4 Oilseeds and oilseed products

This chapter describes recent market developments and highlights the medium-term projections for world oilseed markets for the period 2021-30. Price, production, consumption and trade developments for soybean, other oilseeds, protein meal, and vegetable oil are discussed. The chapter concludes with a discussion of important risks and uncertainties that might affect world oilseed markets over the next ten marketing years.

4.1. Projection highlights

Global market conditions of oilseeds and oilseed products resulted in rapid price increases in the second half of 2020, following short-term market disruptions due to the COVID-19 pandemic. Strong demand, especially for imported soybeans by the People's Republic of China (hereafter "China") and limited supply growth, especially of palm oil, lead to this price increase.

Soybean production is projected to increase by 1.1% p.a. during the outlook period. The expansion of harvested area, including increased double-cropping in Latin America, accounts for about a quarter of global output growth. Soybean production is expected to reach 411 Mt by 2030, more than double the combined output of other oilseeds (rapeseed, sunflower seed and groundnuts) at 179 Mt. Oilseeds are generally processed (90% of soybeans and 87% of other oilseeds) into protein meal, almost entirely used for feed, and into vegetable oil for food, oleochemical, and biodiesel uses.

Soybean production and exports are dominated by two countries: Brazil and the United States. Brazil is expected to be the world's largest producer, with domestic output projected to reach 149 Mt by 2030 based on improved yields and increased cropping intensity by double cropping soybeans with maize. The United States is projected to produce 123 Mt. These two countries are expected to account for about two-thirds of world soybean production and more than 80% of global soybean exports.

Production of other oilseeds is projected to increase by 1.3% p.a. over the next decade, implying slower growth relative to the last ten years. Production growth incentives will be curbed by 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, cultivation of other oilseeds is much less concentrated than that of soybeans. China, the European Union, Canada, and Ukraine each produce between 20 to 32 Mt.

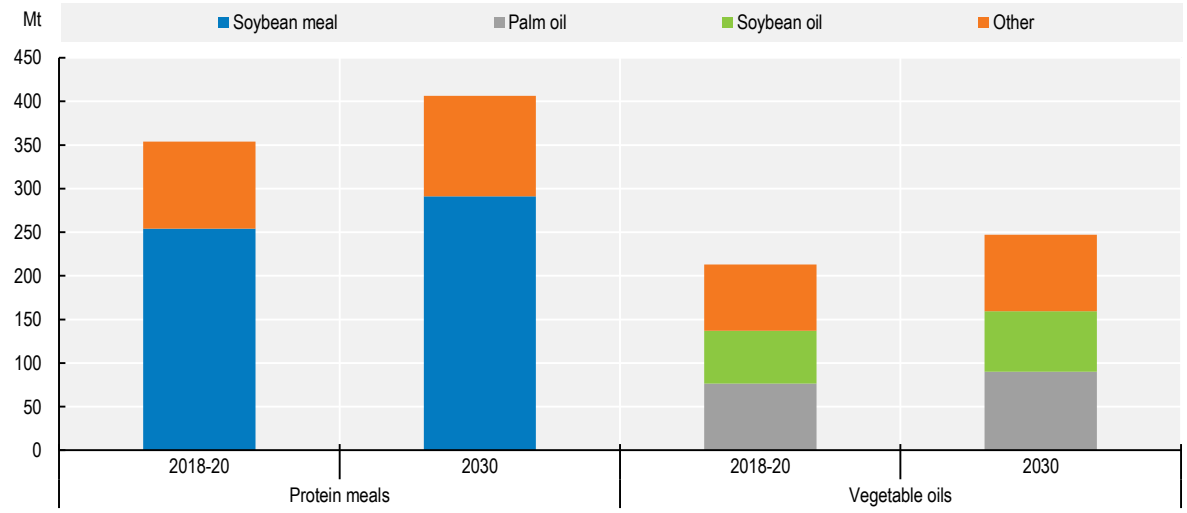
The vegetable oil aggregate in this *OECD-FAO Agricultural Outlook* includes oil obtained from the crushing of oilseeds (about 55% of world vegetable oil production) and palm oil (36%), as well as palm kernel, coconut and cottonseed oils (Figure 4.1). In view of a slowdown in the expansion of the mature oil palm area, further production growth in Indonesia (1.4% p.a.) and Malaysia (0.9% p.a.) is projected to be limited. Nevertheless, by 2030 Indonesia and Malaysia are projected to account for 83% of global palm oil production and 34% of global vegetable oil production. In addition, the expected increase in Indonesia's domestic biodiesel production will lower its export growth of crude palm oil in the medium-term. Global demand for vegetable oil is projected to expand by 33 Mt by 2030, with food use accounting for 68% of total demand.

