4 Oilseeds and oilseed products

This chapter describes market developments and medium-term projections for world oilseed markets for the period 2022-31. Projections cover consumption, production, trade and prices for soybean, other oilseeds, protein meal, and vegetable oil. The chapter concludes with a discussion of key risks and uncertainties which could have implications for world oilseed markets over the next decade.

4.1. Projection highlights

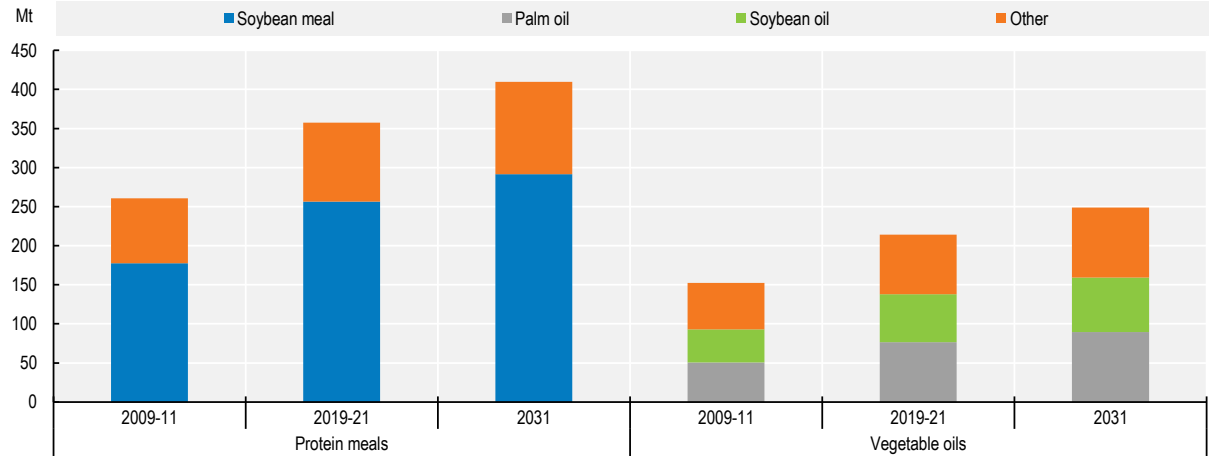
Buoyant markets for oilseeds are driving price rises

Global market conditions of *oilseeds and oilseed products* resulted in rapid price increases in 2021. Strong demand, especially for imported soybeans by the People's Republic of China (hereafter "China") and limited supply growth, especially of palm oil and of Canadian rapeseed, lead to this price increase.

The consumption of vegetable oils is projected to reach 249 Mt by 2031. Food use should account for 66% of total consumption, driven by population growth but also by the increased per capita use of vegetable oil in low – and middle-income countries. The vegetable oil aggregate in this *Outlook* includes oil obtained from the crushing of oilseeds (about 55% of world vegetable oil production) and palm oil (36%), as well as palm kernel, coconut, and cottonseed oils. The use of vegetable oil for biodiesel, currently about 15% of global vegetable oil use, is projected to grow in emerging markets like Indonesia and Brazil but also in the United States, in contrast to stable use for biodiesel in the European Union, still the largest producer of biodiesel.

Protein meal utilisation will be constrained by slower growth in global poultry and livestock production as protein meal is almost entirely used as animal feed. Soybean meal accounts for about three-quarters of the global protein meal sector (Figure 4.1). Demand growth in China is expected to slow down considerably (1.2% p.a. compared to 5.2% p.a. in the last decade), driven by improved feed efficiency combined with efforts to achieve lower protein meal shares in livestock feed rations. Nevertheless, a strong rebound is expected in pork production (around 14 Mt increase in the next decade). In the European Union, the second-largest user of protein meal, consumption is expected to decline as growth in animal production slows and other protein sources are increasingly used in feed. By contrast, in Southeast Asia increasing animal production is projected to raise demand for imports of protein meal.

Figure 4.1. Protein meal and vegetable oil production by type



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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In view of a slowdown in the expansion of the mature *oil palm* area, palm oil production growth in Indonesia and Malaysia is projected to be limited. Nevertheless, by 2031 Indonesia and Malaysia are projected to account for 82% of global palm oil production.

Soybean production is projected to increase by 1% p.a. during the outlook period. Yield improvements are assumed to account for about three-quarters of the global growth in production while the expansion of the harvested area, including increased double-cropping in Latin America, accounts for the remaining quarter. Soybean production is expected to reach 411 Mt by 2031, more than double the combined output of other oilseeds at 188 Mt. Brazil and the United States are expected to account for about two-thirds of world soybean production and more than 80% of global soybean exports. Brazil is expected to be the world's largest producer by 2031, with domestic output projected to reach 147 Mt.

