500 thousand MT (USDA, May).

The HFCS market access dispute has been referred to both the NAFTA and WTO Dispute Settlement Bodies. Although, the WTO rulings were unfavorable to the case of Mexico, citing among other things that the Mexican government did not adequately consider all economic factors affecting its sugar industry that were pertinent in

⁵ The U.S.-Mexican dispute over HFCS actually began in January 1997 with the Mexican National Chamber of Sugar and Alcohol Industries alleging that the U.S. was selling its HFCS in the Mexican market at less than fair value. Countervailing duties were placed on HFCS imports from June of that year.

determining whether there was a threat of material injury to its sugar industry, Mexico continued to impose duties on HFCS from the U.S. And, on September 20, 2000 the Mexican government published revisions to the final resolution of the antidumping investigation based on the conclusions and recommendations of the Special Group of the Dispute Settlement Panel of the WTO. The matter has since been referred back to the original WTO panel by the U.S. on the basis that the re-determination of injury and the continuation of duties remain inconsistent with the WTO Antidumping Agreement (USDA, May; FAS Report #MX0140; Kornis).

The HFCS dispute is related to the sugar dispute because if resolved in favor of the U.S., and consumption of HFCS in Mexico rises, then Mexico's surplus status could easily be eroded on the basis of the "side letter agreement". However, on the basis of the original NAFTA agreement exports from Mexico would increase considerably as the imported HFCS displaces some of the sugar currently used in that country's soft drink industry.

High tier sugar imports—The third major near term issue that will impact the U.S. sugar industry is the importation of high tier (over-quota) sugar from Mexico. In addition to the in-quota duty free export of surplus sugar to the U.S., NAFTA provides for an additional amount of sugar to be exported from Mexico to the U.S. in accordance with a declining high-tier tariff schedule (See Attachment). In FY 2001, Mexico was able to export approximately 8 thousand MT of raw sugar to the U.S. under this provision.

For FY 2002, the high tier tariff on raw sugar exports from Mexico drops even further to 9.07 cents a pound, respectively. If the U.S. domestic sugar prices were kept at the minimum level to prevent forfeitures of approximately 20 cents a pound for raw

sugars (assuming a loan rate of 18 cents a pound on raw sugar), and if one assumes a one-cent transportation cost on raw sugar imported into the U.S. from Mexico, then as long as the world market price for raw sugar remains at or below 9.9 cent a pound the opportunity would exist for Mexico to ship all of its excess sugar to the U.S. market. Moreover, when one considers that the three-year (1999-2001) and five-year (1997-2001) averages of the world market price of raw sugar were 8.1 and 9.3 cents a pound respectively, the likelihood of this happening in the next couple of years is very convincing. More importantly, this development would overshadow the current sugar disputes since Mexico would be able to export all of its surplus sugar to the U.S. and there are no dispute surrounding the interpretation of this NAFTA provision.

IV. Overview of Model and Policy Scenarios

The Model—To assist us with our analysis we used a modified version of a World Sugar Policy Simulation Model⁶. It is a dynamic, partial equilibrium, net trade model and consists of 18 countries and regions: Algeria, Brazil, Canada, China, Cuba, Egypt, the European Union, the former Soviet Union, India, Indonesia, Japan, Mexico, South Africa, South Korea, Thailand, the United States, and the "Rest of the World". Sugar is assumed to be a homogenous commodity. Refined sugar quantities are expressed in raw sugar equivalents. The model is designed for evaluating the effects on the world sugar economy of farm and trade policies by simulating production, consumption, stocks and trade for sugar. The model makes use of specific assumptions about growth rates of various macroeconomics policy variables, population growth rates, and sweetener consumption.

⁶ The World Sugar Policy Simulation Model was developed by Dr. Won Koo of the Department of Agricultural Economics, North Dakota State University, Fargo, ND. Details of the model can be found in document by Benirschka, M., W. Koo, and J. Lou, 1996. "World Sugar Policy Simulation Model: Description

Policy Scenarios—Using the above model we examine the impact of four likely scenarios (including our baseline scenario) on the U.S. sugar market, over the period 2002-2005⁷.