Soybean meal dominates the protein meal sector. Compared to the past decade, the expansion of protein meal utilisation (1.2% p.a. vs. 3.8% p.a.) is expected to be constrained by slower growth in global pork and poultry production. Demand growth in China is expected to slow down considerably (1.2% p.a. vs. 5.7% p.a.), driven by improved feed efficiency and by efforts to adopt a lower protein meal share in livestock feed rations. China is nevertheless projected to account for about a quarter of global protein meal demand growth. 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 mixtures.

Growth in world exports of soybeans, dominated by the Americas, is expected to slow considerably over the next decade due to projected slower growth in soybean imports by China.

Of all agricultural commodities, vegetable oil has one of the highest trade shares (41%) of production. Indonesia and Malaysia, the world's leading suppliers of palm oil, will continue to dominate the vegetable oil trade, exporting over 70% 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 3.4% p.a. due to growing domestic demand and limited production growth opportunities.

Figure 4.1. Protein meal and vegetable oil production by type



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

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While in the 2020 marketing year prices in the oilseed complex recovered from past multi-year lows, 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. This price trend will be subject to multiple uncertainties, e.g. weather variations in major producing countries and shifts in demand preferences.

China's imports of soybeans expanded substantially in the 2020 marketing year due partly to the rebuilding of pork production following the African Swine Fever (ASF) outbreak, but also to improved trade relations with the United States. The future demand for protein meal in China depends on the balance between feed intensity and efficiency especially of the pigmeat sector. The vegetable oil market will remain dominated by palm oil. The scope to increase output in Indonesia and Malaysia will increasingly depend on oil palm replanting activities and accompanying yield improvements (as opposed to area expansion). Sustainability concerns also influence the expansion of palm oil output as demand in developed countries favours oils that are not associated with deforestation and as consumers seek sustainability certifications for vegetable oil. The use of vegetable oil as biodiesel feedstock is mostly determined by biofuel policies, which determine countries' mandated blending ratios.

4.2. Recent market developments

The conditions in global markets of oilseeds and oilseed products resulted in rapid price increases in the second half of 2020, following short-term market disruptions due to the COVID-19 pandemic. Strong demand, especially for imported soybeans by China, and limited supply growth, especially of palm oil, led to these price increases. The surge in prices contributed to food price inflation in numerous countries, aggravating food access problems stemming from pandemic-driven income losses.

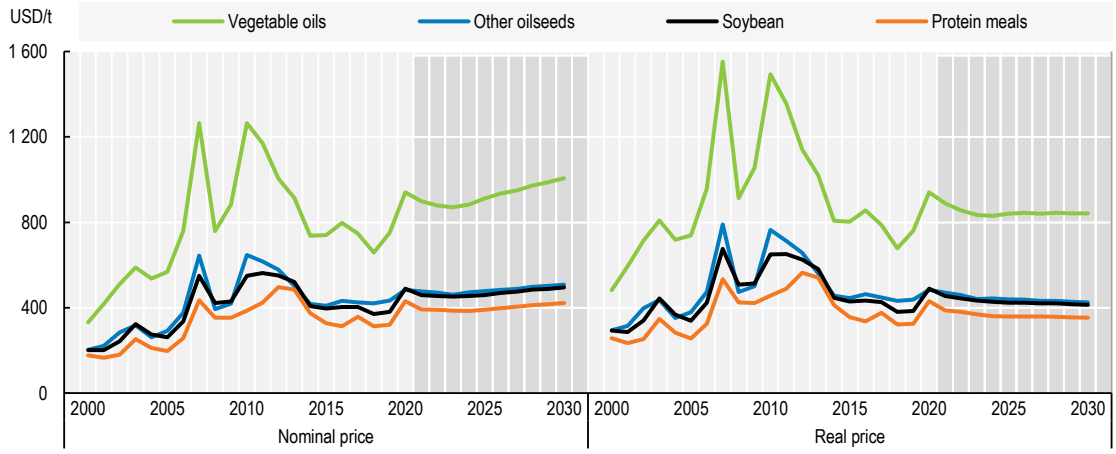
During the first half of 2020, the COVID-19 pandemic led to temporary slowdowns in demand and short-term disruption of supply chains, resulting in price declines. Overall, oilseeds and oilseed products markets adjusted to the new conditions and recovery in demand dominated development as of the second half of 2020. In Malaysia, labour shortages, exacerbated by measures to restrict the movement of people so as to contain the spread of COVID-19, impacted the palm oil harvest in 2020, curbing overall output.

