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Sugar and Sweeteners Outlook

Stephen Haley, coordinator
shaley@ers.usda.gov

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On February 13, 2014, the U.S. Department of Agriculture (USDA) released its long-run projections for the U.S. farm sector for the next 10 years. Included in these projections are those for the U.S. sugar sector through 2023/24. The two primary influences on the U.S. sugar market in the projections are large supplies of sugar in Mexico available for export to the United States and continued low world sugar prices through 2019/20. These two influences increase the likelihood of USDA purchases of sugar for resale to ethanol producers through 2019/20.

Mexico's harvested area for sugarcane grew in recent years in response to high returns and is expected to top out at 844,000 hectares in 2014/15. After that, declines in Mexican sugarcane returns lead to lower area. Nonetheless, sugar production averages 6.317 million tons, raw value (MTRV) in 2014/15-2023/24, about 17 percent higher than the average for 2007/08-2011/12. Mexico's consumption of high fructose corn syrup (HFCS) is expected to resume growth after a lull in 2012/13 due to unusually high corn prices. By 2023/24, annual HFCS consumption is projected at 2.735 million metric tons, dry weight—about 85 percent more than forecast for 2013/14—and will comprise about 41 percent of combined sugar and HFCS consumption in Mexico.

The combination of Mexico's improved sugar production prospects and declining sugar consumption make more Mexican sugar available for export. Annual exports to the U.S. market are expected to average 1.768 million MTRV, or 1.949 million short tons, raw value (STRV). This projection contrasts with the estimated average for the first 6 years of the full implementation of the sweetener provisions of the North American Free Trade Agreement Area (NAFTA) period of 1.364 million STRV. Over the long term, imports from Mexico are expected to constitute between 10.6 and 16.9 percent of annual U.S. sugar supply, or, on average, 12.8 percent. The corresponding average for the first 6 years after NAFTA implementation is estimated at 10.3 percent.

World sugar prices are projected to average 17.74 cents per pound between 2014/15 and 2019/20, levels that would not provide support for the U.S. sugar sector. This lack of support increases the likelihood of sugar purchases by the Commodity Credit Corporation (CCC) of USDA for resale to ethanol producers, especially in 2014/15, 2017/18, and 2018/19. These quantities sum to 568,000 STRV. Beyond 2019/20, world sugar prices are projected to be higher, and the likelihood of USDA having to purchase sugar for resale to ethanol producers is diminished.

On February 10, 2014, the USDA published in the *World Agricultural Supply and Demand Estimates* (WASDE) its latest sugar supply and use projections for the United States and Mexico for fiscal year 2012/13 and projections for 2013/14. The USDA reduced its projection of 2013/14 cane sugar production by 53,000 STRV based on revised production forecasts made by processors in Florida, Texas, and Hawaii. Along with a downward revision of its estimate of beginning sugar stocks by 3,500 STRV, 2024/14 ending stocks are projected at 1.825 million STRV, down 56,500 STRV from last month. The implied ending stocks-to-use ratio is projected at 14.9 percent.

The USDA reduced its projection of 2013/14 Mexico sugar production by 345,000 Mt to 6.350 million Mt. Harvest data through the beginning of February imply sharply reduced prospects for sucrose recovery and diminished prospects for sugarcane yields. Based on pace to date, the USDA also reduced its projection of sugar consumption by 100,000 Mt to 4.306 million Mt. These changes combine to imply reduced 2013/14 sugar exports of 2.399 million Mt, down from 2.622 million Mt projected last month. Because of increased margins between U.S. and world raw sugar prices, the USDA expects no change in Mexico sugar exports to the United States, implying that Mexico will instead reduce its exports to other export destinations.

Long-Term Projection of U.S. and Mexico Sugar Supply and Use through 2024/25

The U.S. Department of Agriculture (USDA) annually prepares and publishes long-run projections for the U.S. farm sector for the next 10 years. The report is released in February, immediately prior to USDA's annual Outlook Conference. Projections cover agricultural commodities, agricultural trade, and aggregate indicators of the farm sector, such as farm income and food prices. Projection results are used in the preparation of the President's Annual Budget.

The *Sugar and Sweetener Outlook* of USDA's Economic Research Service (ERS) prepares supply and use projections for U.S. sugar.[1] These projections are reviewed and cleared by USDA's Interagency Commodity Estimates Committee (ICEC) for sugar. Projections are based on the assumption of extension of current policies through the entire projections period. The *Sugar and Sweetener Outlook* analytic framework works out the implications for supply and use from the expected states of the physical and economic environment in the policy setting. Although the distinction is subtle, supply and use projections are not forecasts but are base points against which to analyze the effect of policy changes or other exogenous influences on the sugar and sweetener sector.

The most important factors affecting U.S. sugar supply and use over the long-term projections period are the U.S. sugar program, the availability of sugar imports from Mexico, and the level of sugar prices in the world market. The following sections develop this background, and then the framework for analysis is described and results and implications are discussed.

Factors Influencing the Baseline: U.S Sugar Policy

The U.S. sugar program relies on supply control mechanisms of domestic marketing allotments, price support instruments, and import restrictions to keep U.S. sugar prices above world levels. The main features are shown in table 1. The 2008 Farm Act made marketing allotments permanent at a level to be not less than 85 percent of estimated sugar deliveries for human consumption. Allotments are split between refined beet sugar at 54.35 percent and raw cane sugar at 45.65 percent. Aggregate production in excess of allotment quantities cannot be marketed for domestic human consumption or forfeited for repayment of loans (described below) received from Commodity Credit Corporation (CCC).

Under USDA's non-recourse loan rate program, sugarbeet and sugarcane processors have the option of repaying 9-month CCC-originated loans by forfeiting the sugar pledged to the CCC in lieu of cash. Forfeiture repayment is likely when the market price of sugar is below the sum of the loan rate, interest expense, and transport adjustments (the "minimum price-to-avoid forfeiture"–calculated at 20.94 cents/pound (lb) for raw cane sugar in 2012/13). The raw sugar loan rate is 18.75 cents/lb. The refined beet sugar loan rate is specified to equal 128.5 percent of the raw cane sugar loan rate. In order to discourage forfeitures, the 2008 Act introduced the Feedstock Flexibility Program (FFP), which requires the CCC to divert sugar from food use to ethanol producers at the beginning of September, if needed, to keep sugar prices above levels at which sugar processors might otherwise forfeit sugar under loan to the CCC. Operationally, the CCC purchases sugar at prices offered by processors and resells the sugar to ethanol producers at prices they offer to pay. The difference between the purchase expenditures and sales receipts is a CCC cost to the U.S. Government budget.

The 2008 Farm Act states that the raw and refined sugar tariff-rate quotas (TRQs) be established at the beginning of the marketing year at the minimum levels required to comply with international trade agreements approved by the U.S. Congress, with an exception for imported specialty sugar. During the first half of the fiscal year (October 1 – March 31), the 2008 Farm Act states that the sugar TRQ must be increased above the minimum levels by the

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[1] The Sugar and Sweetener Outlook prepares baseline projections for Mexico sugar and high fructose corn syrup, but these are not published in the USDA long-term projections report.

Table 1 -- U.S. long-term sugar projections: incorporating supply-control assumptions for U.S. sugar program

Marketing Allotment Program

  Domestic processors get Overall Allotment Quantities (OAQ) allocations equal to no less than 85 percent
    of projected deliveries for human consumption:
      Beet processors allocated 54.35 percent of total OAQ
      Cane processors allocated the remainder

Domestic price support

  Non-recourse loan-rate program: processors have option to re pay 9-month loans from USDA by forfeiting
    pledged sugar to USDA - amount forfeited must comply with OAQ allocation, raw sugar loan
    rate = 18.75 cents per pound.

  Feedstock Flexibility Program under Farm Act Energy Title: USDA is required to purchase sugar
    from processors to avoid non-recourse forfeitures. Sugar is required to be resold to ethanol producers
    at whatever price they are willing to pay. Difference between USDA purchase and sales price
    constitutes a unit subsidy and incurs budget expense.

Limit sugar imports: tariff-rate quotas (TRQs)

  TRQs specified at minimum levels to be compliant with obligations to the World Trade Organization (WTO)
    and currently implemented Free Trade Agreements (FTAs).

Source: ERS, *Sugar and Sweetener Outlook*.

Secretary of Agriculture if a sugar shortage occurs due to an emergency situation such as a natural disaster, war, or other catastrophic event. The 2008 Farm Act states that after April 1, the sugar TRQ can be increased by the Secretary to provide an adequate supply, but only to a level that does not threaten sugar forfeitures to the CCC.

Factors Influencing Baseline: Sugar Imports from Mexico

The sugar provisions of the North American Free Trade Agreement (NAFTA) removed all duties and quantitative restrictions on sweetener trade between Mexico and the United States as of January 1, 2008. For the fiscal years 2007/08-2012/13, annual sugar imports from Mexico to the United States averaged about 1.301 million short tons, raw value (STRV). The share of Mexican sugar imports of domestic consumption has grown from 6.7 percent in 2007/08 to 18.5 percent in 2012/13. For 2013/14, imports from Mexico are projected at 1.745 million STRV, about 15.2 percent of projected U.S. sugar consumption.

The amount of sugar available for export to the United States is influenced by sugar production and the quantity of high fructose corn syrup (HFCS) consumed in Mexico.