Production of *other oilseeds* is projected to increase by 1.2% p.a. over the next decade, a slower growth rate relative to the last decade. This is mainly due to the stagnating demand for rapeseed oil as a feedstock in European biodiesel production and the increasing competition by cereals for limited arable land in China and the European Union. In general, the cultivation of other oilseeds such as rapeseed or sunflower seed is much less concentrated than that of soybeans. China, the European Union, Canada, and Ukraine each produce between 20 Mt to 32 Mt of these oilseeds. In Ukraine, the war in 2022 causes several disruptions in sunflower seed production, processing and trade.

The world's leading suppliers of *palm oil*, Indonesia and Malaysia, will continue to dominate the vegetable oil trade, exporting around 65% of their combined production and jointly accounting for nearly 60% of global exports. India, the world's biggest importer of vegetable oil, is projected to maintain its high import growth of 1.8% p.a. due to growing domestic demand and limited production growth opportunities. Growth in world exports of soybeans, another product with a high trade share dominated by the Americas, is expected to slow considerably over the next decade due to the projected slower growth in soybean imports by China.

While in the 2021 marketing year prices in the oilseed sector are at or close to record highs, a downward adjustment is expected during the first years of the outlook period. Thereafter, prices are expected to increase slightly in nominal terms, while declining in real terms following the long-term trend of agricultural commodity prices.

The scope to increase palm oil output in Indonesia and Malaysia will increasingly depend on oil palm replanting activities and accompanying yield improvements (as opposed to area expansion) creating new challenges. Sustainability concerns (i.e. deforestation and the use of sustainability certifications for vegetable oil) also influence the expansion of palm oil output both for producer and consumer countries. The use of vegetable oil as biodiesel feedstock is mostly determined by biofuel policies, which determine countries' mandated blending ratios. The future demand for protein meal in China depends on the balance between feed intensity and efficiency especially in the rebuilding pig meat sector, following African Swine Fever (ASF) starting in 2018. Nevertheless, the overall per capita meat demand in China is expected to grow compared to the last decade (0.5% p.a in comparison to a decline by 0.6% p.a).

4.2. Current market trends

*Nominal prices are at record level**s** due to limited supply*

Prices of oilseeds and oilseed products continued to increase during 2021 and into 2022 reaching new record highs in nominal terms, especially for vegetable oils, due to strong demand and a slight production decline, especially of rapeseed and soybeans. The surge in prices contributed to food price inflation in numerous countries, aggravating food access problems from pandemic-driven income losses.

During the first half of 2021, the COVID-19 pandemic led to temporary slowdowns in demand and short-term disruption of supply chains, resulting in price declines. In South America, soybean production suffered from severe weather conditions that impacted the crush and yields. In Malaysia, labour shortages, exacerbated by measures to restrict the movement of people to contain the spread of COVID-19, impacted

the palm oil harvest in 2021, curbing overall production and exports. Canadian rapeseed production decreased, resulting in a fall of its exports too.

With tighter global production of oilseeds and palm oil resulting in higher prices, the expectations of growing global demand have been reduced for the 2021/2022 marketing year. In Indonesia, the new Domestic Market Obligation policy set by the government led to a reduction of palm oil exports to India, China, and the European Union.

4.3. Market projections

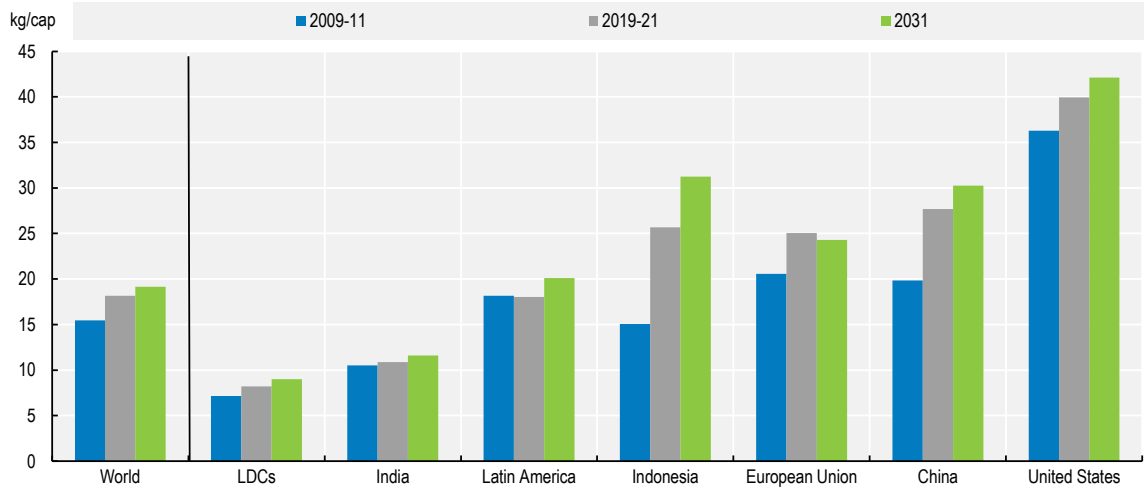
4.3.1. Vegetable oil consumption

Demand for vegetable oil for food is slowing down

The two dominant uses of vegetable oil are for human consumption (65%) and as feedstock for the production of biodiesel (15%). In addition, vegetable oils are also used for cosmetics, varnishes, and increasingly in animal feed preparations, especially for aquaculture.

