Chapter 4. Oilseeds and oilseed products

This chapter describes the market situation and highlights the latest set of quantitative medium-term projections for world and national oilseeds markets for the ten-year period 2018-27. Global oilseeds production is expected to expand at around 1.5% p.a., well below the growth rates of the last decade. Brazil and the United States will be the largest soybean producers, with similar volumes. Protein meal use will grow more slowly due to slower growth in livestock production and as the protein meal share in Chinese feed rations has reached a plateau. Demand for vegetable oil is expected to grow more slowly due to slower growth in per capita food use in developing countries and the projected stagnation in demand as feedstock for biodiesel. Vegetable oil exports will continue to be dominated by Indonesia and Malaysia, while soybean, other oilseeds and protein meal exports are dominated by the Americas. Prices are projected to increase slightly in nominal terms over the outlook period, with slight declines in real terms

Market situation

Global soybean production declined slightly in the 2017 marketing year (October 2017 to September 2018), as the harvest in South America (in the first months of 2018) fell short of the year before. Soybean production in the People's Republic of China (hereafter "China") and also in Canada increased considerably, due to the increased attractiveness of soybeans compared to other crops. India, by contrast, saw a decline in production. The aggregate world production of other oilseeds (rapeseed, sunflower seed and groundnuts) in 2017 remained almost unchanged.

The growing demand for protein meals, especially in China, has been the main driver behind the expansion of global oilseed production. However, growth in soybean imports by China has been only moderate in the marketing year 2017, in part due to the destocking of maize.

Vegetable oil production continued to increase in 2017 compared to 2016, although the growth was smaller than in previous years, due to a slow recovery in palm oil production after the 2015 *El Niño*. Increasing import demand around the world became evident and led to the refilling of stocks, including in importing countries. Per capita food use of vegetable oils also continued to grow both in developed and developing countries, though at a much faster rate for developing countries.

Overall the oilseeds and products markets were stable during the marketing years 2016 and 2017 with no major disruptions.

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 at a faster rate 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 1.5% p.a., which is well below the growth rate of 4.8% p.a. of the last decade. This slowdown is due mainly to a slower area expansion. Brazil and the United States are expected to compete throughout the projection period for the place as largest producer, with production reaching 129 Mt and 131 Mt respectively by 2027. Production of other oilseeds increases by 1.6% p.a. over the next decade, below the 3.1% p.a. growth rate of the previous one. Crushing of soybeans and other oilseeds into meal (cake) and oil continue to 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 2027.

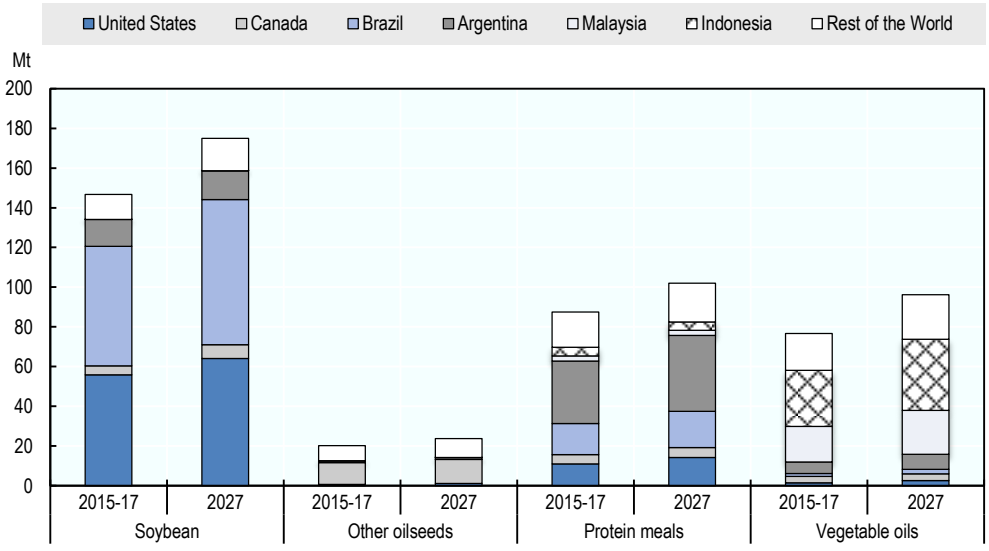
Vegetable oil includes oil obtained from the crushing of soybeans and other oilseeds (about 55% of world vegetable oil production), palm oil (35%), as well as palm kernel, coconut and cottonseed oils. Despite a slowdown in the expansion of the mature oil palm area, significant production growth is projected in Indonesia (1.8% p.a. vs. 6.9% p.a. in the previous decade) and Malaysia (1.4% p.a. vs. 1.3% p.a.). Growth in demand for vegetable oil is expected to be slower in the coming decade due to (i) reduced growth in per capita food use in developing countries (1.2% p.a. compared to 3.2% p.a. in the

