

OILSEEDS AND OILSEED PRODUCTS

Market situation

Global soybean production increased strongly in 2016, with the United States and Brazil registering record crops. The aggregate world production of other oilseeds (rapeseed, sunflower seed and groundnuts) increased for the first time in three years. Increased sunflower production, mainly in the Russian Federation and Ukraine, helped offset the decreased production of rapeseed in the European Union. This has brought some relief to a relatively tight market situation.

Vegetable oil production declined in the 2015 marketing year for two reasons. First, palm oil yields decreased in Southeast Asia (Chapter 2) due to *El Niño*, and secondly, the market share of soybeans, which contain less oil than other oilseeds, increased, resulting in a stagnation of oilseed oil production. This led to a sharp decline in world stocks and although vegetable oil production recovered in 2016, this will not be sufficient to relieve the relatively tight market in view of the demand growth for vegetable oils to produce biodiesel in 2016, especially in Indonesia and the United States. Per capita food use of vegetable oils also continued to grow both in developed and developing countries.

The growing demand for protein meals, especially in China, has been the main driver behind the expansion of global oilseed production. This has increased the share of protein meals in the returns from the crushing of oilseeds, in particular for soybeans due to their higher protein content.

Projection highlights

In nominal terms all oilseeds and oilseed product prices are projected to increase slightly over the outlook period. Due to saturated per capita food demand, stagnation in the biodiesel sector and ongoing livestock intensification in many emerging economies, vegetable oil prices will decline further than protein meal prices in real terms over the outlook period. Prices for soybeans and other oilseeds are also projected to decline in real terms. Nevertheless, volatility should be expected due to market uncertainties.

During the outlook period, global soybean production is expected to continue to expand, but at 1.9% p.a., which is well below the growth rate of 4.9% p.a. of the last decade. This slowdown is due mainly to a decrease in additional area planted. Brazil soybean production is expected to grow at 2.6% p.a., the fastest of the major producers as more additional land is available, compared to Argentina (2.1% p.a.) and the United States (1.0% p.a.). Consequently, Brazil is projected to overtake the United States as the largest soybean producer. Production of other oilseeds increases by 1.0% p.a. over the next decade, considerably below the 3.4% p.a. growth rate of the previous one. Crushing of soybeans and other oilseeds into meal (cake) and oil are the dominate usage and will increase faster than other uses, in particular direct food consumption of soybeans, groundnuts and sunflower seeds as well as direct feeding of soybeans. Overall, 90% of world soybean production and 86% of world production of other oilseeds are projected to be crushed in 2026.

Vegetable oil includes oil obtained from the crushing of soybeans and other oilseeds (about 55% of world vegetable oil production), palm oil (35%), as well as palm kernel, coconut and cottonseed oils. Growth in demand for vegetable oil is expected to be slower

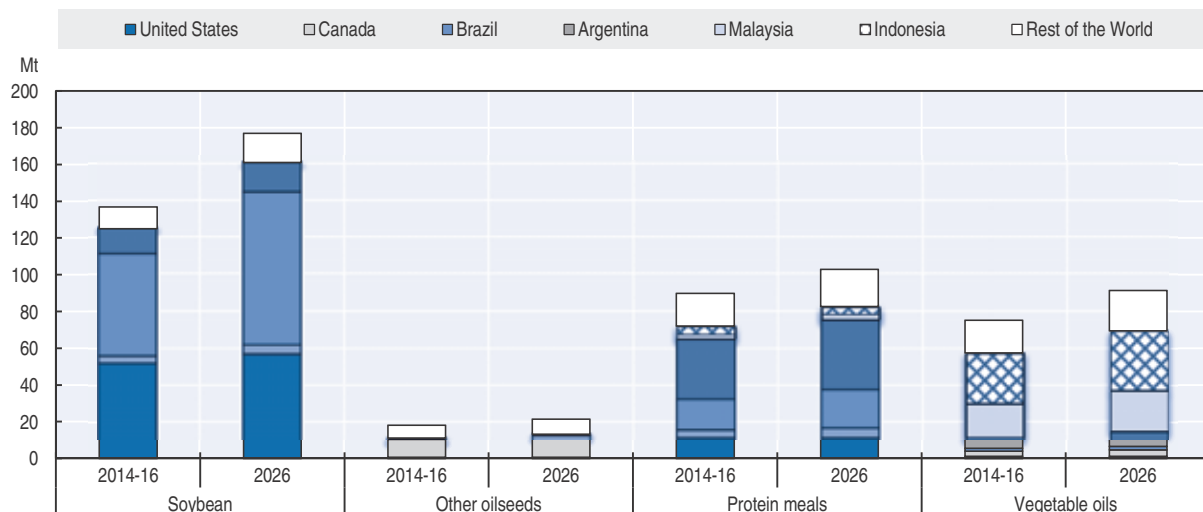
in the coming decade due to reduced growth in per capita food use in developing countries (1.1% p.a. compared to 3.1% in the previous decade) and to the stable demand for vegetable oils that are used to produce biodiesel. Despite a slowdown in the expansion of the mature oil palm area, there will be significant production growth in Indonesia (2.0% p.a. vs. 7.0% p.a. in the previous decade) and Malaysia (1.5% p.a. vs. 1.2% p.a.).

