

# 5 Sugar

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This chapter describes recent market developments and highlights the medium-term projections for world sugar markets for the period 2021-30. 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 that might affect world sugar markets over the next ten marketing years.

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## 5.1. Projections highlights

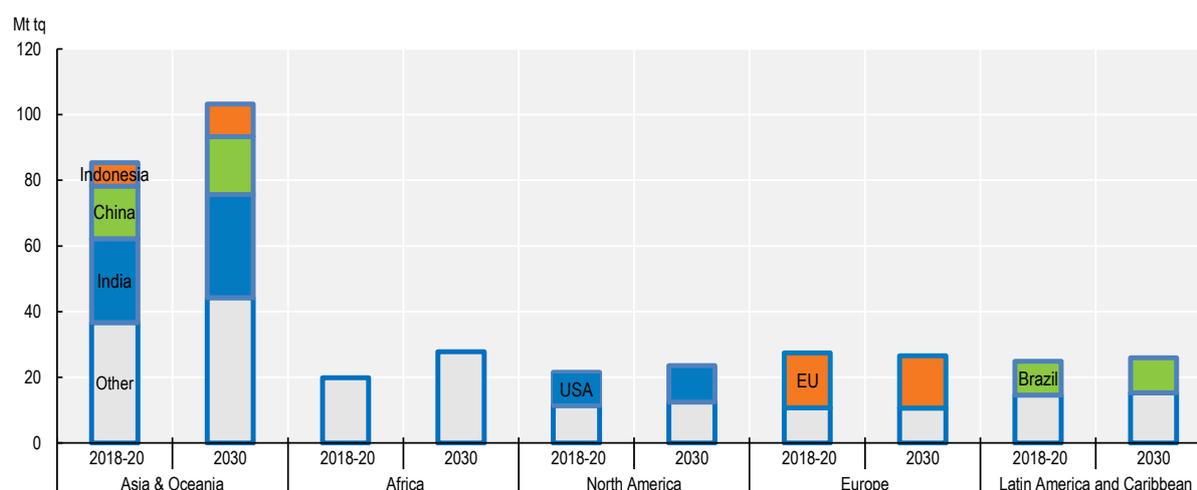
Global production of sugar in the current season (October 2020-September 2021) is foreseen to decrease for the third consecutive year after unfavourable weather conditions negatively affected prospects in some of the key producing countries. World production is expected to fall below global consumption, which is projected to rebound from the lower level of the 2019 season following the onset of the COVID-19 pandemic.

Assuming normal weather conditions, production of sugarcane and sugar beet crops is expected to increase over the next decade, mainly on account of some remunerative returns. Both sugar crops are expected to grow at a higher rate than in the past decade, although well below those observed in the 1990s and 2000s, when production of sugar crops was also used for the development of first generation biofuels. Over the next decade, the diversion of sugar crop crushing to ethanol production – the other main sub-product – will continue to challenge sugar production.

Most of the projected growth in sugar production is expected to come from developing countries. Brazil<sup>1</sup> is expected to maintain its position as the world's largest sugar producer, closely followed by India; these two countries will respectively account for about 21% and 18% of the world's total sugar output by 2030. In absolute terms and compared to the base period (2018-2020), Brazil (+5.8 Mt), India (+5.1 Mt), and Thailand (+3.2 Mt) show the largest increases in production. In Thailand, higher prices are expected to support a production recovery after two consecutive seasons of reduced output (2019 and 2020) due to a combination of bad weather and low prices that curtailed plantings.

Overall, global average per-capita consumption is expected to increase over the next decade as a result of income gains and urbanisation in developing countries. Sugar consumption in Asia is foreseen to grow the most (in absolute terms) and to represent more than half of global consumption by 2030, reflecting higher demand in sugar-rich confectionery products and soft drinks. In Africa, the increase in consumption is expected to be driven by population growth but consumption is projected to remain at levels well below those in Asia, in absolute terms.

**Figure 5.1. Evolution of sugar consumption, by regions**



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

Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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In developed countries, total sugar consumption is not expected to grow in the next decade, a reflection of concerns about its negative effects on health when consumed excessively. Per capita consumption is anticipated to decline, although at a slower pace than in the past ten years, as several countries have implemented measures to discourage sugar consumption. These measures are assumed to remain in effect over the outlook period. Global consumption of the main alternative caloric sweetener, high fructose corn syrup (HFCS), is projected to increase by 0.6 Mt to reach 14 Mt by 2030, mainly driven by population growth.

Sugar is traded internationally in the form of raw or white (refined) sugar from sugarcane and white sugar from sugar beet. Driven by remunerative returns and a marginal increase in the nominal premium, the share of white sugar exports from some producing countries is expected to increase slightly over the projection period. Brazil is expected to remain the leading sugar exporter, followed by Thailand and India. Countries that have invested in sugar refineries will mainly import raw sugar (Indonesia, China – hereafter “China”–, United Arab Emirates, Algeria), while countries without refining capacity will continue to import refined sugar.

In real terms, raw and white sugar prices are expected to remain fairly flat over the projection period, with additional supplies foreseen to keep up with the growth in consumption in developing countries, a result of higher population and per capita income. The white sugar premium (the difference between white and raw sugar prices), which averaged USD 79/t during the base period, is projected to increase slightly in nominal terms to USD 88/t by 2030.

