UNION ZUR FÖRDERUNG VON OEL- UND PROTEINPFLANZEN E. V.

UFOP REPORT ON **GLOBAL SUPPLY 2021/2022**

European and world demand for biomass for the purpose of biofuel production in relation to supply in the food and feedstuff markets

Sustainable intensification – backbone of global nutrition and a contribution to climate protection

» Promote technological progress and innovation rather than preventing them

First, the good news: the present report confirms yet again that in terms of numbers, there are enough staple foods such as grain and vegetable oil available to feed the world's population. More specifically, global production of grains in the 2021/2022 crop year amounts to approximately 2.3 billion tonnes, or even to 2.8 billion tonnes if rice is included. The global oilseed harvest also hit a new record high at approximately 0.636 billion tonnes.

These numbers are offset by the sobering fact that more than 800 million people still suffer from malnutrition. Speaking to the Committee for Human Rights and Humanitarian Aid of the German Bundestag at the end of January 2022, David Beasly, UN World Food Programme Executive Director, pointed out that the number of people acutely affected by famine has increased from 135 million to 285 million over the past two years. The main reasons he quoted were, alongside the economic implications of the pandemic, the increase in global conflicts, crises and climate catastrophes, which ultimately also trigger migration flows.

It is a very welcome fact that Germany is one of the main nations providing the World Food Programme with the financial resources needed. However, not all nations or governments are equally willing to help. This means that the human right to enough food is being disregarded.

At the same time, agriculturists in the European Union are faced with the question of which contribution to global nutrition EU agriculture should and, above all, can make in the future. The benefits of sustainable agriculture are manifold. Not only do they include a major contribution to food security, but also the provision of renewable feedstocks for material and energy use, and thus ultimately climate protection. The use of cultivated biomass for material or energy does not conflict with food supply. This is also confirmed by the report. On a global scale, supply of carbon hydrates is more than adequate. On the other hand, demand for protein is growing. Proteins for food or feed uses are generated in the production of biofuels from oilseeds, such as rapeseed, the primary European "source of oil and protein". In addition, grain legumes used as flowering plants and atmospheric nitrogen fixers in expanded crop rotation systems can contribute to protein supply, thereby reducing the need for soybean imports from overseas.

This quantity potential is far from being fully exploited, because the existing funding environment doesn't provide enough incentive to boost production of these crops in the medium term. The "pull" the market itself exerts on the crop acreage is not sufficient. There is a need for appropriate and extensive funding to create more competitive balance in terms of area-based compensation, accompanied by systematically and adequately financed plant breeding and the development of innovative product ideas that ultimately become visible to consumers in the market via the commodity chain. The aim must be to optimise crop cultivation in rotation systems for the purposes of climate change mitigation and to expedite this process by using all innovative technologies available today. Climate change, which is currently particularly visible in regions threatened by famines, requires urgent action. Technological progress in the sense of sustainable intensification can and

should also contribute to exploiting the genetic yield potential as soon as possible. Unfortunately, digitization is the nearly the only technology people think of. Although digitalization is required to optimise process flows – from precision sowing, fertilising and application of crop protection products to recording harvest volumes. However, higher yield levels as a result of crop breeding, along with adequate producer prices, remain the backbone of the economic contribution required to move towards sustainability.

Experts believe that the "Farm to Fork" strategy presented by the EU Commission actually counteracts this line of development. There is reason to fear that these proposals will result in increases in the EU's share of imports and, with that, the EU will exacerbate competition in the food markets. Establishing a target for the extent of organic farming is also counterproductive, because it is still people's willingness to buy that determines which products having which properties are in demand, and in what quantities. In principle, there is nothing to be said against expanding organic farming and it should, in fact, be supported in terms of the existing need for research. However, sustainable cultivation also depends on adequate demand from consumers, which in turn "pulls" the corresponding production areas.

The issue of sustainable intensification is therefore key to the viability and competitiveness of arable farming in Germany and the European Union. The UFOP sees the arable farming strategy of the German Ministry of Agriculture as a strategically important approach to inseminating innovation in farming practice jointly and promptly. The prerequisites including the networks to implement this concept are all in place.

Detlef Kurreck
Chairman of the Union zur Förderung von Oel- und Proteinpflanzen e. V.

Quick information on UFOP e. V.:

The Union for the Promotion of Oil and Protein Plants e. V. (UFOP) represents the political interests of companies, associations and institutions involved in the production, processing and marketing of domestic oil and protein plants in national and international bodies. UFOP supports research to optimise agricultural production and for the development of new recycling opportunities in the food, non-food and feed sectors. UFOP public relations aim to promote the marketing of domestic oil and protein plant end products. (https://www.ufop.de/english/news)

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1 | Feedstock supply

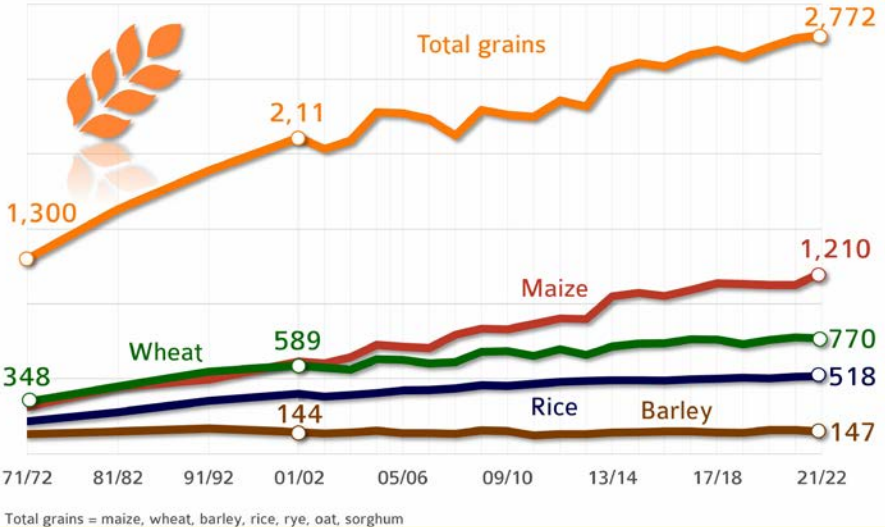
1.1 How much grain is produced on a global scale?

» 1.1.1 Global grain production

Even though optimal vegetation conditions did not prevail in all regions of the northern and southern hemispheres in 2021, global cereal production increased. This especially applies to maize (+7,5 per cent) and rice (+1 per cent). The global barley harvest was clearly lower at 8 percent, and the wheat harvest was barely larger than in the previous year (+0.8 percent). The previous year's result is exceeded by 0.8 per cent. **Worldwide, a record production of just under 2.8 billion tonnes is expected in the 2021/22 marketing year**. In general, as a result of progress in plant breeding, expansions in overall area and improvement of agricultural production practices (fertiliser applications, pest and disease control, reduced losses at harvest and in storage), world grain production has continuously increased over the past decades. Since 1971/72, the harvest volume of maize has almost quadrupled and that of wheat and rice has more than doubled. Record harvests in many growing regions led to a supply surplus on the markets. Maize is in first place, which underlines its growing global importance for supplying the animal feed sector and for bioethanol production, especially in the USA. Barley, like maize, is mainly used to feed livestock. In contrast rice and wheat are primarily used for human consumption.

Global grain production exceed 2.7 billions tonnes

Production of grains, total and by major crops, worldwide, 2021/22, estimated, in million tonnes



Total grains = maize, wheat, barley, rice, rye, oat, sorghum

1.1 How much grain is produced on a global scale?

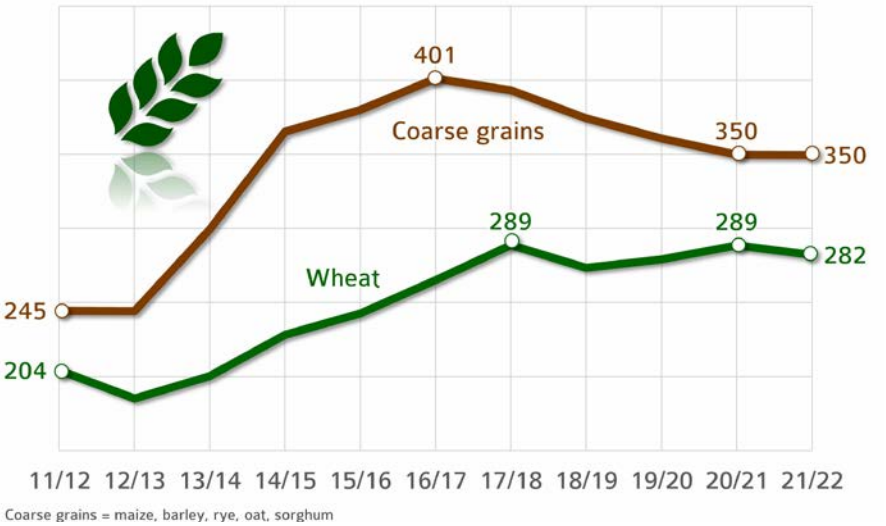
» 1.1.2 Global stocks of grain

Despite larger wheat harvests in the past two years, world stocks did not grow. In the marketing years 2020/21 and 2021/22 consumption of wheat exceeded and will exceed production. Stocks at the end of the marketing year ensure the supply at the beginning of the following marketing year. In 2021/22, they are expected to reach 282 million tonnes, falling just over 2 million tonnes short of the previous year's level.

Consumption of coarse grains, that is maize, barley, rye, oat, sorghum and meslin, is projected at the same level as the 2021/22 harvest volume. This means that stocks are set to remain **stable at just less than 350 million tonnes.**

Brisk global demand causes grain stocks to shrink

Stocks of coarse grains and wheat, worldwide, 2021/22, estimated, in million tonnes



Coarse grains = maize, barley, rye, oat, sorghum

1.1 How much grain is produced on a global scale?

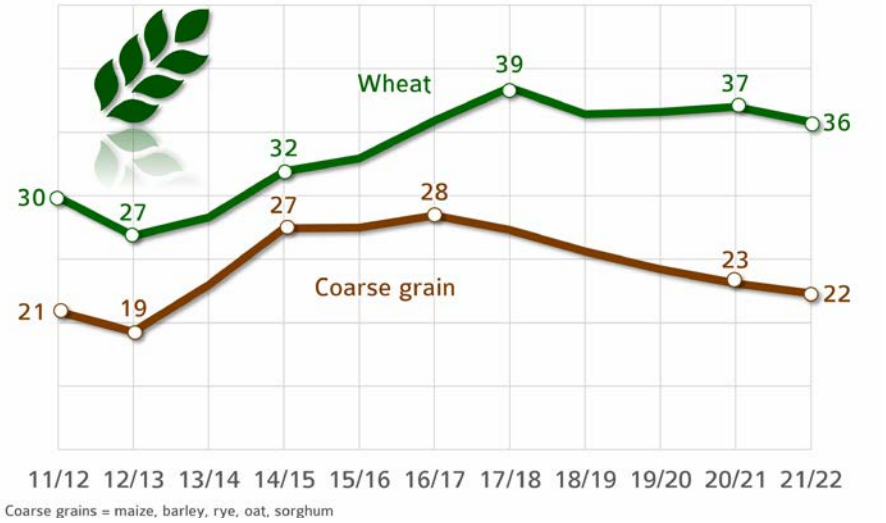
» 1.1.3 Global grain supply

The ratio of supplies to consumption (also called the stock-to-use ratio) is a key figure in estimating supply and, consequently, potential price trends. Despite increases in wheat output in 2021/22, global stocks are not growing due to a sharp rise in consumption. As a result, the stock-to-use ratio will decline for the first time in two years. The projected ending stocks 2021/22 would cover only 35.6 per cent of calendar year demand, a slightly weaker result than a year earlier.

By contrast, 2021/22 consumption of coarse grains will probably rise more than stocks. In other words, the stock-to-use ratio for coarse grains is set to fall significantly to 22 per cent, well below the long-term average of 24.9 per cent. This could lead to firming prices for coarse grains in the current crop year.