previous decade) as consumption levels are approaching saturation levels, and (ii) the projected stagnation in demand for vegetable oils that are used to produce biodiesel.

Protein meal production and consumption is dominated by soybean meal. Compared to the past decade, consumption growth of protein meal (1.6% p.a. vs. 4.2% 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 1.7% p.a. compared to 7.2% 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 (41%) of production of all agricultural commodities. This share is expected to remain stable throughout the outlook period, with global vegetable oil exports reaching 96 Mt by 2027. Vegetable oil exports will continue to be dominated by Indonesia and Malaysia (Figure 4.1), which are strongly export-orientated: nearly 70% of Indonesian and more than 80% of Malaysian vegetable oil production is exported. In both countries the share of exports is expected to slightly decline as more vegetable oil will be used as feedstock for biofuels and vegetable oil consumption for food use will gain importance. Indonesian exports will grow at 1.6% p.a. compared to 5.8% p.a. in the last decade.

Figure 4.1. Exports of oilseeds and oilseed products by region



Source: OECD/FAO (2018), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink http://dx.doi.org/10.1787/888933743005

Soybean, other oilseeds and protein meal exports are dominated by the Americas. Growth in world trade of soybeans is expected to slow considerably in the next decade, a development directly linked to the projected slower growth in soybean crushing in China. In parallel, Brazil will overtake North America as the world's largest exporter of soybean by 2027, its share in the global soybean exports rises to 41.8%, with that of Canada and the United States combined declines to 40.6% by 2027.

Productivity improvements will be necessary to sustain production growth. The scope for increasing soybean and palm oil production will depend on replanting activities and the

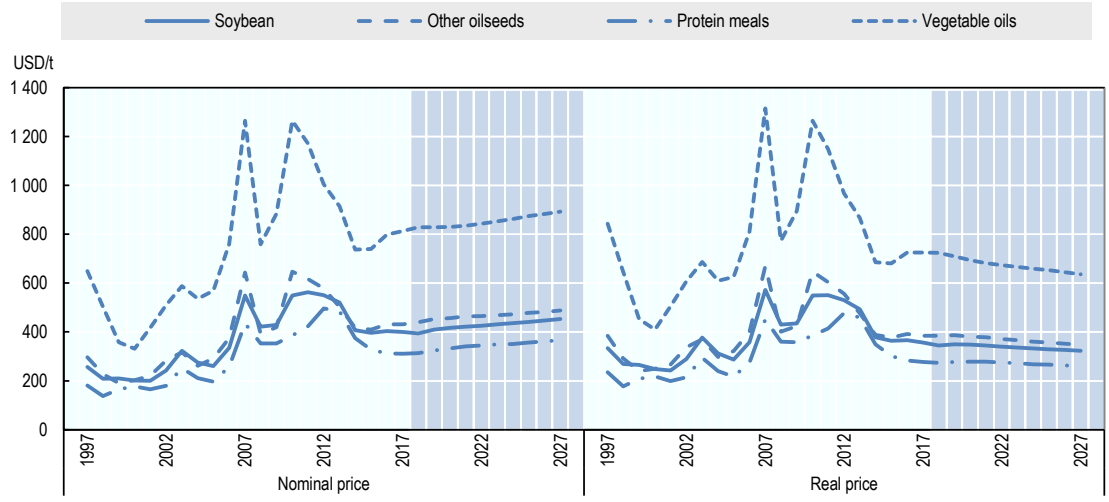
availability of additional land. Palm plantation replanting has been sluggish given low profitability of the sector, especially in Malaysia given rising labour costs. The implications of replanting delays will be seen over the projection period in terms of muted growth in vegetable oil output. Area expansion could be constrained by new legislation seeking to protect the environment. A new certification schemes for sustainable palm oil proposed by importing countries could override current certifications from major exporters. 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.