After a period of high returns, Mexico sugarcane area expanded to a record 780,253 hectares in 2012/13 (fig. 1). Combined with good crop yields, 2012/13 production was 6.975 million metric tons (mt), 36.5 percent above the average for preceding 5-year period. The *Comite Nacional Para El Desarrollo Sustentable de la Caña de Azucar* (Conadesuca) in Mexico projects 2013/14 area at 819,000 hectares, although production is forecast lower at 6.695 million mt because of lower crop yields.
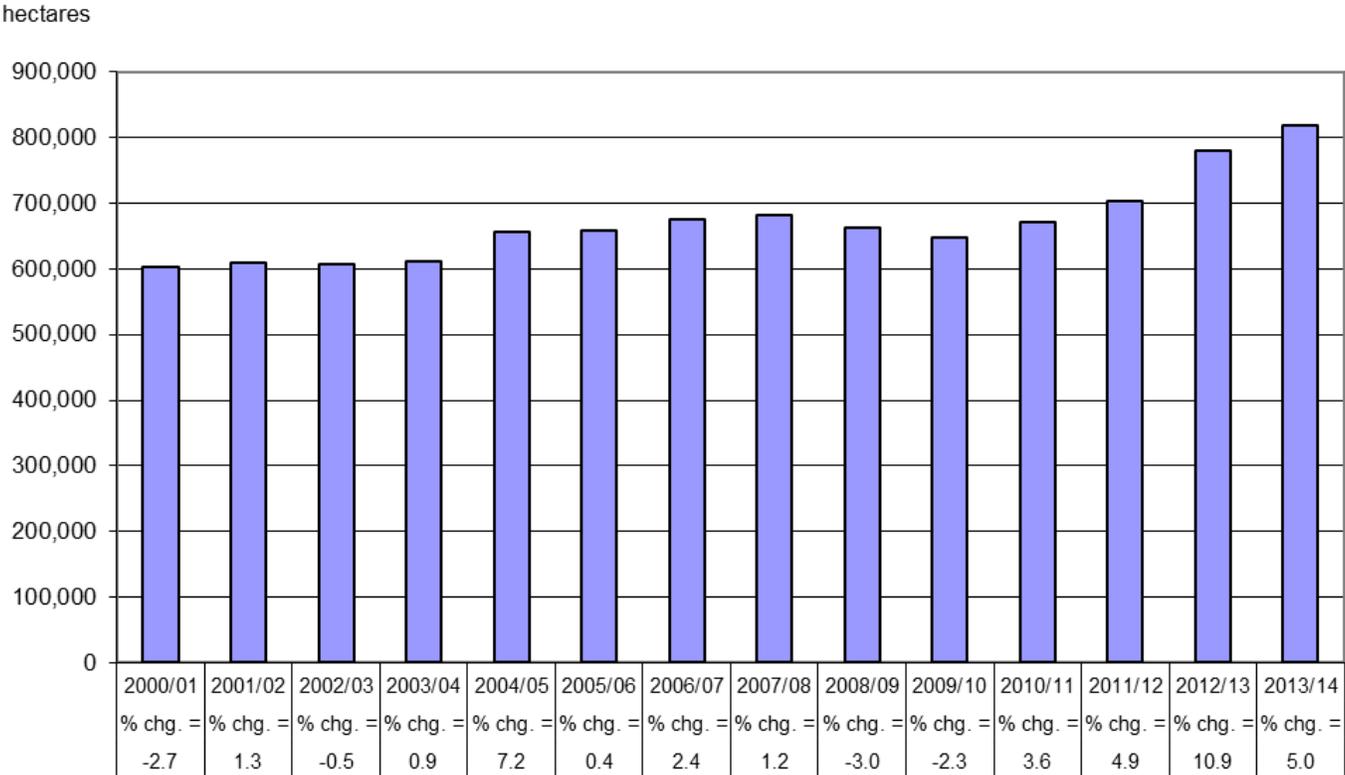
As seen in figure 1, reductions in area harvested have occurred in only 4 of the 14 years shown and have been small relative to years when expansion has occurred. Even when crop returns are low or negative, reductions in total area are not large because sugarcane is a perennial crop that spans at least 5 years in most growing areas. Withdrawal of area is gradual at best, whereas increases can occur quickly when profit expectations are high. The implication is that with the recent area growth, Mexico sugar production is likely to average above the levels of the first 5 years of the NAFTA period, at least for the first several years of the baseline projections period.

HFCS consumption has grown from 653,000 mt, dry weight, in 2007/08 to 1.721 million mt in 2011/12. Consumption growth stalled in 2012/13 at 1.567 million mt because of lower sugar prices and higher HFCS prices due to suppliers' higher net corn costs in production. Although HFCS consumption is forecast at only 1.490 million mt in 2013/14, growth is likely to return quickly to its upward trend now that corn prices have descended to much lower levels than last year.

Factors Influencing the Baseline: World Sugar Prices

Before 2009/10, U.S. and world raw sugar prices were largely unrelated, but since then, movements in both price series have been closely allied.[2] Figure 2 shows the two series plus the U.S. raw sugar loan-rate level. Before the start of the NAFTA period (that is, prior to January 1, 2008), the correlation between U.S. and world raw sugar

## Figure 1
Mexico sugarcane harvested area, 2000/01-2013/14

hectares

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =	% chg. =
-2.7	1.3	-0.5	0.9	7.2	0.4	2.4	1.2	-3.0	-2.3	3.6	4.9	10.9	5.0

Source: Conadesuca.

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[2] The U.S. raw sugar price is the average of the nearby Intercontinental Exchange (ICE) Contract No. 16 settlement price, and the world raw sugar price is the average of the corresponding Contract No. 11 settlement price.

Figure 2
U.S. and world raw sugar prices since 2000

Cents per pound
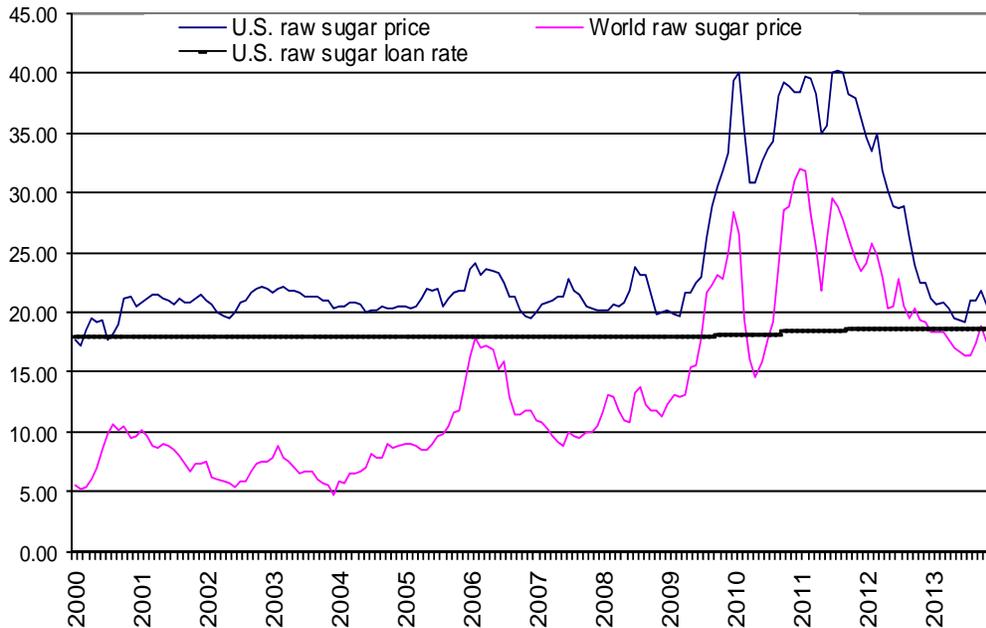
Source: Intercontinental Exchange, No. 11 nearby (world), No. 16 nearby (U.S.).

prices was .0516. Over the NAFTA period through the end of 2013, the correlation has risen to 0.862. More sophisticated statistical analysis shows that movements in the U.S. raw sugar price have been strongly influenced by movements in world prices in the NAFTA period.

Before the NAFTA period, the expectations regarding the ending stocks-to-use ratio had a significant effect on the third-quarter average U.S. raw sugar price. During the NAFTA period, however, expectations regarding ending stocks-to-use have more strongly influenced the margin between U.S. and world prices. All this means that U.S. raw sugar prices move in the same direction as world prices, but the gap or margin between the prices is strongly influenced by the U.S. supply-use balance, as measured by the ending stocks-to-use ratio.

Figure 2 also shows that over much of the NAFTA period, world prices have been above the U.S. raw sugar loan rate, making the possibility of loan forfeitures very unlikely. Starting in January 2013, world prices fell below the loan rate and remained below for the entire year. Record-high 2012/13 U.S. sugarbeet production and record-high sugar imports from Mexico kept the margin between U.S. and world prices at right around 3 cents/lb, meaning that the resulting domestic raw sugar price was below the minimum level to avoid loan forfeitures. These loan forfeitures occurred in spite of CCC sugar purchases for resales to ethanol producers (FFP) and livestock feed producers and for exchanges with refiners for re-export program credits and certificates-for-quota entry (CQEs). [3]

Low world prices, at or below the loan rate level, have become a necessary condition for loan forfeitures to take place. For baseline analysis, a forecast of these world prices over the projection period is necessary. ERS's *Sugar*
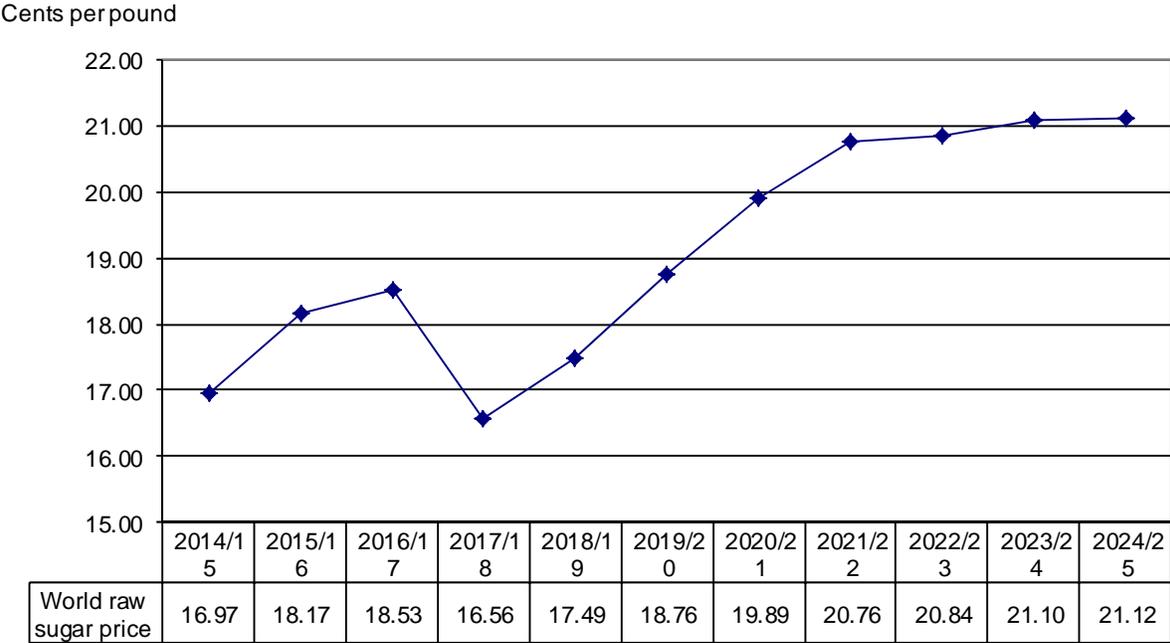
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[3] Monthly editions of Sugar and Sweetener Outlook in 2013 have chronicled these developments. See especially the November 2013 chapter entitled "The Road to Forfeitures," pages 12-17.

and Sweetener Outlook has developed a methodology for forecasting these prices. The approach uses data from the Foreign Agricultural Service (FAS) sugar Production, Supply, and Distribution (PSD) database to replicate supply-use dynamics in major sugar producing and trading countries and regional aggregates. The approach emphasizes sugar-ethanol trade-offs in Brazil, the world's largest sugarcane producer.[4]

Any set of projections is very much dependent on initial conditions and assumptions derived from historical experience. Projection-making imposes an order on developments that can never be known with even the slightest precision. Nonetheless, charting out the implications of changes in policy requires a framework for evaluation. World price projections are crucial for the framework. In this sense, world price projections are not forecasts, but are merely the extension of presently perceived realities into the future by economic logic.

