

SUGAR

Market situation

International sugar prices fell by more than 30% in 2014. The prospect of a global sugar production deficit has led to a price increase at the start of the current season, but with stocks still at comfortable levels, the price increase is expected to average slightly above 2% in the 2015 marketing year (see glossary for a definition of marketing year).

Indeed, there has been a slowdown in output growth since 2013, and global sugar production is expected to fall by about 5 Mt in 2015. Given steady growth in global consumption, this should put an end to the surplus phase. Increases in sugar production are foreseen in Brazil (the leading producer and exporter), Australia, the Russian Federation and Thailand, but two main producers, India and the European Union, will see a decrease. After four years of replenishing global stocks, the stocks-to-use ratio should begin to decline at the start of the 2016-25 outlook period.

Projection highlights

The continuation of in place domestic policy measures as well as Brazil's sugarcane production prospects will continue to largely influence the sugar market over the medium-term. World sugar prices, when denominated in US dollars, are not expected to increase much as production prospects should be able to satisfy a growing world demand, notwithstanding WHO recommendations to reduce daily "free" sugar intake to less than 10% of total energy intake.

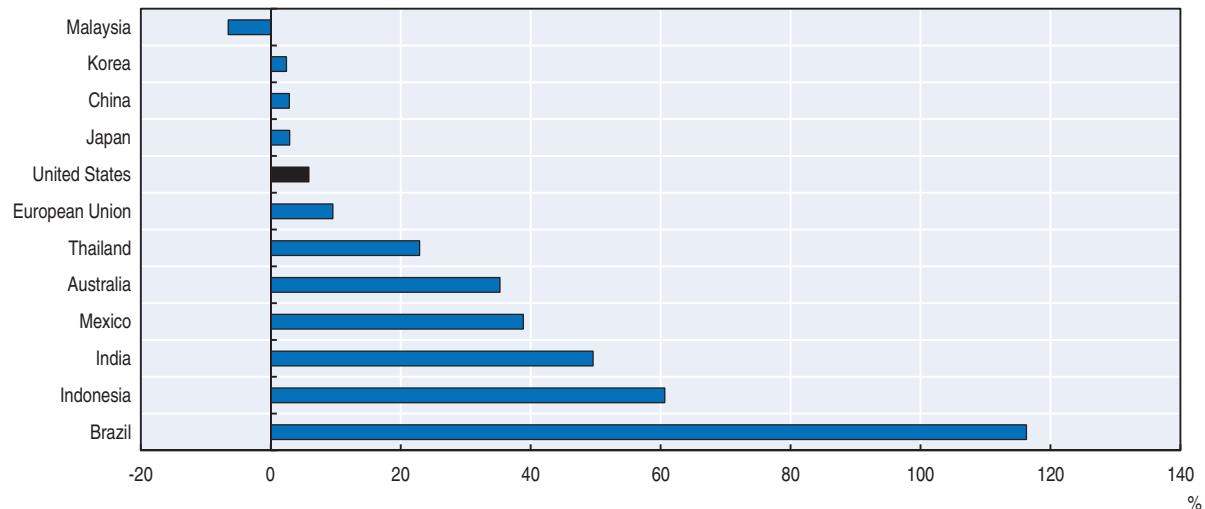
In terms of the macro-economic assumptions underpinning the *Outlook*, exchange rates are a key factor affecting the sugar market. Over the forecast period, the USD is assumed to strengthen against the majority of currencies, enhancing the competitiveness of major sugar exporters on the world market, especially Brazil. In contrast, a few deficit countries located mainly in Asia (China, Korea, Japan, Malaysia), will benefit from a firming of their exchange rates against the USD, making imports less expensive when denominated in local currencies.

World sugar prices, with the return to a deficit phase, are expected to increase only slightly for a couple of years as a consequence of high level of stocks and low oil prices. They are then foreseen to follow a moderate upward trend. The international raw sugar price (Intercontinental Exchange No. 11 contract nearby futures) is projected to reach USD 342/t (USD 15.5 cts/lb) in 2025, in nominal terms. Similarly, the indicator world white sugar price (Euronet, Liffe futures Contract No.407, London) is projected to reach USD 425/t (USD 19.2 cts/lb) in nominal terms in 2025. The white sugar premium (difference between white and raw sugar prices) should temporarily decline in 2017 with the decline in the EU raw sugar imports after quota abolition, before returning to a level close to USD 83/t at the end of the period.


The sugar sub-sectors in many developed and developing countries will continue to benefit from domestic policy support measures such as high import tariffs, tariff rate quotas, and minimum price support. These policies will continue to distort markets and contribute to the relatively elevated level of market volatility. However, new policies will

Figure 3.3. **Change in world nominal raw sugar prices when denominated in selected national currencies**

2025 vs. 2013-15



Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.

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liberalise the sugar market to some extent, such as the abolition of sugar quotas in 2017 in the European Union and the deregulation of sales of sugar in the open market in India.

Brazil's sugar sector has faced financial problems for several years, but will benefit from the weakness of the Brazilian real. Government policies continue to support ethanol production from sugarcane, but the share of sugarcane devoted to ethanol production should slightly decline over the outlook to 57%. This will displace sugar sales in domestic and export markets. Globally, a higher share of sugarcane production will be devoted to producing ethanol, rising from about 20.7% during the base period to 22.3% in 2025.

Global sugar production, despite an expected fall in the coming season in some producing countries, should rise over the course of the decade, sustained by demand growth and a reduction in stocks. Over the ten-year period, the growth in production is foreseen to average 2.1% per annum (p.a.), with production reaching 210 Mt by 2025, an increase of around 39 Mt over the base period (2013-15). Most of the additional production will originate in countries producing sugarcane rather than sugar beet, and the main driver of output growth is area expansion, notably in Brazil, even though yield improvements are foreseen for sugar crops and sugar processing in some other producing countries (India and Thailand).

The anticipated growth in world sugar demand for the next decade is steadier with an increase of 2% p.a. resulting in a decrease of the stock-to-use ratio from 45% in the base period to 39% in 2025. However, the growth in demand is mixed with nearly no growth in the matured developed countries and stronger prospects in developing countries, in particular Africa and Asia. In developing countries with high sugar calorie intake, no noticeable changes in consumer habits are foreseen, as sugar is an available, cheap source of energy, which is easy to transport and store.