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. Vegetable oil consumption is driven mainly by food demand in developing countries as a consequence of population and income 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 the incorporation rate of protein in feed rations in emerging markets.

In real terms, a slight decline in oilseeds and oilseed products prices is expected over the projection period (Figure 4.2), but volatility should be expected due to market uncertainties.

Figure 4.2. Evolution of world oilseed prices



Note: Soybeans, US, 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 (2018), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

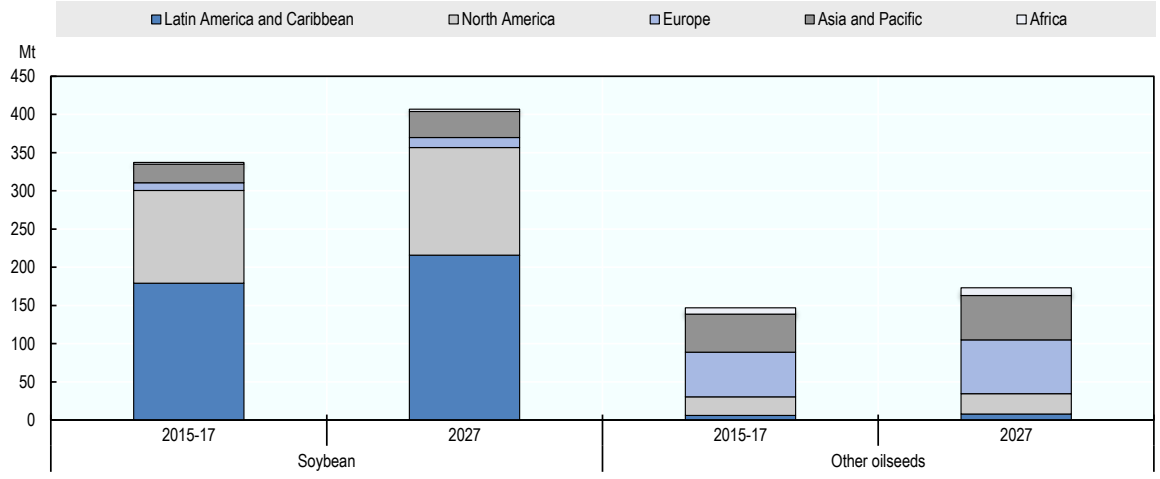
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Oilseed production

The production of soybeans is expected to grow by 1.5% p.a., compared to 4.8% p.a. during the last decade. The production of other oilseeds (rapeseed, sunflower seed and groundnuts) will grow marginally faster than the production of soybeans, at 1.6% p.a. compared to 3.1% p.a. over the past ten years. Growth in other oilseeds is dominated by yield increases, which will account for about 60% of production growth, compared to 55% of overall production growth coming from yield in the case of soybeans.

Brazil and the United States are expected to have similar levels of soybean production throughout the next decade, with production in both cases reaching around 130 Mt in 2027. Their respective annual growth rates are 1.2% p.a. in the United States and 1.3% p.a. in Brazil. Overall, the production of soybeans will continue to grow strongly in Latin America, with Argentina and Paraguay producing 66 Mt and 12 Mt by 2027 (Figure 4.3). In China soybean production is expected to resume growth after decreases over the past decade due partly to reduced policy support for the cultivation of cereals. Soybean production is also expected to grow in the Russian Federation, Ukraine, and several countries in Sub Saharan Africa.