These projections are based on assumptions about productivity, consumption behaviour, macro-economic conditions, and policies. Deviations between actual trends and assumptions could alter the market projections presented in this edition of the *OECD-FAO Agricultural Outlook*. Other sources of uncertainty include oil prices, investments in bioethanol, and demand for sweeteners. A greater increase in oil prices would increase competition between sugar and sugarcane-based ethanol, which would have a significant impact on Brazil, the main sugar exporter, and affect the international sugar market. Investments in the bioethanol sector in India could decrease the availability of cane for sugar production, which could affect the international market as well. A lower than expected demand for caloric sweeteners due to health concerns in countries that consume high amounts of these sweeteners would also lead to outcomes that diverge from the findings of this *Outlook*. Finally, the policy environment regulating the sector constitutes a source of uncertainty for the projections.

## 5.2. Recent market developments

The international sugar market is characterised by production shortfalls in some major producing countries for a third consecutive year, resulting in a tight global sugar balance and an upward pressure on prices. The global deficit is nevertheless contained by two main producers: Brazil, where the weakness of its currency favours a good level of sugar exports combined with the fact that sugarcane-based ethanol is not very profitable due to low crude oil prices, and India, where good rainfalls have allowed for a good production level. Prospects for sugar crop yields are improving in the 2021 season, given rains in Thailand and some winter frost coupled with a temporary reauthorisation of neonicotinoids for beet seeds in several EU countries. These should allow sugar market to return to positive levels.

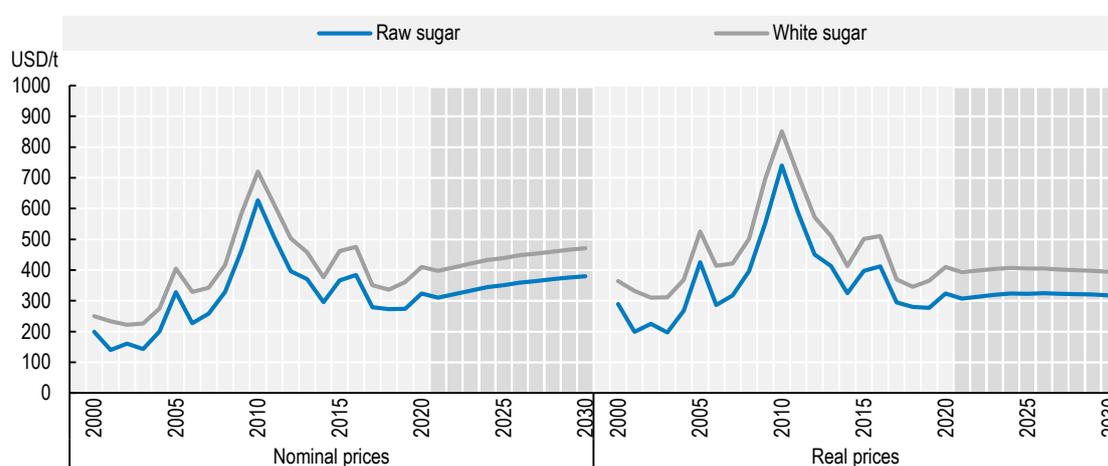
Overall, global sugar consumption declined in 2019 (-0.4%) due to the COVID-19 pandemic, which led to national lockdowns and/or closure of restaurants for several months. Demand, however, is assumed to pick up in 2020 in nearly all countries, with the highest per capita sugar consumption growth taking place in low income countries.

### 5.3. Prices

As demand returns to the trends prevailing before the COVID-19 pandemic, prices in nominal terms are projected to follow a moderate upward trend, with supply easily meeting demand, assuming normal weather conditions and little change in ethanol price parity with sugar. Some domestic policies and the dominance of few exporters may result in some price variability of international sugar prices over the next ten years. Global stocks are expected to increase slowly, which will bring some confidence back to the market with a stock-to-use ratio stabilising at around 49%, close to that of the last decade.

After recovering from a fall at the onset of the outlook period, real prices are projected to resume their long-term decline due to productivity gains from better yields (Figure 5.2). Overall, real prices should fall below the average level of the last 20 years, when prices were under upward pressure due to competition from biofuels (ethanol). White sugar premium is projected to decrease slightly in absolute real terms, with a slight increase of the share of white sugar exports in total trade.

**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 (2020=1).

Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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### 5.4. Production

Sugar markets, benefiting from a small rebound in prices, are expected to undergo a slow recovery over the outlook period. Sugarcane, the main sugar crop, grows mainly in tropical and sub-tropical regions and is water-intensive. It is a perennial crop; the same plants can be harvested after 12 to 18 months for about five years, although yields decline over time. Apart from sugar, sugarcane also makes it possible to produce ethanol (with a certain flexibility in Brazil). In addition to sugar and ethanol, sugarcane can produce molasses or thick juice and the residue from milling cane (bagasse) is used to supply energy (cogeneration feedstock for electricity). Conversely, sugar beet is an annual crop, cultivated mostly in temperate zones, whose thick juice is used for sugar or ethanol production. Beet pulp and molasses are the two by-products derived from sugar beet. This crop is then used to produce a wide range of products, including food (sugar), feed, bio-based products for industry (pharmaceuticals, plastics, textiles and chemicals) and ethanol. Over the next ten years, the profitability of the two main sub-products of the sugar crops, sugar and ethanol, are

projected to expand slightly, which will result in an increase in sugar crop production. Sugarcane will continue to account for around 86% of sugar crops and sugar beet will make up the remainder.