The four scenarios are described in Table 1 (below) and are based on likely near term outcomes discussed earlier. The model was calibrated using 1999 as the base year.

Table 1. Near Term Policy Scenarios

Scenarios	Conditions	Rationale
S ₀ (BASE-LINE)	<ul style="list-style-type: none"> ▪ Set TRQ to 1.38 MMT from FY 2001. ▪ No change in current loan rate of 18 cents a pound on raw sugar. ▪ No PIK program or direct government sugar purchases. ▪ Mexico allowed to export all of their surplus sugar to U.S. market commencing in FY 2002. ▪ No restrictions on U.S. domestic production. 	<ul style="list-style-type: none"> ▪ Increased from current 1.13 MMT in order to reflect the NAFTA side letter agreement which permits a maximum duty free export of sugar from Mexico of 0.25 MMT beginning in FY 2001 to FY 2007. ▪ Based on 1996 Farm Bill. ▪ In accordance with NAFTA's accelerated high-tier Schedule for over-quota sugar exports from Mexico. Assumptions: <ul style="list-style-type: none"> ○ No drastic increase in world market price of sugar (i.e. prices remain within the range of 5-year average). ○ No or minimum leakage in the Sugar Re-export program.

⁷ The model was updated and calibrated using FY 1999 as the base data. This year was chosen since it represented the last year before the start of government PIK program and sugar purchases.

Scenarios	Conditions	Rationale
S ₁	<ul style="list-style-type: none"> ▪ Same as Scenario 1, except US domestic sugar production restricted to maximum of 7.5 MMT 	<ul style="list-style-type: none"> ▪ Assumes some kind of market allocation to control domestic production. ▪ The level chosen reflects the 1999 U.S. domestic sugar production.
S ₂	Same as in Scenario 1 except U.S. domestic price is maintained at 20 cents a pound from FY 2001 to avoid loan forfeitures.	<ul style="list-style-type: none"> ▪ Assumes a loan rate of 18 cents a pound for raw sugar. ▪ Minimum raw sugar price to avoid loan forfeitures is 19.60 a pound.
S ₃	Same as in Scenario 1 except U.S. domestic price is maintained at 18 cents a pound from FY 2001 to avoid loan forfeitures.	<ul style="list-style-type: none"> ▪ Assumes a loan rate of 16 cents a pound for raw sugar, implying a reduction in the implicit floor price for sugar. ▪ On this basis the minimum forfeiture price is calculated at 17.40 a pound for raw sugar.

V. Results and Discussion of Analysis

Attachment 2 contains the results of the analysis while Figures 3 to 7 illustrate the projected trends based on the information contained in the attachment. Figure 3 shows that in the baseline scenario (S₀), which assumes among other things, no government PIK and sugar purchases programs, the domestic raw sugar price drops considerably from the initial based value of 21.39 cents a pound to approximately 17 cents a pound. Since this level is below the minimum forfeiture level (target price) of 19.60, there would be considerable amount of loan forfeitures and budgetary consequences. The reduction in price is caused by the increase in exportable sugar coming from Mexico in FY 2002. When domestic production is restricted and kept constant at the 1999 level of 7,470

thousand MT, scenario 1 shows that the domestic raw sugar price declines initially to a low of 19.72 cents a pound in FY 2002 and then rises thereafter to reach a projected level of 22.87 cents a pound in 2006. This represents a difference of 5 cents compared with the baseline projection in FY 2006. Scenarios 2 and 3 show the assumed conditions of holding the domestic raw sugar price constant at 20 and 18 cents a pound, respectively.

Figure 4 shows the projected trends in U.S. domestic sugar production (raw sugar equivalent). In the base scenario, output increased slightly then decreased in FY 2002 in response to the increased sugar import from Mexico and the downward pressure exerted on the U.S. domestic sugar price. Scenario 1 shows the assumed condition of keeping constant the domestic sugar output. In both scenarios 2 and 3 the effect of maintaining the sugar price above the minimum forfeiture levels of the respective loan rates, results in a steady increase in output. In the case of the former, output increased from 7,470 thousand MT to a level of 8,138 thousand MT in FY 2006 while in the case of the latter it increased to 8,018 thousand MT. Hence, in both cases, the 2006 estimates showed a four percent increase over the 2006 baseline output. Because of the lowering of the loan rate in scenario 3 from 18 to 16 cents a pound, the domestic sugar output is slightly below that of scenario 2.

