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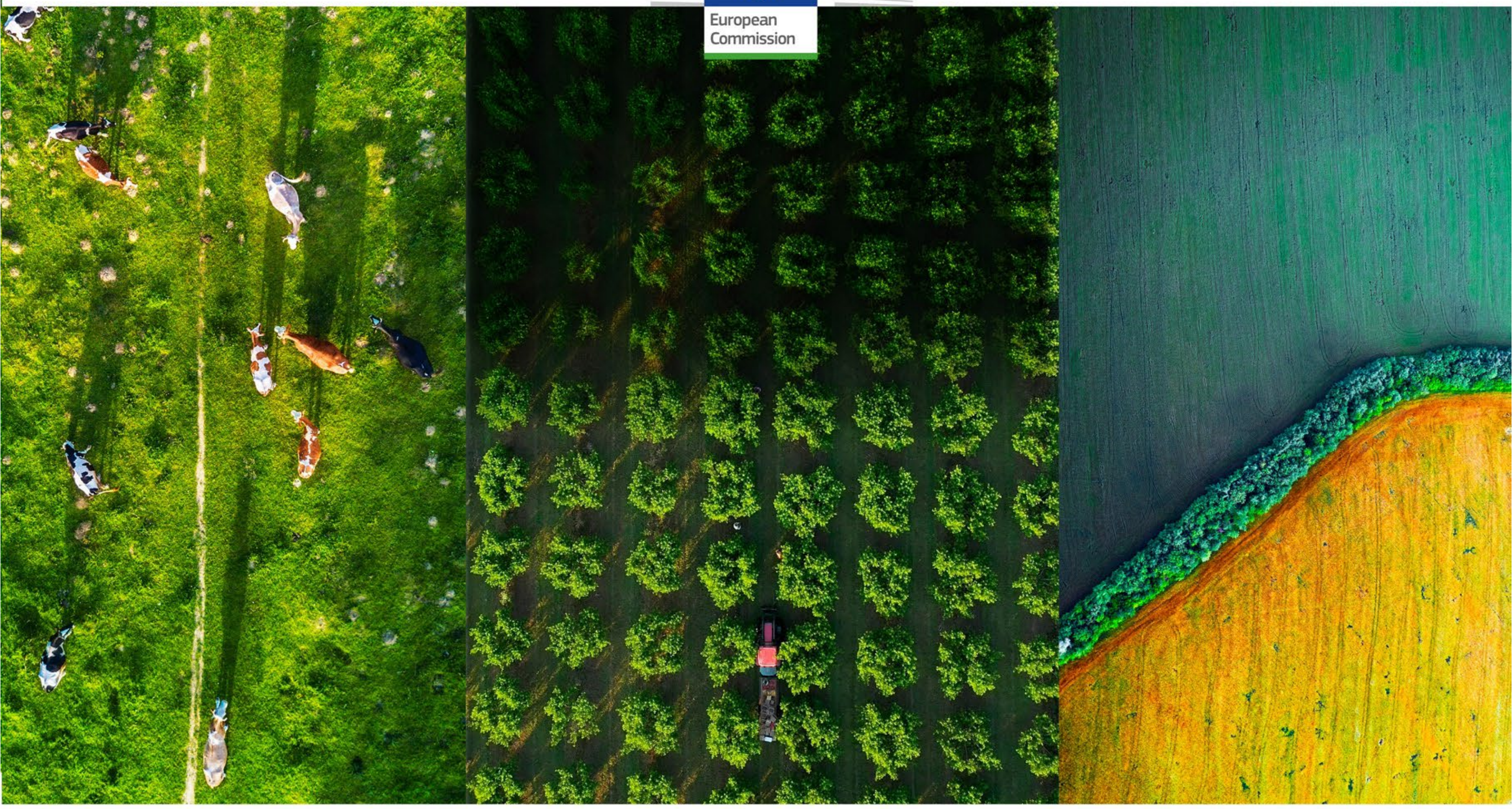

EU AGRICULTURAL OUTLOOK

FOR MARKETS, INCOME AND ENVIRONMENT 2022 - 2032

Executive Summary

Agriculture and Rural Development

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While all efforts are made to provide sound market and income projections, uncertainties remain.

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EXECUTIVE SUMMARY

Main assumptions

This outlook report covers the period until 2032 and reflects agricultural and trade policies in place in November 2022. Global projections are based on the OECD-FAO Agricultural Outlook 2022-2031 updated with the most recent macroeconomic and market data.

This annual report was prepared in a significantly changing environment. In early 2022, the post-COVID recovery led to supply and trade disruptions and increasing commodity prices and input costs. New severe shocks came with the Russian invasion of Ukraine, bringing further uncertainties to agricultural markets and global food security. All this came on top of changes observed due to disruptive weather events related to climate change, and animal disease outbreaks.

Against the backdrop of these challenges, the report takes the most plausible macroeconomic assumptions for the 2022-2032 period. Overall, macroeconomic developments are causing a lot of uncertainty. Energy prices have been significantly revised upwards compared to previous outlooks, because of the war in Ukraine, the EU sanctions against Russia and the need for the EU to find alternative supplies. Inflationary pressure is growing because of high energy prices and the increasing cost of raw materials, which affect food prices and household spending, most notably in the near future. These short-term impacts are likely to affect the magnitude and direction of consumption pattern changes also in the medium term. Disruptions in international trade due to the Ukraine war are assumed to continue. There is no clear view on its duration and its future consequences. Moreover, macroeconomic assumptions foresee a change in exchange rate developments: in the short term, the euro is due to remain weaker against the US dollar than in recent past, being close to parity. This has implications for EU exports (which gain in competitiveness) and imports (especially of inputs, which are due to become more expensive). In the medium term, the euro is expected to appreciate back to its level of last years. The EU population growth in 2022 reflects an inflow of people fleeing from Ukraine and follows a declining trend in the medium term.

As macroeconomic projections and crop yield expectations are by nature uncertain, a systemic uncertainty analysis has been carried out, which enables us to illustrate possible developments caused by the uncertain conditions in the economy and agricultural markets. This report includes possible price ranges around the expected baseline.

In line with the methodology used for this annual exercise, only implemented policy changes are incorporated in the report. CAP strategic plans of individual EU countries and possible ensuing market developments are considered, assuming that this new policy setting will remain in place until 2032. Considerations and implications based on CAP specific objectives are made, in addition to broader changes related to implementing sustainable production methods, reduced energy dependency, reinforced sector resilience, and changing diets.

Overall, sustainable growth remains a key factor affecting future developments in EU agriculture. Measures stemming from the Farm to Fork and Biodiversity strategies are taken into account when corresponding legislation is approved and implemented. Otherwise, the direction of change related to these measures is only considered to the extent observable so far in individual markets.

Similarly, free trade agreements (FTAs) are included only if they have entered into force. No new FTA has been added compared to last year, as the agreement-in-principle with New Zealand remains to be approved, although the temporary trade liberalisation with Ukraine, in place until June 2023, is reflected. On the other hand, the relationship between the EU-27 and the UK is based on the EU-UK Trade and Cooperation Agreement provisionally applied from 1 January 2021; a duty-free/quota-free trading relationship is assumed. WTO tariff-rate quotas have been recalculated following their apportionment between the EU-27 and the UK respectively.

In recent decades, the EU was able to steadily increase agricultural productivity, and thereby production. A significant role in this was played by Member States that joined the EU after 2004 where structural investment, thanks to EU funding, has boosted crop and milk yields. This may be seen as a transition following decades of underinvestment in these countries. Looking at the next decade in this report, key productivity parameters seem to enter a new phase:

- crop yield growth is now due to slow down and production level to stagnate, for a series of reasons including climate change and weather-related events, lower use of plant protection products and synthetic fertilisers, limited access to gene-editing and a slowdown of possible genetic improvements.
- milk production growth that has been robust since the end of the milk production quotas may significantly slow down and turn even slightly negative, as the herd number reduction may not be compensated anymore by the milk yield increase.

On the consumption side, meat consumption is expected to decline. This is another reversing trend, which is supported by a continuing decline in beef and pigmeat consumption, and a sign of diet change in the EU. However, in the rest of the world meat demand continues expanding, driven by population and income growth.

These evolutions in production and consumption seem to point into the same direction, as a turning point in trends, a possible *Zeitenwende*, with an agri-food system ensuring food security in a more sustainable manner.

Land use

The total EU agricultural area is projected to remain stable. Pasture areas and arable land are expected to decline marginally. Within the latter, only the area under protein crops is due to grow, while the cereal and oilseed areas are forecast to decline. Moreover, the area of olives for oil is expected to grow in line with past trends. Following the rules in the new CAP, fallow land is due to increase slightly. Likewise, the share of land under organic farming will further increase, benefiting from public support that should partly offset market factors such as the protracted implications of the current food price inflation.

Arable crops

The total EU cereal area is projected to decrease marginally to 57.2 million ha by 2032, driven by a decrease in barley and maize, and an increase in wheat. Yields of barley and wheat are expected to stagnate, with a slight decrease for the former and a slight increase for the latter. Meanwhile, maize yields may still increase due to yield improvements in eastern EU countries. This is due to translate into a decrease of 1.1 million t below the 2020-2022 average production of cereals (308 million t). Domestic use is expected to decrease, even with an increase in human consumption (+3.9 % compared to 2020-2022), due to lower animal production and feed use (-6.1 %). On the trade side, the EU will remain competitive but face strong competition from other key global actors. It will remain a net exporter of wheat and barley and a net importer of maize and rice.

The report also includes a scenario on how extreme weather events impact yields of the main crops (wheat and maize) and so the respective markets. The results show how exports and imports act as a buffer to the effect of concurrent extremes (i.e. happening once, at the same time, over a large area) as they improve the availability of commodities domestically. Due to the impossibility of substituting the commodities within the EU market when there are concurrent shocks, the EU becomes a net importer of wheat. In the case of recurrent extremes (i.e. happening repeatedly over time in the same area), market disruptions are potentially larger for commodities in which the EU has a stronger trade position, such as wheat.

The EU oilseed area is due to fall to 11.0 million ha, a slight decrease compared to current levels. The areas used for rapeseed and sunflower production are expected to decline, but this reduction is counterbalanced by an increase in the areas for soya beans and pulses. Average oilseed yields are due to continue to increase. Given an expanding area and increasing yields, EU oilseed production is projected to be 32.9 million t in 2032 (30.2 million t in 2020-2022). Production of pulses (+54.7 %) and soya beans (+33.3 %) are expected to increase the most. The EU is due to remain a net importer of oilseeds, but imports are expected to decline. Likewise, the EU will import less pulses and may become largely self-sufficient. While human consumption of pulses is expected to increase markedly, feed will remain their main use.

Oilseed crushing volumes are expected to decrease marginally (-0.8 %), and its composition will also change slightly: rapeseed and soya beans will decline, and the use of sunflower seeds will increase. Internal demand for oilseed meals is due to diminish because of its lower use for animal feed. The EU demand for vegetable oils is due to decline too, driven by lower biodiesel demand and the consumption of oils different than of oilseed origin. Likewise, food consumption of vegetable oils is expected to change its composition, with a large increase in sunflower oil and a large decrease in palm oil. Olive oil consumption is due to continue growing, especially outside the main producing countries (Spain, Italy, Greece, Portugal). In addition, imports of vegetable oil are expected to decline, driven by a reduction of palm oil imports (from 6 million t in 2020-2022 to 3.3 in 2032) that more than compensates the increase in sunflower oil imports (from 1.1 million t to 2 million t).

Projections for the oilseeds market in selected EU countries (Germany, France, Poland, Romania, Bulgaria and Hungary) foresee an area increase in Germany, France and Poland, given the relatively higher prices compared to cereals. Sunflower seed production is expected to grow the strongest, while rapeseed production in Germany and France is likely to sustain its high levels. The crushing capacities in these two countries are not likely to grow due to low margins and declining demand for oils and meals. The opposite trend is expected for Hungary. More strongly increasing production than domestic demand in Romania, Bulgaria and Hungary will lead to increasing net exports. Soya bean meal is expected to be a preferred feedstock (except in Germany). The demand for vegetable oils could slightly grow as well as trade, following changes in supply and demand patterns.

Demand for feed from arable crops is projected to decrease by -4.7 % by 2032 due to the decline in EU pig, beef, and dairy herds. Likewise, the shift to grass-based production systems, driven by an increase in organic dairy production and further extensification, will strengthen this trend. High and low protein feed use are set to decline, but medium-protein feed might increase.

The EU sugar area will slowly decrease to 1.45 million ha, as some growers switch to other crops in view of the challenges posed by plant protein products available for sugar beet. Combined with stable yields, EU sugar production could be reduced to 15.5 million t. Domestic sugar consumption will decline faster than production. This could allow EU sugar exports to grow and, by 2032, they are expected to reach the level of imports.

In the medium term, **biofuel** demand follows the trends in road transport fuel use. Biodiesel use is expected to stay relatively stable, while bioethanol use is due to increase by 2030 (+13 % compared to 2022) before declining in 2032. Maize will remain the main feedstock for ethanol production, but its share is expected to decline.

Milk and dairy products

The shift to more sustainable EU milk production will translate into an extended adoption of sustainable farming practices, sustained high quality standards and increased differentiation of production systems. Alternative systems, like organic, are expected to grow and gain greater market share. Environmental concerns will reduce the size of the dairy herd further, mostly in intensive production systems. While animal welfare and more efficient feeding strategies may contribute to still increasing yields, they may not offset the reduction of the dairy herd. This could lead to a decline in EU milk production by 0.2 % per year by 2032.

Despite the slowdown in milk production growth in the EU, it will remain the largest global dairy supplier (24 % of the global dairy trade in 2032). However, global dairy exports are expected to be reduced, as many traditional importers will improve their self-sufficiency. Also, the volume growth recorded in the past will be hard to improve. This will lead to lower growth for the trade in milk powders especially. On the other hand, new trends like premiumisation and the increasing role of foodservice are likely to push the sector towards exports of high-quality products.

The reduction in EU milk production will not lead to a proportionally lower milk processing capacity, as protein and fat content could improve. **Cheese** and whey production will benefit most from the milk produced. Meanwhile, due to increasing competition, whole milk powder production and some applications of dairy solids are likely to decline.

Nutritional aspects and functionality will drive EU dairy demand. Consumer preferences will increase the consumption of certain products, such as those with less fat and sugar, and fortified or functional dairy products. The growth in EU consumption of **cheese** could remain relatively modest and expanding production could be supported by rising exports. The EU will keep its position in the global trade of whey powders, mainly growing in food uses. Meanwhile, EU exports of skimmed milk powder will remain at a comparable level to 2020-2022, and the low competitiveness of EU whole milk powder could lead to reduced EU exports.

By 2032, EU cheese and whey powder prices are due to increase the most relative to their already high 2020-2022 value (0.7 % and 2.4 % per year, respectively). Butter will reach a comparable level to its current price. As a result, the EU raw milk price is expected to be around EUR 45/t by 2032.

Meat products

Global meat consumption is expected to continue growing. A large share of demand will be met by domestic production, but 1.8 million t of poultry meat and 1.3 million t of beef will come from increased imports. The EU will be benefitting only to a limited extent, mainly for poultry meat.

Sustainability will play an increasingly prominent role in EU **meat markets**. Meat production will be more efficient and more environmentally friendly. The spread of animal diseases and market opening through free-trade agreements both will be important factors of change, though with opposite effects. On the other hand, consumers' concerns about the environment and their health, as well as convenience trends, will shape meat consumption, leading overall to a slight decline to 66 kg per capita by 2032 (-1.5 kg per capita). The composition of the meat basket is also expected to change, with a more significant reduction in beef and a substitution of pig meat by poultry.

Following the decline in the EU cow herd (-9.1 %), production of **beef** is also expected to fall. EU beef consumption is due to decline by 0.8 kg per capita by 2032. Meat export opportunities may improve in the medium term but will be offset by a decline in live animal exports due to increased competition and animal welfare concerns over long-distance transport. EU beef imports will slowly increase to pre-COVID levels. Prices are expected to come down and stabilise at EUR 4000/t by 2032.

EU **pigmeat** consumption is due to decrease by 0.4 % per year (or -1.3 kg per capita) by 2032, due to health, environmental and social concerns. Likewise, China's production capacity is projected to recover sooner than expected, with a massive impact on EU exports to Asia. These two factors, together with lasting effects of African swine fever, will lead to a reduction of 1 % in EU pigmeat production. Prices should go down until 2025, when they should stabilise around EUR 1500/t.

EU **poultry** production and consumption are expected to continue growing by 0.2 % per year, slower growth than in the past decade due to environmental restrictions and concerns, as well as changes in consumption (less meat). Exports will also recover by 0.8 % per year, thanks to increasing demand in Sub-Saharan Africa, the Philippines, and the UK. The poultry price is expected to decrease and stabilise around EUR 2000/t by 2032, above pre-COVID levels.

EU production of **sheep** and **goat** meat is projected to increase slightly by 0.2 % per year. Consumption is expected to remain stable at 1.3 kg per capita by 2032. Exports of live animals will decline, mainly due to financial risks and animal welfare concerns, which can be impactful in anticipation of possible regulatory changes. Exports of meat are expected to catch up due to consolidation of trade with partners in the Near and Middle East. Exports to the UK, representing half of EU meat exports, will remain stable. Likewise, imports will recover in the short term and decline slightly over the medium term. Prices are due to follow a downward shift but reach a level higher than before COVID-19.

Food security

High EU self-sufficiency rates across agricultural products derive from favourable natural conditions, diversity of territories and climate, and the competitive EU position relative to some other global suppliers. This also reflects the cumulative results of the CAP over the years, while food security is a core goal of the EU Treaty.

In the next 10 years, the EU is expected to remain self-sufficient in wheat and barley, while for maize, favourable world prices are likely to favour imports over domestic production growth. Historically, the EU has low self-sufficiency rates in oilseeds. However, the expected increase in feed demand for GM-free meals, relatively higher profitability compared to cereals and reinforced crop rotation are likely to push the production of oilseeds up, resulting in a higher EU self-sufficiency, especially in soya beans.

EU self-sufficiency rates are above 100 % overall for animal products and these rates are likely to persist, despite some reduction in EU because consumption is also expected to decline (especially in meats) and export growth could also fall.

The EU is due to reinforce its positive net trade position (+21 % increase in net trade compared to 2022), with exports of high-value food products, beverages, and dairy more than compensating for imports of commodities such as vegetable oils and animal feed. At the same time, EU exports will remain well-diversified while diversification of EU imports may be reduced, but without significant exposure to a large concentration of suppliers.

Average food expenditure at household level is expected to decrease by 2 percentage points in 2030 compared to 2020 (20 %), which is a record level. Over the medium term, greater convergence is likely between EU-13 and EU-14 countries. Nevertheless, these projections have to be considered with special caution, against the backdrop of uncertainties about broader socio-economic impacts of crises (such as changes in livelihoods, growing inequalities).

Agricultural income and labour

Overall, the **value of EU agricultural production** is expected to grow slightly, with the value of crop and animal production projected to return to levels similar to 2019, from 2025 onwards. Regarding input costs, energy and fertiliser costs are due to remain higher than in the past in the short and medium term, although the uptake of renewable energy, more diversification of energy supplies, more energy-efficient practices and better-targeted fertiliser use are expected to reduce the economic impact of these costs for farmers.

Total farm income adjusted for inflation is expected to remain at a comparable level to 2010-2012, but below a peak seen in 2022 due to high agricultural prices. The real income per worker, considering a slower but continuing shrinking in the labour force in the next 10 years, is expected to increase by 1.1 % per year between 2012 and 2032.

Based on the latest Farm Structure Survey (census year 2020), there were 9.1 million farms in the EU (25 % below the 2010 figure). At the same time, the number of large farms (above 100 ha) increased by 14 % and they cultivated around 50 % of utilised agricultural area. Around 80 % of EU farms are specialised, with field crops accounting for one third while livestock specialized farms showed the sharpest decline (-40 %).

Environmental scenario on lower livestock density

This report presents a scenario analysis of potential impacts of a lower livestock density per ha of utilised agricultural area, inspired by ongoing discussions in some EU countries. Additionally, livestock density may be among the options to reach the Farm to Fork target regarding a 50 % reduction of nutrient losses.

A set of scenarios has been considered, simulating livestock density thresholds of 2 and 1.4 livestock unit per ha in all EU countries in 2030, which would affect current hotspot regions with high density. Likewise, the effects of a feed additive for the reduction of methane emissions are also included.

The analysis quantifies the environmental benefits and the economic impact of a lower livestock density. It would lead to a significant drop of greenhouse gas emissions in the EU (although offset by a leakage effect in other parts of the world). Livestock density reduction in hotspot areas can also reduce the EU average ammonia emissions from agriculture up to 11 % and average nitrate pollution per hectare up to 12 %. Reductions would be much more significant in hotspots regions, up to 50-60 % in some of them.

As regards the economic impact of the scenarios, a general increase in prices of animal products can be observed, due to a lower supply, with producer price increases highest for pigmeat, eggs and beef. By contrast, crop producer prices, in particular feed crops, will decrease on average, driven by the lower demand for animal feed. In terms of EU production, reductions are most significant for meats and eggs, while remain limited for dairy. Regarding impacts on trade, EU exports of poultry and pigmeat are the ones declining most.

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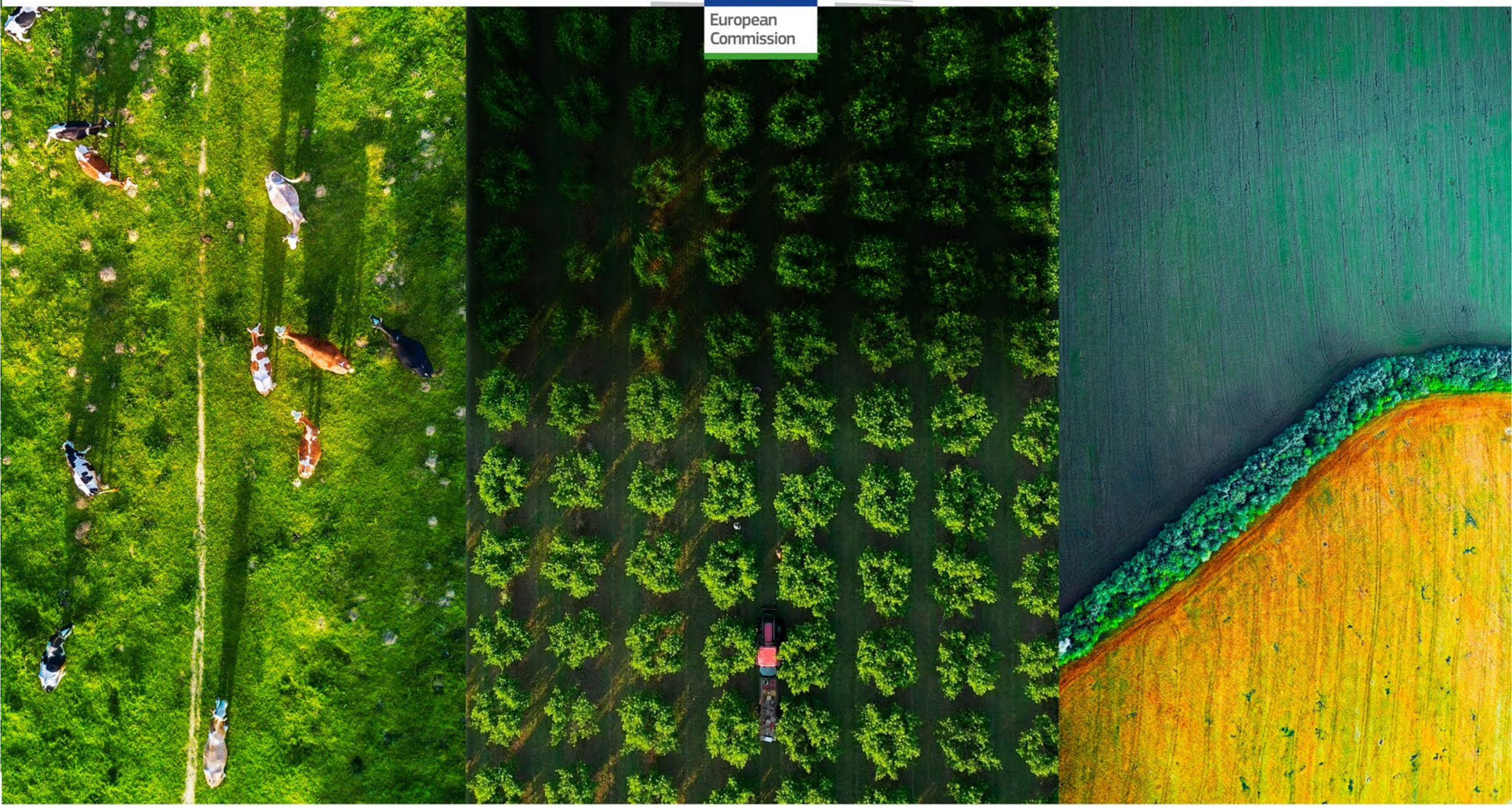

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NOTE TO THE READER

The report presents the medium-term outlook for EU agricultural markets, income and environment until 2032. It is based on a set of macroeconomic assumptions deemed most plausible at the time of the analysis. Short-term inflation and GDP projections are based on the latest European Central Bank forecast in the short term, while in the medium term, in addition also oil prices, USD/EUR exchange rate, are based on S&P Global and the September European Commission's forecast. These were updated in November 2022. Population figures were adjusted in a short term outlook and take into account an inflow of people fleeing from Ukraine in 2022 and follows a declining trend in the medium term. The analyses of agricultural markets rely on data that was available up to the end of September 2022 for agricultural production and trade and an agro-economic model used by the European Commission.

As EU Member States have submitted their CAP strategic plans to the Commission, projections take this into account for 2023-2032. However, the level of ambition stemming from various policy initiatives, notably under the European Green Deal and in particular the targets of the Farm to Fork and Biodiversity strategies, for which legislation is being prepared, is not reflected in the presented baseline. Only free trade agreements that had been ratified up to end of September 2022 are considered.

The report is also accompanied by an analysis of a selected set of market uncertainties. Possible variations are due to fluctuations in the macroeconomic environment and in the yields of main crops and milk. Specific scenarios are also presented for extreme weather events and livestock reduction resulting from requirements for high density regions.

An external review of the baseline and the scenarios was conducted at a hybrid outlook workshop organised on 20 October 2022 by the Directorate-General for Agriculture and Rural Development (DG AGRI), which was led by Franziska Schweiger, Matthias Vancoppenolle and Sabrina Denin. At the workshop, valuable input was collected from high-level policy makers, European and international modelling and market experts, private companies and other stakeholders.

This Commission report is a joint effort between DG AGRI and the Joint Research Centre (JRC), with DG AGRI responsible for the content. As uncertainties on geopolitical macroeconomic developments and trade relations, as well as climate events in the next 10 years remains high, it is important to highlight that the medium-term outlook presents a baseline for any future analytical and scenario work, which would allow testing different development paths.

In DG AGRI, the report and underlying baseline were prepared by Lucia Balog, Piotr Bajek (development of EU farm structures), Paolo Bolsi (macroeconomic environment, agricultural labour and income, food security), Vincent Cordonnier, Andrea Furlan (environmental scenario), Mihaly Himics, Beate Kloiber, Adam Kowalski, Dangiris Nekrasius (sugar, biofuels), Andrea Porcella Čapkovičová (overall coordination, milk, dairy products), Carlo Rega, Alexander Stein (land use, cereals, oilseeds, oilmeals, vegetable oils, protein crops), Jean-Marc Trarieux, Benjamin Van Doorslaer (meats, feed) and Ruben Franco Pescador. DG AGRI's outlook groups and market units helped preparing the baseline.

The JRC team that contributed to this publication included, for the outlook Christian Elleby, Beatrice Farkas (baseline preparation), Ignacio Pérez Domínguez (technical co-ordination of the baseline work); Simone Pieralli (baseline preparation, extreme weather events scenario); for the environmental scenario, Maria Bielza, Franz Weiss, Thomas Fellmann, Mihaly Himics, Jordan Hristov, Renate Koeble, Peter Witzke, Robert M'Barek and Emanuele Ferrari (food security). Marcel Adenauer and Hubertus Gay from the OECD also provided valuable technical support and expertise.

The text on the oilseed complex for selected Member States was prepared by the AGMEMOD consortium, represented by: Verena Laquai (Thünen Institute) with additional contributions from Martin Banse, Marlen Haß and Max Zirngibl (Thünen Institute), Ana Gonzalez Martinez, Roel Jongeneel and Myrna van Leeuwen (Wageningen Economic Research), Mariusz Hamulczuk (Warsaw University of Life Science) and Edit Varga, Anna Boglárka Éliás, Zsuzsa Molnár and Norbert Potori (AKI Institute of Agricultural Economics).

We are grateful to the participants from the October 2022 outlook workshop and to many other colleagues for their feedback in the preparation of the report.

CONTENT

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The total EU cereal area is projected to decrease marginally to 57.2 million ha by 2032, driven by a decrease in barley and maize, and an increase in wheat. Yields of barley and wheat are expected to stagnate, with a slight decrease for the former and a slight increase for the latter. Meanwhile, maize yields may still increase due to yield improvements in eastern EU countries. This is due to translate into a decrease of 1.1 million t below the 2020-2022 average production of cereals (308 million t). Domestic use is expected to decrease, even with an increase in human consumption (+3.9 % compared to 2020-2022), due to lower animal production and feed use (-6.1 %). On the trade side, the EU will remain competitive but face strong competition from other key global actors. It will remain a net exporter of wheat and barley and a net importer of maize and rice.

The report also includes a scenario on how extreme weather events impact yields of the main crops (wheat and maize) and so the respective markets. The results show how exports and imports act as a buffer to the effect of concurrent extremes (i.e. happening once, at the same time, over a large area) as they improve the availability of commodities domestically. Due to the impossibility of substituting the commodities within the EU market when there are concurrent shocks, the EU becomes a net importer of wheat. In the case of recurrent extremes (i.e. happening repeatedly over time in the same area), market disruptions are potentially larger for commodities in which the EU has a stronger trade position, such as wheat.

The EU oilseed area is due to fall to 11.0 million ha, a slight decrease compared to current levels. The areas used for rapeseed and sunflower production are expected to decline, but this reduction is counterbalanced by an increase in the areas for soya beans and pulses. Average oilseed yields are due to continue to increase. Given an expanding area and increasing yields, EU oilseed production is projected to be 32.9 million t in 2032 (30.2 million t in 2020-2022). Production of pulses (+54.7 %) and soya beans (+33.3 %) are expected to increase the most. The EU is due to remain a net importer of oilseeds, but imports are expected to decline. Likewise, the EU will import less pulses and may become largely self-sufficient. While human consumption of pulses is expected to increase markedly, feed will remain their main use.

Oilseed crushing volumes are expected to decrease marginally (-0.8 %), and its composition will also change slightly: rapeseed and soya beans will decline, and the use of sunflower seeds will increase. Internal demand for oilseed meals is due to diminish because of its lower use for animal feed. The EU demand for vegetable oils is due to decline too, driven by lower biodiesel demand and the consumption of oils different than of oilseed origin. Likewise, food consumption of vegetable oils is expected to change its composition, with a large increase in sunflower oil and a large decrease in palm oil. Olive oil consumption is due to continue growing, especially outside the main producing countries (Spain, Italy, Greece, Portugal). In addition, imports of vegetable oil are expected to decline, driven by a reduction of palm oil imports (from 6 million t in 2020-2022 to 3.3 in 2032) that more than compensates the increase in sunflower oil imports (from 1.1 million t to 2 million t).

Projections for the oilseeds market in selected EU countries (Germany, France, Poland, Romania, Bulgaria and Hungary) foresee an area increase in Germany, France and Poland, given the relatively higher prices compared to cereals. Sunflower seed production is expected to grow the strongest, while rapeseed production in Germany and France is likely to sustain its high levels. The crushing capacities in these two countries are not likely to grow due to low margins and declining demand for oils and meals. The opposite trend is expected for Hungary. More strongly increasing production than domestic demand in Romania, Bulgaria and Hungary will lead to increasing net exports. Soya bean meal is expected to be a preferred feedstock (except in Germany). The demand for vegetable oils could slightly grow as well as trade, following changes in supply and demand patterns.