Supply and demand estimate based on the stock-to-use-ratio

Stock-to-use-ratio of wheat and coarse grains, worldwide, 2021/22, estimated, in per cent



Coarse grains = maize, barley, rye, oat, sorghum

1.2 How much oilseed and vegetable oil is produced on a global scale?

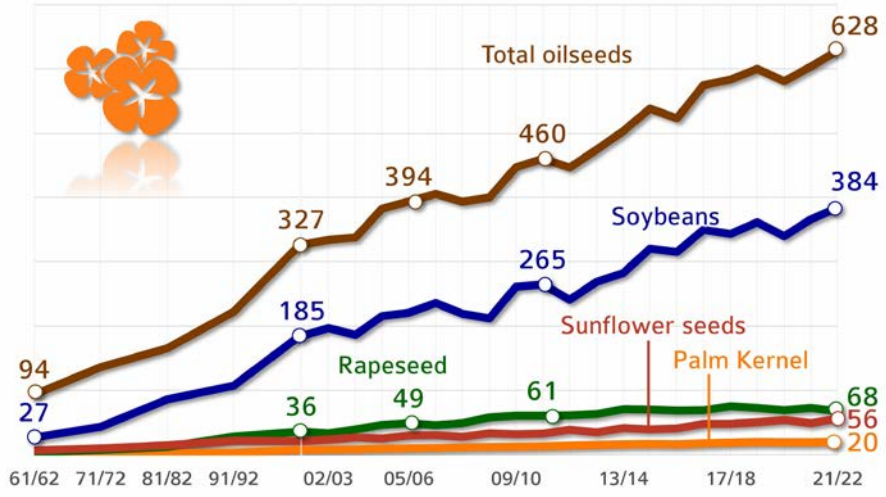
» 1.2.1 Global oilseed production

In the marketing year 2020/21, production of oilseeds is likely to hit 598 million tonnes, 1 per cent less the previous year. Global rise in demand for high-quality feed protein has been a key driver of North and South American soybean production for years now and is the main reason for the expansion in cultivation area. On a global scale, soybean is the number one oilseed crop, accounting for just below 51 per cent of world oilseed area. The expansion in soybean area is considered to be responsible for growing deforestation in Brazil. For this reason, the EU Commission submitted a proposal for a "Regulation governing deforestation-free products" at the end of November 2021. **The requirement of a dated proof of land use for the purpose of market access has been standard practice already since 2008 for the sustainability certification of biofuels from cultivated biomass – including for deliveries from third countries!**

Oilseed crops differ in oil and protein content as well as fatty acid composition and protein quality, along with their climate and soil requirements. These factors have a determining influence on the price of the oilseed crop in question. This especially applies to protein quality, because soybean is also the most valuable source of protein in terms of quality. For this reason, rapeseed breeders are working intensively on improving the protein quality of rapeseed. The UFOP is supporting a number of different project proposals relating to the use of rapeseed protein in animal feed and the human diet to raise this added-value potential. Some of the latest research results were presented during a UFOP conference: https://www.ufop.de/ufop-der-verband/ufop-online-fachtagung/

Soybeans are the world's no. 1 oilseed crop

Production of oilseed crops, total and by major oilseed crop, worldwide, 2021/22, estimated, in million tonnes



Total oilseeds = soybeans, rapeseed/canola, sunflower seeds, palm kernel, peanuts, coconut, cotton

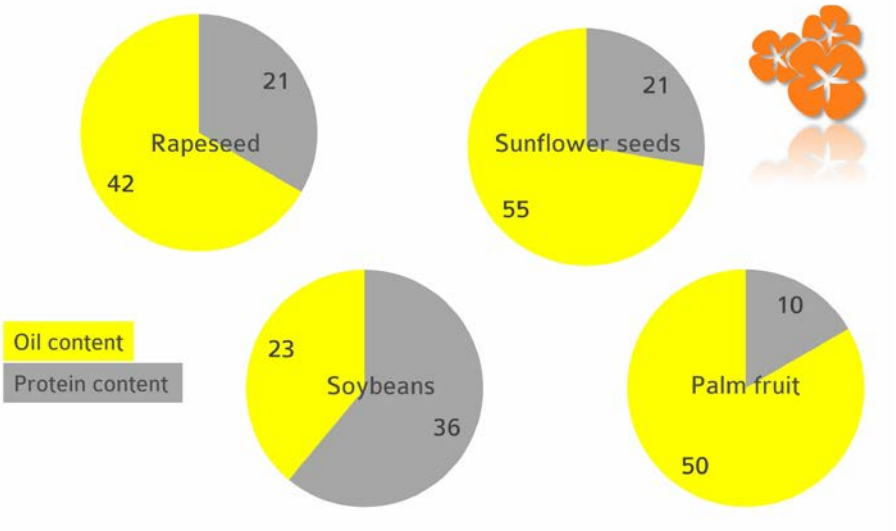
1.2 How much oilseed and vegetable oil is produced on a global scale?

» 1.2.1 Global oilseed production

↳ 1.2.1.1 Composition of oilseed crops

Sunflowers have the highest oil content

Proportion of pure protein and oil in different oilseed crops, in per cent



1.2 How much oilseed and vegetable oil is produced on a global scale?

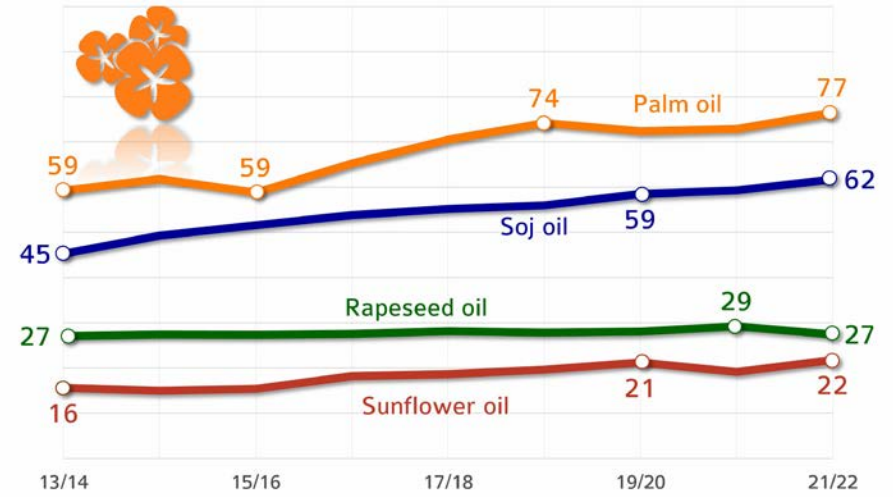
» 1.2.2 Global vegetable oil production

Global production of vegetable oils continues to increase in the 2021/22 crop year to reach new record highs. An expected decline in rapeseed oil output can be more than offset by production increases in palm, sunflower and soybean oil. According to the USDA outlook, 2021/22 global production of vegetable oils will amount to 214.8 million tonnes. This would be an 8.21 million tonne rise compared to 2020/21. **In other words, production will presumably fully cover demand of 211.8 million tonnes also in the current crop year**. Global output of vegetable oil is set to exceed the level of 200 million tonnes for the fourth year running in the 2021/2022 marketing year.

Palm oil is set to remain the world's most important vegetable oil, with output estimated at 76.5 million tonnes. This translates to a 3.6 million tonne rise over 2020/21. In other words, palm oil accounts for just less than 36 per cent of total vegetable oil production. Indonesia remains the largest palm oil producer (44.5 million tonnes), followed by Malaysia (19.7 million tonnes) and Thailand (3.1 million tonnes). Production of soybean oil is based on larger harvest expected to grow 4 per cent to 61.7 million and could hit a new record. **China remains the most important producer and main global importer of soybeans with production amounting to 17.6 million tonnes, whereas the USA ranks second with 11.6 million tonnes. Production of sunflower oil is expected to climb as much as 14 per cent to 21.8 million tonnes**. On the other hand, global rapeseed oil production is seen to decline 6 per cent to 27.4 million tonnes based on inadequate rapeseed supply. Palm and soybean oil account for 65 per cent of world vegetable oil production. Rapeseed oil occupies third place, accounting for almost 13 per cent, followed by sunflower oil with almost 10 per cent of world output.

Palm oil further expands top position

Production of vegetable oils, total and by major oilseed crop, worldwide, 2021/22, estimated, in million tonnes



1.2 How much oilseed and vegetable oil is produced on a global scale?

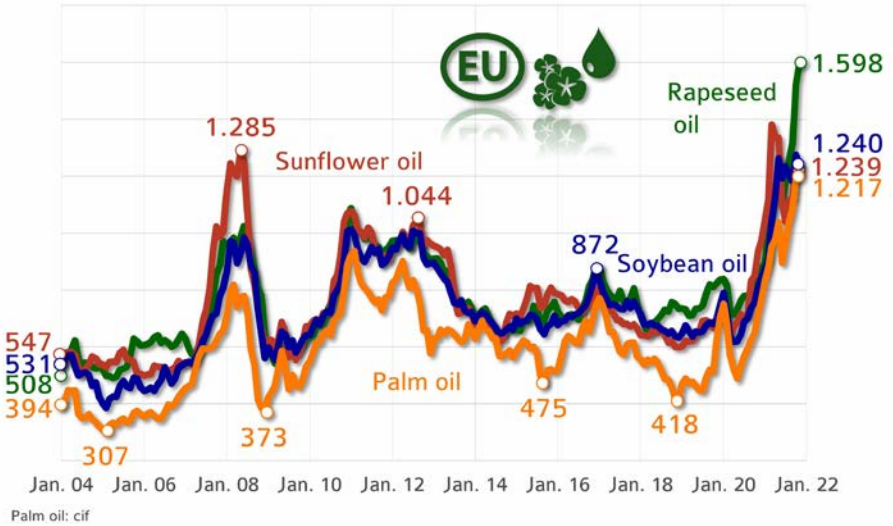
» 1.2.2 Global vegetable oil production

↳ 1.2.2.1 Price development of vegetable oils

The global economic recovery and the associated growth in consumption as well as the rebound of tourist and transport traffic caused demand for fuel to increase. This resulted in rising energy prices. Reduced stocks of natural gas in the EU further exacerbated the overall situation. The price increases affected all energy sources and electric power. Prices for vegetable oil also followed this upward trend. In the case of rapeseed oil, the significantly lower Canadian rapeseed harvest due to drought was another factor contributing to the price rally.

Record prices for repeseed, soybean and palm oil

Monthly wholesale prices, fob oil mill, in EUR per tonnes



1.2 How much oilseed and vegetable oil is produced on a global scale?

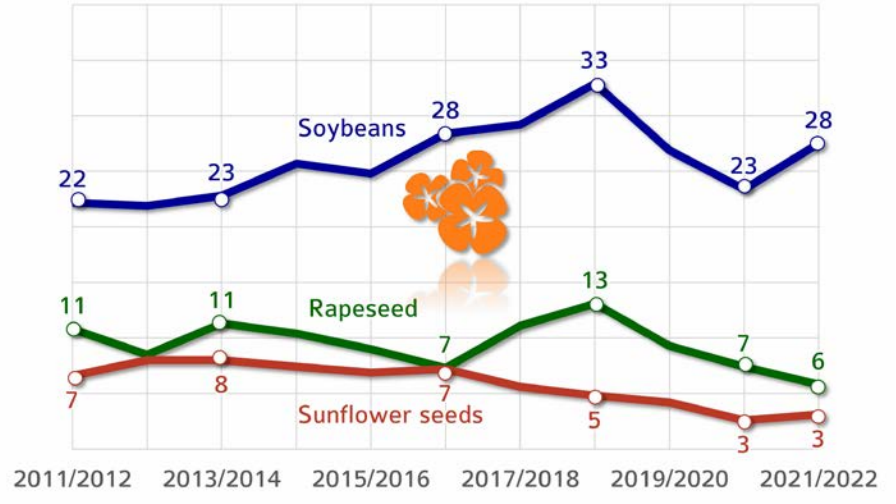
» 1.2.3 Global oilseed supply

The ratio of supplies to consumption (also called the stock-to-use ratio) is a key figure in estimating supply and, consequently, potential price trends. The stock-to-use ratio for sunflowerseed stopped declining for the first time in five years, rising 0.5 percentage points on the previous year. The trend changed to an increase also for soybeans, whereas the ratio for rapeseed declined for the third consecutive year.

Although record soybean harvests are steadily increasing supply, demand for soybean protein for animal feed, particularly in China, is also rising sharply. Due to the steadily positive development of the economy and income in the world's most populous country, purchasing power is increasing and so is demand for meat and, consequently, oilseed meals to feed the growing numbers of livestock. Whereas global soybean production has grown considerably this marketing year, global demand is set to see only a slight increase. This is causing stocks to swell with the result that the stock-to-use ratio for soybeans will also rise sharply.

Soy beans end decline

Stock-to-use ratio of soybeans, rapeseed and sunflowers, worldwide, 2021/22, estimated, in per cent



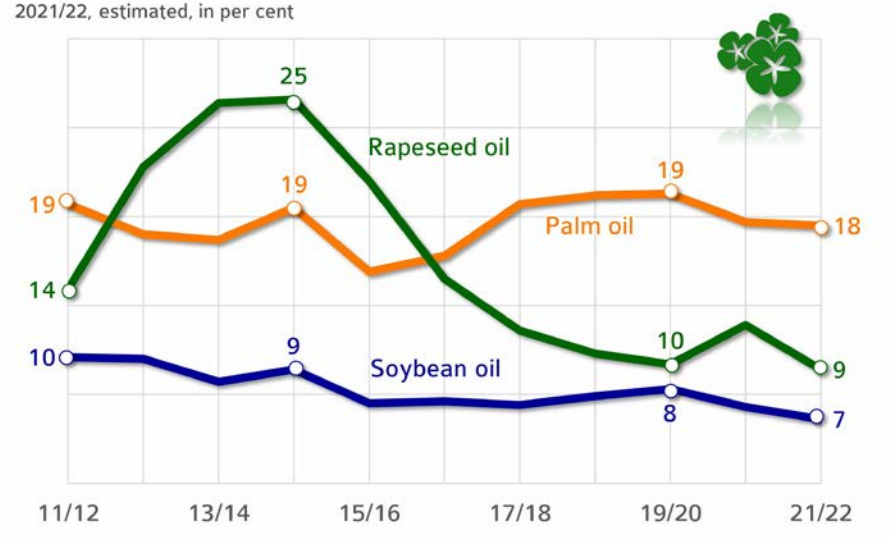
1.2 How much oilseed and vegetable oil is produced on a global scale?