Figures 5 and 6 show the expected impact on acreage of sugar beets and sugar cane harvested. With regard to Figure 5, the baseline scenario shows that acreage harvested, after increasing slightly from 1,486 acres in the base year to 1,513 in FY 2001, remains more or less the same through FY 2006. Presumably the lowering of the sugar price increased the competitiveness of some of the alternative commodities. Scenarios 2 and 3 exhibit the same growth pattern. The differences in acres harvested largely reflect the

Fig. 3. U.S. Raw Sugar Price Projections, 2001-06
(U.S. cents/lb)

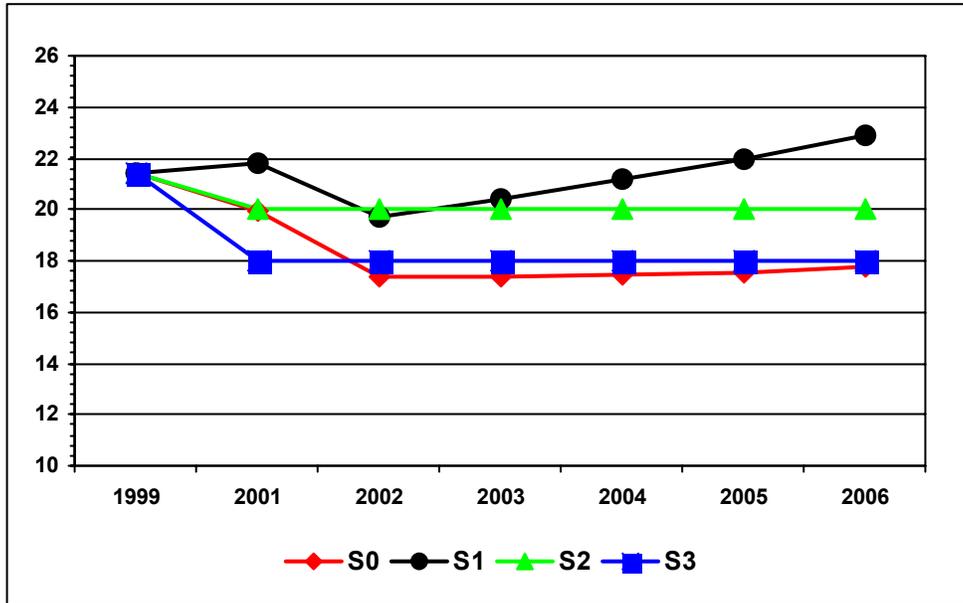


Fig. 4. U.S. Sugar Production Projections, 2001-06
(‘000 metric tons)

