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Sugar and Sweeteners Outlook

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Strong Yields in 2017/18 Forecast for Both the Sugarcane and Sugarbeet Crops Raise Production Outlook

The August *World Agricultural Supply and Demand Estimates* (WASDE) raised projected domestic production in 2017/18 by 232,000 short tons, raw value (STRV), based on strong yields forecast in the National Agricultural Statistics Services' (NASS) *Crop Production* report released on the same day. Projected supplies are also increased due to a 235,000-STRV increase in projected beginning stocks, the result of higher estimated production in 2016/17 and higher estimated imports due to USDA's raising the 2016/17 raw sugar TRQ and requesting that the U.S. Department of Commerce (USDOC) raise the Export Limit for shipments from Mexico. Higher imports are also projected for 2017/18, as the raised raw sugar TRQ for 2016/17 also announced that shipments under the quota could enter until October 31, 2017. Total domestic deliveries projections for 2017/18 are unchanged at 12.578 million STRV, including 12.423 million STRV projected for domestic deliveries for food and beverage use. Ending stocks for 2017/18 are projected to be 1.673 million STRV, which would result in a 13.3-percent stocks-to-use ratio—raised from the previous month's projection of 9.0 percent.

Estimated ending stocks for Mexico in 2016/17 are 87,000 metric tons, actual value (MT), lower than the July report. This is due primarily to higher estimated exports to the United States as a result of the raised Export Limit. With fewer supplies carried over into 2017/18, projected exports are reduced 94,000 MT. In addition to lower 2017/18 beginning stocks projected, domestic deliveries are raised 6,000 MT, in line with revised estimates for deliveries in 2016/17. Ending stocks for 2017/18 are projected to be 816,000 MT, which would be an 18.0-percent stocks-to-human consumption ratio. This level is seen as the minimum required to satisfy domestic demand for the early period of 2018/19.

Increased Raw Sugar TRQ and Mexico Export Limit Raise Estimated Supplies in 2016/17

Total domestic sugar production in 2016/17 is estimated to be 8.848 million STRV, a 12,000-STRV increase from the July estimate. Cane sugar production is estimated to be 3.850 million STRV, a 2,000-STRV increase from the previous month based on revised production estimates from Texas, which are estimated to be 140,000 STRV. Cane sugar estimates for Florida (2.055 million), Louisiana (1.612 million), and Hawaii (43,000), remain unchanged from the previous month.

Table 1 -- U.S. sugar: supply and use, by fiscal year (Oct./Sept.), August 2017.

Items	2015/16	2016/17 (estimate)	2017/18 (forecast)	2015/16	2016/17 (estimate)	2017/18 (forecast)
	1,000 Short tons, raw value			1,000 Metric tons, raw value		
Beginning stocks	1,815	2,054	1,675	1,647	1,863	1,519
Total production	8,989	8,848	8,970	8,155	8,027	8,137
Beet sugar	5,119	4,998	5,068	4,644	4,534	4,598
Cane sugar	3,870	3,850	3,902	3,511	3,493	3,540
Florida	2,173	2,055	2,126	1,971	1,864	1,929
Louisiana	1,428	1,612	1,626	1,296	1,462	1,475
Texas	116	140	150	106	127	136
Hawaii	152	43	0	138	39	0
Total imports	3,341	3,353	3,631	3,031	3,042	3,294
Tariff-rate quota imports	1,620	1,727	1,707	1,469	1,567	1,549
Other program imports	396	350	200	359	318	181
Non-program imports	1,325	1,276	1,724	1,202	1,158	1,564
Mexico	1,309	1,266	1,714	1,187	1,148	1,554
Total supply	14,145	14,255	14,276	12,832	12,932	12,951
Total exports	74	125	25	67	113	23
Miscellaneous	-33	0	0	-30	0	0
Deliveries for domestic use	12,051	12,455	12,578	10,932	11,299	11,411
Transfer to sugar-containing products for exports under re-export program	148	120	120	134	109	109
Transfer to polyhydric alcohol, feed, other alcohol	22	35	35	20	32	32
Commodity Credit Corporation (CCC) sale for ethanol, other	0	0	0	0	0	0
Deliveries for domestic food and beverage use	11,881	12,300	12,423	10,778	11,158	11,270
Total Use	12,091	12,580	12,603	10,969	11,412	11,433
Ending stocks	2,054	1,675	1,673	1,863	1,519	1,517
Private	2,054	1,675	1,673	1,863	1,519	1,517
Commodity Credit Corporation (CCC)	0	0	0	0	0	0
Stocks-to-use ratio	16.99	13.31	13.27	16.99	13.31	13.27

Source: U.S. Dept. of Agriculture, Economic Research Service, Sugar and Sweetener Outlook.

Beet sugar production in 2016/17 is estimated to be 4.998 million STRV, a 10,000-STRV increase from the previous month. The change is primarily the result of higher projected 2017/18 crop-year beet sugar production, along with a result of larger early season production that will occur at the end of the 2016/17 fiscal year. Data in the Farm Service Agency's (FSA) *Sweetener Market Data* through June show that the pace of crop-year (August to July) sugarbeet slice would imply a higher shrink than previously forecast. This is offset, however, by an increase in the forecast sucrose extraction rate from sliced sugarbeets.

Table 2: Beet sugar production projection calculation, 2016/17

	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17 July	2016/17 August
Sugarbeet production (1,000 short tons) 1/	29,783	32,034	28,896	35,224	32,789	31,285	35,371	36,881	36,881
Sugarbeet shrink 2/	5.7%	5.9%	5.9%	4.8%	6.8%	5.4%	6.5%	7.0%	8.3%
Sugarbeet sliced (1,000 short tons)	28,097	30,137	27,184	33,532	30,545	29,595	33,066	34,314	33,832
Sugar extraction rate from slice	14.3%	15.4%	15.0%	15.3%	14.3%	14.6%	14.6%	13.6%	13.8%
Sugar from beets slice (1,000 STRV)	4,023	4,631	4,086	5,142	4,325	4,325	4,820	4,667	4,667
Sugar from molasses (1,000 STRV) 2/	325	357	401	327	324	341	362	353	353
Crop year sugar production (1,000 STRV) 3/	4,348	4,987	4,487	5,469	4,648	4,667	5,183	5,020	5,020
August-September sugar production (1,000 STRV)	396	623	294	708	315	461	688	606	606
August-September sugar production forecast (1,000 STRV) 4/	--	--	--	--	--	--	606	539	548
Sugar from imported beets (1,000 STRV) 5/	--	--	--	--	--	--	--	36	36
Fiscal year sugar production (1,000 STRV)	4,575	4,659	4,900	5,076	4,794	4,893	5,119	4,988	4,998

Notes: 1/ National Agricultural Statistics Service, U.S. Dept. of Agriculture. 2/Projections based on processor forecasts published by U.S. Dept. of Agriculture, Farm Service Agency. 3/ August-July basis. 4/ 2016/17 based on 10-year historical average. 5/ Sugar from imported beets split out for projections only. They are incorporated into total production in historical data.
Source: U.S. Dept. of Agriculture, Economic Research Service and World Agricultural Outlook Board.

Sugar imports in 2016/17 are estimated to be 3.353 million STRV, a 222,000-STRV increase from the July estimate. The increase is driven primarily by policy announcements by the USDA, the U.S. Trade Representative (USTR), and the U.S. Department of Commerce (USDOC). On July 24, 2017, the USDA announced an adjustment to the 2016/17 fiscal year Overall Allotment Quota, including a 270,000 STRV reallocation to the raw sugar TRQ quota holders and a request to the USDOC to increase the 2016/17 Export Limit for Mexico by 104,000 STRV—29,000 STRV of sugar with less than 99.2 polarity and 75,000 STRV for sugar with polarity less than 99.5. In addition, the USDA requested that the USTR reallocate the existing 2016/17 raw sugar TRQ among quota-holders to reduce the expected shortfall. Finally, the USDA announced that sugar imported under the 2016/17 TRQ will be permitted to enter through October 31, 2017, as opposed to September 30, 2017, which marks the end of the 2016/17 fiscal year, thus allowing more time for the marketing and logistics of the increased quota. USTR announced the updated amounts for TRQ quota-holders on July 31, 2017.