Demand for feed from arable crops is projected to decrease by -4.7 % by 2032 due to the decline in EU pig, beef, and dairy herds. Likewise, the shift to grass-based production systems, driven by an increase in organic dairy production and further extensification, will strengthen this trend. High and low protein feed use are set to decline, but medium-protein feed might increase.

The EU sugar area will slowly decrease to 1.45 million ha, as some growers switch to other crops in view of the challenges posed by plant protein products available for sugar beet. Combined with stable yields, EU sugar production could be reduced to 15.5 million t. Domestic sugar consumption will decline faster than production. This could allow EU sugar exports to grow and, by 2032, they are expected to reach the level of imports.

In the medium term, biofuel demand follows the trends in road transport fuel use. Biodiesel use is expected to stay relatively stable, while bioethanol use is due to increase by 2030 (+13 % compared to 2022) before declining in 2032. Maize will remain the main feedstock for ethanol production, but its share is expected to decline.

Milk and dairy products

The shift to more sustainable EU milk production will translate into an extended adoption of sustainable farming practices, sustained high quality standards and increased differentiation of production systems. Alternative systems, like organic, are expected to grow and gain greater market share. Environmental concerns will reduce the size of the dairy herd further, mostly in intensive production systems. While animal welfare and more efficient feeding strategies may contribute to still increasing yields, they may not offset the reduction of the dairy herd. This could lead to a decline in EU milk production by 0.2 % per year by 2032.

Despite the slowdown in milk production growth in the EU, it will remain the largest global dairy supplier (24 % of the global dairy trade in 2032). However, global dairy exports are expected to be reduced, as many traditional importers will improve their self-sufficiency. Also, the volume growth recorded in the past will be hard to improve. This will lead to lower growth for the trade in milk powders especially. On the other hand, new trends like premiumisation and the increasing role of foodservice are likely to push the sector towards exports of high-quality products.

The reduction in EU milk production will not lead to a proportionally lower milk processing capacity, as protein and fat content could improve. Cheese and whey production will benefit most from the milk produced. Meanwhile, due to increasing competition, whole milk powder production and some applications of dairy solids are likely to decline.

Nutritional aspects and functionality will drive EU dairy demand. Consumer preferences will increase the consumption of certain products, such as those with less fat and sugar, and fortified or functional dairy products. The growth in EU consumption of cheese could remain relatively modest and expanding production could be supported by rising exports. The EU will keep its position in the global trade of whey powders, mainly growing in food uses. Meanwhile, EU exports of skimmed milk powder will remain at a comparable level to 2020-2022, and the low competitiveness of EU whole milk powder could lead to reduced EU exports.

By 2032, EU cheese and whey powder prices are due to increase the most relative to their already high 2020-2022 value (0.7 % and 2.4 % per year, respectively). Butter will reach a comparable level to its current price. As a result, the EU raw milk price is expected to be around EUR 45/t by 2032.

Meat products

Global meat consumption is expected to continue growing. A large share of demand will be met by domestic production, but 1.8 million t of poultry meat and 1.3 million t of beef will come from increased imports. The EU will be benefitting only to a limited extent, mainly for poultry meat.

Sustainability will play an increasingly prominent role in EU meat markets. Meat production will be more efficient and more environmentally friendly. The spread of animal diseases and market opening through free-trade agreements both will be important factors of change, though with opposite effects. On the other hand, consumers' concerns about the environment and their health, as well as convenience trends, will shape meat consumption, leading overall to a slight decline to 66 kg per capita by 2032 (-1.5 kg per capita). The composition of the meat basket is also expected to change, with a more significant reduction in beef and a substitution of pig meat by poultry.

Following the decline in the EU cow herd (-9.1 %), production of beef is also expected to fall. EU beef consumption is due to decline by 0.8 kg per capita by 2032. Meat export opportunities may improve in the medium term but will be offset by a decline in live animal exports due to increased competition and animal welfare concerns over long-distance transport. EU beef imports will slowly increase to pre-COVID levels. Prices are expected to come down and stabilise at EUR 4000/t by 2032.

EU pigmeat consumption is due to decrease by 0.4 % per year (or -1.3 kg per capita) by 2032, due to health, environmental and social concerns. Likewise, China's production capacity is projected to recover sooner than expected, with a massive impact on EU exports to Asia. These two factors, together with lasting effects of African swine fever, will lead to a reduction of 1 % in EU pigmeat production. Prices should go down until 2025, when they should stabilise around EUR 1500/t.

EU poultry production and consumption are expected to continue growing by 0.2 % per year, slower growth than in the past decade due to environmental restrictions and concerns, as well as changes in consumption (less meat). Exports will also recover by 0.8 % per year, thanks to increasing demand in Sub-Saharan Africa, the Philippines, and the UK. The poultry price is expected to decrease and stabilise around EUR 2000/t by 2032, above pre-COVID levels.

EU production of sheep and goat meat is projected to increase slightly by 0.2 % per year. Consumption is expected to remain stable at 1.3 kg per capita by 2032. Exports of live animals will decline, mainly due to financial risks and animal welfare concerns, which can be impactful in anticipation of possible regulatory changes. Exports of meat are expected to catch up due to consolidation of trade with partners in the Near and Middle East. Exports to the UK, representing half of EU meat exports, will remain stable. Likewise, imports will recover in the short term and decline slightly over the medium term. Prices are due to follow a downward shift but reach a level higher than before COVID-19.

Food security

High EU self-sufficiency rates across agricultural products derive from favourable natural conditions, diversity of territories and climate, and the competitive EU position relative to some other global suppliers. This also reflects the cumulative results of the CAP over the years, while food security is a core goal of the EU Treaty.

In the next 10 years, the EU is expected to remain self-sufficient in wheat and barley, while for maize, favourable world prices are likely to favour imports over domestic production growth. Historically, the EU has low self-sufficiency rates in oilseeds. However, the expected increase in feed demand for GM-free meals, relatively higher profitability compared to cereals and reinforced crop rotation are likely to push the production of oilseeds up, resulting in a higher EU self-sufficiency, especially in soya beans.

EU self-sufficiency rates are above 100 % overall for animal products and these rates are likely to persist, despite some reduction in EU because consumption is also expected to decline (especially in meats) and export growth could also fall.

The EU is due to reinforce its positive net trade position (+21 % increase in net trade compared to 2022), with exports of high-value food products, beverages, and dairy more than compensating for imports of commodities such as vegetable oils and animal feed. At the same time, EU exports will remain well-diversified while diversification of EU imports may be reduced, but without significant exposure to a large concentration of suppliers.

Average food expenditure at household level is expected to decrease by 2 percentage points in 2030 compared to 2020 (20 %), which is a record level. Over the medium term, greater convergence is likely between EU-13 and EU-14 countries. Nevertheless, these projections have to be considered with special caution, against the backdrop of uncertainties about broader socio-economic impacts of crises (such as changes in livelihoods, growing inequalities).

Agricultural income and labour

Overall, the **value of EU agricultural production** is expected to grow slightly, with the value of crop and animal production projected to return to levels similar to 2019, from 2025 onwards. Regarding input costs, energy and fertiliser costs are due to remain higher than in the past in the short and medium term, although the uptake of renewable energy, more diversification of energy supplies, more energy-efficient practices and better-targeted fertiliser use are expected to reduce the economic impact of these costs for farmers.

Total farm income adjusted for inflation is expected to remain at a comparable level to 2010-2012, but below a peak seen in 2022 due to high agricultural prices. The real income per worker, considering a slower but continuing shrinking in the labour force in the next 10 years, is expected to increase by 1.1 % per year between 2012 and 2032.

Based on the latest Farm Structure Survey (census year 2020), there were 9.1 million farms in the EU (25 % below the 2010 figure). At the same time, the number of large farms (above 100 ha) increased by 14 % and they cultivated around 50 % of utilised agricultural area. Around 80 % of EU farms are specialised, with field crops accounting for one third while livestock specialized farms showed the sharpest decline (-40 %).

Environmental scenario on lower livestock density

This report presents a scenario analysis of potential impacts of a lower livestock density per ha of utilised agricultural area, inspired by ongoing discussions in some EU countries. Additionally, livestock density may be among the options to reach the Farm to Fork target regarding a 50 % reduction of nutrient losses.

A set of scenarios has been considered, simulating livestock density thresholds of 2 and 1.4 livestock unit per ha in all EU countries in 2030, which would affect current hotspot regions with high density. Likewise, the effects of a feed additive for the reduction of methane emissions are also included.

The analysis quantifies the environmental benefits and the economic impact of a lower livestock density. It would lead to a significant drop of greenhouse gas emissions in the EU (although offset by a leakage effect in other parts of the world). Livestock density reduction in hotspot areas can also reduce the EU average ammonia emissions from agriculture up to 11 % and average nitrate pollution per hectare up to 12 %. Reductions would be much more significant in hotspots regions, up to 50-60 % in some of them.

As regards the economic impact of the scenarios, a general increase in prices of animal products can be observed, due to a lower supply, with producer price increases highest for pigmeat, eggs and beef. By contrast, crop producer prices, in particular feed crops, will decrease on average, driven by the lower demand for animal feed. In terms of EU production, reductions are most significant for meats and eggs, while remain limited for dairy. Regarding impacts on trade, EU exports of poultry and pigmeat are the ones declining most.

ABBREVIATIONS

ASF	African swine fever
AWU	annual working unit
CAP	common agricultural policy
CH_4	methane
CO_2	carbon dioxide
COP21	the twenty-first session of the Conference of the Parties, United Nations Framework Convention on Climate Change
CV	coefficient of variation
DG	Directorate General
EC	European Commission
EU	European Union (of 27 Member States)
EU-27	EU without the UK
EUR	euro
FAO	Food and Agriculture Organization of the United Nations
FDP	fresh dairy products
FTA	free trade agreement
GDP	gross domestic product
GHG	greenhouse gas
GM	genetically modified
ILUC	indirect land-use change
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
K	potassium
LSU	livestock unit
MTO	medium-term outlook
N	nitrogen
N_2O	nitrous oxide
NO_3	nitrate
NH_3	ammonia
OECD	Organisation for Economic Cooperation and Development
P	phosphorus
SDG	United Nations Sustainable Development Goals
SMP	skimmed milk powder
SSR	self-sufficiency ratio
TRQ	tariff-rate quota
UAA	utilised agricultural area
UK	United Kingdom
US	United States of America
USD	US dollar
WMP	whole milk powder

bbl	barrel
c.w.e.	carcass weight equivalent
CO_2 eq.	carbon dioxide equivalent
eq.	equivalent
g	gram
ha	hectare
hl	hectolitre
kcal	kilocalories
kg	kilograms
km^2	square kilometre
l	litre
mg	miligrams
Mt	million t
pp	percentage point
ppm	parts per million
t	tonne
t.o.e.	tonne oil equivalent
w.s.e.	white sugar equivalent

INTRODUCTION BASELINE SETTING

/1

This chapter presents the main assumptions used for the projections in the medium-term outlook for the major EU agricultural markets and agricultural income to 2032. It includes assumptions about the policy and macroeconomic environment, as well as key results of the analysis carried out to assess possible developments caused by uncertain conditions.

The baseline comprises a set of coherent macroeconomic assumptions, despite the significant degree of uncertainty due to the ongoing war in Ukraine. Macroeconomic assumptions for the EU are based on the latest European Central Bank September forecast for 2022-2024 and S&P Global macroeconomic forecasts for the longer term. The OECD and FAO provided the global agricultural outlook. Oil prices, population, USD/EUR exchange rates forecast were also accounted for based on S&P Global projections.

Normal agronomic and climatic conditions in the projection period and steady demand and yield trends are also assumed, without anticipating any market disrupting events (e.g. climatic events, animal diseases, trade disruptions). In addition, the medium-term projections reflect agricultural and trade policies in place in November 2022 (and later if CAP strategic plans were approved after this date), including agreed and ratified trade agreements only.

BASELINE SETTING AND POLICY ASSUMPTIONS

Setting the scene

This report was prepared in a challenging environment. Earlier this year, there were some signs of a post-COVID recovery which firstly led to increasing demand, while some disruptions occurred in supply and trade (e.g. missing and costly containers, severe congestion in ports) as demand grew unevenly - also because it was still constrained by new waves of COVID-19. In particular, the zero-COVID policy applied by China contributed to many disruptions. At the same time, commodity prices and input costs started to increase.

This environment of already increasing prices and costs experienced new shocks when Russia invaded Ukraine in February. These shocks also brought further uncertainties to energy as well as agricultural markets and global food security. The duration, implications and further developments of this invasion remain a great source of uncertainties that are shaping the 2022-2032 outlook for EU agriculture.

These challenges came on top of the changes already observed due to climate change, disruptive weather events and outbreaks of animal diseases, and put the resilience of EU agriculture to the test. However, they also increased the need to act, and to facilitate the transition of EU agriculture towards higher sustainability standards, into a more resilient food system, and strengthened food security.

The common agricultural policy (CAP) is and will remain an essential framework to facilitate this transition in EU agriculture. In this report, CAP strategic plans of individual EU countries are considered, and policy stability until 2032 is assumed. The analysis included in this report contains considerations and implications for individual agricultural markets based on CAP specific objectives and other policy actions. These include sustainable production methods in both crop and livestock sectors, reduced energy dependency by increasing renewable energy production (without undermining food production), reinforced sector resilience and changing diets. Further opportunities stemming from new markets are also reviewed. These are complementary to actions supported via the CAP.

Other actions stemming from the Farm to Fork or Biodiversity strategies are considered only in cases when the legislation is already approved and implemented[1]. Otherwise, the direction of change related to these actions is only considered to the extent currently observable in individual markets.

In this report, it is assumed that the agricultural area under organic farming will increase further from the current 9 %[2] in 2020, driven in particular by the increase in financial support for organic farming, based on the information provided in CAP strategic plans.

This new policy environment is unfolding after more than two years when the world and the EU have been facing challenges of historic magnitude. These bring EU agriculture to a turning point. Since the 2004 EU enlargement, EU agriculture underwent significant changes, leading to greater productivity and production. These were stronger in EU-13 countries[3], which, thanks also to EU funds, underwent significant structural change. While in 2002-2004, the average cereal yields of the EU-13 were 38 % below that of the EU-14[4], in 2020-2022 the gap was only half. In milk production, although yields were growing faster in the EU-14 (+1700 kg/cow in 2004-2020), the relative change was higher in the EU-13 (+34 % compared to 27 % in EU-14). This led to a smaller gap over the years (70 % in 2018-2020). However, these adjustments are likely to slow down in the coming years, resulting in slower growth in EU-13 countries. And EU-14 countries are likely to face some productivity growth constraints. The cost of increasing production will be even higher in environmental and social terms, in addition to the economic ones.

Productivity gains were also mirrored in changing farm structures (with fewer and bigger farms, revealed by the 2020 farm structure survey results) and a growing trade surplus. For example, while in 2002-2004, aggregated EU meat exports represented around 10 % of EU meat production, in 2020-2022 this was around 17 % (driven by a high export demand for pigmeat in 2020-2021). Increasing trends have also been observed in EU cereals exports as well as dairy products. However, the events of the last two years (COVID-19, invasion of Ukraine, climate change, extreme weather events, outbreaks of animal diseases) created unprecedented conditions for EU agricultural markets, affecting production, consumption and trade patterns.

1 A timeline for Farm to Fork actions can be found here: https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en#inf%20o

2 This annual evolution is based on annual organic crop statistics (based on data collected through the organic certifying bodies), which differs from data collected for the farm structure survey (through national statistical institutes, directly from farms), available every 10 years. The latter depicts a lower level of agricultural area under organic farming in 2020 (8.3%), but a stronger increase from 2010 (+119%). As of 2025, data to monitor the annual area under organic farming will be collected and reported under the regulation on statistics on agricultural input and output.

3 EU countries which accessed the EU in 2004 and later.

4 EU countries which access the EU before 1 May 2004.

At a turning point

Until now, the EU has been able to increase agricultural productivity and thereby also production, which led to increasing trade surpluses, while greenhouse gas (GHG) emissions have stagnated since 2010, which made the EU an exception among the largest global agricultural producers. More generally, the European food system has become a globally trusted provider of safe, nutritious, and high-quality food.

In 2023-2032, driven by the challenges faced in the last two years and by the policy changes initiated by the new CAP, EU agriculture is expected to become more sustainable. In this respect, the economic sustainability of EU farms is due to be supported via continued income support but also through other incentives (e.g. promotion) which could help farmers not only to add additional value to their products but create market opportunities for them. The environmental sustainability will strongly be reinforced through enhanced conditionality and other actions to protect natural resources, biodiversity, soil health, and help to adapt and mitigate climate change impacts. Last, but not least, social sustainability will be reflected via a stronger focus on animal welfare, but also rising concerns of consumers for nutrition and health, with some likely changes taking place in the EU dietary patterns. Through an increased sustainability, also the long-term resilience of EU agriculture could be improved. At the same time, current sustainability commitments (e.g. COP21, SDGs), which are further supported through the new CAP, also reinforce food security.

For some years, the EU has been moving in this direction, supported by concrete public policy actions as well as slowly changing consumption patterns (e.g. towards more plant-based diets).

As stated in the EU Treaty, fair income for farmers and reasonable prices for consumers remain key objectives of the EU agricultural policy. This can be achieved not least by having a productive and competitive agricultural sector. Transition towards a more sustainable EU agriculture sector also presents a 'first mover' opportunity for players in the food supply chain. More sustainable food systems could also help to tackle some volatility coming from exposure to external markets. As seen already, these can be easily disturbed/disrupted by geopolitical events, climate, weather, or other events. Limiting excessive volatility should also help to diminish potentially disruptive impacts of distortive events on markets, but also economies in general. International trade remains crucial in a new geopolitical order, with a move from global to bilateral/multilateral partnerships, which would still allow the EU to contribute to food security globally.

In this report, changes related to an increased sustainability remain a key factor affecting future developments in the EU. Compared to past increasing trends, EU cereals yields are now expected to stagnate, given the counterbalancing effects in place.

On the one hand, there are:

- the impacts of climate change and more frequent disruptive weather events;
- an expected reduction in the use of agricultural inputs (plant-protection products, fertilisers, antibiotics, irrigation);
- an ongoing move towards lower-yielding farming systems (e.g. organic);
- restrictions on growing genetically engineered crops;
- the continuing regulatory restrictions on other modern breeding technologies (e.g. gene-editing).

On the other hand, other innovations could counteract the dampening effects on yields. These include innovations related to precision agriculture, or improved farming practices (e.g. due to crop rotation having become a conditionality for direct payments).

Production of wine, oranges, fresh tomatoes and apples is also likely to be challenged and changed in the future. Besides increasing costs in the short-term, other factors could be a reduced use of plant-protection products, fluctuating water availability for irrigation, increasing frequency of droughts and heatwaves, a lack of seasonal workers and increasing competitiveness from outside the EU. Overall, these sectors are likely to experience a production decline. However, some adjustments are likely to take place, by incorporating some new varieties to adapt to new climatic conditions and consumer preferences. In addition, consumption of processed fruits is likely to decline, while consumption of fresh fruit could grow. In the wine market, the growth of quality wines is due to add value to the sector in the future as well.

The ongoing dietary shift away from animal protein is expected to drive a decline in EU meat consumption, which is another noticeable change compared to last years' outlook report. This results in some reduction in meat production but also creates surpluses that can generate increased exports.

Similarly, after the continuous growth observed in past, EU milk production has likely reached its peak and could decline in future. This is mainly due to a lower yield growth which is a result of larger extensive and organic production systems, and of declining dairy herds in intensive systems, which are also more intensive in terms of labour.

Outlook assumptions

This outlook covers the period from 2022 to 2032. The projections are based on the 2022-2031 OECD-FAO Agricultural Outlook, updated with the most recent global macroeconomic and market data for the EU and world prices. The macroeconomic assumptions consider the latest forecast and analysis available in early November 2022. The statistics and market information used to project the short-term market developments were those available at the end of September 2022.

Best efforts were made to take the most plausible macroeconomic assumptions for the period covered by the report (2022-2032). Overall, macroeconomic developments are expected to bring a lot of uncertainty, with inflationary pressures growing in the short-term because of high energy prices and increasing cost of raw materials. This is also expected to affect food prices and household spending. Disruptions in international trade due to Russia's war of aggression are expected to bring further uncertainties as well, without a clear view regarding how long this could last and what the future consequences would be once the war is over.

Compared to last year, macroeconomic assumptions imply a short-term change to exchange rate developments. In the short term, the euro is expected to remain weak against the US dollar, which implies relatively cheaper prices for EU exports on the one hand, but higher import costs on the other. In the medium-term, it is assumed that the euro will become stronger again.

In this report, a temporary increase of the EU population due to an inflow of people fleeing from Ukraine is taken into account in 2022, while in a longer term, a declining trend is followed as in the past and indicated in several resources.

Methodology

As the nature of econometric modelling suggests, market developments are assumed to move forward relatively smoothly in the medium term. However, they are likely to be much more volatile each year depending also on unexpected external shocks (e.g. weather events, outbreak of animal diseases). Therefore, this outlook report should not be misinterpreted as a forecast. More precisely, these projections correspond to the average trends that agricultural markets are expected to follow if current policies remain unchanged over the projected period and given a macroeconomic environment that was plausible, but not certain, at the time of analysis.

To provide more reliable comparison of trends, the report uses average values over a 3-year period. For arable crops, milk, dairy products and meats this means that when referring to 2022 (2012), the mean values for 2020-2022 (2010-2012) are used.

Macroeconomic forecasts and crop yield expectations are by nature surrounded by uncertainty. To reflect this, a systematic **uncertainty analysis** around the baseline has been carried out. Such analysis allows us to illustrate possible developments caused by the uncertain conditions in which agricultural markets operate. This report presents possible price ranges for agricultural products around the report's baseline. A more systematic representation of the variability in agricultural markets stemming from these uncertainties is summarised in the section on 'Uncertainty analysis' in this introductory chapter. While many factors were able to be tested and an uncertainty analysis was performed, some factors still remain unquantifiable or difficult to aggregate (e.g. changing consumer perceptions and preferences).

Crisis or market measures addressing severe market disturbances are not modelled: the baseline does not include unforeseen market disruptions and decisions to deploy those measures are taken on a case-by-case basis and are difficult to anticipate.

Given the geographical aggregation of the model used for the EU projections, it is not always possible to account for how direct payments are distributed between and within EU countries or for the targeted allocation of coupled payments. Similarly, the impact of payments' capping, specific schemes for young farmers and the redistributive payment are only accounted for in the projections through expert estimates.

The effects of the Nitrate Directive and other environmental regulations on water and air quality and other environmental policies and measures (e.g. eco-schemes and enhanced conditionality for several CAP payments) are not explicitly taken into account in the model but accounted for in the projections for the individual markets.

In this report, no new **free trade agreements** (FTAs) are included as none have been ratified (the agreement with New Zealand only concluded the negotiations). The baseline takes into account the temporary trade liberalisation with Ukraine, currently in place until June 2023[5].

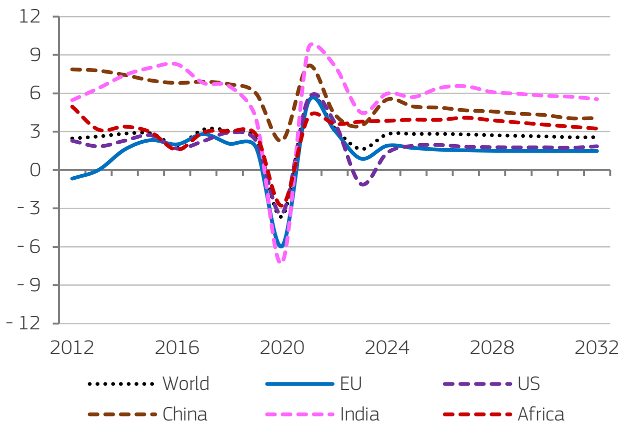
The relationship between the EU-27 and the UK is based on the EU-UK Trade and Cooperation Agreement provisionally applied from 1 January 2021. This assumes duty-free/quota-free trading relations during the outlook period. As the outlook is based on the 2022-2031 OECD-FAO Agricultural Outlook 2022-2031, UK market developments (and thus assumptions about future trade agreements), are not changed in our work. The tariff-rate quotas were re-calculated after they were apportioned between the EU-27 and the UK respectively.

As uncertainties regarding macroeconomic developments and geopolitical and trade relations in the next 10 years remains high, it is important to highlight that this medium-term outlook presents a baseline for future analytical and scenario work by the Commission, which allows the testing of different developments. This baseline may also provide a reference for assessing the impacts of different legislative proposals on agricultural markets and income.

[5] Regulation (EU) 2022/870

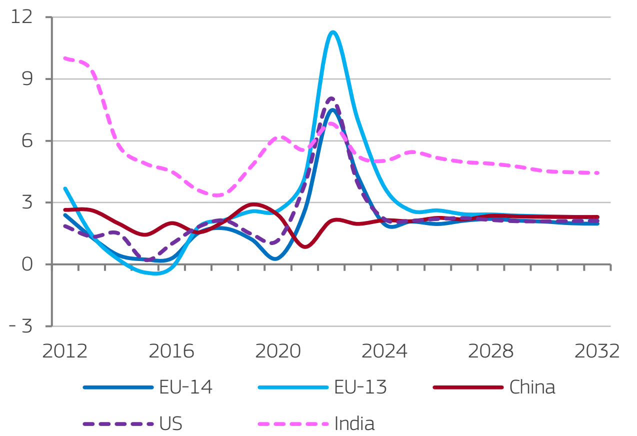
MACROECONOMIC ENVIRONMENT

GRAPH 1.1 GDP - annual growth assumptions (%)



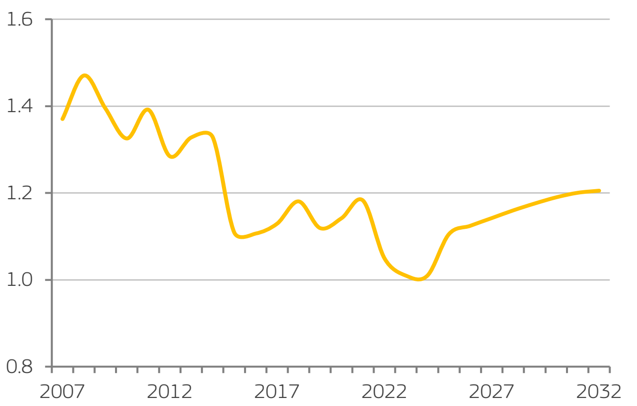
Source: DG Agriculture and Rural Development, based on AMECO, ECB, OECD-FAO, and S&P Global.

GRAPH 1.2 Consumer prices - annual growth assumptions (%)



Source: DG Agriculture and Rural Development, based on AMECO, ECB, OECD-FAO, and S&P Global.

GRAPH 1.3 Exchange rate USD/EUR assumptions



Source: DG Agriculture and Rural Development, based on ECB and S&P Global.

Large macroeconomic uncertainty due to Ukraine war

The development of economic indicators in the short and medium term is significantly affected by the large uncertainty due to economic impacts of the war in Ukraine. Even if the purpose of this report is not to produce macroeconomic forecasts, assumptions need to be made about the most plausible economic environment in which EU agricultural markets will operate. The baseline scenario assumes that global economic growth will level off at an average annual growth rate of 2.6 % by 2032 (4.1 % in China, 5.5 % in India, 1.8 % in the US and 1.5 % in the EU)[6]. While the war in Ukraine is already producing visible economic effects this year, GDP is still expected to grow in 2022, fuelled by increased demand for goods and services after the relaxation of COVID-19 containment measures. Concerns about more limited GDP growth or global recession are instead affecting 2023 macroeconomic forecasts. EU real GDP is projected to grow by 3.1 % in 2022 and by 0.9 % in 2023, before bouncing back to 1.9 % in 2024, returning to its stable path of economic convergence as observed in the past.

Surge of inflation in the short term

The most immediate economic effect of Ukraine war on the EU is the record level of inflation. Imbalances between global demand and supply were already fuelling inflation at the end of 2021, but the disruption in natural gas supplies from Russia has further worsened it, in particular for Eastern European countries. Early estimates of annual inflation in the euro area reached 10.2 %[7] in October 2022 compared to the same month in 2021, with food prices being the second contributor to inflation after energy. The baseline scenario assumes an increase in average annual inflation for EU-14 countries to 7.5 % in 2022 and 4.3 % in 2023, while for EU-13 countries to 11.2 % in 2022 and 7 % in 2023, subsequently returning towards the 2 % annual inflation path until year 2032.

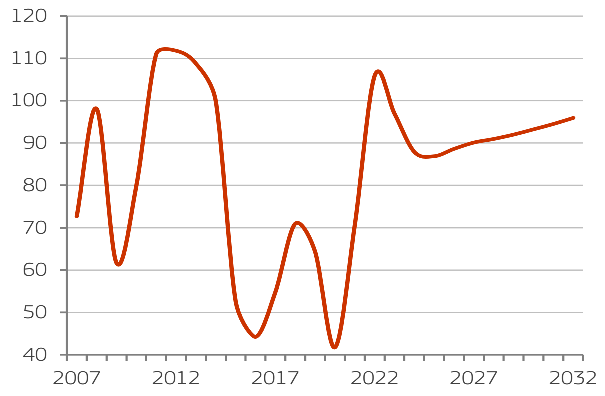
A weaker euro that regains value in the medium term

Exchange rates directly impact the competitiveness of EU agricultural exports. In the short term, the euro exchange rate is assumed to be close to parity with the US dollar to reflect the weakening of the euro up to 2024, based on ECB assumptions. In the medium-term, it is assumed that the euro will appreciate back to 1.21 USD/EUR in 2032, based on S&P Global forecasts.

6 Based on September ECB macroeconomic projections for the euro area in the short term (until 2024), while the medium-term growth is based on OECD-FAO and S&P Global.

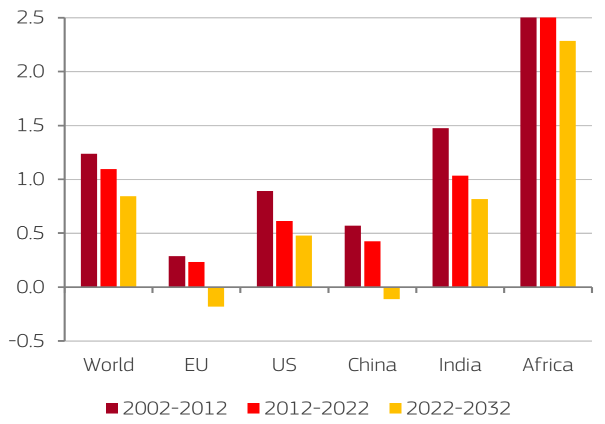
7 Based on September ECB macroeconomic projections for the euro area in the short term (until 2024) and AMECO, in the short term, and assuming 2% in the medium-term.

GRAPH 1.4 Brent crude oil price assumptions (USD/bbl)



Source: DG Agriculture and Rural Development, based on OECD-FAO and S&P Global.

GRAPH 1.5 World population assumptions (% per year)



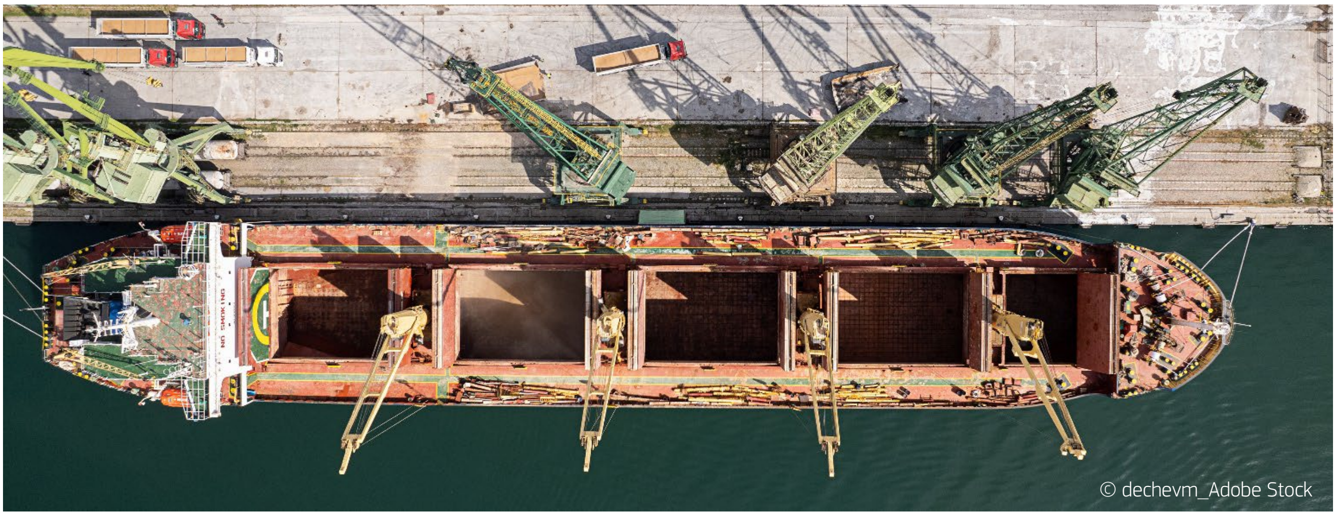
Source: DG Agriculture and Rural Development, based on AMECO, OECD-FAO and S&P Global.