» 1.2.3 Global oilseed supply

↳ 1.2.3.1 Global vegetable oil supply

Soy oil supply continues to decline

Stock-to-use ratio of rapeseed oil, palm oil and soybean oil, worldwide, 2021/22, estimated, in per cent



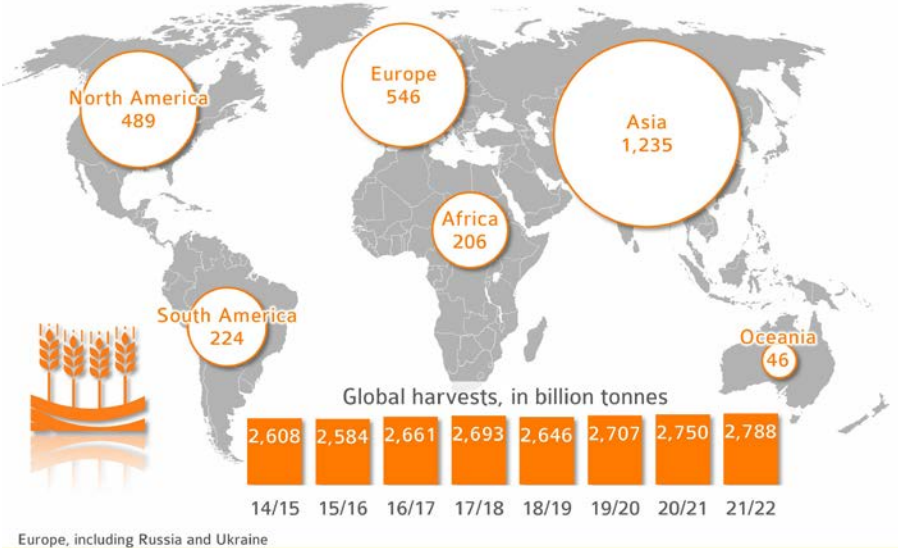
1.3 How much oilseed and grain does each continent produce?

» 1.3.1 Production of grain

2021/22 world production of grain (including rice) is set to be slightly higher than it was in the past crop year and reaching a record high. This outlook is based on the significantly larger global maize harvest. The decline in North and South America will likely be more than offset by the growths in the other regions. Above all, Europe farmers will probably harvest considerably larger quantities of grains than the previous year. The Food and Agriculture Organization FAO expects around 2,788 million tonnes of grain on a global scale. The majority, around 44 per cent is produced in Asia. The main reason is that Asia is the home of rice production. China is the main country of origin for grain and rice. Europe holds second position with sharply 20 per cent. North America follows close behind with 489 million tonnes, headed by the US with more than 449 million tonnes. Whereas marketing grain globally is vital for the economy of countries such as the US or Canada, China hardly offers any of its grain on the world market. The country produces most of its agricultural commodities to cover domestic demand and also needs extensive imports.

Asia is the largest grain producer

Harvests of grains (including rice) by continent, 2021/22, estimated, in million tonnes



Europe, including Russia and Ukraine

1.3 How much oilseed and grain does each continent produce?

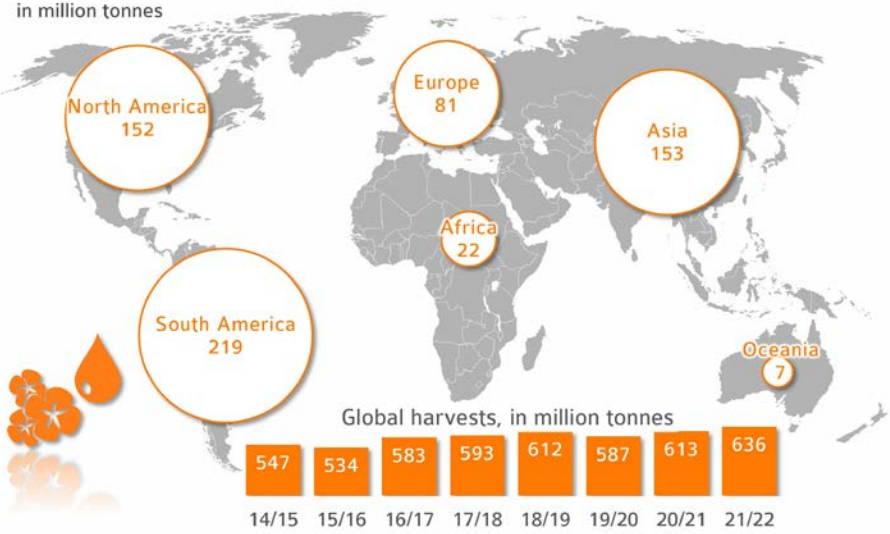
» 1.3.2 Production of oilseeds

The output of oilseeds is growing rapidly. The Food and Agriculture Organization FAO estimates global production in 2021/22 at 636 million tonnes. This is up 4 per cent year-on-year and just over 40 per cent from 10 years ago. **The increase is primarily based on growth of output in South America, Europe as well as in Asia due to the expansion of planted areas. The world's most important oilseed and palm oil producing regions are more evenly distributed than grain-producing areas are**. The difference is not so much in output as in crops grown: whereas soybean is the most important oilseed crop in South America and the US, rapeseed prevails in Canada and the EU-27 due to climatic conditions. In eastern Europe sunflowers predominate. Asian countries such as China and India produce large amounts of both rapeseed and soybeans. On the other hand, oil palm is the primary oilseed crop in Malaysia and Indonesia. This geographical distribution also "buffers" regional yield fluctuations in the interests of security of supply, for example if the weather phenomenon "El Niño" leads to yield declines in Asia or "La Niña" in South America.

Brazil is set to be the world's largest producer of soybeans in 2021/22, ahead of the US. Canada has lost its top position among rapeseed producing countries to the EU and even China due to the drought. Ukraine harvested the largest amount of sunflowers in 2021, followed by Russia.

Oilseed harvest at all-time high

Harvests of oilseeds (including palm oil) by continent, 2021/22, estimated, in million tonnes



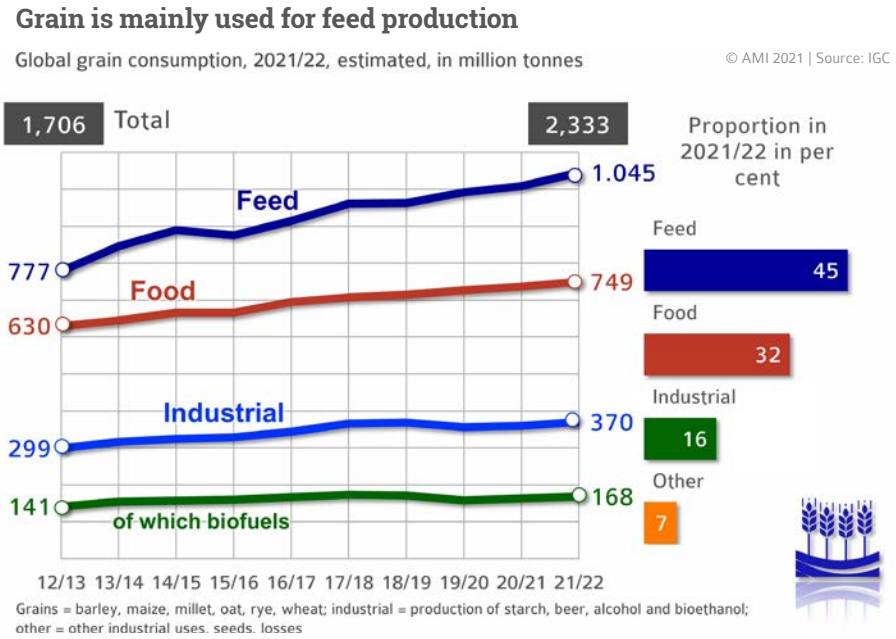
Europe, including Russia and Ukraine

1.4 What products are made from grain?

» 1.4.1 Global use of grain

Global production of grains (excluding rice) in the 2021/22 marketing year amounted to an estimated 2.3 billion tonnes. The produce is intended for human consumption, but also used as a livestock feed and feedstock in bioethanol production. At 45 per cent, the largest part of the grain harvests goes into feeding troughs, showing a stable trend compared to the previous year. The same holds true for food uses (approximately one third) and industrial uses (just over one sixth). Although demand for grain for use in transport fuel production is likely to increase slightly after declining due to corona in 2021/22, it is set to account for less than one tenth of total consumption, the International Grain Council (IGC) has reported. This means that there is enough grain to meet the growing demand for food and feed.

In the US, bioethanol is mostly made from maize. The process generates Dried Distillers Grains with Solubles (DDGS), which is used as a protein feed. One tonne of wheat that is processed into bioethanol produces on average 295 kg of DDGS with a moisture content of 10 per cent. One tonne of maize yields 309 kg of DDGS. When grain prices are high, processing is the first activity to go down, before farmers begin to save on feed. **The high added-value potential in the food markets ensures that most of the grain goes into the production of food when grain prices are high. This means that the biofuels market serves as a "buffer" that ensures grain is constantly available for human consumption and feed.**



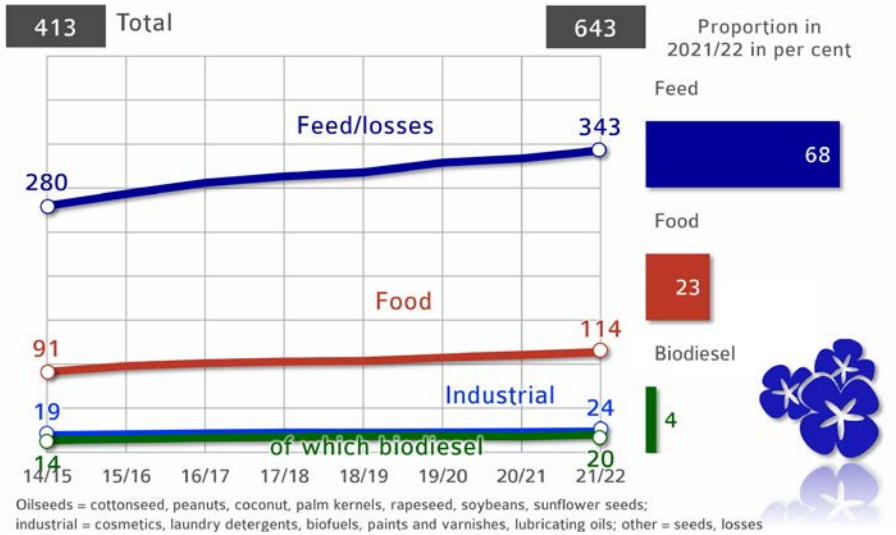
1.5 What products are made from oilseeds?

» 1.5.1 Global use of oilseeds

Oilseeds grown worldwide are obtained to make vegetable oils, extraction meal and oilseed cake. Vegetable oil can be obtained by different chemical and physical processes. Before being pressed, the feedstock is heated to increase oil yield. The meal that remains after pressing is used as a high-protein feed. Consequently, the largest part of the oilseeds – just less than 70 per cent – goes into feeding troughs and the smaller proportion – around 23 per cent – into food production. Soybean meal is the number one feed in terms of quantity, with global output amounting to 259 million tonnes. It is followed by rapeseed meal at around 39 million tonnes. **Farmers in the EU-27 only produce GM-free rapeseed. Consequently, rapeseed is by far the most important GM-free source of protein for animal feeding in the EU. Therefore, EU-rapeseed meal reduces the corresponding need for soybean imports and the acreage of land that would otherwise be required for soy cultivation. Unfortunately, this fact has still not received the necessary recognition from the EU Commission, for example with respect to incorporating the protein component in greenhouse gas accounting for rapeseed-based biodiesel or the "Farm to Fork" strategy.** Output of sunflower meal, at 23 million tonnes, is almost eleven times lower than that of soybean meal. Any meal produced is also used as animal feed.

