

Chapter 5. Sugar

This chapter describes the market situation and highlights the medium-term projections for world sugar markets for the period 2019-28. Price, production, consumption and trade developments for sugar beet, sugar cane, sugar, molasses and high-fructose corn syrup are discussed. The chapter concludes with a discussion of important risks and uncertainties affecting world sugar markets during the coming ten years.

5.1. Market situation

Following a record production in the 2017 season year (October 2017-September 2018), a smaller surplus is estimated for 2018. The contraction in output is mostly due to unfavourable weather conditions, which negatively affected yields in major producing countries such as India, Thailand, and Europe. For the last two years, India has surpassed Brazil as the world's largest sugar producer. Despite increases in domestic production, the People's Republic of China (hereafter "China") continues to be a major sugar importer.

Although demand growth has slowed in recent years due to a decrease in world population growth rates and increasing concerns over the potential health effects of excessive sugar consumption, growth in sugar intake continues to remain strong in many developing countries, where per capita consumption is relatively low. Sugar inventories are building up in India, following bumper crops, while destocking is taking place in the European Union and the United States, resulting in a relatively stable global stock-to-use ratio.

World nominal sugar prices were relatively depressed for much of the 2017 season, dropping to levels of about ten years ago, underpinned by a supply glut. Prices would have dropped even lower if Brazil had not diverted sugarcane from sugar to ethanol production. However, several sugar exporters such as India, Mexico and Australia experienced an increase of their export prices for much of 2018 due to the appreciation of the US dollar.

5.2. Projection highlights

Starting at relatively low levels, raw and white sugar prices in real USD terms are projected to rebound over the next four years and then follow a slight downtrend to return to USD 285/Mt in 2028. Under the assumption of a constant oil price, the profitability of the highly mechanised sugar sub-sector is expected to decrease over time. In nominal USD terms, prices are projected to pursue a moderate upward trend (+1.3% p.a. on average). A relatively tight white sugar premium (difference between white and raw sugar prices) in the 2018 season (USD 70/Mt nominal terms) is expected to widen slightly up to USD 88/Mt over the projection period, but will stay lower than the average of the last decade (USD 93/Mt).

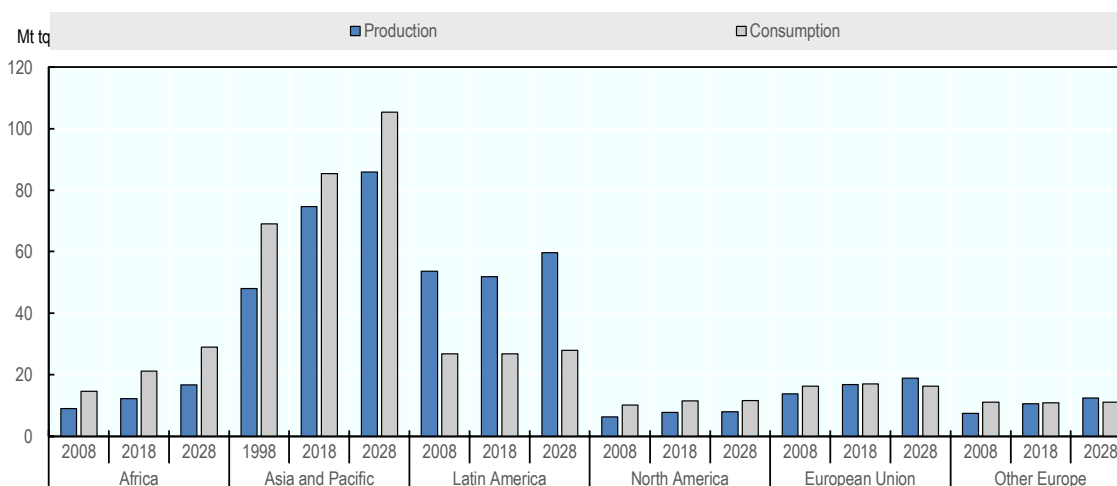
Assuming normal weather conditions, both sugarcane and sugar beet production are foreseen to continue to expand, driven by remunerative returns in comparison to alternative crops and by policies that support sugar or sugar crop-based ethanol production. Sugarcane, cultivated predominantly in tropical and sub-tropical countries in Africa, Asia and Latin America and the Caribbean, will remain the dominant sugar crop (about 86%). Compared to sugar beet, a higher growth in sugarcane yields is foreseen, while areas are expected to expand at the same rate for both crops.

Over the next ten years, global sugar production is projected to expand by 14%, from 178 Mt in the base period (September 2016 to October 2019) to 207 Mt in 2028, with 85% of the projected increase originating in developing countries. The economic assumptions underlying the projections imply that Brazil's sugar export prices remain attractive enough to create productivity gains throughout the sugar value chain. The sugar sub-sector is expected to face increasing competition from the use of sugarcane for ethanol production, despite relatively low oil prices, since Brazil's Renovabio programme (adopted in December 2017) will support ethanol production over the next decade. Brazil is expected to recapture India's recent position as the world's largest sugar producer for two seasons, stabilising for just over a sixth of the world's sugar output (compared to a fourth a decade

ago). In absolute terms, and when compared to the base period, major changes in global production are projected in India (+5.7 Mt), Thailand (+3.0 Mt), China (+2.9Mt) and Brazil (+2.5 Mt). Globally, the average annual growth rate of sugar production is foreseen to be slightly lower over the next decade compared to the previous one, especially in OECD countries and the main Asian producers.

Global demand for sugar is expected to rise to 203 Mt in 2028, which is 32 Mt more than in the base period, mainly driven by rising sugar consumption in Asia, Middle East and North Africa. In per capita terms, however, a slowdown is foreseen in those regions and a decline is expected in high consuming countries. Consumption of the main alternative caloric sweetener, high fructose corn syrup (HFCS), is projected to increase by 1.6 Mt to reach 15 Mt in 2028. Sugar and HFCS will continue to represent respectively 80% and 10% of the sweetener market. In several developed countries, and certain developing countries (e.g. Brazil, Egypt, Mexico, Paraguay, South Africa, Turkey), high levels of sugar consumption have raised health concerns (obesity, diabetes, and other associated health issues) to the point of triggering policy actions such as the introduction of taxes on high caloric sweeteners (sugar and HFCS). The effect of such taxes could be more effective if they are part of a broader public health strategy framework, which includes policies to promote balanced diets and physical activity; governments nevertheless gain from higher tax revenues and have started to introduce these taxes over the past few years, including in Asia.