Significant increase in oil prices

Compared to last year's outlook, energy prices have been revised substantially upwards in the baseline scenario following the war in Ukraine, the EU sanctions against Russia and the need for the EU to find alternative supplies. Natural gas prices in the EU have soared to unprecedented levels and this surge has direct repercussions for the EU economy by increasing production costs, which also affects agriculture in particular, as natural gas is used to produce nitrogen fertilisers. In response, the European Commission's the REPowerEU strategy aims to rapidly reduce dependence on Russian fossil fuels and accelerate the green transition. In the baseline scenario, energy prices are projected to be significantly higher than pre-COVID levels. The oil price in this medium-term outlook is projected to reach 106 USD/bbl in 2022, remaining at a level of 96 USD/bbl in 2032, using an average between OECD and S&P Global forecasts.

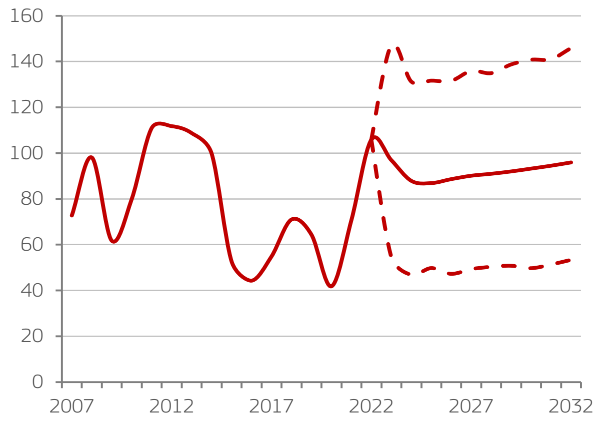
Increase in EU population due to refugees

World population growth, despite slowing to 0.8 % annually by 2032, will remain a key driver of demand growth. African population will grow most (+25 % compared to 2020-2022), followed by Asia (6 %). In 2022-2023, the EU population will be impacted by a significant increase in immigration due to the war in Ukraine. It is assumed that only in 2022 alone, this increase will be around 4.5 million. In the medium-term, the EU population growth is expected to align the trend of S&P Global forecasts.



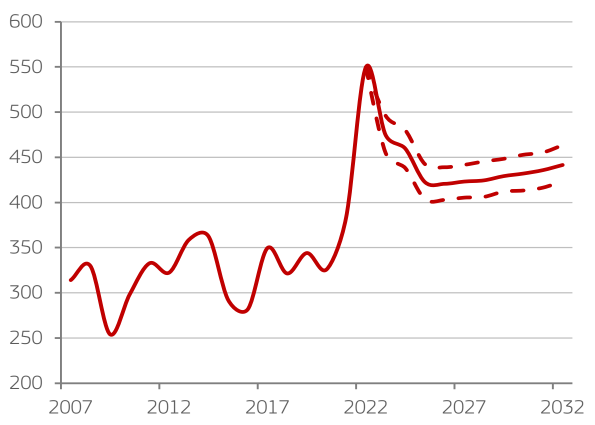
UNCERTAINTY ANALYSIS

GRAPH 1.6 Brent crude oil price projection (USD/bbl) and uncertainty range



GRAPH 1.7 Exchange rate projection (USD/EUR) and uncertainty range

GRAPH 1.8 EU raw milk price projection (EUR/t) and uncertainty range



Note: The area between the dashed lines represents 95 % of the alternative outcome distributions in each year.

Sources of uncertainty

Every outlook report is underpinned by a set of uncertainties which can vary in nature and have varying impacts, from less to more serious, local to global, etc. This has been particularly evident since 2020, when COVID-19 led to a sharp drop in economic activities and unexpected (and uneven) impacts on economic sectors and countries worldwide. These sectors and territories also have varying recovery paths.

The baseline projections presented in this report are based on consultations with market experts and researchers and reflect the consensus view of market developments given specific assumptions on known supply and demand drivers and trends. While any deterministic projection represents just one of many possible trajectories, the possible outcomes have different probabilities of occuring. The results of this uncertainty analysis, therefore, quantify the likely range of market outcomes around the consensus view.

Factors that affect commodity markets can be grouped into those that mainly affect supply and those that mainly affect demand, although there are clear links between the two. In this report, market uncertainty is assumed to stem from macroeconomic and yield developments deviating from their baseline trajectories (deemed most plausible at the time of the analysis). Crop yields and macroeconomic variables are considered proxies for numerous drivers of market developments (see 'Methodology' on the next page). These are also variables that can be quantified, to make it easier to measure their impacts.

However, many sources of uncertainty are hard to predict or quantify. Among many, these are geopolitical and climate events, whose disruptive impact could be very big, as well as changing consumer preferences and habits.

Highly uncertain oil prices and exchange rates

The baseline assumes the oil price to be USD 96/bbl in 2032. However, oil price projections are notoriously uncertain and may possibly range from USD 53/bbl to USD 146/bbl. Energy prices affect agricultural markets through several channels. They affect production and processing costs, the purchasing power of consumers and biofuel demand. High oil prices, for example, drive up production costs (shifting the supply curve upward) and reduce the purchasing power of consumers (shifting the demand curve downward). High oil prices also reduce demand for fuel but increase the competitiveness of biofuels. The net effect on the demand for biofuel feedstocks depends also on market specifics and existing biofuel policies.

Another uncertain factor is the development of the exchange rate which affects trade competitiveness and cost of imported inputs. The baseline assumes that the exchange rate will appreciate from 1.05 USD/EUR in 2022 to 1.21 USD/EUR in 2032. When uncertainty is factored in, the exchange rate ranges from 1.11 USD/EUR to 1.30 USD/EUR in 2032. A higher exchange rate implies a stronger euro, which reduces the competitiveness of EU production, leading to lower exports, while a lower price of foreign products in euro attracts higher imports.

Uncertainty of commodity prices resulting from macroeconomic and yield uncertainty

The uncertainty of factors affecting supply and demand (e.g. oil and gas price, exchange rate, yields) translates into uncertainty in agricultural commodity prices. Even if market trends lead to prices that follows the solid line, that will probably not be the actual outcome. What can be said, however, is that prices are likely to end up somewhere between the two dashed lines provided that the underlying assumptions on market trends turn out to correspond to reality (see an example of EU raw milk price).

Methodology[8]

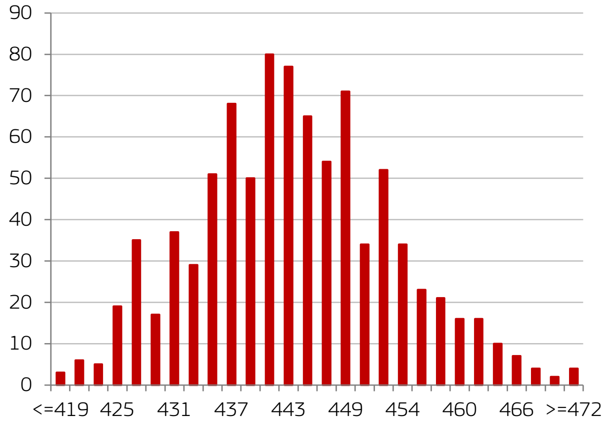
This uncertainty analysis is based on the Aglink-Cosimo model, which is a mathematical representation of global agricultural commodity markets and their interlinkages. In this model, production costs and consumer demand are affected by macroeconomic country-specific variables and the international crude oil price (proxy for energy prices). A change in any of these factors will affect commodity markets through model linkages. Crop and milk yields are endogenously determined with domestic and international prices acting as market-clearing variables. The model allows for changes in equilibrium prices and quantities as long as market balances hold.

The procedure used to assess the uncertainty of baseline projections is the following: first, 140 variables were treated jointly as partially stochastic using empirically observed variability from 2000-2021[9]; next, statistical time-series models were used to separate random movements over time from trends in yield and macroeconomic variables or from stable relationships between them. Then, 1 000 sets of alternative trajectories of yields and macroeconomic variables were generated using statistical techniques accounting for covariation across regional blocks. Finally, the generated time series were used as alternative input data to the model, which was solved for each set thus producing 1 000 alternative baselines. The procedure yielded 89 % successful runs (i.e. in 11 % of the cases combinations of extreme shocks led to infeasible solutions).

The different combinations of yield and macroeconomic factors would lead to different market balances and price equilibria. For example, EU raw milk prices in 2032 resulting from this procedure range from EUR 423/t to EUR 463/t. An input variable with a high historical variability will result in market outcomes (e.g. market balances, prices) that display large variation, too. An indicator of relative variability that allows for comparison across variables measured in different units is the coefficient of variation (CV, %)[10]. The higher the CV value of an input variable, the higher the importance of that variable in driving market uncertainty. The macroeconomic variable with the largest variability is the oil price with a CV value of 23.8 %. Exchange rate is also fairly uncertain ($CV_{USD/EUR\ or\ EUR/USD}$ = 4 %). In comparison, the CV values of EU GDP and the consumer price index are somewhat lower (see Annex).

On average, the EU crops with the most uncertain yields are durum wheat, maize, soya bean, sunflower, sugarbeet and rye (see Annex). Soya bean yield variability is lower in the major exporting countries. Soya beans and other oilseeds prices are affected directly by changes in yields (affecting supply) but also by changes in GDP and inflation that affect supply and demand for food and feed. In addition, the oil price affects their production costs (supply) as well as their biofuel demand. This means that oilseed prices are highly uncertain, which in turn leads to uncertain protein and vegetable oil prices (see Annex).

GRAPH 1.9 Distribution of EU raw milk price (EUR/t) in 2032 (frequency of 1 000 runs)



[8] For more details see Pieralli et al. (2022 - model documentation; 2020 - methodology of uncertainty analysis).

[9] 89 region-commodity combinations of crop and milk yields, 50 country-specific macroeconomic variables (consumer price index, exchange rates, real GDP, GDP index) and the crude oil price (Brent).

[10] Coefficient of variation (CV) = 100 × standard deviation ÷ mean. The CV is a measure of the dispersion of a distribution that is independent of the units of the stochastic variable. In our case, the distribution is that of simulated values in a given year (e.g., the crude oil price in 2032 across 1 000 simulations).

CROPS /2

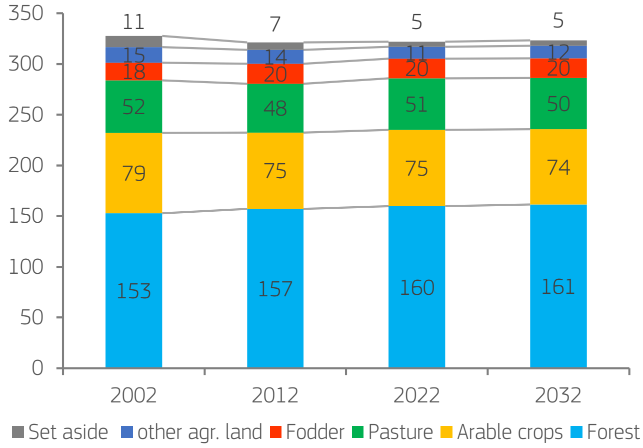
This chapter provides an overview of the outlook for arable crops (common wheat, durum wheat, barley, maize, rye, oats, rice, other cereals, rapeseed, sunflower seeds, soya beans and pulses) and several processed products (sugar, vegetable oils, protein meals, biodiesel and ethanol). It first considers land use developments, before taking a closer look at cereals (incl. rice), oilseeds and protein crops, and the feed complex, sugar and biofuels.

EU production of arable crops is expected to decrease slightly in the medium term. In particular, the yields of cereal crops and sugar beet are no longer expected to increase but rather to stagnate over the coming decade, mostly driven by the growing impact of climate change and the economic constraints on the use of agricultural inputs that cannot be compensated by other yield-enhancing factors (such as precision farming or soil improvement). It is expected that the EU will nevertheless maintain its position as an exporter of wheat.

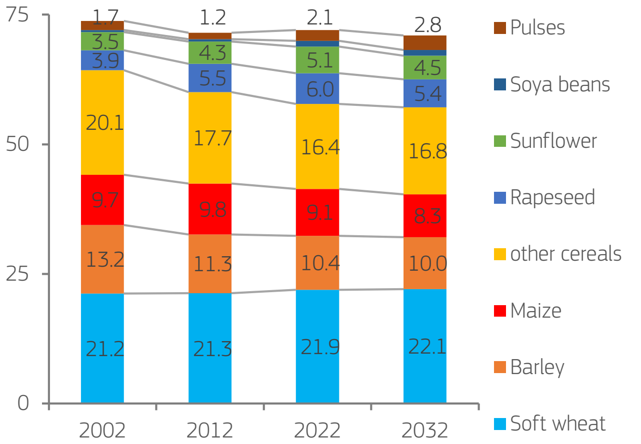
On the other hand, the production of pulses and soya beans are expected to increase significantly, albeit from a lower level. This is not least due to the economic and political incentives for a change in farming practices (crop rotation) and increasing demand for organic soya beans for the growing organic dairy herd, as well as a growing demand for labelled soya products (GM-free, rainforest free) and an increasing move towards more plant-based diets.

LAND USE

GRAPH 2.1 EU agricultural and forest area (million ha)



GRAPH 2.2 EU cereal, oilseed, and protein crop area (million ha)

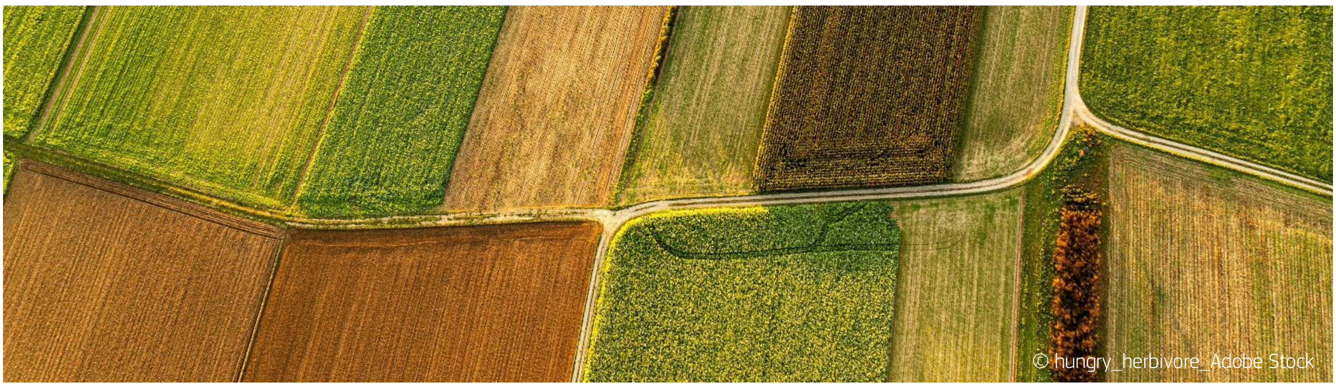


Set aside areas and forests to increase

The total utilised agricultural area (UAA) is projected to remain stable at 162.0 million ha in 2032 (162.3 million ha in 2022). By contrast, given the stronger requirements in the new CAP under enhanced conditionality, fallow land is expected to increase slightly to 5.4 million ha in 2032 (5.1 million ha in 2020-2022). At the same time, the proportion of forest areas continues to increase steadily. Forests have a crucial carbon-storing role and provide other important ecosystem services. A growing need for renewable materials and increasing prices for wood and paper may also boost their economic value. The total forest area could therefore reach 161.4 million ha in 2032 (159.8 million ha in 2022).

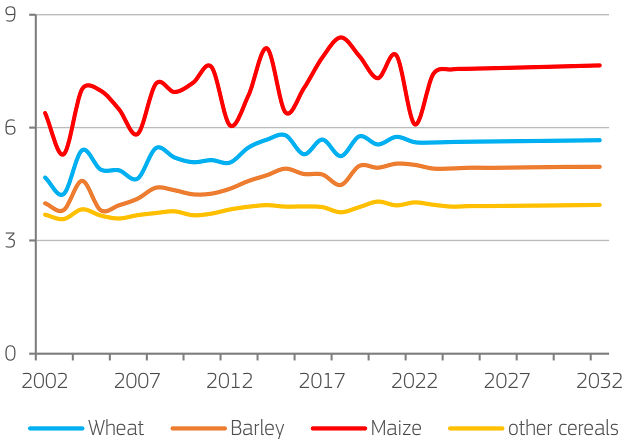
Arable land and pastures to decline marginally

Given that total UAA is to decrease only marginally, overall arable land is also expected to decline only slightly, to 74.3 million ha in 2032 (75.4 million ha in 2022), while the area of permanent grassland is expected to go down to 50.4 million ha in 2032 (50.8 million ha in 2022). Among other types of agricultural land, the area of olives for oil is expected to increase in line with previous trends (to reach close to 5 million ha in 2032), with more areas to be covered by irrigated intensive systems, especially in Spain and Portugal, or to be converted to organic and quality systems, especially in Italy and Greece. The area used for wine production remains stable (3.2 million ha until 2032), while the combined area for apples and oranges is expected to decline from 764 000 ha to 750 000 ha between 2022 and 2032. Among arable crops, by 2032, land area for cereals is expected to decline to 57.2 million ha (57.8 million ha in 2020-2022), and for oilseed by 9.7 % (to 11.0 million ha in 2032), whereas the area for protein crops is expected to grow by 34 % (to 2.8 million ha) (see chapters on Cereals and Oilseeds and Protein Crops). The areas for pasture (permanent grassland) and fodder (e.g. silage maize and temporary grassland) could decline only marginally as an expected extensification of livestock and milk production may somewhat counteract the reduction in the dairy and beef herds across the EU (see chapters on Milk and Beef).

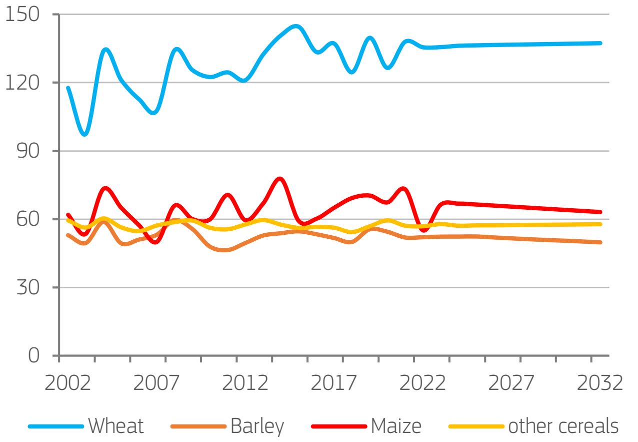


CEREALS and RICE

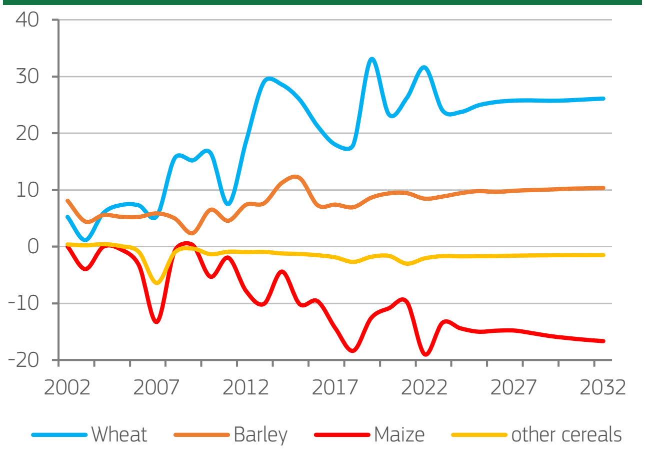
GRAPH 2.3 Cereal yields in the EU (t/ha)



GRAPH 2.4 EU cereal production (million t)



GRAPH 2.5 EU net export of cereals (million t, exports-imports)



Stagnating yields due to climate change and less inputs

The negative effects of climate change and of economic and political factors affecting the development and use of agricultural inputs (fertiliser, pesticides, seeds, irrigation), are increasing, especially in the short term. In parallel, the share of lower-yielding production systems (organic farming) is increasing. These trends cannot be completely offset for all cereals by positive developments that could boost yields and improve sustainability (e.g. growth of precision farming, more crop rotation, or better soil health). Compared to the average in 2020-2022, cereal yields are due to stagnate until 2032 (-0.7 % for barley, +0.5 % for wheat) except for maize yields, which are expected to increase by 7.7 % compared to 2020-2022 as yields were unusually low in 2022. However, higher yields are not the only objective: despite an expected reduction in the use of inputs, more sustainable farming can still sustain current productivity levels.

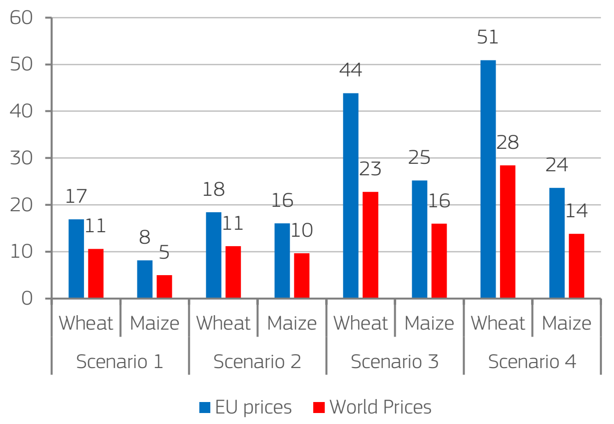
Given that the EU cereal area is slightly decreasing (see chapter on Land use); and due to lower yields, in 2032 overall EU cereal production is expected to fall to 1.1 million t below the 2020-2022 average production of 309 million t (to 308 million t). The areas sown with soft and durum wheat could increase (from the 2020-2022 average area of 23.6 million ha to 24.2 million ha in 2032), driven by the competitiveness of EU wheat and the demand on export markets. However, barley and maize areas are projected to decline (-5.1 % and -10.0 %, respectively). The area used for other cereals (i.e. oats, rye, rice and others) is expected to remain stable (9.6 million ha in 2032 versus 9.7 million ha in 2020-2022), due to growing demand for organic products and the need for longer crop rotations and diversification, which help with climate change adaptation and control pests and diseases.

Decreasing use of feed, higher food demand and trade

The EU's use of cereals in animal feed is expected to drop to 150.5 million t in 2032 (-6.1 % compared to 2020-2022; see chapters on Feed and Meats). At the same time, human consumption of cereals is expected to reach 69.3 million t in 2032 (+3.9 %), also due to anticipated shifts to more plant-based diets. On the trade side, total volumes traded are expected to increase to 78.5 million t in 2032 (+5.8 %), in line with the relative competitiveness of EU producers (greater for wheat and barley, lower for maize and rice). While EU producer prices are expected to come down again slightly over the next 3 years, they are not projected to fall below pre-COVID levels until the end of the projection period (2032).

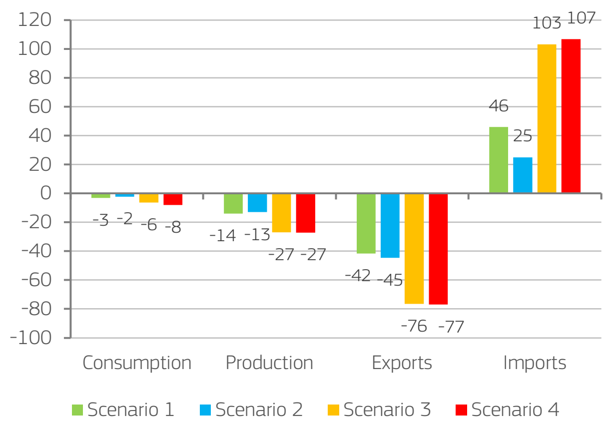
MARKET IMPACTS OF EXTREME WEATHER EVENTS

GRAPH 2.6 EU and world price increases in 2024 (% changes compared to baseline)



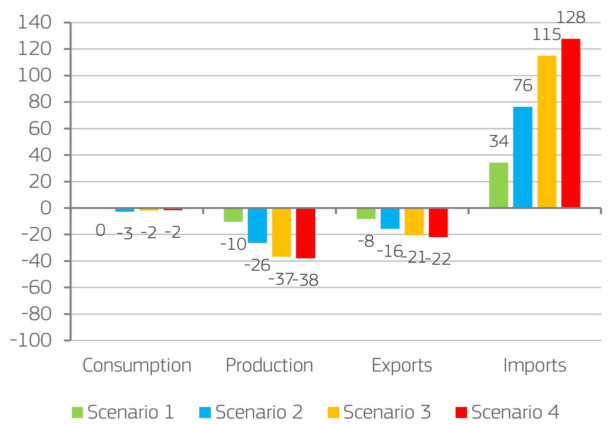
Source: Scenario simulations, based on Aglink-Cosimo model.

GRAPH 2.7 Wheat market balance in 2024 (% changes compared to baseline)



Source: Scenario simulations, based on Aglink-Cosimo model.

GRAPH 2.8 Maize market balance in 2024 (% changes compared to baseline)



Source: Scenario simulations, based on Aglink-Cosimo model.

Background

Extreme weather events are occurrences of unusually severe weather or climate conditions (compared to given thresholds) that can devastate local communities, agriculture and natural ecosystems. Extreme weather events of recent years have ranged from spring frost and hot and dry weather to lack of rain, each having different effects depending on geographical locations and crops. Due to climate change, these extreme weather events are becoming increasingly more likely, longer lasting, and more severe in impact. According to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2021) in the intensity and frequency of hot extremes all over Europe will range between 'very likely' (more than 90 %) and 'virtually certain' (more than 99 %) under projected increases in average temperatures (1.5 to 4°C). Climate change will not only increase the average temperature but also its variability.

The scenario depicted in graphs using the Aglink-Cosimo model attempts to illustrate the potential effects of concurrent (i.e. happening once, at the same time, over a large area) and recurrent (i.e. happening repeatedly over time in the same area) extreme weather events on EU agricultural commodity markets and, in particular, on production and trade.

A combination of concurrent and recurrent events is expected to have a negative and compounding effect on disruptions to EU markets and international trade. On the one hand, if yields fall in two regions at the same time (concurrent extremes), there is a less chance of compensating a smaller harvest or even a crop failure in one location with imports from another location. On the other hand, if yields fall in the same region in consecutive years (recurrent extremes), the effects of subsequent negative events may become stronger over time, for example, due to depletion of stocks during the previous years.

Selection of extremes

To understand the impact of an increased frequency of extreme weather events, several scenarios, with extreme yield losses, are constructed. For this, the worst annual average yields are chosen for wheat and maize in EU countries since 1993[11]. Extreme yield losses are then calculated as the average of the worst (minimum) yield gaps for soft wheat, durum wheat, and maize in the period 1993-2021, weighted by country gross production in 2021.

[11] EC (2022), Short-term outlook for EU agricultural markets, Autumn 2022. European Commission, DG Agriculture and Rural Development, Brussels.

Yield gaps are defined as the percentage difference between minimum and average yields for each region/crop combination over 1993-2021, as shown in the following Table[12]

Regarding the weights for calculating EU averages, annual maize production in the EU is around 60 million t, while that of durum and soft wheat together is around 113 million t. The lion's share of the wheat produced in the EU (around 90 %) is soft wheat.

TABLE 2.1: Lowest and average yields per selected crops and regions (t/ha), and yield gaps (%)

Region/Crop	Lowest yield 1993-2021	Average yield 1993-2021	Yield gaps
EU-14 Soft Wheat	5.3	6.7	20.8
EU-14 Durum Wheat	2.3	3.3	30.9
EU-14 Maize	7.1	9.2	22.4
EU-13 Soft Wheat	2.5	3.9	36.8
EU-13 Durum Wheat	2.2	4.1	45.8
EU-13 Maize	2.6	5.1	49.3

These calculated yield gaps can be illustrated in the context of observed past events. For example, for soft wheat the weighted minimum yield (5.3 t/ha) is very similar to the yield of France in 2016, the lowest in the period considered. For the EU-13, the weighted minimum yield (2.5 t/ha) is very similar to the yields during the 2000 and 2003 droughts in Romania and Hungary respectively. For maize, in the EU-14 the weighted minimum yield (7.1 t/ha) is almost identical to the yield in France in 2003, which was the worst yield in France in 1993-2021. For the EU-13, the weighted minimum yield (2.6 t/ha) is very similar to the drought in Slovakia and Romania in 2000 and 2012 respectively.

Scenario assumptions

The selected yield gaps for maize and wheat underpin the assumptions for the four scenarios set out below that are tested for impacts on production and trade:

- *Scenario 1*: Yields in 2024[13] in **EU-14** decline for maize by -22.4 %, for soft wheat by -20.8 %, and for durum wheat by -30.9 %.
- *Scenario 2:* Yields in 2024 in **EU-13** decline for maize by -49.3 %, for soft wheat by -36.8 %, and for durum wheat by -45.8 %.
- *Scenario 3:* Maize and wheat yields are affected in 2024 **concurrently**, both in **EU-14** and **EU-13** as in scenarios 1 and 2.
- *Scenario 4:* Maize and wheat yields are affected **concurrently** both in **EU-14** and in **EU-13 and recurrently** in 2023 and 2024 as in scenario 3.

Depending on the scenario, the trade exposure and production capability of producers hit by extreme weather events are expected to be increasingly more affected if the events are compound (i.e. when considering concurrent and recurrent extreme events). As a result, there may be some substitution between cereals (e.g. for feed or food use), or additional cereals will have to be imported to meet demand in the affected regions, potentially increasing a region's dependency on trade.

In this analysis, only the EU is assumed to be affected by the extreme weather events, while other world regions are not. If non-EU markets were to be hit concurrently, which would compound the effects even more, the resulting impacts could be more severe depending on the relative competitiveness between EU and non-EU affected regions.

Production and trade impacts

The four scenarios evaluate the impacts of extraordinary shocks (i.e. that exceed normal fluctuations) to yields of wheat and maize in the EU. The production of wheat and maize would drop between -10 % and -38 % in the years of assumed extreme weather events. This would cause stocks and exports to decrease and imports to increase in the EU. Under Scenario 3 (concurrent shocks in both regions), the EU would become a net wheat importer. However, even with increasing imports, cereal availability for domestic use would be drastically reduced, resulting in domestic prices increasing by between 8 % and 51 %, depending on the scenario (see Graph 2.7). Higher demand and lower supply in the EU would translate into even higher world wheat and maize prices, which would increase by between 5 % and 28 %. This may also have negative consequences for global food security.

The negative effects of extreme weather events would be compounded should they occur concurrently in the two EU regions (EU-14 and EU-13). For example, domestic wheat prices would increase by 17 % in Scenario 1 and by 18 % in Scenario 2, whereas they would increase by 44 % in the case of concurrent extreme events (Scenario 3). Thus, concurrent events have strong compounding price effects with respect to the sum

[12] The two EU regions considered in the model are EU-14 and EU-13. EU-14 are EU Member States which accessed the EU before 1 May 2004, EU-13 the remaining ones.

[13] The choice of year is simply to give an example. Other year of the baseline period could have been chosen.

of events in a single region (with prices rising by more than 8 additional pp).

However, the compounding effects would be much smaller for maize. Domestic maize prices would rise by 8 % in Scenario 1 and by 16 % in Scenario 2, but by only 25 % in the case of concurrent extreme events (Scenario 3). This is because the EU is usually a wheat exporter but a maize importer, and non-EU maize exporters would not be affected in the scenarios.