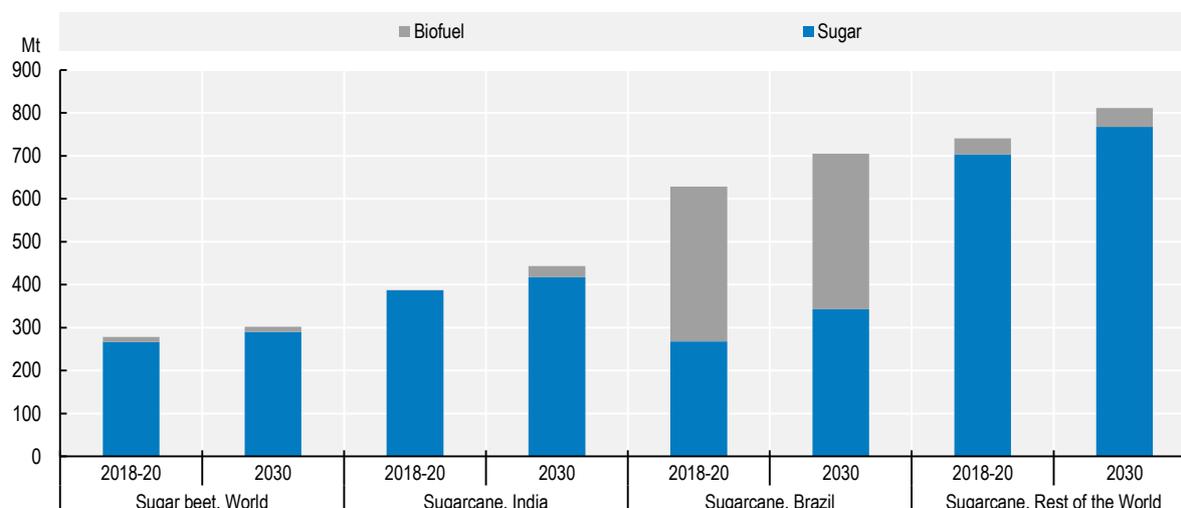
Over the outlook period, the increase in the production of sugarcane is projected to come from higher yields combined with improving irrigation techniques (Brazil, Thailand, Central America) and area expansion. In the case of sugar beet, increases are expected mainly from yields. Sugarcane production is projected to grow by 1% p.a. and reach 1 960 Mt by 2030, with Brazil and India anticipated to contribute 65% of the change in global output volume (38% and 27% respectively). Prospects are less robust for sugar beet, which is projected to reach 302 Mt by 2030, with annual production growth anticipated to be 0.6% p.a., under the 1% p.a. achieved during the past decade (Figure 5.3). Compared to the base period, expansion is expected in Egypt and the United States (+4.4 Mt each), the Russian Federation (hereafter “Russia”) (+3.9 Mt), China (+3.4 Mt), Turkey (+3 Mt), and Ukraine (+2.6 Mt), and contractions in the European Union (-1.9 Mt), in contrast to it contributing to more than 11% of the global increase in sugar beet over the last decade.

In the European Union, the use of neonicotinoids was banned in 2018 given their suspected harmful effects on bees, for a sustainable agricultural sector. This ban resulted in the development of some diseases (yellow virus) harmful to beet plants in 2020,<sup>2</sup> with losses of more than 12% in the sugar output of the season (which began in October 2019). Production growth is projected to be weak, due notably to a lack of alternatives to neonicotinoids and prices that are not sufficiently attractive to encourage massive investments in the sector. In Russia, production costs should remain high as climatic conditions are harsh; after a drought leading to a low output, production should recover in 2021, although not much growth is expected. In the United States, where both sugar crops are cultivated, higher yields are projected and sugar will continue to be produced almost equally from the two crops. However, in the case of sugar beet, increasing input costs (i.e. from improved harvesting technologies) and decreasing cultivated areas will dampen production growth after a few years. Nevertheless, some growth in sugarcane production is expected as this crop is more stable given its perennial nature.

Over the outlook period, the shares of sugar crops used for sugar and ethanol are projected to be about 81% for the production of sugar (78% in the case of sugarcane and 96% in the case of sugar beet) and 19% for ethanol. Brazil will continue to be the main producer of sugar and sugarcane-based ethanol, producing 36% of the world's sugarcane by 2030. Its sugarcane will be used for 20% of global sugar production and 84% of global sugarcane-based ethanol production (compared to 20% and 91% during the base period).

As of 2020, world sugar production is projected to increase at a stronger average growth rate than in the previous decade (1.4% vs 0.3% p.a.), responding to attractive sugar prices due to steady growth in global demand. Most production increases are expected to occur in developing countries, which are projected to represent 79% of global sugar production by 2030 (compared to 76% in the base period). The leading regions are Asia and Latin America. Asia is projected to expand its share in global production from 39.6% during the base period to 40.9% by 2030; Latin America from 32.1% to 31.8%.