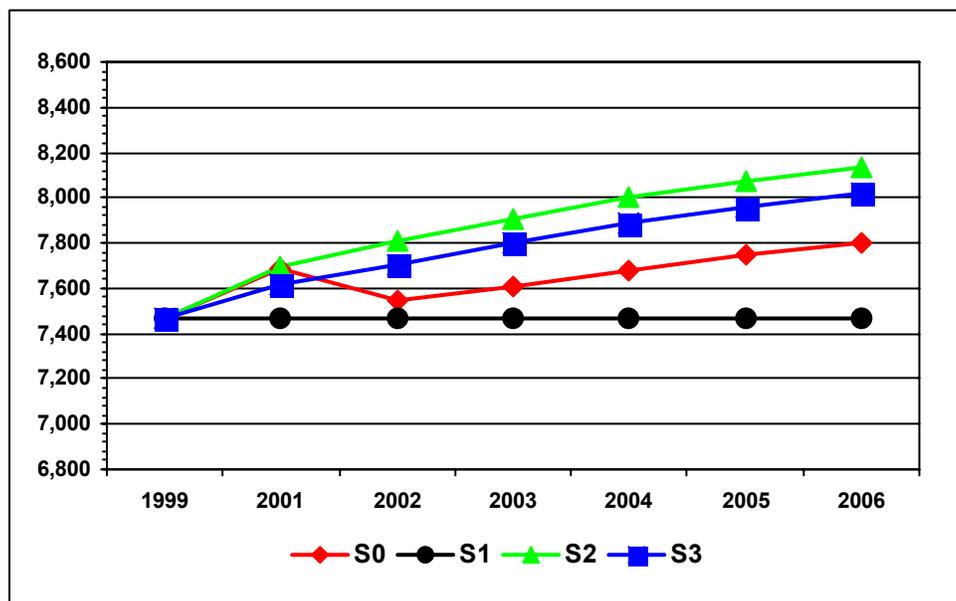


Fig. 5. U.S. Sugar Beet Acres Harvested Projections, 2001-06
('000 acres)

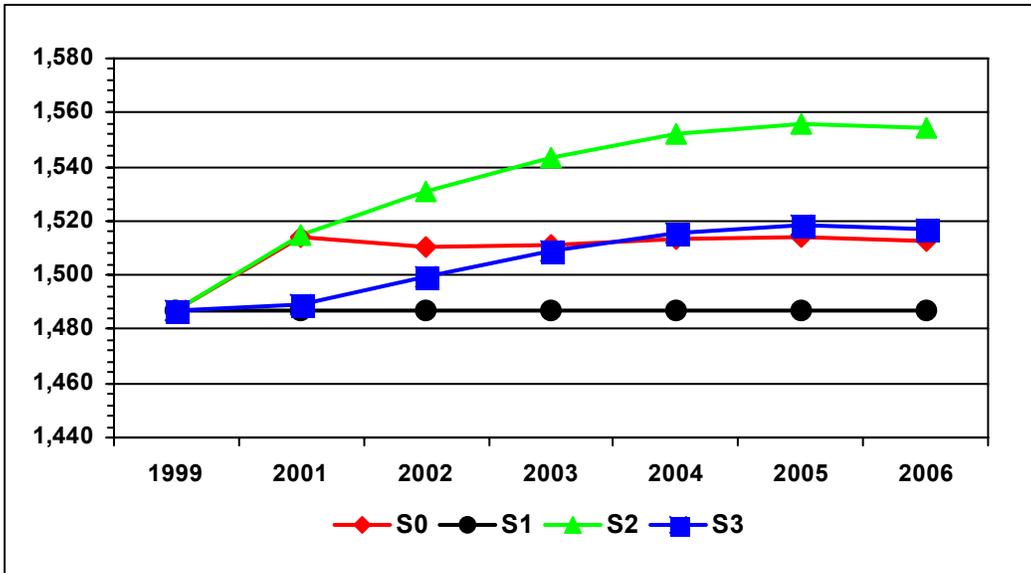
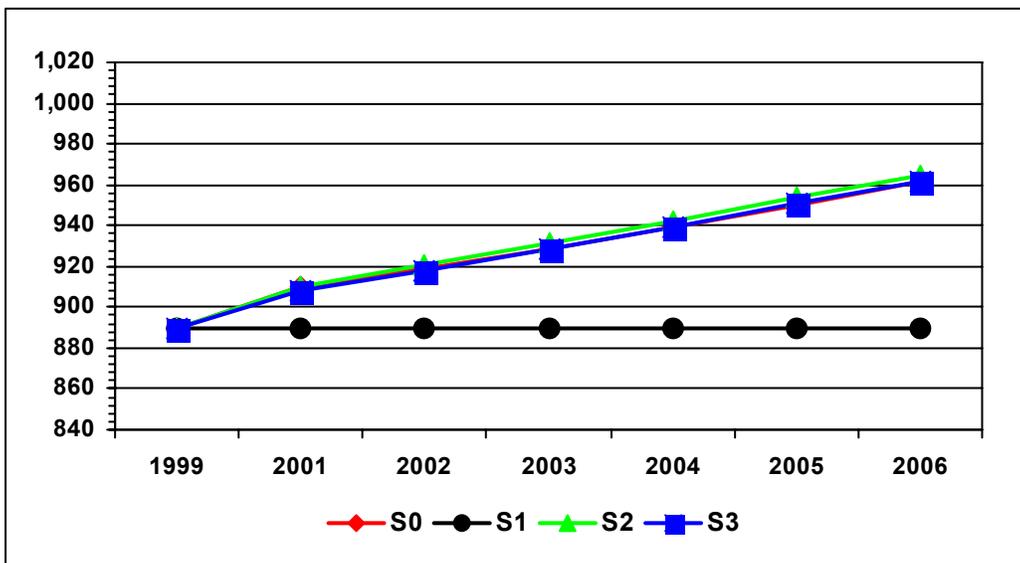