Per capita consumption of vegetable oil for food is projected to grow by 0.5% p.a., considerably less than the 1.7% p.a. increase observed during 2012-21 due to near-saturated food demand in developed countries and emerging markets. In China (30 kg/capita) and Brazil (27 kg/capita), the consumption of vegetable oil for food is set to reach levels comparable to those of developed countries, where it is projected to level off at 28 kg/capita, growing at 0.6% p.a. (Figure 4.2).

Figure 4.2. Per capita food availability of vegetable oil in selected countries



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

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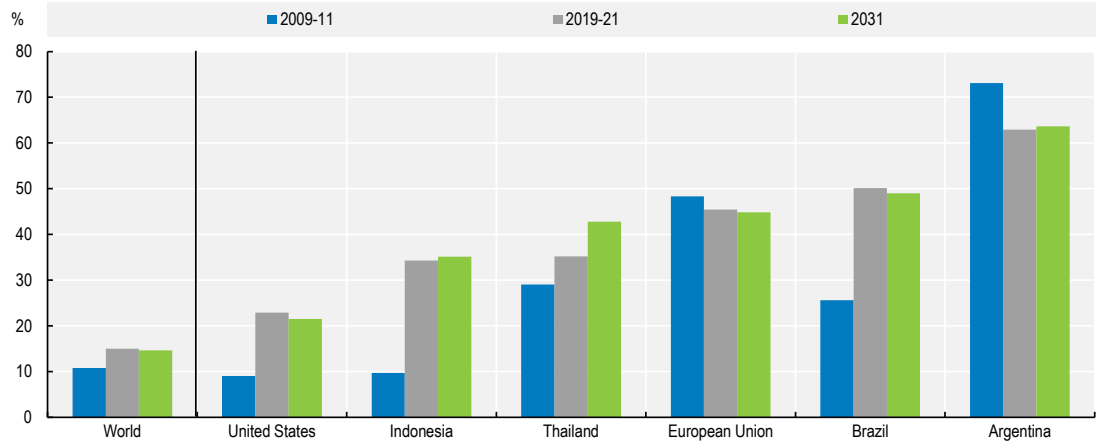
India, the world's second largest consumer and number one importer of vegetable oil, is projected to sustain a per capita consumption growth of 1.1% p.a., reaching 12 kg/capita by 2031. This substantial increase will be the result of both increases in its domestic production, crushing of increased domestic oilseed production, and imports of mainly palm oil from Indonesia and Malaysia. As urbanisation increases in developing countries, dietary habits and traditional meal patterns are expected to shift towards

processed foods that have a high content of vegetable oil. For least developed countries (LDCs), the per capita availability of vegetable oil is projected to increase by 0.8% p.a., to reach 9 kg per capita by 2031 due to low per capita income.

The uptake of vegetable oil as feedstock for biodiesel (about 10-15% of global vegetable oil use) is projected to remain stable over the next ten years, compared to the 6.3% p.a. increase recorded over the previous decade when biofuel support policies took effect (Figure 4.3). The use of vegetable oil as feedstock for biodiesel depends on the policy setting (Chapter 9) and the relative price development of vegetable oil and crude oil (see below). In general, national targets for mandatory biodiesel consumption are expected to increase less than in previous years. In addition, used oils, tallow, and other feedstocks are increasing their share in the production of biodiesel, especially in the European Union and the United States, largely due to specific policies. Vegetable oil uptake by Argentina's export-oriented biodiesel industry is projected to be 1.6 Mt by 2031, equivalent to 56% of domestic vegetable oil consumption. In Indonesia, the growth in the use of vegetable oil to produce biodiesel is projected to remain strong and reach 8.9 Mt by 2031 due to supportive domestic policies. However, Indonesia is the main driver in the world for the increasing use of vegetable oil as feedstock for biodiesel.

Figure 4.3. Share of vegetable oil used for biodiesel production



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

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4.3.2. Protein meal consumption

Feed demand is slowing and is shaped by developments in China

Protein meal is exclusively used as feed and its consumption is projected to continue to grow at 1.2% p.a., considerably below the last decade's rate of 3.4% p.a. The link between feed use of protein meal and animal production is related to the intensification of animal production, which increases demand for protein meal, whereas feeding efficiencies lead to a reduction of protein feed per animal. Moreover, the composition of animal husbandry and herd sizes are additional factors.