In the face of growing global demand, sugar exports are likely to expand in countries that have modernised their sugar sub-sector in recent years (e.g. Australia, European Union, and Thailand). Brazil will remain the world's major producer and

exporter, but lose market share at the start of the period, opting for more profitable ethanol production in the short-term. Favourable currency terms should encourage investment. Overall, Brazil's share of world sugar exports is expected to decline at the start of the projection period before recovering to a level close to that achieved during the base period (41%). On the other side, imports will remain diversified, mostly driven by demand from Africa and Asia.

Over the medium-term, the interaction between the sugar market and other sectors such as the feed sector, biofuels, and other caloric sweeteners (e.g. isoglucose) will generate feedback effects. Also, with existing policies and high fixed costs, the sugar sector should stay volatile. Furthermore, any external shock to one of the related markets, or to the exogenous assumptions, could alter the results discussed in this report.

The expanded sugar chapter is available at
http://dx.doi.org/10.1787/agr_outlook-2016-9-en

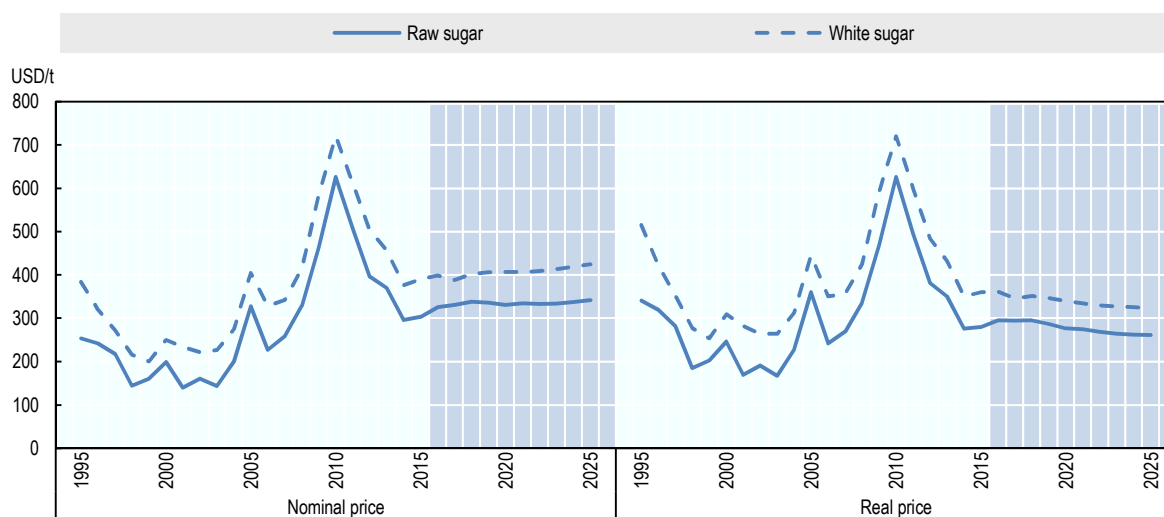
SUGAR

Prices

World sugar prices are low at the start of the *Outlook* period and are projected to stay low in the short term before strengthening moderately in the following years. By 2025, they will be higher than the 2013-2015 base period in nominal terms, but lower when expressed in real terms. The nominal world raw sugar price is projected at USD 342/t (USD 15.5 cts/lb) and at USD 425/t (USD 19.2 cts/lb) for white sugar, in 2025. The white sugar premium, although increasing in the current period due to rising import demand in Myanmar and Sudan, is expected to undergo a squeeze in 2017, as the abolition of the EU sugar quota allows for further exports of white sugar on the world market. The resultant downward pressure on price will encourage producers to switch to exporting more raw sugar rather than white sugar, which in turn will stabilise the premium towards the end of the period (USD 83/t versus USD 85/t during the base period).

Sugar price volatility should diminish over the forecast period, largely due to low production costs and the change in Indian sugar policy, implemented in 2013. India is the world's largest consumer and second largest producer of sugar, but has suffered cyclically from deficits and at these times has relied on imports to meet demand when needed. Today, however, Indian growers receive a "fair and remunerative" level of guaranteed cane price. This helps regulate sugarcane production and maintains a better market balance.

Figure 3.3.1. 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 (2010=1).

Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Production

After five years of production increases, a production deficit was experienced in 2015. While there are increases in sugar production in Brazil and other smaller producing countries such as the Russia Federation, South Africa and Australia, these are offset by decreases in Europe and some key Asian countries. Over the forecast period, stocks are expected to diminish and remain low for several years. Brazil, the largest sugar producer and supplier, will continue to play a key role on world markets, but its dual use of sugarcane as a feedstock for ethanol and for sugar production will continue to be affected by relative price competition between the export-oriented market for sugar and the largely domestic ethanol market.

World sugar production is projected to grow by 2.1% p.a. to reach 210 Mt by 2025, up nearly 39 Mt, 19% above the average for the base period. Higher increases are expected to occur in developing countries with 79% of global sugar production in 2025 compared to 77% during the base period. In the developing world, the leading regions are Asia and Pacific and Latin America and the Caribbean, which are expected to account for 40% and 33% of global sugar production in 2025 respectively, up from 38% and 34% during the base period. Growth in Asian sugar production is expected to increase by 2.4% p.a. to 2025, compared to 2.2% p.a. in the previous decade, whereas growth in Latin America should increase by 2.4% p.a. compared to 2.1% p.a. in the previous decade. This expansion should be driven mainly by higher output growth in India, Thailand, Pakistan and Latin America. In Africa, sugar output is projected to increase by 49% by the end of 2025 as a result of production expansion in Sub-Saharan countries. Regarding developed countries in the coming decade, production is expected to grow at a much slower pace than in the developing countries (respectively 0.83% p.a. and 2.51% p.a.). The main increases would occur in Australia, averaging 1.7% p.a., followed by the United States and the European Union, both growing at 0.6% p.a. (Figure 3.3.2).