Brazil, the world's biggest supplier, has been persistently in debt over the last ten years but some restructuring has recently started. Over the next decade, the assumed depreciation of the Real combined with some incentive interest rates are foreseen to help increase the profitability of the sector and to attract new investments despite rising input costs. Its sugar sector will continue to be challenged by biofuels, with more than half of its sugarcane being used to produce ethanol. Overall, the country's dominance as the world's top producer and exporter of sugar will be maintained over the outlook period, with production projected to reach 41 Mt (+5.8 Mt compared to the base period) by 2030.

**Figure 5.3. World sugar crops production**

Source: OECD/FAO (2021), “OECD-FAO Agricultural Outlook”, OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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India is the world's second largest sugar producer. A significant output recovery is projected for 2020, after a drop in 2019, as a result of good weather conditions and larger plantings. On the basis of remunerative returns, production is projected to increase by 5.1 Mt over the next decade, reaching 35.6 Mt by 2030. In Thailand, where a second consecutive year of low output is anticipated for 2020, production is projected to recover in 2021 and reach as high as 13.6 Mt by 2030. At this level, Thailand would become the world's fourth largest producer, the European Union being in the third place. Chinese production, in the first years of the projection period, is expected to benefit from the 2020-2022 action plan of the main sugarcane producing province, Guangxi, that aims to modernize the sector. Production costs are expected, however, to remain high when compared to neighbouring countries. By 2030, Chinese sugar production is projected to reach 11.8 Mt. In Pakistan, where government strongly supports the sugar sector through guaranteed prices to farmers, production is projected to increase by 2.3% per annum, compared to 1.8% during the last decade, to reach 7.6 Mt by 2030.

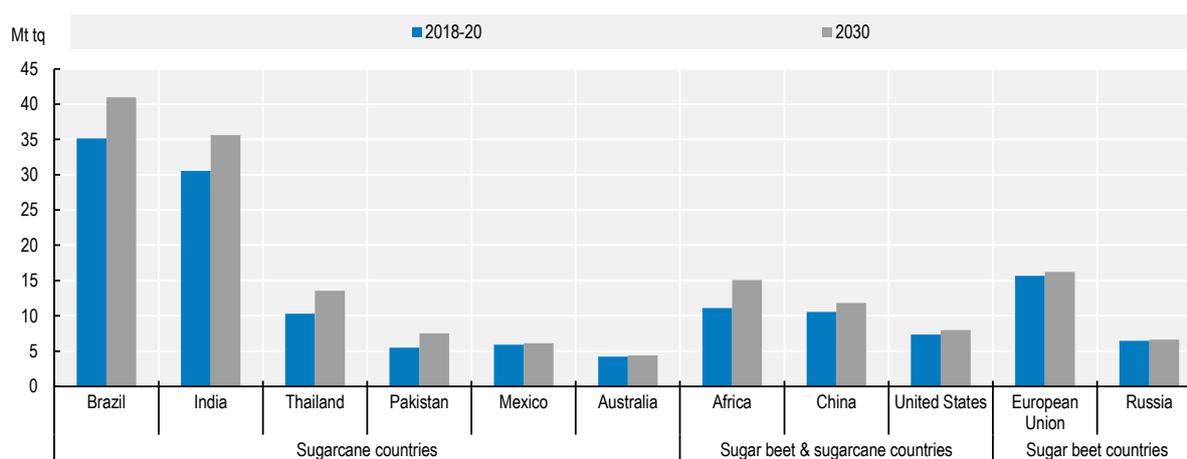
In Africa, sugar output is projected to increase by 36% to reach 15.1 Mt by the end of 2030 compared to the base period; this is due to production expansion in Sub-Saharan countries, boosted by national and international investments in the sector, and to suitable conditions for growing sugar crops, including a favourable climate and available land. Egypt is expected to be a key contributor to overall growth, with production projected to reach 3.8 Mt by 2030, due mostly to expansion of the sugar beet area. However, despite this production growth, Africa will continue to represent only a small share of world output (7.5% in 2030).

In the last decade, developed countries accounted for 22% of the increase of global sugar output, with significant growth in Russia. This share, however, is projected to decrease to 8% over the forecast period (Figure 5.4), with a projected growth of only 0.7% p.a. (1.6% p.a. in developing countries). In this group of countries and relative to the base period, the United States, is foreseen to increase its production the most (+0.7 Mt) as it benefits from government policies supporting domestic production. US policies include: the Sugar Loan Program that supports prices paid to farmers; the Sugar Marketing Allotments that aim for domestic production to cover up to 85% of domestic consumption; the Feedstock Flexibility Program that diverts any sugar surplus to ethanol production, rather than sugar loan forfeitures to the USDA's Commodity Credit Corporation; and trade barriers that limit imports to needs only (through tariff rate quotas,

regional agreements, and the Suspension Agreements on Sugar with Mexico). In the European Union and Russia, sugar production levels should not change much over the next ten years. The European Union will maintain its position as the world's third largest producer. As for Russia, efforts in recent years towards self-sufficiency have been successful, but the country remains a high-cost producer and its exports are not competitive for production to continue to increase much over the next decade.