Figure 3 shows the Sugar and Sweetener Outlook world price projections covering the period 2014/15 through 2024/25. Projections can be grouped into two periods. From 2014/15 to 2019/20 (the first 6 years), prices fluctuate and average 17.74 cents/lb. Over the remainder of the projections period (the 5 years between 2020/21 and 2024/25), prices are increasing year-over-year and average 20.74 cents/lb. The long-term trend of higher prices derives from increased sugar demand based on higher world Gross Domestic Product (GDP) growth and increased Brazilian ethanol demand, which is based on expected strong future growth of automobile sales. The nearer term problem is that the transition to the growth trend is strongly influenced by present economic conditions that are working themselves out to reach the trend.

Figure 3
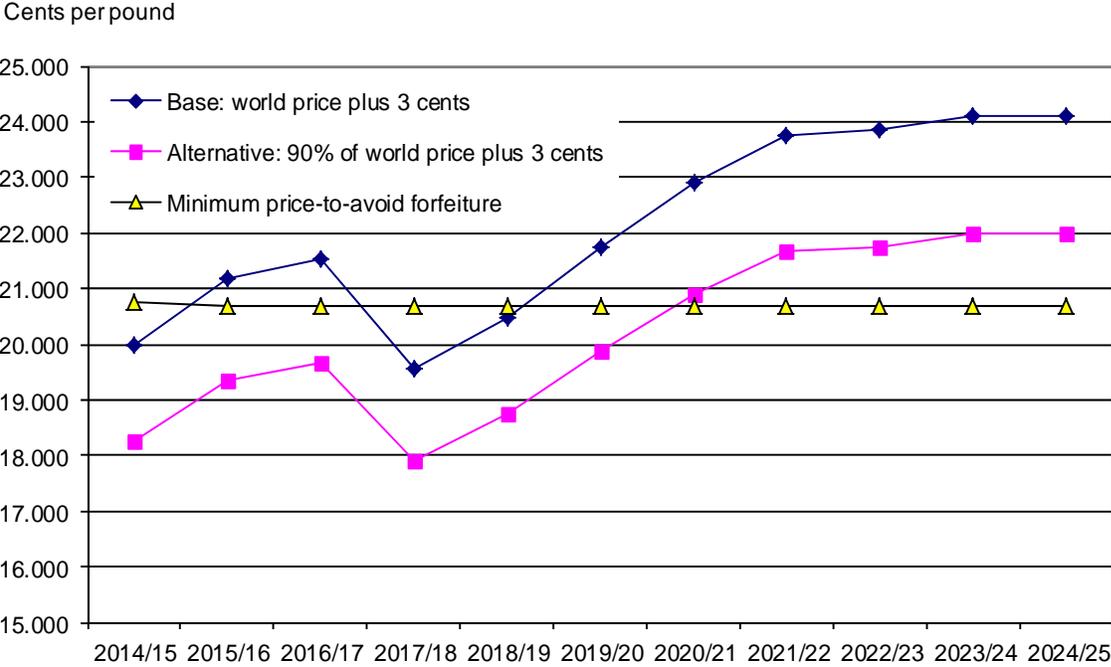**Sugar and Sweetener Outlook projections of world raw sugar prices, 2014/15-2024/25**

Cents per pound

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
World raw sugar price	16.97	18.17	18.53	16.56	17.49	18.76	19.89	20.76	20.84	21.10	21.12

Source: ERS, *Sugar and Sweetener Outlook,* projections made November 2013.

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[4] The modeling approach is an extension of the framework presented in Situation and Outlook Report No. SSSM-297-01, May 2013, entitled "World Sugar Prices: The Influence of Brazilian Costs of Production and World Surplus/Deficit Measures."

Figure 4 presages the influence of differing levels of world prices on domestic policy. The (nearly) horizontal line represents the minimum price-to-avoid forfeiture. The line called "base" combines the world price projections with a minimum U.S.-world raw sugar price margin of 3 cents/lb. The line called "alternative" is similarly constructed, but with world prices projected 10 percent lower in all of the projection years. The figure implies forfeiture concern when the price lines are below the minimum price forfeiture line. For the base, there are three instances of this occurring: 2014/15, 2017/18, and 2018/19. For the alternative, there are six consecutive instances up through 2019/20.

Figure 4
World raw sugar price forecasts plus minimum U.S.-world price margins and minimum price-to-avoid forfeiture

Cents per pound

Source: ERS, *Sugar and Sweetener Outlook.*

Framework for Making Long Term Projections – Price Determination

Although projected third-quarter U.S. raw sugar prices are a function of the domestic supply-use balance as measured though the ending stocks-to-use ratio, there are two paths to the actual derivation. These paths are related to whether or not U.S. prices are supported by world sugar prices, as discussed above. (Table 2 explains the price projection formulation in detail.)

The price is calculated as the maximum of: (1) world price plus the price margin whose minimum value is 3 cents/lb; or (2) inverse function of ending stocks-to-use (estimated econometrically), whose value must be equal to or greater than the minimum price-to-avoid forfeiture. The price margin of the first option is itself a function of the ending stocks-to-use ratio (also estimated econometrically, but with far fewer observations than the inverse function of option 2).

Table 2 -- Price determination: U.S. raw sugar pricing and other prices

Method 1 - U.S. raw sugar price when supported by world price

Margin between third-quarter U.S. and world raw sugar prices is a function of projected ending stocks-to-use ratio:
U.S. raw sugar price = world raw sugar price + margin
Margin = max(28.284 - 1.2673*[stocks-to-use ratio], 3 cents per pound)

If the initial margin is less than 3 cents per pound, then:
Minimum margin of 3 cents per pound achieved by increasing the tariff-rate quota shortfall up to
50 percent of initial allocation; and, if necessary, diverting a required percentage of total Mexico exports
to third-country destinations. These actions reduce U.S. sugar supply and thereby stocks so
that the ending stocks-to-use ratio rises to a level that implies a 3-cent price margin

Method 2 - U.S. raw sugar price when supported by U.S. sugar loan-rate program

U.S.raw sugar price in 3rd quarter is a function of projected ending stocks to use ratio:
U.S. raw sugar price = max(43.301*[stocks-to-use ratio]^(-0.2532), minimum price to avoid forfeiture)

Minimum price-to-avoid forfeiture = loan rate + interest payable on loan + transportation cost less discount

If U.S. raw sugar price = minimum, then private stocks-to-use ratio = (Minimum price^(-1/0.2532))/43.301

USDA purchase of sugar for ethanol = (total stocks-to-use ratio - private stocks to use ratio)*(total supply use)
Note: USDA purchase equal to zero if raw sugar price is above the minimum price to avoid forfeiture

USDA sells sugar to ethanol producers at a price consistent with the value of corn used for ethanol production

U.S. raw sugar price = Max(Method 1, Method 2)

Other U.S. prices:

Domestic refining margin is a function of ending stocks-to-use and refiner capacity utilization:
Refining margin = -2.085*[(stocks+sugar for ethanol)/use] + 1.567*[cane sugar refining capacity utilization]
- 1.336*[beet sugar production/total production]

Beet sugar spot price = raw sugar price + refining margin

Sugarbeet price is a function of beet sugar producer price index (ppi), which is a function of weighted
average of current-year and previous-year's beet sugar spot price

Sugarcane price is function of weighted average of current-year and previous year's 3rd-quarter raw
sugar price

Source: ERS, *Sugar and Sweetener Outlook.*

Figure 5 illustrates the two approaches for two cases: one where the world price is equal to 20 cents/lb and the other where the world price is only 14 cents/lb. The price curves slope downward, indicating that the margin becomes smaller as the stocks-to-use becomes larger. At about a 20- percent stocks-to-use ratio the lines flatten, as the margin has reached its minimum 3 cent/lb level. This minimum value is maintained by assuming that TRQ shortfall increases as exporters having allocated-access to the U.S. market divert shipments to markets where returns are higher. This type of diversion occurred in 2012/13 for many exporters that had better profit prospects in other markets. In the projections framework, it is assumed that up to 50 percent of the established TRQ can contribute to the shortfall. If that 50-percent level is insufficient to reach the 3 cent/lb margin level, then it is assumed that Mexico will divert a portion of its sugar exports to third-country markets. This type of diversion was seen in 2012/13 and is projected for 2013/14 as well.[5]

The other price curve shows an inverse relationship between the U.S. raw sugar price and ending stocks-to-use when there is weak price support from the world market. The curve flattens out at a stocks-to-use between 18 and 19 percent. It is here that the domestic price reaches the minimum price-to-avoid forfeiture. That minimum price is uniquely related to a maximum privately owned stocks-to-use ratio. Implied stocks above the maximum are either forfeited to the CCC or purchased by the CCC for resale to ethanol producers. This type of curve represented price-determination in the early- and pre-NAFTA period.

For any particular stocks-to-use ratio, the price is read off the curve in the top-most position. When the world price is 20 cents/lb, the price is read off only the "20-cent curve" because it lies everywhere above the "loan-rate support" curve. The lowest domestic price here is 23 cents/lb. If the world price is 14 cents/lb, the price is read off the "14-cent curve" for stocks-to-use below about 16.5 percent and off the "loan-rate curve" for higher ratio values.