Table 3: Raw sugar TRQ Reallocation and Increase, fiscal year 2017

	FY2017 Reallocation	FY2017 Increase	Total Increase
	Short tons, raw value		
Argentina	5,243	17,168	22,411
Australia	10,119	33,140	43,259
Belize	1,342	4,392	5,733
Brazil	17,679	15,390	33,069
Colombia	2,927	9,582	12,509
Costa Rica	1,829	5,989	7,818
Ecuador	1,342	4,392	5,733
El Salvador	3,170	10,380	13,551
Fiji	1,097	3,594	4,690
Guatemala	5,852	19,165	25,017
Guyana	1,463	4,792	6,255
Honduras	1,219	3,993	5,212
India	976	3,194	4,170
Jamaica	1,342	4,392	5,733
Malawi	1,219	3,993	5,212
Mauritius	1,463	4,792	6,255
Mozambique	1,585	5,191	6,776
Nicaragua	2,561	8,384	10,945
Panama	3,536	11,579	15,115
Peru	4,999	16,370	21,369
Philippines	16,460	53,901	70,361
South Africa	2,804	9,183	11,988
Swaziland	1,951	6,388	8,339
Thailand	1,706	5,590	7,296
Zimbabwe	1,463	4,792	6,255

Source: U.S. Trade Representative.

Imports from quota programs are estimated to be 1.727 million STRV in 2016/17, a 148,000-STRV increase from the previous month. The increase represents the actions taken to increase the amount of imports under the raw sugar TRQ. The estimate assumes that approximately 220,000 STRV of the 2016/17 quota will enter between October 1 and October 31, 2017, as permitted in the announcement, but will be accounted for in the 2017/18 fiscal year.

Estimated imports from Mexico are 1.266 million STRV, a 104,000-STRV increase from the previous month. The increase reflects the entirety of the raised Export Limit requested by the USDA. Given that current projections show that Mexico will not fill the 2017/18 Export Limit, based on the calculated U.S. Needs from the July WASDE, Mexican market fundamentals may be a more influential factor in total imports from Mexico than quantity restrictions from the suspension agreements, although the current gap between the projection and the current Export Limit has fallen in recent months. With available 2016/17 Mexican supplies and indications that the increased Export Limit will be filled at the time of the policy announcements, the current estimate is for the entire updated Export Limit.

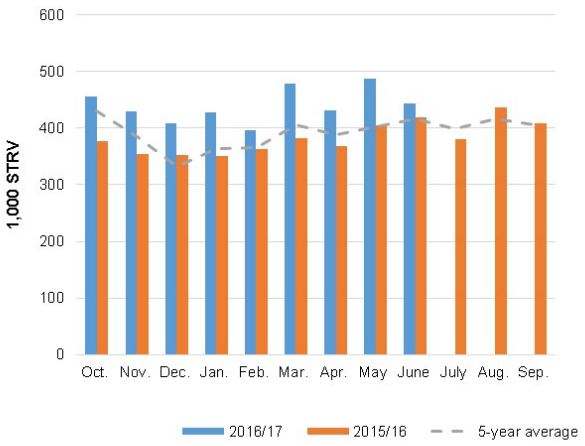
Imports under the re-export program are reduced 25,000 STRV to 350,000 STRV based on pace to date. This amount is expected to be shipped in 2017/18, however, and is reflected in that year's balances.

Domestic deliveries unchanged as reported beet sugar deliveries remain strong through June

Estimated total domestic deliveries for 2016/17 are unchanged from the previous month at 12.455 million STRV. Likewise, deliveries for food and beverage use is unchanged at 12.3000 million STRV and other domestic deliveries are estimated to be 155,000 STRV. Exports are estimated to be 125,000 STRV, unchanged from the previous month's estimate.

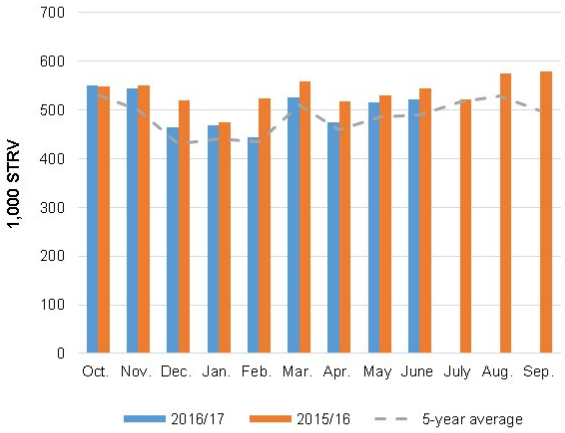
Through June, total sugar deliveries for human consumption are 3.6 percent higher than the previous year. June deliveries for beet processors continued strong relative to the previous year and 5-year averages, although not to the same degree as in earlier months. Beet processors' deliveries are still 17.5 percent larger than the previous year. Cane deliveries, on the other hand, are 5.4 percent lower than the previous year over the same time period.

Figure 1
Beet sugar deliveries, monthly, 2010/11 to 2016/17



Source: U.S. Department of Agriculture, Farm Service Agency.

Figure 2
Cane sugar deliveries, monthly, 2010/11 to 2016/17

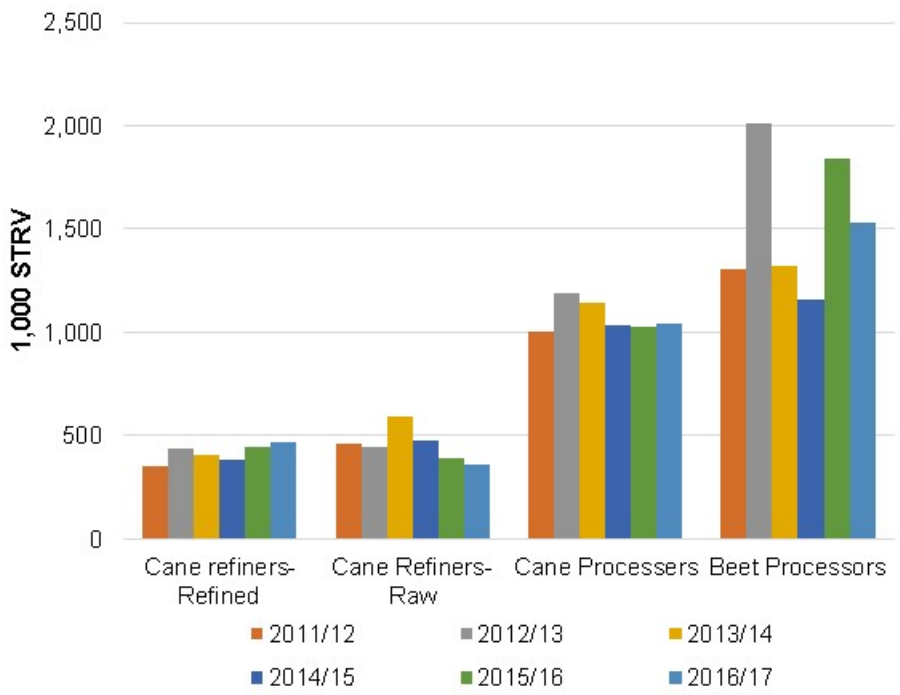


Source: U.S. Department of Agriculture, Farm Service Agency.

Ending stocks for 2016/17 are projected to be 1.675 million STRV, a 235,000-STRV increase from the July estimate. The resulting stocks-to-use ratio is 13.3 percent, compared with the previous month's estimate of 11.5 percent.

Reported inventories in June show an 8.0-percent decline compared with the same time in 2015/16. Much of this decline can be attributed to fewer stocks held by beet processors. The strong pace of deliveries by beet processors thus far through 2016/17, mostly fueled by large inventories held at the end of 2015/16, have resulted in June inventories being 16.5-percent lower than at the same time the previous year. Beet sugar inventories were still large relative to historical standards, but not to the same magnitude as in other recent years.

Figure 3
June 30 sugar inventories, by distributor, fiscal year



Source: U.S. Department of Agriculture, Farm Service Agency.