It is projected that sugarcane will account for about 86% of sugar output over the next decade, although some expansion of sugar beet production is anticipated in the Russian Federation, Egypt, the Ukraine, and the European Union following the abolition of quotas in 2017. For sugarcane and sugar beet production, most of the increases are projected to come from higher yields and area expansion, and, in the European Union, a lengthening of the beet slicing period. The share of sugarcane allocated to ethanol will continue its upward trend, and 22% of sugarcane in 2025 will be allocated to ethanol production (from 21% during the base period). Conversely, the share of sugar beet allocated to ethanol (5%) will decrease slightly to 3%.

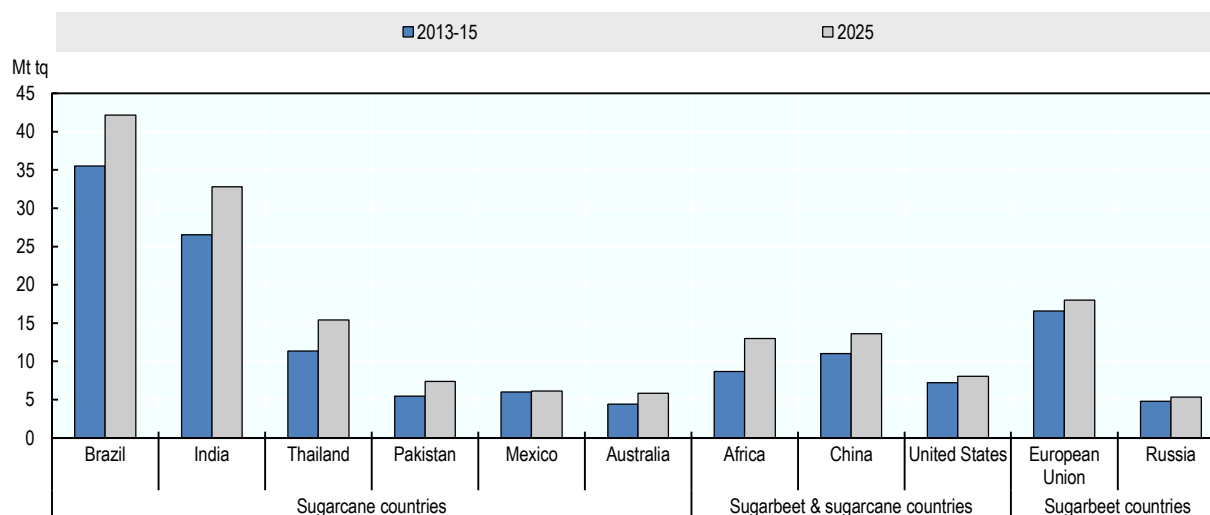
Brazil will maintain its leading position on the sugar market although high levels of debt are expected in the sector for several years at the start of the outlook period due to difficulties linked to unfavourable weather and economic conditions (higher overseas debt denominated in US dollars due to mechanisation, increases in wages, and limited access to credit). Bankruptcy rates have gone up as mills face mounting debts in the face of lower returns. Supported by the Brazilian government, hydrous ethanol production, which allows for a quicker return, has become since 2012 more profitable than sugar. However, although benefiting from a favourable exchange rate, it is foreseen that a lack of renewed plantings and investments in the sugar sector will persist for a couple of seasons. Taking into account the continued fiscal policy for fuels, depreciation of the currency, and assuming no weather shocks, it is foreseen that production will return to its previous high levels after 2021 and reach 42 Mt at the end of the projection period.

In Asia, India, Thailand and the People's Republic of China (hereafter "China") are the top three sugar producers. Sugarcane production in India, the leading producer of the region, is expected to expand, driven by sugar and ethanol policies. The recent sugar policy reform provides greater reliability in terms of prices paid to farmers and abolishes marketing constraints put on sugar mills. The latest supporting policy for ethanol also provides renewed incentives to expand sugarcane production and processing capacities. Indian sugar production is expected to reach 32.8 Mt in 2025, about 23.6% above the level of the base period 2013-15.

Thailand has produced large sugarcane crops following the surge in production in 2010 and since 2014 is the second largest producer of the region, although drought did affect yields in 2015. Assuming normal weather conditions, Thailand is expected to maintain its market position, despite a slower pace of production growth in medium term as opposed to recent years. Indeed, as sugarcane expansion reaches areas less suitable for production, yields becomes more volatile,

labour costs rise, and small-scale farming limits mechanisation. In China, unlike India and Thailand, farmers have the possibility to switch between different crops depending on their profitability. Sugar import prices have become competitive as the sector in China suffers from high labour costs, small farm sizes, and low productivity. This has led to massive imports of sugarcane. A new plan (2015-2020) for the production and development in the main producing areas of sugarcane intends to once again boost the sector. China sugar production is expected to increase by 24% over the forecast period to reach 13.6 Mt, mainly through increases in sugarcane and sugar beet yields.

Figure 3.3.2. Sugar production classified by crop



Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Sugar production in Africa is projected to increase by 4% p.a. to 2025 due to continued increases in production capacity at both the farm and processing levels, primarily in Sub-Saharan countries. Growth in output will be driven by strong domestic demand for sugar as well as trade opportunities, such as those offered under the Economic Partnership Agreements (EPAs) and the Everything But Arms (EBA) initiatives of the European Union. However, the removal of the sugar quota by the European Union, with an implied reconciliation of EU and world prices, is expected to have negative implications on exports from high-cost, non-LDCs, African, Caribbean and Pacific (ACP) producing countries that benefitted from a higher EU price. Sugar output in South Africa has been expanding in the base period but at a moderate rate (less than 1% p.a.). It is expected that a similar situation will prevail over the medium term, supported by a rise in the minimum import price, as South Africa considers the sugar sub-sector a key to rural development.