Figure 5.1. Supply and demand of sugar by region



Note: data are expressed on a tel quel basis (tq)

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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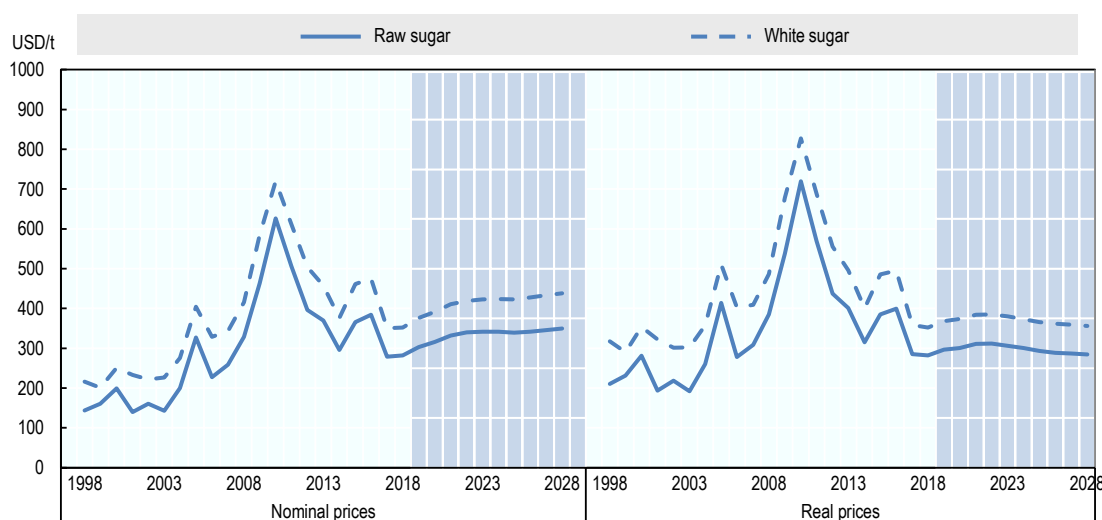
Global policy changes and government-to-government free trade agreements are expected to create new world trade dynamics. Brazil is expected to continue to dominate world trade in sugar; its share of the market, which has declined in recent years, is foreseen to rebound in the early 2020s, but Thailand is expected to remain a major competitor to fill the gap with supplies into expanding markets in Africa, the Middle East, and Asia. Trade tensions between large exporters will continue to dominate the market, with complaints to the WTO over subsidies and other forms of supports likely to persist.

5.3. Prices

Real sugar prices are low at the start of the outlook period and close to the historically low levels that occurred during the bumper crop seasons in 2006, 2014 and 2017. Prices are foreseen to slightly rebound for about four years, sustained by a production that resumes slowly from its current level. For the remainder of the project period, prices are expected to follow a downward trend reaching levels in 2028 that are similar to the current level. This downward trend is driven by an expected slowdown in demand growth over the next decade, even in countries where per capita consumption is low compared to the world average, and abundant sugar supplies. The stocks are not anticipated to increase much and the stock-to-use ratio is expected to return smoothly to below its long-term average of 48%.

Average sugar prices in real terms over the next decade are expected to be lower than the average of the last 20 years, but higher when expressed in nominal terms. By 2028, the nominal world price is projected to be USD 350/t (USD 15.9cts/lb) for raw sugar and USD 438/t (USD 19.9cts/lb) for white sugar (Figure 5.2). The white sugar premium is currently low with higher white sugar deliveries from the European Union, and increasing refining capacities in Middle Eastern countries and Algeria. The premium is expected to increase slowly to USD 88/t in nominal terms at the end of the outlook period.

Figure 5.2. Evolution of world sugar prices



Note: Raw sugar world price, Intercontinental Exchange contract No.11 nearby futures price; Refined sugar price, Euronext Liffe, Futures Contract No. 407, London. Real sugar prices are nominal world prices deflated by the US GDP deflator.

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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The phasing out of trade-distorting sugar support policies in some key sugar markets is expected to contribute to a dampening of year-to-year sugar price variations. Recent policy changes on the supply side include the elimination of the sugar quota system in the European Union in October 2017 and the removal of production quota and price support in Thailand at the end of 2017. The renegotiated sugar trade deal between the United States and Mexico, finalised in June 2017, has brought a certain stability to the market. Nonetheless, support programmes that encourage the export of sugar (e.g. India, Pakistan)

can have significant negative effects on prices. Reforms on the demand side seem to have less price impact as changes in consumer behaviour are rarely immediate. In general, these reforms refer to sugar taxes on caloric sugar-sweetened beverages that aim to fight obesity and other health-related issues that are already in place in several countries.

5.4. Production

Sugar crop farming is foreseen to expand in many parts of the world, given its specific advantage that allows sugar mills to shift between sugar and ethanol production, depending on their respective remunerative prices. Sugarcane accounts for around 86% of the sugar crops and sugar beet makes up the remainder. Sugarcane is a perennial crop which grows mainly in the tropical and sub-tropical regions. The same plants can be harvested for several years, although at declining yields which makes them less substitutable than annual crops. In addition to sugar and ethanol, sugarcane can also generate derivatives such as electricity (through bagasse surplus) and bioplastics. However it remains a water-intensive crop. Conversely, sugar beet is an annual crop, cultivated mostly in temperate zones. All parts of the crop are used to produce a wide range of products, from food (sugar), feed, bio-based products for the industry (pharmaceuticals, plastics, textiles and chemicals), and ethanol.

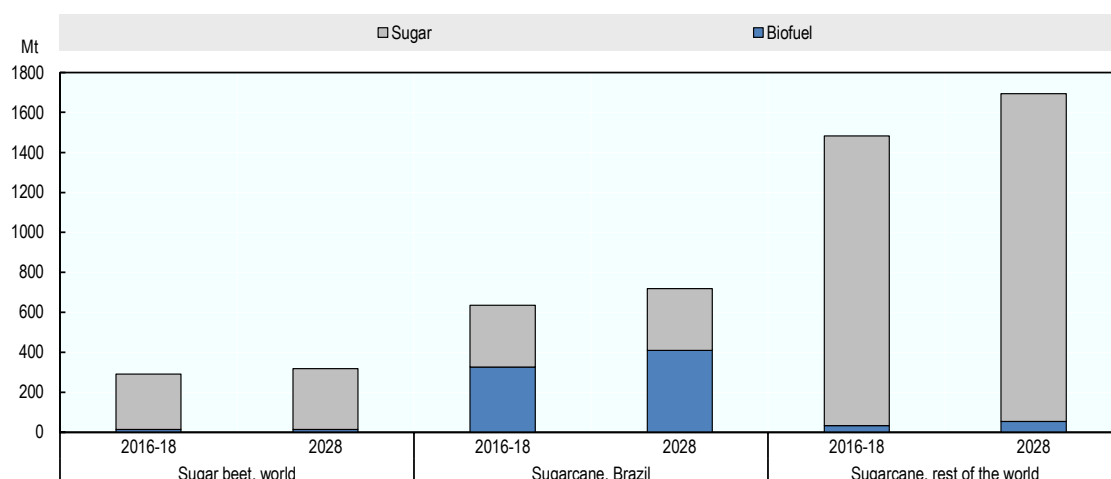
Over the outlook period, increases in production for both sugar crops are foreseen to come from higher yields rather than area expansion. Production of sugarcane, the main sugar crop, is projected to grow by 1.3% p.a., slightly lower than during the last decade, with Brazil anticipated to contribute to 44% of the change in global output volume. Prospects are relatively less robust for sugar beet with an anticipated lower production growth (+1% p.a.) compared to the last decade (+2.4% p.a.) (Figure 5.3); some expansion is expected in Egypt, Turkey, the European Union, China, the Russian Federation, and Ukraine. However, in the European Union, the ban on the use of some neonicotinoids that came into effect on 1 January 2019 will contribute to lowering beet yields for a couple of years until acceptable practices are put in place and more pesticide-resistant seeds are used. In the highly supported US sugar sector, where both sugar crops are cultivated, increasing input costs will dampen production growth of sugar beet, while some growth in sugarcane production is expected since this crop is more stable given its perennial nature.