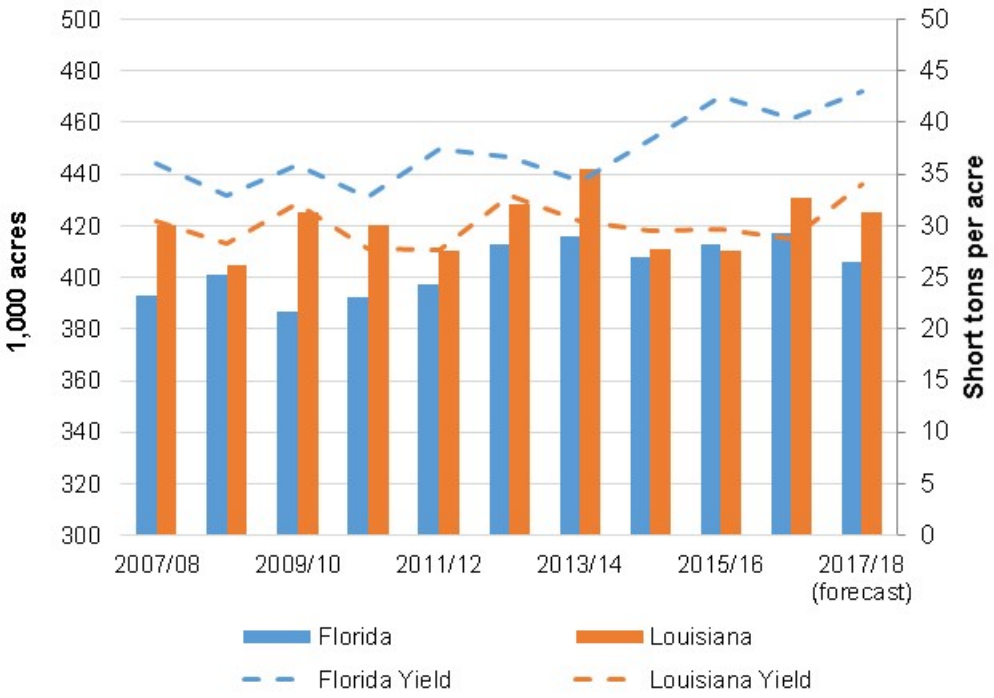
Inventories held at the end of June by cane refiners and processors were 0.5 percent larger than the previous year. The increase is mainly due to a 1.2-percent increase from domestic cane processors. Refiners' inventories were 0.4 percent lower; notably, though, the makeup of those inventories were more heavily weighted toward refined sugar rather than raw sugar. The increased raw sugar TRQ and raised Export Limit should alleviate the tight supplies of raw sugar for cane refiners, providing additional input to raise capacity utilization rates for sugar refiners heading into 2017/18.

Strong yields for both sugarcane and sugarbeet crop raise production outlook for 2017/18

Total sugar supplies in 2017/18 are projected to be 14.276 million STRV, a 540,000-STRV increase from the previous month's projection. Beginning supplies are increased 235,000 STRV from the changes to the 2016/17 market balances, totaling 1.675 million STRV.

Domestic sugar production is projected to total 8.970 million STRV, a 232,000-STRV increase from the July projection. Cane sugar production is projected at 3.902 million STRV, a 152,000-STRV increase from the previous month, largely based on record sugarcane yields forecast for both Florida's and Louisiana's crops. Cane sugar production in Florida is projected at 2.126 million STRV, a 126,000-STRV increase from the previous projection. The National Agricultural Statistics Service's (NASS) August *Crop Production* report forecasts sugarcane yields in the State at 43.0 short tons per acre, compared with 40.5 in 2016/17. Despite lower forecast harvested acres in Florida than in the previous year, sugarcane production is expected to increase 3.8 percent. The current 2017/18 Florida sugar production projection represents a 3.4-percent increase from the 2016/17 estimate. Cane sugar production in Louisiana is projected to be 1.626 million STRV, a 26,000-STRV increase. Similarly, the increase is due to a NASS forecast that sugarcane production in the State will be 4.1 percent higher than the previous year.

Figure 4
Harvested area and yields, sugarcane, Florida and Louisiana, 2007/08 to 2017/18



Source: U.S. Department of Agriculture, National Agricultural Statistics Service.

Beet sugar production for 2017/18 is projected to be 5.068 million STRV, an 80,000-STRV increase from the previous month. The August *Crop Production* showed a downward revision in forecast harvested acreage, but a yield of 33.4 short tons per acre, which would exceed the record 2016/17 level. Total sugarbeet production is forecast to be 1.5-percent less than the previous year's record crop. With sucrose recovery levels expected to come back from the extremely low levels witnessed during the 2016/17 slicing campaign, crop-year production is projected to be 5.131 million STRV. Based on relatively early pace of planting in May, 548,000 STRV of the current crop's production is expected to be produced before October 1 and accounted for in the 2016/17 fiscal year production. The fiscal year projection is then adjusted, assuming early-season production from the 2018/19 sugarbeet crop is in line with historical averages.

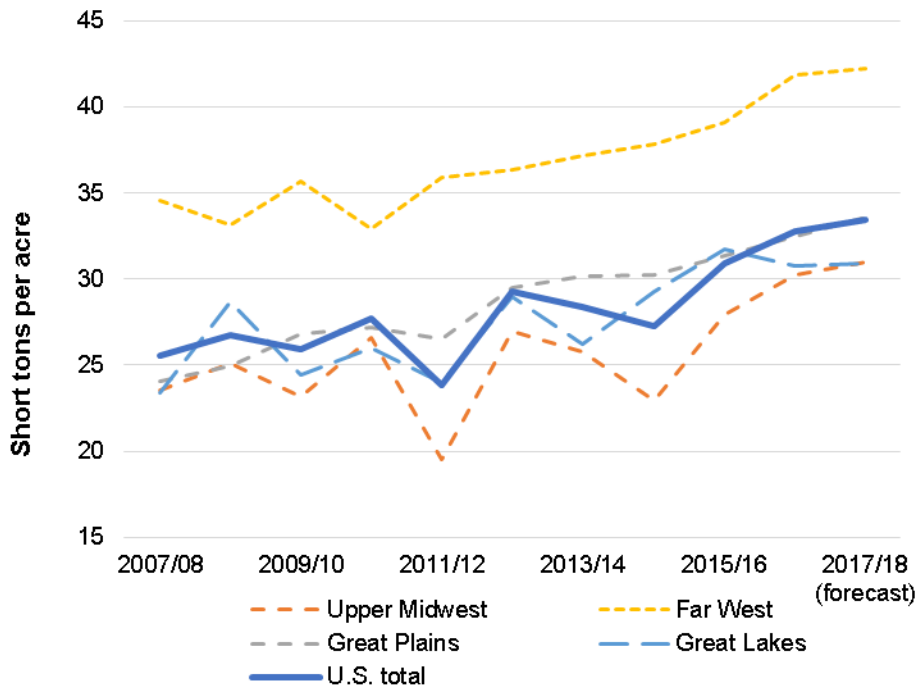
Table 4: Sugarbeet harvested area, 2015/16 to 2017/18, August 2017

State	2015/16	2016/17	2017/18	Annual Change
		1,000 acres		*percent*
Minnesota	435.0	417.0	405.0	-2.9
North Dakota	206.0	203.0	192.0	-5.4
Idaho	172.0	170.0	167.0	-1.8
Michigan	151.0	149.0	142.5	-4.4
Nebraska	46.8	47.2	48.4	2.5
Montana	43.7	45.3	42.0	-7.3
Wyoming	31.2	30.0	27.1	-9.7
Colorado	27.3	27.6	28.1	1.8
California	24.7	25.0	25.2	0.8
Oregon	7.7	10.2	8.8	-13.7
Wasington	N/A	1.9	1.8	-5.3
U.S. Total	1,145.4	1,126.2	1,087.9	-3.4

Source: U.S. Dept. of Agriculture, National Agricultural Statistics Service.

The August *Crop Production* report forecast a record national sugarbeet yield for the 2017/18, which would continue the trend of improved yields over the past 10 years. The largest producing region in the Upper Midwest—which includes Minnesota and North Dakota—is also forecast to have record yields, which largely underlies the strong national forecast. Yields in the Far West, which are typically higher due to the prevalence of irrigation systems, are also forecast to increase to a higher level. Overall, favorable growing conditions, along with continued technical productivity enhancements, offset the forecast decline in harvested area. As a result, the sugarbeet production forecast of 36.345 million tons would be the second-largest crop, behind the previous year's record-setting production.

Figure 5
Yields, sugarbeets, by region, 2007/08 to 2017/18



Source: U.S. Department of Agriculture, National Agricultural Statistics Service.

Total imports in 2017/18 are projected to be 3.631 million STRV, a 73,000 STRV-increase from the July projection. Imports under quota programs are increased from the previous month by 158,000 STRV and are projected to be 1.707 million STRV. This is entirely due to the increase in the 2016/17 raw sugar TRQ and decision to extend the imports under the quota through the end of October—the first month of the 2016/17 fiscal year. Imports under the re-export program are increased 25,000 STRV to 200,000 STRV, offsetting the decrease registered for the 2016/17 estimate. Imports from Mexico are projected to total 1.714 million STRV, a 110,000-STRV decrease from the July projection. Shipments from Mexico in 2017/18 are projected to be constrained by available supplies. The increase in the 2016/17 Export Limit are expected to draw down stocks going into 2017/18. As a result, the increased shipments estimated for 2016/17 will have the effect of shifting exports from one period to another, assuming that Mexico's supply outlook remains at its current levels.

Larger projected ending stocks due to higher supplies in 2017/18

Total use in 2017/18 is projected to be 12.603 million STRV, unchanged from the previous month's projection. Domestic deliveries for food and beverage use are projected to be 12.423 million STRV, also unchanged. This would represent a 1.0-percent increase from the 2016/17 estimate. Other domestic deliveries are projected to be 155,000 STRV and exports are projected to be 25,000 STRV, both unchanged from the previous month.