A similar asymmetric impact on commodity prices would occur if concurrent and recurrent yield shocks happened simultaneously (Scenario 4). The impact would be more negative for wheat than for maize, due to the stronger EU trade position for this crop than for maize. Domestic wheat prices would increase by 7 pp more than in Scenario 3 (rising to 51 % over the baseline). Under Scenario 4, domestic maize prices would instead decrease by 1.5 pp compared to Scenario 3 (only 24 % increase compared to the baseline). A very similar pattern is observed with respect for the quantity consumed of the two commodities.

For world prices, the repercussions of the simulated shocks are different. Compounding negative impacts are only expected in the case of a concurrent and recurrent effect (Scenario 4) and only for wheat, for which the EU has a strong net exporter position. World prices for wheat would increase by an additional 5.5 pp when going from a concurrent (Scenario 3) to a concurrent and recurrent yield shock (Scenario 4).

As expected, trade can buffer concurrent yield shocks as it can help balance the supply of crops for domestic use. On the one hand, imports following concurrent shocks would increase more than the combined imports from single (non-concurrent) shocks. Wheat imports would increase by 46 % under Scenario 1 and by 25 % under Scenario 2, but by 103 % when concurrent events occur in Scenario 3 (see Graph 2.8). Under Scenario 3, the concurrent events would put such pressure on agricultural production that additional imports would need to offset production losses from both EU regions. This compounding effect would also apply to maize, but it would be proportionally smaller. Maize imports would grow by 34 % under Scenario 1, by 76 % under Scenario 2, and by 115 % under Scenario 3) (see Graph 2.9). This compounding effect would lead to a remarkable increase in maize imports, though smaller than that for wheat.

On the other hand, the impact of concurrent extremes on exports is smaller than the combined impact of the individual (non-concurrent) events. Exports would decrease less than proportionally for concurrent extremes than for single ones (-42 % in EU-14 scenario, -45 % in EU-13 scenario, and -77 % in the concurrent event scenario for wheat and -8 % in EU-14 scenario, -16 % in EU-13 scenario, and -21 % in the concurrent event scenario for maize).

Impacts on trade would be slightly larger for concurrent and recurrent extremes than for concurrent ones alone. Under Scenario 4, imports would increase by an additional 3.6 pp for wheat and 12.8 pp for maize, while exports would remain basically stable in both cases (additional decrease of -0.5 pp for wheat exports and -1.4 pp for maize exports).

Concluding remarks

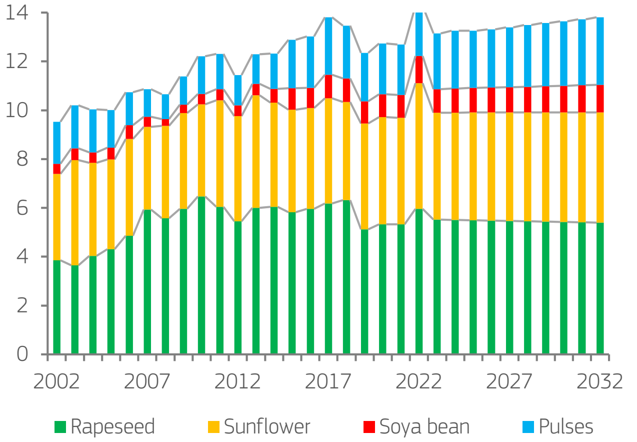
The scenarios show how EU production could be drastically affected by record low yields caused by extreme weather events. In the absence of extremes in non-EU regions, lower exports and higher imports would buffer concurrent extremes as the domestic availability of commodities would improve. In the case of concurrent extremes, the EU would become a net importer of wheat. In the case of concurrent and recurrent extremes, market disruptions would be potentially larger for commodities in which the EU has a strong net exporter position, such as wheat.

There are important caveats to this analysis. It only considers the effects of yield shocks on two major crops (maize and wheat) in the EU. However, it is likely that these weather events also affect other crops and neighbouring countries and regions, including also non-EU regions. Therefore, if more markets were affected, effects on prices and trade (and thus on affordability and availability) could be potentially more severe, depending on the magnitude of the extremes. A more detailed analysis of concurrent yield losses due to extreme events in major trading regions is needed to assess their effects on the resilience of agricultural trade.[14] Moreover, further research on the attribution of negative yield shocks to climate extreme events is essential to understand potential adaptation strategies to more frequent shocks, such as production technology improvements (e.g. better inputs or practices).

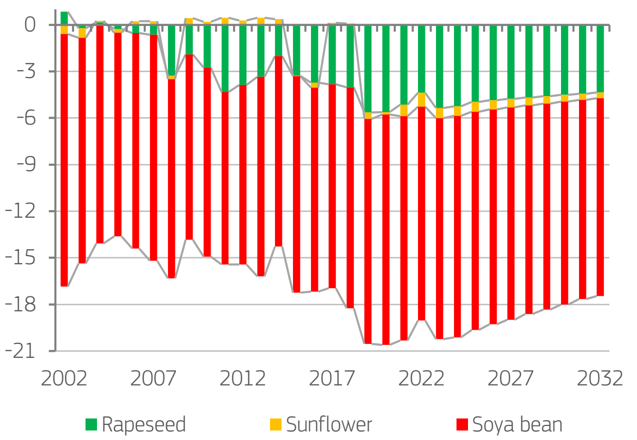
[14] Chatzopoulos et al. 2021.

OILSEEDS and PROTEIN CROPS

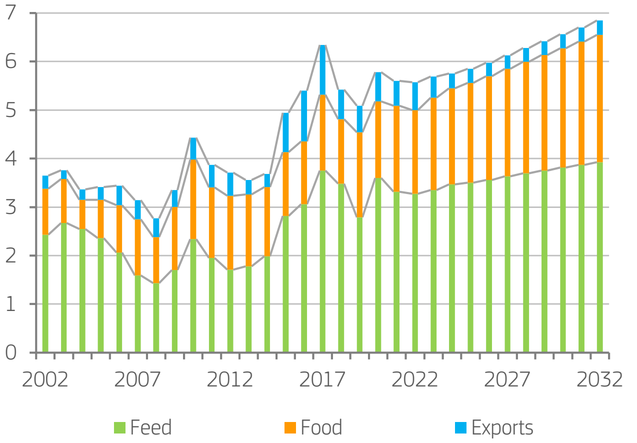
GRAPH 2.9 EU oilseed and protein crop area (million ha)



GRAPH 2.10 EU net export of oilseeds (million t, exports-imports)



GRAPH 2.11 Use of pulses in the EU (million t)



Oilseed area to stabilise, area under pulses to grow

Compared to a peak in 2022, due to the temporary derogation allowing the use of fallow land to ensure food security in the wake of Russia's invasion of Ukraine, and due to high prices for oilseeds, the areas used for rapeseed and sunflower production in the EU are expected to decline in future (by -2.5 % for both crops between 2020-2022 and 2032). However, this reduction of 255 000 ha is more than counterbalanced by the increase of 825 000 ha in the soya bean and pulse-growing areas. Reasons for this expansion include supportive EU policies for protein crops, changing agricultural practices (crop rotation), feed needs for the still-expanding organic dairy herd, the increase in labelled soya products (GM-free), the push for deforestation-free soya beans and, especially for pulses, the move to more plant-based diets.

Production of soya bean and pulses to increase most

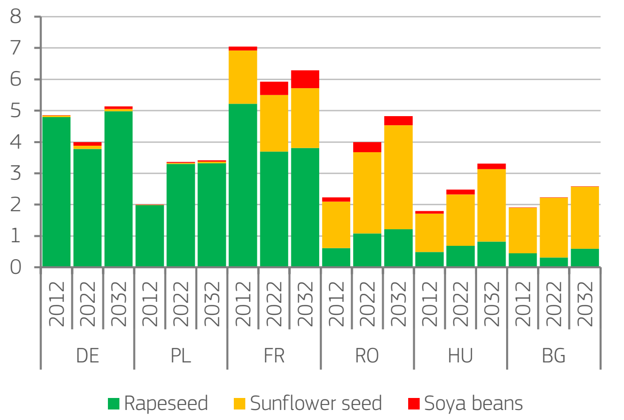
While the area for oilseed crops is set to decline, average yields are expected to continue to increase (albeit without surpassing historical record yields). Overall EU oilseed production is therefore expected to reach 32.9 million t in 2032 (up from 30.2 million t in 2020-2022), with rapeseed, sunflower, and soya bean production expected to increase by +2.8 %, +14.3 % and +33.3 %, respectively. Given an expanding area and increasing yields, the production of pulses is projected to increase by 2.4 million t and to reach 6.7 million t in 2032.

Imports of oilseeds and protein crops to decline

The EU is expected to remain a net importer of oilseeds and protein crops through to 2032, though growth is expected to taper off, with net imports of oilseeds expected to decline from an average of 20.0 million t in 2020-2022 to 17.5 million t in 2032. This is due to increased production and lower domestic demand (also see chapters on Biofuels and on Oilmeals & Vegetable Oils). Over the same period, the import of pulses is expected to decline from an average of 1.3 million t in 2020-2022 to 0.1 million t in 2032, driven by domestic production and increasing world market prices. Human consumption of pulses in the EU is also expected to increase (by 55 % between 2020-2022 and 2032), but feed will remain the main use of pulses (3.9 million t used for feed in 2032 compared to 2.6 million t used for food).

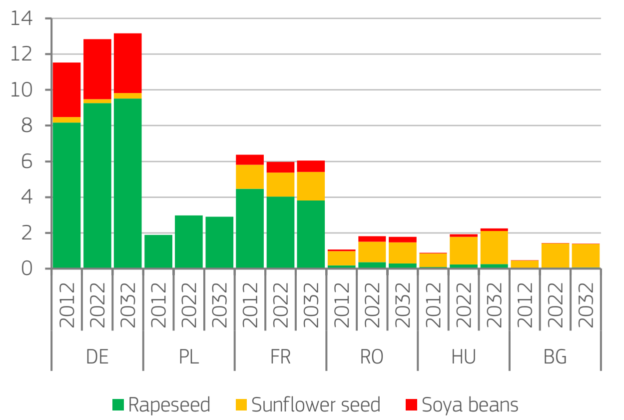
THE OILSEED COMPLEX for selected EU countries

GRAPH 2.12 Oilseed production in selected EU countries (million t)



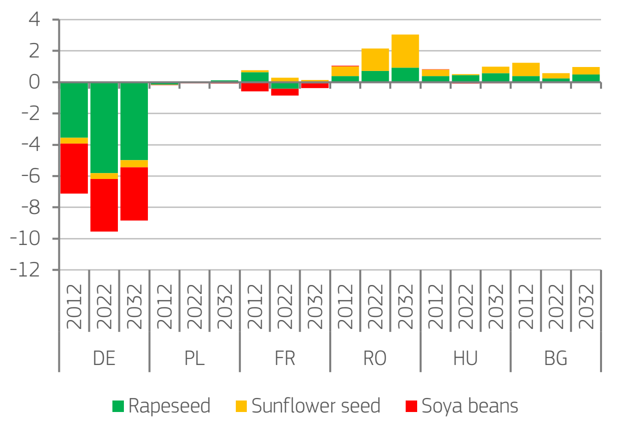
Source: Simulations based on AGMEMOD.

GRAPH 2.13 Crushing of oilseeds (million t)



Source: Simulations based on AGMEMOD.

GRAPH 2.14 Net trade (incl. intra-EU trade) of oilseeds (million t)



Source: Simulations based on AGMEMOD.

Rapeseed production recovers while sunflower production continues to grow

Driven by relatively high prices of oilseeds compared to cereals, the oilseed area is projected to expand between now and 2032 in Germany, France, and Poland, while area expansions in Romania, Hungary and Bulgaria are restricted by crop rotation requirements (oilseed are already cultivated on a quarter to one third of the arable land). The sharp increase in the sunflower area, especially in 2022, is assumed to be a short-term phenomenon due to Russia's invasion of Ukraine and associated policies in the EU such as the derogation to allow cultivation on fallow land.

Rapeseed yields have also started to increase again after significant drops between 2015 and 2020 and are projected to increase slightly further as producers adapt their production system to handle the fewer approved crop protection products. For sunflower, the picture is more diverse with yields increasing in Romania, Hungary, and Bulgaria, and nearly stagnating in France. Despite the projected growth in rapeseed production, France and Germany are not expected to exceed production levels observed in the last decade. Sunflower seed production is projected to increase the most in Romania and Hungary, while only small increases are expected in France and Bulgaria. The production of soya beans will continue to be supported by the new CAP, in Poland, France, Romania, and Hungary. This should result in strong growth rates, albeit from low levels, except for Romania where the support is slightly reduced in the new CAP.

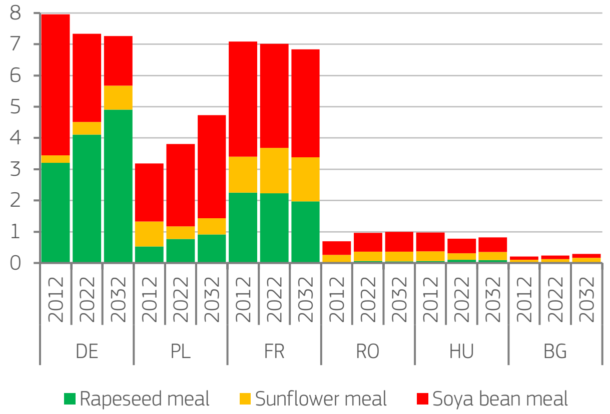
Only slight expansion of oilseed crushing

Crushing, main method for extraction oil, does not necessarily take place in the country from where the oilseeds originate. Germany is a large importer of oilseeds from EU and non-EU countries that are crushed in oil mills located at sea and river ports, whereas France practices crushing predominantly on domestically produced oilseeds. For both countries, crushing capacities are not likely to expand due to low margins and decreasing domestic oil and meal demand. However, expansions might be observed for Hungary driven by increasing oilseed production and growing demand for vegetable oils.

Reduced imports and increased exports of oilseeds

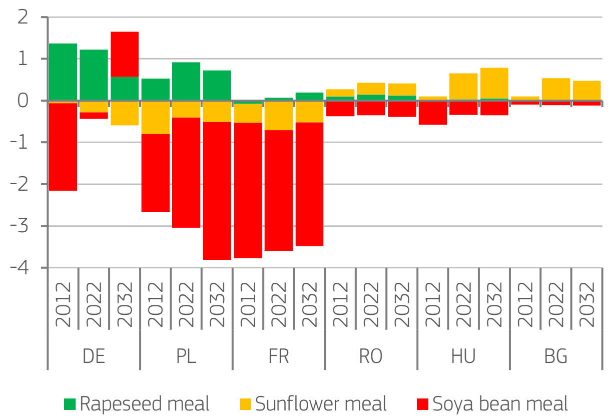
The growing domestic production of oilseeds results in decreasing imports of rapeseed in Germany and of soya beans in France. In Romania, Hungary, and Bulgaria, as production is growing faster than domestic consumption, net exports of rapeseed and sunflower seed are increasing.

GRAPH 2.15 Domestic use of oilseed meals (million t)



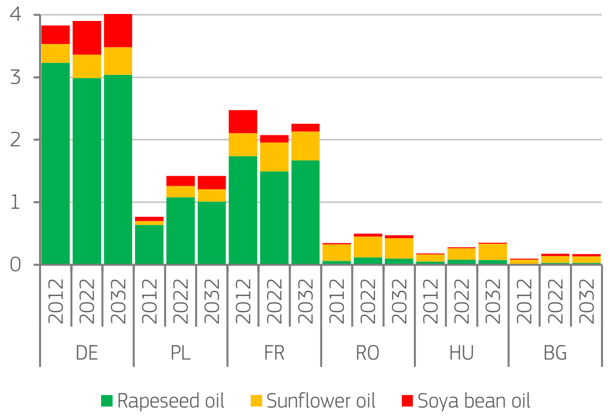
Source: Simulations based on AGMEMOD.

GRAPH 2.16 Net trade (including EU intra trade) of oilseed meals (million t)



Source: Simulations based on AGMEMOD.

GRAPH 2.17 Domestic use of vegetable oils (million t)



Source: Simulations based on AGMEMOD.

Soya bean meal as preferred feedstock except in Germany

The demand for oilseed meals strongly depends on developments in the livestock sector. In most EU countries, the livestock production is projected to decline, in line with lower domestic demand and expected changes in the production systems to cope with multiple challenges (environmental regulations, animal diseases, animal welfare). This should result in an overall decline in demand for oilseed meal. One exception is the growing poultry sector in Poland which is accompanied by an increased demand for soya bean meal.

Most EU countries continue to favour the use of soya bean meal due to its nutritional qualities and competitive price over other oilseed meals. Germany is an exception as the retail sector demands GM-free feed to label their final products accordingly. Therefore, the substitution of soya bean meal with other oilseed meals is projected to continue. This would lead to Germany becoming a net exporter of soya bean meal. The other EU countries considered in this analysis are expected to remain net importers of soya bean meal as their increased soya bean production is relatively small compared to the total demand for soya bean meal.

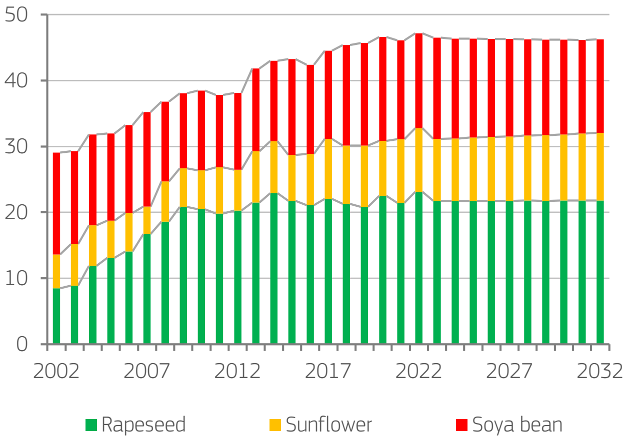
Slight demand growth of vegetable oils and increasing trade

Demand for vegetable oils is dependent on the demand for food and biodiesel. For three vegetable oils considered, the strongest growth in demand is expected to be in Hungary due to increased food use. Increased demand is also expected in Germany and France primarily due to increased biodiesel production.

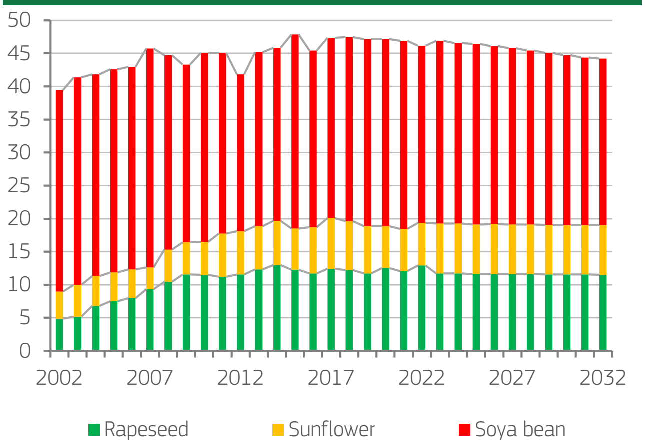
In all countries, rapeseed oil is mainly used as a feedstock for biodiesel production. Due to substitution effects between vegetable oils for biodiesel use, rapeseed oil is projected to increase slightly in Germany and France and only slightly decrease in the other EU countries considered in this analysis. Demand for sunflower oil is growing the most in Hungary and Germany as the demand for ready meals grows, while approximately stagnating or even declining in the other countries considered. The latter may be because of consumer preferences shifting towards more healthy oils, especially in France. Due to its price competitiveness, soybean oil demand is set to increase in all countries except Hungary. The big producers of rapeseed (Germany, Poland, and France) and sunflower seed (France, Romania, Hungary, and Bulgaria) are also net exporters of rapeseed oil and sunflower oil, with exports to increase, except for France which is projected to become a net importer of rapeseed oil and Bulgaria which already exports more than 80 % of its sunflower oil production. Additionally, net exports of soya bean oil of Germany are projected to decline, while net imports of sunflower oil might increase. Of the five countries, only Poland is a net importer of vegetable oils as soybean oil and sunflower oil imports exceed rapeseed oil exports and is expected to remain a net importer.

OILMEALS, VEGETABLE OILS and OLIVE OIL

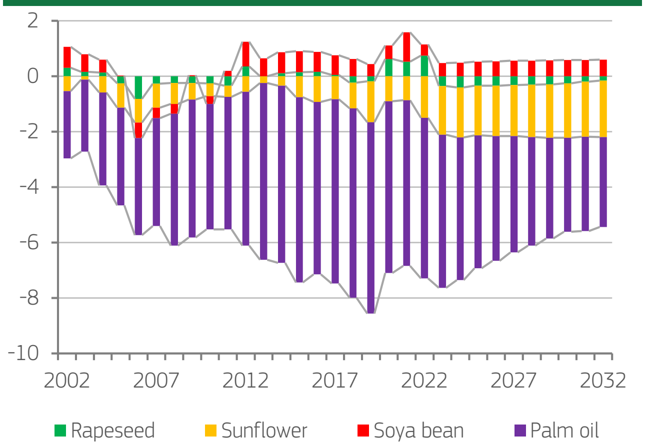
GRAPH 2.18 EU oilseed crushing (million t)



GRAPH 2.19 EU feed use of meals (million t)



GRAPH 2.20 EU net export of oils (million t, exports-imports)



Oilseed crushing stable but changing composition

When crushing oilseeds, two products are obtained: oilmeals (plant protein) and vegetable oil. Overall, crushing in the EU is expected to decrease marginally by -0.8 % from an average of 46.6 million t in 2020-2022 to 46.2 million t in 2032. However, the composition of the crushed oilseeds will change slightly as the crushing of rapeseed and soya beans will decline by -2.4 % and -5.6 %, respectively, while the crushing of sunflower seeds is expected to increase by 10.9 % over the same time, following increases in sunflower production (see chapter on Oilseeds and Protein crops).

Demand for meals and vegetable oils to go down

EU demand for oilseed meals is expected to decrease due to lower animal feed demand, which is expected to decline to 44.2 million t in 2032, down from 46.7 million t in 2020-2022 (-5.4 %,). This is mainly due to better feed conversion, overall lower feed demand from the EU herd, and reduced demand for high-protein feed from organic livestock production (see chapter on Feed). The biggest reduction is expected for soya meal (-9.5 %), while sunflower meal will make gains (+17.2 %) (see chapter on Oilseeds and Protein Crops).

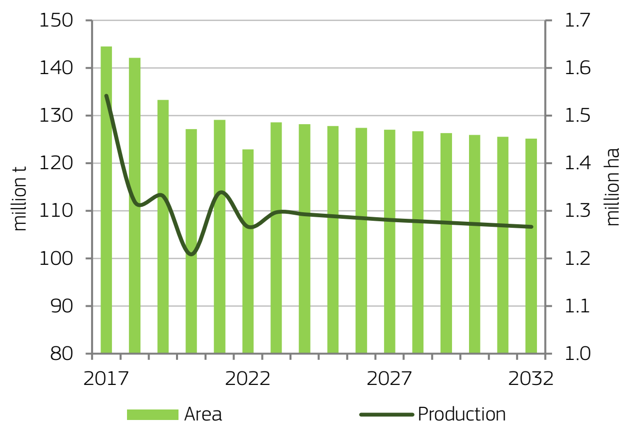
Overall, the use of vegetable oils in the EU is expected to decline from an average of 22.1 million t in 2020-2022, to 21.2 million t in 2032 as they are replaced by other types of oils and due to the diminishing demand for diesel (see chapter on Biofuel). The use of vegetable oils in food is expected to increase slightly by 2.9 % (up from 10.3 million t in 2020-2022 to 10.6 million t in 2032). However, given the efforts to reduce the use of palm oil, the types of vegetable oils used in food are also expected to change (+12.6 % for rapeseed oil, +27.5 % for sunflower oil, -23.5 % for soya oil, and -35.7 % for palm oil). Olive oil is expected to increasingly replace vegetable oils in food consumption particularly outside the main producing countries, driven by a healthy image of olive oil, and an increasing popularity of the various Mediterranean cuisines. This trend is expected to contribute to the decline in demand for vegetable oils and to affect butter consumption, especially in home cooking and foodservices.

Import of vegetable oils to decline

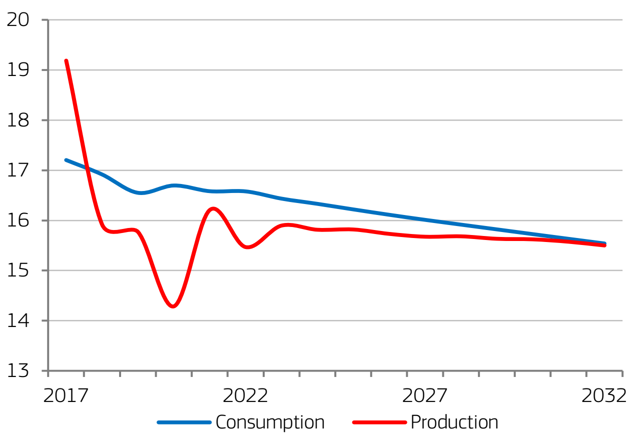
Given the declining EU demand for vegetable oils and the largely stable crushing volumes, imports of vegetable oils are expected to decline by 16.4 % from an average of 5.8 million t in 2020-2022 to 4.9 million t in 2032, driven by a reduction of palm oil imports (from 6.0 million t in 2020-2022 to 3.3 million t in 2032) that more than offsets the expected increase in sunflower oil imports (from 1.1 million t in 2020-2022 to 2.0 million t in 2032).

SUGAR

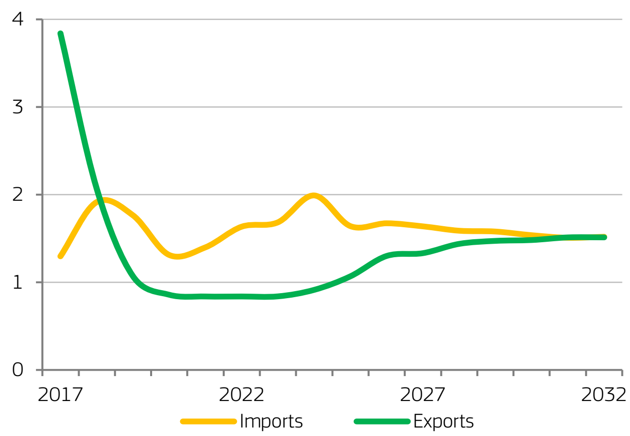
GRAPH 2.21 EU sugar beet area (million ha) and sugar beet production (million t)



GRAPH 2.22 EU sugar production and consumption (million t)



GRAPH 2.23 EU sugar imports and exports (million t)



Stagnating yields and switch to more profitable crops pushing production down

The total EU sugar beet area is expected to slowly but steadily decrease to 1.45 million ha in 2032. An important factor is the lack of viable alternatives to banned plant protection products, especially neonicotinoid substances, and as a result, some growers switch to other crops. This has also caused growth in sugar beet yield to significantly slow down in recent years. In the medium term, the EU's average sugar beet yield is projected to stabilise at around 73.5 t/ha.

As a result of a declining beet area and stable yields, sugar production is expected to slowly decrease, from an average of 15.8 million t in 2023-25 to 15.5 million t in 2032.

Part of the reduction in EU sugar production is expected to be compensated by the increase in isoglucose production, which is projected to grow from around 580 000 t currently to 750 000 t in 2032. Nevertheless, the growth in demand for isoglucose could be limited by reduced food demand and competition from other sweeteners.

Consumption to resume downward trend

Sugar consumption in the EU has been decreasing steadily for many years, largely because of consumers shifting to healthier diets. Given the expected EU population decline and sustained trend of declining per capita sugar consumption, the downward trend is expected to continue in the medium term. Therefore, sugar consumption is expected to decrease by an average of 0.6 % per year and reach 15.5 million t in 2032.

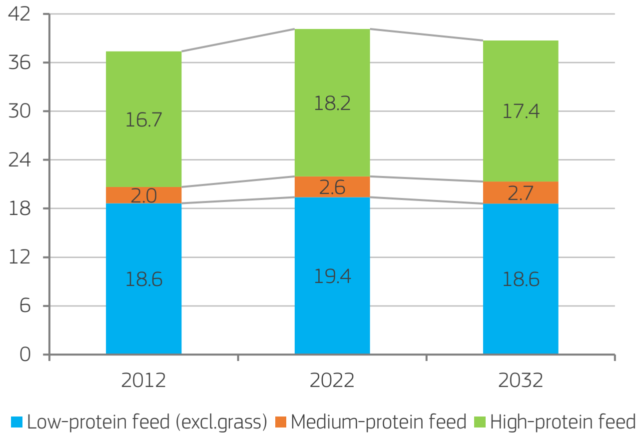
Sugar exports and imports to reach parity

Apart from the first year after the end of the sugar production quotas (September 2017), the EU has always been a net importer of sugar, with average exports and imports of under 1 million t and 2 million t respectively.

As sugar consumption is projected to decline faster than production, EU sugar exports are likely to increase in the medium-term while imports of sugar are expected to slowly decline. By 2032, EU sugar exports are projected to reach the level of imports at around 1.5 million t.

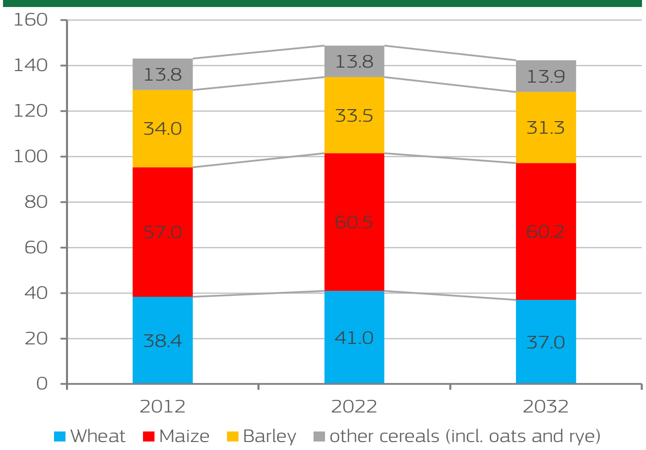
FEED

GRAPH 2.24 EU total feed demand (million t of protein equivalent)

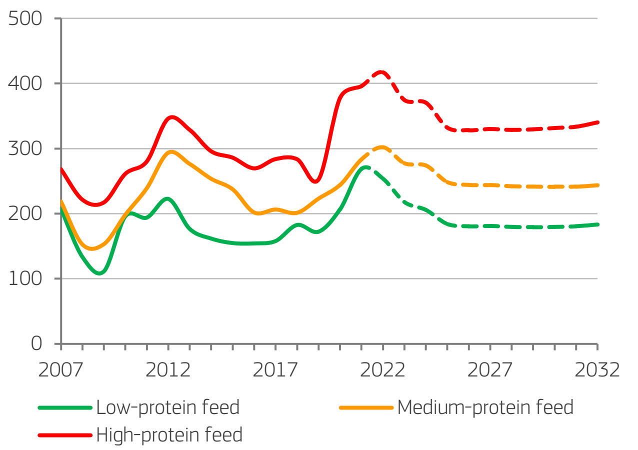


Note: Protein content of feed material on average: 10.7 % for low, 27 % for medium, 37 % for high protein feed[15].

GRAPH 2.25 EU total cereal use in feed (million t)



GRAPH 2.26 EU nominal feed prices (EUR/t)



Lower demand for feed while shifting to more grass-based systems

Demand for animal feed in the EU could fall by 4.7 % by 2032, mainly due to the decline in the EU's production of pigmeat, beef and milk. A drop in crop-based feed is also expected due to a shift to more grass-based production systems, and more efficient feed conversion ratios. These ratios are likely to be improved via genetics and more efficient and better-targeted feeding systems. The decline in pigmeat, beef and milk production should be partly offset by the projected growth of the poultry and egg sector. At the same time, EU countries with lower productivity are continuing to close the gap with countries with more efficient and more intensive production systems, although more slowly than in past. The projected increase in organic milk production in the EU will push the share of feed proteins coming from grass higher.