Relative to the base period, the share of sugarcane allocated to sugar production is expected to decline by 4% while it will remain more or less flat in the case of sugar beet. This means that the share of world sugar crops used for world ethanol production is expected to increase from 18% in the base period to 21% in 2028. Brazil will continue to be the main producer of sugar and sugarcane-based ethanol, producing 37% of the world's sugarcane by 2028, which will be used for 18% of global sugar production and 88% of global sugarcane-based ethanol production (versus 19% and 91%, respectively, during the base period).

Growth in world sugar production is expected to slow to 1.5% p.a. over the projection period compared to 1.7% p.a. in the previous decade. Most of the production increases are expected to occur in developing countries, which will represent 77% of global sugar production in 2028 (compared to 75% during the base period). The leading regions are Asia and Latin America. Asia is projected to expand its share in global production from 39% during the base period to 42% in 2028. Latin America, on the other hand, is expected to play a smaller role in global production, with their share decreasing from 31% during the base period to 29% in 2028. This drop is mostly due to a lower contribution from Brazil, the biggest supplier to the global output. The country has been dealing with persistent indebtedness for the last ten years and this will weigh on the pace of growth of investment in productivity and cane renewal for the coming years. Its sugar sub-sector will also

continue to be challenged since more than half of its sugarcane will be used for ethanol production. Brazil's dominance as the world's top producer and exporter will be maintained over the outlook period. At the end of the projection period, sugar production in Brazil is projected to reach 36 Mt (+2.5 Mt compared to the base period, about 3.3 Mt less than the increase foreseen in India).

Figure 5.3. World sugar crops production



Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

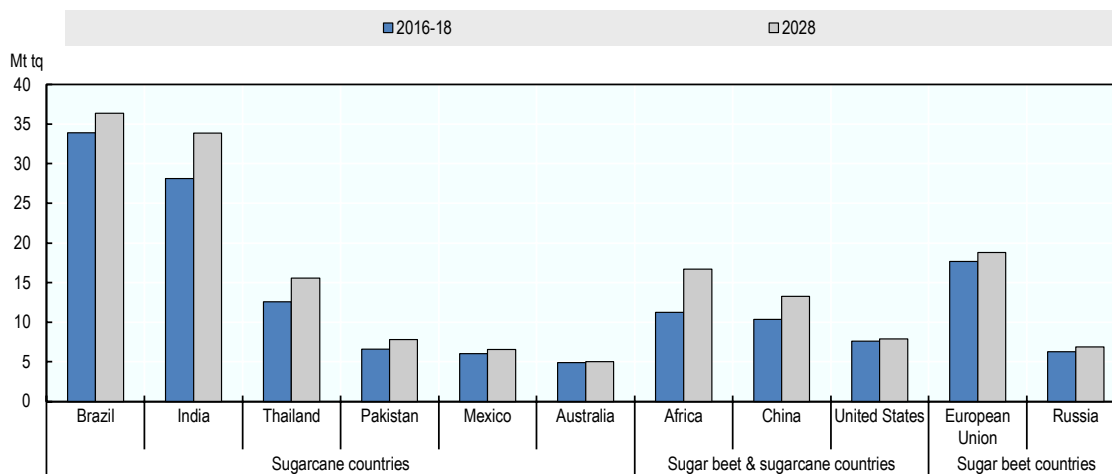
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The world's second largest sugar producer is India, where production is expected to expand more steadily, partly driven by renewed public support to the sub-sector. On the back of robust domestic demand for sugar, production is expected to increase by 5.7 Mt over the next decade, reaching 34 Mt in 2028. Thailand will maintain its market position as the world's fourth largest producer (the European Union is the third largest), but is projected to experience a slower growth compared to recent years due to the elimination of price supports from January 2018 onwards and the fact that sugarcane expansion occurs in areas less suitable for production. Thailand is projected to produce as much as 15.6 Mt by 2028. China is projected to experience an accelerated growth in sugarcane and sugar beet production during the first years of the projection period, supported by the 2015-2020 National Plan, but production costs are expected to remain high when compared to neighbouring countries. To limit competitive imports, the government increased the out-of-quota duty for some specific countries from 50% to 95% in May 2017, and extended it to all origins as of 1 August 2018. By 2028, sugar production in China is projected to reach 13.3 Mt. In Pakistan, with a government still strongly supporting sugar through guaranteed prices to farmers, production is foreseen to increase but at a much lower growth rate per annum, 2% compared to 6.5% during the last decade to reach 7.8 Mt in 2028.

In Africa, growth in output will be driven by strong domestic demand for sugar as well as trade opportunities. Sugar output is projected to increase by 48% to reach 16.7 Mt by the end of 2028 compared to the base period as a result of production expansion in Sub-Saharan countries supported by investments at the farm and mill levels. Despite this production growth, the continent will continue to represent a small share of the world market (8% in 2028).

Developed countries accounted for nearly a third of the increase of global sugar output during the last decade. This share, however, is projected to decrease to 15% over the forecast period (Figure 5.4). Whereas production growth in the developing world is projected to be 1.7% p.a., it will be only 1.0% p.a. in the developed world. Relative to the base period, the main increases in developed countries are projected to occur in South Africa and the European Union (each +1.1Mt), the Russian Federation (+0.6Mt), Ukraine (+0.4 Mt), and the United States (+0.3 Mt). The European Union will maintain its position as the world's third largest producer, although production is projected to slow down during the first years of the outlook period due to lower beet yields. Sugar in South Africa is projected to expand, shielded by higher import duties (from USD 566/t to USD 680/t in August 2018); increasing inputs costs and frequent tensions between mills and workers hamper further growth. In the Russian Federation, efforts were made to modernise the industry, increase yields, and daily processing capacities; some consolidation is still expected in the coming years, but the country will remain dependent on weather conditions. Not much change is expected in the United States as the sugar sub-sector remains heavily influenced by government policies that support domestic production. These policies include the Sugar Loan Program that support prices paid to farmers, the Sugar Marketing Allotments to force or to encourage producers to fulfil 85% of domestic consumption, the Feedstock Flexibility Program to divert any sugar surplus to ethanol production rather than sugar loan forfeitures to the USDA's Commodity Credit Corporation, and trade barriers that limit imports (through tariff rate quotas, regional agreements, and Export Limits for Mexico).

Figure 5.4. Sugar production classified by crop



Note: Data are expressed on a tel quel basis (tq)

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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World sugar stock levels are relatively high at the beginning of the projection period, due mainly to ample supplies in India, even if the European Union and the United States released some stocks on the market in 2018. Global stocks are expected to increase moderately over the next decade. The global stock-to-use ratio is projected to decline to 43.6% in 2028, from 47.3% in the base period.