Protein meal production and consumption is dominated by soybean meal. Compared to the past decade, consumption growth of protein meal (1.7% p.a. vs. 4.1% p.a.) will be limited by slower growth in global livestock production and by the fact that the protein meal share in Chinese feed rations has reached a plateau. Chinese consumption of protein meal is projected to grow by 2.3% p.a. compared to 7.9% p.a. in the previous decade, a rate which still exceeds the growth rate of animal production.

Vegetable oil has one of the highest trade shares (42%) of production of all agricultural commodities. This share is expected to remain stable throughout the outlook period, with global vegetable oil exports reaching 91 Mt by 2026. Vegetable oil exports will continue to be dominated by Indonesia and Malaysia (Figure 3.2), which are strongly export-orientated: about two-thirds of Indonesian and more than 80% of Malaysian vegetable oil production is exported. While the share will remain unchanged in the latter over the outlook period, in Indonesia it is expected to decrease as more vegetable oil will be used as feedstock for biofuels. Indonesian exports will grow at 1.5% p.a. compared to 6.1% p.a. in the last decade.

Soybean, other oilseeds and protein meal exports are dominated by the Americas. The phasing-out of export taxes in Argentina opens new opportunities for its soybean and sunflower production and their products, although there could be some reallocation of land in favour of competing grain crops that benefit from immediate export liberalisation. Growth in world trade of soybeans is expected to slow down considerably in the next decade, a development directly linked to the projected slower growth in soybean crushing in China.

Figure 3.2. **Exports of oilseeds and oilseed products by region**



Source: OECD/FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.
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The expected expansion of soybean and palm oil production will depend on the availability of additional new land, which could be constrained by new legislation seeking to protect the environment. This concerns notably oil palm plantations. Biofuel policies in the United States, the European Union and Indonesia are also major sources of uncertainty because they account for a considerable share of the vegetable oil demand in these countries. In addition, the issues and uncertainties common to most commodities (e.g. the macroeconomic environment, crude oil prices, and weather conditions) have considerable influence on the oilseed complex.

The expanded oilseeds and oilseed products chapter is available at
http://dx.doi.org/10.1787/agr_outlook-2017-8-en