Cereal and high-protein feed use to decline

The lower feed demand will lead to a decline in low-protein and high-protein feed. The use of low-protein feed (with less than 15 % protein content; excluding grass), is set to decline by 5.4 % between 2022 and 2032 because of decreasing cereal use in feed. The use of high-protein feed (over 30 % protein content), which includes oilmeals, fish meals and skimmed milk powder, is also projected to decrease by 4.8 % by 2032. Reasons for this include a reduction in crushing in the EU (and therefore a lower availability of oilmeals), environmental and climate concerns around imports of soya meals for use in feed, and relatively high prices. By contrast, increased availability of protein crops in the EU could improve the use of medium-protein feed (between 15-30 % protein content) which is expected to increase by 1.1 % compared to 2022.

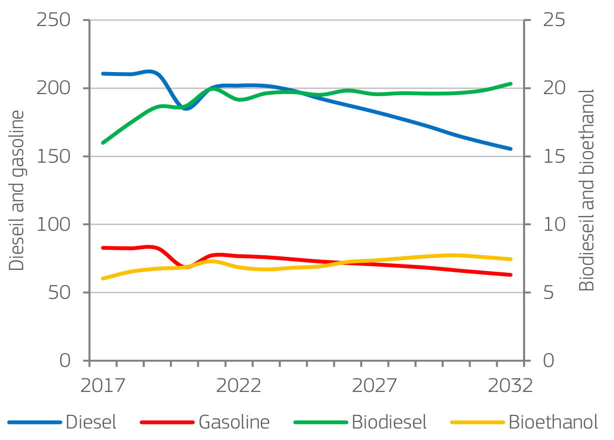
Feed prices to come down but stay higher than pre-COVID levels

As most cereal prices peaked in 2021-2022, they are expected to decline between 2022 and 2025 and then remain relatively stable. The price of low-protein feed is expected to follow this trend and to level out to just above pre-COVID prices from 2025. Medium-protein and high-protein feed prices are expected to peak in 2022 and then to decline gradually between 2022 and 2025 before levelling out to above pre-COVID prices.

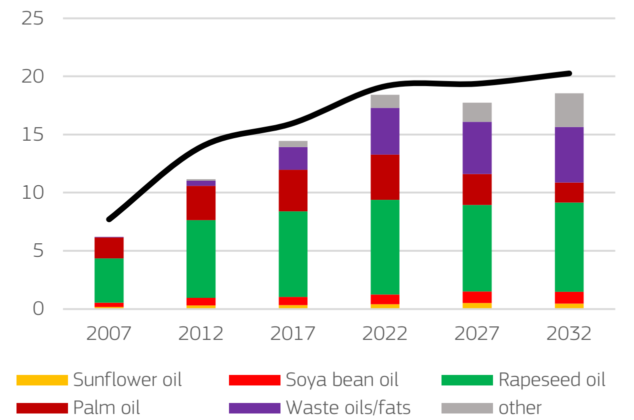
[15] Based on EU feed protein balance sheet.

BIOFUELS

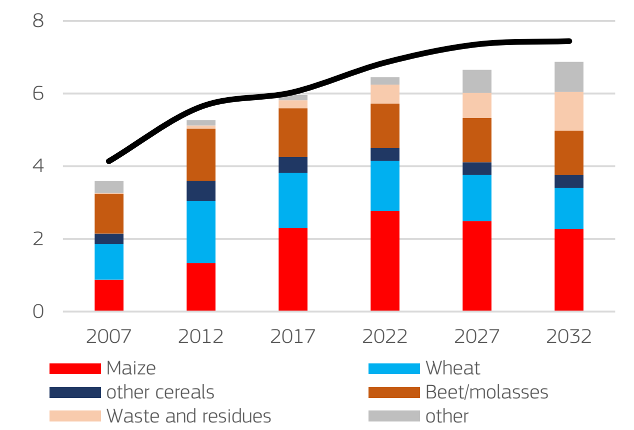
GRAPH 2.27 Use of EU conventional fuels and biofuels (billion l)



GRAPH 2.28 Use of EU biodiesel feedstock and biodiesel (billion l)



GRAPH 2.29 Use of EU ethanol feedstock and ethanol (billion l)



Higher biofuel blending rates and a slower fall in demand for road fuel to hold up demand for biofuel

Exogenous projections for gasoline and diesel consumption are taken form the National Energy and Climate Plans scenario of the POTEnCIA model, which represents a 'current policies' scenario. These projections rely on Eurostat energy balances and the underlying assumptions are aligned to the EU Reference Scenario 2020. CO_2 emission standards for vehicles are assumed to remain unaltered after 2030 and other policies are conservatively projected up to 2070. Gasoline and diesel consumption in road transport after 2030 is the result of the continuation of these polices and assumed autonomous efficiency improvement trends.

Compared to 2020-2022, the use of diesel is expected to fall by 21 % in 2032 to 155 billion l, and use of gasoline by 18 % to 63 billion l.

Demand for biofuels is directly linked to demand for road transport fuels, and the obligatory fuel blending rates. The projected increases in these rates are expected to boost demand for biofuels which is expected to stay relatively stable at almost 20 billion l per year. Demand for bioethanol is set to increase to 7.7 billion l per year in 2030 (up 11 % from to 2020-2022) before falling to 7.4 billion l per year by 2032.

The share of advanced biofuels set to rise as the share of crop-based biofuels falls

Due to requirement to certify indirect land use change (ILUC), the share of palm oil in biodiesel feedstock is expected to fall from 23 % in 2019-2021 to 9 % in 2032. The use of other vegetable oils (primarily rapeseed oil) is expected to remain relatively stable at around 50 % of biodiesel feedstock. By contrast, the share of advanced biodiesels is expected to grow from 29 % to 42 %. The share of waste oils and fats is set to rise from 23 % to 26 %, and other advanced biodiesels from 6 % to 16 %. This increase is mainly driven by specific fuel blending targets for advanced biofuels and the fact that they can be double counted towards the overall mandatory blending targets.

For ethanol production, maize is projected to remain the principal feedstock, but its share is expected to fall from 45 % to 33 %. The total share of crops (cereals, sugar beet and molasses) in ethanol feedstock is expected to fall from 90 % in 2019-2021 to 72 % by 2032, while the share of waste and residues could grow from 7 % to 15 %. Production from other sources is expected to increase even faster, from 3 % in 2019-2021 to 12 % by 2032.

MILK AND DAIRY PRODUCTS

/3

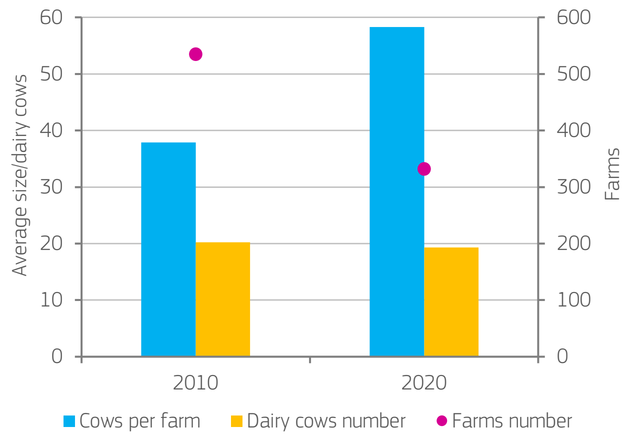
This chapter presents the projections for milk and dairy products. EU milk production is expected to become more sustainable and segmented, with an expected further increase in alternative production systems like organic, GM-free and pasture-based. Overall, EU milk production could slightly decline, as a reduction in the dairy herd is not likely to be proportionally compensated by yields growth. Most of the milk pool will be processed into cheese and whey powders.

As EU dairy consumption is already relatively mature, it is expected to remain stable in future, and more segmented and specialised. Above all, functional and fortified dairy products could gain ground among different groups of consumers. EU consumption of cheese, cream, new fresh dairy products and whey used in food could grow, while it could remain stable for butter and whole milk powder. Despite lower production, the EU will still retain its position in the global dairy trade which is expected to grow less than in the past decade. This will likely reduce EU exports of whole milk powder, and reduce growth rates for skimmed milk powders, though exports of whey could still grow, mainly for food use, which should add value to EU milk.

By 2032, the EU raw milk price is likely to find a new equilibrium, in between the current record levels and an average of previous years.

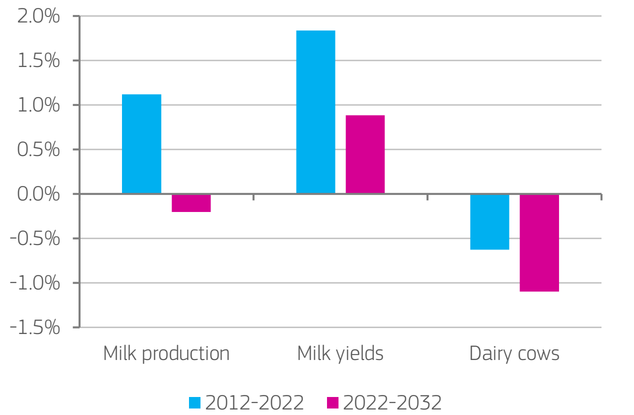
MILK

GRAPH 3.1 Average EU dairy farm size (heads/farm), dairy cows' number (million heads) and farms number (1 000)



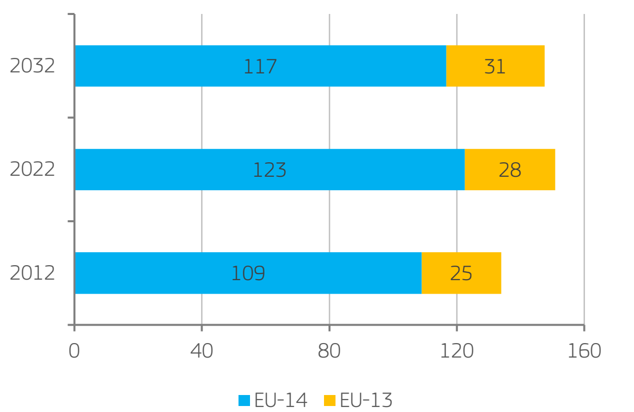
Note: for comparison purposes between the periods, RO and LU were excluded. Source: DG Agriculture and Rural Development, based on Eurostat.

GRAPH 3.2 Annual growth rates of EU milk production, milk yields and dairy cows' numbers in selected periods



Note: 2012/2022 represent in this chapter averages 2010-2012 and 2020-2022 respectively.

GRAPH 3.3 Milk production in EU-14 and EU-13 countries, in selected years (million t)



Milk production on the transformation path

Over the years, the EU milk production has become highly intensified and specialised. In 2020, around 80 % of EU milk was produced in intensive systems (above 1.4 livestock units per ha) while more than 93 % came from specialised farms, with a lower share in Eastern EU countries (e.g. in CZ 64 %, SK 67 %, HU 76 % and PL 88 %). This transformation was further differentiated by the availability of capital investment, dependency on purchased feedstuffs (on average more than 30 % of total farms' costs) and lower demand for hired labour due to more automated processes and higher labour requirements. Meanwhile, EU dairy farms have become larger (58 cows per farm in 2020 compared to 38 in 2010), rely more on compound feed, and are characterised by more controlled production conditions (e.g. computerised feeding, milking robots, measurement of individual cow's performance and health). In recent years, more attention has also been paid to animal welfare, and to improving the sector' sustainability (e.g. focusing on biogas production, manure treatment, carbon sequestration, extensive grazing, reduced use of antimicrobials).

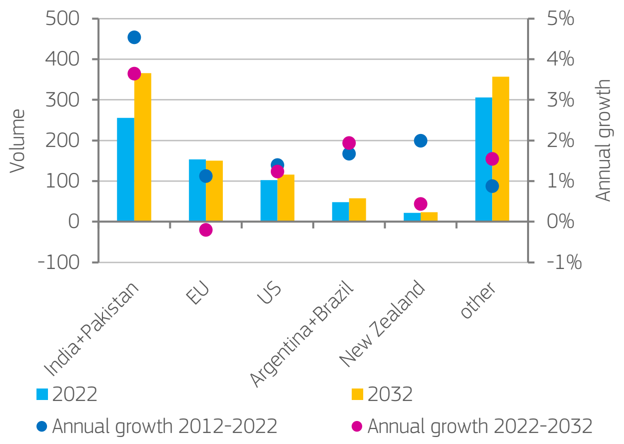
Specialisation and intensification led to higher productivity. In 2020-2022, the EU milk yield is more than 7500 kg/cow (20 % above 2010-2012). At the same time, the gap between Western and Eastern EU countries declined (by 9 pp to 28 %), while the dairy herd was reduced. Sustainability, health, quality concerns and preferences drove consumer choices, and led to an increase in alternative production systems. This prevented further herd reduction but lowered the yield growth. In 2020, the share of organic milk was around 4 %, and the share of milk produced in extensive milk production systems around 20 %.

Reduced but sustainable milk production growth

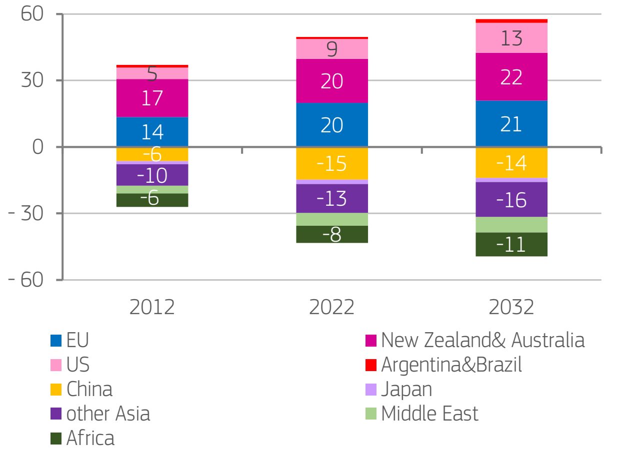
Sustainability drivers will continue shaping EU milk production up to 2032. The added value will be generated through high quality and sustainability standards and diversified production systems (e.g. organic, quality schemes). Environmental concerns will likely push the dairy herd further down (-10 % compared to 2020-2022), mostly in intensive systems while alternative production systems could grow. Social elements, such as a focus on animal welfare (and so better animal health care and well-being), could also contribute to increasing yields. However, the growth will be only half what it was in the past (0.9 %), which was driven by productivity gains and structural changes, especially in Eastern EU countries.

Overall, increasing yields could not offset the reduction of the dairy herd, and so total EU milk production could decline by 0.2 % per year by 2032. This drop is likely to be driven by EU-14 countries (6 million t), while the rest of the EU could compensate for half of it.

GRAPH 3.4 Milk production volume (million t) and growth rates (%) in given period for selected countries

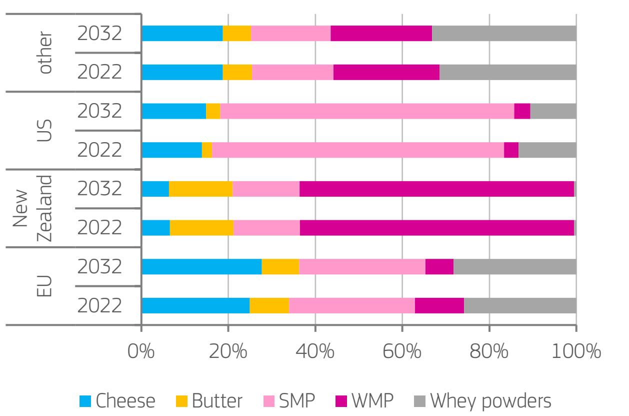


GRAPH 3.5 Milk surplus and deficit in selected countries and regions (million t of milk equivalent)



Note: surplus/deficit is calculated as domestic consumption- domestic production

GRAPH 3.6 Trade shares of main dairy exporters in selected dairy products



Global production and consumption growth led by developing countries

Globally, milk production growth will be at a comparable level to 2012-2022 (around 2 % per year). However, while in the past decade the EU contributed to growth by around 10 %, due to the expected production decline, shares from other countries and regions will grow. This should also be attributed to ongoing efforts to increase their own self-sufficiency by increasing cow herds and improving productivity. Among others, Asian and African countries could contribute by almost one third to the expected growth. Around 8 % of milk will remain traded globally (which is comparable to the current level) by 2032. Additional production capacities in Africa and Asia will be absorbed by domestic markets. The population and income increase in Africa is expected to contribute the largest share to the nine-fold dairy consumption growth on the continent. Among Asian countries, destinations other than China and Japan will grow the most their consumption (by around 35 % in volume compared to now).

EU remains largest dairy exporter, US shares increasing

Despite increasing self-sufficiency rates, the main importing countries will remain in deficit, and therefore needing to import dairy products, although less than in the past (1.3 % annual deficit growth in 2022-2032, compared to 5 % in the past).

The EU and New Zealand will remain the main exporters (around 24 % both, with the EU set losing around 3 pp compared to 2020-2022). As US production will grow the most among the largest dairy exporters, this will allow them to gain further market shares and reinforce their third position (17 % in 2032, compared to 13 % now), with some increase likely to come from South America as well.

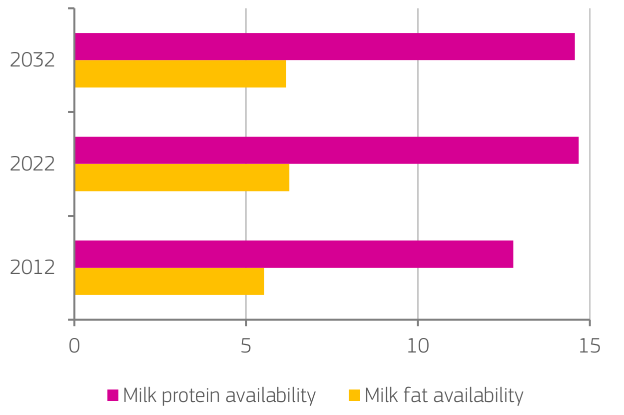
Differentiation of global imports supporting EU trade

The expected reduction in global imports will mostly impact skimmed and whole milk powders. Their annual growth rates are likely to drop by 2.3 pp and 2.1 pp respectively. As they are mainly used as an input for processing in final destinations, increasing milk production will reduce their needs, in addition to already high levels of growth achieved in 2012-2022. By contrast, cheese, and whey exports growth could be reduced less, while butter shipments could even increase.

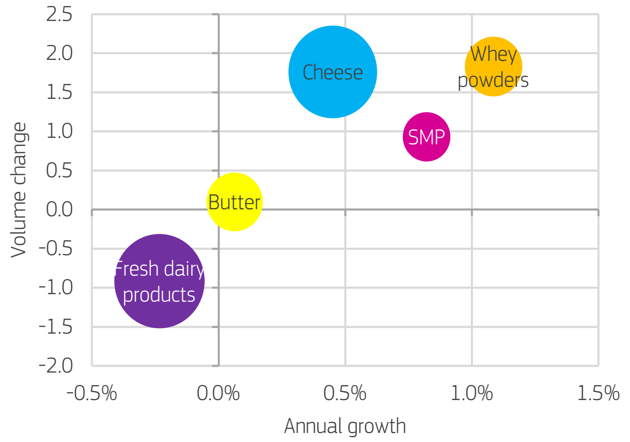
While these trends illustrate volume growth, there will also be a change in the quality portfolio, differentiated by sophistication of targeted markets, and so the potential to add value to traded dairy products. This is already illustrated by the re-direction of milk powder' shipments between African and South-Eastern Asian markets. At the same time, rising disposable incomes in the medium term and increased global consciousness about sustainability, health and nutrition quality are likely to push demand for high quality products for which the EU is already well-known and well-positioned globally.

DAIRY PRODUCTS

GRAPH 3.7 Availability of milk fat and milk protein in the EU (million t)

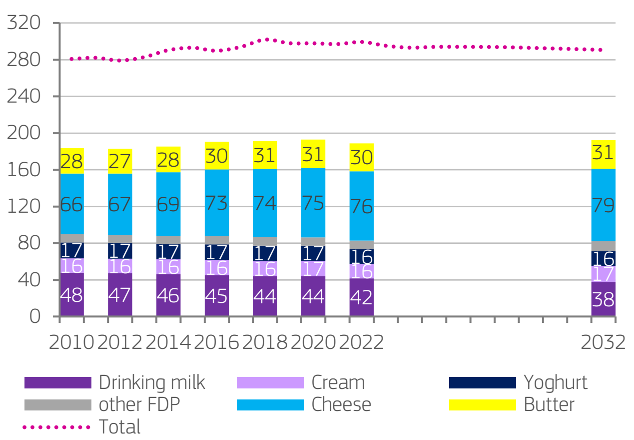


GRAPH 3.8 EU production of selected dairy products change (million t of milk equivalent) and annual growth (%) in 2022-2032



Note: sizes of circles correspond to the volume of milk (in milk equivalent) used for their production in 2020-2022

GRAPH 3.9 EU per capita consumption total and selected dairy products (kg of milk equivalent)



Increasing milk solids supporting processing availability

Reduced EU milk production also implies a lower availability of milk solids for processing. However, the drop is not likely to be proportional. Some improvements in milk composition could be achieved, for example by feed, or replacing cow breeds. In the past, the progress on average EU milk solids content was also due to growth in some EU countries whose dairy herd is composed of cows producing milk of a higher milk content (e.g. Austria, Denmark, Ireland). In addition, increasing shares of pasture-based systems and organic ones could contribute to a higher availability of milk components, especially fats. On the other hand, the downward push could be linked to fluctuations in feed quality as well as potentially some heat stress as observed in 2022. Therefore, the growth of both could be rather limited (0.1 % per year by 2032).

Cheese and whey gaining shares in the milk pool

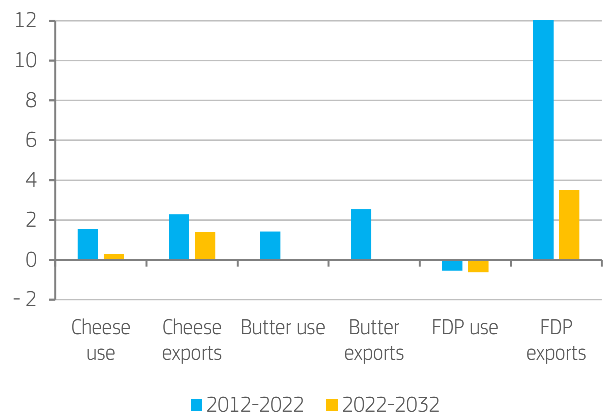
Improved milk content is only expected to offset some decline in EU milk availability. This implies some adjustments in the dairy products portfolio. Diversified and changing consumer preferences, competitiveness with other global suppliers, and the potential to generate added value will be among the most influential factors channelling the reduced EU milk pool to different dairy products. The cheese and whey production stream are expected to grow by around 4 million t of milk and could absorb 38 % of EU milk (35 % in 2020-2022). Skimmed milk powder (SMP) and butter combined could grow to a limited extent (1 million t) while other dairy products are likely to decline for different reasons, such as the EU competitiveness (e.g. whole milk powder - WMP), ongoing EU consumption decline (e.g. drinking milk) or reduced global demand (e.g. infant formula due to lower birth rates in China).

Consumer dairy products more fortified and functional

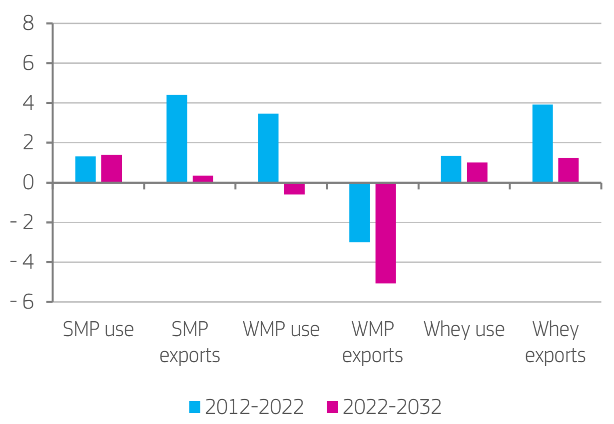
Domestic market is expected to remain the main outlet for EU milk (86 % in 2032). Overall, EU per capita consumption of dairy products is due to slightly decline (-0.3 % per year by 2032) but from a relatively high level achieved thanks to extraordinary circumstances during COVID-19 (2020) and the subsequent recovery (2021). In the next decade, it is likely that consumer preferences will change, and so also expectations of dairy products. According to some recent research[16], young consumers (18-35 years old), are more inclined to increase consumption of dairy products with less fat, low sugar or without allergens. At the same time, there is increasing demand for fortified (e.g. with added vitamins or minerals) or functional dairy products (e.g. for specialised nutritional needs).

[16] Based on https://www.tateandlyle.com/news/webinar-european-dairy-consumption-trends.

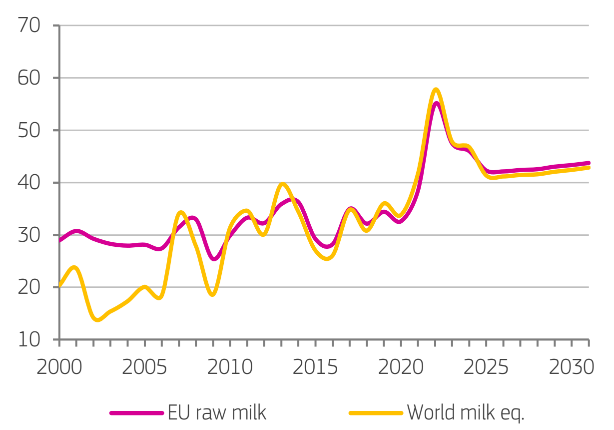
GRAPH 3.10 Annual change in EU use and exports of cheese, butter and fresh dairy products (FDP), in %



GRAPH 3.11 Annual change in EU use and exports of skimmed milk powder (SMP), whole milk powder (WMP) and whey powders, in %



GRAPH 3.12 Milk prices (EUR/t)



Cheese market to continue growing

The flagship EU dairy product, cheese, will continue to benefit from increasing exports (1.4 % per year). EU consumption could grow further (0.3 % per year), relative to high levels in 2020-2022, which was due to retail demand during COVID-19 outbreaks in 2020, and the foodservice recovery in 2021.

Among other dairy products, drinking milk is expected to continue to decline while per capita consumption of yoghurts could remain stable, and other fresh dairy products could grow. These developments are to be supported by consumers' interest in fortified products (e.g. extra proteins) or due to changing lifestyles (e.g. drinkable yoghurts). However, this would not prevent EU consumption to decline (-0.6 % per year). Prospects remain positive for EU exports (reaching up to 1.8 million t by 2032), particularly thanks to foodservice growth in China.

The EU butter market is expected to remain relatively stable, both in terms of consumption and exports (although slightly declining compared to high levels in 2021). However, more competition with other fats could take place, especially in home cooking and foodservice (e.g. olive oil).

Whey powders gaining value thanks to food use

EU whey powder production, a co-product of cheese production, is expected to grow (1.1 % per year), with positive prospects both in EU use (+1 % per year) and exports (+1.3 %). Globally, demand is driven by increasing food use, also supporting a stronger exploitation of the EU whey market. The reduced global imports, and stronger competition, will likely reduce EU SMP export growth and they could remain at a comparable level to 2020-2022. Domestic use could grow around 1.4 % per year. By 2032, the EU, formerly an export-oriented SMP market, will be more balanced between domestic use and exports. Not only reduced global imports, but also low EU competitiveness will contribute to the production decline in WMP (-21 % by 2032) as EU exports could drop by 5 % annually (relative to the high 2020-2022 average). Domestic use could also drop by around 0.6 %, as the confectionery sector and some alternatives to dairy ingredients might gain more popularity, due to price or consumers' move towards veganism.

New milk price equilibrium higher than in the past

It will take a few years before the market establishes a new price equilibrium (assumed to happen in 2025) and dairy prices will grow again thereafter. By 2032, EU cheese and whey powders prices are expected to increase the most, compared to a high 2020-2022 average (0.7 % and 2.4 % per year respectively), while the EU butter price could reach a comparably high level again by 2032. The SMP price could also grow. This would support EU raw milk price to reach around EUR 45/t by 2032. This price level would allow to cover for increasing costs while creating an added value through differentiated products.

MEAT PRODUCTS

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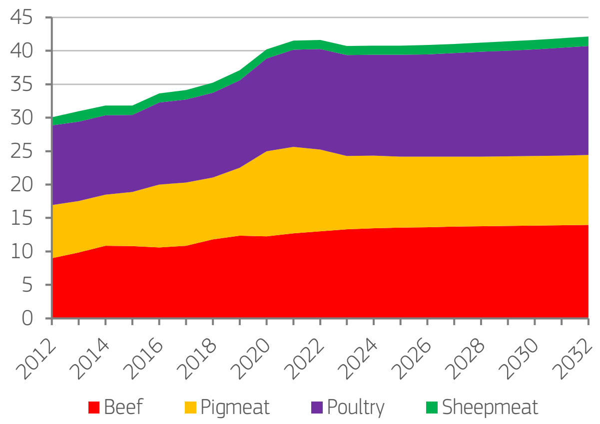
This chapter presents the drivers of EU meat markets and introduces projections for beef and veal, pigmeat, poultry, and sheep and goat meat.

Sustainability and social concerns should take a more prominent role in shaping EU meat production and consumption. In this context, the most important outcomes that could be expected by 2032 include (i) lower per capita meat consumption, (ii) lower production based on more extensive and environmentally friendly systems, along with fewer animals or lower density. Poultry will be the only sector to expand in terms of production and consumption.

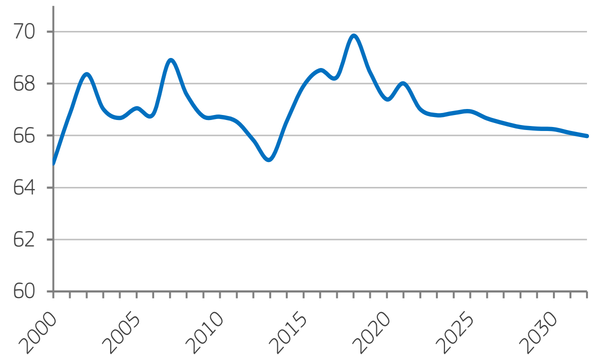
However, spread of animal diseases, the aftermath of Brexit and certain free trade agreements under negotiation will be important factors. Moreover, the dependencies on global markets and current political events add further uncertainty and might alter the prospects for trade relations. While world consumption and import demand are expected to expand (except for pigmeat) opportunities for EU export growth should mostly benefit the poultry sector. EU prices, although generally higher, will continue to reflect changes in world prices.

DRIVERS OF MEAT MARKETS

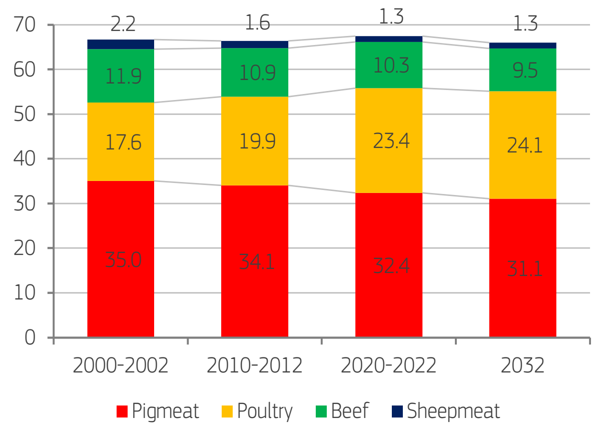
GRAPH 4.1 Global import demand (million t of carcass weight equivalent)



GRAPH 4.2 EU per capita meat consumption (kg)



GRAPH 4.3 EU per capita consumption by meat type (kg)



Global meat consumption and import demand to increase

By 2032, global meat consumption is expected to continue growing (+43 million t in 10 years), due to population growth and higher incomes, mainly in developing countries. A large part of the additional world demand will be met by domestic production. However, 1.8 million t of poultry and 1.3 million t of beef will need to come from increased global trade to cover the supply deficit in many countries. The EU will only benefit to a limited extent from this additional demand (mainly for poultry meat). The recovery of pigmeat production in China and the rest of Asia will play a determining factor for EU exports.