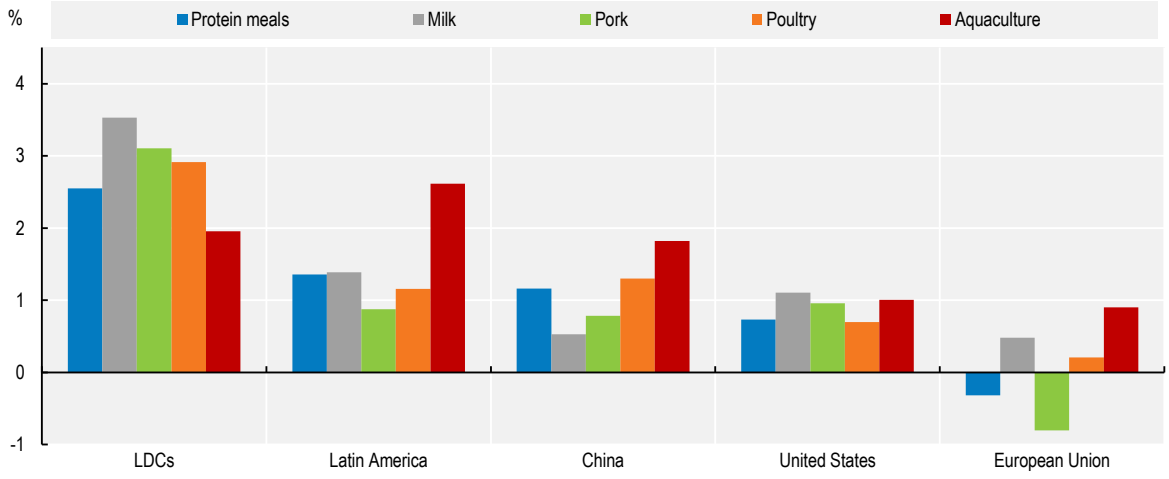
The link between animal production and protein meal consumption is associated with a country's level of economic development (Figure 4.4). Lower income countries, which rely on backyard production, consume less protein meal, whereas higher income economies which employ intensive production systems use higher amounts of protein meal. Because of a shift to more feed-intensive production systems in developing countries in response to rapid urbanisation and increasing demand for animal products, growth in protein

meal consumption tends to exceed growth in animal production. In LDCs, where the use of protein meals is very low, intensification in livestock production with growing use of compound feed is expected to continue. With intensification, the use of protein meal per unit of livestock production increases considerably, leading to fast growth in total demand.

China accounts for more than a quarter of global protein meal demand and is therefore shaping global demand development. Growth in China's demand for compound feed is expected to be slower than in the previous decade due to declining growth rates for animal production and the existing large share of compound feed-based production. The protein meal content in China's compound feed is expected to remain stable after it surged in the last decade but should exceed present levels in the United States and European Union. As pig herds are being rebuilt in China following the outbreak of ASF, larger scale feed-based intensive production systems have been installed, leading to an expected additional increase in demand for protein meal.

In the United States and the European Union, where compound feed satisfies most protein requirements of animal production, protein meal consumption is expected to grow at a slower rate than animal production due to improving feeding efficiencies. In addition, animal products, primarily poultry and dairy, are increasingly marketed in the European Union as produced without feed use from genetically modified crops, driven by large retail chains that reduces demand for soybean meal.

Figure 4.4. Average annual growth in protein meal consumption and animal production (2022-31)



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

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4.3.3. Oilseed crush and production of vegetable oils and protein meal

Slowing global oilseed crush and limited growth in palm oil production

Globally, the crushing of soybeans and other oilseeds into meal (cake) and oil accounts for about 90% of total usage. The demand for crush will increase faster than demand for other uses, notably direct food consumption of soybeans (including for meat and dairy replacements), groundnuts and sunflower seeds, as well as direct feeding of soybeans. The crush location depends on many factors, including transport costs, trade policies (e.g. different tariffs for oilseeds and products), acceptance of genetically modified

crops, processing costs (e.g. labour and energy), and infrastructure (e.g. crushing facilities, ports and roads).

In absolute terms, soybean crush is projected to expand by 45 Mt over the outlook period, less than half of the 100 Mt in the previous decade. Chinese soybean crush is projected to increase by 18 Mt, accounting for about 40% of the world's additional soybean crush, the bulk of which will utilise imported soybeans. The growth in China, although large, is projected to be considerably lower than in the previous decade as the country's demand for compound feed is expected to slow down due to lower animal production growth rates. In addition, the protein meal content in China's compound feed has reached a relatively high level, leaving little scope to further increase the incorporation rate. Global crush of other oilseeds as compared to soybeans is expected to grow in line with production by 28 Mt over the outlook period and to occur more often in the producing country.