Ending stocks in 2017/18 are projected to be 1.673 million STRV, a 540,000-STRV increase from the July projection due to higher beginning stocks, increased production, and more imports projected. With total use unchanged from the previous month's projection, the stocks-to-use ratio is projected to be 13.3 percent, compared with the previous month's ratio of 9.0 percent.

Special Article: Per Capita Caloric Sweetener Deliveries Decline in 2016, Continuing Downward Trend

Total caloric sweetener deliveries in 2016 totaled 20.702 million short tons, dry basis (tons), down marginally from 2015. This translates to 128.1 pounds per person of delivered sweeteners, a 0.7-percent decline from the previous year. Refined sugar represents a majority of caloric sweetener deliveries, accounting for 54.4 percent, up slightly from the previous year. High-fructose corn syrup (HFCS) accounted for 32.3 percent of sweetener deliveries, declining both in terms of total volume and share of consumption.

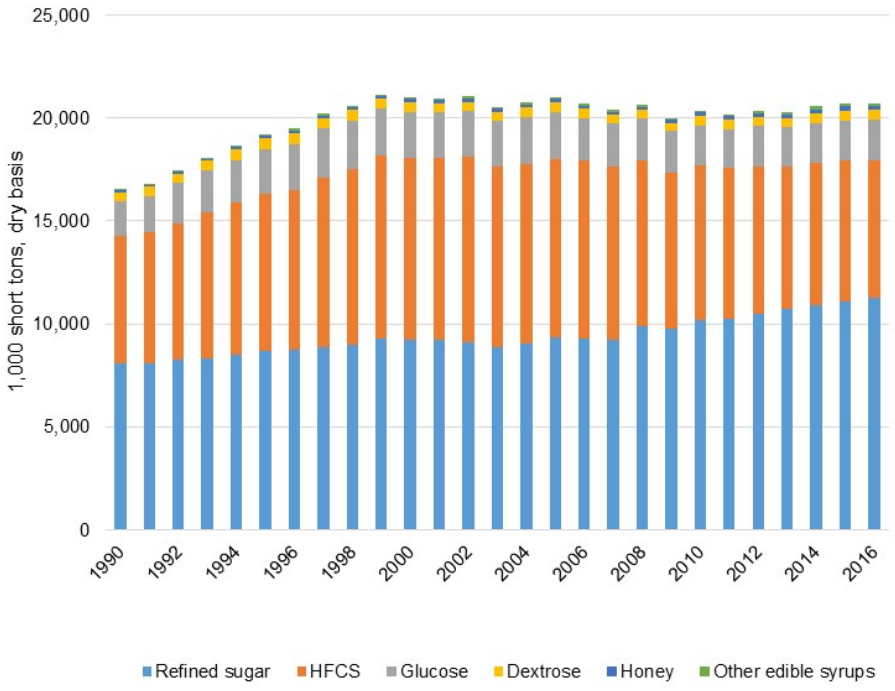
Table 5- U.S. total and per capita estimated deliveries of caloric sweeteners for domestic food and beverage use, by calendar year 1/

Calendar year	U.S. population 2/ (July 1)	Refined sugar 3/	Corn sweeteners: HFCS	Corn sweeteners: Glucose syrup	Corn sweeteners: Dextrose	Corn sweeteners: Total	Pure honey	Edible syrups	Total caloric sweeteners
	Millions								
				1,000 short tons, dry basis					
2005	295.8	9,324	8,707	2,261	481	11,448	156	94	21,022
2006	298.8	9,286	8,643	2,053	463	11,159	174	98	20,718
2007	301.7	9,230	8,432	2,067	448	10,947	141	94	20,412
2008	304.5	9,911	8,021	2,036	419	10,476	151	93	20,631
2009	307.2	9,740	7,630	1,991	417	10,038	141	90	20,009
2010	309.3	10,208	7,487	1,956	450	9,893	160	117	20,379
2011	311.7	10,276	7,282	1,908	446	9,635	169	102	20,183
2012	314.0	10,466	7,187	1,969	420	9,577	174	104	20,321
2013	316.2	10,754	6,914	1,903	415	9,232	183	111	20,280
2014	318.6	10,903	6,911	1,941	472	9,324	207	129	20,563
2015	320.9	11,095	6,824	1,972	476	9,272	207	138	20,712
2016	323.1	11,259	6,690	2,001	443	9,134	202	107	20,702
				Pounds per capita, dry basis					
2005	295.8	63.1	58.9	15.3	3.3	77.4	1.1	0.6	142.2
2006	298.8	62.2	57.8	13.7	3.1	74.7	1.2	0.7	138.7
2007	301.7	61.2	55.9	13.7	3.0	72.6	0.9	0.6	135.3
2008	304.5	65.1	52.7	13.4	2.8	68.8	1.0	0.6	135.5
2009	307.2	63.4	49.7	13.0	2.7	65.3	0.9	0.6	130.3
2010	309.3	66.0	48.4	12.6	2.9	64.0	1.0	0.8	131.8
2011	311.7	65.9	46.7	12.2	2.9	61.8	1.1	0.7	129.5
2012	314.0	66.7	45.8	12.5	2.7	61.0	1.1	0.7	129.4
2013	316.2	68.0	43.7	12.0	2.6	58.4	1.2	0.7	128.3
2014	318.6	68.4	43.4	12.2	3.0	58.5	1.3	0.8	129.1
2015	320.9	69.2	42.5	12.3	3.0	57.8	1.3	0.9	129.1
2016	323.1	69.7	41.4	12.4	2.7	56.5	1.3	0.7	128.1

1/ Per capita deliveries of sweeteners by U.S. processors and refiners and direct-consumption imports to food manufacturers, retailers, and other end users represent the per capita supply of caloric sweeteners. The data exclude deliveries to manufacturers of alcoholic beverages. Actual human intake of caloric sweeteners is lower because of uneaten food, spoilage, and other losses. See Table 51 of the Sugar and Sweeteners Yearbook series for estimated intake of sugar.
2/ Source: U.S. Census Bureau.
3/ Based on U.S. sugar deliveries for domestic food and beverage use.
Source: U.S. Dept. of Agriculture, Economic Research Service, Sugar and Sweeteners Outlook.

Total caloric sweetener deliveries in 2016 continued the trend since the early 2000's of relatively stable volumes. Total sweetener deliveries peaked in 1999 at 21.155 million tons and have leveled off since. The makeup of caloric sweeteners has evolved over this time, however. Although total deliveries have remained relatively stable, refined sugar (extracted from sugarbeet or sugarcane) has accounted for a larger market share of total sweeteners. In 2016, refined sugar accounted for 54.4 percent of total deliveries. By comparison, in 1999, refined sugar accounted for 43.8 percent of total deliveries. The growth in refined sugar market share began to change in 2008, coinciding with the implementation of NAFTA sweetener provisions between the United States and Mexico. Refined sugar deliveries had grown steadily until then, exceeding 50 percent of the market in 2010 and then continuing to trend upward.

Figure 6
Total U.S. caloric sweetener deliveries for food and beverage use, calendar year, 1990 to 2016

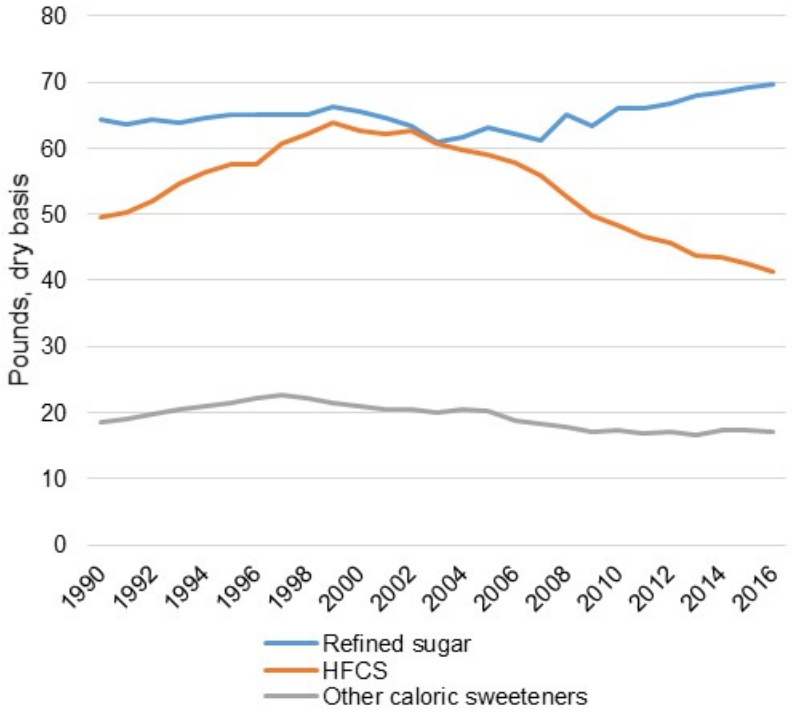


Source:Economic Research Service, U.S. Dept. of Agriculture.