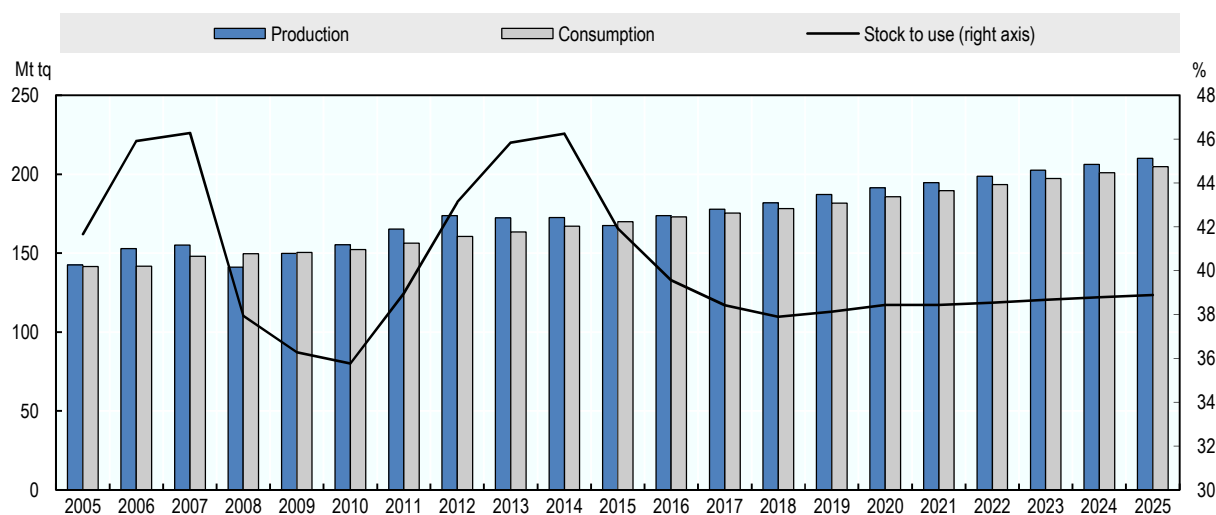
In developed countries, more moderate developments are expected compared to the developing world. Major increases will occur in Australia, Europe and the United States, the latter being sustained by policy (see below). Australia is an export-oriented country which will benefit from recent efforts from milling groups to increased cane plantings and sugar yields and an assumed low Australian dollar compared to the US dollar. With normal weather conditions, its sugar production is foreseen to increase by 1.7% p.a. to reach 5.8 Mt by 2025.

The European Union is the leading producer among the developed countries and will face major reforms. After 1 October 2017, sugar and HFCS quotas and guaranteed prices will be abolished, which will force the market to be guided by market fundamentals, leading domestic prices to be more in line with world prices. The refined sugar price is forecast to drop to EUR 401/t in 2025 from EUR 503/t during the base period. Competition will occur between sugar beet and other crops, and mills will be able to process sugar beet for different products, both for food and non-food use,

without a price differential. Pressure to become competitive on the global market is expected to lead some producers to increase output through higher yields and lengthening of the production campaign. This is expected to foster very modest increases in EU sugar production (0.6 p.a.), which will never reach the production levels seen before the 2006 sugar reforms. Isoglucose production is forecast to take off as early as 2017 and to compete with sugar, especially in the EU sugar deficit areas.

Sugar production in the United States, the second largest producer amongst the developed countries, remains heavily influenced by government policy. As the sugar market continues to be based on domestic support, TRQs and regional agreements, domestic prices are expected to stay about 75% above global market prices. Production is controlled by the USDA's Commodity Credit Corporation (CCC) through marketing allotments that encourage millers to increase their production level up to 85% of total consumption each year. In return, sugar producers can receive a floor price (loan rate) and forfeit their production in lieu of repayment if they expect prices to fall below the loan rate. To help ensure that US prices are secure,² since November 2015 Mexican sugar entering the US market under NAFTA are limited to defined "US needs" (countervailing duty (CVD) and anti-dumping (AD) suspension agreement). Over the forecast period, US sugar production is expected to increase by 0.6% p.a., reaching 8.0 Mt in 2025 and US HFCS production is expected to fill the forecast deficit in the Mexican sweetener market as Mexico continues to export part of its sugar to the more remunerative US sugar market.

Figure 3.3.3. Production, consumption and stock-to-use ratio of sugar



Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook". *OECD Agriculture statistics* (database).
<http://dx.doi.org/10.1787/agr-outl-data-en>.

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The Russian Federation, which is looking for sugar self-sufficiency, has continued its effort to modernise its sugar industry which is supported by high level of import barriers. The majority of successful beet growers are now vertically integrated and less eager to switch to other crops. Despite anticipated rising input costs as well as high interest rates, it is anticipated that the increase in the Russian Federation's beet production will continue and contribute to a stabilisation of the sugar deficit over the next ten years, with production close to 5.4 Mt in 2025. Sugar production in the Ukraine is expected to recover somewhat, driven by a projected improved economic environment and a decrease in input costs.

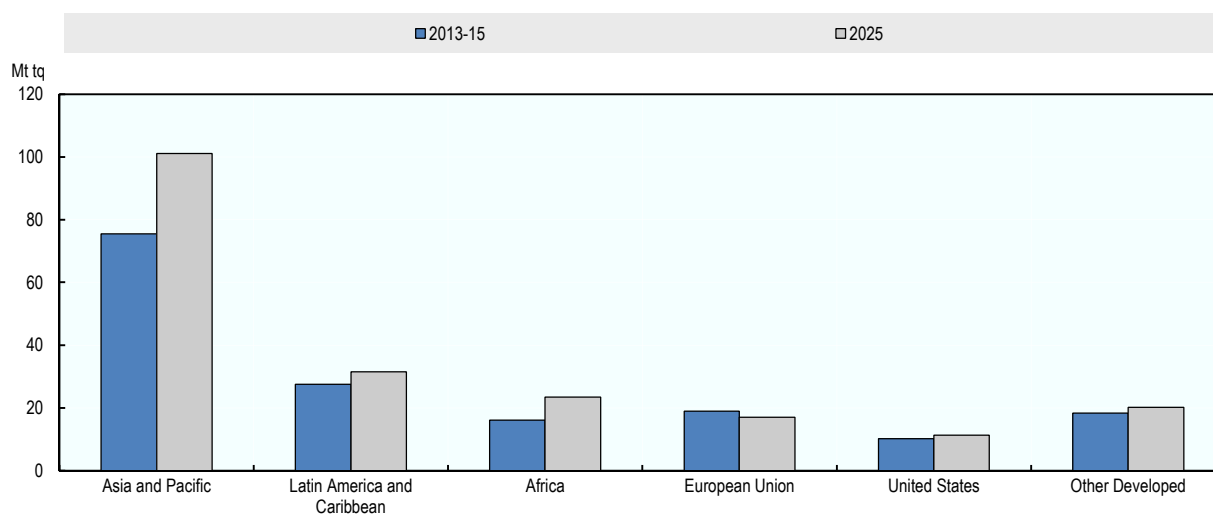
With lower world prices and largely replenished stocks in a number of countries at the start of the projections, several major countries such as China are expected to release part of their large sugar stocks over the course of the outlook period. Over the ten years, the global stocks-to-use ratio should average lower than the previous decade, at 38.6% compared to 41.8%.