Figure 5
U.S. raw sugar pricing as function of stocks-to-use and world raw sugar price

Implied U.S. sugar price: cents (c) per pound (lb)

U.S. price = For given world price (here 14c/lb or 20c/lb), maximum value associated with individual stocks-to-use ratio
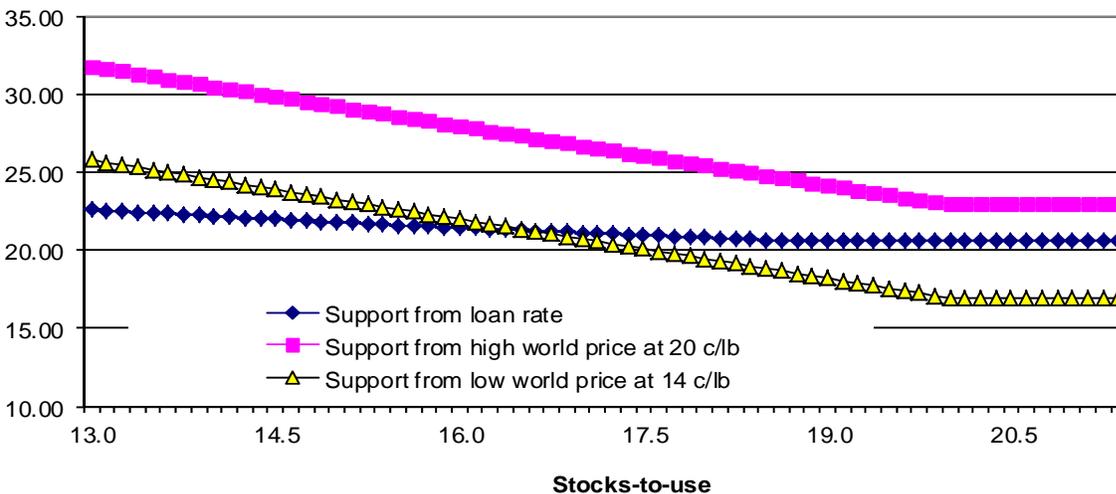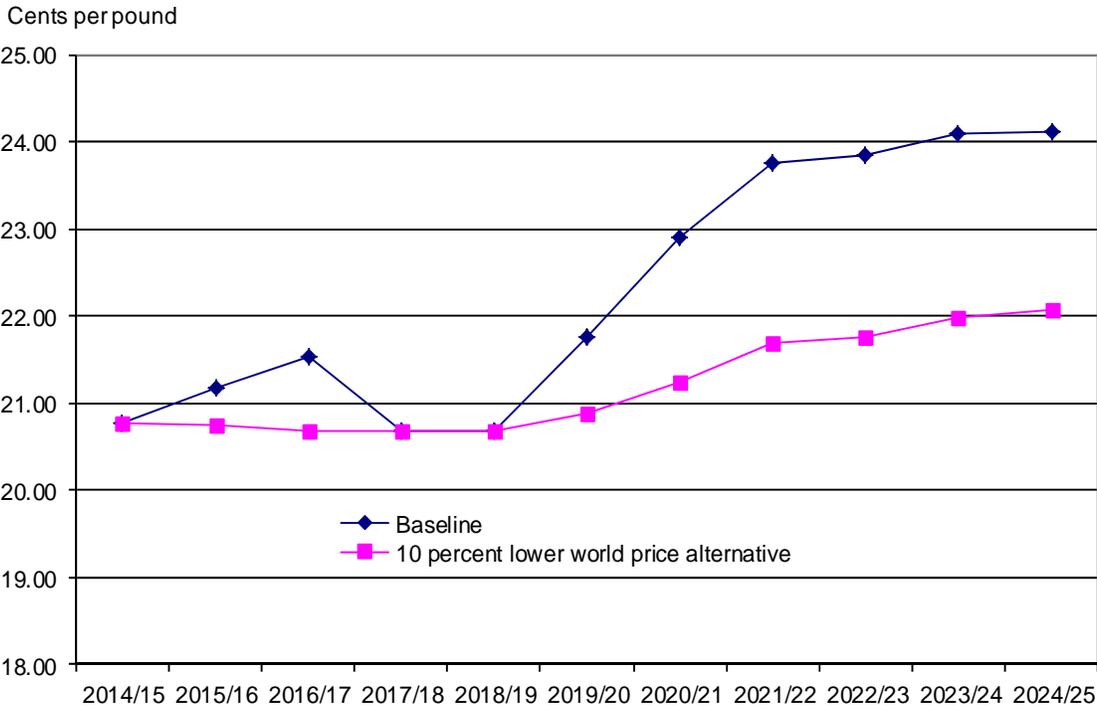

Source: ERS, *Sugar and Sweetener Outlook.*

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[5] See the NAFTA chapter of the December 2013 Sugar and Sweetener Outlook for an extended discussion.

The positioning of the stocks-to-use ratio is dependent on a trading equilibrium with Mexico that links the U.S. raw sugar price to the peso-denominated estandar sugar price in Mexico. This relationship is explained below.

Framework for Making Long Term Projections – U.S. Sugar

The domestic refining margin is a function of ending stocks-to-use and exogenously determined cane sugar refiner capacity utilization. The third-quarter beet sugar spot price is equal to the sum of the third-quarter raw price plus the margin. An annual beet sugar price is estimated as a weighted average of current and previous year third-quarter prices. The return to growing sugarbeets is directly proportional to this annual price. The sugarcane price is proportional to an estimated annual raw sugar price from the current and previous year's third-quarter price. Sugar crop prices relative to alternative crop prices determine changes in sugarbeet plantings and sugarcane harvested area in all growing areas except Florida. (Area for harvest in Florida is exogenously set.) Sensitivity to real price changes are fairly inelastic, but low sustained returns can lead to processing capacity reductions that can cause large, irreversible area reductions. Sugar yields follow observed trends from sugar crop producing areas.

Figure 6
USDA projections of third-quarter U.S. raw sugar prices
Cents per pound

Source: ERS, *Sugar and Sweetener Outlook*.

Sweeteners for consumption are comprised of refined sugar, HFCS, and sugar in net imported products. Per capita sweetener availability over the long term is assumed to be constant at 119 pounds. There is limited substitution between refined sugar and HFCS, dependent on refined sugar prices and cost of producing HFCS. The declining trend in soft drink consumption that has been the primary cause of reduced per capita HFCS consumption since 1999 is assumed to have flattened out.

Framework for Making Long Term Projections – Mexico Sugar

Area for sugarcane production is estimated as a function of changes in the lagged sugarcane prices. (This estimated relationship has better statistical properties than several examined alternatives.) Sugar yield is assumed to increase according to trend. In sweetener consumption, the trend toward increased HFCS use regains its momentum after 2013/14. Domestic HFCS production is set at 480,000 mt, and the rest is imported – almost all from the United States.

An important assumption is that Mexico does not import sugar for consumption. The only sugar it does import is for use in its products re-export IMMEX program.[6] Not importing for consumption allows a higher domestic sugar price in Mexico that encourages more sugar from domestic production.

The price of estandar sugar varies inversely with ending sugar-stock levels relative to consumption. An export trading equilibrium is set when the estandar export parity price (price in cents per pound = 1.06 x U.S. raw sugar price + 2.27) is equal to the domestic estandar price. The adjustment is achieved by changes in exports affecting ending stock levels on a one-to-one basis but in the opposite direction. (Example: 100 mt export increase decreases ending stocks by 100 mt, all else constant.) Fewer stocks increase the estandar price and more stocks decrease it. After exports have adjusted to reach the trading equilibrium, ending stocks are calculated as a residual.

The sugarcane price in Mexico varies directly with the peso-denominated estandar price and is adjusted into real terms. Exchange rate and inflation factors are taken from USDA's international macroeconomic baseline projection.

Results from Base Scenario

There are two scenarios: the base and the alternative. The base assumes world prices as set out in the table accompanying figure 3. The alternative assumes world prices 10 percent below those shown in the table. Table 3 shows U.S. results for both scenarios and table 4 does the same for Mexico. Base results are discussed first.

From a 2014/15 base of 8.783 million STRV, U.S. sugar production is projected to increase to 9.516 million STRV by 2024/25, an increase of 8.5 percent. Beet sugar growth at 12.2 percent to 5.609 million STRV outstrips cane sugar growth of 3.5 percent to 3.906 million STRV. Sugar imports average 3.508 million STRV, constituting about 23.1 percent of total sugar supply. Imports from Mexico average 1.949 million STRV, 71.8 percent higher than average TRQ imports of 1.134 million STRV. TRQs are established at the minimum access levels and are not increased above those levels in any of the projected years.

Deliveries for human consumption increase to 12.725 million STRV by 2024/25, an increase of 6.5 percent, matching more or less the growth in population. The beet sugar portion of the marketing allotment's OAQ averages 5.649 million STRV, above the corresponding beet sugar production average of 5.485 million STRV. In no year is projected beet sugar production greater than the corresponding marketing allotment. The same holds true for cane sugar, by much wider margins.

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[6] IMMEX = Industria Manufacturera, Maquiladora y de Servicios de Exportación.

Ending stocks average 2.486 million STRV for an average stocks-to-use ratio of 19.59 percent. Although the stocks-to-use ratio is high, the average third-quarter raw sugar price of 22.30 cents/lb is supported by the world price in all but 3 of the projection years. Domestic prices show sustained growth above forfeiture levels starting in 2019/20, corresponding to the rise in world prices. The 3 years when loan rates determine the domestic price are 2014/15, 2017/18, and 2018/19. The CCC is shown to purchase sugar from the market for resale to ethanol producers in those years: 207,000 STRV in 2014/15; 183,000 STRV in 2017/18; and 178,000 STRV in 2018/19.

Mexico sugar production averages 6.317 million MTRV over the projection period. Production in 2024/25 is close to this average at 6.353 million MTRV, down by nearly a million MTRV from 2014/15. The large decline from early-period levels is due to large reductions in area: from 844,000 hectares in 2014/15 to 706,000 hectares in 2024/25. As previously discussed, the high returns of the period before the start of the projections period pushed area to record levels, but the large declines in those returns first seen in 2012/13 caused lagged effects not fully realized until several years later.

Although Mexico's sweetener consumption increases 14.2 percent over the period to 6.789 million mt (actual, dry weight), sugar consumption decreases by 282,000 mt, or 6.7 percent, to 3.921 million mt (or 4.156 million MTRV). HFCS consumption increases in 2024/25 to 2.868 million mt, dry weight. The HFCS share of combined HFCS and sugar consumption is 42.2 percent in 2024/25, up from 29.3 percent in 2014/15.