Fig. 6. U.S. Sugarcane Acres Harvested Projections, 2001-06
('000 acres)

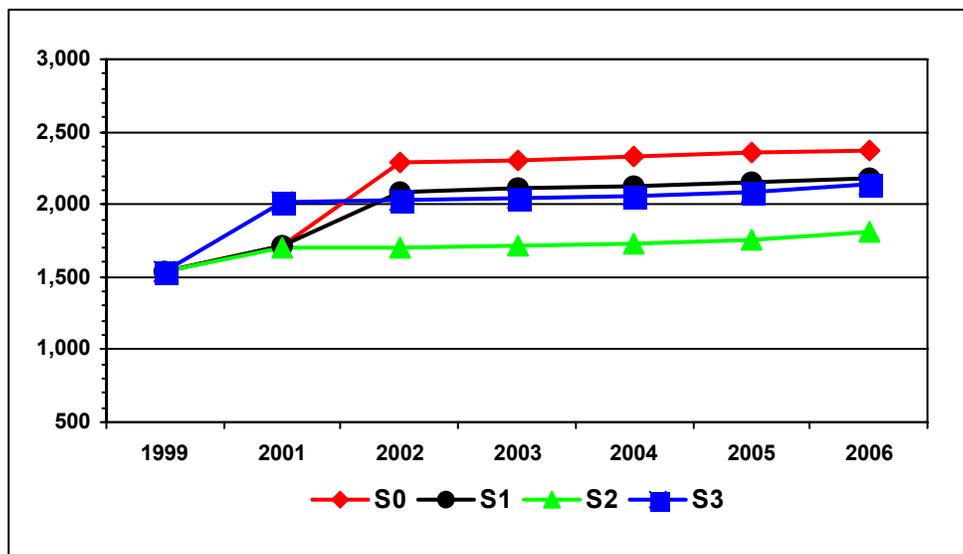


differences in the target prices. In scenario 2 when the U.S domestic price is kept at 20 cents a pound, acreage harvested increased from 1,487 thousand acres in the base year to 1,555 in FY 2006. However, as shown in scenario 3, when the domestic price support reduces to 18 cents a pound, the increase in domestic production over the duration of the period is smaller, increasing from 1,487 in the base year to 1,516 thousand acres in FY 2006. Scenario 1 reflects the assumed condition of keeping domestic sugar production constant.

Figure 6 shows the projected growth of acres of sugarcane harvested. The noticeable difference between this Figure and Figure 5, which shows the projected growth of acreages of sugarbeets harvested, is due to the greater planting flexibility associated with the cultivation of sugarbeets in comparison with that of sugarcane. In most areas where sugarcane is produced, there are not many alternative uses for the land. Figure 6 shows that there were hardly any changes in the area of sugarcane harvested for the three scenarios (S0, S2, and S3). From a base level of 889 thousand acres in 1999 area harvested increased steadily to about 961 in FY 2006, an increase of about seven percent.

The projected trends in imports are shown in Figure 7. In all scenarios the projected patterns of growth are similar, that is, increasing initially and then remaining fairly constant. The biggest increase in imports occurs in the baseline scenario. This increase was due in part to the relatively low domestic sugar price that caused consumption to increase and domestic production to fall. The second highest level of imports is reflected in scenario 1 when domestic production was restricted. This caused U. S. domestic sugar prices to increase and provided an incentive for Mexico to ship its entire exportable sugar surplus to the U.S. Imports of sugar under scenarios 2 and 3 are mirror images of those

Fig. 7. U.S. Sugar Imports Projections, 2001-06
 ('000 metric tons)



observed for domestic sugar production (Figure 4). The higher maintained U.S. domestic sugar price under scenario 2 stimulated domestic sugar production and reduced the need for imports. Hence, the level of import under scenario 2 is lower than under scenario 3.