Production of oilseeds and palm oil increased in the 2020/2021 marketing year due to a rebound in harvested area and higher yields in major producing countries. But demand increased faster than production, mainly driven by a strong increase in soybean imports by China in its efforts to rebuild the pig herd following the outbreak of ASF and to its improved trade relations with the United States.

4.3. Prices

The price of oilseeds and oilseed products increased rapidly in the second half of 2020 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 and the gradual elimination of COVID-19-related logistics constraints on trade. 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 4.2). The assumed increase in the real price of crude oil and 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 4.2. 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 (2020=1).
Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook OECD Agriculture statistics (database)", http://dx.doi.org/10.1787/agr-outl-data-en.

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4.4. Oilseed production

The production of soybeans is projected to grow by 1.1% p.a., compared to 4.0% p.a. over the last decade. The production of other oilseeds (rapeseed, sunflower seed, and groundnuts) will grow at a slower pace, at 1.3% p.a. compared to 2.5% p.a. over the previous ten years (2011-2020). Growth will be dominated by yield increases, accounting for three-quarter of production growth. Soybeans benefit from their fast growing period, which allows for double-cropping production, especially in Latin America. Consequently, a considerable share of additional harvested area increase will result from double-cropping soybean with maize in Brazil and with wheat in Argentina.

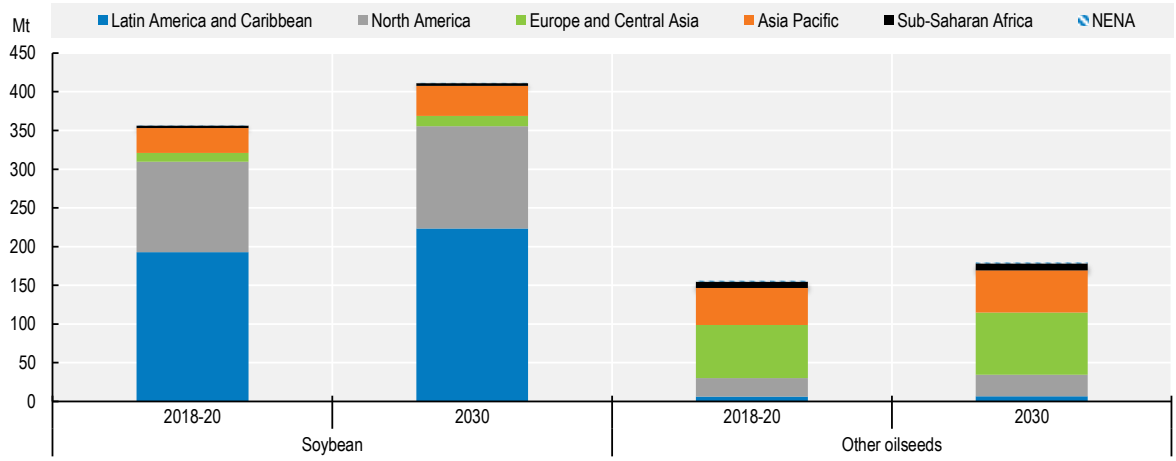
Brazil has in recent years been the largest producer of soybeans and is expected to grow at 1.2% p.a. over the next decade – faster than the United States, the second largest producer, at 0.7% p.a. This is also due