Figure 4.3. Oilseed production by region



Source: OECD/FAO (2018), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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China (which produces mainly rapeseed and groundnuts) and the European Union (a major producer of rapeseed and sunflower seed) are the most important producers of other oilseeds, with projected output of 32 Mt and 30 Mt in 2027. However, limited growth in output is expected for both regions, with China expected to have a small production expansion at 1.0% p.a., and production in the European Union increasing by only 0.3% p.a. Canada, another major producer of rapeseed, is projected to increase its production by 0.7% p.a. By contrast, faster growth in other oilseed production is projected for Ukraine, the Russian Federation and India. 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 4.3% and 2.2% p.a., respectively. India will also expand its oilseeds output at 2.6% p.a. through

further yield improvements as well as a continued expansion of soybean area and a recovery in the area planted to other oilseed. This expansion should allow it to meet growing domestic consumption needs for vegetable oil.

Soybean stocks are expected to remain largely unchanged which implies that the world stock-to-use ratio would decline from 11.6% in 2015-17 to around 10.6% in 2027. 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.

Oilseed crush and production of vegetable oils and protein meal

Globally, the crushing of soybeans and other oilseeds into meal (cake) and oil dominates 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 2027. The crush location 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).

Based on the projected small growth rate in global soybean production, the annual average growth in world soybean crush is expected to be 1.5%, compared to 5.0% in the previous decade. In absolute terms, this translates into an expansion of 70 Mt over the outlook period, well below the 109 Mt expansion of the previous decade. Chinese soybean crush is expected to increase by 26 Mt, accounting for about 37% of the world's additional soybean crush, the bulk of which will utilise imported soybeans. Crush of other oilseeds is expected to grow at a slower rate than the last decade, expanding by 1.6% p.a., equivalent to an increase of 24 Mt by 2027, relative to 2015-17, mainly fuelled by additional crush in Ukraine (+6.9 Mt), China (+6.8 Mt) and India (+3.3 Mt).

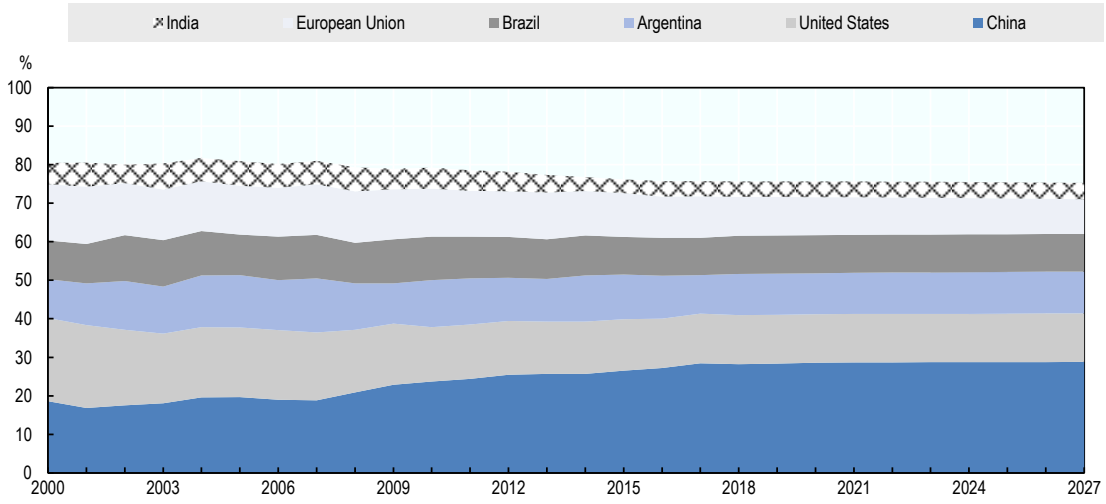
With a large increase in imports and oilseed production, China will to continue to increase its oilseed crush. Its share of in the total global oilseed crush will reach 28.8% by 2027 (Figure 4.4). The share of the United States is expected to decline only slightly to 12.6% by 2027. Argentina and Brazil maintain their respective shares of world oilseed crush at 10.8% and 9.8% of global crush in 2027. The European Union is expected to account for a declining share of world crush as demand for protein meal and vegetable oil is growing slower than in the rest of the world. Crush in other developing countries, partly based on imported oilseeds, increases faster in the coming decade than in the major countries shown.