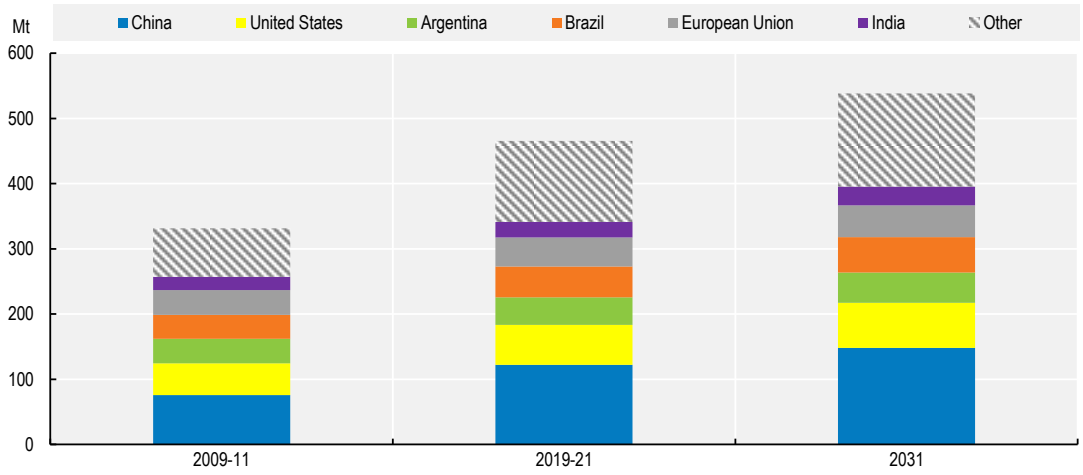
Global vegetable oil production depends on both the crush of oilseeds and the production of perennial tropical oil plants, especially palm oil. Global palm oil output has outpaced the production of other vegetable oils over the past decade. However, growth in the production of palm oil is expected to weaken due to increasing attention to sustainability concerns and the aging of oil palm trees in Indonesia and Malaysia. These two countries account for more than one-third of the world's vegetable oil production and for more than 80% of global palm oil production.

At the global level, palm oil supplies are projected to expand at an annual rate of 1.0%. Increasingly stringent environmental policies from the major importers of palm oil and sustainable agricultural norms (e.g. in line with the 2030 UN Agenda for Sustainable Development) are expected to slow the expansion of the oil palm area in Indonesia and Malaysia. This implies that growth in production comes increasingly from productivity improvements, including an acceleration of replanting. Palm oil production in other countries is expected to expand more rapidly from a low base, mainly for domestic and regional markets. For example, Thailand is projected to produce 3.8 Mt by 2031, Colombia 2.1 Mt, and Nigeria 1.8 Mt. In several Central American countries, niche palm oil production is developing with global sustainability certifications in place from the outset, positioning the region to eventually reach broader export markets.

The vegetable oil complex includes palm kernel, coconut and cottonseed oil, as well as palm oil and oil extracted from the crush of oilseeds as noted above. Palm kernel oil is produced alongside palm oil and follows the production trend of the latter. Coconut oil is mainly produced in the Philippines, Indonesia, and Oceanic islands. Palm kernel oil and coconut oil have important industrial uses, and dominance has shifted towards palm kernel oil along with the growing production of palm oil. Cottonseed oil is a by-product of cotton ginning, with global production concentrated largely in India, the United States, Pakistan, and China. Overall, vegetable oil production is projected to increase globally by 1.1% p.a., driven mainly by food demand in developing countries resulting from population and income growth.

Global protein meal output is projected to increase by 1.1% p.a., reaching 410 Mt by 2031. 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 (Figure 4.5). In China and the European Union, most protein meal production comes from the crushing of imported oilseeds, primarily soybeans from Brazil and the United States. In the other important producing countries – Argentina, Brazil, India, and the United States – domestically-produced soybeans and other oilseeds dominate.

Figure 4.5. Oilseed crush by country or region



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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4.3.4. Oilseed production