Sugar exports average 1.850 million MTRV over the projection period, an average of 29.3 percent of production. Exports to the United States average 1.768 million MTRV, or 95.6 percent of the total. Third-country exports occur only in 2015/16 and 2016/17 to help keep the U.S.-world raw sugar price margin from falling below 3 cents/lb. Strong early-period exports result from large production levels. As production declines in the middle-to-later part of the projection period, declines in sugar consumption and lower ending stockholding combine to expand exports from the low 2017/18 total of 1.439 million MTRV to 2.014 million MTRV in 2024/25.

Estandar sugar prices are linked to U.S. raw sugar prices through a trading equilibrium. Both increase, more or less, over the projections period, mirroring the increase in world raw sugar prices.

Results from Alternative Scenario

Results for the lower world price alternative scenario are shown in the lower panels of table 3 (U.S. results) and table 4 (Mexico). The most direct implication of lower world raw sugar prices is lower U.S. raw sugar prices. Figure 6 compares U.S. raw sugar prices across the two scenarios. Just as there are two discernable periods for world prices (lower and variable in the first 5 or 6 years, and higher and growing in the remainder period, as discussed earlier), the same is true for U.S. prices. By 2019/20, world prices in both scenarios are high enough to support U.S. prices above forfeiture levels. World price support for domestic prices in the first 5 years, however, is less likely. Whereas the base scenario had U.S. prices at minimum forfeiture levels in 3 years, 10 percent lower world prices imply prices at minimum forfeiture levels in all of the first 5 years of the projections period. As a consequence, the alternative scenario implies CCC sugar purchases for ethanol producer resale in these amounts: 207,000 STRV in 2014/15; 212,000 STRV in 2015/16; 181,000 STRV in 2016/17; 182,000 STRV in 2017/18; and 89,000 STRV in 2018/19.

Table 3 -- U.S. sugar long-run projections of supply and use: base and alternative specifications

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Base specification - support from world prices											
1,000 short tons, raw value											
Beginning stocks	2,082	2,240	2,500	2,504	2,311	2,329	2,536	2,552	2,563	2,576	2,600
Production	8,783	8,963	9,170	9,270	9,289	9,292	9,341	9,424	9,512	9,529	9,516
Beet sugar	5,032	5,257	5,438	5,512	5,527	5,520	5,541	5,595	5,655	5,647	5,609
Cane sugar	3,751	3,706	3,732	3,757	3,762	3,771	3,799	3,829	3,858	3,882	3,906
Total imports	3,848	3,597	3,244	3,219	3,507	3,626	3,466	3,436	3,414	3,529	3,699
TRQ	963	838	844	1,233	1,467	1,393	1,237	1,188	1,140	1,096	1,079
Mexico	2,485	2,359	2,000	1,587	1,641	1,832	1,828	1,848	1,874	2,033	2,221
Other imports	400	400	400	400	400	400	400	400	400	400	400
Total supply	14,713	14,800	14,915	14,992	15,107	15,247	15,342	15,412	15,489	15,634	15,815
Exports	250	250	250	250	250	250	250	250	250	250	250
Total deliveries	12,016	12,050	12,161	12,249	12,349	12,461	12,540	12,598	12,663	12,784	12,935
Deliveries for food and beverage	11,806	11,840	11,951	12,039	12,139	12,251	12,330	12,388	12,453	12,574	12,725
Other deliveries	210	210	210	210	210	210	210	210	210	210	210
Use	12,266	12,300	12,411	12,499	12,599	12,711	12,790	12,848	12,913	13,034	13,185
Ethanol	207	0	0	183	178	0	0	0	0	0	0
Ending stocks	2,240	2,500	2,504	2,311	2,329	2,536	2,552	2,563	2,576	2,600	2,631
Total ending stocks-to-use	18.26	20.33	20.17	18.49	18.49	19.95	19.95	19.95	19.95	19.95	19.95
Cents per pound											
World raw sugar price	16.97	18.17	18.53	16.56	17.49	18.76	19.89	20.76	20.84	21.10	21.12
U.S. raw sugar price - 3rd quarter	20.76	21.17	21.53	20.69	20.69	21.76	22.89	23.76	23.84	24.10	24.12
Refining margin	6.00	5.77	5.89	5.74	5.79	6.09	6.39	6.61	3.00	3.09	3.09
Refined beet sugar spot price - 3rd quarter	26.76	26.93	27.41	26.43	26.48	27.85	29.29	30.37	26.84	27.19	27.21
Sugarbeet price (Dollars/ton)	48.25	47.62	47.98	47.83	47.16	47.89	49.61	51.18	50.24	48.06	48.32
Sugarcane price (Dollars/ton)	29.50	34.81	41.70	47.10	42.22	42.76	41.83	42.19	42.58	41.80	41.77
Alternative specification - lower world raw sugar prices											
1,000 short tons, raw value											
Beginning stocks	2,082	2,240	2,280	2,296	2,315	2,336	2,435	2,519	2,571	2,588	2,614
Production	8,783	8,963	9,157	9,228	9,261	9,294	9,327	9,370	9,426	9,432	9,418
Beet sugar	5,032	5,257	5,431	5,490	5,508	5,524	5,536	5,555	5,586	5,570	5,535
Cane sugar	3,751	3,706	3,726	3,739	3,753	3,771	3,791	3,815	3,840	3,862	3,884
Total imports	3,848	3,589	3,457	3,492	3,464	3,512	3,552	3,566	3,567	3,696	3,856
TRQ	963	838	868	1,362	1,467	1,470	1,472	1,433	1,408	1,416	1,477
Mexico	2,485	2,351	2,188	1,730	1,597	1,642	1,681	1,734	1,759	1,880	1,979
Other imports	400	400	400	400	400	400	400	400	400	400	400
Total supply	14,713	14,792	14,894	15,017	15,040	15,142	15,314	15,455	15,563	15,717	15,888
Exports	250	250	250	250	250	250	250	250	250	250	250
Total deliveries	12,016	12,050	12,167	12,269	12,366	12,458	12,545	12,634	12,724	12,853	13,002
Deliveries for food and beverage	11,806	11,840	11,957	12,059	12,156	12,248	12,335	12,424	12,514	12,643	12,792
Other deliveries	210	210	210	210	210	210	210	210	210	210	210
Use	12,266	12,300	12,417	12,519	12,616	12,708	12,795	12,884	12,974	13,103	13,252
Ethanol	207	212	181	182	89	0	0	0	0	0	0
Ending stocks	2,240	2,280	2,296	2,315	2,336	2,435	2,519	2,571	2,588	2,614	2,636
Total ending stocks-to-use	18.26	18.54	18.49	18.50	18.51	19.16	19.69	19.95	19.95	19.95	19.89
Cents per pound											
World raw sugar price	15.27	16.35	16.67	14.90	15.74	16.88	17.90	18.68	18.76	18.99	19.00
U.S. raw sugar price - 3rd quarter	20.76	20.75	20.67	20.69	20.69	20.89	21.24	21.68	21.76	21.99	22.08
Refining margin	6.00	5.68	5.74	5.75	6.08	6.19	6.07	6.09	3.00	3.00	3.00
Refined beet sugar spot price - 3rd quarter	26.76	26.43	26.42	26.44	26.76	27.07	27.31	27.77	24.76	24.99	25.08
Sugarbeet price (Dollars/ton)	48.25	47.36	47.11	47.11	47.29	47.68	48.03	48.43	47.26	45.30	45.52
Sugarcane price (Dollars/ton)	29.50	34.81	41.70	47.10	42.22	42.76	41.83	42.19	42.58	41.80	41.77

Source: ERS, *Sugar and Sweetener Outlook*.

Table 4 -- Mexico sugar and high fructose corn syrup projections of supply and use: base and alternative specifications

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Sugar Production	7,326	6,989	6,470	6,062	5,964	5,976	5,998	6,053	6,119	6,210	
				1,000 metric tons, raw value							
Base specification											
Beginning stocks	1,044	1,445	1,306	1,188	1,280	1,227	1,017	840	720	679	625
Area: hectares	844	803	740	691	678	676	677	680	685	693	706
Sugar Yield	8.675	8.707	8.739	8.771	8.803	8.835	8.866	8.898	8.930	8.962	8.994
Sugar production	7,326	6,989	6,470	6,062	5,964	5,976	5,998	6,053	6,119	6,210	6,353
Imports	181	181	181	181	181	181	181	181	181	181	181
Supply	8,551	8,615	7,958	7,432	7,425	7,385	7,196	7,075	7,021	7,070	7,160
Disappearance	4,852	4,758	4,712	4,713	4,710	4,706	4,698	4,678	4,643	4,600	4,554
Consumption	4,455	4,361	4,314	4,315	4,312	4,309	4,300	4,281	4,245	4,203	4,156
Other disappearance	398	398	398	398	398	398	398	398	398	398	398
Exports	2,254	2,551	2,058	1,439	1,488	1,662	1,659	1,676	1,700	1,845	2,014
To the United States	2,254	2,140	1,815	1,439	1,488	1,662	1,659	1,676	1,700	1,845	2,014
To other countries	0	411	243	0	0	0	0	0	0	0	0
Ending stocks	1,445	1,306	1,188	1,280	1,227	1,017	840	720	679	625	592
Stocks-to-Consumption	32.43	29.95	27.53	29.65	28.46	23.59	19.53	16.83	15.98	14.88	14.24
High Fructose Corn Syrup	1,744	1,894	1,999	2,088	2,181	2,275	2,373	2,482	2,605	2,735	2,868
Estandar price (cents per pound)	24.28	24.71	25.09	24.20	24.20	25.33	26.53	27.45	27.54	27.81	27.83
Alternative specification											
Beginning stocks	1,044	1,445	1,383	1,335	1,279	1,228	1,145	1,044	940	885	816
Area: hectares	844	803	740	689	673	671	670	670	672	676	680
Sugar Yield	8.675	8.707	8.739	8.771	8.803	8.835	8.866	8.898	8.930	8.962	8.994
Sugar production	7,326	6,989	6,467	6,045	5,928	5,932	5,940	5,966	6,003	6,056	6,117
Imports	181	181	181	181	181	181	181	181	181	181	181
Supply	8,551	8,615	8,032	7,562	7,389	7,342	7,267	7,191	7,124	7,122	7,114
Disappearance	4,852	4,758	4,711	4,712	4,712	4,707	4,698	4,679	4,644	4,601	4,554
Consumption	4,455	4,361	4,314	4,315	4,315	4,310	4,300	4,281	4,246	4,203	4,156
Other disappearance	398	398	398	398	398	398	398	398	398	398	398
Exports	2,254	2,474	1,985	1,570	1,449	1,490	1,525	1,573	1,596	1,706	1,795
To the United States	2,254	2,133	1,985	1,570	1,449	1,490	1,525	1,573	1,596	1,706	1,795
To other countries	0	341	0	0	0	0	0	0	0	0	0
Ending stocks	1,445	1,383	1,335	1,279	1,228	1,145	1,044	940	885	816	765
Stocks-to-Consumption	32.43	31.72	30.96	29.65	28.46	26.56	24.28	21.95	20.85	19.41	18.41
High Fructose Corn Syrup	1,744	1,894	1,999	2,088	2,179	2,274	2,373	2,481	2,605	2,735	2,868
Estandar price (cents per pound)	24.28	24.27	24.18	24.20	24.20	24.41	24.78	25.25	25.33	25.57	25.67

Source: ERS, *Sugar and Sweetener Outlook*.