Most oilseeds also used for animal feed

Global oilseed consumption, 2021/22, estimated, in million tonnes



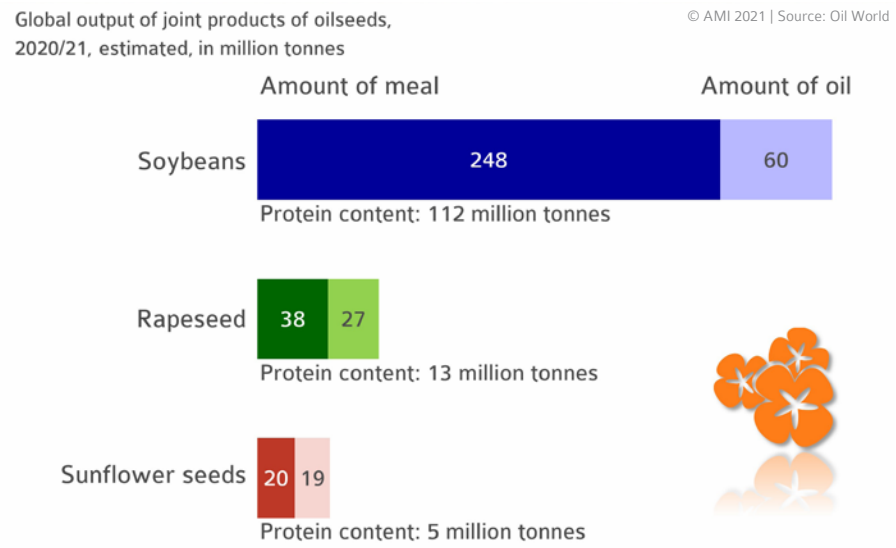
Oilseeds = cottonseed, peanuts, coconut, palm kernels, rapeseed, soybeans, sunflower seeds; industrial = cosmetics, laundry detergents, biofuels, paints and varnishes, lubricating oils; other = seeds, losses

1.5 What products are made from oilseeds?

» 1.5.1 Global use of oilseeds

↳ 1.5.1.1 Global production of oils and meals

Practical dual use of oilseeds



1.6 Production of pulses

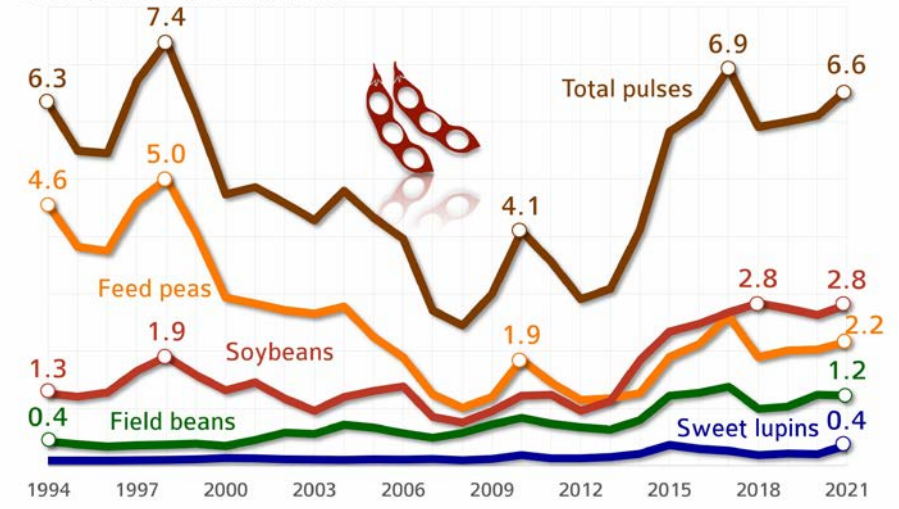
» 1.6.1 Production in the EU-27

The production of legumes is gaining importance in the EU-27 in terms of climate protection (no need for nitrogen applications) and as an alternative source of protein for innovative food products. In 2021 the total output amounted to 6.5 million tonnes. Following the drought-related slump in 2018, it leaped 7 per cent. The most important legume crop in the EU-27 is soybean, which accounts for a slightly lower share of around 43 per cent of grain legume production. Farmers harvested around 2.8 million tonnes in 2021, approximately 8 per cent more than the previous year. This was mainly due to a 7 per cent growth in yield, since the soybean area was only marginally expanded. The second most important legume crop in the EU-27 is feed pea. At 2.3 million tonnes, production surged 13 per cent from 2020. The main reason is a 9 per cent expansion in area planted. Yields were up 3 per cent year-on-year. In the long-term comparison, production of feed peas was up 7 percent and that of soybeans 5 per cent.

Protein crops for livestock feeding purposes are in strong competition with imported soybeans and soybean meal. Considering their protein quality, the latter are often lower priced, which makes them attractive for the production of compound feeds. Nevertheless, progress in the use of grain legumes is impressive. They are the basis for the national and European protein plant strategy. The UFOP is supporting project proposals or directly involved in joint projects (https://www.ufop.de/agrar-info/forschu/berichte/).

Soybean remains main legume crop in the EU

Production of pulses, total and by major crops, in the EU-27, 2021/22, estimated, in million tonnes



Total pulses = feed peas, field beans, soybeans, sweet lupins

1.6 Production of pulses

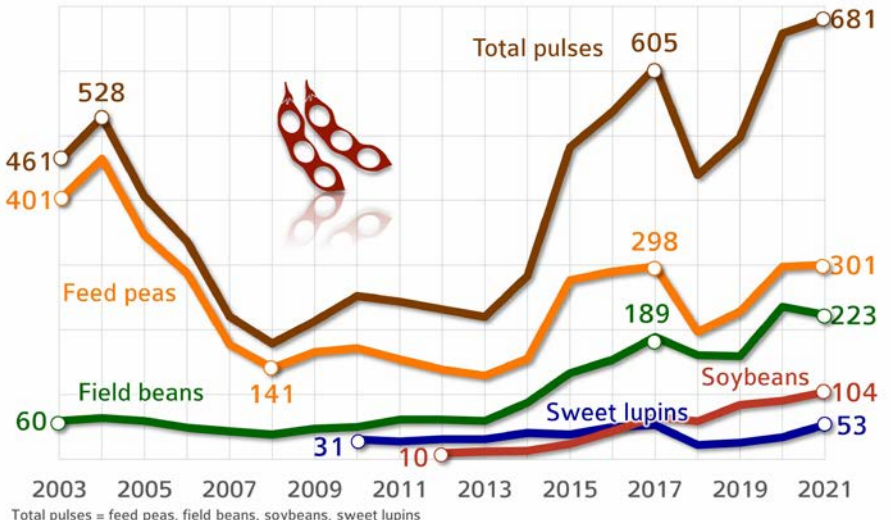
» 1.6.2 Production in Germany

The area increases contributed to a larger German legume harvest, although the yields of peas and beans were disappointing. **At 681,000 tonnes, total legume output reached a record level in 2021. Soybeans are also becoming increasingly attractive, if on a regional scale and at a lower level.** In 2021, the area planted with legumes for grain (including soybeans) totalled 219,000 hectares; this was up 11 per cent year-on-year. Feed peas were the most important grain legume crop, occupying 98,000 hectares (+ 18 per cent), followed by field beans at 57,700 hectares (-2 per cent). The sweet lupin area also increased 13 per cent to 28,900 hectares. The soybean area was even larger while remaining virtually unchanged from the previous year at 34,300 hectares.

However, soybean production was at a low scale compared to other legume crops. The reason is a poor competitive position compared to imported soybean meal and soybeans respectively. **As flowering plants, legumes are indispensable crops to expand crop rotations and improve biodiversity and soil fertility. What makes them so special is that, aided by bacteria that cling to their roots, they convert atmospheric nitrogen into organic nitrogen which encourages plant growth.**

Production of soybeans and sweet lupins increases

Production of pulses, total and by major crops, in Germany, field beans and sweet lupins, 2021 forecast, in 1,000 tonnes



Total pulses = feed peas, field beans, soybeans, sweet lupins

2 | Production of biofuels

2.1 Which countries promote biofuels?

» 2.1.1 Global output of bioethanol

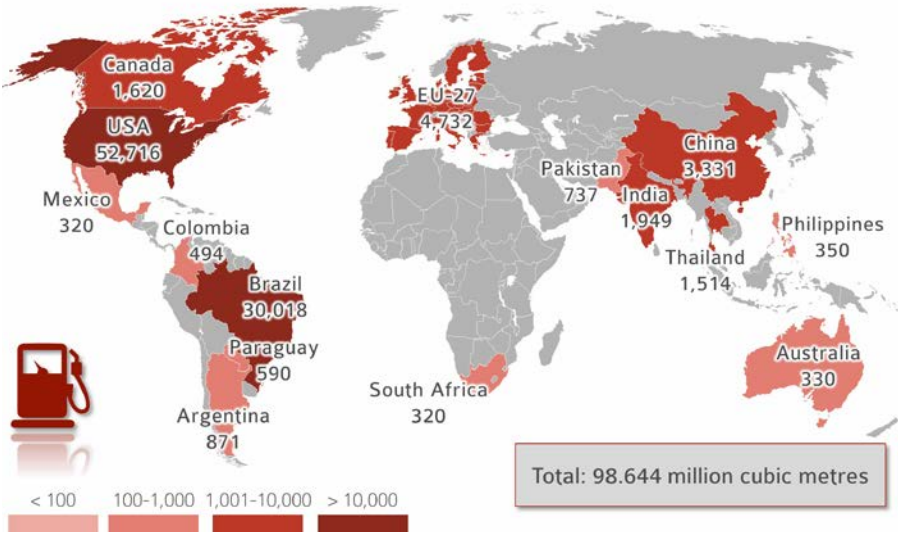
Worldwide almost 98,6 million m3 of bioethanol were produced in 2020. The aim is to reduce the use of fossil energy sources, thus making a contribution towards climate protection, and support feedstock prices to ensure adequate incomes from farming. Blending quotas have become globally accepted as a flexible instrument to achieve this aim. Policy therefore has a direct influence on the scale of biofuel or bioethanol production. For example, in the US the blending rate for bioethanol was raised from 10 per cent to 15 per cent after the rate of 10 per cent was actually reached. In China, official steps taken to boost grain processing as a means of curbing local surpluses contributed to an increase in bioethanol production. The consumption of grain and sugar for the global production of bioethanol continues to grow, especially outside the US, in China and South America. The use of grain (especially maize) as a feedstock is expected to rise 3 per cent to 168.4 million tonnes in 2021/22. **According to the FAO, global cereal production (including rice) will hit a new record high at 2.8 billion tonnes.**

Worldwide almost 99 (2019: 110) million m3 of bioethanol were produced in 2020. The main producers are by far the US. About 52.7 million m3 were produced there in 2020 which was 12 per cent less than in the previous year. Bioethanol in the US was produced of 98 per cent corn and 2 per cent on other kinds of biomass. The second largest bioethanol-producing country is Brazil with 30 million m3 based on sugar from sugar cane. In EU-27, about 4.7 million m3 of bioethanol were produced from cereals and sugar beet in 2020.

Bioethanol production in the USA decreased significantly

Bioethanol production in key countries, in 2020, in 1,000 cubic metres

Sources: RAF, OECD

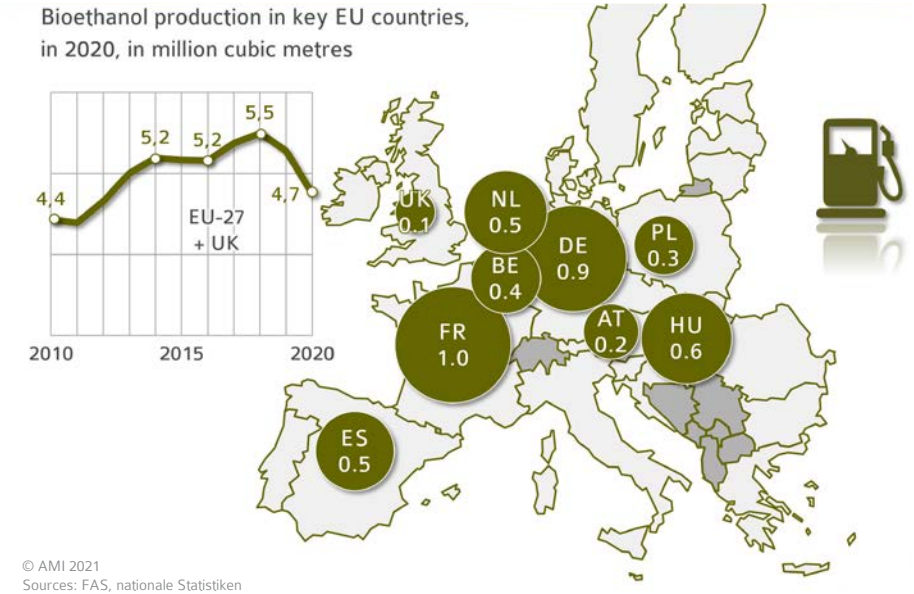


2.1 Which countries promote biofuels?

» 2.1.1 Global output of bioethanol

↳ 2.1.1.1 Key EU-27+UK bioethanol producers

France reduces production of bioethanol by a quarter



Sources: FAS, nationale Statistiken

2.1 Which countries promote biofuels?

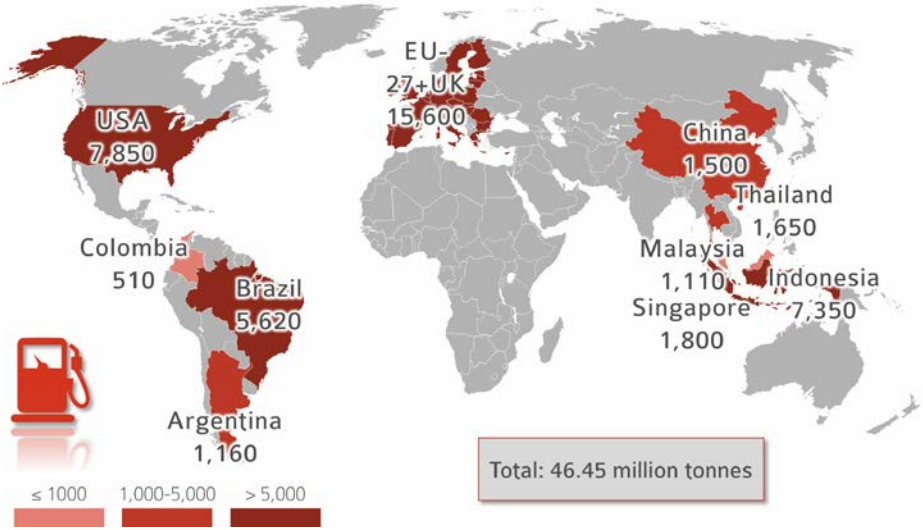
» 2.1.2 Global output of biodiesel

By far the world's most important biodiesel producer is the European Union (including the United Kingdom), which accounted for 33 per cent of global output of nearly 46,5 million tonnes in 2020. The term "biodiesel" is used in the statistics to refer to biodiesel (FAME = fatty acid methyl ester), hydrogenated vegetable oil (HVO) and biofuels made by co-processing vegetable oils in petroleum refineries. Whereas in Europe the primary feedstock is rapeseed oil, soybean oil is the primary source on the American continent and palm oil in Asia. Soybean oil is a by-product of soybean processing. It accounts for about 20 per cent of the bean (rapeseed oil > 42 per cent of the grain) **and is increasingly used in biodiesel production as a result of steadily increasing harvest volumes due to increases in production area, especially in Brazil.**

Biodiesel production is concentrated in the EU-27, the US, Indonesia and Brazil. Indonesia has gained increasing importance in the biodiesel market as one of the top palm oil producing countries. The Indonesian government pushed ahead with the quota policy in response to supply surpluses and the associated price pressure on the vegetable oil markets. The increase in biofuel blending quotas caused output to rise to 7.350 million tonnes. Contrary to the EU, by raising the national blending quota requirements (B20/B30) the Indonesian government has been making an active, i.e. politically intended contribution towards stabilising producer prices and cutting foreign exchange spending on imports of mineral oil. On the other hand, production in Malaysia declined slightly for the first time.