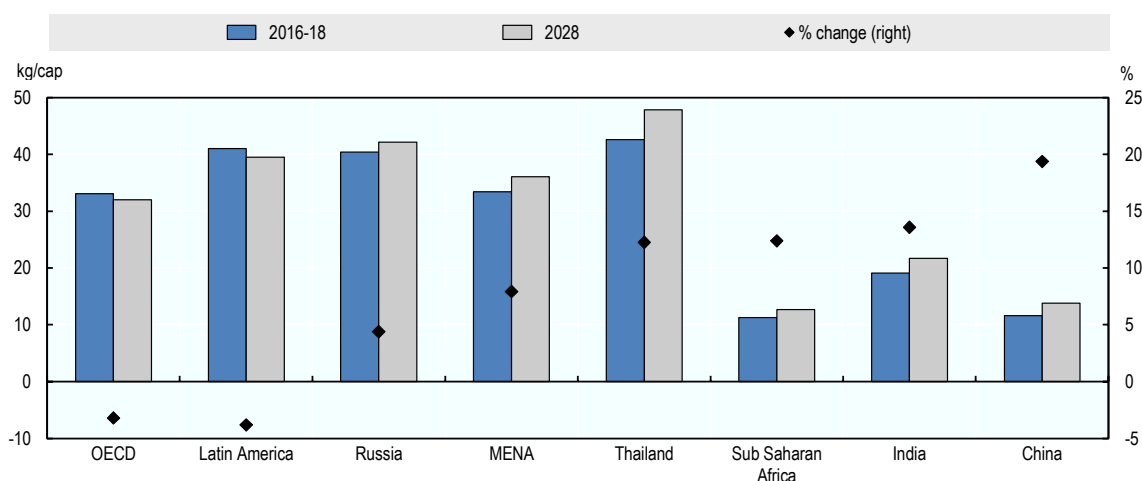
5.5. Consumption

Global sugar consumption is projected to continue growing at around 1.6% p.a., reaching 203 Mt in 2028. It will be influenced by the slight slowdown in population growth, sluggish global economic growth, and rising concerns over the potential effects of excessive sugar consumption. Over the outlook period, the average world level of per capita consumption is expected to increase from 22.7 kg/cap to 24.2 kg/cap, although considerable variations between regions and countries will occur (Figure 5.5).

Increases in global sugar consumption over the next ten years are expected to come mainly from the developing countries, which will account for 98% of the additional demand. The largest contributions to additional demand will occur in Asia (69%) and Africa (27%), two sugar deficit regions. With higher demand for processed products, sugar-rich confectionery and soft drinks, growth prospects are high in urban areas in Asian and African countries where the levels of consumption are low compared to other regions. Conversely, little growth is foreseen in Latin America where consumption is already high.

In Asia, it is expected that India, followed by China, Indonesia, and Pakistan, will experience the largest increases in sugar consumption. Per capita consumption is very low in China and LDC Asia, less than 10 kg per year during the base period, but the annual growth rate in those countries will not change much compared to the last decade as individuals do not favour sweet products and eating habits change slowly. In Africa, the highest increases in total consumption are projected for Egypt and several Sub-Saharan countries, but per capita consumption will remain below 11 kg per year in LDC Sub-Saharan countries and Nigeria.

Figure 5.5. Per capita sugar demand in major countries and regions



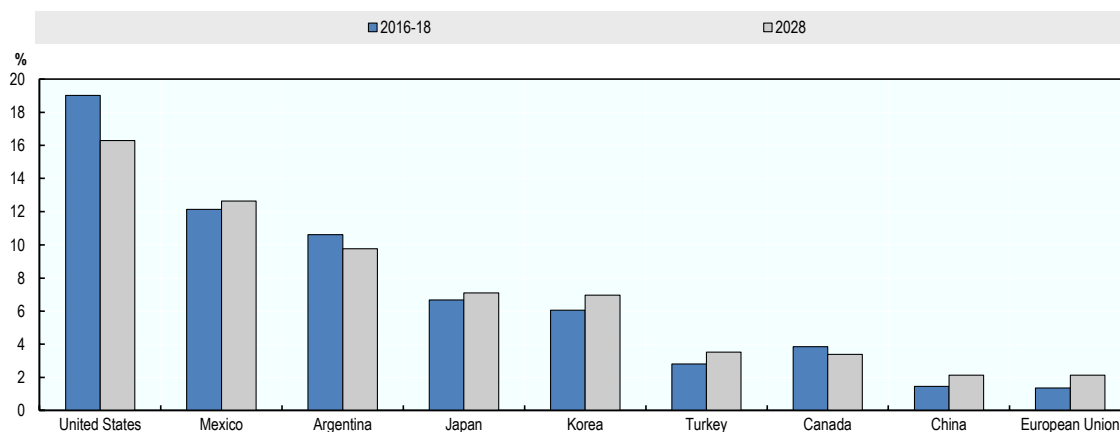
Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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In contrast, the level of sugar intake per person in many developed countries is expected to continue to decline due to increased consciousness of the negative health effects of sugar overconsumption: unhealthy weight gains that raise the risk of diabetes, heart disease and tooth decay. Several countries have implemented taxes on caloric sugary products in an attempt to reduce sugar consumption; Mexico was the first country to do so in 2014. To

counteract the effects of these taxes, some multinationals have managed to reduce portion sizes, decrease the amount of caloric sweeteners, or replace the amounts of sugar by the equivalent amount of artificial sweetener, the latter having a sweeter taste but fewer calories than sugar. The decline in sugar consumption of developed countries is foreseen to be strongest in the European Union as its sugar markets will also face competition with isoglucose (HFCS), the starch-based sweetener whose production was limited before September 2017. The reverse is expected to occur in the United States where the share of sugar in per capita caloric sweetener consumption is projected to increase, from 62% during the base period to 64% in 2028, even if sweetener consumption itself is expected to remain stable. The idea that HFCS is potentially more harmful to health than sugar continues to be debated in the country. In the Russian Federation, conversely, sugar demand is anticipated to continue growing based on good prospects for alcoholic drinks (rum and vodka), even if regulations are locally implemented to reduce heavy drinking, and soft and hot drinks. The debate on a possible taxation of sugar is still in progress.

Figure 5.6. Share of per capita HFCS in sweetener consumption for major consuming countries



Source: OECD/FAO (2019), “OECD-FAO Agricultural Outlook”, OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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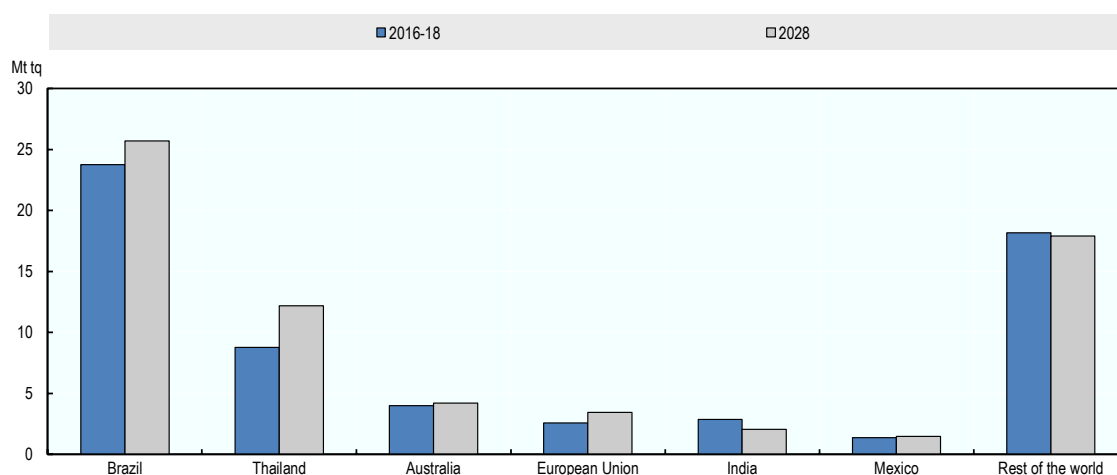
Owing to its competitiveness in sugary soft drinks, HFCS consumption (dry weight) is projected to grow by 12% or 1.6 Mt by 2028. Global consumption will remain limited to a few countries. Like sugar, per capita consumption is assumed to decline in countries where total caloric sugar consumption is high, with China expected to be the main driver of this increase. As the biggest world producer of starch, it is anticipated that China will increase its HFCS supply to fulfil a growing domestic demand. In the European Union, an increase in isoglucose availability was planned following the abolition of the HFCS quota in 2017 in the sugar deficit countries of the region; it is assumed to be less pronounced than predicted due to its relatively higher price compared to sugar. Consumption growth is also expected – to a lesser degree – in Mexico. In the latter, the share of HFCS in the demand for sweeteners is expected to slightly increase over the outlook period due to the fact that companies tend to replace sugar by “less sugar” in their soft drinks, and both HFCS and sugar prices are competing. Conversely, in the United States, the leading HFCS producer, demand for HFCS as a share of global consumption of the product is projected to continue to decline from 48% during the base period to 38% in 2028. This reduced demand is a