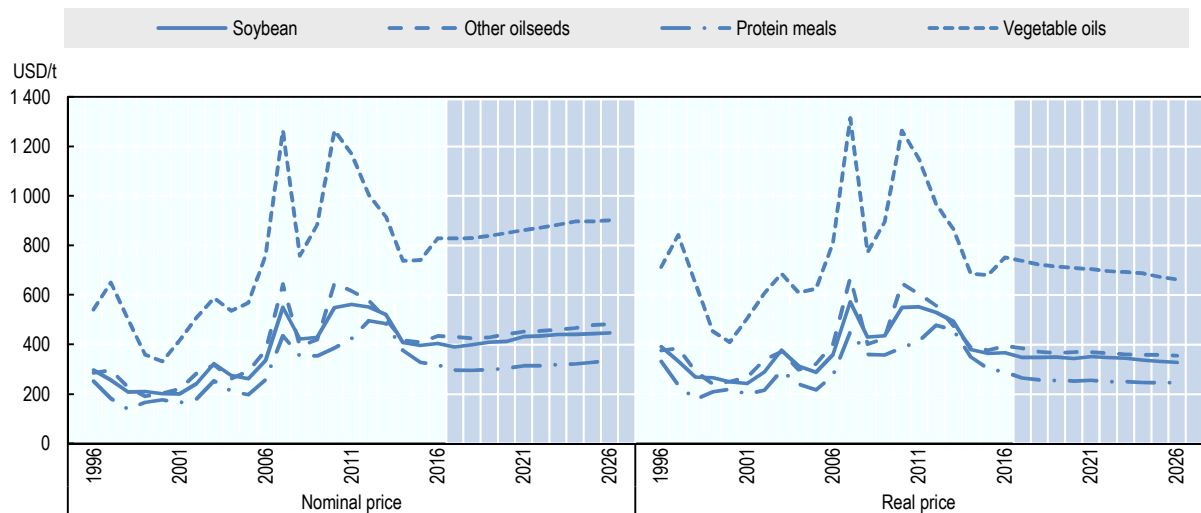
OILSEEDS AND OILSEED PRODUCTS

Prices

Nominal prices of oilseeds and oilseed products are expected to recover over the medium term due to rising demand for vegetable oil and protein meal, although they are not expected to attain previous highs (Figure 3.2.1). Vegetable oil consumption is driven mainly by food demand in developing countries as a consequence of population growth. Additionally, the assumed low crude oil prices and the limited additional policy support imply a very small growth in vegetable oil uptake for biodiesel production. The demand for protein meals is driven mainly by growth in non-ruminant livestock and milk production, and a greater incorporation rate of protein in feed rations in emerging markets. The relative strength of the meal component in the overall crush value is expected to decline during the first year of the projection period and to slightly recover thereafter.

In real terms, a slight decline in oilseeds and oilseed products prices is expected over the projection period (Figure 3.2.1), but volatility should be expected due to market uncertainties.

Figure 3.2.1. Evolution of world oilseed prices



Note: Soybeans, U.S., c.i.f. Rotterdam; Other oilseeds, Rapeseed, Europe, c.i.f. Hamburg; Protein meal, production weighted average price for soybean meal, sunflower meal and rapeseed meal, European port; Vegetable oil, production weighted average price for palm oil, soybean oil, sunflower oil and rapeseed oil, European port. Real prices are nominal world prices deflated by the US GDP deflator (2010=1).

Source: OECD/FAO (2017), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database), <http://dx.doi.org/10.1787/agr-data-en>.

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Oilseed production

The production of soybeans is expected to grow by 1.9% p.a., compared to 4.9% p.a. during the last decade. The production of other oilseeds (rapeseed, sunflower seed and groundnuts) continues to grow slower than the production of soybeans, at 1.1% p.a. compared to 3.4% p.a. in the past ten years. Growth in other oilseeds is dominated by yield increases, which will account for about 85% of production growth, whereas in the case of soybeans, yield increase will account for 60% of overall production growth.

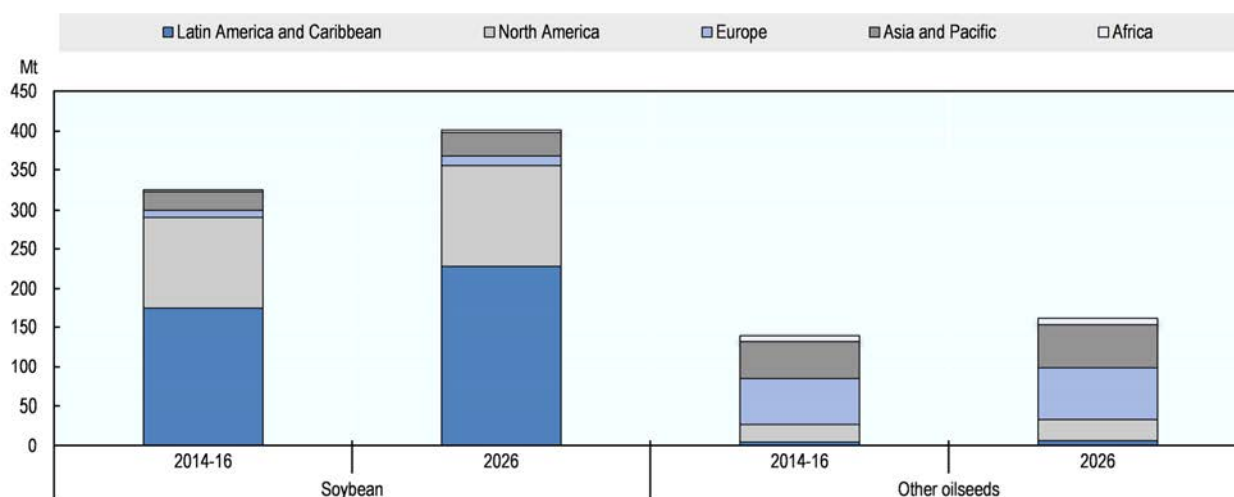
Brazil is expected to overtake the United States as the single most important soybean producer during the projection period, reaching 137 Mt in 2026 compared to 99 Mt in 2014-16. Overall, the production of soybeans will

continue to grow strongly in Latin America, with Argentina and Paraguay becoming important producers, reaching 70 Mt and 12 Mt by 2026, respectively (Figure 3.2.2). In the People's Republic of China (hereafter "China") soybean production is expected to grow after decreases over the past decade due partly to reduced policy support for the cultivation of cereals.