Simultaneously, corn sweeteners have declined, both in terms of volume and market share, over this period. Corn sweeteners, which include high-fructose corn syrup (HFCS) and crystalline fructose, dextrose, and glucose, accounted for 55.2 percent of the sweetener market in 1999. The trends in corn sweeteners have been the opposite of those of refined sugar, as deliveries began declining steadily in 2008, accounting for 44.1 percent of the market in 2016. Much of the decline in corn sweeteners is attributed to the decline in HFCS deliveries. Glucose and dextrose deliveries have been much more stable. HFCS deliveries peaked in 2002—totaling 8.998 million tons—before steadily declining to 6.690 million tons in 2016, a 2.1-percent average annual decline. This period coincided with higher input prices due to global commodity price spikes; the growth of the corn-based domestic ethanol production; increased availability of sugar supplies due to increased imports from Mexico; and heighted attention by food manufacturers and consumers to ingredient labeling.

Taking into account population growth, the trends in per capita sweetener deliveries exacerbate the trends seen in total volume. Per capita refined sugar deliveries have risen about 0.5 percent per year, on average, over the last 15 years. HFCS deliveries have declined 2.7 percent per year over the same period. Other caloric sweeteners, which include corn sweeteners dextrose and glucose, as well as other sweeteners that include honey, maple syrup, molasses syrups, and fructose syrups, make up a relatively minor share of total deliveries.

Figure 7
Per capita U.S. caloric sweetener deliveries for food and beverage use, calendar year, 1990 to 2016



Source:Economic Research Service, U.S. Dept. of Agriculture.

Mexico exports to the United States estimated to increase in 2016/17 due to larger Export Limit

Mexico total sugar supplies in 2016/17 are estimated to be 7.088 million metric tons, actual value (MT), a 9,000-MT increase from the July estimate. The increase is primarily due to a 9,000-MT increase in estimated imports based on the pace of imports reported through May. The increase is expected to be from imports for human consumption, currently estimated at 34,000 MT. The remaining 60,000 MT of imports are expected to be for the IMMEX program.

Production in 2016/17 is estimated to be 5.957 million MT, a fractional increase from the previous month. The increase represents preliminary final production tallies subsequent to the end of the national harvest campaign, reported by *Comité Nacional para el Desarrollo Sustentable de la Caña de Azúcar* (Conadesuca).

Table 6 -- Mexico sugar supply and use, 2015/16 - 2016/17 and projected 2017/18, August 2017.

Items	2015/16	2016/17 (estimate)	2017/18 (forecast)
		1,000 metric tons, actual weight	
Beginning stocks	811	1,037	981
Production	6,117	5,957	6,100
Imports	83	94	75
Imports for consumption	17	34	25
Imports for sugar-containing product exports, IMMEX 1/	66	60	50
Total supply	7,011	7,088	7,156
Disappearance			
Human consumption	4,387	4,468	4,534
For sugar-containing product exports (IMMEX)	390	390	330
Other deliveries and end-of-year statistical adjustment	-10	0	0
Total	4,767	4,858	4,864
Exports	1,207	1,248	1,476
Exports to the United States & Puerto Rico	1,120	1,083	1,466
Exports to other countries	86	165	10
Total use	5,974	6,106	6,340
Ending stocks	1,037	981	816
		1,000 metric tons, raw value	
Beginning stocks	859	1,099	1,040
Production	6,484	6,315	6,466
Imports	88	99	80
Imports for consumption	18	36	27
Imports for sugar-containing product exports (IMMEX)	70	64	53
Total supply	7,431	7,513	7,586
Disappearance			
Human consumption	4,650	4,736	4,806
For sugar-containing product exports (IMMEX)	413	413	350
Other deliveries and end-of-year statistical adjustment	-10	0	0
Total	5,053	5,149	5,156
Exports	1,279	1,323	1,565
Exports to the United States & Puerto Rico	1,187	1,148	1,554
Exports to other countries	92	175	11
Total use	6,332	6,473	6,721
Ending stocks	1,099	1,040	865
Stocks-to-human consumption (percent)	23.6	22.0	18.0
Stocks-to-use (percent)	17.4	16.1	12.9
High fructose corn syrup (HFCS) consumption (dry weight)	1,482	1,484	1,484

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

Source: USDA, *World Agricultural Supply and Demand Estimates* and Economic Research Service, Sugar and Sweeteners Outlook; Conadesuca.

Estimated domestic deliveries for human consumption in 2016/17 are 4.468 million MT, a 6,000-MT increase from the July estimate. The change aligns with updated market estimates released by Conadesuca subsequent to the last WASDE release. Through June, sugar deliveries for consumption totaled 3.518 million MT, nearly unchanged from the same period the previous year. High-fructose corn syrup (HFCS) deliveries have increased 4.7 percent over the same period, resulting in a 1.1-percent increase in total sweetener deliveries.

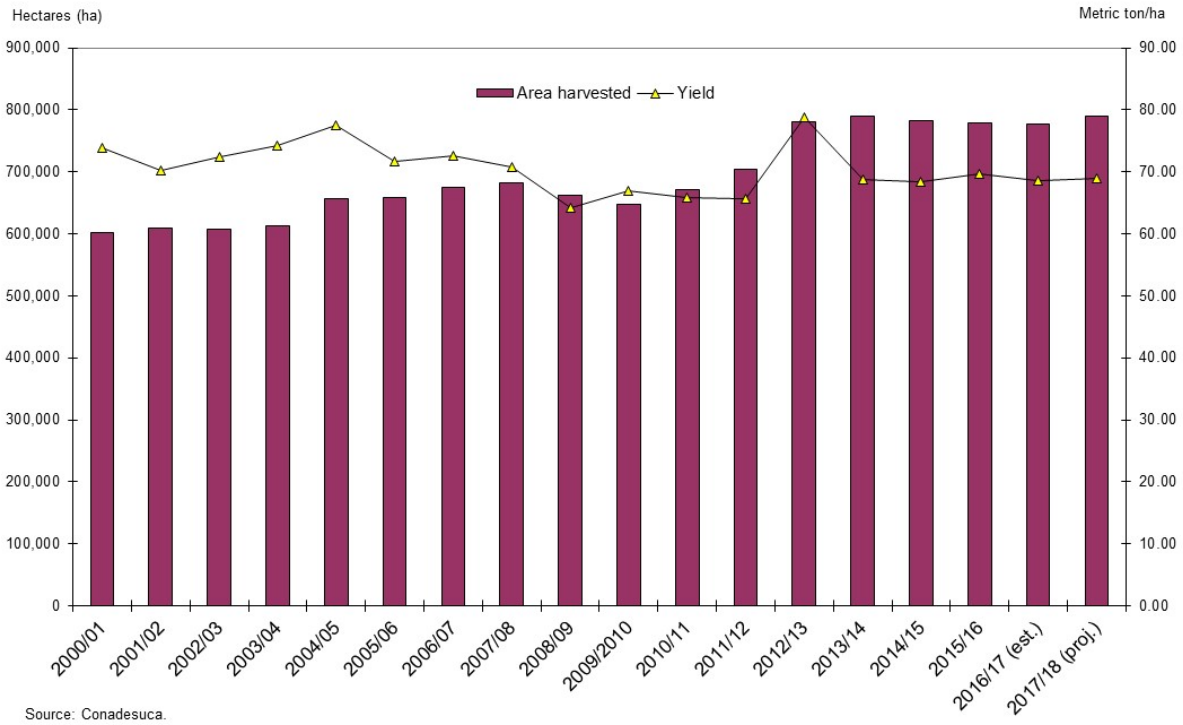
Estimated exports for 2016/17 are 1.248 million MT, an 89,000-MT increase from the July estimate. The increase reflects the increased access to the U.S. market through the USDOC-raised Export Limit, with estimated shipments to the United States totaling 1.083 million MT.

With the increase in domestic deliveries and exports, estimated total use for 2016/17 is 95,000 MT larger than the July estimate, totaling 6.106 million MT. Along with the increase in total supplies, estimated ending stocks are reduced 87,000 MT to 981,000 MT. This results in a stocks-to-consumption ratio of 22.0 percent, compared with 23.9 percent in the July report.