EU-27+UK accounts for about one of global biodiesel production

Biodiesel production in key countries, in 2020, in 1,000 tonnes

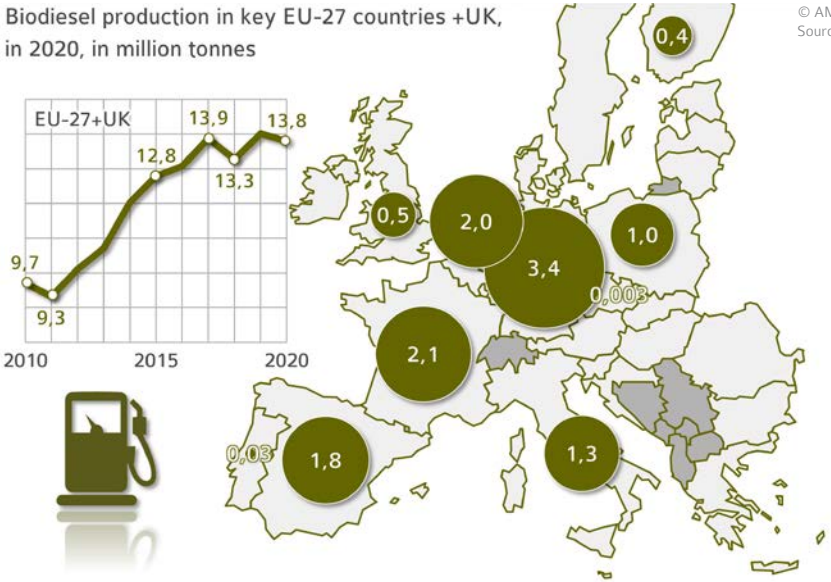


2.1 Which countries promote biofuels?

» 2.1.2 Global output of biodiesel

↳ 2.1.2.1 Key EU-27+UK biodiesel producers

Germany largest biodiesel producer in the EU



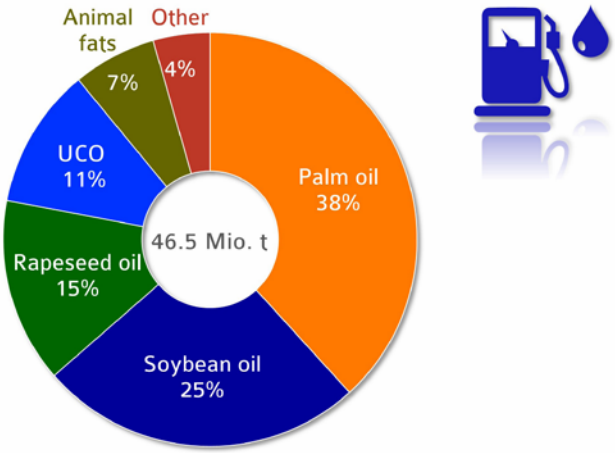
2.2 What feedstocks are used in world biofuels-production?

» 2.2.1 Global resource bases for biodiesel

Production of biodiesel has increased all over the world and, consequently, so has demand for feedstock, the use of which rose just under 1 per cent from 2019 to 2020. The importance of each commodity has slightly changed, but the ranking has remained unchanged. Palm oil accounts for 38 per cent of the global resource basis, soybean oil for 25 per cent and rapeseed oil for 15 per cent, whereas used cooking fats make up 11 per cent and so do animal fats and other fats. The use of palm oil declined 2 per cent compared to 2019, that of soybean oil increased just less than 4 per cent, and that of rapeseed oil remained at the previous year's level. One can expect that soybean-based and palm oil-based biofuel production will continue to grow in the Americas and in Southeast Asia. In the EU-27, the proportion of biodiesel from waste oils and fats is expected to climb at the expense of rapeseed oil. However, due to its genetically determined fatty acid structure, rapeseed oil has the advantage of providing better winter diesel fuel quality. In the winter months, rapeseed oil is needed as a feedstock in any production of biodiesel (FAME) for use in blends.

Shares of soybean oil and the total amount increased

Feedstock use in biodiesel production, worldwide, in 2020, in per cent



UCO = used cooking oil

2.3 What feedstocks are used in European biodiesel fuel production?

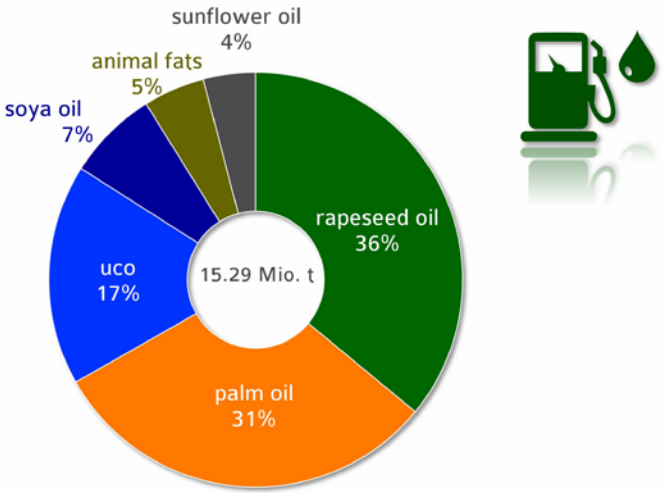
» 2.3.1 Resource bases for biodiesel in the EU-27

Availability and selling prices of vegetable and animal oils and fats have a determining influence on the use in biodiesel fuel production. Rapeseed oil is the primary feedstock source for biodiesel production in the European Union, but its share dwindles. In 2020 it fell to 36 per cent, from 46 per cent in 2016. The use of used cooking oil has increased dramatically as policy continues to promote its use. In the EU, with the exception of Germany, biofuels from waste and residues count double towards national quota obligations. All member states are required to establish a 10 per cent share of renewable energy in the transport sector by 2020 and a 14 per cent share by 2030. By contrast, competition from low-price feedstocks from overseas hardly increased in 2020. The share of palm oil rose to 31 per cent (up 1 per cent year-on-year and up 2 per cent on 2016). In countries such as Italy, Spain and the Netherlands, imported palm oil is the number one feedstock in biodiesel fuel production, whereas in Germany and France, the prime feedstock is rapeseed oil.

However, it must be noted that the statistical basis for the share of feedstock is very different depending on the "source" and cannot be adopted uncritically. The reporting and documentation requirements will be tightened under the revised Renewable Energy Directive (2018/2001/EU, Red II). A European database similar to the German database "Nabisy" will be put in place. Official information on the shares of feedstocks in biofuels consumed in the EU have previously not been available, although the EU Commission's proposals to amend the RED relate biofuel production from cultivated biomass to the issue of indirect land use change. The concrete basic statistical information necessary to measure the "iLUC effect" remains lacking to date.

Rapeseed oil reduced and replaced by animal fats

Feedstock use in biodiesel production in the EU-27, in 2020, in per cent



2.4 What feedstocks go into the production of biodiesel used in Germany?

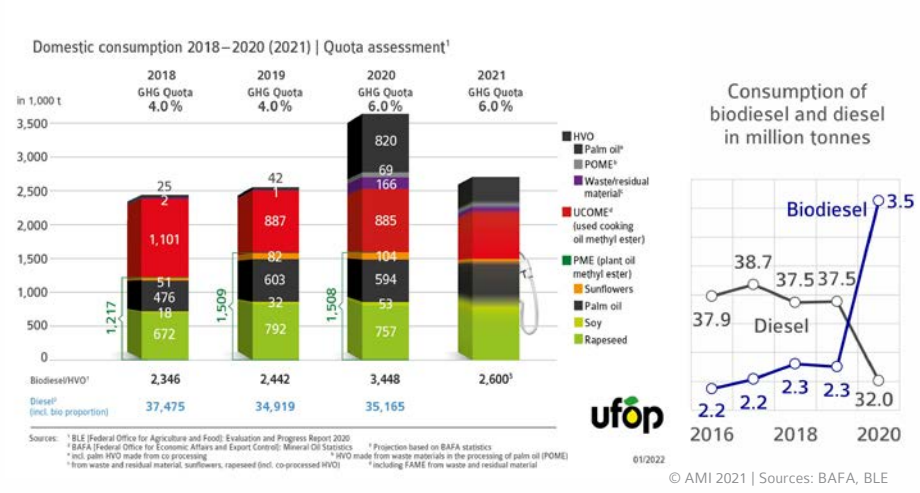
» 2.4.1 Shares of feedstock in biodiesel consumed

In Germany in 2020, just over 3.5 million tonnes of biodiesel and hydrotreated vegetable oil (HVO) were used as a blending component in diesel fuel. This was up almost one third year-on-year. The surge was due to the requirement on all EU member states to reach the 6 per cent reduction in greenhouse gas emissions in 2020 physically. In other words, biofuel quota carryforwards or credits from previous years could not be used to meet the 2020 target. However, this has been possible again since 2021, which explains the considerable lower consumption estimate for 2021. The enormous rise in the use of palm oil-based biofuels (biodiesel/HVO) is particularly noticeable. More specifically, the use of palm oil more than doubled to just less than 1.4 million tonnes from 645,000 tonnes in 2019. The surge was mainly due to HVO use, as consumption of palm oil methyl ester declined 1 per cent. The use of rapeseed oil also decreased slightly (4 per cent). By contrast, soybean oil and sunflower oil recorded strong increases of 66 per cent and 27 per cent respectively.

Biofuels from a large variety of feedstocks will still have to continue to play a leading role in replacing fossil fuels in the coming years. **In Germany, around 10 per cent of diesel consumption was replaced by biofuels in the 2020 quota year.**

Share of rapeseed oil in biodiesel almost stable

Sales and raw material composition, biodiesel/HVO, in 1,000 tonnes, and consumption of biodiesel and diesel (incl. blending) 2016-2020, in million tonnes, in Germany



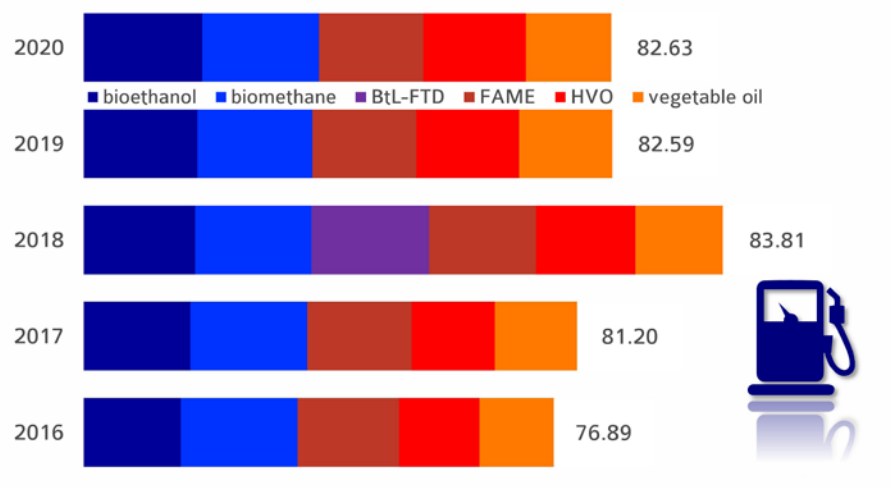
© AMI 2021 | Sources: BAFA, BLE

» 2.4 What feedstocks go into the production of biodiesel used in Germany?