Consumption

Being less volatile than production, global consumption of sugar is projected to grow at around 2% p.a., slightly higher than in the previous decade, to reach 205 Mt in 2025. Although there have been growing concerns concerning excess sugar consumption, the average world level of per capita consumption is expected to increase. World sugar demand will also be influenced by the recovery in global economic growth and the slight slowdown in population growth.

Demand in developing countries will continue its rapid growth, driven by rising incomes, urbanisation and growing populations, although with considerable variation between countries (Figure 3.3.4). Per capita sugar consumption in urban African and Asian countries is historically low and growth prospects are high compared to other regions.

Figure 3.3.4. Sugar demand in major countries and regions



Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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The sugar deficit regions of Asia and Pacific, and Africa will be responsible for most of the expansion in sugar use (68% and 19% respectively). In Asia, it is expected that India, followed by China and Indonesia, will experience the biggest increase in sugar consumption. Sugar consumption in Indonesia is expected to increase faster than the world average, driven by rising per capita income and expansion in the processing and manufacturing food sectors. The government has supported large investments in farm and processing units in order to attain self-sufficiency, and while this support has spurred domestic sugar production, large imports will be required to satisfy domestic sugar intake. In terms of per capita consumption, growth is expected to be largest in Bangladesh, Indonesia and Thailand. In Africa, the highest increases in consumption are projected in several Sub-Saharan countries, both in level and per capita.

In contrast, the largest consuming developed countries are projected to show a decline in their level of sugar intake per habitant, consistent with their status as mature or saturated sugar markets. Slowing population growth, dietary changes based on increased health consciousness and nutritional commitments taken by multinationals in those countries will continue to impact their markets. Rapid expansion of demand is, however, foreseen for the Russian Federation and the Ukraine where sugar will be considered as a staple product as long as slow economic growth persists.

Due to its competitiveness in producing sugary soft drinks, growth in isoglucose consumption is projected to double over the next ten years, 1.5% p.a. as compared to 0.8% p.a. during the previous

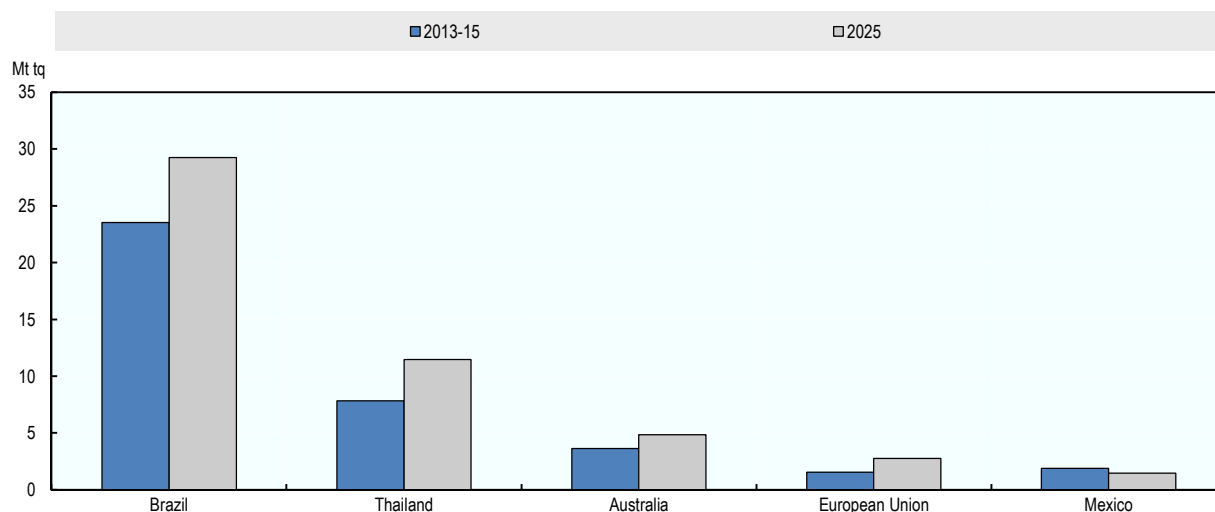
decade. HFCS consumption is projected to grow by 17% or 2.2 Mt to 2025. More than two-thirds of this increase will occur in the European Union, with the expected surge in isoglucose availability after the abolition of the HFCS quota. Consumption growth is also expected in China and Mexico. In the latter, due to the last policy development on sugar trade with the United States, HFCS share in the demand for sweeteners is expected to increase from 25% in the base period to 29% in 2025. Finally, demand in the United States, the leading producer, will continue to decline slightly.

For several years, per capita consumption of sugar has been growing, with associated concerns about the implications for human health. In March 2015, the WHO made a recommendation for adults and children to reduce their daily intake of free sugars to less than 10% of their total energy intake to help fight against the risks of obesity and dental caries. The effects of the implementation of such a recommendation on agricultural markets are not taken into account in this *Outlook*, but they could nevertheless be strong (Box 3.1.1). Some countries have already tried to impose levies to limit sugar intake. For example, Mexico implemented a tax of 8% per litre in 2014 to address obesity concerns due to over consumption of sugary drinks (this is taken into account in the present *Outlook*). Over the projection period, an increase of 0.3% p.a. is foreseen for its per capita sweetener consumption.