China (which produces mainly rapeseed and groundnuts) and the European Union (a major producer of rapeseed) are the most important producers of other oilseeds, at 31 Mt and 29 Mt in 2026. However, China is expected to have very little production expansion at 0.6% p.a., and production in the European Union is slightly declining. Canada, another major producer of rapeseed, is projected to increase its production by 1.7% p.a. due, mainly, to area increases. Ukraine and the Russian Federation, world leaders of sunflower seed production, are expected to continue expanding their production of other oilseeds faster than the world average at, respectively, 2.7% and 1.7% p.a.

Soybean stocks are expected to decline sharply from record high levels during the first half of the projection period, which implies that the stock-to-use ratio will decline significantly over the ten-year period. In 2026, a stock-to-use ratio of 7.3% is projected, compared to around 11.5% in the base period 2014-16. Given the global trend to gradually concentrate oilseed production in a few major producing countries, the declining stock-to-use ratio could result in increased price volatility.

Figure 3.2.2. Oilseed production by region



Source: OECD/FAO (2017), "OECD-FAO Agricultural Outlook", *OECD Agriculture statistics* (database), <http://dx.doi.org/10.1787/agr-data-en>.

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Oilseed crush and production of vegetable oils and protein meal

Globally, the crushing of soybeans and other oilseeds into meal (cake) and oil will continue to dominate total usage. The demand for crush will increase faster than other uses, notably direct food consumption of soybeans, groundnuts and sunflower seeds as well as direct feeding of soybeans. Overall, 90% of world soybean production and 86% of world production of other oilseeds will be crushed in 2026. Based on the projected small growth rate in global soybean production, annual average growth in world soybean crush is expected to be 1.9%, compared to 4.8% in the previous decade. In absolute terms, this translates into an expansion of 73 Mt over the outlook period. Crush of other oilseeds is expected to grow by only 1.2% p.a. or 18 Mt compared to 2014-16. This is partly explained by a reduction of 0.1% p.a. in the European Union, which, along with China, has the highest crushing levels at 30 Mt in 2026.

Which regions will crush these oilseeds depends on many factors, including transport costs, trade policies, acceptance of genetically modified crops, processing costs (e.g. labour and energy), and infrastructure (e.g. ports and roads). It is anticipated that China will continue to increase oilseed crush and that its share of the world total will reach 30% (Figure 3.2.3). Large increases in oilseed production in *Mercado Común del Sur* (MERCOSUR) countries (full members are Argentina, Brazil, Paraguay and Uruguay) will fuel expansion of the region's processing sector, keeping the bloc's share in global crush over 20%. The downward trend in the share of world

crush of the North American Free Trade Agreement (NAFTA) countries (United States, Canada and Mexico) and the European Union should continue, but at a slower pace.