to the possibility of increased cropping intensity by double cropping soybean with maize. The production of soybeans is projected to grow strongly elsewhere in Latin America, with Argentina and Paraguay producing 55 Mt and 12 Mt respectively by 2030 (Figure 4.3). 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 (hereafter “Russia), 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 31 Mt and 30 Mt respectively by 2030. However, limited growth in output is projected for both regions (0.9% p.a. for China and 1.1% 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 1.2% p.a., to reach 23 Mt by 2030. Strong growth in other oilseed production is projected for Ukraine and Russia, supported by ongoing expansion of arable land in the Black Sea region.

Soybean stocks are projected to remain stable, resulting in a lower stock-to-use ratio of 10.5% by 2030. Overall, the stock-to-use ratio remains low compared to the past two decades, which implies that harvest failures could quickly lead to market shortages.

Figure 4.3. Oilseed production by region



Note: NENA stands for Near East and North Africa, and is defined as in Chapter 2.
Source: OECD/FAO (2021), "OECD-FAO Agricultural Outlook OECD Agriculture statistics (database)", http://dx.doi.org/10.1787/agr-outl-data-en.

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

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 substitutes), groundnuts and sunflower seeds, as well as direct feeding of soybeans. 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).

In absolute terms, soybean crush is projected to expand by 47 Mt over the outlook period, well below the 92 Mt of the previous decade. Due to the gradual recovery of the crush sector in China, reflecting

expectations of a steady increase in the pig herd, Chinese soybean crush is projected to increase by 20 Mt, accounting for about 43% 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 21 Mt over the outlook period and to occur more often in the producing country.

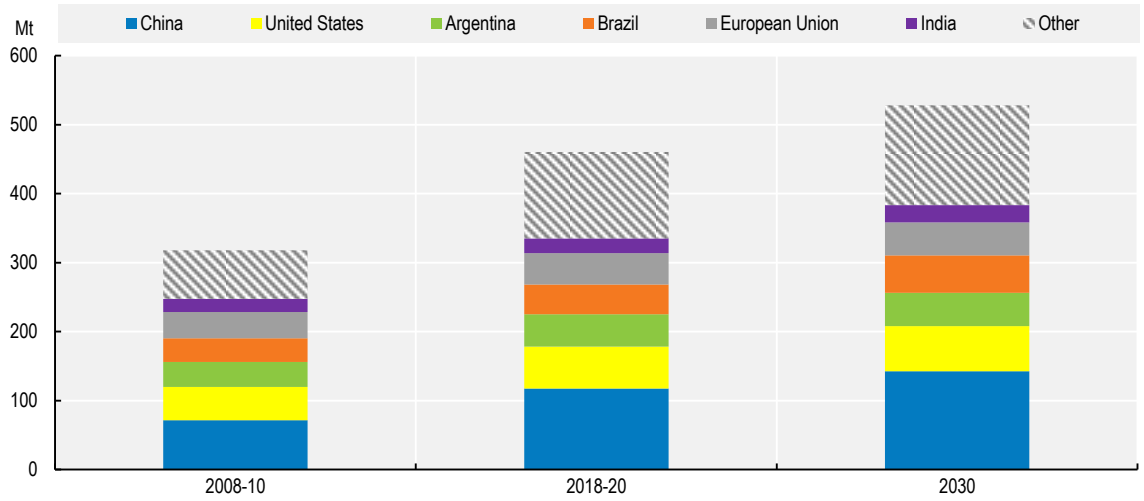
Global vegetable oil production depends on both the crush of oilseeds and the production of perennial tropical oil plants, especially palm oil. Global palm oil output has outpaced the production of other vegetable oils over the past decade. However, growth in the production of palm oil is expected to 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.