Mexico supplies in 2017/18 expected to constrain exports

Total supplies in 2017/18 are projected to be 7.156 million MT, an 87,000-MT reduction from the July projection. The decrease is due to lower beginning stocks, carrying over from the changes to the 2016/17 market balance. Projected production is unchanged, at 6.100 million MT. With no reporting of the 2017/18 crop released yet from Mexican organizations, the current projection is based on harvested area of 790,000 hectares, which would be on the upper end of historical performance, and yield and recovery rates in line with historical averages and trends. Projected imports remain unchanged at 75,000 MT.

Figure 8
Mexico sugarcane, area harvested and yield, 2000/01-2017/18



Source: Conadesuca.

Domestic deliveries in Mexico for 2017/18 are projected to be 4.864 million MT. Domestic deliveries for human consumption are raised to 4.534 million MT, a 6,000-MT increase from the July projection. The increase keeps per capita deliveries the same as the revised 2016/17 deliveries estimates. Deliveries to the IMMEX program are projected to be 330,000 MT, unchanged from the July report but lower than the current 2016/17 estimate.

Exports for 2017/18 are projected to be 1.477 million MT, a 94,000-MT reduction from the previous month. Exports to the United States are projected to be 1.467 MT, which represents the entirety of the reduction. Export projections are constrained by the projected Export Limit at the higher bound and by adequate stock-holding on the lower bound. Adequate stock-holding is determined as enough ending stocks to satisfy 18 percent of domestic consumption, the minimum inventory to satisfy domestic consumption between the end of the fiscal year and when supplies from the subsequent year's harvest begin to hit the market in December.

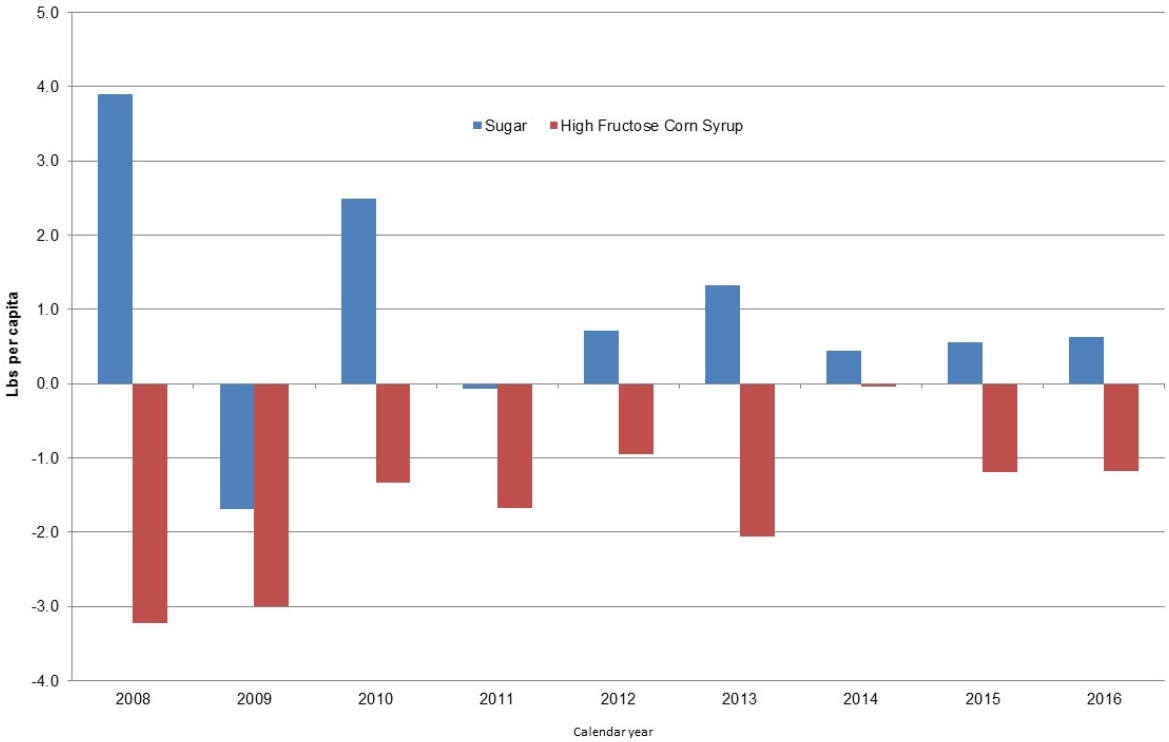
The current projection reflects the lower bound, as the currently projected Export Limit, based on the July WASDE and the supply outlook for Mexico, indicate that Mexico cannot fully meet its U.S. market access volumes and still satisfy domestic demand. As a result, the increase in exports for 2016/17 resulted in reducing beginning stocks and supplies for 2017/18. Therefore, much of the reduction in projected 2017/18 exports is due to the raised export outlook for the previous year's reduction of available supplies. This could have an impact on the timing of the shipments between the 2 fiscal years, as the urgency to fill the 2016/17 Export Limit may be lessened by the likelihood of available volume in the 2017/18 Export Limit. Ultimately, this would not impact the total volume of sugar shipped to the United States over the 2-year period, but it could affect the timing and export-accounting for the 2 years. An additional consideration, however, is that if the U.S. Needs were calculated from the August WASDE, it would be reduced from the July WASDE due to higher domestic production and imports projected to a level close to the lower bound of sugar availability within Mexico. Depending on the evolution of the market outlook in upcoming months, Mexico could potentially have supplies to fully meet the 2017/18 Export Limit.

Ending stocks for 2017/18 in Mexico are projected to total 816,000 MT, a 1,000-MT increase from the previous month. The result would be an 18.0-percent stocks-to-consumption ratio. As mentioned, this is considered the minimum amount of stocks the market should hold to satisfy domestic demand in the first few months of the fiscal year. The increased volume is a result of the slightly raised deliveries projection.

Appendix: Sugar Consumption Trends Since 2008: Background for USDA WASDE Forecasting

The WASDE forecasting approach for sugar deliveries for food and beverage use is a consensus process, using multiple methods and sources of information within the ICEC committee. One method, however, is a regression approach that looks at the U.S. sugar market as one part of a larger sweetener market complex. The following is a description and documentation of this particular approach as evaluated by the ICEC.

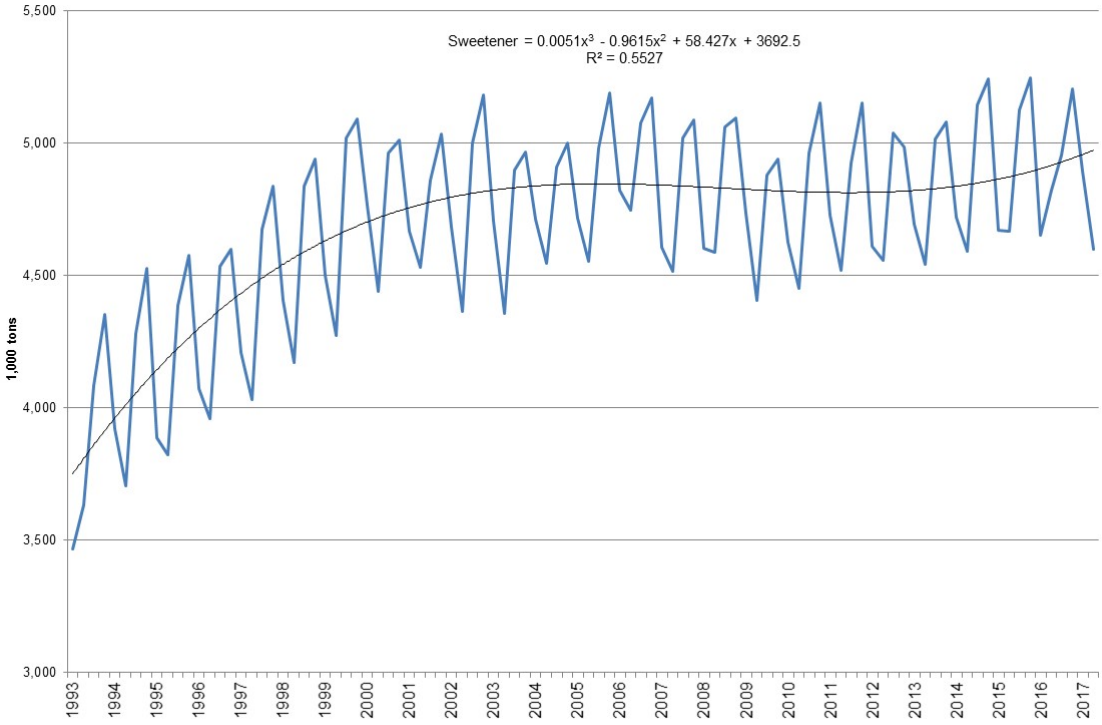
Figure A1
Changes in per capita sugar and high fructose corn syrup deliveries, calendar year 2008 to 2016



Source: U.S. Depart. of Agriculture, WAOB, Sugar ICEC.