» 2.4.2 Greenhouse gas savings

Greenhouse gas saving virtually unchanged from previous year

Emissions reduction due to biofuels (bioethanol, biomethane, Btl-FTD, FAME, HVO, vegetable oil) weighted against fossil comparison value, in percent, by crediting year



2.5 Where do the feedstocks for biodiesel at German petrol stations come from?

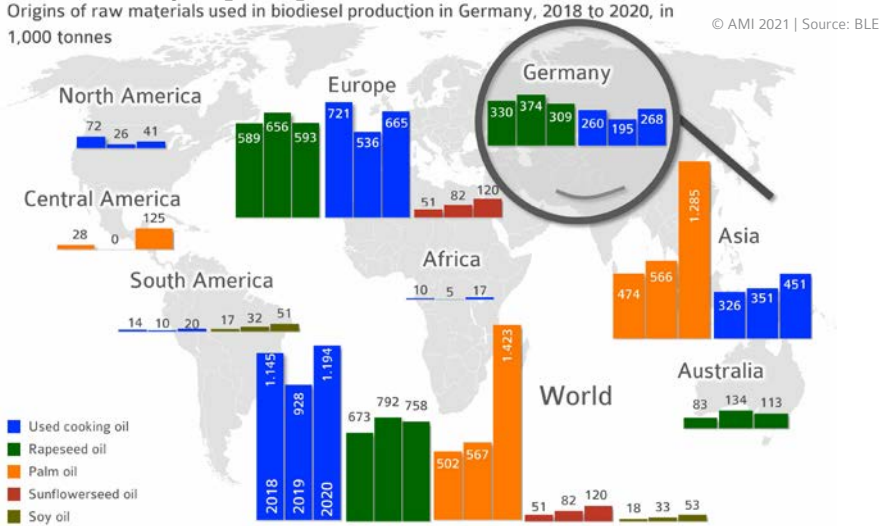
» 2.5.1 Origins of feedstocks for biodiesel used in Germany

In 2020, a total of 3.5 million tonnes of feedstocks were used to produce the biodiesel/HVO/vegetable oil that was placed on the market. Around 40 per cent of it came from Europe, mostly from Germany. The use of rapeseed oil amounted to 758,000 tonnes, most of which was sourced in Europe, except for a small amount that came from Australia. The amount of biodiesel from waste oils (used cooking fats, used deep-frying oils, etc.) has increased by 29 per cent compared to the previous year and is still higher than the amount of biodiesel made from rapeseed oil. **The largest amount of imported used cooking oil came from Asia, with volumes actually increasing 28 per cent**. Shipments from North and South America and Africa also picked up. I**mports of palm oil, mainly from Indonesia and Malaysia, were raised enormously to account for around 40 per cent of the feedstock mix in 2020**. Soybean oil from South America and EU oil mills played a secondary role. By contrast, the use of sunflower oil rose yet again.

In Germany, the biomass used in biofuel production is systematically recorded in high-quality in the "Nabisy" database and published in the annual Experience and Evaluation Report of the Federal Office for Agriculture and Food (BLE). The unique traceability system exclusively centers on biofuels marketed as transport fuels and heating fuels (CHP plants). These sustainable biofuels can then be counted towards the quota of greenhouse gas (GHG) emission reduction. Exports are excluded, but analog evidence of conformity must be provided, if they are to be counted towards renewable quota obligations in any other EU country. A database with analogous documentation requirements – **Nabisy requirements apply to biofuels only** – is to be created at EU level in 2022. The diagram below only shows the part of feedstock origins used in biodiesel and HVO that was imported to Germany or processed for such use in Germany.

Third-country imports predominate

Origins of raw materials used in biodiesel production in Germany, 2018 to 2020, in 1,000 tonnes



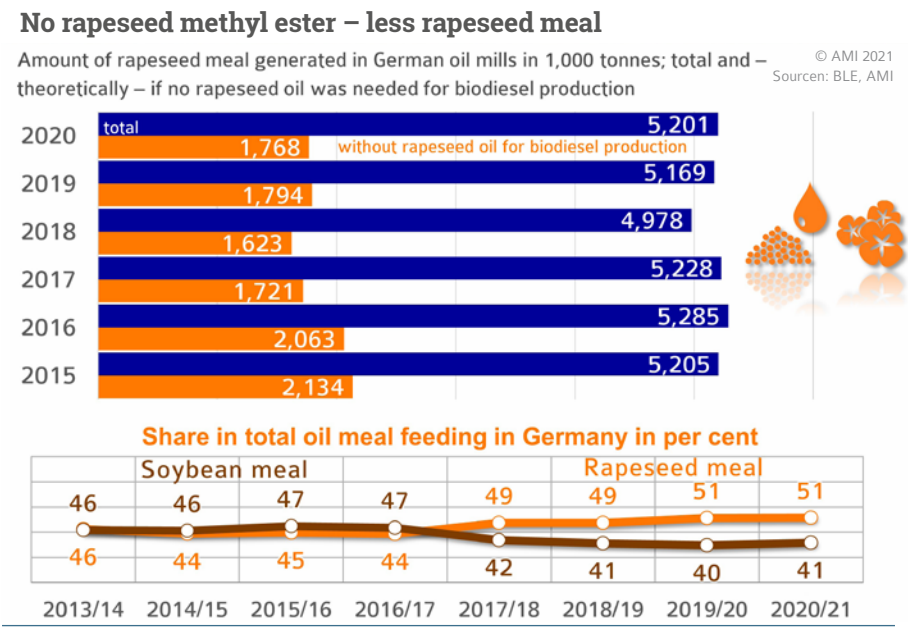
3 | Food security

3.1 What do biofuels have to do with feedstuff?

» 3.1.1 Output of rapeseed meal with and without biodiesel fuel production

The feed market is one of the main beneficiaries of biodiesel production, because rapeseed meal is generated as a high-protein joint product (approximately 60 per cent protein) in oil mills. In 2020, German oil mills processed just under 9.0 million tonnes of rapeseed, yielding just over 3.8 million tonnes of rapeseed oil and just over 5.2 million tonnes of rapeseed meal. Since rapeseed is produced in Europe without using genetic manipulation (GM), its by-product, rapeseed meal, is also classified as GMO-free. This classification promotes the use of rapeseed meal mainly in dairy feeding, where it can fully replace soybean meal and the corresponding imports from overseas. The key factor is demand for dairy products that qualify as "without GM". **The corresponding consumer demand thus also supports the regional production and processing of rapeseed. At the same time, the dependence on imports of GMO soy or GMO soy meal and thus the demand for crop land in third countries, especially Brazil, is reduced to a considerable extent.**

Only about one third of the 3.8 million tonnes of rapeseed oil were used for human consumption, whereas 66 per cent were used for technical applications or energy production. If demand for rapeseed oil for use in biodiesel production were to shrink in the future, if biodiesel is no longer seen as a contribution towards decarbonising the transport sector, two thirds of rapeseed meal production would no longer be available. This would have been as much as 3.4 million tonnes last year. Annual soybean meal imports would have to be boosted by nearly 2.7 million tonnes to fill this gap. This volume translates to a soybean area of 1 million hectares. These imports would therefore reverse the trend of promoting domestic GM-free protein sources. **Since 2012, rapeseed meal accounts for half of the meal fed to animals in Germany.**



3.2 Why is demand for oilseeds increasing?

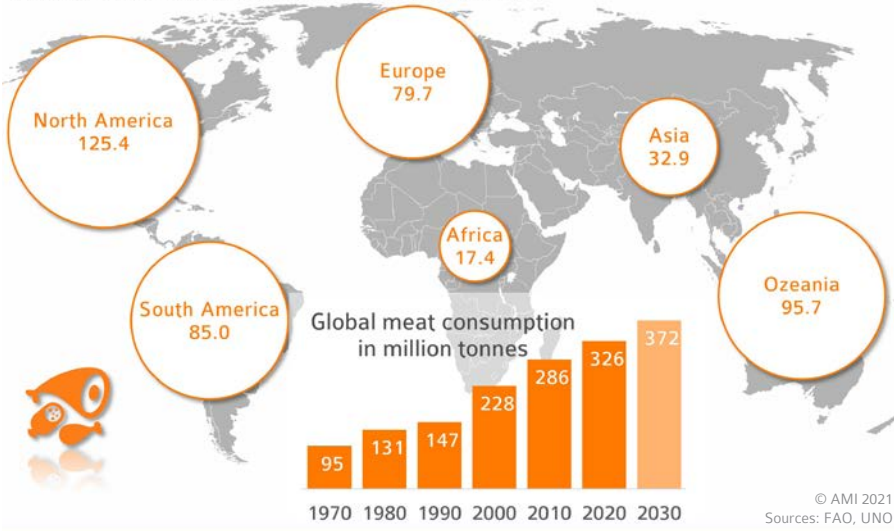
» 3.2.1 Global consumption of meat by continent

World meat consumption multiplied in the past 50 years to around 320 million tonnes and is set to increase further in the years to come. The increase in consumption is not just driven by the growth in world population, but strongly depends on standard of living, eating habits and consumer price levels. Compared to other raw materials, meat involves high production costs and is relatively expensive compared to other staple foods.

The growing demand for livestock provokes the need to produce more feed. Alongside grains, soybeans and rapeseed are the main crops used in feeds. Both soybeans and rapeseed are used to make protein feed meal. On a global scale, most soybeans are grown from genetically modified (GM) seed, as is rapeseed in Canada. Because of the global surge in meat consumption, demand for feed protein from oilseeds is set to rise further in future. The European Union exclusively grows GM-free oilseeds like rapeseed, sunflowers and soybeans. **Since demand for produce declared as "without GM" is growing, production of GM-free products is increasingly based on national or European oilseeds. This aspect will gain more and more importance as a result of climate protection policy of the EU 27 that gears the cultivation of raw materials increasingly to sustainability and greenhouse gas reduction.**

Meat consumption on a steady rise

Per capita consumption of meat in 2020, by continent, in kilogram per capita and development of consumption 1970-2030, in million tonnes



Sources: FAO, UNO

3.2 Why is demand for oilseeds increasing?

» 3.2.2 Blending quotas for biodiesel

On a global scale, the largest driving force promoting biofuels are statutory blending requirements. The motivation of the various countries differs greatly. Whereas US and Brazilian interests focus on security of supply in the energy sector and reduction of fuel imports, the EU places great importance on climate protection and an increase in the overall proportion of renewable energy generated. The goals in Asian countries, such as Malaysia, Indonesia or China, but also in Argentina, are different again. In these countries, the main objective is to reduce vegetable oil surplus in an effort to stabilise market prices. These countries' national mandates for shares of volume or energy in fossil-energy diesel fuel range from 1 to 30 per cent.

The obligation to reduce greenhouse gas (GHG) emissions was imposed on petroleum companies in Germany in 2015. It has also be introduced in other member states and was incorporated in the EU Commission's proposal to revise the Renewable Energy Directive (2018/2001/EG) – Red III. Distributors, that is the petroleum companies, must provide evidence of compliance. Globally, bioethanol plays the most important role in the majority of countries that have quota requirements. Again, its use is driven by (sometimes temporary) oversupply in the grain and sugar markets. The biofuel funding policy's aim is not only to contribute to protecting the climate and natural resources, but also to reduce pressure on the market and, consequently, stabilise prices for farmers.

Blending quotas promote use of biofuels

Quotas for ethanol and biodiesel by country, 2020, partly 2021, in per cent

E=ethanol, B=biodiesel	E=ethanol, B=biodiesel
Germany: 6 % GHG reduction	Peru: E7,8, B1 (target 2025: B5)
EU-27: 6 % GHG reduction	South Africa: overall 2 %
UK: overall 10,7	Ethiopia: E5
Norway: E20, B3,5-B7	Angola: E10
Canada:E5-E8.5, B2-B4, depending on state	Nigeria: E10
USA: overall 11,6 %, Minnesota E10, B10	Malawi: E10
Argentina: E12, B10	India: E5 (target: E10)
Bolivia: E12 (target 2025: E25)	Indonesia: E2, B30 (target july 2021: B40)
Brasil: E27, B12 (target 2023: B15)	China: E10 in 11 provinces (target: 15)
Chile: E5, B5	Philippines: E10, B2
Costa Rica: E7, B20	Malaysia: B10
Ecuador: E5, B5 (target: B10)	South Korea: B3
Columbia: E6-E8, depending on region (target: E10), B2-B9 (target: B10)	Thailand: trucks B20
Mexico: E5,8 E10 (target)	Australia: New South Wales: E7, B2; Queensland: overall 3 %

Sources: Biofuels Digest, FAS, Ländermeldungen

3.3 What is the amount of grain/vegetable oil per person?

» 3.3.1 Supply per capita

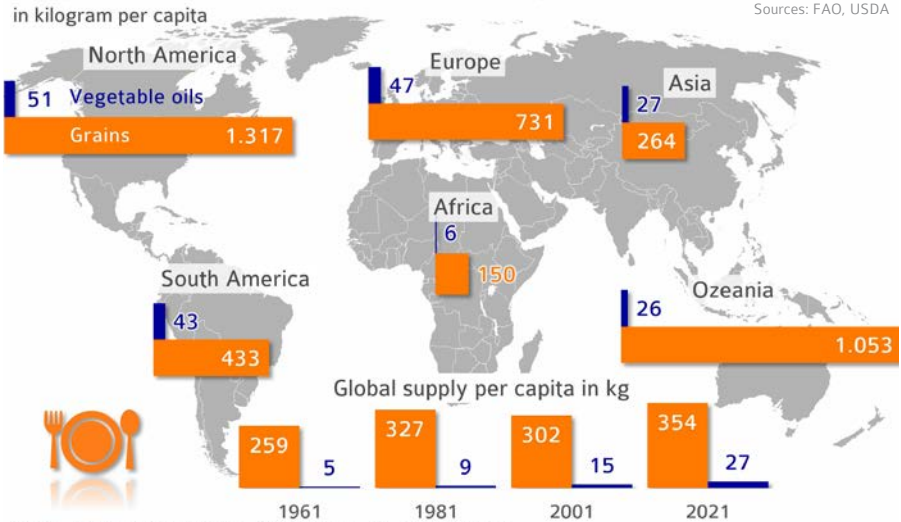
ver the past 60 years the average per capita supply of the world's growing population of grain and vegetable oils was subject to fluctuation but trended upward. In the 2021/22 marketing year, 354 kg of grain and 27 kg of vegetable oil per capita are expected. These figures exceed the previous year's total of 375 kg per capita by just under 7 kg per capita. They include all consumption, i.e. also use in animal feed, in fuel blends and other industrial uses. Conversely, the amount of feedstock used in biofuels serves as a "supply buffer" that could be "diverted" to food use for human consumption. Because of this, the EU Commission's arable extensification policy associated with the Green Deal, which stipulates blanket reduction targets for fertilising and crop protection products, should be questioned. The expected drop in output would deprive the market of commodity volumes for food supply and other application options in the bioeconomy.