VI. Concluding Remarks

The near term prospects for the U.S. sugar industry appear bleak. The fact that this is so is not new to the industry. The industry was in a somewhat similar situation in the mid eighties when the successful development and promotion of hfcs threatened its survival. However, back then, the combination of the sugar program and adequate border protection (import restrictions) provided a cushion and allowed the industry sufficient breathing room to recover. The situation is much different today. Increased U.S. international sugar commitments under the WTO and NAFTA have made it virtually impossible to use trade restrictions as a means of supporting the sagging industry. And,

the sugar program by itself is proving to be ineffective in providing the level of support to which the growers had become accustomed to, at no or minimum cost to the federal government.

Our analysis suggests that within the near future Mexico will be able to ship all of its exportable surplus sugar to U.S. market as over-quota sugar. Since there are no misunderstandings surrounding this NAFTA provision that authorizes Mexico to do so, little if anything, can be done to restrict such imports. Consequently, in the absence of any restrictions on domestic production or government sugar purchases, the U.S. domestic raw sugar price can be expected to drop to level of around 17 cents a pound. Restricting domestic production to 1999 output level of approximately 7.5 MT will enable prices to recover somewhat but will come at a cost to the government. Owing to the greater flexibility associated with sugar beet cultivation in comparison with sugarcane, acreage harvested of the former is expected to vary much more than the latter in the near future. Consequently, the brunt of the burden will be borne by the sugarcane growers. Finally, reducing the loan rate on raw sugar from 18 to 16 cents a pound while supporting the domestic price to prevent loan forfeitures will adversely affect the income of the U.S. sugar producers but will be insufficient to restrict over-quota exports from Mexico.

In light of the developments within the U.S. sugar market, alluded to earlier, and the implications of our findings, there is a need for a comprehensive plan—covering both sugar and corn sweeteners—to ensure the smooth integration of the U.S. and Mexican sweetener markets post 2008.

Attachment 1

Mexico's High-Tier Sugar Tariffs

Year	Mexico		Most Countries	
	Raw Sugar	Refined Sugar	Raw Sugar	Refined Sugar
-----cents per pound-----				
1995	15.20	16.11	17.62	18.60
1996	14.80	15.69	17.17	18.12
1997	14.40	15.26	16.72	17.65
1998	14.00	14.84	16.27	17.17
1999	13.60	14.42	15.82	16.69
2000	12.09	12.81	15.36	16.21
2001	10.58	11.21	15.36	16.21
2002	9.07	9.61	15.36	16.21
2003	7.56	8.01	15.36	16.21
2004	6.04	6.41	15.36	16.21
2005	4.53	4.81	15.36	16.21
2006	3.02	3.20	15.36	16.21
2007	1.51	1.60	15.36	16.21
2008	0.00	0.00	15.36	16.21

Source: Evans and Davis

Attachment 2

U.S. Sugar Projections Under Various Scenarios

Scenario 0 (S ₀)	Unit	Base Year	Projections					
		1999	2001	2002	2003	2004	2005	2006
Carry-in Stocks	'000 MT	1,522.60	1,529.63	1,542.98	1,577.07	1,597.06	1,611.08	1,622.30
Production	'000 MT	7,470.08	7,690.57	7,542.00	7,607.73	7,678.18	7,744.25	7,804.38
Net Imports	'000 MT	1,540.19	1,720.19	2,285.00	2,306.00	2,329.00	2,351.00	2,374.00
Consumption	'000 MT	9,019.46	9,397.41	9,791.65	9,893.49	9,992.59	10,084.13	10,168.69
Carry-out Stocks	'000 MT	1,513.41	1,542.98	1,577.07	1,597.06	1,611.08	1,622.30	1,631.78
Wholesale Price	U.S. cents/lb	21.39	19.93	17.35	17.38	17.47	17.56	17.75
Sugar Beets Area	Acres	1,486.60	1,513.84	1,510.47	1,511.28	1,513.63	1,514.18	1,512.43
Sugarcane Area	Acres	889.41	909.61	918.75	928.75	939.31	950.22	961.38
World Price	U.S. cents/lb	9.16	9.90	10.90	11.33	12.10	12.88	13.80