Sweetener deliveries (the sum of sugar, high fructose corn syrup (HFCS), and sugar contained in imported product (SCP)) since the early 1990s) can be split into three phases: (1) 1992-1998: growth for sugar and HFCS; (2) 1999-2007: marked per capita decline, due mostly to reductions in HFCS 55 for carbonated soft drinks and flat sugar deliveries; and (3) NAFTA period of 2008-2017, characterized by a return to sugar deliveries growth offsetting a decline in HFCS42.

Figure A2
Trend in quarterly sweetener deliveries, 1993-2017



Source: U.S. Department of Agriculture, World Agricultural Outlook Board, Sugar ICEC.

A single equation for sweetener deliveries for consumption does not account for structural change over the period 1993-2017. The single equation below, although it has a high-adjusted R-squared, performs poorly when compared with three structurally similar but separate equations for the discrete time periods 1993-98, 1999-2007, and 2008-17. The Chow Breakpoint test statistic indicates a better statistical fit for the three equations considered jointly against the single equation covering the entire time period.

Table A1: Regression results, quarterly total sweetener deliveries (refined sugar, HFCS, and sugar containing products).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	4273.459	267.940	15.949	0.000
Quarter 1	-472.892	26.828	-17.627	0.000
Quarter 2	-620.709	21.300	-29.141	0.000
Quarter 3	-127.200	24.627	-5.165	0.000
Trend	46.105	16.040	2.874	0.005
AR(1)	0.509	0.098	5.218	0.000
AR(2)	0.443	0.097	4.577	0.000
R-squared	0.931	Mean dependent var		4681.307
Adjusted R-squared	0.926	S.D. dependent var		384.259
S.E. of regression	104.481	Akaike info criterion		12.227
Sum squared resid	993374.818	Schwarz criterion		12.412
Log likelihood	-592.145	Hannan-Quinn criter.		12.302
F-statistic	203.507	Durbin-Watson stat		2.154
Prob(F-statistic)	0.000			
Inverted AR Roots	0.97	-0.46		

Chow Breakpoint Test: Quarter 1 1999; Quarter 1 2008.
Null Hypothesis: No breaks at specified breakpoints

Equation Sample: 1993Q1 2017Q2

F-statistic	4.515318	Prob. F(14,77)	0
Log likelihood ratio	60.97367	Prob. Chi-Square(14)	0
Wald Statistic	333.3327	Prob. Chi-Square(14)	0

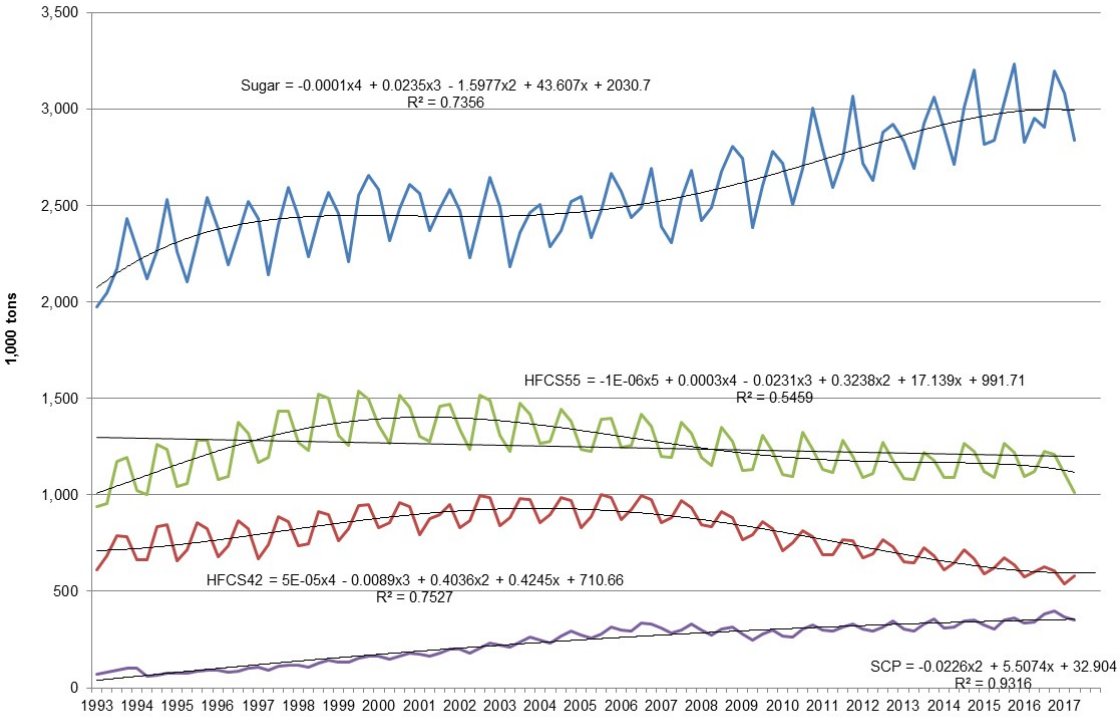
The null hypothsis is rejected, meaning that three similarly specified equations for the periods of 1992-1998, 1999-2007, and 2008-2017 account for more of the variance from predicted values than does the single equation.

Source: U.S. Depart. of Agriculture, WAOB, Sugar ICEC.

The chart below shows the following trends in sweetener components:

- Sugar – growth 1992-1998 and 2008-2017 but flat 1999-2007.
- HFCS 55 – growth 1992 – 1998; reduction 1999 – 2007 but slow leveling 2008-2017.
- HFCS42 – growth 1992 – 1998 with some leveling off 1999 – 2007; sustained reduction 2008 and after.
- Sugar Contained in Imported Product (SCP) – good growth over entire period.

Figure A3
Trends in quarterly sweetener deliveries, by category, calendar year 1993-2017.



Source: U.S. Department of Agriculture, World Agricultural Outlook Board, Sugar ICEC.

Similar to overall sweeteners, breaks in the sugar delivery trend over 1992-2017 are indicated by econometric analysis with breakpoints at 1999 and 2008. That is to say, there was a fundamental change in the pattern of deliveries corresponding to those years.

Table A2: Regression results, refined sugar, quarterly, 1992 to June 2017.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	2206.204	31.526	69.981	0.000
Quarter 1	-185.073	18.629	-9.935	0.000
Quarter 2	-339.280	20.983	-16.169	0.000
Quarter 3	-170.149	18.612	-9.142	0.000
Trend	29.363	2.053	14.302	0.000
AR(1)	0.478	0.090	5.309	0.000

R-squared	0.905	Mean dependent var.	2392.975
Adjusted R-squared	0.901	S.D. dependent var.	262.951
S.E. of regression	82.925	Akaike info criterion	11.733
Sum squared resid	667032	Schwarz criterion	11.886
Log likelihood	-598.237	Hannan-Quinn criterion	11.795
F-statistic	185.718	Durbin-Watson stat	2.347
Prob(F-statistic)	0.000		

Chow Breakpoint Test: Quarter 1 1999, Quarter 1 2008.
Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables

F-statistic	6.500	Prob. F(10,87)	0
Log likelihood ratio	67.320	Prob. Chi-Square(10)	0
Wald Statistic	103.952	Prob. Chi-Square(10)	0

Source: U.S. Depart. of Agriculture, WAOB, Sugar ICEC.

The same result holds true for modelling 1999 to 2017 with a breakpoint at 2008.

Table A3: Regression results, refined sugar, quarterly, 1999 to June 2017.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	2118.208	57.835	36.625	0.000
Quarter 1	-177.244	23.527	-7.534	0.000
Quarter 2	-330.767	26.407	-12.526	0.000
Quarter 3	-162.117	23.489	-6.902	0.000
Trend	33.784	3.388	9.970	0.000
AR(1)	0.462	0.108	4.292	0.000

R-squared	0.869	Mean dependent var.	2482.716
Adjusted R-squared	0.859	S.D. dependent var.	235.348
S.E. of regression	88.262	Akaike info criterion	11.878
Sum squared resid	537522	Schwarz criterion	12.064
Log likelihood	-439.437	Hannan-Quinn criterion	11.952
F-statistic	91.429	Durbin-Watson stat	2.302
Prob(F-statistic)	0.000		

Chow Breakpoint Test: Quarter 1 2008
Null Hypothesis: No breaks at specified breakpoints

F-statistic	10.02268	Prob. F(6,62)	0
Log likelihood ratio	50.50209	Prob. Chi-Square(6)	0
Wald Statistic	61.09051	Prob. Chi-Square(6)	0

Source: U.S. Depart. of Agriculture, WAOB, Sugar ICEC.