As a result, global sugar stocks will increase moderately over the next decade but the global stock-to-use ratio is projected to stay constant, close to the average level of the last ten years (49%).

**Figure 5.4. Sugar production classified by traditional crops**



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

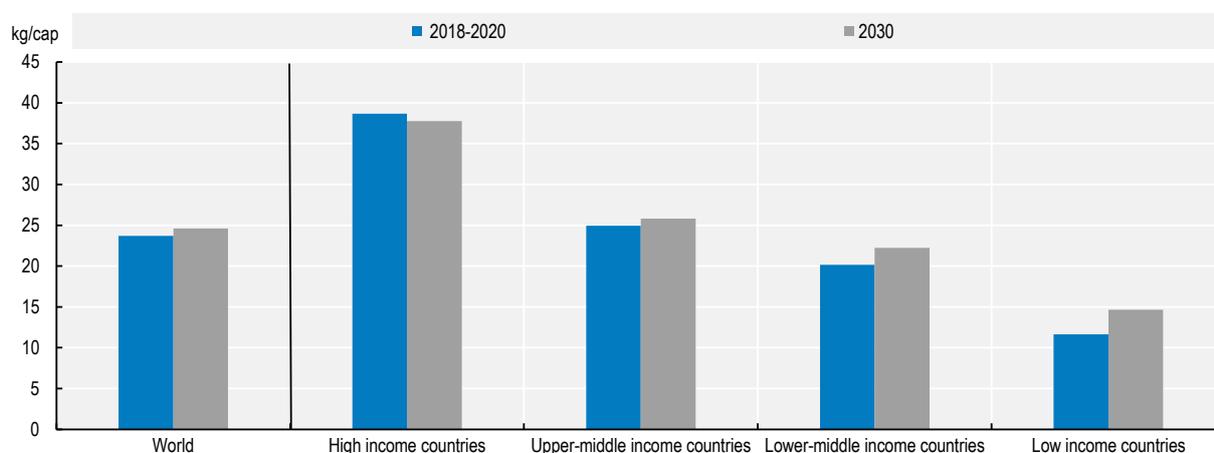
Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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## 5.5. Consumption

Global sugar consumption is projected to continue growing at around 1.4% p.a., reaching 196 Mt by 2030, underpinned by population and income growth. Over the outlook period, the average world level of per capita consumption is expected to increase from 22 kg/cap to 23 kg/cap, although considerable variations between regions and countries will occur (Figure 5.5). In general, a decline is projected in high income economies that are more mature markets, while other economies should see an increase, proportionately higher when the group's income is lower.

The largest contributions to additional demand will occur in Asia (66%) and Africa (30%). In these two sugar deficit regions, per capita consumption levels are generally low compared to other regions, and the prospects for growth are high. The higher growth rate in Asia will stem from a higher demand in sugar-rich confectionery products and soft drinks, generally in urban areas, while that of Africa will come from a higher access to direct consumption. In Latin America, which already has high per capita consumption levels, growth in consumption by 2030 is projected to be relatively small, only 4%.

**Figure 5.5. Per capita consumption of sweeteners**

Note: Data are expressed on a *tel quel* basis (tq). The 38 individual countries and 11 regional aggregates in the baseline are classified into the four income groups according to their respective per-capita income in 2018. The applied thresholds are: low: < USD 1 550, lower-middle: < USD 3 895, upper-middle: < USD 13 000, high: > USD 13 000.

Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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In Asia, it is expected that India will experience the largest increase in the level of sugar consumption based on population growth and the expansion of the food and beverage industry. In Africa, the highest changes in total consumption are projected for Egypt and several Sub-Saharan countries. Per capita consumption in Asia and Africa is expected to grow by 1.1% p.a. and 0.8% p.a. respectively over the next decade. Despite this overall increase, average per capita consumption is projected to remain below global average levels.

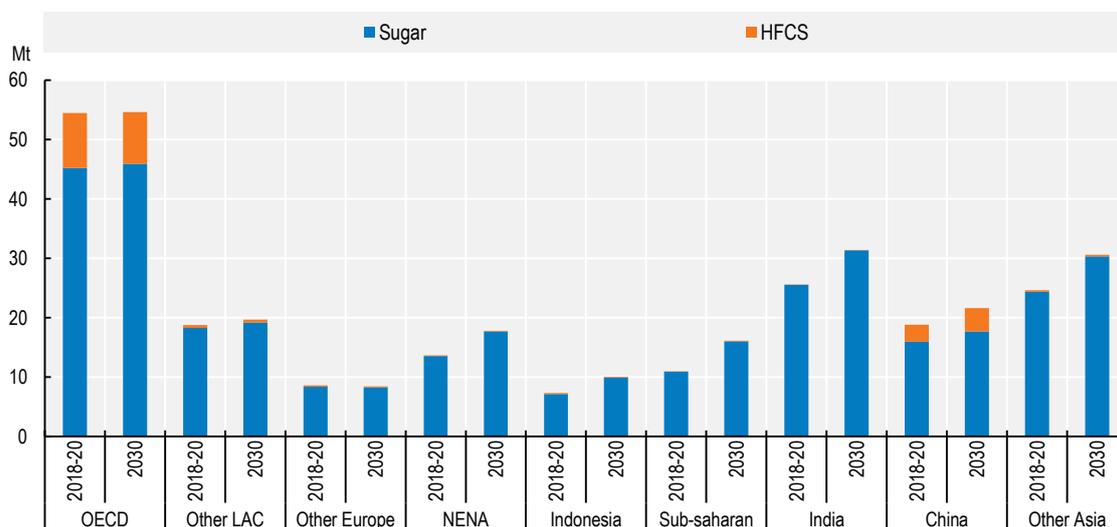
In contrast, the level of per capita sugar consumption in many developed countries is expected to continue to decline due to increased concerns about the negative health effects of sugar overconsumption; unhealthy weight gains that increase the risks of diabetes (type 2), heart disease, and tooth decay. Several countries have implemented taxes on caloric sugary products in an attempt to reduce sugar consumption. (Mexico was the first country to do so at the national level in 2014). In some countries or regions, bans were designed to limit the sale and/or the promotion of sugary drinks or sweet products to children under 18 years. In reaction to this trend, some multinationals have adapted by reducing portion sizes and the amount of caloric sweeteners per product, or by replacing the amount of sugar with an equivalent amount of artificial sweetener, the latter having a sweeter taste but fewer calories.