direct result of the contraction of the market for carbonated soft drinks in the United States due to the desire of some consumers to avoid this sweetener.

5.6. Trade

Over the coming decade, sugar exports (Figure 5.6) are expected to remain highly concentrated, with Brazil keeping its position as the leading exporter (38% of world trade). The weakening of its currency *vis-à-vis* the US dollar over the projection period will help maintain the industry's competitiveness, but the sugar market will be challenged by strong ethanol production. As a result, Brazilian sugar exports are projected to expand by only 2 Mt compared to the base period. In Thailand, the world's second largest sugar exporter, very little ethanol is produced directly from sugarcane (less than 3%); molasses or cassava are used instead. This established Asian competitor will benefit from steady growth in production and is foreseen to continue to gain market share, accounting for 18% of world sugar exports in 2028 versus 14% (9 Mt) during the base period to reach 12 Mt of sugar exports in 2028. In Australia, investments in irrigation, sugarcane area expansion, and increased milling capacity will lead to higher production, which in turn will boost export sales over the medium term.

Figure 5.7. Sugar exports for major countries and regions



Note: Data are expressed on a *tel quel* basis (tq)

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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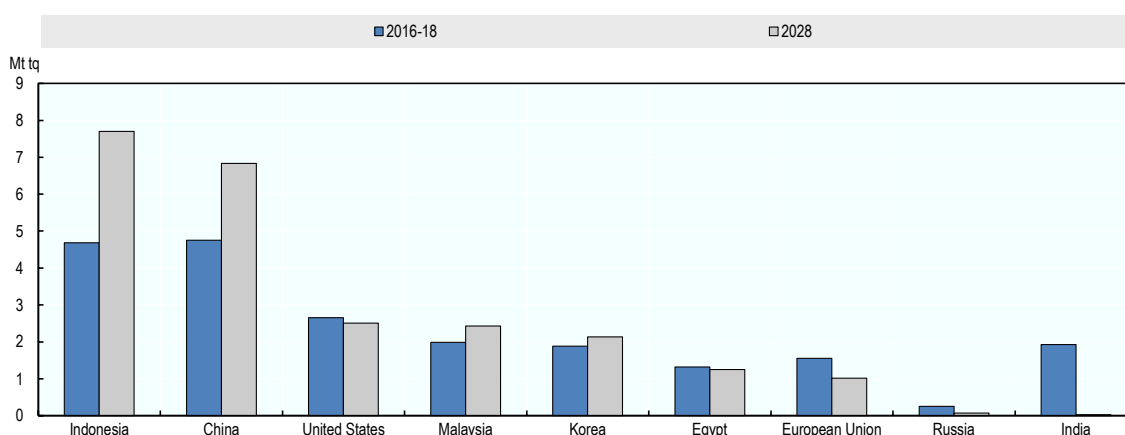
In 1968 the European Union introduced sugar and isoglucose production quotas to guarantee production and prices. These quotas were abolished in 2017, which led to a decrease in domestic prices and freed exports from their WTO subsidised export limit. Over the projection period, an increase of 33% in high quality white sugar exports is projected compared to the base period, even if sold at a premium price. These exports will mainly reach sugar-deficit countries in the MENA and Far East regions, but will face competition from traditional sugarcane refineries in the MENA region.

World sugar imports are more dispersed than exports (Figure 5.7). Based on the outlook projections, Asia and Africa will see the strongest growth in sugar demand and this will influence the growth in imports for these regions. During the base period, China and

Indonesia were the leading importers followed by the United States, Malaysia, India, and Korea. Production increases in India and China will affect the repartition over the next decade, during which Indonesia is expected to become the leading sugar importer, followed by China, the United States, Malaysia and Korea (respectively 7.7 Mt, 6.8 Mt, 2.5 Mt, 2.4 Mt, and 2.1 Mt in 2028). Due to the abolition of the sugar quotas, the European Union has become less attractive for countries that are allowed to ship their sugar despite some regional trade agreements; sugar imports are projected to decrease by 61% over the next ten years to average at 1.0 Mt, versus 2.6 Mt the last decade. The EU HFCS trade will not change much as the production increase occurring after 2017 will mostly satisfy internal demand.

The United States, traditionally a sugar-deficit region, will continue to be influenced by its policies which tend to foster domestic production and control the level of imports. The projected low sugar prices during the outlook period provide little incentive to expand sugar production. This environment will lead to a continuation of restricted imports, characterised by tariff rate quota (TRQ) allocations under WTO or free trade agreements (FTAs) as well as limited imports from Mexico due to the US Export Limit (set by the US Department of Commerce). Given the relatively higher sugar prices in the United States, Mexico will continue to export its sugar primarily to the United States. In return, Mexico is expected to resort to US HFCS (+9% or 93 kt by 2028) to fill its demand for sweeteners.

Figure 5.8. Sugar imports for major countries and regions



Note: Data are expressed on a tel quel basis (tq)

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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5.7. Main issues and uncertainties

The projections in this *Outlook* assume stable macro-economic and weather conditions and make specific assumptions with respect to crude oil prices. Domestic sugar markets are also protected with domestic policies that foster production even in a context of relatively low prices. A shock to any of these variables could create significant variability in the market because production is concentrated within a small number of countries.

The projections for Brazil carry some uncertainty due to the ongoing financial consolidation. These projections are also based on the Brazilian real, the appreciation of

which could reduce the returns paid to farmers from sales denominated in US dollars. The evolution of biofuel policies and prices in the country could also indirectly affect the sugar markets. In addition, the increased planting of genetically modified sugarcane plants, whose commercial use was approved two years ago, could impact sugarcane yields from 2020 onwards and therefore change the level of production of the sub-products.

The outlook for Thailand is rather positive as the country has benefited from strong investments in the sugar sector during the recent years. However, Thailand is assumed to allocate only a small share of its raw sugar to ethanol production. If this share were to increase, depending on the profitability of both products, this could create some instability on world markets, given the country's large contribution to world sugar exports.