A greater awareness of sustainability in meat production and consumption

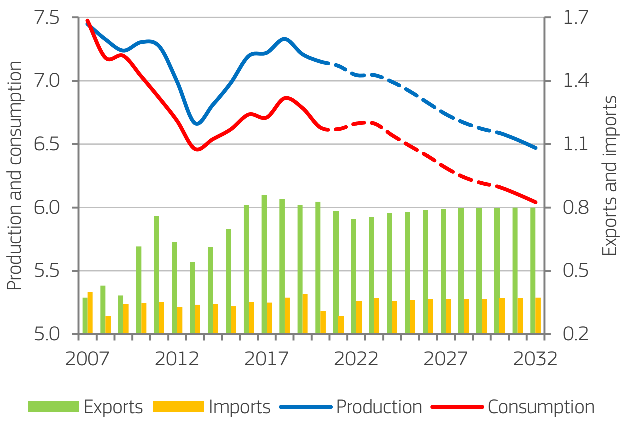
Sustainability will play an increasingly prominent role in EU meat markets for both producers and consumers. Although modernisation, innovative technologies and changes in farming practices could lead to more efficient and more environmentally friendly meat production, concrete investment decisions could remain a challenge given the uncertainty of the returns. Consumer concerns about the environment and climate change will result in more attention being paid to production processes and where meat products come from (e.g. local sourcing, organic and other quality schemes, animal welfare, deforestation and the environmental footprint). Other drivers changing consumer habits range from health considerations (lower or no intake of animal-based proteins) to convenience (with a shift from fresh meat towards more processed meat and preparations). The EU population will have fallen by 2032, and diets of older people (smaller portions) and young adults (less portions) include less meat. Cultivated meat is not expected to become a big competitor for meat in the next 10 years because of possibly lower consumer acceptance, price positioning and regulatory requirements. The shift to plant-based diets could lead to a growing number of protein alternatives to meat, but they are expected to continue having a very small market share.

EU per capita meat consumption drops to 66 kg by 2032

After a dip in consumption due to COVID-19 restrictions and the exceptional exports to China, EU meat consumption is set to further decline from a relatively low average compared to previous years (67.5 kg per capita in 2020-2022) to 66 kg by 2032 (-2.2 %). This is unlike past decades when the EU experiences a gradual increase in meat consumption. The overall decline will be accompanied by a change in the consumer basket with an expected shift from some types of red meat (beef, pigmeat) to white meat (poultry). Sheep meat consumption is expected to stabilise due to its low availability and sustained demand despite relatively high prices.

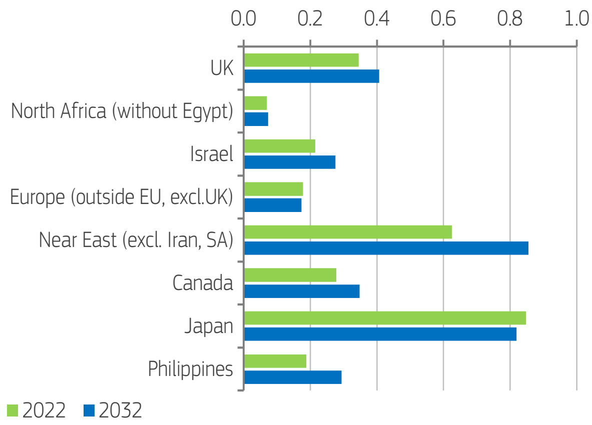
BEEF AND VEAL

GRAPH 4.4 EU beef and veal market balance (million t)



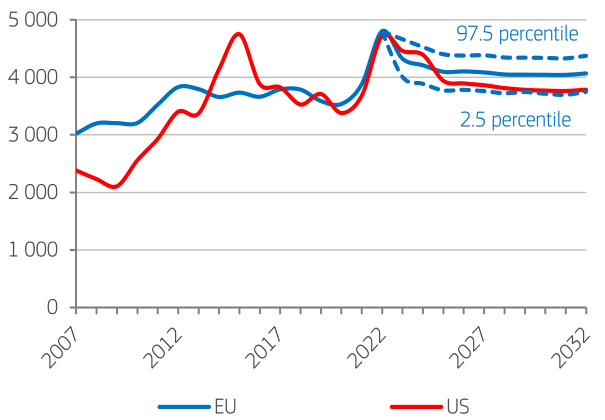
Note: Production corresponds to gross indigenous production; trade includes live animals.

GRAPH 4.5 Beef imports of main EU partners (million t)



Note: Total imports; countries cover 20 % of world demand.

GRAPH 4.6 Beef prices (EUR/t) and uncertainty range



Beef production and consumption continue to fall

EU gross beef production is expected to continue declining and fall by 0.6 million t (-9 %) in the next decade. At the same time, the total EU cow herd is set to decrease by 2.8 million head (-9.1 %). The dairy herd should decline progressively (see the chapter Milk), while the suckler cow herd is set to decrease to 9.9 million head by 2032 (-636 000 head or -6 %), due to low profitability and increasing environmental concerns. The overall decline hides opposing developments in different EU countries. Coupled income support and certain eco-schemes under the new CAP, together with a relatively good price outlook will only dampen this trend, not reverse it. The average slaughter weight will continue its slightly upward trend thanks to advanced technologies (e.g. management of germinal products) and a larger share of beef-type animals in the productive herd, while a shift to organic and more extensive production systems may partially counteract this trend.

After COVID-19, EU beef consumption continued decreasing in 2022 because of low availability and high prices. It should follow this downward trend during the next ten years. By 2032, per capita beef consumption may drop from 10.3 to 9.5 kg (-7.8 %).

Meat export gains offsetting the decline in exports of live animals

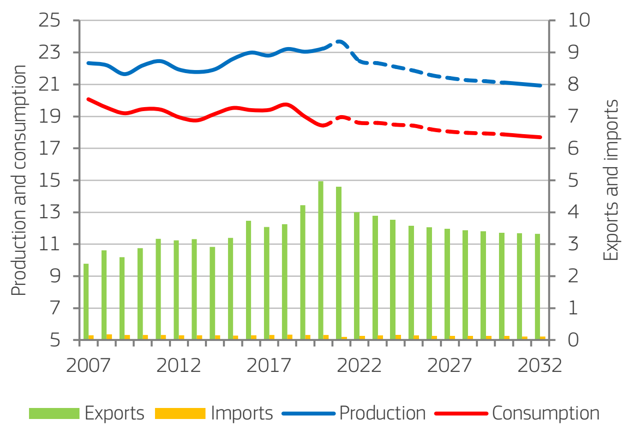
Global import demand for beef will increase by 1.3 million t between 2020-2022 and 2032. EU exports of live animals are expected to decline gradually (-2.8 % per year) due to increased competition and concerns about animal welfare in long-distance transport. EU meat exports are due to grow by 2032 (+1.1 % per year), mainly thanks to continuing or rising demand from existing trade partners. Future trade agreements between the UK and Australia/US (not accounted in this baseline) might change this picture drastically. However, the EU will keep exporting to high-value markets in neighbouring countries (UK, Switzerland, Norway) and in countries with whom the EU concluded FTAs recently (Japan, Canada). EU beef imports rebounded in 2022 after Brexit, the relaxation of the COVID-19 lockdown measures, the limited supply and the highly attractive EU price. In the coming years, imports will slowly increase and reach close to pre-COVID level by 2032.

Beef prices to stabilise around EUR 4 000/t

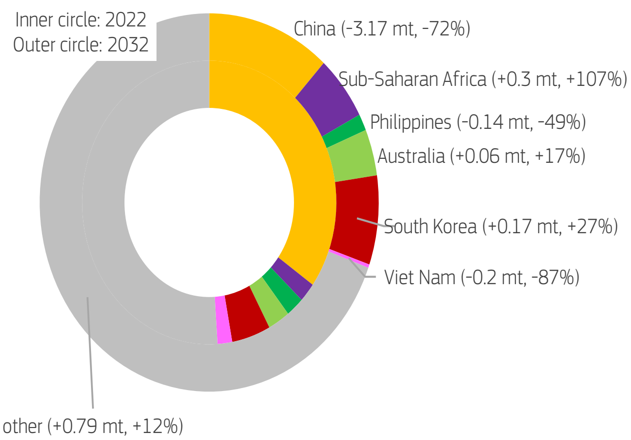
After the high beef prices in 2022, prices are expected to come down again due to more balanced supply and demand, and an expected cost reduction at EU and world level. So, it could stabilise at slightly above EUR 4 000/t, supported by high international demand.

PIGMEAT

GRAPH 4.7 EU pigmeat market balance (million t)

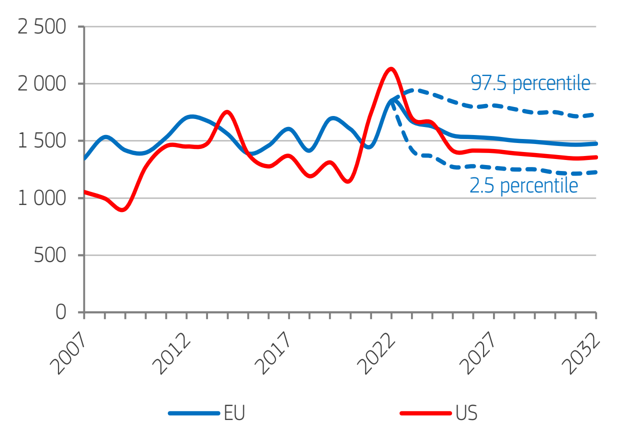


GRAPH 4.8 Shares of selected pigmeat importers on global imports



Note: Sub-Saharan Africa includes South Africa.

GRAPH 4.9 Pigmeat prices (EUR/t) and uncertainty range



Pigmeat production to start declining

In the EU, health, environmental and societal concerns will continue affecting consumer preferences for different types of meat, and this will have a negative impact on EU pigmeat consumption. Apparent EU pigmeat consumption is projected to decrease by 0.4 % per year, from 32.4 kg per capita in 2022 to 31.1 kg in 2032 (- 4 % over the whole period).

Benefiting from excellent export possibilities to Asia despite African swine fever (ASF), the EU pigmeat sector increased production to 23.7 million t in 2021, but this then fell in 2022. While export opportunities should gradually shrink, ASF will have a lasting effect in the EU - a functional vaccine against ASF is not expected to be unavailable during the outlook period. In addition, intensive production systems are likely to face further societal criticism. Combined with stricter environmental laws in certain EU countries, these will have a serious effect on production. Therefore, EU pigmeat production is projected to fall by 1 % per year in 2022-2032 (2.2 million t over the whole period).

Pigmeat exports to decline as Chinese production recovers

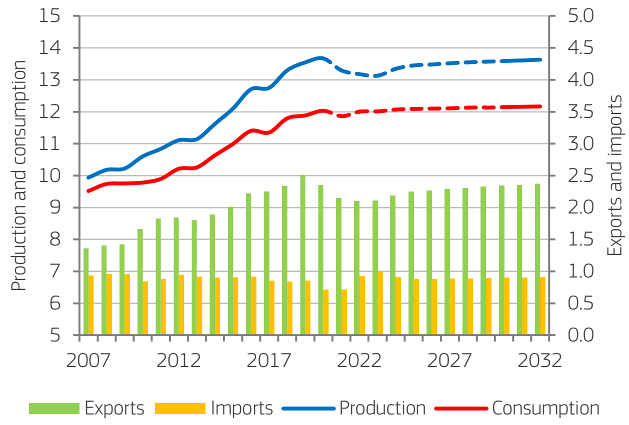
China's production capacity is expected to recover sooner than expected. It will therefore drastically reduce its reliance on imports, despite further ASF outbreaks still occurring. Other regions in Asia may take longer to recover. This has a massive impact on EU pigmeat exports which predominantly go to China. In addition, other EU export destinations like Japan, the Philippines and Vietnam are expected to reduce their imports by 2032. However, markets in South Korea, Australia, Sub-Saharan Africa or neighbouring European countries might create additional opportunities for EU exports. As a result, while EU exports increased by 2.8 % per year in 2012-2022, they are projected to decrease by -3.2 % per year in 2022-2032. The EU will also need to strengthen and diversify its export portfolio. Uncertainties remain about the speed of recovery from and trade bans due to ASF. Another possible risk is the spread of ASF to the American continent.

Pigmeat prices to remain contained

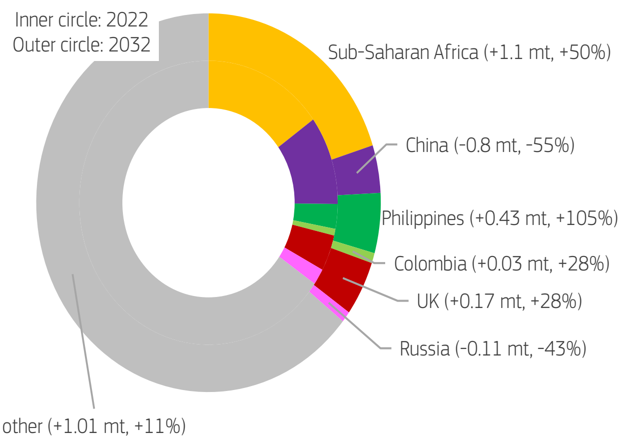
After the price spike in 2022, EU prices should decrease. However, import demand outside China, continuing outbreaks of ASF in Asia and an adjusting domestic production could slow down the decrease in prices until 2025. EU prices are then expected to remain around EUR 1 500/t until 2032.

POULTRY MEAT

GRAPH 4.10 EU poultry meat market balance (million t)

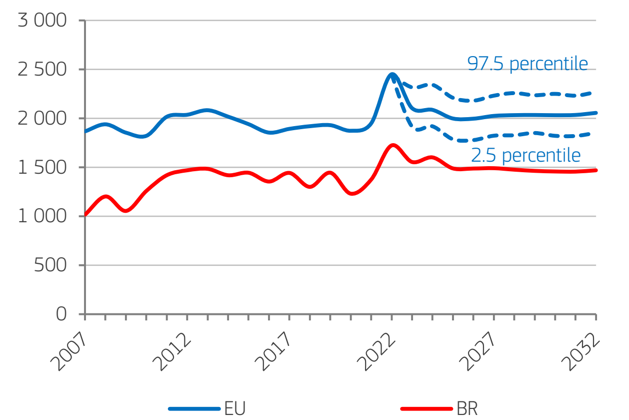


GRAPH 4.11 Shares of selected poultry importers on global imports



Note: Sub-Saharan Africa includes South Africa.

GRAPH 4.12 Poultry prices (EUR/t) and uncertainty range



Poultry production to increase after drop in recent years, while consumption growth to slow

After the decrease in 2022, amid high input prices and outbreaks of highly pathogenic avian influenza (HPAI), EU poultry production is expected to recover during the Outlook period (+0.2 % per year), albeit with slower growth than in the past decade (2 %), mainly due to environmental restrictions and changes in consumption. Unlike previous years, the incidence of HPAI extends over the whole year instead of being a seasonal event, which will challenge the sector and more particularly the free-range production systems in the EU.

The growth in EU poultry consumption will slow from 1.9 % per year in 2012-2022 to 0.2 % in the next decade. Nevertheless, this still translates into an increase in per capita consumption from 23.4 kg to 24.1 kg (+3 % over the next decade). That stems from a healthier image of poultry compared to other meats (especially pigmeat), greater ease of preparation, the absence of religious constraints regarding its consumption and its relatively cheaper price.

Poultry trade to recover slowly

EU poultry exports showed a dynamic expansion until 2019, with the main products exported being those less in demand in the EU (wings, legs, and offal). However, COVID-19, HPIA outbreaks and high domestic prices created challenging conditions for EU poultry exports and that trend was halted. By 2032, exports will recover slowly by 0.8 % per year, reaching a level of 2.4 million t, especially thanks to increasing demand from Sub-Saharan Africa, the Philippines and the UK.

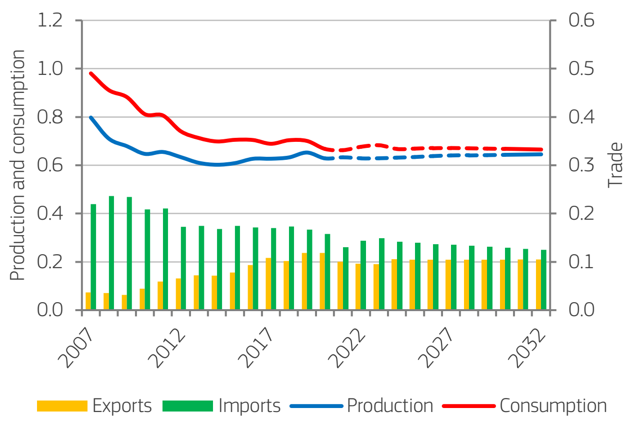
EU poultry imports, mostly supplying foodservice and food processors, recovered quickly in 2022, also due to the duty-free quota-free agreement with Ukraine (valid till June 2023). Without this preferential access to the EU market, imports should fall back to pre-COVID levels before increasing slowly to a level of 910 000 t by 2032.

Poultry price to stabilise above pre-COVID level

After the spike in 2022, the EU poultry price is expected to decrease and stabilise at around EUR 2 000/t by 2032, above the pre-COVID price level, mainly thanks to sustained demand in the EU. The price gap with Brazil will continue, which makes competing on the same ground almost impossible.

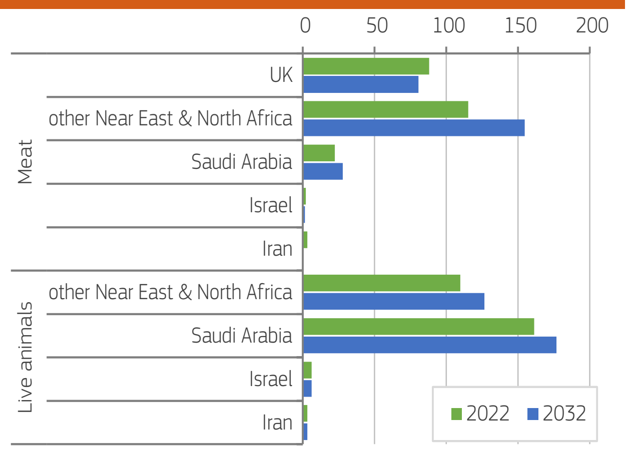
SHEEP AND GOAT MEAT

GRAPH 4.13 EU sheep and goat meat market balance (million t)

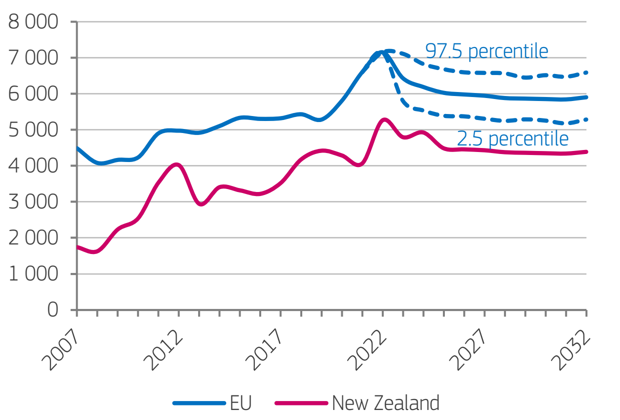


Note: Production corresponds to gross indigenous production; trade includes live animals.

GRAPH 4.14 Sheep imports of key EU partners (1000 t)



GRAPH 4.15 Sheep meat prices (EUR/t) and uncertainty range



Production and consumption rise slightly

Contrary to declining trend of recent years, EU sheep and goat meat production is expected to increase slightly by 0.2 % per year until 2032 (up to 645 000 t). This is mainly driven by a continuing increase in the EU-13 (0.7 % per year). Coupled income support, a tight global supply-demand situation and favourable prices for producers should support this trend. Production will remain concentrated in a few EU countries, with slaughtering in Spain, Greece, France, Ireland and Romania representing more than two thirds of total EU production in 2021.

EU per capita consumption is expected to remain relatively stable by 2032 (around 1.3 kg per year). This is thanks to the diversification of meat diets and sustained consumption patterns in the EU population (due to religious tradition and migration). In general, sheep meat consumption is less sensitive to price changes and more affected by peaks in seasonal demand related to religious celebrations.

Imports fall due to high Asian demand while meat exports to Near and Middle East could rise

EU exports of live animals are expected to decline by 2032 to 45 000 t (-17.5 % compared to 2022). This is mainly due to concerns about animal welfare during long-distance transport and financial risks of certain export destinations. After 2 years of low exports due to Brexit and high domestic prices, EU meat exports are expected to catch up in 2023-2024 and reach 60 000 t by 2032 based on a consolidation and further expansion of trade with partners in the Near and Middle East. UK imports currently represent almost half of EU meat exports and should remain stable at most. There is a lot of uncertainty on the possible impact of trade agreements between the UK and Australia/New Zealand on EU exports and UK exports to the EU. EU imports will recover in the short run and slightly decline to 125 000 t by 2032. Even though the EU is still an attractive export destination, Australia and New Zealand will focus more on Asian markets, given its easier access. While Australia should fill its EU tariff rate quotas, New Zealand's production capacity is not expected to be able to serve both the Asian and EU markets despite productivity gains.

Prices to remain above pre-COVID level

After high prices in 2021 and 2022, EU prices are to start a downward trend but are likely to remain significantly higher than before COVID-19. A big gap between EU prices and prices in New Zealand and Australia will remain. This reflects the lower production and labour costs in these two countries. There is also less pressure from the global market on these countries than on the EU.

FOOD SECURITY /5

This chapter analyses some dimensions of food security using a selected set of indicators: self-sufficiency rates, diversification of imports and exports, and households' expenditure on food, using two economic models, aiming to provide a basic overview of EU resilience with regard to value chains, since food security is a complex subject with many dimensions and implications both at EU and global level.

EU will remain self-sufficient in most agricultural products in 2032 and able to generate surpluses which contribute to the global food supply, in particular for wheat and dairy products. However, due to agro-climatic and market conditions, it is and will still not be by 2032 self-sufficient for products such as tropical fruit, oilseeds and soya beans although some improvements will be made.

Internationally, the EU will remain a strong exporter of high-value food products while importing commodities such as vegetable oils and animal feed, with a well-diversified set of destinations for exports and a more reduced diversification of EU imports, but without significant exposure to a large concentration of suppliers. Average food expenditure at household level is expected to decrease by 2 percentage points, down to 18% in the medium term, from the recent levels of higher food expenditures from the COVID-19 pandemic seen in 2020 and higher food prices, but towards convergence between EU countries.

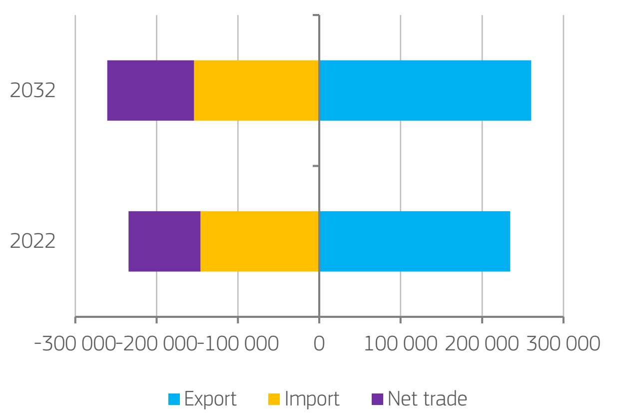
FOOD SECURITY

GRAPH 5.1 EU self-sufficiency rates – crops (%)

Note: Self-sufficiency rates are calculated as the ratio between EU agricultural production and consumption in the EU.

GRAPH 5.2 EU self-sufficiency rates – meats and dairy (%)

GRAPH 5.3 EU agri-food trade EU (million EUR)



Note: the estimates and the goods covered by the MAGNET model do not exactly match the aggregation of agri-food trade used by DG Agriculture and Rural Development in its [EU-Agri-food trade monitoring](). Value expressed in real terms.

Food security is a complex subject with many dimensions to be analysed at both EU and global level (e.g. affordability, distribution, yield resilience). In this chapter, EU food security is illustrated by selected indicators only such as self-sufficiency rates, diversification of imports and exports, and household expenditures.

Increasing self-sufficiency in oilseeds

The high level of EU self-sufficiency rates across agricultural products derives from favourable natural conditions, diversity of territories and climate, and a competitive EU position relative to other global suppliers. This also reflects the results of successive CAP reforms over the years, also on the food security. As a result, the EU continues providing abundant, quality, safe and nutritious food to its own population and globally. These provide food security to the EU while generating surpluses which contribute to global food supply. However, given the agro-climatic and market conditions, the EU is not self-sufficient in some products (e.g. tropical fruit, oilseeds). In the next 10 years, the EU is expected to remain largely self-sufficient in wheat and barley, while for maize, lower international prices are likely to favour imports over domestic production growth. The EU production would not be enough to address domestic demand for rice. Historically, the EU has low self-sufficiency rates in oilseeds. As regards GM-free soya beans, more feed demand, higher profitability compared to cereals and reinforced crop rotation practices will favour their production, hence a slightly higher EU self-sufficiency, especially for soya beans. Nevertheless, the EU will remain reliant on imports to cover its oilseeds demand in 2032.

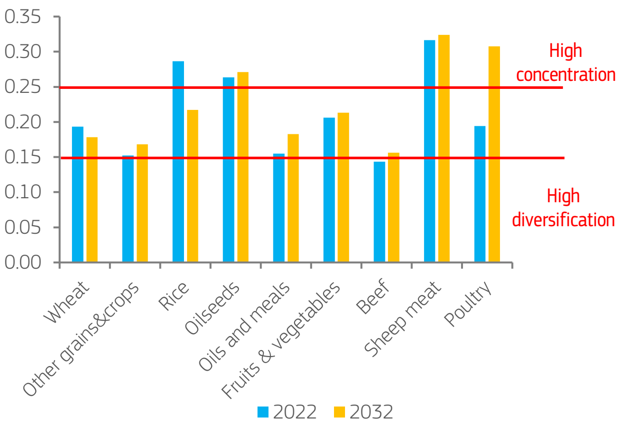
Sustained meat and dairy self-sufficiency

EU self-sufficiency rates are above 100 % overall for animal products (and even above 130 % in milk powders). For all meat and dairy products (except sheep and goat), the EU is expected to remain self-sufficient in the medium-term and to even generate surpluses. For 2032, some decline is expected especially for whole milk powder. Regarding meats, self-sufficiency rates will remain above 100 % in 2032, but not as high as those observed for dairy, with sheep and goat meat being close to self-sufficiency (97 %).

Net trade to remain positive and increasing

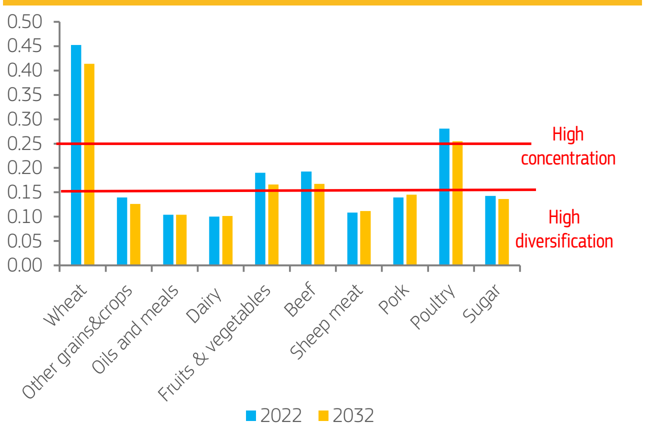
An intial overview of the EU dependency on global food supply chains is provided by net trade, the difference between export and import flows. Projections shows that in 2032, the EU will reinforce its positive net trade position (+21 % increase in net trade compared to 2022), with exports of high-value food products, beverages and dairy more than compensating for imports of commodities such as vegetable oils and animal feed.

GRAPH 5.4 Market concentration index – EU imports (0-1 index)

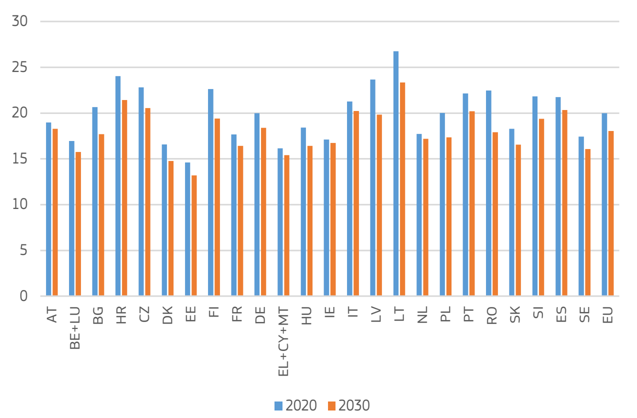


Note: Market concentration index for imports and exports determined as Herfindahl index built on trade flows in value in real terms: values below 15 % are associated with a diversified market, while above 25 % implies a concentrated market. Note that the calculation is done at the least disaggregated country group level, but not at the level of single countries outside the EU, so values calculated at country-levels might be different than those shown in this report.

GRAPH 5.5 Market concentration index – EU exports (0-1 index)



GRAPH 5.6 Food expenditure as % of household budget



Note: calculations based on another MAGNET model version, not fully aligned with this report. This provides results at Member State level as well as additional indicators. Luxemburg is aggregated with Belgium; Greece combined with Cyprus and Malta. Food expenditure shares include food services (catering and restaurants).

Reduced diversification of EU imports, but no large concentration of supply

One way to measure diversification of EU imports, and so the resilience of EU value chains, is through a Herfindahl market concentration index: the lower the value, the less concentrated the imports are, meaning the EU is dependent on a larger number of suppliers. In general, diversification will tend to slightly decrease over time up to 2032 across sectors, with some significant trends e.g. in poultry (+0.11), however these refer to sectors where the EU also has strong domestic production. Concentration index value for sheep meat imports remains above 0.25 as Australia, New Zealand and the United Kingdom will remain the main EU suppliers. The oilseeds sector will also remain more concentrated than others with Ukraine, South America and Canada remaining the main suppliers for the EU. A noticeable increase in supply diversification is observed for the rice sector (concentration lower by 0.7).

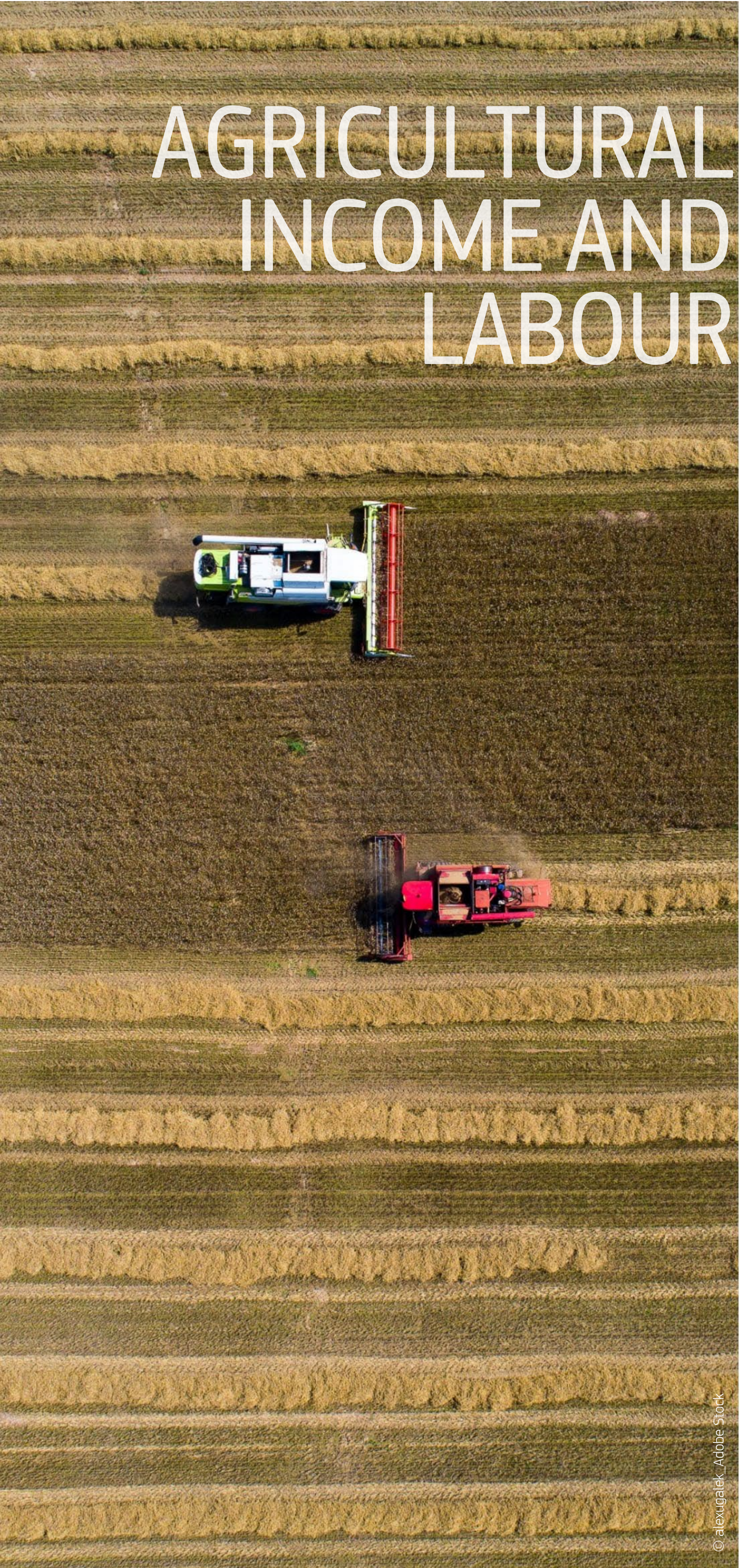
EU exports well-diversified across most sectors

Market concentration for EU exports gives a more homogeneous picture, with most sectors showing more variety of destinations outside the EU in 2032. Wheat, while apparently a significant exception, shows high values because its exports are concentrated towards the two country groups for Middle East and North African countries (MENA) and Sub-Saharan Africa (SSA), with the latter group set to become relatively more prominent by 2032.