At the global level, palm oil supplies are projected to expand at an annual rate of 1.3%. Increasingly stringent environmental policies from the major importers of palm oil and sustainable agricultural norms (e.g. in the context of the 2030 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 activities. 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 2030, Colombia 2.0 Mt, and Nigeria 1.6 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 aggregate includes palm kernel, coconut and cottonseed oil, as well as palm oil and oil extracted from the crush of oilseeds as analysed 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 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 1.3% p.a., a higher rate than most agricultural commodities covered in this *Outlook*, driven mainly by food demand in developing countries resulting from population and income growth.

Global protein meal output is projected to increase by 1.2% p.a., reaching 406 Mt by 2030. 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 4.4). 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 are the dominant raw material.

Figure 4.4. Oilseed crush by country or region



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

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4.6. Vegetable oil consumption

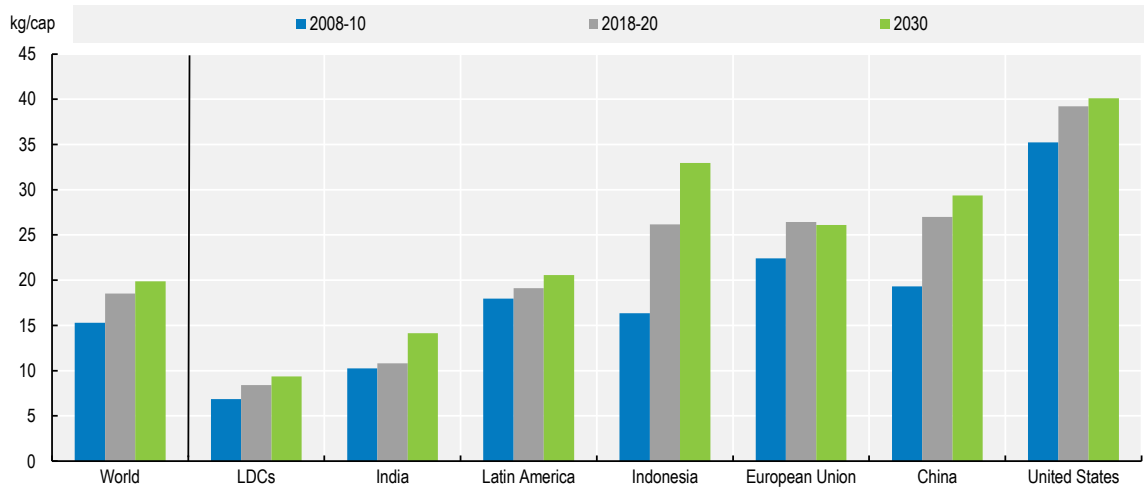
Per capita consumption of vegetable oil for food is projected to grow by 0.8% p.a., considerably less than the 2.3% p.a. increase observed during 2011-20 due to increasingly saturated food demand in developed countries and emerging markets. In China (29 kg/capita) and Brazil (26 kg/capita), the per capita level of vegetable oil food availability is set to reach levels comparable to those of developed countries, where growth in vegetable oil food consumption is projected to level off at 28 kg/capita, growing at 0.3% p.a. (Figure 4.5).

India, the world's second largest consumer and number one importer of vegetable oil, is projected to maintain a high per capita consumption growth of 2.6% p.a., reaching 14 kg/capita by 2030. This substantial increase will be the result of both increases in its domestic production, crushing of increased domestic oilseed production, and in 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 1.3% p.a., to reach 9 kg per capita by 2030 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 6.5% p.a. increase recorded over the previous decade when biofuel support policies took effect (Figure 4.6). Projected increases in Asia and Latin America will be offset by reductions in Europe and North America, where fixed blending targets and declining transport fuel consumption affect demand for biodiesel. 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 (see Chapter 9 for more details on biofuels). Vegetable oil uptake by Argentina's export-oriented biodiesel industry is projected to be 2.1 Mt by 2030, equivalent to 66% 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 7.9 Mt by 2030 due to supportive domestic policies. Indonesia is the main driver for the increasing use of vegetable oil as feedstock for biodiesel in

the world. 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).