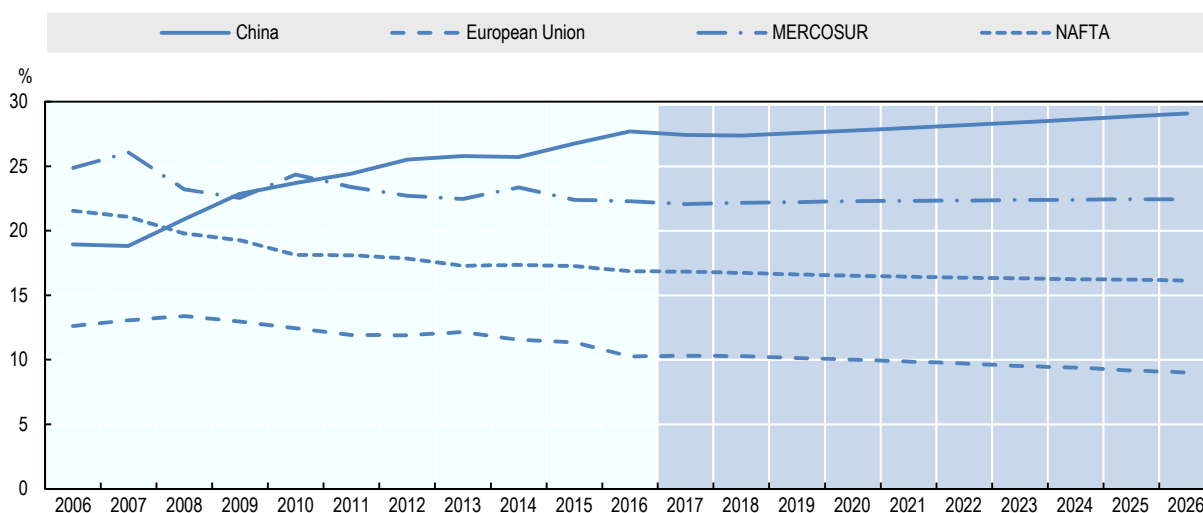
Chinese soybean crush is expected to increase by 23 Mt, accounting for about 44% of the world's additional soybean crush, the bulk of which will use imported soybeans. Rapid growth in soybean crush is expected at a rate of more than 2% p.a. in India, Indonesia, Paraguay, the Russian Federation, and Turkey, each of which had a domestic crush of 3 to 12 Mt in 2026.

Global vegetable oil production depends on both the crush of oilseeds and on the production of perennial tropical oil plants, especially oil palm. Global palm oil output has outpaced the production of other vegetable oils in the past decade and the position of palm oil is expected to strengthen over the projection period. Production of palm oil is concentrated in Indonesia and Malaysia, which together account for more than a third of world vegetable oil production. Palm oil production in Indonesia is expected to grow by 2.0% p.a. over the projection period compared with 7.0% p.a. in the previous decade. Increasingly stringent environmental policies are expected to slow down the expansion of the oil palm area and the focus for production increase will shift to yield.

In addition to palm oil and oil extracted from the crush of oilseeds analysed previously, palm kernel, coconut and cottonseed oil complete the vegetable oil aggregate. Palm kernel oil is produced alongside palm oil and follows the trend of the latter. The combined share of palm and palm kernel oil in total oil production is projected to increase. Coconut oil is mainly produced in Southeast Asia and Box 2.6 in Chapter 2 further elaborates on this market development. Cottonseed oil is a by-product of cotton; cotton production is discussed Chapter 3.8.

Global protein meal output is projected to increase by 1.7% p.a., reaching 384 Mt by 2026. World production of protein meals is dominated by soybean meal which accounts for more than two-thirds of world protein meal production. Production is concentrated in a small group of countries. The projections suggest that Argentina, Brazil, China, the European Union, India, and the United States will account for 76% of global production by 2026. In China, meal production is projected to rise by 27 Mt over the outlook period, accounting for 38% of world production increase. Strong growth protein meal production is expected in Argentina, Brazil and India at, respectively, 7.1 Mt, 7.4 Mt and 3.5 Mt.

Figure 3.2.3. Share in global oilseed crush for leading regions



Source: OECD/FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.

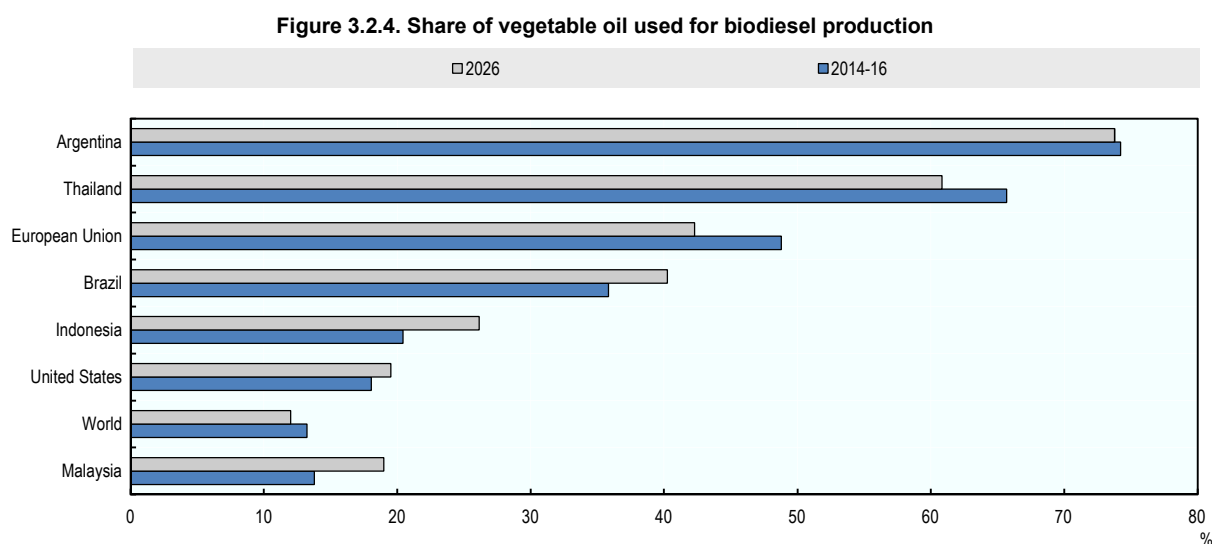
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Vegetable oil consumption