Separate regressions for sugar deliveries for periods 1992-1998, 1999-2007, and 2008-2017 show structural differences. Deliveries in FY 2016 were much lower than originally forecast, and so a dummy variable for 2016 (2016=1, zero otherwise) is used in that equation.

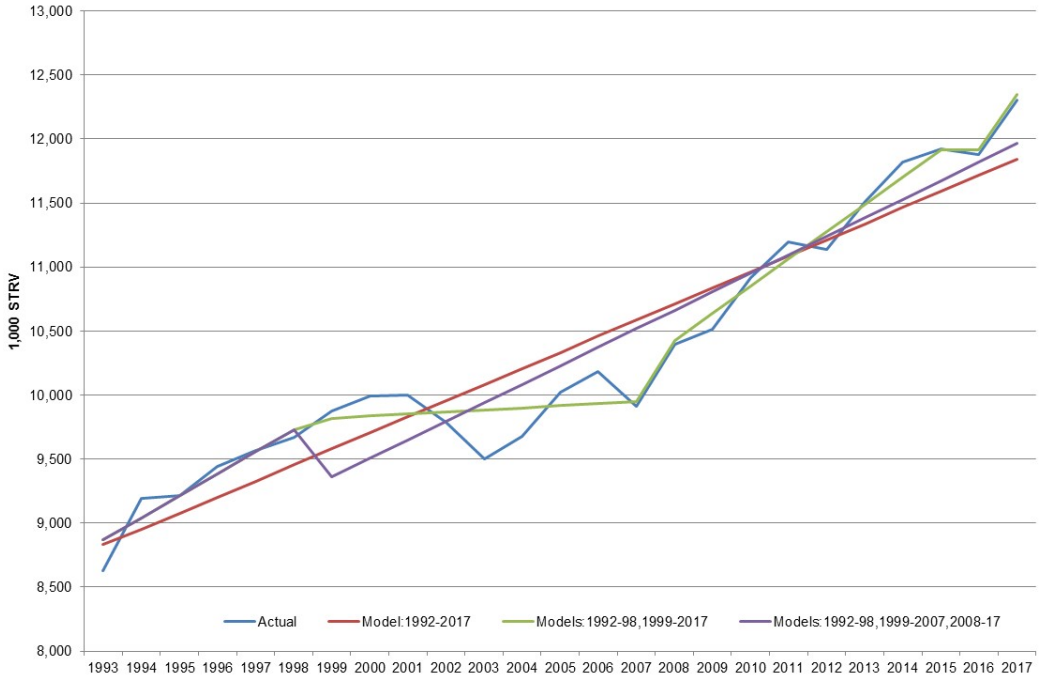
Table A4 - Quarterly regression equations for sugar deliveries for consumption for 1992-1998; 1999-2007; and 2008-2017.

	Time period: 1992 to 1998					Time period: 1999 to 2007					Time period: 2008 to June 2017			
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	2225.544	26.748	83.203	0.000	Constant	2398.467	74.602	32.150	0.000	Constant	1846.044	66.132	27.915	0.000
Quarter 1	-212.447	30.262	-7.020	0.000	Quarter 1	-92.866	25.541	-3.636	0.001	Quarter 1	-261.797	40.025	-6.541	0.000
Quarter 2	-367.405	30.262	-12.141	0.000	Quarter 2	-293.088	28.057	-10.446	0.000	Quarter 2	-373.039	28.504	-13.087	0.000
Quarter 3	-195.544	30.262	-6.462	0.000	Quarter 3	-137.047	24.885	-5.507	0.000	Quarter 3	-197.642	39.970	-4.945	0.000
Trend	40.301	5.350	7.533	0.000	Trend	3.797	6.542	0.580	0.566	Trend	49.862	3.162	15.771	0.000
					AR(1)	0.402	0.170	2.369	0.025	D2016	-49.949	30.452	-1.640	0.111
										AR(1)	-0.389	0.165	-2.363	0.024
R-squared	0.899	Mean dependent var	2152.597		R-squared	0.780	Mean dependent var	2309.194		R-squared	0.903	Mean dependent var	2642.891	
Adjusted R-squared	0.882	S.D. dependent var.	164.650		Adjusted R-squared	0.743	S.D. dependent var.	125.849		Adjusted R-squared	0.885	S.D. dependent var.	196.005	
S.E. of regression	56.616	Akaike info criterion	11.071		S.E. of regression	63.783	Akaike info criterion	11.305		S.E. of regression	66.414	Akaike info criterion	11.395	
Sum squared resid	73723	Schwarz criterion	11.309		Sum squared resid	122050	Schwarz criterion	11.569		Sum squared resid	141147	Schwarz criterion	11.694	
Log likelihood	-149.992	Hannan-Quinn criter	11.144		Log likelihood	-197.486	Hannan-Quinn criter	11.397		Log likelihood	-215.204	Hannan-Quinn criter	11.502	
F-statistic	51.339	Durbin-Watson stat	2.090		F-statistic	21.251	Durbin-Watson stat	2.009		F-statistic	49.829	Durbin-Watson stat	1.999	
Prob(F-statistic)	0.000				Prob(F-statistic)	0.000				Prob(F-statistic)	0.000			

Source: U.S. Depart. of Agriculture, WAOB, Sugar ICEC.

Following chart plots actual annualized deliveries against 1993-2017 and 1999-2017 single equation fitted values and values from the three other equations covering the same time horizon. Note differences for FY 2017 forecast showing equation covering 2008-17 yield higher forecast than equations for 1993-2017 and 1999-2017.

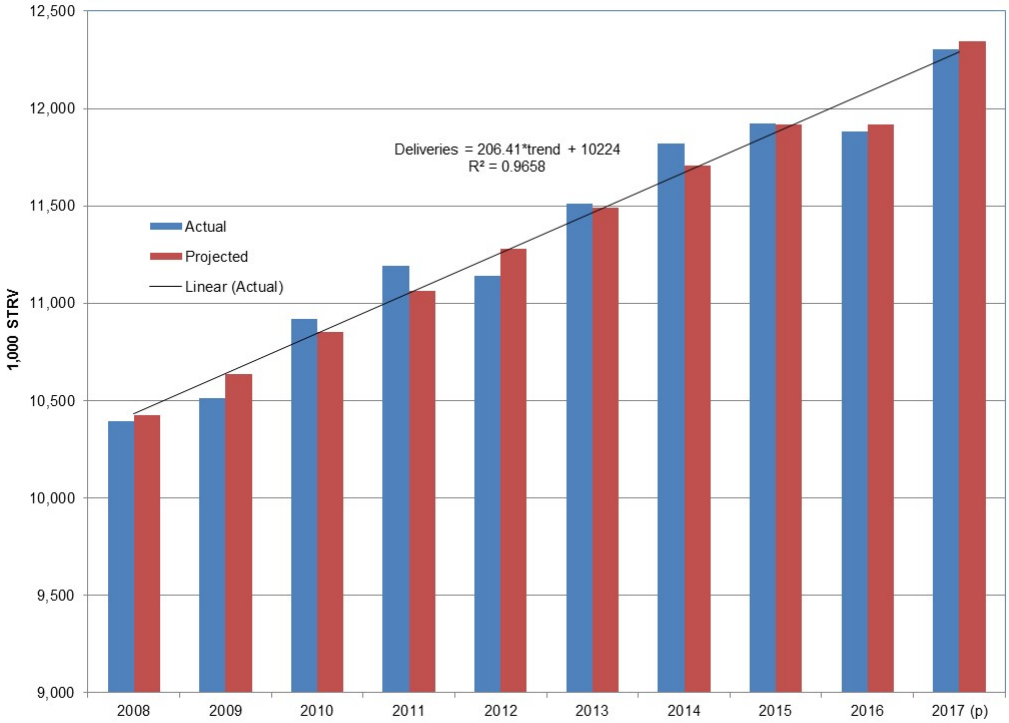
Figure A4
Annual deliveries for human consumption, model forecasts vs actual, 1993 to 2017



Source: U.S. Department of Agriculture, WAOB, Sugar ICEC.

The following chart focuses specifically on actual versus 2008-17 model forecast for sugar deliveries. The forecast for 2016/17 deliveries for human consumption in the July WASDE 2016/17 is 12.300 million STRV, consistent with the forecast in the following chart.

Figure A5
U.S. sugar deliveries for consumption, projected vs actual, 2007/08 to 2016/17.



Note: Actual for 2017 inludes actaul deliveries for first 3 quarters plus projected for the final quarters.
Source: U.S. Depart. of Agriculture, WAOB, Sugar ICEC.

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