Trade

Over the coming decade, sugar exports are expected to remain highly concentrated (Figure 3.3.5). It is expected that Brazil will keep its position as the leading exporter. Despite the current industry crisis, the weakened Brazilian real against the US dollar should maintain the industry's competitiveness but the expected rebound will take several years. Brazilian exports are expected to decline at the start of the outlook period before regaining market shares. In 2025, with its sugar exports higher by 5.7 Mt, it is foreseen to account for about 42% of world trade (from 41% during the base period). In Thailand, the world's second largest exporter, shipments are expected to increase by 3.6 Mt, (46% compared to the base), driven by a steady growth in production and export availabilities. Similarly, in Australia, with rising investment in irrigation, expansion of the sugarcane area and milling capacities, higher production is expected to boost export sales over the medium term.

Figure 3.3.5. Sugar exports for major countries and regions



Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

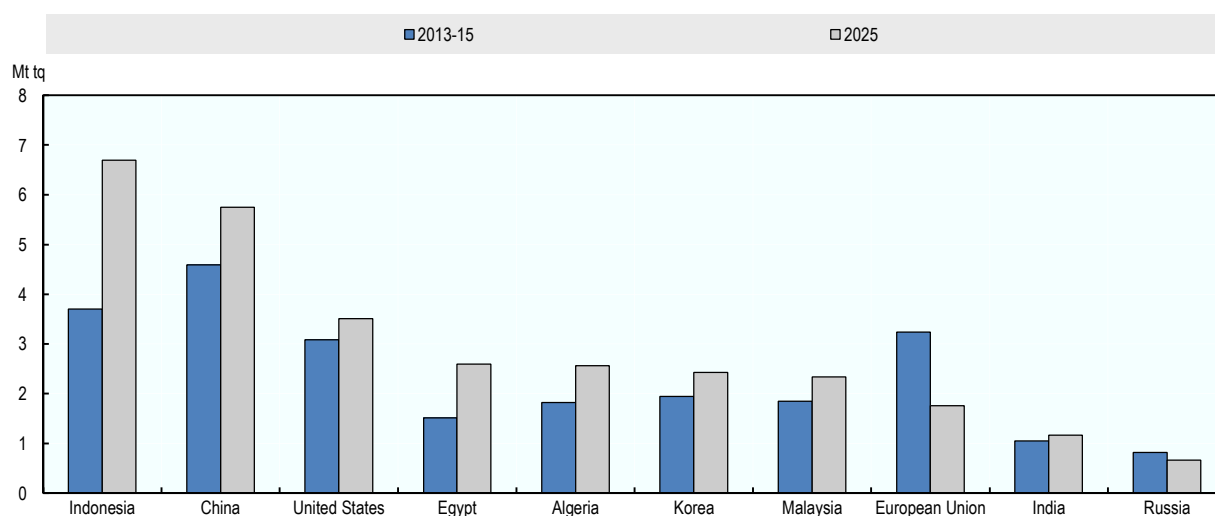
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In the European Union, the increase in sugar and HFCS production following the abolition of sugar and isoglucose quotas is foreseen to result in an increase of its renowned high quality white sugar exports (+80%), even with a premium price, and a cut in sugar imports (-46%). The EU HFCS trade will not change much as the production increase that will occur after 2017 will satisfy internal demand. Consequently, the European Union is expected to lose its position as the world largest sugar importer with imports projected to regress by 1.5 Mt in 2025 compared to the base period.

World sugar imports are more dispersed than exports as more countries begin importing. According to the outlook projections, Asia and Pacific, and Africa will see the strongest growth in sugar demand and this will influence the growth in imports for those regions (Figure 3.3.6). During the base period 2013-15, China and Indonesia are the leading importers after the European Union, but over the projection period, Indonesia is expected to become the leading sugar importer.

The United States, traditionally a sugar deficit region, will continue to be influenced by its domestic policies which tend to oversee the amount of domestic production and the level of imports. During the outlook period, with low sugar and corn prices, sugar supplies are expected to be relatively tight. This will result in a continuation of imports established under TRQ duty-free imports through WTO and FTAs agreements, and imports from Mexico under NAFTA. These latter imports will nevertheless be limited by the calculation of the target quantity of US needs as defined in the countervailing duty investigations on sugar from Mexico, dated 19 December 2014. Gaining from higher sugar prices in the United States, Mexico will continue to export its sugar to the United States (from 1.9 Mt during the base period to 1.6 Mt in 2025) and resort to US HFCS imports (+60% or 600 kt) to fill its demand for sugar. With sugar imports expected to average 3.2 Mt per year, the United States will be the third largest importer in 2025.

Figure 3.3.6. Sugar imports for major countries and regions



Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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Main issues and uncertainties

In regards to the macroeconomic environment, crude oil prices and weather conditions are issues and uncertainties common to most commodities. Sugar production is capital intensive and in several exporting countries (e.g. Brazil) a considerable share of debt is in USD. Thus, uncertainty as to the profitability and competitiveness of producers increases when world prices stay relatively low. Combined with the current large stock levels, any shock to one of those variables would create some volatility, which could create some substitution in areas and change the allocation of sugar crops to the end product. Furthermore, a range of domestic policies still support the sugar sector.

Box 3.3.1. Potential impacts on agricultural commodity markets of the WHO guideline on sugar intake