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; however the position of palm oil weakens slightly 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 1.8% p.a. over the projection period compared with 6.9% p.a. in the previous decade. Increasingly stringent environmental policies from the major importers of palm oil and the mainstreaming of global sustainable agricultural norms, brought on by the 2030 Agenda for Sustainable Development, are expected to slow the expansion of the oil palm area in Malaysia and Indonesia. In parallel, delayed replanting of plantations due to labour shortages in Malaysia is expected to constrain production over the outlook period, so growth in

production will be sourced from productivity improvements. Palm oil production in other countries is expanding more rapidly from a low base, mainly for domestic and regional markets. This includes Thailand producing 2.9 Mt by 2027, Columbia 2.0 Mt and Nigeria 1.2 Mt. At a global level, palm oil supplies will expand at the annual rate of 1.8%.

Figure 4.4. Share in global oilseed crush for leading regions



Source: OECD/FAO (2018), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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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. Coconut oil is mainly produced in the Philippines, Indonesia and Oceanic islands. For Indonesia, output will grow at 2.2% p.a. while for the Philippines and Oceanic Islands, output will expand by 1.8% and 1.7% p.a., respectively over the outlook period. Cottonseed oil is a by-product of cotton, with global production concentrated largely in India, the United States, Pakistan and China. Output is set to expand for India and Pakistan, at 2.4% and 1.4% p.a. respectively over the outlook period. Modest growth in production is projected for the United States at 0.8% p.a. and for China at 0.6% p.a. Overall, vegetable oil production is expected to increase globally by 1.7% p.a.

Global protein meal output is projected to expand by 1.6% p.a., reaching 400 Mt by 2027. 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 indicate that Argentina, Brazil, China, the European Union, India, and the United States will account for 75% of global production by 2027. In China, meal production is projected to rise by 23.8 Mt over the outlook period, mostly based on imported soybeans from Brazil and the United States.

Vegetable oil consumption

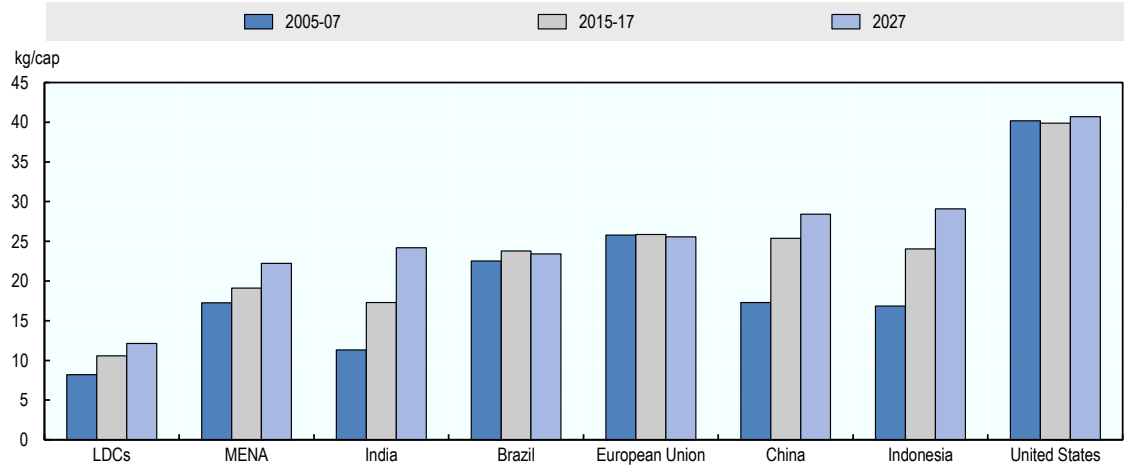
Rising per capita income is expected to lead to a 1.0% p.a. increase in per capita vegetable oil consumed as food in developing economies, which is considerably less than

the 2.7% p.a. increase observed during 2008-17. This slowdown reflects the saturation in per capita uptake in many emerging economies. For example, in China it will reach 28 kg per capita in 2027 with a 0.8% growth p.a.; for Brazil, the figure remains unchanged at 23 kg; and in South Africa, consumption will reach 25 kg, growing at 0.6% p.a.