Production growth is slowing while soybeans continue to shift to Latin America

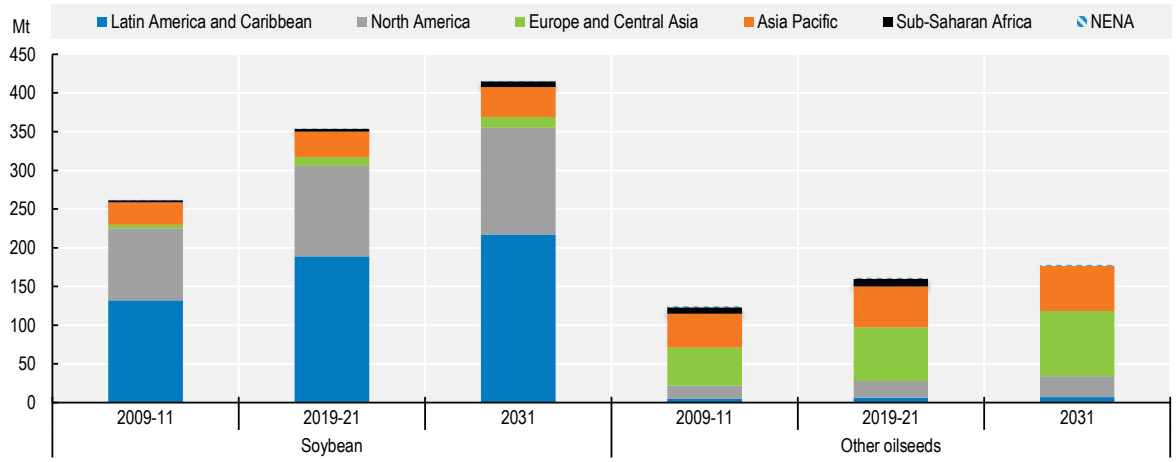
The production of soybeans is projected to grow by 1.0% p.a., compared to 2.9% p.a. over the last decade. The production of other oilseeds (rapeseed, sunflower seed, and groundnuts) will grow at a slower pace, at 1.2% p.a. compared to 2.3% p.a. over the previous ten years (2012-2021). Growth will be dominated by yield increases, accounting for three-quarters of production growth. Soybeans benefit from their fast-growth, which allows for double-cropping, especially in Latin America. Consequently, a considerable share of additional harvested area increase will result from double-cropping soybean following maize in Brazil and wheat in Argentina.

Brazil has in recent years been the largest producer of soybeans and is expected to grow at 0.9% p.a. over the next decade – slightly stronger than the United States, the second largest producer, at 0.7% p.a., due to double cropping soybeans with maize. The production of soybeans is projected to grow strongly elsewhere in Latin America, with Argentina and Paraguay producing 53 Mt and 11 Mt, respectively, by 2031 (Figure 4.6). In China, soybean production is expected to continue to increase in response to reduced policy support for the cultivation of cereals. Soybean production is also expected to increase in India, the Russian Federation, Ukraine, and Canada.

China (a major producer of rapeseed and groundnuts) and the European Union (which mainly produces rapeseed and sunflower seeds) are the most important producers of other oilseeds, with a projected annual output of 32 Mt and 31 Mt, respectively, by 2031. However, limited growth in output is projected for both regions (0.8% p.a. for China and 1.0% p.a. for the European Union) as relatively higher prices for cereals are expected to generate strong competition for limited arable land. Canada, another major producer and the largest exporter of rapeseed, is projected to increase its production of other oilseeds by 1.1% p.a., to reach 22 Mt by 2031.

Soybean stocks are projected to reach a stock-to-use ratio of 11.9% by 2031. Overall, the stock-to-use ratio remains low compared to the past two decades, which means harvest failures could quickly lead to market shortages.

Figure 4.6. Oilseed production by region



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

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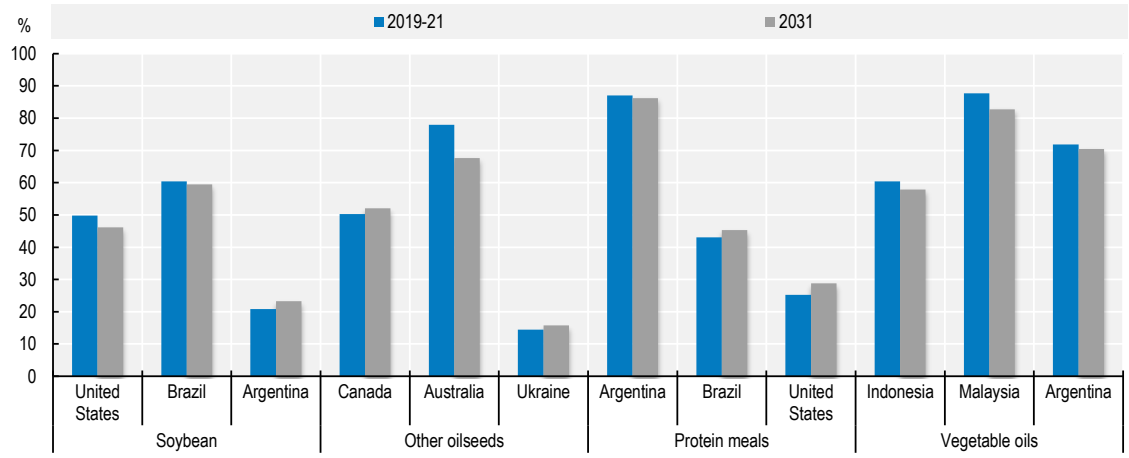
4.3.5. Trade

Trade is significant for oilseeds and products, but slowing down

Over 42% of world soybean production is traded internationally, a high share compared to other agricultural commodities. The expansion in world soybean trade is directly linked to projected slower growth of the soybean crush in China and imports, which are projected to grow by 0.9% p.a. to about 112 Mt by 2031 (down from 5.9% p.a. in 2012-2021), accounting for about two-thirds of world soybean imports. Exports of soybeans originate predominately from Brazil and the United States. Whereas the United States was historically the largest global exporter of soybeans, Brazil has taken over that role with steady growth in its export capacity and is projected to account for 50% of total global exports of soybean over the projection period.