Table 5 presents base and alternative results separated into the first 6 years of the projections period and the remaining 5 years of the period. Comparison across scenarios of supply and use components for the first part of the projections period show very small differences except for CCC purchases. This result is not surprising because the raw sugar price averages for the two scenarios are close to each other: 21.10 cents/lb for the base and 20.74 cents/lb for the alternative. CCC sugar purchases are about 53 percent higher in the alternative scenario. Results for Mexico sugar supply and use show a similar pattern of closeness between scenarios.

Differences in raw sugar prices between scenarios are more pronounced in the second part of the projections period. The alternative scenario average at 21.75 cents/lb is about 2 cents/lb lower than the base average. Differing prices directly mirror the assumptions made about world raw sugar prices because world prices in both scenarios are providing support to U.S. prices above minimum forfeiture levels. In both scenarios, the U.S. – world raw sugar price margin is about 3 cents/lb.

Price differences between scenarios in the second part of the projections period do not imply much regarding supply and use balances. Average annual production is 0.7 percent lower in the alternative and average annual consumption is 0.4 percent higher. Average imports in the alternative are higher by 139,000 STRV, or about 4 percent, than in the base. Lower average annual imports from Mexico due to reduced Mexico sugar production and higher stockholding are more than offset by lower TRQ shortfall.

Table 5 -- USDA long-term projections for sugar in the United States and Mexico, baseline and alternative scenario

		Baseline 1/		Alternative 2/	
		2014/15-2019/20	2020/21-2024/25	2014/15-2019/20	2020/21-2024/25
World raw sugar price	Cents per pound	17.74	20.74	15.97	18.67
U.S. raw sugar price	Cents per pound	21.10	23.74	20.74	21.75
U.S.-world sugar price margin	Cents per pound	3.35	3.00	4.77	3.08
U.S. beet sugar					
Sugarbeet price	Dollars per ton	47.79	49.48	47.47	46.91
Area planted	1,000 acres	1,229.22	1,218.82	1,227.48	1,206.99
Area harvested	1,000 acres	1,184.21	1,174.28	1,182.55	1,162.94
Beet sugar yield	STRV per acre 3/	4.54	4.78	4.54	4.78
Beet sugar production	1,000 STRV	5,381	5,609	5,373	5,556
U.S. cane sugar					
Sugarcane price	Dollars per ton	39.68	42.03	39.68	41.76
Area harvested	1,000 acres	836	834	835	831
Cane sugar yield	STRV per acre	4.48	4.62	4.48	4.62
Cane sugar production	1,000 STRV	3,747	3,855	3,741	3,838
U.S. sugar production	1,000 STRV	9,128	9,464	9,115	9,394
Imports					
Tariff-rate quota (TRQ) allocation	1,000 STRV	1,571	1,584	1,571	1,584
TRQ shortfall	1,000 STRV	-448	-437	-410	-144
TRQ sugar imports	1,000 STRV	1,123	1,148	1,162	1,441
Mexico	1,000 STRV	1,984	1,961	1,999	1,807
Other sources	1,000 STRV	400	400	400	400
Total imports	1,000 STRV	3,507	3,509	3,560	3,648
Deliveries for human consumption	1,000 STRV	12,004	12,494	12,011	12,542
CCC sugar purchase for ethanol 4/	1,000 STRV	95	0	145	0
Federal budget expense -- annual average	1,000 dollars	27,660	0	43,051	0
Federal budget expense -- present value	Million dollars	154.327	0	242.358	0
Ending stocks	1,000 STRV	2,403	2,584	2,317	2,586
Ending stocks-to-use	percent	19.14	19.95	18.37	19.89
Estandar price - Mexico City	cents per pound	24.63	27.43	24.25	25.32
Mexico sugar production	1,000 MTRV 5/	6,465	6,147	6,448	6,016
Mexico sugar for consumption	1,000 MTRV	4,344	4,237	4,345	4,237
Mexico sugar exports		1,909	1,779	1,870	1,639
Exports to the United States	1,000 MTRV	1,800	1,779	1,813	1,639
Exports to other countries	1,000 MTRV	109	0	57	0
Mexico ending stocks	1,000 MTRV	1,244	691	1,303	890
Mexico ending stocks-to-consumption	percent	28.63	16.32	29.98	21.00

1/ Baseline world raw sugar price (cents per pound) from figure 3.

2/ Alternative scenario: world raw sugar prices are 90 percent of corresponding baseline prices.

3/ STRV = short tons, raw value.

4/ CCC = Commodity Credit Corporation.

5/ MTRV = metric tons, raw value.

Source: ERS, *Sugar and Sweetener Outlook.*

Conclusion: Expected Budgetary Effects of the 2008 Act

The scenarios described in this chapter constitute the USDA base and alternative long-term sugar supply and use projections for February 2014. One of the chief uses of the long term projections is to estimate Federal Government budget expense from U.S. sugar program operations. In the base scenario, CCC sugar purchases of sugar for resale to ethanol producers is indicated in 2014/15, 2017/18, and 2018/19 for a total of 568,000 STRV. The present value of total net expenditure (quantity purchased/resold times the difference between purchase and sales prices) is forecast at $154.327 million In the alternative scenario of lower world prices, CCC sugar purchases of sugar for resale to ethanol producers is indicated for 2014/15 – 2018/19 for a total of 871,000 STRV. The present value of total expenditures is $242.358 million.

Sugar and Sweeteners in the North American Free Trade Agreement (NAFTA) Area

On February 10, 2014, the USDA published in the *World Agricultural Supply and Demand Estimates* (WASDE) its latest sugar supply and use projections for the United States and Mexico for fiscal year 2012/13 and projections for 2013/14.

U.S. Sugar

The Farm Service Agency (FSA) made several small revisions to *Sweetener Market Data* (SMD) for 2012/13 based on corrected data supplied by a sugarbeet processor. Beet sugar production was decreased slightly to 5.076 million short tons, raw value, (STRV), the estimate for deliveries for human consumption was decreased 1,665 STRV to 11.511 million STRV, and the ending stocks estimate was reduced by 3,500 STRV to 2.157 million STRV.

The USDA reduced its projection of 2013/14 cane sugar production in several States based on revised forecasts made by sugarcane millers: Florida – decrease of 53,000 STRV to 1.780 million STRV; Texas – decrease of 5,000 STRV to 135,000 STRV; and Hawaii – increase of 5,000 STRV to 185,000 STRV. The Florida crop has been hurt by rain and freezing temperatures in January. The Texas crop has been challenged all season, and Hawaii production in December was uncharacteristically strong at the end of its calendar-based crop year.

There were no other changes made to the U.S. sugar supply and use balance (table 6). Deliveries for human consumption through December have totaled 2.892 million STRV, about 2.1 percent ahead of last year through the same period. Imports through the end of January have totaled 964,888 metric tons, raw value (MTRV) – 16.2 percent ahead of last year. Although imports entering under the 2013/14 raw sugar tariff-rate quota (TRQ) at 177,528 MTRV are running 38.8 percent behind last year's pace, imports from Mexico totaling 691,997 MTRV are running above last year by 93.9 percent. The Sugar and Sweetener Outlook estimates that about 71 percent of 2013/14 imports from Mexico have gone to U.S. sugar refiners, compared with 41 percent for the same period last year.

Ending stocks are projected at 1.881 million STRV, implying an ending stocks-to-use ratio of 14.9 percent, down from 15.4 percent projected last month.

Mexico Sugar and High Fructose Corn Syrup

The USDA reduced its projection of 2013/14 Mexico sugar production by 345,000 Mt to 6.350 million Mt. Harvest data through the beginning of February imply diminished prospects for the sugarcane harvest and sharply reduced prospects for sucrose recovery. Figure 7 shows that sugarcane harvested through the first week of February has totaled 20.070 million metric tons (mt). Although this total is much higher than the corresponding period of harvest years before 2012/13, it is running about 18 percent behind last year and 7.3 percent behind the level expected by Mexico's *Comite Nacional Para El Desarrollo Sustentable de la Caña de Azucar* (Conadesuca). Based on an average relationship between the interim and final sugarcane yield (fig. 8), the Sugar and Sweetener Outlook projects a final sugarcane yield of 70.219 mt per hectare, with a standard deviation of 0.374. This projection is a bit lower than Conadesuca's 70.859 mt per hectare. Assuming that Conadesuca's forecast of area harvested of 819,065 hectares is attainable and likely, the implied *Sugar and Sweetener Outlook* forecast (November 2013) of sugarcane production is 57.514 million mt. Although this forecast is only 1 percent lower than the Conadesuca forecast, the pace of the harvest will have to pick up substantially to achieve it. Area harvested through the first week of February is 31.0 percent of the total forecast. This level compares with 35.7 percent last year and an average of 33.9 percent for the 4 years prior to last year.

Table 6 -- U.S. sugar: supply and use, by fiscal year (Oct./Sept.), February 2014.