Rising per capita income is expected to lead to a 1.1% p.a. increase in per capita vegetable oil consumed as food in developing economies, which is considerably less than the 3.1% p.a. increase observed during 2007-16. This slowdown reflects the saturation in per capita uptake in many emerging economies, e.g. in China it will be 27 kg per capita in 2026 with a 0.9% growth p.a., in Brazil 24 kg and 0.9% p.a., and in South Africa 26 kg and 1.0% p.a. Annual per capita vegetable oil consumption is expected to average 20 kg across developing countries

by 2026, but no more than 10 kg in the least developed countries (LDCs). India, a prominent consuming country and, more importantly, the world's top importer of vegetable oil, is expected to maintain a high per capita consumption growth of 2.6% p.a. and reach 21 kg per capita in 2026. India's vegetable oil consumption will reach 33 Mt by 2026, up from 21 Mt in 2014-16. In developed countries as a group, per capita consumption will slightly increase to 26 kg in 2026 (or 0.6% p.a.).

It is projected that the uptake of vegetable oil as feedstock for biodiesel will remain unchanged over the next ten years, compared to the 12% p.a. increase recorded in the previous decade when biofuel support policies were taking effect. In general, national targets for mandatory biodiesel consumption are expected to increase less than in previous years, while low crude oil prices are likely to dent growth in discretionary biodiesel production. In addition, used oils, tallow and other feedstocks are increasing their share in the production of biodiesel to a large extent due to specific policies. Argentina is expected to maintain an export-oriented biodiesel industry (around 40% of produced biodiesel is exported). Vegetable oil uptake by Argentina's biodiesel industry is projected at 2.5 Mt by 2026, i.e. 75% of domestic vegetable oil consumption (Figure 3.2.4). In the European Union, vegetable oil for biodiesel production is expected to account for 42% of domestic vegetable oil consumption by 2026. In Indonesia, it is projected that biodiesel use of total vegetable oils consumption will reach 26% of total vegetable oil consumption in 2026, up from 20% in the base period.



Source: OECD/FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.

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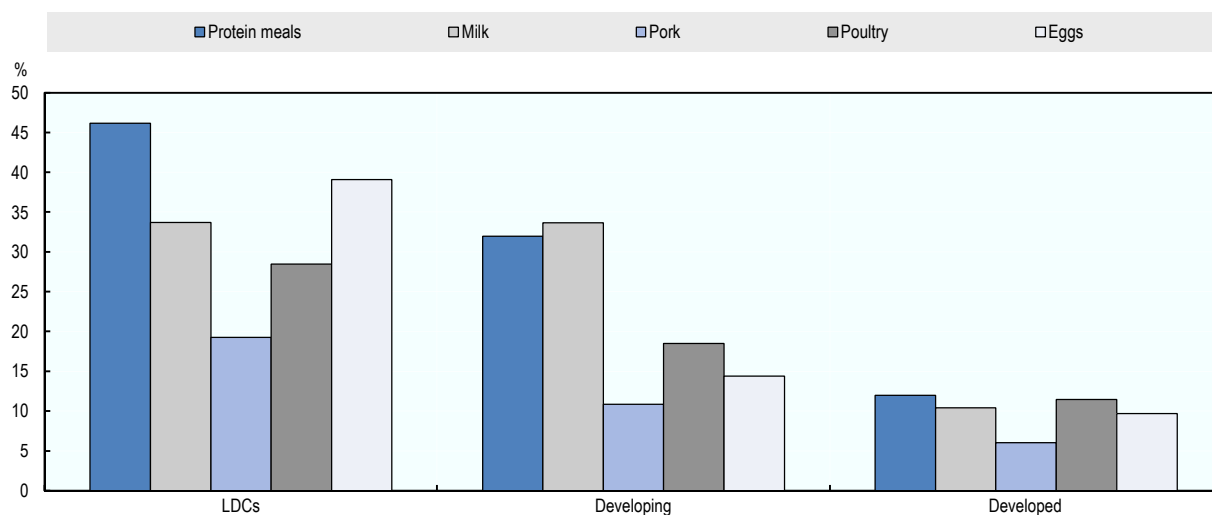
Protein meal consumption