Average food expenditure set to decrease

Households' expenditure of food has been increasing in recent years, due to COVID-19 and increasing food prices. With an expected recovery of global and EU economies after the COVID-19 pandemic and the likely end of the war in Ukraine, the share of households' budget spent on food could decrease over the projection period (-2 pp, to 18 %). Generally, the share of food expenditure is higher in Eastern EU countries in the EU-13 group than in the Western and Southern ones (belonging to EU-14 group). This could be partially explained by lower incomes and purchasing power. The relative importance of expenditure on food services (catering and restaurants) also has an influence on food purchases by households. termIn the medium-term, expenditures of EU countries are likely to converge, mainly due to changes in EU-13 countries. The current record high food inflation rates are not expected to persistently impact the average shares of households' budget spent on food over the medium term, also because consumers are likely to adjust their spending towards more basic products if prices remain high rather than reducing the overall food consumption. Behind these average trends, the economic impact of food inflation is larger for lower-income households, that spend a larger share of their income on food. The broader socio-economic impacts of the recent economic crises remain unertain, but they can potentially contribute to increasing inequalities and can create concerns for food affordability and food security.

AGRICULTURAL INCOME AND LABOUR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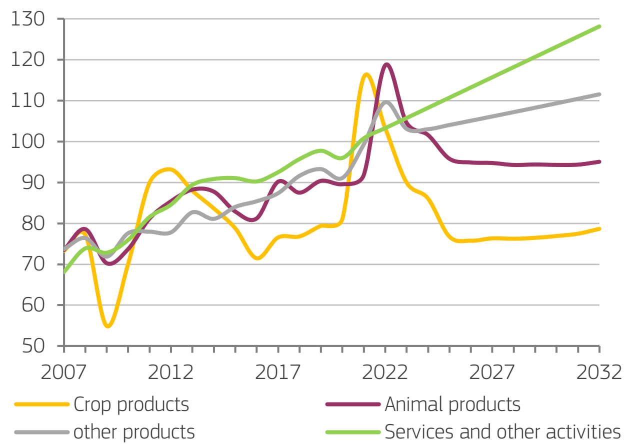
This chapter analyses how changes in agricultural markets over the next decade will affect farmers' income. The analysis is based on assumptions – including as regards agricultural sectors not explicitly covered by this outlook report – and the data from Eurostat's Economic Accounts for Agriculture. The information on public funding has been updated, based on the information available from the CAP strategic plans at the time when the analysis was made.

At EU level, the analysis shows that while agricultural prices are positively contributing to farmers' income in the short term, in the medium term farmers will still be facing significant input costs, mainly due to high energy and fertiliser prices, with lower margins, also impacted by inflation. Despite these elements, income in real terms expressed per annual work unit, is expected to slightly increase in the long term. The labour outflow from agriculture due to structural changes at EU level is projected to continue, but at a slower rate than what has been observed in recent years.

In addition, the chapter presents some results on the development of EU farm structures, based on the latest results of Farm Structure Survey. In general, EU farms are falling in number, and getting bigger and more specialised.

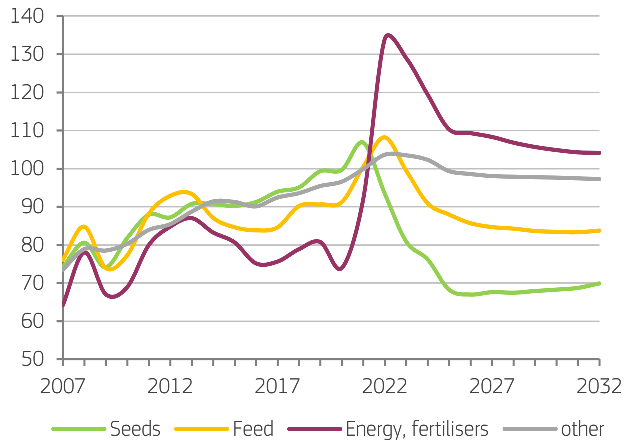
FARM INCOME

GRAPH 6.1 Value of EU agricultural output (average 2020-2022=100)

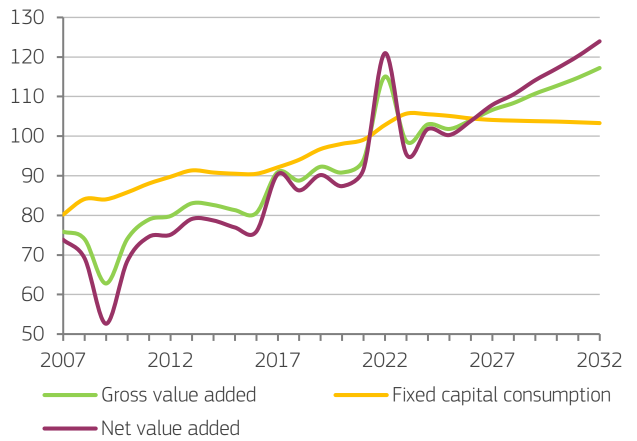


Note: Crop products include cereals, oilseeds, pulses and sugar beet. Animal products include milk, beef and veal, pigmeat, poultry, sheep and goat meat, and eggs. Other products include fruit, vegetables, wine, and olive oil.

GRAPH 6.2 Intermediate costs per category (average 2020-2022=100)



GRAPH 6.3 Composition of farm income (average 2020-2022=100)



Agricultural output due to stabilise after prices peak

The crop production value (16 % of agricultural output in 2022) spiked in 2021 and 2022 due to COVID-19 recovery and geopolitical events but could return to 2019 levels in 2025. After 2025, it is expected to rise more gradually by 2032 (0.3 % per year). In 2022-2032, overall value of crop production could fall by 2.4 % per year, as high prices for crops should return to the levels seen before 2020. The value of animal production (37 % of agricultural output in 2022) is also due to fall by 0.5 % per year over the next decade, compared with the high prices seen in 2022, mainly for dairy products and poultry. In addition, the animal production is expected to decline (see chapters on Meats and Milk). Overall, the total nominal value of EU agricultural production is expected to slightly grow (+0.3 % per year for 2022-2032). It has previously risen by an average of 2.1 % a year in 2012-2022.

Energy and fertilisers are still major costs for farmers

Until 2021, energy and fertiliser costs accounted for 18 % of intermediate costs. However, the 2022 surge in prices of energy, and nitrogen fertilisers due to the cost of natural gas, is likely to continue having a significant impact on farm costs over the coming years (assuming until 2025). In the medium term, the uptake of renewable energy, diversification of energy supplies, more energy-efficient practices and better-targeted fertiliser use (including organic fertilisers) are expected to reduce the economic impact of these costs. Energy and fertiliser costs are still expected to increase by 0.4 % per year by 2032 (+2.5 % per year in 2012-2022). By 2032, they are expected to represent 23 % of all intermediate costs. Due to smaller cultivated crop areas and smaller livestock herds, all other intermediate costs such as seeds, feed, plant protection products, and veterinary expenses could fall. These costs are contained to preserve profit margins, which are estimated to fall by 1.1 % per year by 2032.

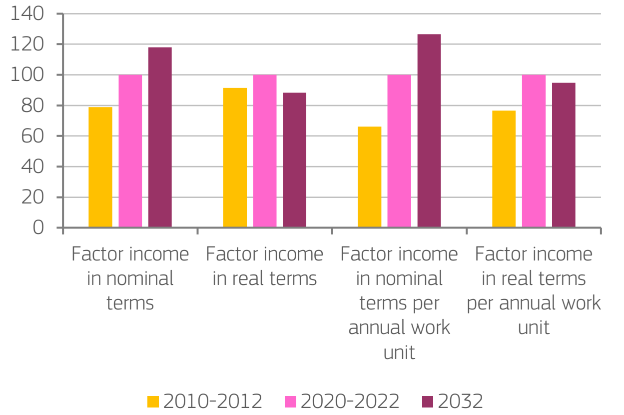
Slowdown of growth in net value added for farmers

Gross value added, calculated as production value minus intermediate costs, could increase by 1.6 % per year by 2032. While digitalisation, further specialisation and modernisation of assets (like buildings and equipment) could have a positive impact on fixed capital consumption[17], this is likely to be offset by high costs for new investments with time-lagged returns. As a result, only a modest increase of 0.3 % per year is expected over 2022-2032. Therefore, net value added (gross value added minus fixed capital consumption) is expected to increase by 2.2 % per year, down from 3.2 % in 2012-2022.

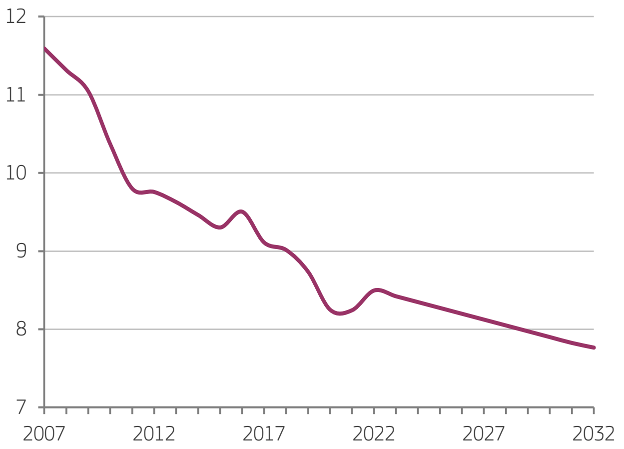
[17] The fixed capital consumption accounts for the loss of economic value of capital, because of it wearing off or becoming obsolete.

AGRICULTURAL LABOUR

GRAPH 6.4 Farm income at current and constant 2010 prices (average 2020-2022=100)



GRAPH 6.5 Number of agricultural workers (million AWU)



Note: AWU stands for Annual Work Unit.

Divergence between nominal and real farm income due to inflation

Nominal farm income (expressed as factor income, i.e. net value added plus subsidies, minus taxes) is expected to increase by 1.7 % per year between 2022 and 2032, down from 2.4 % in 2012-2022. In contrast to nominal values based on current prices, real values are based on constant 2010 prices and so they are corrected for inflation. Given the high inflation seen mainly in 2022 and 2023, this produces a significant difference between current and constant income levels.

Labour productivity gains would also lead to a steady average increase of income per worker. Excluding the bias of high input prices for agricultural commodities seen in 2022, the longer term growth of real income per worker between 2012 and 2032 remains positive and amounts to 1.1 % per year.

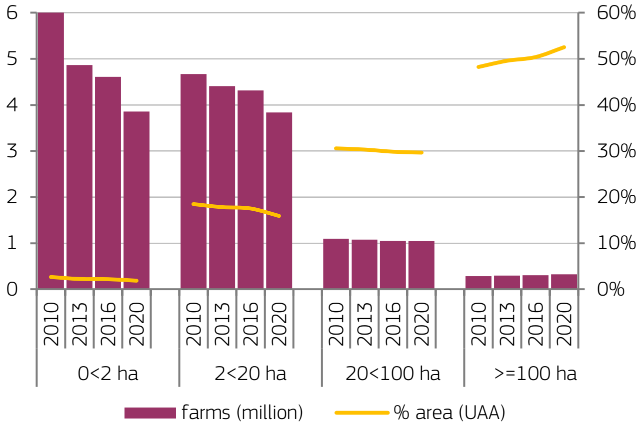
Fall in agricultural labour to slow

Agricultural labour – measured in annual work units (AWU) – is projected to decrease by 0.7 % per year in 2022-2032, i.e. by a slower rate than the 1.8 % decrease seen in 2012-2022. Eastern EU countries (particularly Poland and Romania) are expected to see the highest outflow of agricultural workforce, both in relative and in absolute terms. This is due to an ongoing concentration of farms (i.e. fewer bigger farms emerging) and more mechanised processes.

In general, the downward trend is driven by the low attractiveness of the sector, the increase in productivity enabled by improved mechanisation and automation, profit variability due to market volatility and higher exposure to climate change. This downward trend might be mitigated by policies on income support and rural development, as well as schemes to support new entrants. A new generation of farmers could be attracted by the opportunities created by digitalisation and new production systems.

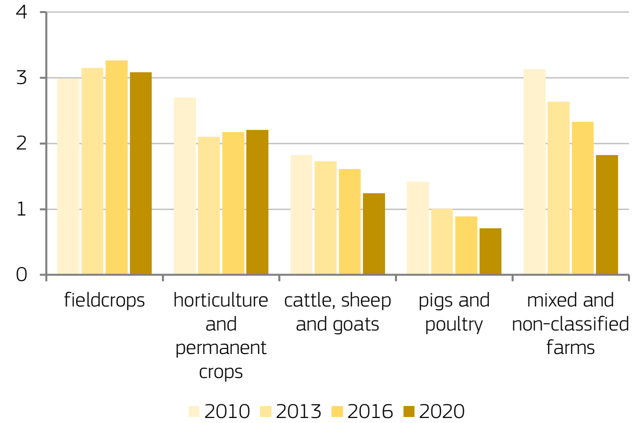
DEVELOPMENT OF EU FARMS

GRAPH 6.6 Number of farms by size of utilised agricultural area (ha of UAA), and % of UAA managed by these farms



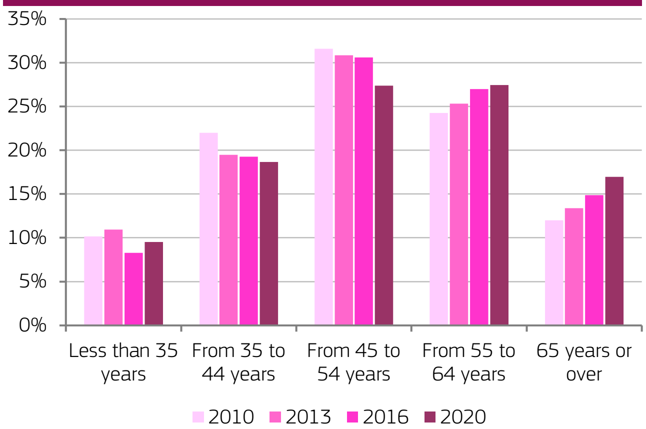
Source: DG Agriculture and Rural Development, based on Eurostat (Farm Structure Survey).

GRAPH 6.7 Number of farms (in million) by farm type group



Source: DG Agriculture and Rural Development, based on Eurostat (Farm Structure Survey).

GRAPH 6.8 Percentage of utilised agricultural area (UAA) in farms, broken down by age of farm managers



Source: DG Agriculture and Rural Development, based on Eurostat (Farm Structure Survey).

Fewer farms while agricultural area remains largely unchanged

In 2020, there were 9.1 million farms in the EU (25 % fewer than in 2010). These farms covered 157 million ha of utilised agricultural area (UAA) and had 113 million livestock units (LSU), slightly below 2010 figures (159 million ha, 122 million LSU). Most farms in the EU are small in terms of the size of land. About 42 % of farms managed less than 2 ha, and 76 % farms less than 10 ha. Farm structures differ greatly among EU countries, and there are a high number of small farms in relatively few countries. In most countries, the largest part of UAA was farmed by the largest farms (50 ha or more). The overall number of farms fell, and farms above 100 ha became more frequent (+14 % since 2010). These large farms cultivated over 50 % of UAA in 2020.

Bigger and more specialised farms

EU farming has become more specialised. In 2010, 74 % of farms were specialised holdings; the rest were mixed and non-classified. In 2020, 80 % of farms were specialist holding. In 2010, mixed farming was still the main type of farm (3.1 million farms). 10 years later, this had fallen to 1.8 million (-42 %). Fieldcrop farms are now the most numerous, accounting for one third of all farms, up 3 % between 2010 and 2020. There are also fewer livestock farms, down by 40 % in 10 years, a far greater fall than the fall in number of farms without animals (down by 5 %). The average farm size increased from 13.2 ha to 17.4 ha; and the average livestok unit from 10.1 to 12.5 respectively.

Farmers are older on average but also more efficient

The average age of farm managers has not changed much from 55.4 years to 56.9 years in 2010-2020. However, the share of farmers over 65 years of age has increased from 30 % to 34 %. This trend can be observed both in rural areas and the population in general, although the share of older farmers is higher than average for the population. On average, the youngest farmers manage the largest farms above 100 ha (51 years old) and the oldest farmers tend to manage the smallest farms below 2 ha (59 years). Still, an increasing area of land is farmed by older farmers. The past 10 years seen an outflow of farm labour from agriculture. Agricultural labour input statistics showed a reduction of 23 % annual work units (AWU) in 10 years due to less unpaid, family labour. The average farmed area and number of livestock units per unit of labour (AWU), as the sector got more automatised and the uptake of technology has increased. In terms of gender, thanks to a slower decline in absolute numbers, there were relatively more women-run farms. In 2020, 32 % of farms were managed by women.

ENVIRONMENTAL SCENARIO

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This chapter presents a scenario analysis of the potential economic, environmental and climate impacts of a lower livestock units per hectare of utilised agricultural area following requirements of Nitrates and Habitats directives. Additional scenarios have been included with the feed additive 3NOP, given to dairy and reproductive cows to reduce methane emissions. The scenarios are compared to the 2030 CAPRI medium-term baseline.

The impacts of scenarios of a lower livestock density on animal numbers and production are diverse across sectors and EU regions. Impacts are highest on pigs followed by non-dairy cattle and lowest for dairy cattle. Reduction of livestock units is high in hotspot regions, but at EU level this is partially offset by increases in other EU regions. Overall, ammonia emissions and nitrates losses to the water are reduced. This lower livestock density has a positive effect on GHG reduction in the EU, but there is a rather large share of emission leakage to non-EU regions as EU imports could grow. The leakage may be addressed by parallel policies targeting emission efficiency, dietary changes, or trade flows. The adoption of the feed additive 3NOP can contribute to reduce methane emissions.

The animal production decrease tends to raise prices of animal products and, due to less demand from livestock, also to decrease prices for several crop products. As the price increase offsets the production decrease in the most cases, a positive net effect on average EU farm income is observed, with differences between activities and regions.

LIVESTOCK REDUCTION SCENARIO

Background

This analysis, using the CAPRI model, looks at the potential impacts of reducing livestock density (LSU) per ha of utilised agricultural area (UAA), inspired by ongoing policy discussions in some EU countries (e.g. Netherlands and Belgium) on a possible reduction in livestock herds to meet legal requirements stemming from the Nitrates and Habitats Directives and to address certain societal concerns. Reducing livestock density is one of the possible options that – together with other measures – can contribute to reach the Farm to Fork (F2F) goal of reducing nutrient losses by 50 %.

This issue is particularly relevent in some EU “hotspots” Regions with high livestok density values (>2 LSU/ha, the EU average beig 0.67) (Table 8.1)

TABLE 7.1 Livestock density trends in hotspot regions

Region	LSU/ha 2010	LSU/ha 2018	Share on total EU LSU (2018)	LSU/ha Change 2010-2018
Antwerp	5.77	5.85	0.42 %	1.44 %
Limburg (BE)	3,02	2,74	0,19 %	-9.3 %
East-Flanders (BE)	3,87	3,5	0,44 %	-9.4 %
West-Flanders (BE)	6,06	5,93	1,06 %	-2.1 %
Weser-Ems (DE)	2,98	3,22	2,58 %	8.2 %
Muenster (DE)	3,34	3,83	1,34 %	14.8 %
Catalonia (ES)	2,37	2,5	2,08 %	5.7 %
Brittany (FR)	2,39	2,31	3,58 %	-3.1 %
Lombardy (IT)	2,34	2,31	2,01 %	-0.9 %
Friesland (NL)	2,43	2,82	0,53 %	16.1 %
Drenthe (NL)	2,05	2,37	0,30 %	15.2 %
Overijssel (NL)	4,35	4,91	0,81 %	12.7 %
Gelderland (NL)	4,81	5,3	1,00 %	10.2 %
Utrecht (NL)	3,34	3,61	0,19 %	8.0 %
North-Brabant (NL)	7,7	8,54	1,71 %	11.0 %
Limburg (NL)	6,79	7,45	0,61 %	9.8 %
TOTAL hotspots	3.10	3.22	18.9 %	3.8 %
EU total	0.66	0.67	100 %	0.4 %

In 2022, The Commission approved a feed additive for the reduction of methane (CH_4) from enteric fermentation, called 3NOP,. This could also help he EU meet the emission reduction targets for the sectors covered by the EU effort-sharing legislation . The use of this new additive has been already proposed in some CAP strategic plans (Belgium-Flanders and Slovenia). This analysis also assesses the potential economic and environmental impacts of using this additive.

Scenario setting

To analyse various options, the analysis has looked at a set of scenarios. They test a situation where maximum livestock density is lowered to a certain level in all EU countries by 2030. While these levels would generally be applied at farm level, in this analysis they are taken at regional level[18]. Therefore, the simulations at a regional level estimate what would happen if livestock were re-distributed between farms with high and low densities in a way that maximises the maximum livestock density allowed. This regional approach might underestimate the overall impacts because in practice cuts in number of livestock in one farm might not always be compensated by increasing livestock in other farms.

This analysis also developed a method to simulate the livestock density at a more detailed gepgraphical resolution. This method uses a distribution of livestock density in a grid of 10x10 km calculated from EUROSTAT data, which indicates the share of area in the region that exceeds the established threshold. It is assumed that livestock density is only reduced in these areas and it is not redistributed between grids within the region would happen. Moreover, while the regional approach enables a full compensation also between regions, the grid-level method assumes that regions with few animals in the reference scenario do not increase their livestock numbers. Therefore, the estimate at grid level generally overestimates the impact of livestock reduction. Simulating a lower livestock density both at regional and grid level allows to estimate the range of potential impacts.

The feed additive 3NOP can be added to the feed of dairy and reproductive ruminants (as the additive is not yet approved for beef herds) when animals are fed in a stable (i.e. not when grazing). In the scenarios, it is assumed that the feed additive is given to all dairy and suckler cows during the time they spend indoors, for a maximum of 10 months per year. The minimum and maximum doses are 60 and 90 parts per million (ppm) per kg of dry matter intake. The price in 2030 is expected to be in the range of EUR 15-17.5/kg per kg of product[19]. The CH_4 mitigation from enteric fermentation depends on the dose and the fat and fibre content in the feed (on average CH_4 emissions

[18] The CAPRI model used for this analysis works at the second level of Nomenclature of Territorial Units for Statistics (NUTS-2)

[19] The commercial product is Bovaer® 10, with approximately 10% of 3NOP content. Cost and emission reduction factors have been provided by DSM Nutritional Products Ltd., the company that has developed 3NOP and so far the only one producing it. Price information has been updated on 26/10/2022.

from enteric fermentation are reduced by around 30 % for an animal which gets the 60 ppm dose).

TABLE 7.2 Scenarios

Scenario		*Maximum Livestock Density (LSU per ha UAA)*	*Geographical resolution*	*3NOP (dose & price/Kg)*
S 1	*a*	*2*	*NUTS2 region*	-
	b		*10 x 10 km grid*	-
S 2	*a*	*1.4*	*NUTS2 region*	-
	b		*10 x 10 km grid*	-
S 3	*a*	*1.4*	*10 x 10 km grid*	*60 ppm & EUR 15*
	b			*90 ppm & EUR 17.5*

The reference scenario is the CAPRI projection for 2030[20]. This analysis simulates six additional scenarios:

Scenario S1a: Livestock density ≤ 2[21] LSU/ha UAA at regional level. This is the least ambitious scenario, which will have a rather strong effect in some regions that currently have a high livestock density. It can also induce strong compensation effects in other regions. This scenario provides the smallest effect of the tested lower livestock density.

Scenario S1b: Livestock density ≤ 2 LSU/ha UAA at grid level. Compared to 1a, this scenario considers livestock density values at a higher gepgraphical resolution. Overall, scenarios at grid level are likely to be closer to reaching the maximum potential impact of the proposed measure.

Scenario S2a: Livestock density ≤ 1.4 LSU/ha UAA at regional level.

Scenario S2b: Livestock density ≤ 1.4 LSU/ha UAA at grid level.

Scenario S3a: Combines the livestock density threshold of S2b with the use of 3NOP feed additive at its lowest dose of 60 ppm and lowest price of EUR 15/kg, and a maximum potential rate of adoption.

Scenario S3b: Combines the livestock density threshold as S2b plus 3NOP feed additive at its highest dose of 90 ppm and highest price of EUR 17.5/kg, and a maximum potential rate of adoption.

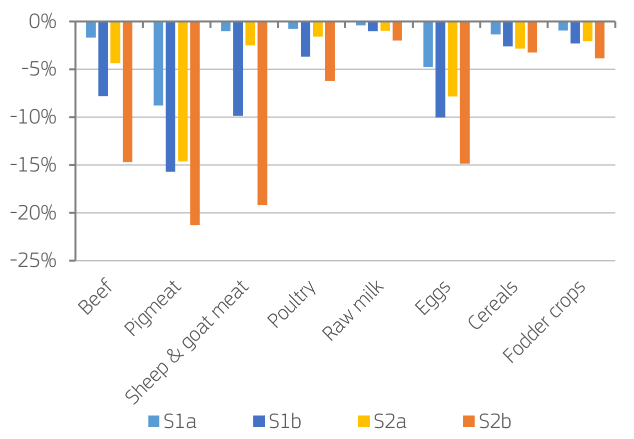
[20] EcAMPA 4 CAPRI baseline based on 2020 EU Medium-term Outlook.

[21] The 2 LSU/ha threshold has been used to approximate the value of 170 g N/ha of manure in the organic farming regulation (EC, 2008) and in the CAP. It was first introduced, together with the 1.4 limit in the 1992 CAP reform (EC, 1991) for the special premium for male bovines and the suckler cow premium. The value 1.4 LSU/ha on forage area was used for the additional extensification premium (Court of Auditors, 2000) and is also one of the values used in different CAP SP (e.g. coupled income support (FR); eco-schemes (DE, IE); AECM (BE-W)).

Impact on livestock numbers, area and production

The reduction of livestock density leads to a reduction in EU livestock numbers under all scenarios: -3 to -10 % under S1 and -7 to -16 % under S2 (S3 scenarios have similar results to those in S2b). The impact is greater on granivores (i.e. poultry and pigs) than on grazing livestock (i.e. cattle and sheep/goats). This can be explained by a combination of both a higher density of pigmeat production and higher profit margins for dairy cattle. Although under all scenarios livestock density considers all, in CAP Strategic Plans the latter is often defined only for grazing livestock[22]. If only grazing livestock is affected, an increase in granivores' animal numbers could be expected to partially compensate for the decrease in ruminants. It may also lead to a greater reduction in the dairy herd, as it is often more intensively managed than beef.

GRAPH 7.1 Changes in production (1 000 t, EU total)



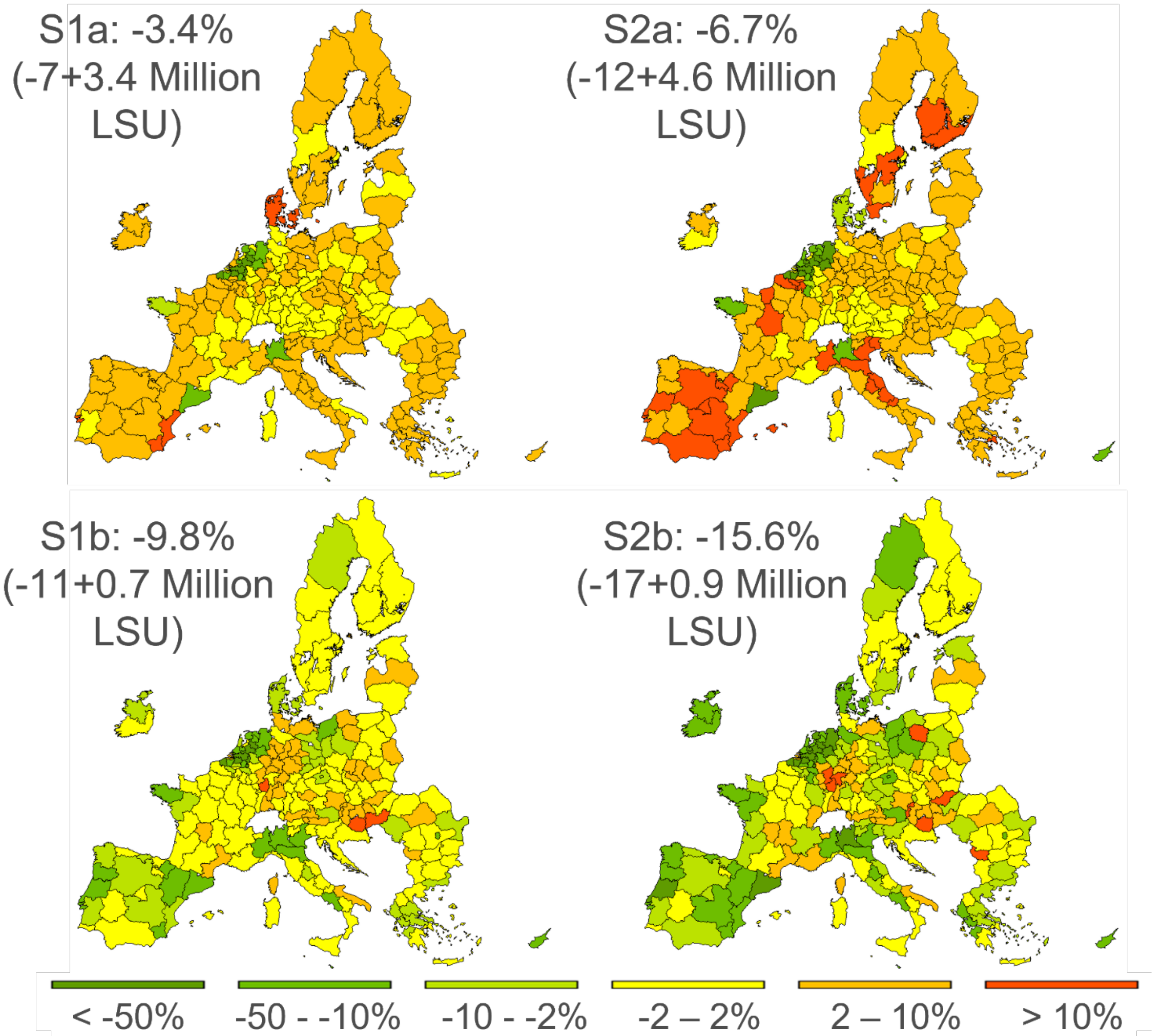
Source: Scenario simulation based on CAPRI model.

Reduced livestock numbers means lower production for all animal products, wiyh a shrper drop in the sectors with lower economic margins (pigmeat, beef, sheep and goats meat), less of a drop in dairy products and an intermediate reduction in poultry. Overall, crop production is also projected to fall for many crops due to lower demand for livestock feed (i.e. fodder crops, cereals and oilseeds). The production of pulses is expected to increases.