Trade distortions in international sugar markets will persist, which creates additional sources of uncertainty. Changes in international sugar prices are not fully transferred to domestic sugar producers and consumers, even if some world sugar markets have undergone reforms and structural changes (i.e. the recent elimination of sugar quotas in European Union and Thailand, the Fair Price paid to farmers in India since 2013). To protect their domestic markets, many countries continue to use trade policy instruments: high out-of-quota tariffs (China introduced a three-year long safeguard measure in May 2017 on sugar imports from top growers, and which was extended to all origins in August 2018; South Africa increased its import duty in August 2018 to USD 680/t from USD 560/t); adjustments to WTO TRQ and Export Limit for Mexico (United States); transportation subsidies to stimulate exports of sugar and support domestic sugar prices (Pakistan, India); high import tariffs (European Union, Russian Federation, United States); regional trade agreements (NAFTA agreements, European Economic Partnership Agreements and Everything but Arms).

Brexit brings an additional uncertainty for the United Kingdom's sugar market. If the country manages to negotiate new free trade deals, British refiners (which are the main ones in Europe) could gain when importing their raw sugar product which is exempt from tariffs. Beet farmers, however, would face prohibitive tariffs when exporting to the European Union. Nevertheless, the impact on the global market is expected to remain weak.

Prospects for demand are also uncertain. In view of growing evidence of the detrimental effect of excessive sugar consumption on human health, consumption levels could go down in the future. To fight obesity and other health problems, some governments have already imposed taxes on caloric sweeteners to encourage lower consumption. This could be reinforced over the next decade, although pro-active actions taken by the food industry, such as product reformulation, use of alternative sweeteners, and decreasing portion sizes, could temper the effects on the projections.

ANNEX C

Table C.3. World sugar projections

Marketing year

		Average 2016-18est	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
WORLD												
SUGARBEET												
Production	Mt	291.4	290.8	293.5	295.1	297.6	300.1	303.2	307.0	310.3	313.8	317.4
Area	Mha	4.7	4.7	4.7	4.7	4.8	4.8	4.8	4.8	4.8	4.9	4.9
Yield	t/ha	61.91	61.59	61.88	62.35	62.56	62.80	63.24	63.81	64.23	64.69	65.15
Biofuel use	Mt	13.8	14.0	14.0	14.0	14.1	14.1	14.1	14.1	14.1	14.1	14.1
SUGARCANE												
Production	Mt	1 758.2	1 731.1	1 771.0	1 800.3	1 825.5	1 849.1	1 870.8	1 892.6	1 908.8	1 926.7	1 947.7
Area	Mha	25.3	24.9	25.3	25.5	25.6	25.7	25.8	25.8	25.8	25.9	25.9
Yield	t/ha	69.36	69.40	69.90	70.56	71.26	71.95	72.59	73.25	73.87	74.51	75.16
Biofuel use	Mt	360.6	376.6	389.5	403.9	412.5	421.4	429.6	437.7	446.1	455.1	464.1
SUGAR												
Production	Mt tq	177.6	179.7	183.0	186.5	189.6	192.2	194.9	197.7	200.2	203.2	206.8
Consumption	Mt tq	170.8	176.6	179.4	181.7	184.4	187.4	190.5	193.7	196.8	199.7	202.5
Closing stocks	Mt tq	80.8	83.5	83.4	84.5	86.0	87.2	87.9	88.1	87.9	87.7	88.3
Price, raw sugar ¹	USD/t	314.9	303.0	315.4	331.9	339.4	341.1	341.4	339.0	341.1	346.0	350.0
Price, white sugar ²	USD/t	392.6	376.1	391.3	410.2	419.1	422.7	423.8	422.9	427.2	433.0	438.4
Price, HFCS ³	USD/t	908.9	691.7	693.7	704.0	709.9	715.1	720.2	723.9	731.8	740.3	746.0
DEVELOPED COUNTRIES												
SUGARBEET												
Production	Mt	236.9	233.5	234.6	234.6	235.3	236.1	237.6	239.6	241.1	242.6	244.2
SUGARCANE												
Production	Mt	78.7	78.5	78.7	79.0	79.5	80.1	80.5	80.7	80.8	80.9	81.1
SUGAR												
Production	Mt tq	44.1	44.2	44.6	45.0	45.5	46.0	46.6	47.1	47.5	47.9	48.4
Consumption	Mt tq	46.9	47.2	47.3	47.3	47.4	47.4	47.5	47.5	47.5	47.6	47.6
Closing stocks	Mt tq	13.5	12.7	12.4	12.4	12.6	12.9	13.1	13.2	13.3	13.4	13.5
HFCS												
Production	Mt dw	9.1	9.0	9.0	9.0	9.1	9.1	9.1	9.1	9.1	9.1	9.1
Consumption	Mt dw	7.9	7.8	7.8	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8
DEVELOPING COUNTRIES												
SUGARBEET												
Production	Mt	54.4	57.3	58.9	60.5	62.2	64.0	65.7	67.4	69.2	71.1	73.1
SUGARCANE												
Production	Mt	1 679.5	1 652.7	1 692.3	1 721.3	1 746.0	1 769.0	1 790.3	1 811.9	1 828.0	1 845.8	1 866.6
SUGAR												
Production	Mt tq	133.5	135.5	138.3	141.5	144.0	146.2	148.3	150.6	152.7	155.3	158.4
Consumption	Mt tq	123.8	129.4	132.1	134.4	137.0	139.9	143.0	146.2	149.2	152.1	155.0
Closing stocks	Mt tq	67.3	70.8	71.0	72.1	73.4	74.3	74.8	74.9	74.5	74.3	74.7
HFCS												
Production	Mt dw	4.5	4.9	5.0	5.1	5.3	5.4	5.5	5.6	5.7	5.8	5.9
Consumption	Mt dw	5.5	6.1	6.2	6.3	6.5	6.6	6.7	6.8	6.9	7.0	7.2
OECD⁴												
SUGARBEET												
Production	Mt	184.0	183.1	183.8	183.4	183.8	184.3	185.5	187.1	188.2	189.5	190.7
SUGARCANE												
Production	Mt	117.5	118.6	119.1	119.5	120.6	121.5	122.3	122.8	123.3	123.8	124.3
SUGAR												
Production	Mt tq	41.4	41.3	41.6	41.8	42.3	42.6	43.0	43.4	43.6	43.9	44.2
Consumption	Mt tq	43.9	44.1	44.3	44.3	44.3	44.3	44.4	44.4	44.4	44.4	44.4
Closing stocks	Mt tq	12.2	11.3	11.4	11.5	11.8	12.0	12.2	12.3	12.4	12.5	12.6
HFCS												
Production	Mt dw	10.3	10.2	10.3	10.3	10.3	10.4	10.4	10.4	10.5	10.5	10.5
Consumption	Mt dw	10.0	10.0	10.0	10.0	10.1	10.1	10.1	10.2	10.2	10.2	10.2

Note: Marketing year: See Glossary of Terms for definitions. Average 2016-18est: Data for 2018 are estimated. HFCS: High fructose corn syrup. Prices are in nominal terms.