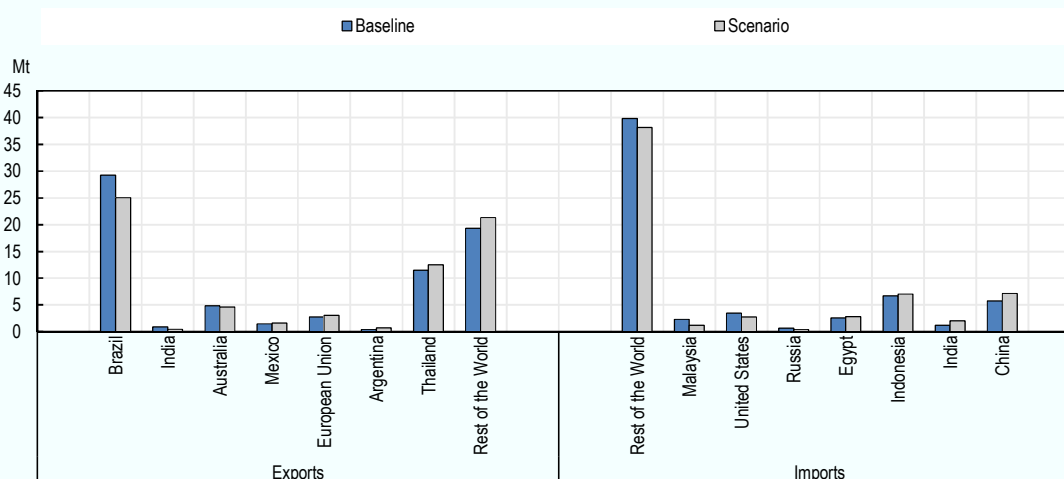
The WHO guideline, published in March 2015, recommended that adults and children reduce their daily intake of free sugars¹ to less than 10% of their total energy intake, in order to fight against the harmful effects of high sugar consumption on weight gain, obesity, non-communicable disease and tooth decay. The potential effects on agricultural markets due to this recommendation on sugar consumption have been assessed using the Aglink-Cosimo model.

The scenario assessed the effect of limiting calorie intake from sugar and isoglucose consumption to 10% of total calorie intake, by reducing per capita demand over a five-year period. This ratio is exceeded in many countries, according to the *Agricultural Outlook Database*. In 2015, this ratio reached more than 16% in Brazil, Israel and Malaysia and ranged between 10 and 15% in South America, Korea, Thailand and Pakistan, developed countries, North Africa, and Sudan. Countries below the 10% threshold were mostly in Asia (India, Indonesia, China...) and Sub-Saharan Africa.

The simulation results show that the market would become over-supplied and world prices would fall by 21% after five years. In 2025, Brazil would see its sugar consumption fall by 5.4 Mt, the United States by 4.4 Mt, and Mexico and Thailand by less than 2 Mt each. On the other hand, non-constrained countries (where consumer habits would not change rapidly) would benefit from the lower prices but only increase their sugar consumption slightly (0.9 Mt in 2025). Globally, over the outlook period, world sugar demand would be 10% lower in 2025: sugar consumption would increase by 17 Mt instead of the 38 Mt projected in the baseline.

The decrease in sugar prices would affect the world sugar market. On the export side, loss of market shares would occur in countries where high prices are needed to support current or new investments (Brazil, Australia). Whereas this would be beneficial to efficient, constrained producing countries where modernisation has occurred (Thailand, Argentina, and some other small South American countries). Among countries with milling capacities that import raw sugar and export refined sugar, only the most competitive would remain (Saudi Arabia), while others would face difficulties (Bangladesh).

Figure 3.3.7. Trade implications of the implementation of the WHO recommendation regarding sugar intake in 2025



Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

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On the import side, despite decreases in world sugar prices there is a slight decline in imports as a result of different factors. Constrained deficit-producing countries would see lower imports (Malaysia, the Russian Federation, and the United States). While non-constrained countries, even with the decrease in sugar prices, would experience only a slight increase in their sugar imports, as consumer preferences do not alter much over the forecast period (China, India and Indonesia). Limited substitution for end products and land allocation would take place in some producing countries in favor of ethanol (Brazil) or more profitable crops such as oilseeds (Brazil), eucalyptus or cassava (China).

In terms of calorie equivalent, a reduction of total calorie intake would occur in nearly all constrained countries. This suggests that the decrease in sugar consumption would not be offset by the increase in the demand of other commodities included in the model.

1. Free sugar is defined by the WHO as "monosaccharides (such as glucose, fructose) and disaccharides (such as sucrose or table sugar) added to foods and drinks by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates".

Another major uncertainty of this outlook relates to domestic sugar policies and their role in shaping the performance of the sub-sector. With lower sugar prices projected for the medium term in comparison to recent years, the role of policy support is most likely to return to the top of the policy agenda. Indeed, new measures may be introduced to limit the impact of lower prices on producers, and hence alter the outcome of the current baseline. Despite the introduction of new policies that are expected to liberalise the sugar market to some extent, such as the abolition of the EU sugar quotas in 2017 and the deregulation of sugar sales on the open market in India, this outlook is still subject to changes in view of the remaining policies that govern the sub-sector, policies that are trade distorting and contribute to high levels of market volatility.

In Brazil, one of the lowest cost sugar producers, the quantity of sugarcane utilised for the production of ethanol at the expense of sugar constitutes another element of uncertainty. The share of sugarcane going towards ethanol production depends on the relative price between gasoline and ethanol, and on the mandatory blending ratio set by the government. With lower oil prices and increasing domestic inflation, the government may decide to lower gasoline prices to contain inflationary pressure, as it has done in the past. A similar move will certainly affect the share of sugarcane going into ethanol production and, by extension, the availability of sugar for export.

Finally, the ratification of regional agreements could also impact the pattern of the world sugar market. For example, the implementation of the Trans-Pacific Partnership (TPP)³ would lead to winners and losers. Australia, the third largest sugar exporter, would see increased access to the US market and lower duties for its sugar exports to Japan and Malaysia. Malaysia, the world's fifth largest sugar importer, would benefit from imports without tariffs from the suppliers of the zone (suppliers currently include Australia, but neither Mexico nor Peru), and Japan would be able to import raw sugar for refining from the TPP zone with no tariffs. However, Brazil and Thailand, the world's top two suppliers of sugar and which supply sugar to the TPP zone, are not part of the agreement and would suffer the consequences of TPP implementation, although Thailand could gain from the ASEAN Economic Community (AEC).