The decline in per capita caloric sweetener consumption in developed countries is projected to be strongest in Mexico, Australia and New Zealand, followed by Canada and countries in Western Europe. In the United States, even if per capita consumption of caloric sweeteners is one of the highest in the world, it is not expected to diminish much; a scientific committee's proposal to reduce the amount of added sugar consumed in the daily calorie diet from 10% (WHO recommendation) to 6% was not retained in the 2020 dietary guidelines. However, the share of sugar in per capita caloric sweetener consumption (HFCS is the other caloric sweetener in this *Outlook*) is projected to increase from 63% during the last decade to 68% by 2030. In Russia, sugar demand is not projected to grow much as the level per capita is already high. The debate on a possible taxation of sugar is still in progress, but sugar is expected to remain a cheap source of calories and consumer habits are not expected to change.

Owing to its competitiveness in caloric sugary soft drinks, HFCS consumption (dry weight) is projected to grow by 0.5% or 0.6 Mt by 2030. Global consumption will remain limited to a few countries (Figure 5.6).

The biggest increase will occur in China, one of the few countries with low per capita sweetener consumption although temporary safeguard measures<sup>3</sup> were put in place to protect its sugar sector. As the world's largest starch producer, China is projected to increase its supply of HFCS to meet growing domestic demand, although a lack of profitability is likely to dampen this growth. In the European Union, unlike expectations related to the abolition of the quota system, HFCS will only become slightly more competitive with sugar over the next decade and its share in the consumption of caloric sweeteners is projected to increase from an average of 3.5% over the past decade to 4.5% by 2030. In other consuming countries which have generally a high level of per capita sweetener consumption, HFCS consumption per habitant is assumed to decline. In Mexico, government efforts to reduce caloric sweetener consumption should reduce demand along with sugar consumption. A decline is also foreseen in the United States, the leading HFCS producer and the share of HFCS in national caloric sweetener consumption is projected to continue to decrease from 37% during the base period to 32% by 2030 as the potential greater health hazard of HFCS over sugar continues to be debated in the country. Thus, despite its leading position, production of HFCS in the United States is projected to decline by 10%, to reach 6.2 Mt by 2030.

**Figure 5.6. Evolution of caloric sweetener consumption in major regions and countries**



Note: NENA stands for Near East and North Africa, and is defined as in Chapter 2.

Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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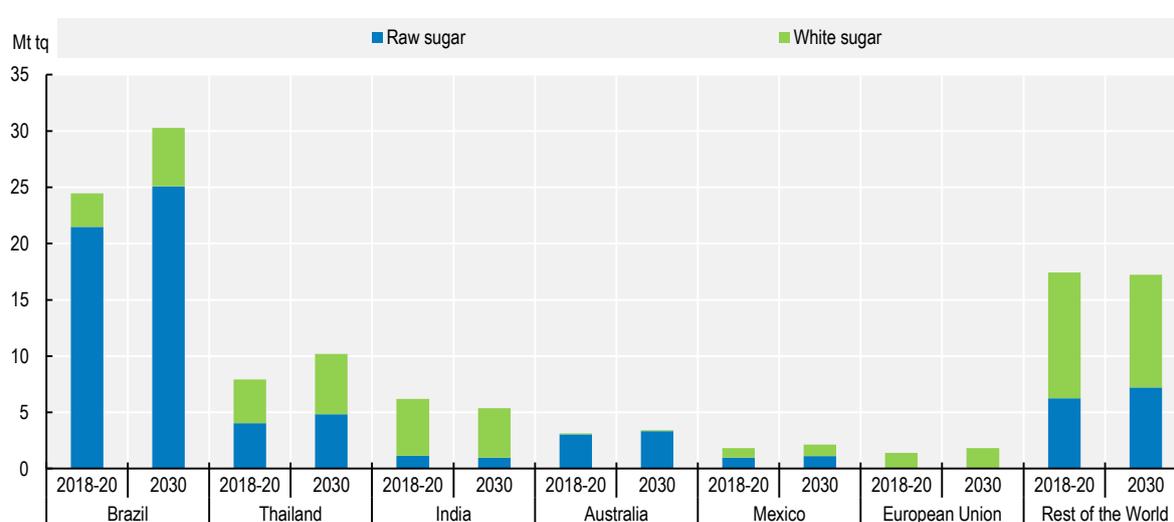
## 5.6. Trade