Items	2011/12	2012/13	2013/14	2011/12	2012/13	2013/14
	1,000 short tons, raw value			1,000 metric tons, raw value		
Beginning stocks	1,378	1,979	2,157	1,250	1,796	1,956
Total production	8,488	8,980	8,725	7,700	8,147	7,915
Beet sugar	4,900	5,076	5,025	4,446	4,605	4,559
Cane sugar	3,588	3,904	3,700	3,255	3,542	3,357
Florida	1,828	1,866	1,780	1,658	1,693	1,615
Louisiana	1,438	1,686	1,600	1,305	1,530	1,451
Texas	150	173	135	136	157	122
Hawaii	172	179	185	156	163	168
Total imports	3,632	3,224	3,184	3,295	2,925	2,888
Tariff-rate quota imports	1,883	957	1,319	1,709	868	1,197
Other Program Imports	664	136	110	602	124	100
Non-program imports	1,085	2,131	1,755	984	1,933	1,592
Mexico	1,071	2,124	1,745	972	1,927	1,583
Total supply	13,498	14,184	14,066	12,245	12,868	12,760
Total exports	269	274	250	244	249	227
Miscellaneous	-64	-22	0	-58	-20	0
Deliveries for domestic use	11,313	11,776	11,991	10,263	10,683	10,878
Transfer to sugar-containing products for exports under reexport program	140	80	150	127	73	136
Transfer to polyhydric alcohol, feed, other alcohol	33	32	35	30	29	32
Commodity Credit Corporation (CCC) sale for ethanol	0	153	316	0	139	--
Deliveries for domestic food and beverage use	11,141	11,511	11,490	10,107	10,442	10,424
Total use	11,519	12,027	12,241	10,450	10,911	11,105
Ending stocks	1,979	2,157	1,825	1,796	1,956	1,655
Private	1,979	1,840	1,825	1,796	1,670	1,655
Commodity Credit Corporation (CCC)	0	316	0	0	287	0
Stocks-to-use ratio	17.18	17.93	14.91	17.18	17.93	14.91

Source: USDA, ERS, *Sugar and Sweetener Outlook* .

Figure 7
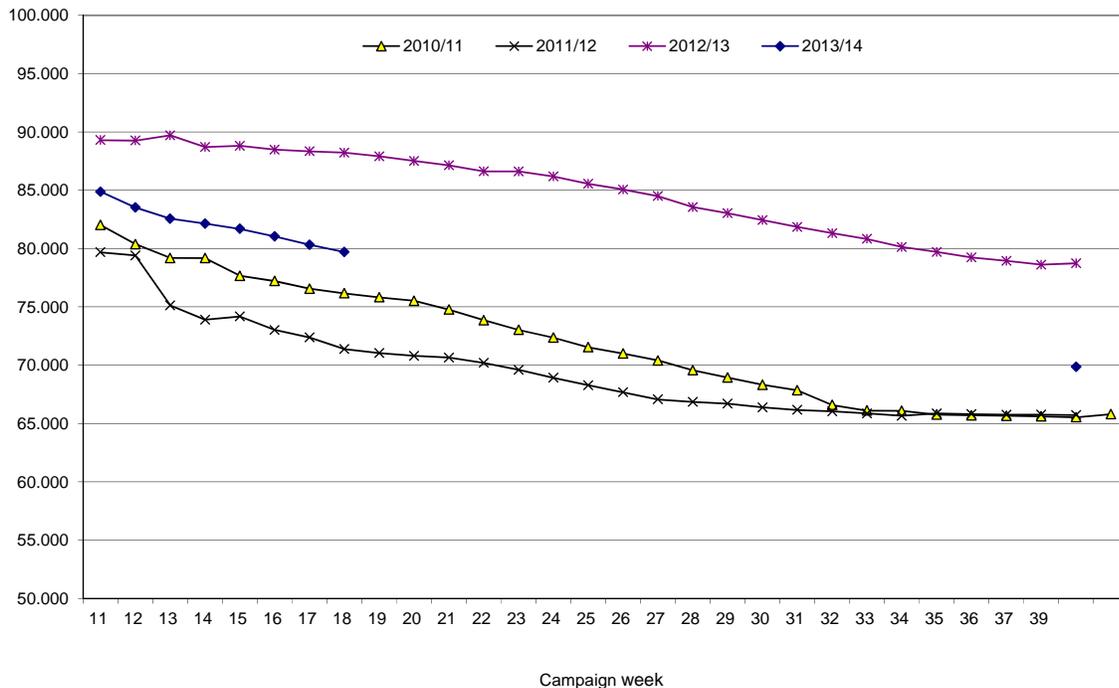**Mexico sugarcane production through week 19, 2008/09-2013/14**

Metric tons
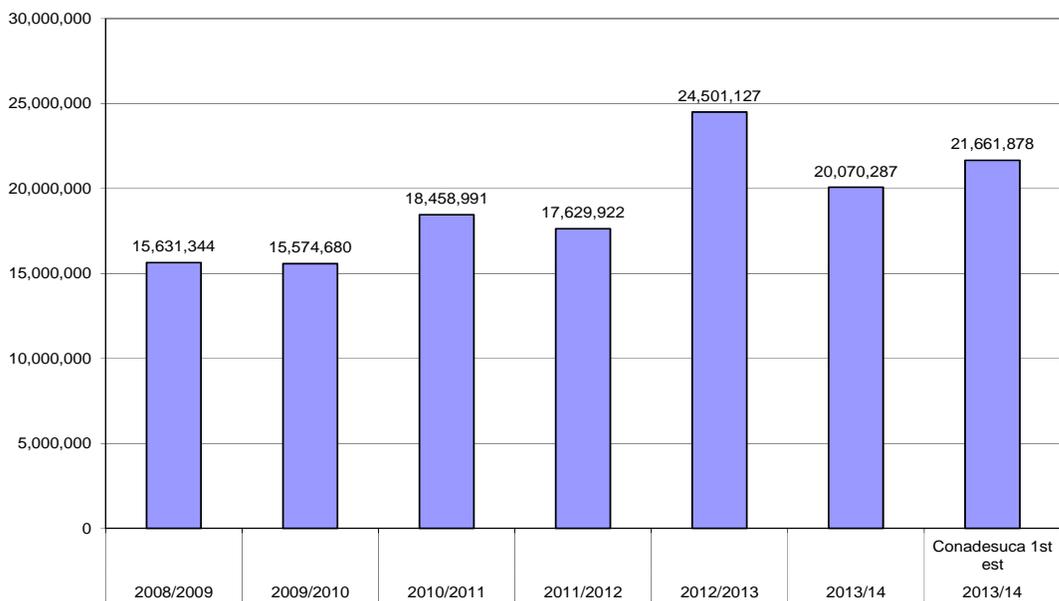
Source: Conadesuca.

Figure 8
Cumulative sugarcane yield in metric tons (mt) per hectare (ha) during harvest season

Sugar mt per hectare

Campaign week

Source: Conadesuca.

Sucrose recovery for 2013/14 will very likely fall much below the level originally forecast by Conadesuca. Figure 9 shows cumulative recovery rates by harvest week since 2011/12, along with the rates expected by Conadesuca for this year. This year's recovery rate has been consistently below the rate profile of 2011/12 that resulted in a final season rate of 10.92 percent. In order to achieve Conadesuca's final rate of 11.54 percent, this year's cumulative rates should be above those of last year (final rate equal to 11.35 percent). Although there is some narrowing of this year's rates and those expected by Conadesuca, they are still about 6 percent apart. Based on relationships between interim and final rates, the Sugar and Sweetener Outlook projects a final rate of 10.787 percent (table 7).

Figure 9
Intra-seasonal, cumulative sugar recovery rates in Mexico, recent crop years
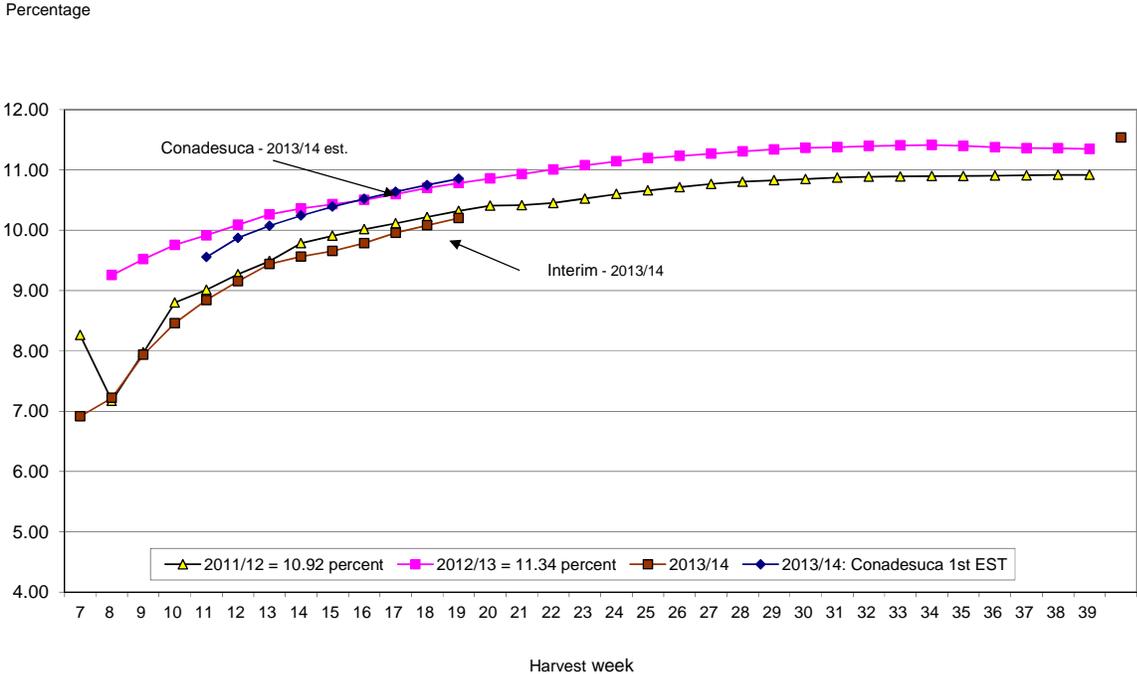
Source: Conadesuca.

Table 7 -- Sugar and Sweetener Outlook Mexico sugar production forecast derived from interim yield and recovery estimates from week 18

	ERS-derived average	ERS-standard deviation	ERS-derived based on 2-standard deviation from mean	Conadesuca - 1st estimate
Area (hectares: ha)	819,065	-	819,065	819,065
Yield (metric ton: mt)	70.219	0.374	70.967	70.859
Sugarcane (mt)	57,513,533		58,126,719	58,038,127
Recovery (percent)	10.787	0.062	10.911	11.536
Sugar (mt)	6,204,014		6,342,008	6,695,310

Source: ERS, *Sugar and Sweetener Outlook* .