1. Raw sugar world price, ICE contract No11 nearby (October/September).
2. Refined sugar price, White Sugar Futures Contract No. 407, Euronext market, Liffe, London, Europe (October/September).
3. United States wholesale list price HFCS-55, dry weight (October/September).
4. Excludes Iceland but includes all EU member countries

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database). doi: dx.doi.org/10.1787/agr-outl-data-en

Table C.23.1. Sugar projections: Production and trade

Marketing year

	PRODUCTION (kt)		Growth (%) ⁴		IMPORTS (kt)		Growth (%) ⁴		EXPORTS (kt)		Growth (%) ⁴	
	Average 2016-18est	2028	2009-18	2019-28	Average 2016-18est	2028	2009-18	2019-28	Average 2016-18est	2028	2009-18	2019-28
WORLD	177 620	206 769	1.73	1.52	56 381	63 245	1.06	1.93	61 445	66 917	1.53	1.82
NORTH AMERICA	7 717	8 015	1.51	0.08	3 795	3 657	-3.29	-0.07	122	112	-12.54	0.00
Canada	100	104	1.66	0.52	1 137	1 150	-0.12	0.00	35	30	-8.07	0.00
United States	7 617	7 911	1.51	0.07	2 658	2 507	-4.41	-0.10	87	82	-14.15	0.00
LATIN AMERICA	54 853	59 659	-0.40	1.86	2 030	1 476	-3.42	-1.50	31 048	33 209	-0.84	2.73
Argentina	1 914	2 338	0.00	2.13	0	0	-77.78	..	334	820	2.30	8.92
Brazil	33 891	36 373	-1.52	2.31	1	0	35.00	..	23 775	25 690	-1.60	3.53
Chile	235	304	-3.81	2.60	489	450	1.35	-0.39	0	0	..	..
Colombia	2 214	2 072	0.61	0.13	110	126	-13.13	6.22	561	198	-5.56	-5.86
Mexico	6 038	6 565	2.27	1.07	22	10	-34.23	-0.03	1 367	1 472	3.56	0.52
Paraguay	136	141	0.94	1.34	107	89	10.69	-0.21	107	83	7.74	0.21
Peru	1 180	1 887	1.94	4.06	376	83	7.01	-10.16	139	189	7.51	2.98
EUROPE	28 578	31 131	2.48	1.19	3 541	2 763	-10.12	-3.31	4 498	6 457	4.07	5.29
European Union ¹	17 681	18 791	1.50	0.87	1 549	1 022	-10.58	-5.57	2 574	3 435	3.57	5.44
United Kingdom	1 168	1 161	0.10	1.33	1 016	1 057	-2.96	-0.56	234	237	-7.93	0.32
Russia	6 262	6 902	7.50	1.48	252	74	-23.46	-10.94	406	1 007	34.84	11.37
Ukraine	2 010	2 453	1.69	2.40	1	0	-74.82	..	577	825	94.70	4.92
AFRICA	11 265	16 664	2.71	3.21	13 594	15 971	3.64	3.04	3 980	3 227	1.87	0.18
Egypt	2 635	4 089	4.83	3.77	1 321	1 252	-0.94	0.08	211	141	-1.11	-0.08
Ethiopia	502	1 313	9.08	6.43	160	9	4.06	-13.78	46	342	477.26	11.36
Nigeria	47	72	4.50	1.57	1 402	1 986	4.18	3.33	0	0	-6.09	..
South Africa	1 930	3 098	-0.83	3.48	463	79	-2.68	-5.94	205	573	-15.19	6.32
ASIA	70 065	85 955	2.98	1.33	33 044	38 974	3.24	2.39	17 608	19 482	5.67	0.15
China ²	10 351	13 269	-1.60	1.65	4 756	6 835	11.54	1.78	97	96	5.23	2.27
India	28 123	33 860	3.39	0.56	1 922	32	7.00	-14.85	2 834	2 046	16.37	-5.57
Indonesia	2 247	2 657	0.44	1.42	4 679	7 696	8.76	4.73	0	0	..	..
Iran	1 828	2 563	10.03	2.61	677	189	-11.71	-10.23	2	0	-65.45	..
Japan	744	749	0.55	-0.01	1 339	1 296	0.47	-0.52	4	5	15.91	0.00
Kazakhstan	30	32	2.72	2.52	456	520	2.31	0.62	8	5	-4.66	-0.62
Korea	0	0	..	..	1 885	2 135	1.78	1.01	318	375	-0.92	2.28
Malaysia	0	0	-77.61	..	1 988	2 434	1.57	2.66	134	52	-9.65	-2.59
Pakistan	6 592	7 775	6.51	2.06	8	11	-32.31	0.46	894	1 125	23.13	-1.22
Philippines	2 267	2 441	0.49	1.03	95	84	14.16	0.60	170	94	-7.88	-4.79
Saudi Arabia	0	0	..	..	1 487	1 916	2.53	2.10	322	391	4.08	2.00
Thailand	12 570	15 567	5.43	1.83	0	0	-61.71	..	8 766	12 178	5.36	1.54
Turkey	2 675	3 283	1.39	1.98	93	26	45.86	-6.90	165	757	2.05	11.59
Viet Nam	1 510	2 145	4.65	2.37	192	320	0.29	17.41	68	20	241.22	-15.02
OCEANIA	5 142	5 345	3.99	0.44	375	404	-0.05	-0.15	4 190	4 429	4.39	0.34
Australia	4 887	5 034	4.07	0.36	84	120	-3.86	0.00	3 978	4 201	4.45	0.33
New Zealand	0	0	..	..	247	239	0.74	-0.13	22	20	-0.28	0.00
DEVELOPED COUNTRIES	44 083	48 364	2.31	1.03	11 880	10 884	-4.74	-0.80	9 080	11 561	2.68	3.07
DEVELOPING COUNTRIES	133 537	158 405	1.55	1.68	44 501	52 361	3.26	2.61	52 366	55 356	1.38	1.57
LEAST DEVELOPED COUNTRIES (LDC)	3 888	5 462	3.87	3.17	8 944	11 528	6.80	4.70	2 466	348	6.60	-8.00
OECD³	41 417	44 229	1.79	0.78	11 263	10 937	-3.12	-0.53	8 792	10 624	2.50	2.41
BRICS	80 556	93 501	0.66	1.54	7 395	7 019	1.31	1.26	27 317	29 412	-0.77	2.79

.. Not available

Note: Marketing year: See Glossary of Terms for definitions. Average 2016-18est: Data for 2018 are estimated. Sugar data are expressed on a ten thousand metric tonne basis.

1. Refers to all current European Union member States except the United Kingdom.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland but includes all EU member countries
4. Least-squares growth rate (see glossary).

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database). doi: dx.doi.org/10.1787/agr-outl-data-en