Protein meal consumption is expected to continue to grow at 1.7% p.a., considerably below last decade's growth rate of 4.1% p.a. The growth in protein meal consumption is closely linked to the development of feed demand as protein meal is exclusively used as feed. The link between animal production and protein meal consumption is linked to a country's degree of economic development (Figure 3.2.5). In developed countries, where most of the animal production is compound feed-based, protein meal consumption grows at similar rates as animal production. In developing countries, the shift from backyard production to compound feed based production started later and is to a large extent still ongoing. Because of this shift to more feed-intensive production systems, growth in protein meal consumption tends to exceed growth in animal production. In LDCs, the growth in protein meal consumption is considerably higher than in developing countries but differs less from the growth in animal production.

Protein meal consumption growth in China is projected to decline from 7.9% p.a. in the last decade to 2.3% p.a., about 2.6 Mt p.a. in absolute terms. Growth in compound feed demand is expected to shrink due to declining growth rates for animal production and the existing large share of compound feed-based production. Furthermore, the share of protein meal in China's overall feed use surged in the last decade and now considerably exceeds the shares in the United States and European Union.

Figure 3.2.5. Growth in protein meal consumption and animal production

2026 vs. 2014-16



Source: OECD/FAO (2017), “OECD-FAO Agricultural Outlook”, OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.

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Trade

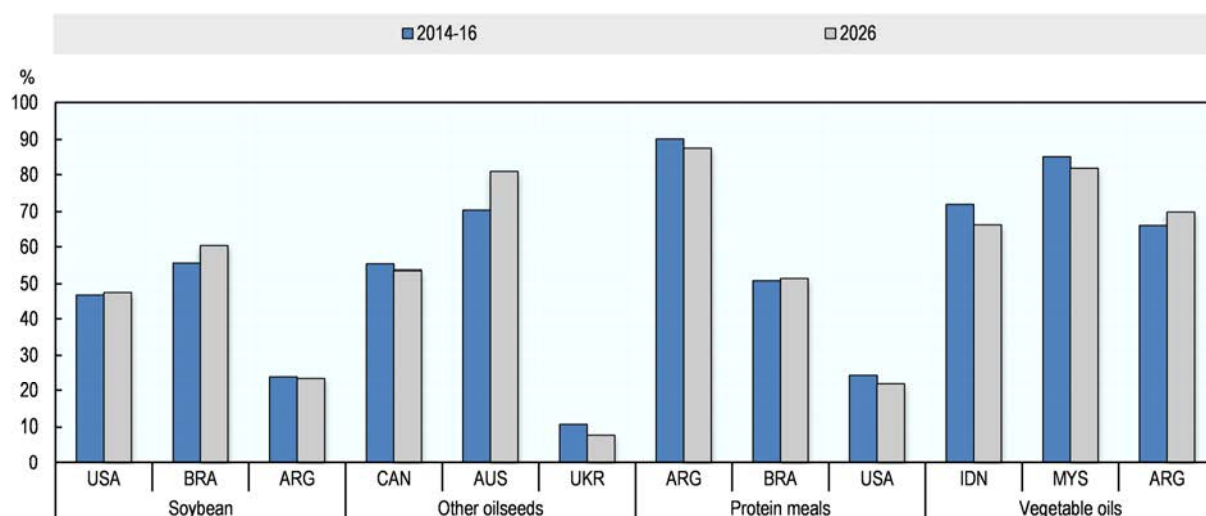
Close to half of global soybean production is traded. Compared to the previous decade, the expansion in world soybean trade is expected to decelerate considerably during the outlook period. This development is directly linked to projected slower growth of soybean crush in China. Chinese soybean imports are expected to grow at 2.6% p.a. to about 117 Mt in 2026, accounting for about two-thirds of world soybean imports. Exports of soybeans originate predominately from the Americas; the United States, Brazil and Argentina will account for 88% of world soybean exports in 2026. Paraguay, Uruguay and Ukraine have faster growing exports, but together will account for less than 10% of world exports.