In most emerging markets, the per capita level of vegetable oil food availability is set to reach levels comparable to those of developed countries, for which growth in vegetable oil food consumption will level off at 27.7 kg per capita, growing at 0.4% p.a.

India, the second largest consumer country in the world, closely behind China, and the world's top importer of vegetable oil, is expected to maintain a high per capita consumption growth of 3.1% p.a. and reach 24 kg per capita in 2027. India's vegetable oil consumption will reach 37 Mt by 2027, up from 24 Mt in 2015-17. This substantial growth will be filled by both an expansion of domestic production, sourced in the intensification of oilseed cultivation, and a further increase in imports of mainly palm oil from Indonesia and Malaysia. For MENA countries and LDCs, the per capita availability of vegetable oil will increase considerably, respectively reaching 22 kg and 12 kg per capita in 2027.

Figure 4.5. Per capita food availability of vegetable oil in selected countries



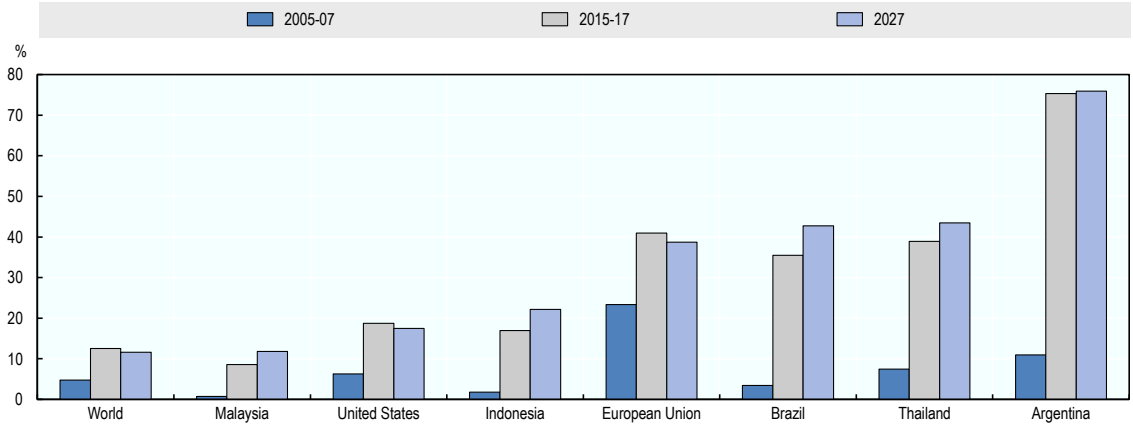
Source: OECD/FAO (2018), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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The uptake of vegetable oil as feedstock for biodiesel will remain virtually unchanged over the next ten years (0.3% p.a. growth), as compared to the 8.5% p.a. increase recorded over 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 limit non-mandatory 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. Given the diversification of feedstock in the European Union into waste and tallow oil, the use of vegetable oil for biodiesel production is expected to account for 39% of domestic vegetable oil consumption by 2027, declining from a current share of about 41%. The lower shares expected in the European Union and the United States will be offset by

greater uptake among emerging market economies. Argentina is expected to maintain an export-oriented biodiesel industry (over 40% of produced biodiesel is exported). Vegetable oil uptake by Argentina's biodiesel industry is projected at 2.9 Mt by 2027, equivalent to 75% of domestic vegetable oil consumption (Figure 4.6). Indonesia, Brazil and Thailand recorded strong growth in biodiesel production over the last decade, but it is expected to taper off in the coming decade. However, in the case of Indonesia and Brazil, growth in biodiesel production over the coming decade is anticipated to exceed overall food demand growth for vegetable oil.