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



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

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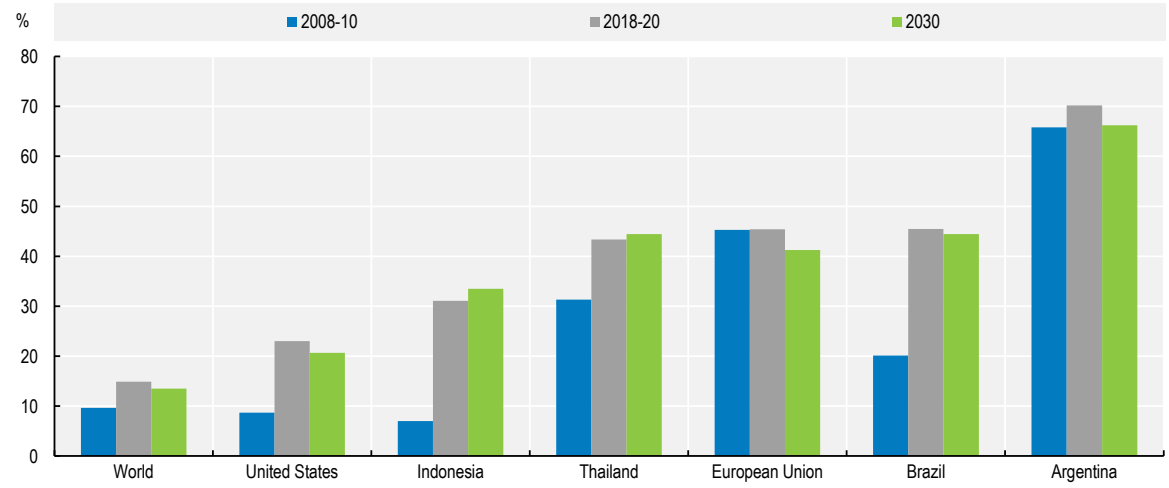
Figure 4.6. Share of vegetable oil used for biodiesel production



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

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4.7. Protein meal consumption

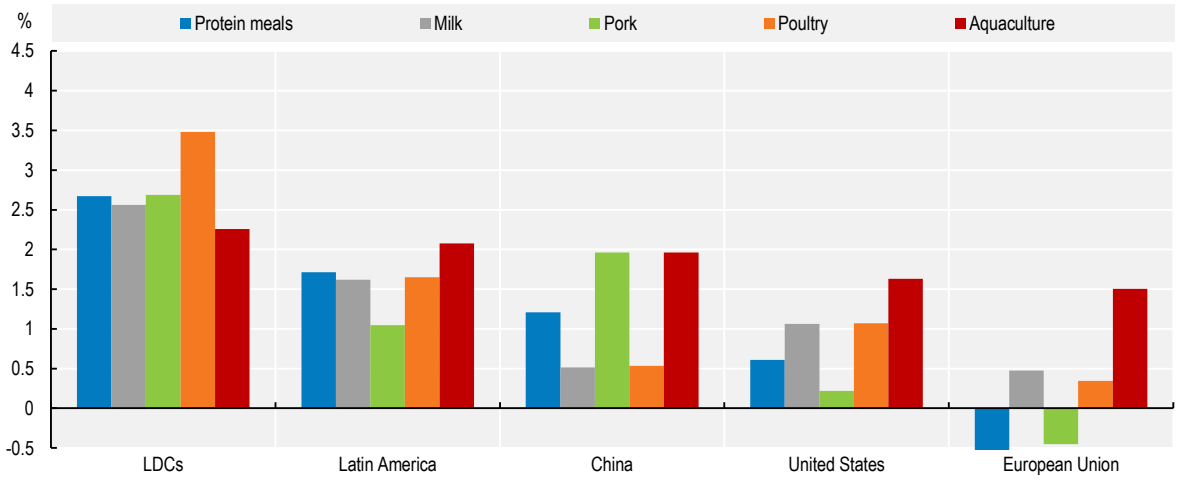
Protein meal is exclusively used as feed and its consumption is projected to continue to grow at 1.2% p.a., considerably below the last decade's growth rate of 3.8% p.a. Several factors influence the link between feed use of protein meal and animal production: intensification of animal production increases demand for

protein meal, whereas feeding efficiencies lead to a reduction of protein feed per animal production output. Composition of animal husbandry and herd sizes are additional determining factors.