Over the coming decade, sugar exports are projected to remain highly concentrated, with Brazil consolidating its position as the leading exporter (from 39% of world trade in the base period to 43% by 2030) (Figure 5.7). Brazil's weak currency *vis-à-vis* the US dollar over the outlook period will improve its sugar sector's competitiveness. Despite rising input costs, millers will benefit from good incentives to produce sugar for exports, although favourable returns for sugarcane-based ethanol production could pose challenges. Brazilian sugar exports are traditionally traded under the form of very high polarization raw sugar, and relatively little sugar is refined for exports. Its exports are projected to represent 72% of the increase in global trade, +5.8 Mt when compared to the base period, mainly under the form of raw sugar.

In Thailand, the world's second largest sugar exporter, very little ethanol is produced directly from sugarcane (less than 2%); molasses or cassava are used instead. Production is expected to progressively

recuperate from the current dip and regain international market shares towards the end of the projection period, accounting for 14% of world sugar exports by 2030 (versus 13% during the base period) and reaching 10 Mt of sugar exports by 2030. India is projected to have enough supplies to maintain a high level of exports, mainly in the form of white sugar, and to be the third largest sugar exporter throughout the next decade. However, the government's continued efforts to promote ethanol inclusion is projected to contribute to a weaker growth in sugar exports during the projection period, with more sugarcane diverted to the production of ethanol. In Australia, sugarcane will be limited by the availability of irrigated land; in view of this constraint, production levels are projected to remain close to the relatively low levels of the current season, but higher than the domestic demand. Thus, the country will continue to export around 77% of its production.

**Figure 5.7. Raw and white sugar exports for major countries and regions**



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

Source: OECD/FAO (2021), "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<sup>4</sup>. Production is not projected to increase much. That of HFCS is expected to generally satisfy internal demand without significant change in EU exports. But the European Union will become a net exporter of high quality white sugar towards the end of the next decade. Its exports traditionally reach sugar-deficit countries in the NENA and Far East regions, but will face competition from the supply of sugar refinery industries which have developed during the last decade, notably in the NENA region, to meet domestic demand while allowing for exports. The NENA region critically depends on Brazil as a supplier of raw sugar, which makes it vulnerable to supply constraints for processing and to movements in exchange rates and freight costs. In addition, it faces strong competition from India in the export of white sugar to East Africa and the Near East.

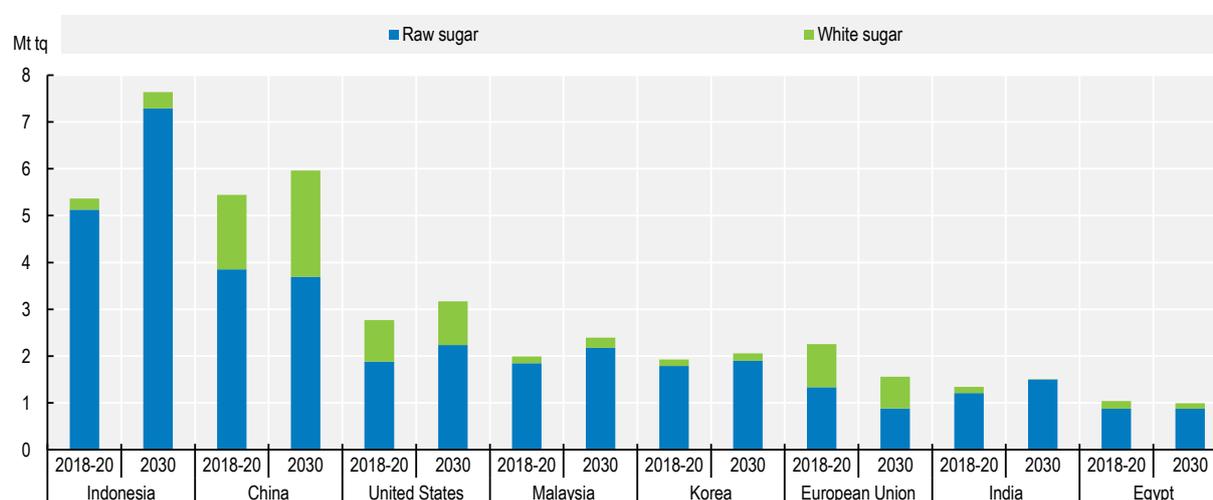
World sugar imports are less concentrated than are exports (Figure 5.8). Based on the outlook projections, Asia and Africa will see the strongest growth in sugar demand, which in turn will influence the ranking of main importers. During the base period, Indonesia and China were the leading importers (at 5.4 Mt each), followed by the United States (2.8 Mt), the European Union (2.2 Mt), Malaysia (2.0 Mt), Korea (1.9 Mt), and India (1.3 Mt). Over the next decade, Indonesia, with a strong growth in consumption, is projected to

consolidate its position as the leading sugar importer by 2030 (7.6 Mt), followed by China (6 Mt), the United States (3.2 Mt), Malaysia (2.4 Mt), Korea (2.1 Mt), and India (1.5 Mt).