Figure 4.6. Share of vegetable oil used for biodiesel production



Source: OECD/FAO (2018), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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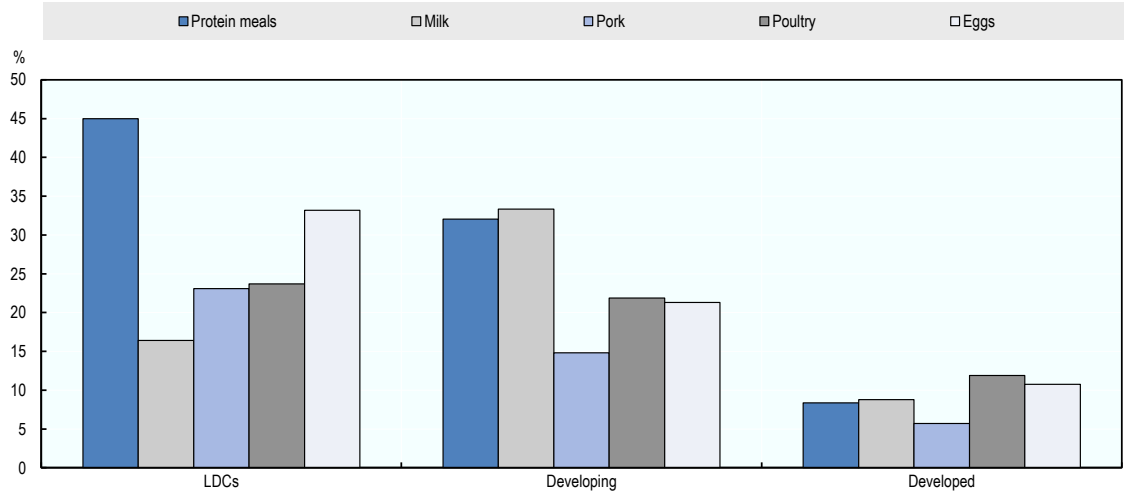
Protein meal consumption

Protein meal consumption is expected to continue to grow at 1.6% p.a., considerably below last decade's growth rate of 4.2% 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 associated with a country's degree of economic development (Figure 4.7). Because of a shift to more feed-intensive production systems in developing countries, growth in protein meal consumption tends to exceed growth in animal production. In LDCs, where the use of protein meals is still very low, it is expected that the intensification in the livestock production with more widespread use of commercial feed will continue. The use of protein meal per unit of livestock production should increase considerably leading to a fast growth in total demand in these countries. In developed countries, where most of the animal production is compound feed-based, protein meal consumption grows at similar rates as animal production.

Among emerging economies, Viet Nam, Indonesia and India are expected to expand their consumption of protein meal over the projection period, with growth rates of 3.8% p.a. for Viet Nam, 2.8% for Indonesia and 2.6% p.a. for India. Only for Viet Nam will this consumption growth be linked to a comparable expansion of protein meal imports.

Protein meal consumption growth in China is projected to decline from 7.2% p.a. in the last decade to 1.7% p.a., adding about 2.2 Mt annually. Growth in China's 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 4.7. Growth in protein meal consumption and animal production