As table 7 shows, if the *Sugar and Sweetener Outlook* projections of sugarcane yield and sucrose recovery were adopted, along with the area harvested as forecast by Conadesuca, Mexico 2013/14 sugar production would be forecast at 6.204 million mt. However, because the harvest season is far from its completion, the USDA decided on a more conservative course. The yield and recovery forecasts were adjusted up by 2 standard deviations to those values shown in the third column of table 7. The implied production (rounded) is 6.350 million mt.

Conadesuca released its estimate of sugar and high fructose corn syrup (HFCS) consumption through December, the first 3 months of the marketing year. These estimates, shown in figure 10 and compared with those of preceding years, are below expected values. Sugar consumption is 4.5 percent below last year; HFCS is 13.9 percent below; and combined sweeteners consumption is 7.5 percent below. Although the HFCS estimate is likely accurate because it is largely sourced from import data, the sugar estimate seems unrealistically low and may be the result of an unaudited stocks estimate.

The USDA expected HFCS consumption to be low but to recover later in the year as lower prices make it more competitive with domestic sugar. For this reason, the USDA made no adjustment to its HFCS consumption forecast of 1.491 million mt, dry weight. Sugar consumption, on the other hand, will probably be lower, if not to the extent shown in figure 10. Accordingly, the USDA reduced its sugar consumption forecast by 100,000 mt to 4.306 million mt (table 8).

With both the U.S. and Mexico sugar markets in relative balance, the USDA continues to project Mexico sugar stocks-to-consumption ratio at 22.0 percent. Ending stocks, therefore, are projected at 947,000 mt. Exports are a residual that balances total use with total supply. It is forecast at 2.399 million mt, a reduction of 223,000 mt compared with last month's forecast.

The USDA forecasts that the export decline will lower Mexico's exports to countries other than the United States on a one-to-one basis, leaving the forecast of exports to the United States unchanged from last month at 1.494 million mt. Figure 11 shows that since December, the decline in Mexico's sugar production relative to Conadesuca's forecast has been accompanied by an increasing margin between U.S. and world raw sugar prices. The margin was just over 3 cents per pound in late December and has risen above 5 cents per pound the last 2 weeks of January. This is clear market signal, both to Mexico and traditional U.S. sugar export suppliers, that the sugar needs of the United States have grown in light of reduced ability of Mexico to export as much as originally expected.

Table 8-- Mexico sugar supply and use, 2012/13 and projected 2013/14, February 2014

Items	2012/13	2013/14
	1,000 metric tons, actual weight	
Beginning stocks	966	1,460
Production	6,975	6,350
Imports	217	226
Imports for consumption	9	10
Imports for sugar-containing product exports (IMMEX) 1/	207	216
Total supply	8,157	8,036
Disappearance		
Human consumption	4,287	4,306
For sugar-containing product exports (IMMEX)	384	384
Statistical adjustment	53	0
Total	4,724	4,690
Exports	1,973	2,399
Exports to the United States & Puerto Rico	1,818	1,494
Exports to other countries	155	905
Total use	6,697	7,089
Ending stocks	1,460	947
	1,000 metric tons, raw value	
Beginning stocks	1,024	1,548
Production	7,393	6,731
Imports	230	240
Imports for consumption	10	11
Imports for sugar-containing product exports (IMMEX)	220	229
Total supply	8,646	8,519
Disappearance		
Human consumption	4,544	4,564
For sugar-containing product exports (IMMEX)	407	407
Statistical adjustment	56	0
Total	5,007	4,971
Exports	2,091	2,543
Exports to the United States & Puerto Rico	1,927	1,584
Exports to other countries	164	960
Total use	7,099	7,515
Ending stocks	1,548	1,004
Stocks-to-Human Consumption (percent)	34.1	22.0
Stocks-to-Use (percent)	21.8	13.4
High Fructose Corn Syrup (HFCS) Consumption (dry weight)	1,573	1,491

Source: USDA, WASDE and ERS, *Sugar and Sweeteners Outlook* ; Conadesuca.

1/ IMMEX = Industria Manufacturera, Maquiladora y de Servicios de Exportación.

Figure 10
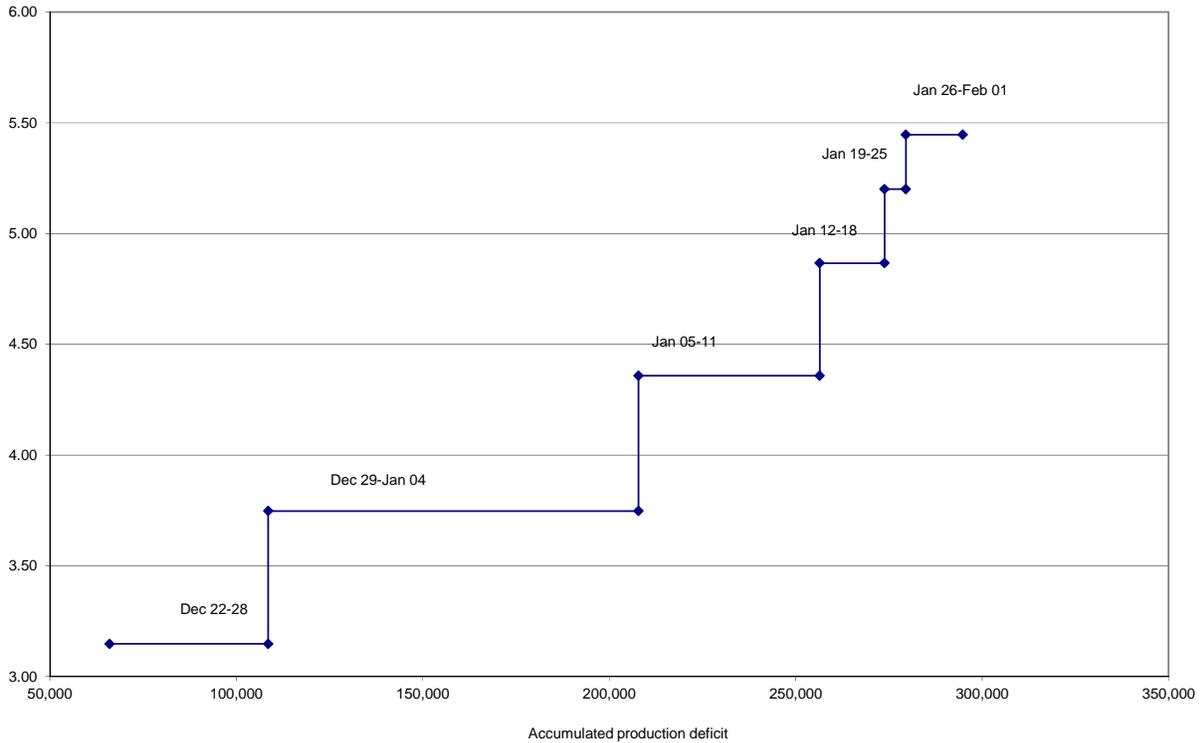**Sweetener consumption in Mexico, 3-months into marketing year, 2009/10 -- 2013/14**

Metric tons, tel quel
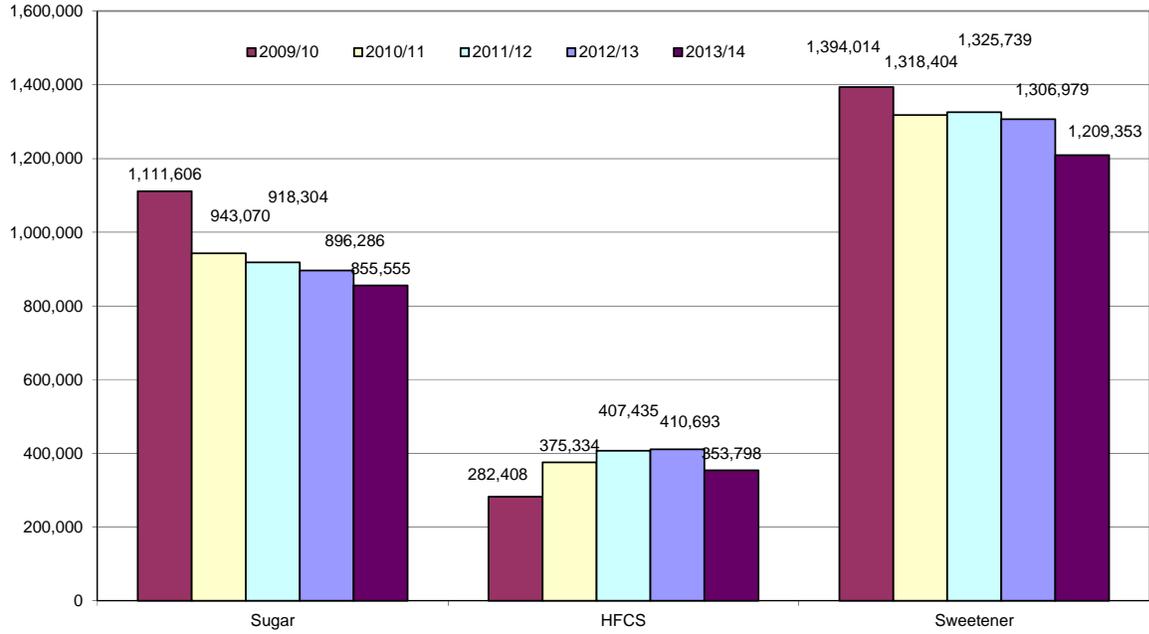
Source: Conadesuca.

Figure 11
Increase in weekly Mexico sugar production deficit relative to predicted value and growing U.S.-world raw sugar price margin

Price margin

Source: Conadesuca; Intercontinental Exchange.

Contacts and Links

Contact Information
Stephen Haley, (202) 694-5247, shaley@ers.usda.gov (coordinator)
Erma J. McCray, (202) 694-5306, ejmccray@ers.usda.gov (web publishing)

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Data

Tables from the *Sugar and Sweeteners Yearbook* are available in the Sugar and Sweeteners Topics at http://www.ers.usda.gov/topics/sugar/. They contain the latest data and historical information on the production, use, prices, imports, and exports of sugar and sweeteners.

Related Websites

Sugar and Sweeteners Outlook http://www.ers.usda.gov/Publications/SSS/
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