Notes

1. Compared to previous reports and in line with the ISO database, sugar quantity data are now expressed on a *tel quel* (tq) basis to take into account the fact that the typical difference in polarization of white and raw sugar has narrowed.
2. The CVD and AD agreements were implemented in 2015 to fight against an excess of sugar from Mexico, which occurred in 2013, a record crop year in both countries leading to significant domestic price declines. Measures were taken to offset and help the US sugar industry.
3. The Trans-Pacific Partnership (TPP) agreement, which must still be ratified, creates a market of 800 million people covering 40% of global GDP. It is a free trade agreement between Asian countries (Japan, Viet Nam, Singapore, Brunei, Malaysia), Oceania and North America (Canada, United States, Mexico), Peru and Chile

Table 3.A1.3. World sugar projections

Marketing year		Average 2013-15est	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
WORLD												
SUGARBEET												
Production	Mt	257.0	268.2	271.9	274.2	276.8	278.9	279.7	280.0	280.4	282.1	284.1
Area	Mha	4.4	4.5	4.5	4.5	4.6	4.6	4.5	4.5	4.5	4.5	4.5
Yield	t/ha	58.63	58.99	59.79	60.31	60.71	61.16	61.51	61.88	62.28	62.69	63.10
Biofuel use	Mt	12.8	12.7	10.0	10.5	10.4	10.4	10.4	9.5	9.5	9.3	9.3
SUGARCANE												
Production	Mt	1 811.6	1 850.3	1 875.1	1 908.5	1 943.3	1 976.0	2 009.2	2 046.4	2 083.4	2 118.0	2 151.9
Area	Mha	26.9	27.2	27.3	27.7	28.0	28.3	28.7	29.1	29.4	29.7	30.0
Yield	t/ha	67.37	68.08	68.57	68.98	69.41	69.74	70.03	70.42	70.86	71.30	71.73
Biofuel use	Mt	374.3	409.5	414.0	420.0	430.3	440.1	448.4	457.1	462.9	471.4	479.0
SUGAR												
Production	Mt tq	170.8	173.7	177.8	181.9	187.2	191.4	194.7	198.8	202.6	206.2	210.0
Consumption	Mt tq	166.8	172.9	175.3	178.2	181.8	185.7	189.6	193.5	197.3	201.0	204.7
Closing stocks	Mt tq	74.5	68.4	67.4	67.5	69.3	71.4	72.9	74.6	76.3	77.9	79.6
Price, raw sugar ¹	USD/t	323.0	325.3	330.4	337.6	335.8	330.9	334.0	333.1	333.5	337.4	341.9
Price, white sugar ²	USD/t	408.0	398.6	388.3	402.5	405.8	407.0	406.9	408.8	413.7	419.0	424.5
Price, HFCS ³	USD/t	539.7	472.1	450.8	457.6	470.1	477.2	476.3	487.7	498.6	500.6	508.3
DEVELOPED COUNTRIES												
SUGARBEET												
Production	Mt	202.2	210.8	213.5	214.8	216.1	216.9	216.6	215.8	215.1	215.8	216.7
SUGARCANE												
Production	Mt	78.1	82.9	85.0	86.9	89.2	90.4	90.8	91.0	91.5	92.3	93.1
SUGAR												
Production	Mt tq	39.1	40.2	41.5	41.9	42.6	42.9	43.0	43.2	43.4	43.7	43.9
Consumption	Mt tq	47.6	47.4	47.0	46.7	47.0	47.3	47.5	47.8	48.1	48.3	48.6
Closing stocks	Mt tq	14.1	12.4	12.7	12.9	13.4	13.9	14.2	14.4	14.5	14.5	14.5
HFCS												
Production	Mt	9.5	9.4	10.1	10.3	10.4	10.5	10.7	10.8	10.9	11.0	11.1
Consumption	Mt	8.2	8.1	8.7	8.9	9.0	9.0	9.2	9.2	9.3	9.3	9.3
DEVELOPING COUNTRIES												
SUGARBEET												
Production	Mt	54.8	57.4	58.4	59.4	60.7	62.0	63.2	64.2	65.3	66.3	67.4
SUGARCANE												
Production	Mt	1 733.5	1 767.4	1 790.2	1 821.7	1 854.0	1 885.6	1 918.4	1 955.3	1 992.0	2 025.7	2 058.8
SUGAR												
Production	Mt tq	131.8	133.5	136.4	140.0	144.6	148.5	151.7	155.6	159.3	162.6	166.1
Consumption	Mt tq	119.2	125.5	128.3	131.4	134.8	138.4	142.0	145.7	149.2	152.6	156.2
Closing stocks	Mt tq	60.3	56.0	54.7	54.6	55.9	57.5	58.7	60.2	61.8	63.4	65.1
HFCS												
Production	Mt	3.3	3.4	3.4	3.5	3.5	3.6	3.6	3.6	3.7	3.7	3.8
Consumption	Mt	4.1	4.3	4.4	4.5	4.6	4.7	4.7	4.8	4.9	5.0	5.1
OECD⁴												
SUGARBEET												
Production	Mt	161.3	166.8	169.9	171.1	172.5	173.1	172.7	172.1	171.6	172.0	172.7
SUGARCANE												
Production	Mt	120.3	125.0	126.2	128.0	130.8	132.3	132.5	132.3	132.4	133.0	134.1
SUGAR												
Production	Mt tq	37.9	38.9	40.2	40.6	41.2	41.5	41.6	41.7	41.8	42.0	42.3
Consumption	Mt tq	43.8	43.9	43.4	43.2	43.5	43.8	44.0	44.2	44.5	44.7	44.9
Closing stocks	Mt tq	12.4	11.2	11.3	11.2	11.4	11.7	11.7	11.7	11.6	11.6	11.6
HFCS												
Production	Mt	10.6	10.5	11.1	11.3	11.5	11.6	11.8	11.9	12.0	12.1	12.2
Consumption	Mt	10.3	10.2	10.8	11.1	11.2	11.3	11.5	11.6	11.7	11.9	11.9

Note: Marketing year: See Glossary of Terms for definitions.

Average 2013-15est: Data for 2015 are estimated.

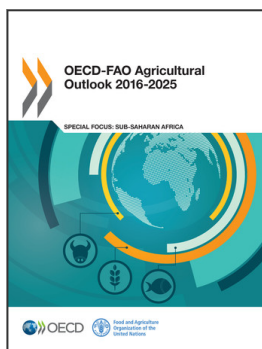
tq : tel quel.

HFCS: High fructose corn syrup.

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, October/September.
4. Excludes Iceland but includes all EU28 member countries.

Source: OECD/FAO (2016), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database). doi: dx.doi.org/10.1787/agr-outl-data-en

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