Source: OECD/FAO (2018), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

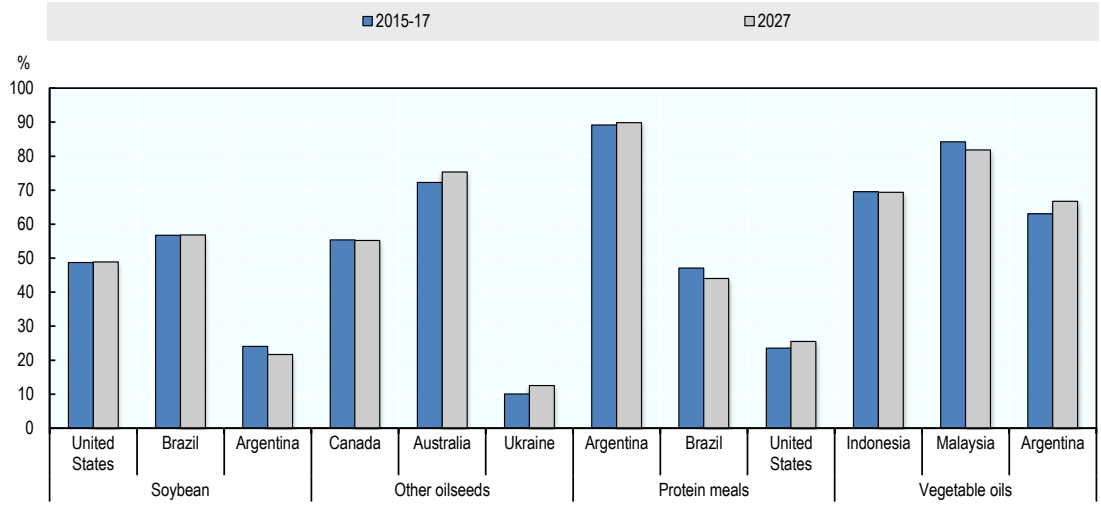
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Trade

Over 40% of world soybean production is traded internationally. 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 the soybean crush in China. Chinese soybean imports are expected to grow by only 1.5% p.a. to about 113 Mt in 2027, accounting for about two-thirds of world soybean imports. Exports of soybeans originate predominately from the Americas; together, the United States, Brazil and Argentina will account for 87% of world soybean exports in 2027. Whereas the United States was historically the largest global exporter of soybeans, Brazil has taken that role with steady growth in its export capacity; by 2027, Brazil will account for 42% of total global exports of soybean.

For other oilseeds, the share of production entering trade is much lower than that for soybeans, at about 14% of world production. Important exporters are Canada, Australia and Ukraine, which account for more than 75% of world exports by 2027. In Canada and Australia, more than half of the other oilseeds (rapeseed) production is exported (Figure 4.8).

Figure 4.8. Share of exports in total production of oilseeds and oilseed products for the top three exporting countries



Note: The main three exporting countries are United States, Brazil and Argentina (Soybeans), Canada, Australia and Ukraine (Other oilseeds), Argentina, Brazil and the United States (Protein meal) and Indonesia, Malaysia 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 (2018), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

StatLink http://dx.doi.org/10.1787/888933743138

Vegetable oil exports, which amount to 41% 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 7.9% of the world vegetable oil exports in 2027. 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 slightly in Indonesia and Malaysia as domestic food consumption plus biofuel and oleochemical consumption is expected to grow more than exports. India is expected to continue its strong growth in imports at 4.7% p.a., reaching 26 Mt in 2027, or about 27% 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 3.6% 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. However, export growth for Argentina is expected at 1.9% p.a. during the projection period, down from 4.3% p.a. In Brazil and the United States, export growth is also expected to slow down markedly. The largest importer is the European Union, with imports remaining almost unchanged at 25.9 Mt in 2027. Half of the 17 Mt global import growth in protein meal will occur in Asia, with Viet Nam, Pakistan and Thailand increasing their imports by 3.4 Mt, 1.8 Mt and 1.1 Mt respectively from 2015-17 to 2027.

Main issues and uncertainties

The 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 intensification of domestic oilseed production in India to meet the consumption needs of a growing population will rely on an important expansion in area and productivity of the sector. Such outcomes will be conditioned on the evolution of oilseed prices and the adoption of new policies that sustainably incentivise domestic agricultural production.

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.

Consumer concerns regarding 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. These concerns present specific constraints to the further expansion of oil palm plantations and their exports for Malaysia and Indonesia.

The demand for vegetable oil as feedstock for biodiesel is levelling off following a rapid growth since 2000 due to domestic policies in a number of countries. 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 that about 12% of vegetable oil is destined to biodiesel production. The link between vegetable oil and crude oil prices results from the use of vegetable oil as a major feedstock used for biodiesel and can induce price volatility.

The demand for protein meal experienced exceptional growth due to the intensification of animal production in emerging markets. The pace of intensification of animal production is currently slowing down (especially in China), leading to a less dynamic development for protein meals and oilseeds over the coming decade.

Protein meals compete in part 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.