In the United States, traditionally a sugar-deficit country, policies will continue to foster domestic production and limit imports. 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) will govern import flows. Given the relatively higher sugar prices in the United States, Mexico will continue to export its sugar primarily to fulfil the United States needs. Mexico, in turn, is expected to resort to US HFCS to meet national demand for sweeteners.

Sugar imports are expected to decline mainly in the European Union, Iran and South Africa. The preferential agreements the European Union signed with partner countries have become less attractive since 2017, when the abolition of sugar quotas resulted in lower prices. The EU sugar imports are projected to meet lower demand and decrease to 1.6 Mt by 2030.

**Figure 5.8. Raw and white sugar imports for major countries and regions**



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

Source: OECD/FAO (2021), "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 Covid-19 pandemic was continuing when the economic assumptions for this report were decided and delays in vaccines have generated uncertainty as to economic recovery in 2021. This *Outlook* assumes that at the end of the 2020 sugar season, confinement and restriction measures will be lifted, restaurants will be reopened, and out-of-home consumption will resume. After a temporary increase, consumption should be back to its long-term growth; recovery may change, however, depending on the availability of vaccines and virus mutations.

The projections in this *Outlook* assume stable macro-economic and normal weather conditions, and make specific assumptions with respect to different variables such as crude oil prices, related policies (i.e. ethanol mandates), or consumption and production trends. A shock to any of these variables can result in significant deviations from the projections, especially since production and trade are concentrated within a small number of countries.

To stay competitive, and in view of declining trends in the sugar demand, producers will look to diversify. New products derived from sugar crops have been developed over the last decade: oligosaccharides obtained from fermentation processes can replace some of the added nutritive elements in feed rations (lysine), bioplastics, and some chemical products. The development on a large scale of these alternative products could create tensions on the markets of the two traditional main sub-products.

The prospects for the sugar demand are uncertain in view of the growing evidence of the negative impact of excessive sugar consumption on human health. Among other things, some governments have imposed taxes on caloric sweeteners to encourage lower consumption, which could be reinforced over the next decade. As a result, some pro-active reactions have been taken by the food industry – such as product reformulation, the use of alternative non-caloric sweeteners including stevia, and decreasing portion sizes – which could also be amplified.

The projections for Brazil carry several uncertainties, particularly with respect to the ongoing financial consolidation. The outlook for the Brazilian Real exchange rate, with respect to the US dollar, and the oil price are two crucial dynamics for Brazil's sugar sector, which has the flexibility to easily switch between the use of its sugarcane for either sugar or ethanol, depending on the relative profitability of the main two sub-products. When the Brazilian Real depreciates, this gives incentives when the product is denominated in US dollars to sell on sugar the international world market (and vice versa). As for the price of crude oil, it must be high enough for millers to produce ethanol as the price of ethanol is fixed at 70% of the crude oil price. An appreciation or depreciation of the Real directly affects the competitiveness of the sector and has a significant impact on international and domestic markets. The implementation of the biofuel programme (Renovabio) can also have a significant impact on sugar markets as could the potential for alternative feedstocks to replace some of the sugarcane-based ethanol which could influence the sector as well.

The outlook for India is subject to high uncertainties. Small changes in consumption or production trends or in related policies could have large impacts on world markets. For example, changes on the assumed fulfilment of the country's ambitious ethanol blending targets could have substantial impact on sugar supply to the domestic and international markets. Similarly, changes to export-related policies could have a large impact on global markets. In addition, production and exports have historically had large swings, which can easily affect the market predictions of this *Outlook*.

Trade distortions on international sugar markets will persist. Changes in international sugar prices are not fully transferred to domestic sugar producers and consumers, even if some world sugar markets have undertaken structural reforms (e.g. elimination of sugar quotas in the European Union and Thailand). However, to protect their domestic markets, many countries continue to use trade policy instruments. These include: (i) high out-of-quota tariffs in China; (ii) the South African dollar-based reference price mechanism that ensures a minimum import price; (iii) adjustments to WTO TRQ and export limits for Mexico (United States); (iv) transportation subsidies to stimulate exports of sugar and support domestic sugar prices (Pakistan, India); (v) high import tariffs (European Union, Russia, United States); and (vi) regional trade agreements (NAFTA, European Economic Partnership Agreements, and Everything but Arms).

## Notes

<sup>1</sup> The economic assumptions underlining the projections for increased production include the depreciation of the Brazilian Real against the US dollar reflecting Brazil's position as the top sugar exporter.

<sup>2</sup> Some emergency authorisations for the use of a neonicotinoid seed treatment can be granted until 2023 (Article 53 of Regulation (EC) No 1107/2009).

<sup>3</sup> The 50% import tariff was increased to 95% from 22 May 2017 to 21 May 2018, 90% from 22 May 2018 to 21 May 2019, and 85% from 22 May 2019 to 21 May 2020.

<sup>4</sup> A complaint filed by Australia, Brazil, and Thailand at the WTO succeeded in capping EU subsidised exports to 1 279 kt/year, as of 2006.