Table C.23.2. Sugar projections: Consumption, food

Marketing year

	CONSUMPTION (kt)		Growth (%) ⁴		FOOD (kg/cap)		Growth (%) ⁴	
	Average 2016-18est	2028	2009-18	2019-28	Average 2016-18est	2028	2009-18	2019-28
WORLD	170 757	202 543	1.60	1.55	22.7	24.2	0.43	0.59
NORTH AMERICA	11 521	11 558	0.13	0.03	31.9	29.6	-0.57	-0.67
Canada	1 220	1 224	0.47	0.05	33.3	30.5	-0.52	-0.75
United States	10 300	10 335	0.09	0.03	31.7	29.5	-0.58	-0.66
LATIN AMERICA	26 431	27 919	-0.06	0.52	41.1	39.5	-1.16	-0.31
Argentina	1 560	1 520	-0.66	-0.23	35.2	31.3	-1.66	-1.05
Brazil	10 967	10 747	-1.19	-0.05	52.4	48.1	-2.06	-0.62
Chile	752	756	0.34	0.07	41.7	38.9	-0.53	-0.57
Colombia	1 747	1 999	1.70	1.19	35.6	38.0	0.74	0.58
Mexico	4 579	5 070	1.37	0.88	35.5	34.9	-0.02	-0.14
Paraguay	133	146	1.18	0.88	19.5	19.0	-0.14	-0.22
Peru	1 358	1 760	2.87	2.33	42.2	48.7	1.55	1.27
EUROPE	27 578	27 334	-0.01	-0.13	37.1	36.9	-0.10	-0.09
European Union ¹	16 776	16 278	0.18	-0.36	37.9	36.8	0.10	-0.33
United Kingdom	1 944	1 981	-0.30	0.39	29.4	28.3	-0.94	-0.11
Russia	5 817	5 965	0.49	0.17	40.4	42.2	0.41	0.36
Ukraine	1 541	1 626	-2.50	0.68	34.9	39.0	-2.02	1.23
AFRICA	20 426	28 988	3.89	3.20	16.4	18.0	1.26	0.81
Egypt	3 613	5 119	3.85	3.15	37.0	44.0	1.68	1.56
Ethiopia	587	972	5.88	4.52	5.6	7.2	3.20	2.25
Nigeria	1 449	2 042	4.27	3.25	7.6	8.1	1.55	0.70
South Africa	2 135	2 585	2.16	1.73	37.7	40.8	0.79	0.74
ASIA	83 542	105 419	2.50	2.11	18.7	21.7	1.46	1.38
China ²	16 337	19 947	2.44	1.68	11.6	13.8	1.92	1.51
India	25 602	32 345	2.53	2.17	19.1	21.7	1.30	1.22
Indonesia	6 944	10 265	4.61	3.61	26.3	35.2	3.35	2.72
Iran	2 519	2 749	0.99	0.77	31.0	31.2	-0.22	0.08
Japan	2 111	2 040	-0.82	-0.34	16.6	16.6	-0.71	0.03
Kazakhstan	502	548	1.39	0.60	27.6	27.3	-0.10	-0.23
Korea	1 598	1 759	2.85	0.83	31.4	33.5	2.43	0.57
Malaysia	1 839	2 354	3.58	2.31	58.2	65.2	1.86	1.10
Pakistan	5 148	6 603	2.30	2.27	26.1	27.8	0.22	0.60
Philippines	2 143	2 425	1.49	1.19	20.4	19.8	-0.13	-0.19
Saudi Arabia	1 230	1 517	3.10	1.83	37.4	39.3	0.45	0.44
Thailand	2 943	3 335	2.09	1.27	42.6	47.9	1.70	1.21
Turkey	2 429	2 543	1.18	0.18	30.1	29.1	-0.38	-0.36
Viet Nam	1 583	2 421	4.69	3.59	16.6	23.1	3.55	2.73
OCEANIA	1 259	1 324	-0.54	0.42	31.6	29.0	-2.04	-0.80
Australia	925	959	-1.11	0.28	37.8	34.6	-2.52	-0.81
New Zealand	220	218	0.36	-0.12	46.8	42.4	-0.69	-0.90
DEVELOPED COUNTRIES	46 923	47 559	0.15	0.09	33.2	32.6	-0.25	-0.18
DEVELOPING COUNTRIES	123 834	154 984	2.20	2.05	20.3	22.5	0.83	0.93
LEAST DEVELOPED COUNTRIES (LDC)	10 166	16 350	5.53	4.40	12.0	15.1	3.07	2.10
OECD³	43 884	44 398	0.34	0.06	33.1	32.0	-0.20	-0.31
BRICS	60 857	71 590	1.54	1.48	19.3	21.3	0.71	0.94

Note: Marketing year: See Glossary of Terms for definitions. Average 2016-18est: Data for 2018 are estimated. Sugar data are expressed on a t equivalent basis.

1. Refers to all current European Union member States except the United Kingdom.
2. Refers to mainland only. The economies of Chinese Taipei, Hong Kong (China) and Macau (China) are included in the Asia aggregate.
3. Excludes Iceland but includes all EU member countries
4. Least-squares growth rate (see glossary).

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database). doi: dx.doi.org/10.1787/agr-outl-data-en

Table C.24. Main policy assumptions for sugar markets

Marketing year

		Average 2016-18est	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
ARGENTINA												
Tariff, sugar	ARS/t	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
BRAZIL												
Tariff, raw sugar	%	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Tariff, white sugar	%	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
CANADA												
Tariff, raw sugar	CAD/t	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Tariff, white sugar	CAD/t	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9
CHINA¹												
TRQ sugar	kt	1 954.0	1 954.0	1 954.0	1 954.0	1 954.0	1 954.0	1 954.0	1 954.0	1 954.0	1 954.0	1 954.0
In-quota tariff, raw sugar	%	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
In-quota tariff, white sugar	%	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Tariff, over-quota	%	69.4	88.3	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
EUROPEAN UNION²												
Voluntary coupled support												
Sugarbeet ³	mIn EUR	178.0	180.2	169.3	169.3	169.3	169.3	169.3	169.3	169.3	169.3	169.3
Tariff, raw sugar	EUR/t	339.0	339.0	339.0	339.0	339.0	339.0	339.0	339.0	339.0	339.0	339.0
Tariff, white sugar	EUR/t	419.0	419.0	419.0	419.0	419.0	419.0	419.0	419.0	419.0	419.0	419.0
INDIA												
Tariff, sugar	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
INDONESIA												
Tariff, sugar	%	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6
JAPAN												
Minimum stabilisation price, raw sugar	JPY/kg	153.2	153.2	153.2	153.2	153.2	153.2	153.2	153.2	153.2	153.2	153.2
Tariff, raw sugar	JPY/kg	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8
Tariff, white sugar	JPY/kg	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1
KOREA												
Tariff, raw sugar	%	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Tariff, white sugar	%	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
MEXICO												
Mexico common external tariff, raw sugar	USD/t	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6
Mexico common external tariff, white sugar	USD/t	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4
RUSSIA												
Minimum tariff, raw sugar	USD/t	230.3	240.0	240.0	240.0	240.0	240.0	240.0	203.0	203.0	203.0	203.0
Minimum tariff, white sugar	USD/t	340.0	340.0	340.0	340.0	340.0	340.0	340.0	340.0	340.0	340.0	340.0
UNITED STATES												
Loan rate, raw sugar	USD/t	413.4	413.4	413.4	413.4	413.4	413.4	413.4	413.4	413.4	413.4	413.4
Loan rate, white sugar	USD/t	531.1	531.1	531.1	531.1	531.1	531.1	531.1	531.1	531.1	531.1	531.1
TRQ, raw sugar	kt rse	1 463	1 422	1 426	1 487	1 596	1 761	1 843	1 951	2 038	2 188	2 250
TRQ, refined sugar	kt rse	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Raw sugar 2nd tier WTO tariff	USD/t	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6	338.6
White sugar 2nd tier WTO tariff	USD/t	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4	357.4
VIET NAM												
Tariff, sugar	%	58.5	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8	60.8

Note: Marketing year: See Glossary of Terms for definitions. Average 2016-18est: Data for 2018 are estimated. The sources for tariffs and Tariff Rate Quotas are the national questionnaire reply, UNCTAD and WTO.

1. Refers to mainland only.
2. Production supported by a EU sugar production quota at 13.5 million tonnes of sugar and 720 kt of HFCS until 30 september 2017.
3. Implemented in 10 Member States.

Source: OECD/FAO (2019), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database). doi: dx.doi.org/10.1787/agr-outl-data-en