Scenario 1 (S ₁)	Unit	Base Year	Projections					
		1999	2001	2002	2003	2004	2005	2006
Carry-in Stocks	'000 MT	1,522.60	1,521.19	1,523.64	1,549.28	1,561.00	1,566.49	1,569.40
Production	'000 MT	7,470.08	7,470.08	7,470.08	7,470.08	7,470.08	7,470.08	7,470.08
Net Imports	'000 MT	1,540.19	1,720.19	2,083.07	2,105.75	2,128.43	2,151.11	2,173.79
Consumption	'000 MT	9,019.46	9,187.82	9,527.51	9,564.10	9,593.02	9,618.28	9,642.17
Carry-out Stocks	'000 MT	1,513.41	1,523.64	1,549.28	1,561.00	1,566.49	1,569.40	1,571.09
Wholesale Price	U.S. cents/lb	21.39	21.78	19.72	20.40	21.20	22.00	22.87
Sugar Beets Area	Acres	1,486.60	1,486.60	1,486.60	1,486.60	1,486.60	1,486.60	1,486.60
Sugarcane Area	Acres	889.41	889.41	889.41	889.41	889.41	889.41	889.41
World Price	U.S. cents/lb	9.16	9.90	10.90	11.33	12.10	12.88	13.80

Attachment 2 (contd.)

Scenario 2 (S ₂)		Base Year	Projections					
		1999	2001	2002	2003	2004	2005	2006
Carry-in Stocks	'000 MT	1,522.60	1,528.97	1,542.07	1,554.30	1,566.30	1,578.33	1,589.94
Production	'000 MT	7,470.08	7,693.52	7,806.18	7,908.58	8,000.01	8,076.46	8,138.06
Net Imports	'000 MT	1,540.19	1,708.55	1,702.63	1,710.94	1,733.81	1,763.37	1,811.07
Consumption	'000 MT	9,019.46	9,388.96	9,496.58	9,607.52	9,721.79	9,828.23	9,937.58
Carry-out Stocks	'000 MT	1,513.41	1,542.07	1,554.30	1,566.30	1,578.33	1,589.94	1,601.49
Wholesale Price	U.S. cents/lb	21.39	20.00	20.00	20.00	20.00	20.00	20.00
Sugar Beets Area	Acres	1,486.60	1,514.79	1,530.82	1,543.47	1,552.37	1,556.05	1,554.61
Sugarcane Area	Acres	889.41	909.68	920.40	931.34	942.39	953.52	964.68

Scenario 3 (S ₃)		Base Year	Projections					
		1999	2001	2002	2003	2004	2005	2006
Carry-in Stocks	'000 MT	1,522.60	1,546.61	1,566.38	1,580.91	1,593.46	1,605.34	1,616.54
Production	'000 MT	7,470.08	7,614.39	7,708.21	7,799.39	7,884.53	7,957.90	8,018.47
Net Imports	'000 MT	1,540.19	2,020.92	2,025.22	2,038.79	2,063.10	2,091.38	2,135.97
Consumption	'000 MT	9,019.46	9,615.54	9,718.91	9,825.63	9,935.74	10,038.07	10,143.41
Carry-out Stocks	'000 MT	1,513.41	1,566.38	1,580.91	1,593.46	1,605.34	1,616.54	1,627.58
Wholesale Price	U.S. cents/lb	21.39	18.00	18.00	18.00	18.00	18.00	18.00
Sugar Beets Area	Acres	1,486.60	1,489.30	1,499.37	1,508.56	1,515.60	1,518.46	1,516.86
Sugarcane Area	Acres	889.41	907.64	917.90	928.58	939.51	950.59	961.75

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