The link between animal production and protein meal consumption is associated with a country's level of economic development (Figure 4.7). 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 as it surged in the last decade and considerably exceeds at present the levels of the United States and the European Union. As pig herds are being rebuilt in China following the outbreak of ASF, larger scale feed-based production systems have been installed. This could lead to an additional shift in demand for protein meal due to further intensification of the Chinese pigmeat production.

Figure 4.7. Average annual growth in protein meal consumption and animal production (2021-30)



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

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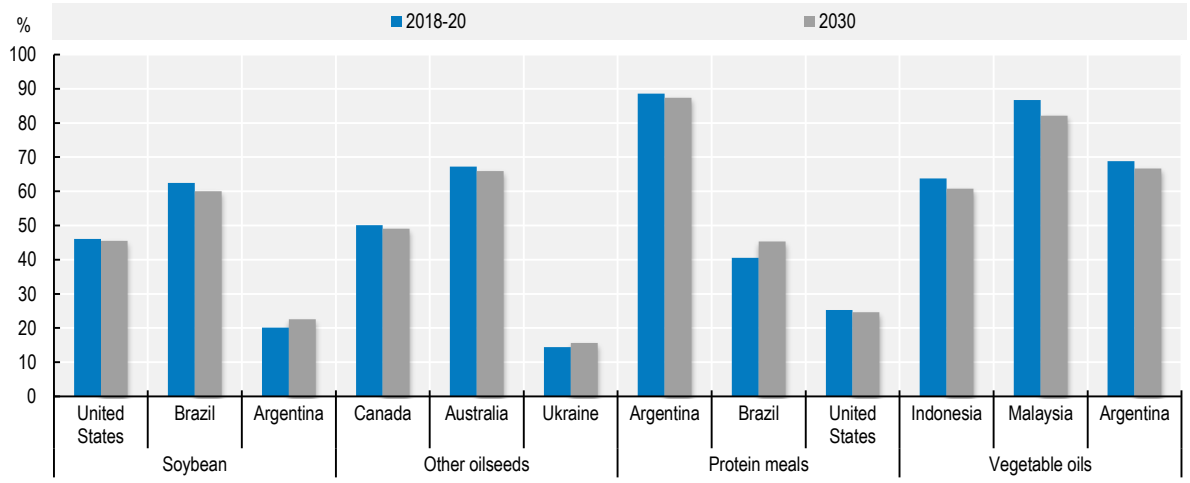
In the United States and the European Union, where compound feed satisfies most protein requirements of animal production, protein meal consumption is expected to grow slower than animal production due to improving feeding efficiencies. In addition, animal products, primarily poultry and dairy, are increasingly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

4.8. Trade

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 subsequent imports. Chinese soybean imports are projected to grow by 1.2% p.a. to about 108 Mt by 2030 (down from 7.1% p.a. in 2011-2020), 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 13% 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 69% of world exports by 2030. In Canada and Australia, more than half of the other oilseed production (primarily rapeseed) is exported (Figure 4.8). Additional oilseed production is crushed domestically and exported in the form of vegetable oil or protein meal.

Figure 4.8. 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 (2021), "OECD-FAO Agricultural Outlook OECD Agriculture statistics (database)", http://dx.doi.org/10.1787/agr-outl-data-en.