In purely arithmetic terms, food supply is sufficient to feed the world's population. However, there are huge differences between regions in availability of agricultural feedstocks. **The difference is primarily a result of distribution issues, rather than a result of global undersupply due to competing fuel and feed uses.** Moreover, there are substantial differences in purchasing power in the different countries. Per-capita income, cost of living and rate of inflation in the different countries should also be taken into account. However, we still need a comparison between specific shopping baskets and habits of consumption (e.g. cassava, millet in Africa) that would allow us to draw conclusions on per capita purchasing power.

Africa continues to lose out

Supply of grain and vegetable oils, in 2021/22, estimated by continent, in kilogram per capita

Sources: FAO, USDA



Grains = barley, oat, millet, maize, mixed grain, rice, rye, sorghum, wheat
Vegetable oils = cotton, coconut, olive, palm, palm kernel, peanut, rapeseed, soybean and sunflower oil

3.4 Is there enough food?

» 3.4.1 The issue of distribution

People in many parts of the world starve or are malnourished although in terms of figures there is adequate supply of the most important staple foods. Along with climate change, natural disasters and poor transport and storage logistics, wars and forced migration are the main factors stoking hunger in the world. On top of this, international terrorism has become an increasing risk to people's lives and safety in a growing number of countries. It is sadly true that to this day more money is spent on maintaining and spreading violence than on peace.

All these factors prevent economies from booming, farmers from farming in a cost-efficient manner and countries from establishing democratic structures without maladministration or corruption. Countries having no structures for a functioning social system run a much higher risk of famine and malnutrition. Where an appropriate framework is in place, it could be used as a base on which to intensify locally adapted cultivation systems in a sustained manner and, by so doing, create the foundation for supply with food that is equally sustained.

The currency used to measure purchasing power is the international dollar, which is based on the US dollar. For example, the World Bank publishes a per capita purchasing power of around 47,060 US dollars in Germany for 2020, but only 270 US dollars in Burundi. Thus, despite an adequate supply of agricultural products, the available resources in countries with low purchasing power are not sufficient to buy the necessary amount of food. **The cause of famine is often a lack of purchasing power, not a shortage of supply. The production of feedstock for biofuel production basically enlarges this supply**. The lack of solidarity of the rich industrial nations with those affected is the reason why the means required to provide comprehensive emergency aid are not made available. **A food-or-fuel debate distracts from where the responsibility actually lies**.

Distribution issue just one of multiple reasons

Largest producers of wheat, rye, millet, rice und edible oils in 2020/21, in million tonnes, and 2020 per capita income in US dollars

Country	Food production	Per capita income	Country	Food production	Per capita income
World	1.532	11.057	Japan	10	40.540
China	317	10.610	Ethiopia	7	890
India	254	1.900	Uzbekistan	6	1.670
EU-28	158	34.081	Irak	5	4.660
Indonesia	86	3.870	Republic of Korea	4	32.860
Russia	83	10.690	Tanzania	3	1.080
USA	64	64.530	Azerbaijan	2	4.450
Ukraine	41	3.510	Guatemala	1	4.490
Bangladesh	38	2.010	Gambia	0,1	750
Pakistan	37	1.280	Namibia	0,01	4.520
Ukraine	33	53.730	Singapore	<0,01	54.920
Pakistan	31	8.930	Qatar	<0,001	56.210

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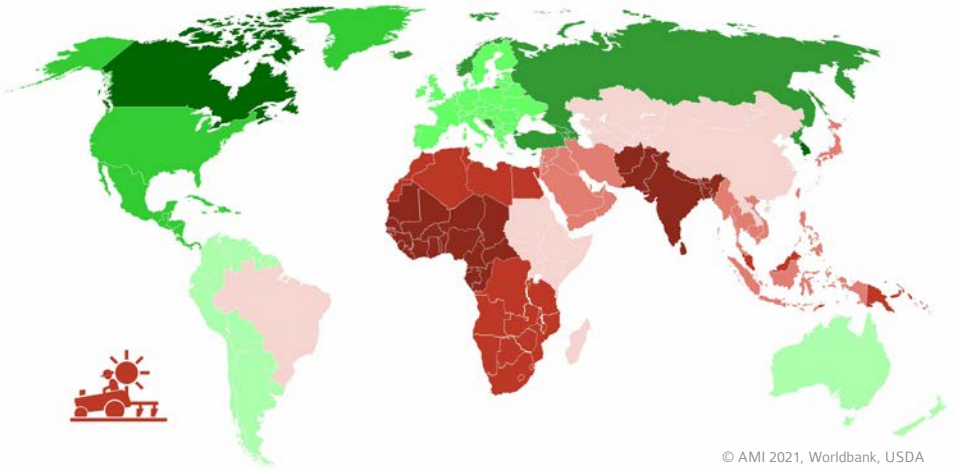
Changes in production due to climate chage

Changes in agricultural production in 2050 due to climate change versus status quo

Source: FAO



4 | Land use

4.1 Does growing energy crops create a lack of land for food crops?

» 4.1.1 Shares of land used for biofuels production

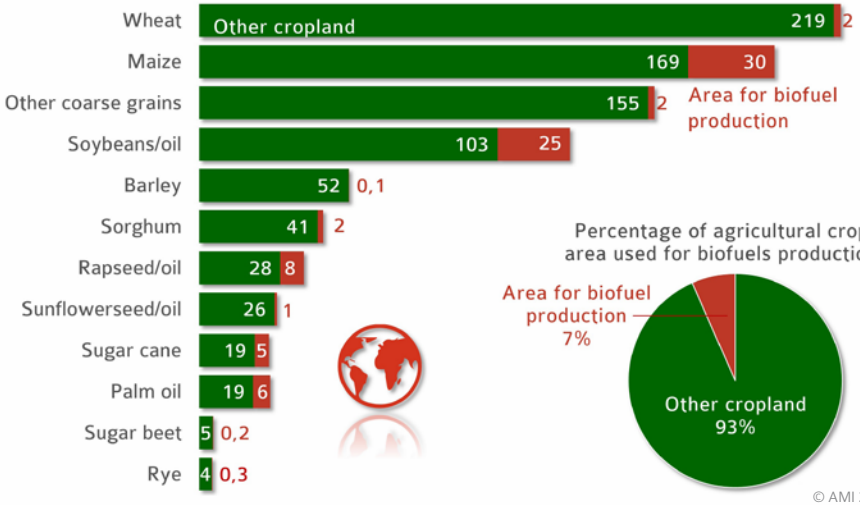
2In 2020, 1.4 billion ha of crops such as grain, oilseeds, protein, sugar and fibre plants, fruits, vegeables, nuts and others were grown worldwide. Most of this produce is used as food. **Only around 7 per cent go into biofuels production.**

Biofuel production is mostly located in countries where there is already a surplus of feedstock (especially maize, soy and palm oil) and legally prescribed blending obligations. If the surplus were not used to produce biofuels, it would have to be placed on the global market, where it would weigh heavily on already low feedstock prices.

The use in biofuel production reduces the production overhang, generates extra value added and reduces the need for foreign currency for imports of crude or fossil fuels. The latter is primarily a problem in poorer countries. Another advantage is the amount of high-quality protein feed that is generated in biofuel production, demand for which is steadily increasing. The amount and quality of these protein feeds have a strong influence on feedstock prices. Consequently, they also determine the amount of land dedicated to growing the feedstocks. **In other words, biofuels are by no means the price drivers in the commodities markets. If necessary, the feedstocks grown for biofuel production are primarily available for food supply.** In the case of politically subsidized extensification, this option for "buffering" food demand is omitted.

Biofuels take up little space

Shares of total cultivation area (arable land + permanent crops) used for selected crops for biofuel production, worldwide, in 2020, in million hectares



Other coarse grains = millet, mixed grain, oats

Sources: OECD, USDA, Oil World

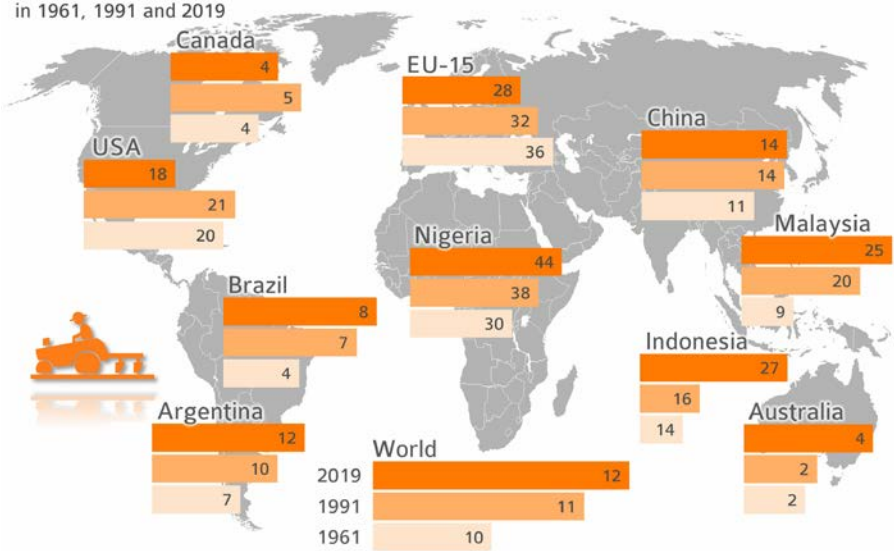
4.1 Does growing energy crops create a lack of land for food crops?

» 4.1.2 Development of cropland

The primary purpose of agriculture has always been to feed a growing world population, taking into account the changes in eating habits due to higher incomes. This purpose requires a sustainable intensification and growth of agricultural production. The production of grain and rice grew more than three and a half times between 1960 and 2021, and the output of vegetable oils increased even more than twelve-fold. In the southern hemisphere, these increases are first and foremost based on expansions of agricultural land, along with progress in production methods (seed, fertilisers, crop protection, agricultural engineering). In the northern hemisphere, on the other hand, cropland is decreasing. Sustainable increases in productivity primarily result from research and innovation at universities and companies from the chemical and plant breeding industries. This progress is achieved as a result of farmers' high levels of qualification, good professional support and prompt implementation of new insights in agricultural practice. However, the trend to promote extensification through political regulations, for example in the EU and also in the US, gives rise to concern.

Less land in agricultural use in the northern, increasingly more in the southern hemisphere

Shares of agricultural land and plantations in total land area, in per cent, in 1961, 1991 and 2019



The conversion of primeval forest and other land necessary for environmental and climate protection is increasingly meeting with public and political resistance. Therefore, binding sustainability requirements must be created for all cultivation regions. In the southern hemisphere, the implementation of social standards and the issues of land acquisition and ownership are paramount for sustained biomass production. For this reason, there is a need to create sustainability requirements that are binding on all growing areas. **Based on these requirements, biomass production should be certified to allow the biomass to be traced back to its origin – irrespective of its final use.** A stop must be put to illegal clearings of primeval forest or changes in land use to create new palm oil plantations or expand soybean cultivation. In the revision of the European Renewable Energy Directive (RED II), the EU's biofuels policy defines more stringent documentation requirements and greenhouse gas reduction requirements, for the first time also for solid biomass. At the same time, in light of the changes in land use in South America and Asia (clearing primeval forest), there are growing calls to develop these system requirements further and lay them down in legislation. The aim is to create a level playing field for global fair competition without any environmental or social dumping.

4.2 Is there a limit to the use of palm oil?

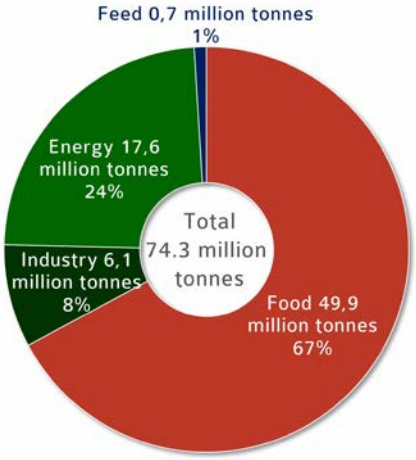
» 4.2.1 Global use of palm oil

Oil palm is the single most important oleaginous fruit crop in Southeast Asia but is also grown to a considerable extent in Colombia and Nigeria. Palm oil is the world's most important vegetable oil, producing over 75.5 milliontonnes annually. Like all vegetable oils, palm oil has many uses: be it in food, oleochemical products or as a biofuel feedstock. Globally, just under 74.3 million tonnes of palm oil were consumed in 2021. The majority is used as edible oil in Southeast Asia. Food uses account for 67 per cent, energy uses for 24 per cent (e.g. biodiesel) and oleochemical uses for 9 per cent of overall consumption. **Global palm oil production is increasing due to the expansion in area by clearing primeval forest legally and illegally and replanting with high-yielding hybrid varieties.** However, the growth in global demand is lagging behind. This has the result that more and more palm oil surplus is processed into biodiesel in the main palm oil producing countries and governments are raising blending quota requirements step by step: in Indonesia, the quota for non-public transport is already at 30 per cent. On the other hand, the EU is going to reduce the use of palm oil in biodiesel, as the EU Commission has resolved that palm oil-based biodiesel can no longer be counted in the achievement of EU climate targets from 2030 at the latest and that its share will be reduced based on 2019 consumption. **In Germany, France, Austria, Belgium and other member states, crediting of palm oil-based biodiesel will already be phased out in 2023 at the latest.**

Nevertheless, palm oil consumption is likely to continue to increase in the coming years, especially in the food sector. At the same time, the individual sectors are poised to make increasing use of palm oil that is certified as sustainable. In the EU-27 today, the percentage of certified sustainable palm oil for energy-related uses is one hundred per cent – a level the food and chemical industries have not yet reached. In the future, the sustainability certification should be introduced or implemented irrespective of the final use.