For other oilseeds, the internationally traded share of global production traded remains much lower at about 14% of world production as the two largest producers, China and the European Union, are net-importers. The main exporters are Canada, Australia, and Ukraine, which are projected to account for more than 67% of world exports by 2031. In Canada and Australia, more than half of the other oilseed production (primarily rapeseed) is exported (Figure 4.7). Additional oilseed production is crushed domestically and exported in the form of vegetable oil or protein meal.

Figure 4.7. Share of exports in total production of oilseeds and oilseed products for the top three exporting countries



Note: 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 (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en

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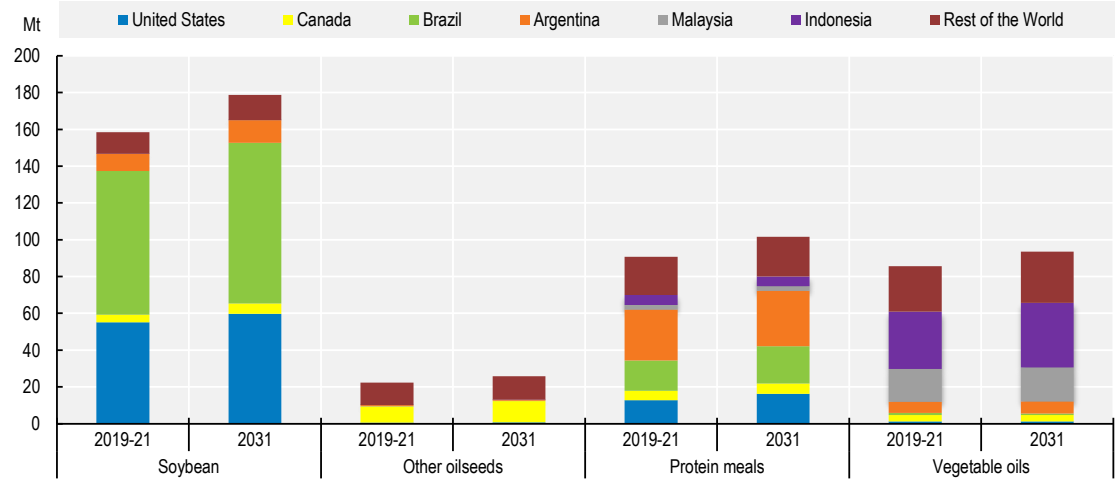
Vegetable oil exports, which amount to 40% of global vegetable oil production, continue to be dominated by a few players. Indonesia and Malaysia are expected to continue to account for 60% of total vegetable oil exports during the outlook period (Figure 4.8). However, the share of exports in production is projected to contract slightly in these countries as domestic demand for food, oleochemicals, and, especially, biodiesel uses is expected to grow. India is projected to continue its strong growth in imports at 1.8% p.a., reaching 16 Mt by 2031, or 17% of world vegetable oil imports, in order to meet increasing demand driven by population growth, urbanisation, and rising disposable income.

Figure 4.8. Exports of oilseeds and oilseed products by region



Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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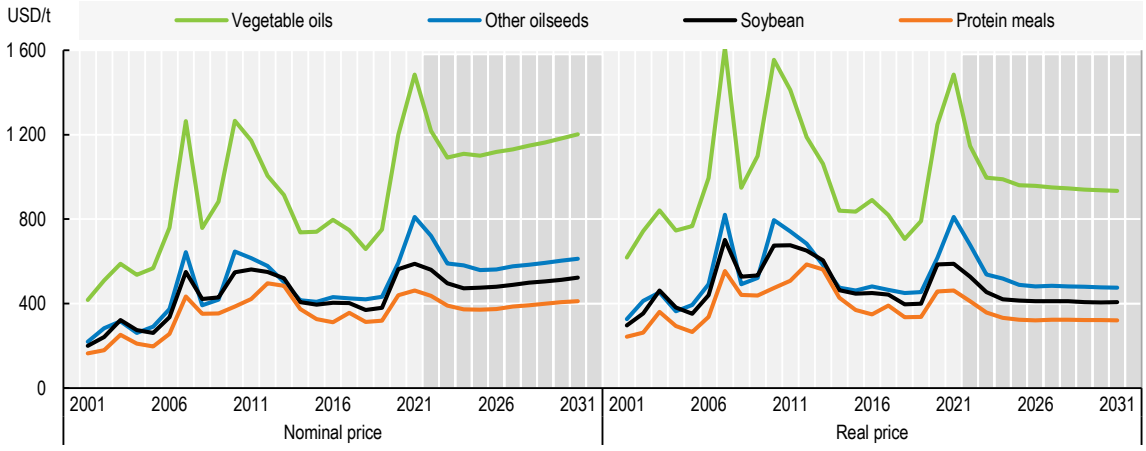
The projected growth in world trade of protein meal is 1.0% p.a. over the outlook period, down from 1.4% p.a. over the last decade. Argentina is expected to remain the largest meal exporter because it is the only major protein meal producer with a clear export orientation. The largest importer is the European Union, with imports expected to decline due to reduced domestic demand for protein meal. Almost all of the 10 Mt global import growth in protein meal is projected to occur in Asia, in particular in Viet Nam, where additional growth will come with the recovery from the ASF outbreak. As the domestic crushing capacity in Asian countries is not expected to keep pace with protein meal demand, expansion of the livestock sector is expected to require imported feed to meet production requirements.