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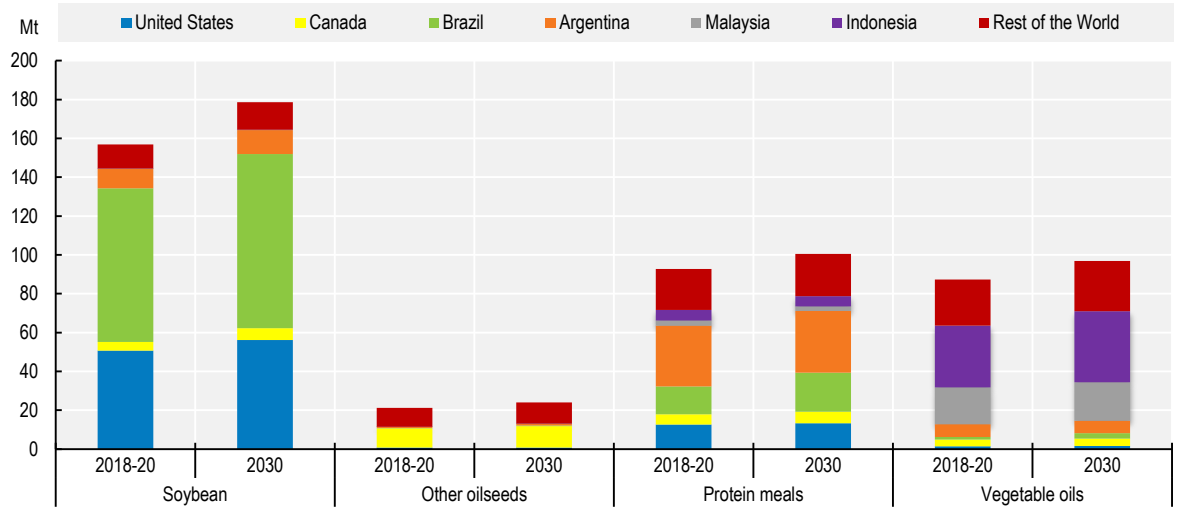
Vegetable oil exports, which amount to 40% of global vegetable oil production, continue to be dominated by a few players. Indonesia and Malaysia are expected to continue to account for 60% of total vegetable oil exports during the outlook period (Figure 4.9). However, the share of exports in production 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 3.4% p.a., reaching 21 Mt by 2030, or about a quarter of world vegetable oil imports, in order to respond to an increasing demand driven by population growth, urbanisation, and increases in disposable income.

The projected growth in world trade of protein meal is 0.8% p.a. over the outlook period, down from 1.8% 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 8 Mt global import growth in protein meal is projected to occur in Asia. Viet Nam in particular, where additional growth will come with the recovery from the ASF outbreak. The domestic crushing capacity in Asian countries is not expected to keep pace with protein meal demand, and expansion of the livestock sector is expected to require imported feed to meet production requirements.

Figure 4.9. Exports of oilseeds and oilseed products by region



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

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4.9. Main issues and uncertainties

The COVID-19 pandemic resulted in reduced individual mobility which has had strong implications for away-from-home consumption. This could affect demand for vegetable oil, which is widely used for deep frying. In addition, the temporary slowdown in economic activity combined with reduced crude oil prices curbed the demand for vegetable oil as biodiesel feedstock. Most production and processing of oilseeds and products is highly mechanised and labour mobility is of less importance. Important disruptions in palm oil and coconut harvesting due to restrictions on labour mobility, however, have been reported. The long-term implications will depend on the speed of the economic recovery as vegetable oil consumption per capita grows strongly with economic growth and protein meal is used as feed in the more elastic animal production.

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 15% of world protein demand in 2018-20. Environmental concerns are also on the rise, especially with respect 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 so as to avoid further deforestation. If successful, these voluntary initiatives should discourage clearing of land by soybean producers.

The scope for increasing palm oil output in Indonesia and especially in Malaysia will increasingly depend on replanting activities and yield improvements (as opposed to 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. Sustainability concerns 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. Several 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 14% of global vegetable oil supplies go to biodiesel production. In Indonesia, the attainability of the recently proposed 30% biodiesel mandate is questionable as – in addition to requiring government subsidisation –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 profitability of biodiesel production, remains a major source of uncertainty. The fastest growth in biodiesel production is expected in Indonesia, but the relationship between palm oil and crude oil prices, as well as economic development, could considerably alter the projected growth path.

The pace of recovery of the Chinese pigmeat industry from ASF and COVID-19 will have a large influence on feed demand as a faster recovery of livestock production requires more protein meal for feeding. 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. This might result in adjustment of feed mixture and influence protein meal use.