Palm oil is primarily food

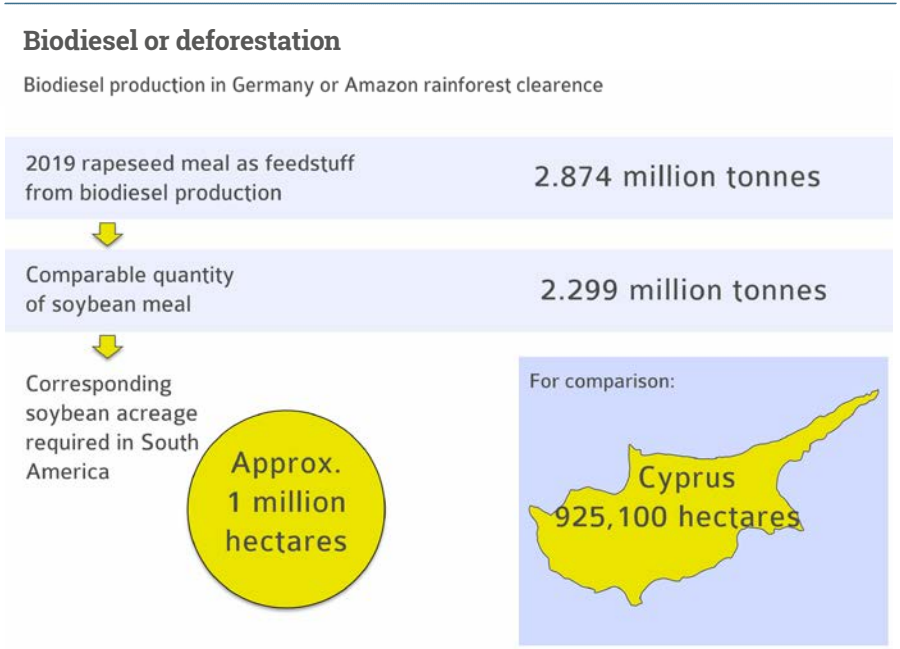
Shares of various uses of palm oil, worldwide, in 2021, estimated, in million tonnes and per cent



4.3 What would protein feed supply be like if there was no biodiesel?

» 4.3.1 Land required for soybeans if German biodiesel production did not exist

Rapeseed meal takes on special importance in relation to the demand for a boost in self-sufficiency in feed protein. What makes this kind of feed protein so special is that it is GM-free. It is also lower priced than adequate alternatives, such as GM-free soybean meal, and it generally has short distances for transport and processing. In Germany, there are 13 locations that process rapeseed into meal. **Extracted rapeseed meal and rapeseed expeller are by-products of rapeseed processing and obtained together with rapeseed oil. The latter is used both as a feedstock for food and for biodiesel production.** If demand for rapeseed oil were to decline because the use of cultivated biomass for biofuels would be politically restricted, supply of rapeseed meal from domestic production would dwindle as well. However, the latter is urgently needed. Germany's annual demand is at around 7.5-8 million tonnes. Without sales of rapeseed oil-based biodiesel, supply of rapeseed meal would decrease approximately 3.4 million tonnes and have to be offset by more expensive imports. In terms of soybean meal equivalents, these imports would amount to 2.7 million tonnes. This volume, which translates to a soybean area of just less than 1 million hectares, could not come from Germany or the EU-27. For comparison, this is a larger area than the island of Cyprus. It is more likely than not that soybean producers in America, especially in South America, would close this gap by expanding cropland further. This would only be at the cost of the primeval forest.



5 | Development of prices

5.1 Do biofuels push food prices up?

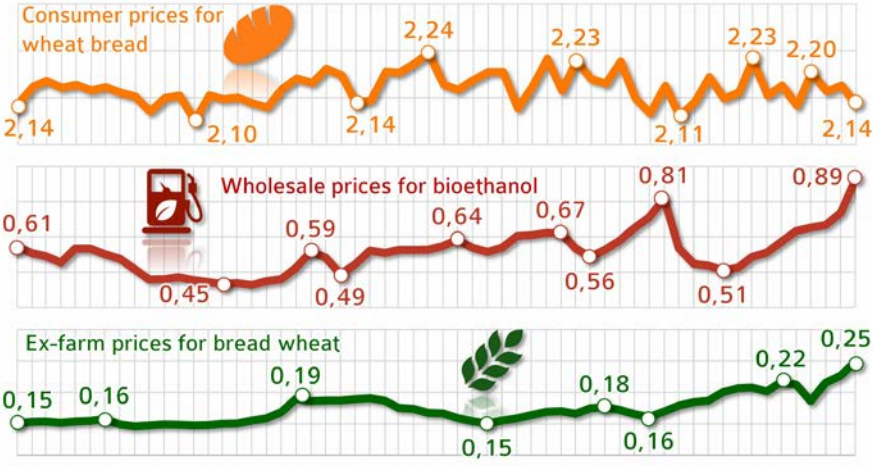
» 5.1.1 Comparison of prices of bread, bioethanol and grain

Wheat is used for both food production and bioethanol production. Many people argue that production of biofuels causes a shortage in this feedstock for food production and drives wheat prices. Looking wheat-rye bread prices, no such correlation is evident. Feedstock supply and changes in price at the producer level barely have an impact on the development of prices for bread. In the 2020/21 crop year, this was especially evident: despite wheat harvest declines in Germany and price increases for soft wheat in September/October 2020, consumer prices for wheat and rye bread dropped and are currently at a more than three-year low. One reason is that raw material only accounts for approximately 15 cents of the costs in a one-kilo loaf of bread.

The explosion of prices for agricultural commodities all over the world in 2008 and the accompanying volatility of prices for staple foods have moved the issue of global food to the fore. Continuing famine and poverty since then have also been associated with changes in international prices for agricultural feedstock. When it comes to the reasons for the price situation, people often construct a correlation with the biofuels market. However, 2021/22 global grain production will once again be abundant, as it was in previous years, also in the EU. The level of self-sufficiency in grains is at 106 per cent. In recent years, the EU consistently produced more grains than it consumed. This permitted the EU to make exports and build up stocks. There can, therefore, be no question of shortage. As the chart shows, demand for agricultural feedstocks for use in biofuels production only has a minor inflationary impact on prices. Although both wheat and bioethanol prices went up, there is no direct correlation between the two. If anything, demand for biofuels stabilises producer prices and, with that, incomes – also those for farmers in developing countries.

Price comparison of bread, bioethanol and grain

Consumer prices for wheat bread, ex-farm prices for bread wheat in EUR per kilogram, wholesale prices for bioethanol (excl. taxes) in EUR per litre, in Germany



5.1 Do biofuels push food prices up?

» 5.1.2 Comparison of prices of biodiesel and vegetable oill

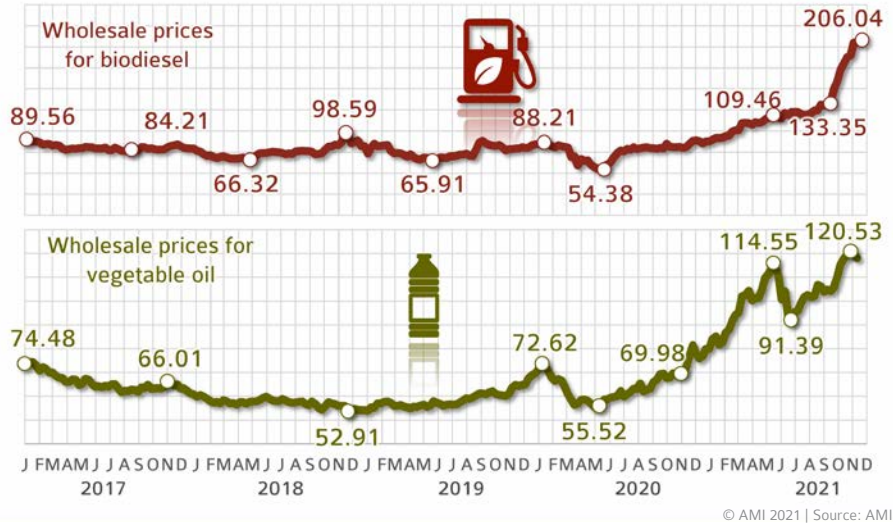
After the slump in energy and feedstock prices in the wake of the global shutdown and decline in demand, demand picked up again in 2021 and could barely be met by the previously curbed production capacities. Also, rising freight costs, poor harvests and increases in energy prices made agricultural produce more expensive. In Germany, the reversal of the reduced value added tax to the original rate was yet another factor contributing to the price increase.

More specifically, vegetable oil prices started a virtually unabated rally already in August 2020, which in November 2021 sent prices rocketing to a level 70 per cent above that of the previous year. Only for a short time did prices flag due to the harvest. However, the allegedly swelling supplies did not materialise and excess demand soon prevailed in the markets again.

Biodiesel prices in Germany resisted the upward trend in the crude oil and vegetable oil markets for a long time, partly because demand was inadequate. Biodiesel consumption sank more than 20 per cent in the first half year 2021. Towards year end, buying interest picked up in connection with quota compliance obligations, but it could not be satisfied. There was a lack of catalytic converters for biodiesel production and cargo space for transportation. And so prices for biodiesel for untaxed RME in mid-November 2021 stood at more than EUR 2.06 per litre, almost three times higher than in November 2020. It remains to be seen whether the factors outlined above will have a one-off effect on prices or whether a long-term trend must be expected.

Corona clearly shows effect

Wholesale prices for biodiesel and vegetable oil (as mean values of rapeseed, soybean, palm and sunflower oil prices), excl. taxes, ex works, in cent/l, in Germany



6 | Statistics

6.1 General notes on handling statistics

» 6.1.1 Pitfalls of statistics

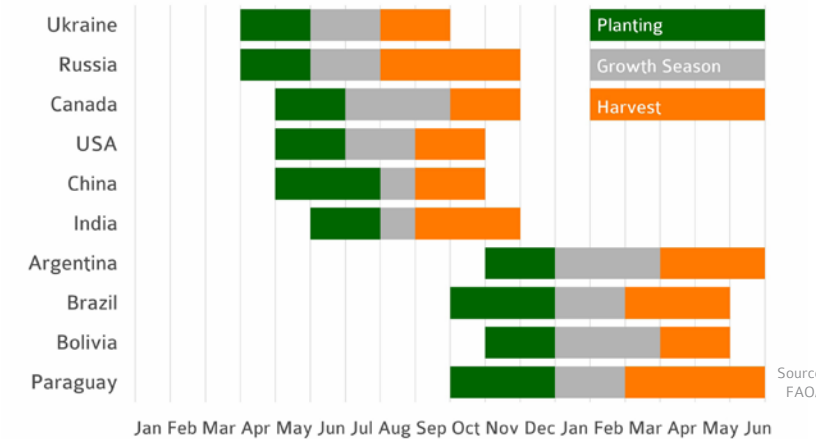
very argument must be based on reliable figures. This especially applies to landmark decisions relating to medium and long-term food supply. But this is not as easy as it may sound. How trustworthy is the data source? What is the intention behind it? And even if the data are objective: Is the glass half full or half empty? And finally – how accurate is it exactly?

This problem can be seen especially in statements of quantity. Nobody has ever counted the quantities. They are based on assumptions and derivations. This method can be very precise, e. g. when the statement of quantity is linked to a government subsidy. However, it is mostly based on empirical information that is validated by reportable movements of volumes. Accurate statistics are quite costly and impossible to carry out across the board. Temporal shifts have an additional effect. Volumes are also not entirely static: whilst the documentation and reports for goods received are being prepared, those same stocks have sometimes already been shipped out again.

Exact time periods help, but there are interpretative risks here too. The best example: the crop years: Whereas a calendar year lasts from 01 January up to 31 December, the crop year depends on the produce and time of harvest. This is straightforward for Germany – the crop year for grain/oilseeds lasts from 01 July to 30 June. In the US, there are different crop years for soybeans (starting 01 September) and rapeseed (starting 01 June). And when the southern hemisphere comes into the picture, things get complicated. The crop year is defined as beginning with the harvest, which is then traded and consumed over a period of 12 months. In the northern hemisphere, with just a few exceptions, this would be September for soybeans for example. In contrast, in South America it would be March. If for a global view, the market is standardised to a single crop year, as it is in USDA outlooks, the position "soybeans 2020/21" would include the US harvest 2020 and the South American harvest 2021. In South American statistics, the information can only be found under 2021/22.

Crop years are not Equal

Soybean crop planting and harvesting windows in the world's main growing regions



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RFA	Markets & Statistics; Renewable fuels association, Ellisville
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