For other oilseeds, the share of production entering trade is much lower than that for soybeans, at about 13% of world production. Important exporters are Canada, Australia and Ukraine, which account for more than 75% of world exports by 2026. In Canada and Australia, more than half of the other oilseeds (rapeseed) production is exported (Figure 3.2.6).

Vegetable oil exports, which account for 42% of global vegetable oil production, continue to be dominated by a few players. Indonesia and Malaysia will continue to account for almost two-thirds of total vegetable oil exports during the coming decade. Argentina is the third largest exporter reaching about 9% of the world vegetable oil exports in 2026. In all three countries, exports account for more than two-thirds of the domestic production of vegetable oil. However, this share is projected to contract in Indonesia as domestic food consumption, biofuel and oleochemical consumption is expected to grow more than exports. India is expected to continue its strong growth in imports at 4.4% p.a., reaching 25 Mt in 2026, or about 28% of world vegetable oil imports.

As the global expansion of meat production is projected to be concentrated in the main oilseed processing countries, domestic use of protein meal will increase and trade will only expand slightly in the coming decade, resulting in a declining share of trade in world production. The expected growth in world trade is around 1.5% p.a. over the projection period, down from 3.8% p.a. during last decade. Argentina will remain by far the largest meal exporter because it is the only country among the large protein meal producers with a clear export orientation but export growth is expected at 2.1% p.a. during the projection period, down from 4.0% p.a. In Brazil and the United States, export growth is also expected to slow down markedly. The largest importer is the European Union, where the increase of imports by 0.3% p.a. is expected to satisfy a slightly growing demand. However, half of the 19 Mt import growth in protein meal will occur in Asia, with Viet Nam and the Philippines increasing their imports by, respectively, 3.0 Mt and 0.8 Mt from 2014-16 to 2026.

Figure 3.2.6. Share of exports in total production of oilseeds and oilseed products for top three exporting countries



Note: The main three exporting countries are United States (USA), Brazil (BRA) and Argentina (ARG) (Soybeans), Canada (CAN), Australia (AUS) and Ukraine (UKR) (Other oilseeds), Argentina, Brazil and the United States (Protein meal) and Indonesia (IDN), Malaysia (MYS) and Argentina (Vegetable oil); The figure only shows the direct share of exports and does not include the export of further processed products, which would lead to higher export shares.

Source: OECD/FAO (2017), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://dx.doi.org/10.1787/agr-data-en>.

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Main issues and uncertainties

Uncertainties common to most commodities (e.g. macroeconomic environment, crude oil prices, and weather conditions) also apply to oilseeds. Due to the concentration of production in a few regions of the world, the production impact of weather variations is more pronounced in the oilseeds and palm oil complex than in other major crop markets.

The gradual reduction of export taxes in Argentina opens new opportunities for that country's soybeans and sunflowers and their products, although some reallocation of land might take place in favour of competing grain crops, especially maize, that also benefit from export liberalisation.

Questions over the sustainability of soybeans and palm oil production stem, respectively, from the high share of soybean production derived from genetically modified seeds and the expansion of oil palm plantations into rain forests. Certification schemes, labelling, and environmental legislation might curb area expansion in key palm oil producing countries and purchases by major importers, which would eventually affect supply growth.

The demand for vegetable oil and protein meal experienced exceptional growth due to the intensification of animal production in emerging markets (especially China) and a fast rise in biodiesel production. These are currently slowing down, leading to a less dynamic development for oilseeds and oilseed products over the coming decade.

The link between vegetable oil and crude oil prices results from the use of vegetable oil as a major feedstock used for biodiesel. Indeed, biofuel policies in the United States, the European Union and Indonesia, and the development of mineral oil prices remain a source of major uncertainty in the vegetable oil sector given the sizeable share of vegetable oil production used to produce biodiesel. For example, since vegetable oil-based biodiesel qualifies as an "advanced biofuel" in the United States' Renewable Fuel Standard mandates, uncertainties related to that policy are relevant to the vegetable oil market.

Protein meals compete directly with other feed components in the production of compound feed and are thus reactive to any change in cereal prices. In addition, changing feeding habits, especially in the cattle sector, can alter the demand for protein meals. Ongoing adjustments in domestic cereal prices in China, for example, will affect the composition of its compound feeds, which currently contain a higher share of protein meal than in developed countries and other major emerging economies.