4.3.6. Prices

Current high prices will weaken over the next decade

The price raise of oilseeds and oilseed products continued through 2021 and closed at record nominal levels as global demand increased faster than supply. A downward adjustment is expected during the first years of the outlook period, reflecting expectations of better production prospects, partly fuelled by improved production incentives of current high prices. Thereafter, prices are expected to increase slightly in nominal terms, while declining in real terms following the long-term trend of agricultural commodity prices (Figure 4.9). Sustained economic growth following the recovery from COVID-19 should support the price of oilseed and oilseed products over the outlook period, whereas continued productivity improvements will put downward pressure on real prices.

Figure 4.9. 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 (2021=1).

Source: OECD/FAO (2022), "OECD-FAO Agricultural Outlook" OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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4.4. Risks and uncertainties

Environmental concerns will influence global oilseed supply chains

The scope for increasing palm oil output in Indonesia and especially in Malaysia will increasingly depend on replanting and yield improvements rather than area expansion. In recent years, growth in production

has been sluggish given the low profitability of the sector and rising labour costs in Malaysia. There has been some replanting progress by major palm oil companies in Indonesia. Regarding the yield developments during the last ten years, average yields in Malaysia declined by 2.3% p.a. and in Indonesia by 1.6% p.a. In addition to the slowdown in yields, sustainability concerns will also influence the expansion of palm oil output as demand in developed countries favours deforestation-free oils and seeks sustainability certification for vegetable oil used as biodiesel feedstock and, increasingly, for vegetable oils entering the food chain. However, competing certification schemes are widely used in Malaysia and Indonesia.

Biofuel policies in the United States, the European Union, and Indonesia remain a major source of uncertainty in the vegetable oil sector given that about 15% of global vegetable oil supplies go to biodiesel production. In Indonesia, attaining the recently proposed 30% biodiesel mandate is questionable as – in addition to requiring government subsidies – they may impose medium-term supply constraints. In the European Union, policy reforms and the emergence of second-generation biofuel technologies will likely prompt a shift away from crop-based feedstocks. The development of crude oil prices, which affects the competivity and profitability of biodiesel production, remains a major source of uncertainty.

The pace of recovery of the Chinese pig meat industry from ASF combined with restructuring of the pig meat industry will have a large influence on feed demand, especially for protein meal for feeding. Protein meals compete in part with other feed components in the production of compound feed and are thus reacting to any change in cereal prices. Any adjustment of feed mixtures will influence protein meal use.

Consumer concerns regarding soybeans stem from the high share of production derived from genetically modified seeds. In the European Union in particular, retailer certification schemes of animal products based on feed free of genetically modified products are gaining momentum and may shift feed demand to other protein sources than soybean meal. This may further reduce protein meal demand as the European Union accounted for 13% of global demand in 2019-21. Heightened environmental concerns are especially related to a potential link between deforestation and increasing soybean production in Brazil and Argentina. These concerns have motivated the private sector to incentivise the use of land already cleared for further area expansion to avoid further deforestation. If successful, these voluntary initiatives should discourage clearing of land by soybean producers.

Russia’s war against Ukraine poses large uncertainty around the sunflower complex as both countries are the largest producers of sunflower seed (each accounting for more than a quarter of global production) and exporters of sunflower products. Especially, Ukraine is also an important regional exporter of rapeseed and soybeans. Thus, any production shortfall reduces available oilseeds and products on the global market but more importantly can lead to shortfall of vegetable oil and protein meal for feed in Ukraine.

The long-term implications of the COVID-19 pandemic could be significant and will depend on the speed of the economic recovery as vegetable oil consumption tends to grow strongly with economic growth while protein meal is closely dependent on trends in animal production, which itself is closely correlated with income growth.

New investment in research and development in the sugar for alternative lower calorie sugar substitutes is strong given the increasing health concerns and could well result in disrupting the dynamics of the market. Similarly, on the supply side, new breeding techniques for sugar crops (gene editing) and new diversification opportunities for the sugar industry would open new opportunities for the sector (e.g. bioethanol, bioplastics and biogas).