Under all scenarios, the total UAA is expected to increase (by maximum 2 % or 3.7 million ha in S2b, S3a and S3b).This is driven by an increase mainly in permanent grasslands and fallow land to not to exceed the hypothetical livestock density thresholds. The shift towards more extensive animal production is accompanied by a more extensive crop production, with lower yields and less use of fertiliser overall. While the use of mineral fertilisers tends to decrease for N, it increases for P and K. This is due to less manure available, as P and K are relatively more abundant in manure than N to meet the crop requirements.

[22] Usually referred to total forage areas (grassland and forage crops), instead of total UAA.

MAP 7.1 Change in animal density (LSU per ha UAA)[23]



Source: Scenario simulation based on CAPRI model.

[23] Scenarios 3a and 3b are not shown when they do not significantly differ from scenario 2b.

Impacts on prices, net trade, food consumption and farm income

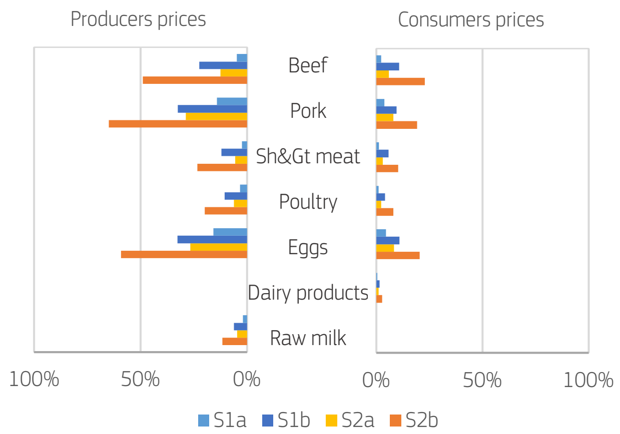
In general, the lower supply of animal products leads to higher producer and consumer prices. Producer price increases are highest for pigmeat, eggs and beef. Relatively inelastic demand is one of the key factors behind the projected increases (all livestock products are affected, so there is limited scope for substitution between products, especially in S2b).

On the supply side, the high increase in prics for beef is mainly driven by import restrictions, with current tariff rate quotas limiting the gowth of imports. As the EU has a large share of the global pigmeat market and the number of alternative exporter countries is therefore limited, reducing EU production would have a substantial effect on world market prices for pigmeat[24].

By contrast, a reduction in livestock would lead to a decrease on average of crop producer prices, , decrease on average, due to lower demand for animal feed. The decreases would be most pronounced for prices of feed crops (e.g. maximum under S2b and S3: -15 % pulses, -9 % rye and meslin, -8 % oats). However, the prices of other crops would remain stable or even increase (e.g. potatoes, vegetables and permanent crops).

In general, the changes in consumer price changes are likely to be of a similar magnitude when looking at absolute changes, but due to high consumer margins (assumed to be constant), the relative changes are much lower than for producer prices.

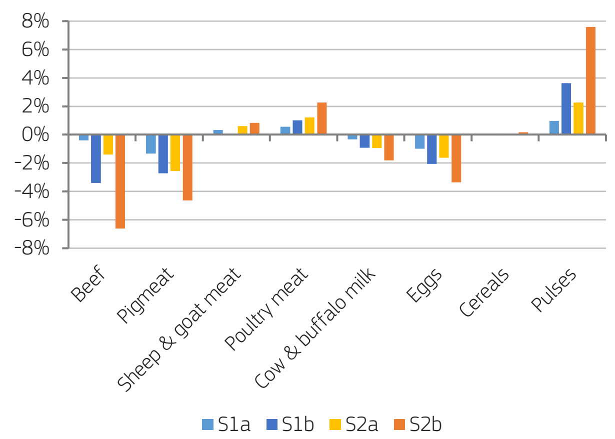
GRAPH 7.2 Change in producer and consumer prices in the EU[25]



Source: Scenario simulation based on CAPRI model.

Higher prices are expected to lead to a drop in consumption of animal products, although consumption is expected to fall less than production due to an inelastic demand. While in the consumption of beef, pigmeat and egg is expected to fall, it is expected to increase for poultry meat and some dairy products. The overall effect is two-fold: a partial substitution of animal by plant-based food (increases in consumption of protein crops, vegetal oils, etc.), and an increase in total expenditure on animal products (up to +12 % in S2b and S3), with a higher increase in expenditure for meat and eggs, and a smaller increase (+3 %) on dairy products.

GRAPH 7.3 Change in EU human consumption



Source: Scenario simulation based on CAPRI model.

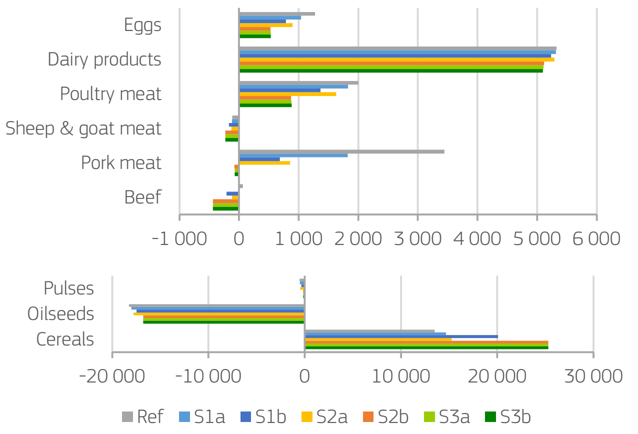
Lower EU supply and higher domestic prices are expected to lead to a drop in EU net exports of animal products, mainly meat and eggs. Net exports of dairy products are expected to fall only slightly. The trade changes in the crop sector reflect the production and price changes expected. Due to lower demand for animal feed, cereal net exports of cereals would increase overall. For instance, wheat, barley and oat exports would increase, whereas grain maize imports would decrease. Similarly, while imports of oilseeds and oilmeals would decrease, imports of vegetable oils for human consumption (e.g. palm oil, sunflower) would increase. The EU would import less of other arable field crops and vegetables (e.g. pulses, potatoes, and tomatoes) due to higher domestic production.

Total EU agricultural income is projected to increase under all scenarios, driven by higher prices. However, this masks significant sectoral and regional differences . Income for livestock producers is expected to rise underall scenarios because the rise in producer prices more than offsets the effect of lower production. By contrast, income is expected to fall in the crop sector, as the increase in demand increase for some food products does not compensate the decrease in demand for livestock feed. But as the CAPRI model only gives regional results , distributional effects between farms could not be simulated.

[24] It has to be mentioned that CAPRI is rather conservative for simulating emerging exports, i.e. the increase in exports for countries with low exports in the baseline is likely underestimated. Price impacts are partly confirmed by simulations with the Aglink-Cosimo model.

[25] Scenarios 3a and 3b are often not shown as they do not significantly differ from scenario 2b.

GRAPH 7.4 EU net exports (1 000 t)



Source: Scenario simulation based on CAPRI model.

Impacts on Nitrogen surplus, ammonia emissions and nitrates leaching and run-off

The scenarios modelling a reduction in livestok density indicate that overall they would reduce the surplus of Nitrogen. The EU average Nitrogen surplus would fall by 3 - 8 % under S1 and by 6 -12 % under S2. At regional level, the Nitrogen surplus would decrease in some regions (coloured in green in the maps) but increase in other regions (indicated in orange), mainly under scenarios S1a and S2a. In hotspot regions, the reduction can reach over 100 kg N/ha or over 50 %.

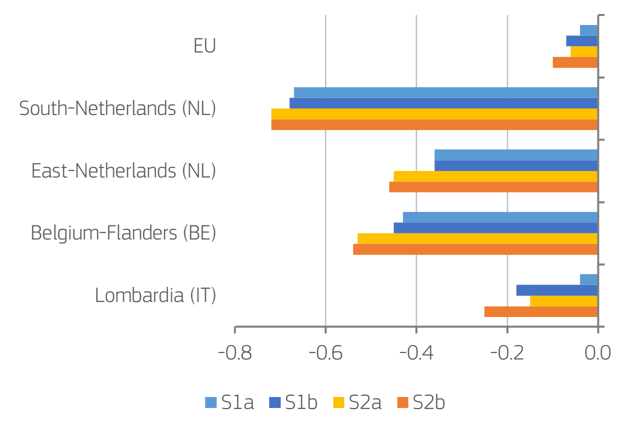
EU ammonia (NH_3) emissions are also ex[ected to decrease, by 3 - 7 % under S1 and by 6 -11 % under S2. Most of the reduction in NH_3 is related to manure, with a smaller share due to less use made of mineral fertiliser (Table 7.3).

TABLE 7.3 Changes in the emissions of ammonia (NH_3) in the EU

	S1a	S2a	S3a	S4a
NH_3 Total	-3 %	-7 %	-6 %	-11 %
NH_3 from animals	-3 %	-9 %	-6 %	-14 %
NH_3 from mineral fertilisers	-2 %	-2 %	-4 %	-3 %

Source: Scenario simulation based on CAPRI model.

GRAPH 7.5 Nitrates leaching and runoff reduction in EU in some hotspots



Source: Scenario simulation based on CAPRI model.

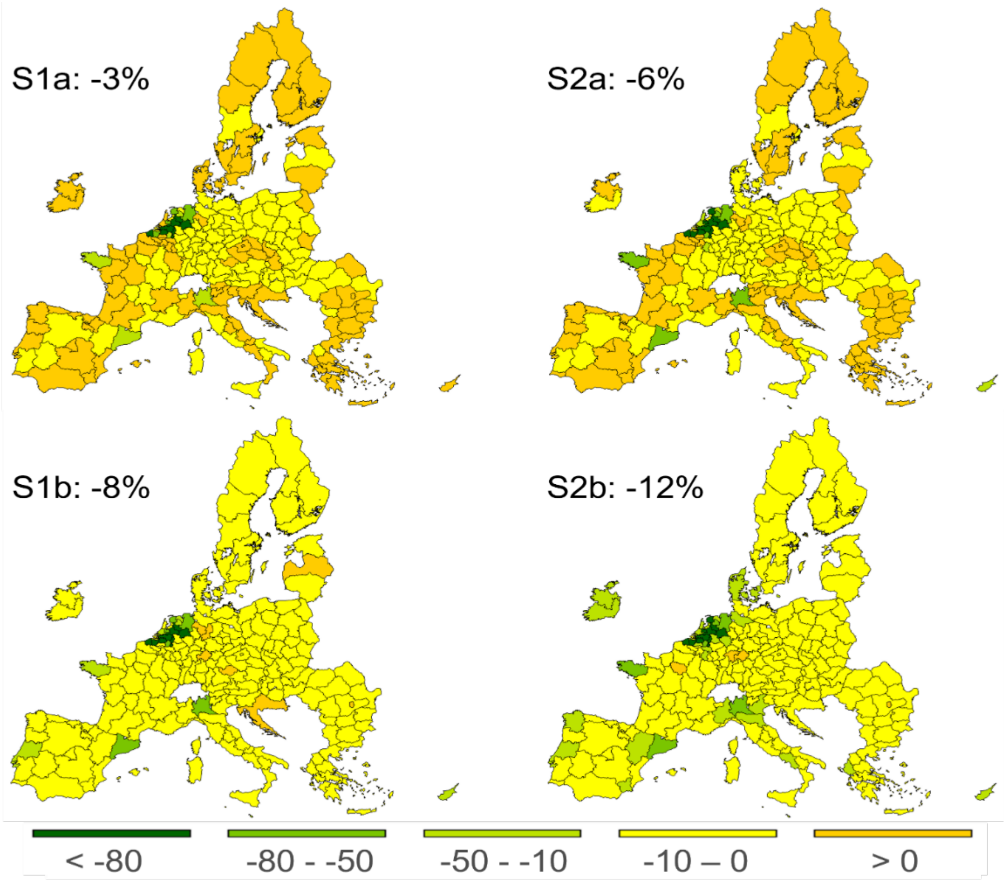
On average across the EU, the scenarios are expected to lead to a reduction in nitrates leaching and runoff by 4-7 % under S1 and 6-10 % under S2. However, in hotspot regions, for example in regions in the Netherlands and Belgium, they can achieve reductions of over 50 %. As the analysis did not take into account manure trade (exports) from these regions, the leaching and runoff reduction effect could be overestimated in these hotspot regions.

Impacts on Greenhouse gas emissions

Lower livestock density levels can reduce EU methane and nitrous oxide emissions by 4 9 % under S2. However, , between 79 % and 84 % of the abated emissions are offset by increasing emissions in other areas of the world, what is known as emission leakage. This is the result of increasing EU imports due to lower domestic supply while the demand does not decline proportionally. Consequently, production outside the EU could grow, and so emissions.. In addition, emissions per unit of product outside the EU are higher and are not subject to any change in these scenarios Following these developments, the biggest net global GHG reduction is less than -2 % in scenario S2. Importantly, this analysis excludes emissions from the production of mineral fertilisers and from land use change.

The low impact on GHG of the reduced livestock density can be seen as resulting intrinsically from the modelling assumptions that meat demand is relatively inelastic, and that production standards in third countries remain unchanged. In reality, policy measures aiming at changing diets, trade, and increasing emissions efficiency in agricultural production may be envisaged. An example of an emission efficiency-increasing

MAP 7.2 Nitrogen surplus change (kg N per ha UAA)



Source: Scenario simulation based on CAPRI model.

technology is the feed additive 3NOP, which reduces methane emissions by between 8 % for the lower dose and 10 % for the higher dose and total non-CO_2 GHG by 4-5 % compared with scenario S2b. Final net GHG reduction increases from 2 % under Scenario S2b to 5-7 % under Scenarios S3a and S3b, depending on the dose of 3NOP used.

The EU average emission reduction per cow, given the time spent indoors and the maximum 10 months per year is:

- a 16-21 % reduction in methane emissions from enteric fermentation for dairy cows and
- a 9-12 % reduction in methane emissions for suckler cows;
- a 11-15 % reduction in total GHG emissions for dairy cows and
- a 6-9 % reution in total GHG emissions for suckler cows (on 60-90 ppm doses).

Emissions reductions can reach over 30 % in some regions. The expected cost of the additive per tonne of reduced CO_2 equivalent is EUR 63-73 for the 60 ppm dose and EUR 70-82 for the 90 ppm dose (for the EUR 15-17.5 price range in 2030).

The EU average cost of the 3NOP additive per cow in the EU and per day would be: EUR 0.17-0.20 for dairy cows and EUR 0.10-0.12 for suckler cows on the lower dose.This would rise to EUR 0.26-0.30 and EUR 0.15-0.18 on the higher dose.

TABLE 7.4 GHG emissions in the EU (% change)

	S1a	S1b	S2a	S2b	S3a	S3b
GHG N_2O + CH_4	-1.9	-5.5	-3.8	-9.0	-12.6	-13.8
CH_4	-1.7	-6.0	-4.0	-10.4	-17.2	-19.5
N_2O	-2.1	-4.9	-3.7	-7.4	-7.4	-7.4
Leakage %	84 %	79 %	83 %	79 %	56 %	51 %
Net or global GHG change	-0.3	-1.1	-0.7	-1.9	-5.4	-6.7

Source: Scenario simulation based on CAPRI model.

ANNEX /8

This chapter presents figures of macroeconomic and income outlook, balances of key EU agricultural markets and results of uncertainty analysis.

In addition, it includes a list of references used in the report.

For comparison reasons, simple averages are used for 2022 (2020-2022) in the majority of balances.

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MARKET OUTLOOK DATA

TABLE 8.1 Baseline assumptions on key macroeconomic variables

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Population growth (EU-27)	0.4%	0.4%	-0.5%	-0.4%	-0.4%	-0.3%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Real GDP growth (EU-27)	0.8%	0.9%	1.9%	1.7%	1.6%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
Inflation (Consumer Price Index) EU-14	3.5%	4.3%	1.9%	2.1%	2.0%	2.1%	2.2%	2.1%	2.1%	2.0%	2.0%
Inflation (Consumer Price Index) EU-13	6.0%	7.0%	3.7%	2.6%	2.6%	2.4%	2.4%	2.4%	2.3%	2.3%	2.3%
Exchange rate (USD/EUR)	1.1	1.01	1.01	1.11	1.12	1.14	1.16	1.18	1.19	1.20	1.21
Oil price (USD per barrel Brent)	73	97	88	87	89	90	91	92	93	94	96

Sources: DG AGRI estimates based on the European Commission macroeconomic forecasts, OECD-FAO outlook and S&P Global forecasts.

TABLE 8.2 EU agricultural income (2020-2022=100)

	avg 2010-2012	avg 2020-2022	2032
Factor income in nominal terms	78.9	100.0	117.9
Factor income in real terms	91.5	100.0	88.3
Labour input	119.7	100.0	93.2
Factor income in real terms per labour unit	76.6	100.0	94.8

TABLE 8.3 EU area under arable crops (million ha)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Cereals	**57.4**	**58.0**	**58.0**	**57.8**	**57.7**	**57.5**	**57.4**	**57.2**	**57.1**	**56.9**	**56.8**	**-0.3%**	**-0.1%**
Common wheat	21.5	22.0	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	0.0%	0.3%
Durum wheat	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	-2.1%	0.0%
Barley	10.6	10.6	10.6	10.6	10.5	10.4	10.3	10.3	10.2	10.1	10.0	-0.6%	-0.5%
Maize	9.2	8.9	8.9	8.8	8.7	8.6	8.6	8.5	8.4	8.3	8.3	0.0%	-1.0%
Rye	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	-2.2%	0.4%
Other cereals	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.3	12.3	-0.1%	0.1%
Rice	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**-1.8%**	**0.0%**
Oilseeds	**11.2**	**10.9**	**10.9**	**10.9**	**10.9**	**10.9**	**11.0**	**11.0**	**11.0**	**11.0**	**11.0**	**0.5%**	**-0.1%**
Rapeseed	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.4	5.4	5.4	5.4	-0.8%	-0.3%
Sunseed	4.6	4.4	4.4	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5	1.1%	-0.3%
Soyabeans	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	8.6%	1.2%
Sugar beet	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	-0.4%	-0.1%
Roots and tubers	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	-1.9%	-0.1%
Pulses	2.1	2.3	2.4	2.3	2.4	2.5	2.5	2.6	2.6	2.7	2.8	3.9%	3.0%
Fodder (green maize, temp. grassland etc.)	19.8	19.9	19.8	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	0.3%	-0.1%
Utilised arable area	**93.8**	**92.2**	**92.5**	**92.6**	**92.8**	**93.0**	**93.2**	**93.5**	**93.8**	**93.9**	**94.2**	**-0.2%**	**0.0%**
set-aside and fallow land	5.6	5.7	5.7	5.6	5.5	5.5	5.4	5.4	5.4	5.4	5.4	-3.5%	-0.4%
Share of fallow land	*5.9%*	*6.2%*	*6.1%*	*6.0%*	*6.0%*	*5.9%*	*5.8%*	*5.8%*	*5.7%*	*5.7%*	*5.7%*	-3.3%	-0.4%
Total arable area	99.3	98.1	98.3	98.3	98.5	98.6	98.7	98.9	99.1	99.3	99.5	-0.4%	0.0%
Permanent grassland	50.7	50.7	50.6	50.6	50.6	50.6	50.6	50.5	50.5	50.5	50.4	0.2%	-0.1%
Share of permanent grassland in UAA	*31.2%*	*31.2%*	*31.2%*	*31.2%*	*31.2%*	*31.2%*	*31.2%*	*31.2%*	*31.2%*	*31.2%*	*31.1%*	0.4%	0.0%
Orchards and others	12.3	13.4	13.3	13.2	13.1	12.9	12.8	12.6	12.4	12.2	12.0	0.6%	-0.2%
Total utilised agricultural area	162.4	162.2	162.2	162.2	162.1	162.1	162.1	162.1	162.0	162.0	162.0	-0.1%	0.0%

TABLE 8.4 EU cereals market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Production	**307.4**	**310.3**	**310.7**	**310.7**	**310.0**	**309.4**	**308.7**	**308.1**	**307.5**	**307.0**	**306.3**	**0.6%**	**0.0%**
Imports	24.3	23.9	24.9	25.4	25.4	25.4	25.9	26.4	26.8	27.2	27.5	4.0%	1.2%
Exports	47.0	43.6	43.8	45.3	45.9	46.6	46.8	46.9	47.1	47.4	47.7	4.2%	0.2%
Consumption	**285.5**	**292.2**	**292.7**	**290.3**	**289.3**	**288.2**	**288.0**	**287.6**	**287.2**	**286.7**	**286.2**	**0.1%**	**0.0%**
of which food and industrial	112.3	123.6	124.0	122.8	123.4	123.0	123.7	124.3	124.8	124.3	123.7	-0.4%	1.0%
of which feed	160.2	156.9	157.2	156.2	154.8	154.3	153.6	152.9	152.2	151.3	150.5	0.3%	-0.6%
of which bioenergy	13.0	11.8	11.6	11.3	11.1	10.8	10.6	10.5	10.3	11.1	12.0	2.9%	-0.8%
Beginning stocks	43.4	40.2	38.7	37.8	38.2	38.4	38.4	38.2	38.2	38.2	38.2	0.9%	-1.3%
Ending stocks	42.6	38.7	37.8	38.2	38.4	38.4	38.2	38.2	38.2	38.2	38.1	3.2%	-1.1%
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Stock-to-use ratio	14.9%	13.2%	12.9%	13.2%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	3.1%	-1.1%

Note: cereals marketing year is July/June

TABLE 8.5 EU wheat market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**133.3**	**135.6**	**136.1**	**136.3**	**136.5**	**136.6**	**136.8**	**136.9**	**137.0**	**137.1**	**137.3**	**0.8%**	**0.3%**
Imports	4.8	5.3	5.3	5.2	5.2	5.2	5.2	5.3	5.3	5.3	5.3	-3.5%	1.1%
Exports	31.8	29.3	29.0	30.1	30.7	31.0	31.0	31.0	31.1	31.3	31.4	4.2%	-0.1%
Consumption	**105.3**	**113.0**	**113.0**	**111.3**	**110.9**	**110.9**	**111.1**	**111.2**	**111.3**	**111.2**	**111.3**	**-0.5%**	**0.6%**
of which food and industrial	61.2	67.9	68.1	67.1	67.3	68.0	68.8	69.4	70.1	69.7	69.4	-0.1%	1.3%
of which feed	40.0	41.6	41.4	40.8	40.2	39.7	39.1	38.6	38.1	37.5	37.0	-0.9%	-0.8%
of which bioenergy	4.1	3.5	3.5	3.4	3.3	3.3	3.2	3.1	3.0	4.0	4.9	-0.7%	1.8%
Beginning stocks	12.9	14.2	12.8	12.1	12.2	12.3	12.3	12.2	12.2	12.1	12.1	1.5%	-0.7%
Ending stocks	13.9	12.8	12.1	12.2	12.3	12.3	12.2	12.2	12.1	12.1	12.0	4.0%	-1.5%
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Note: the wheat marketing year is July/June

TABLE 8.6 EU common coarse grains market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**174.2**	**174.8**	**174.6**	**174.4**	**173.5**	**172.7**	**172.0**	**171.2**	**170.5**	**169.8**	**169.1**	**0.5%**	**-0.3%**
Imports	19.4	18.7	19.6	20.2	20.2	20.2	20.7	21.2	21.5	21.8	22.1	7.4%	1.3%
Exports	15.2	14.3	14.8	15.2	15.2	15.6	15.8	15.9	16.1	16.2	16.3	4.0%	0.7%
Consumption	**180.2**	**179.2**	**179.7**	**178.9**	**178.4**	**177.3**	**176.9**	**176.5**	**176.0**	**175.5**	**174.9**	**0.5%**	**-0.3%**
of which food and industrial	51.1	55.7	55.9	55.7	56.2	55.1	54.9	54.8	54.6	54.6	54.3	-0.8%	0.6%
of which feed	120.3	115.2	115.7	115.4	114.6	114.6	114.5	114.3	114.1	113.7	113.6	0.8%	-0.6%
of which bioenergy	8.9	8.2	8.1	7.8	7.7	7.6	7.4	7.4	7.2	7.1	7.0	5.2%	-2.3%
Beginning stocks	30.5	26.0	26.0	25.6	26.0	26.0	26.1	26.0	26.1	26.1	26.1	0.7%	-1.5%
Ending stocks	28.7	26.0	25.6	26.0	26.0	26.1	26.0	26.1	26.1	26.1	26.1	2.9%	-0.9%
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Note: the coarse grains marketing year is July/June

TABLE 8.7 EU common wheat market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**125.8**	**127.9**	**128.5**	**128.7**	**128.8**	**129.0**	**129.1**	**129.2**	**129.3**	**129.5**	**129.6**	**1.0%**	**0.3%**
Yield	**5.9**	**5.8**	**5.8**	**5.8**	**5.8**	**5.8**	**5.8**	**5.9**	**5.9**	**5.9**	**5.9**	**1.0%**	**0.0%**
Imports	2.6	2.7	2.6	2.6	2.5	2.5	2.5	2.4	2.4	2.4	2.3	-6.3%	-1.0%
Exports	30.9	28.3	28.1	29.1	29.7	29.9	30.0	30.0	30.1	30.3	30.5	4.8%	-0.1%
Consumption	**96.1**	**104.4**	**103.7**	**102.0**	**101.6**	**101.5**	**101.6**	**101.7**	**101.7**	**101.6**	**101.6**	**-0.5%**	**0.6%**
of which food and industrial	52.2	59.5	58.9	58.0	58.1	58.7	59.5	60.1	60.7	61.2	61.8	-0.1%	1.7%
of which feed	39.8	41.4	41.3	40.6	40.1	39.5	39.0	38.5	37.9	37.4	36.8	-0.9%	-0.8%
of which bioenergy	4.1	3.5	3.5	3.4	3.3	3.3	3.2	3.1	3.0	3.0	2.9	-0.7%	-3.3%
Beginning stocks	11.3	13.7	11.5	10.9	11.0	11.1	11.1	11.1	11.0	11.0	11.0	1.4%	-0.3%
Ending stocks	12.7	11.5	10.9	11.0	11.1	11.1	11.1	11.0	11.0	11.0	10.9	4.4%	-1.4%
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
EU price in EUR/t	261	235	220	197	192	193	192	192	192	193	197	1.4%	-2.8%
EU intervention price in EUR/t	101	101	101	101	101	101	101	101	101	101	101		

Note: the common wheat marketing year is July/June

TABLE 8.8 EU durum wheat market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**7.5**	**7.7**	**7.6**	**7.6**	**7.6**	**7.6**	**7.6**	**7.7**	**7.7**	**7.7**	**7.7**	**-2.0%**	**0.2%**
Yield	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**0.6%**	**0.1%**
Imports	2.2	2.6	2.7	2.7	2.7	2.7	2.8	2.8	2.9	2.9	3.0	2.3%	3.1%
Exports	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-6.9%	0.2%
Consumption	**9.2**	**8.6**	**9.4**	**9.3**	**9.3**	**9.4**	**9.4**	**9.5**	**9.6**	**9.6**	**9.7**	**0.1%**	**0.6%**
of which food and industrial	9.0	8.4	9.2	9.1	9.2	9.2	9.3	9.3	9.4	8.5	7.5	0.2%	-1.8%
of which feed	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	-2.3%	-1.1%
of which bioenergy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0		
Beginning stocks	1.6	0.5	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	2.9%	-4.1%
Ending stocks	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	0.6%	-4.1%

Note: the durum wheat marketing year is July/June

TABLE 8.9 EU barley market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**52.8**	**52.3**	**52.3**	**52.3**	**51.9**	**51.5**	**51.1**	**50.8**	**50.5**	**50.1**	**49.7**	**1.0%**	**-0.6%**
Yield	**5.0**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**5.0**	**5.0**	**5.0**	**1.5%**	**-0.1%**
Imports	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	4.7%	0.4%
Exports	10.4	10.2	10.8	11.1	11.0	11.2	11.3	11.4	11.5	11.6	11.7	4.1%	1.2%
Consumption	**43.8**	**43.0**	**42.8**	**42.4**	**42.2**	**41.7**	**41.1**	**40.7**	**40.2**	**39.8**	**39.4**	**-0.5%**	**-1.1%**
of which food and industrial	9.3	9.4	9.2	9.0	9.1	8.8	8.5	8.2	8.0	7.8	7.6	-0.8%	-2.0%
of which feed	34.0	33.2	33.1	32.9	32.7	32.4	32.2	32.0	31.8	31.6	31.3	-0.4%	-0.8%
of which bioenergy	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	-2.0%	-0.1%
Beginning stocks	4.3	4.1	4.5	4.6	4.7	4.8	4.8	4.8	4.8	4.9	4.9	-8.6%	1.3%
Ending stocks	4.2	4.5	4.6	4.7	4.8	4.8	4.8	4.8	4.9	4.9	4.9	-3.7%	1.5%
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
EU price in EUR/t	245	217	203	182	178	179	178	179	179	180	183	1.8%	-2.9%

Note: the barley marketing year is July/June

TABLE 8.10 EU maize market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**65.2**	**66.4**	**66.9**	**66.5**	**66.0**	**65.5**	**65.1**	**64.6**	**64.1**	**63.6**	**63.2**	**0.3%**	**-0.3%**
Yield	**7.1**	**7.4**	**7.5**	**7.6**	**7.6**	**7.6**	**7.6**	**7.6**	**7.6**	**7.6**	**7.7**	**0.2%**	**0.7%**
Imports	17.6	17.1	17.9	18.6	18.6	18.7	19.1	19.6	20.0	20.3	20.6	8.3%	1.6%
Exports	4.4	3.7	3.5	3.6	3.8	3.9	3.9	3.9	3.9	3.9	3.9	4.1%	-1.2%
Consumption	**80.2**	**80.6**	**81.5**	**81.1**	**80.7**	**80.3**	**80.4**	**80.3**	**80.3**	**80.1**	**79.9**	**1.4%**	**0.0%**
of which food and industrial	10.0	13.1	13.8	13.9	14.2	13.8	13.9	14.1	14.1	14.2	14.1	-2.6%	3.5%
of which feed	62.9	60.7	61.0	60.8	60.2	60.4	60.4	60.4	60.4	60.2	60.2	1.6%	-0.4%
of which bioenergy	7.3	6.8	6.6	6.4	6.3	6.1	6.0	5.9	5.8	5.7	5.6	7.8%	-2.7%
Beginning stocks	20.5	16.6	15.8	15.6	16.0	16.1	16.2	16.1	16.1	16.0	16.0	5.0%	-2.4%
Ending stocks	18.7	15.8	15.6	16.0	16.1	16.2	16.1	16.1	16.0	16.0	16.0	5.5%	-1.6%
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
EU price in EUR/t	261	226	212	189	185	185	183	182	182	182	185	1.8%	-3.4%

Note: the maize marketing year is July/June

TABLE 8.11 EU other cereals* market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**56.2**	**56.1**	**55.4**	**55.6**	**55.6**	**55.7**	**55.8**	**55.9**	**55.9**	**56.1**	**56.1**	**0.3%**	**0.0%**
Yield	**4.0**	**3.9**	**3.9**	**3.9**	**3.9**	**3.9**	**3.9**	**3.9**	**3.9**	**3.9**	**3.9**	**0.7%**	**-0.1%**
Imports	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-2.7%	-9.3%
Exports	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	1.9%	5.6%
Consumption	**56.3**	**55.6**	**55.4**	**55.4**	**55.5**	**55.3**	**55.4**	**55.4**	**55.5**	**55.6**	**55.7**	**0.1%**	**-0.1%**
of which food and industrial	31.8	33.2	32.8	32.7	32.8	32.6	32.5	32.5	32.5	32.6	32.6	-0.1%	0.2%
of which feed	23.4	21.3	21.6	21.7	21.7	21.8	21.9	21.9	22.0	22.0	22.1	0.5%	-0.6%
of which bioenergy	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-1.8%	-1.1%
Beginning stocks	5.7	5.2	5.6	5.4	5.3	5.1	5.1	5.2	5.2	5.2	5.2	1.0%	-0.9%
Ending stocks	5.7	5.6	5.4	5.3	5.1	5.1	5.2	5.2	5.2	5.2	5.2	2.7%	-0.9%

** Rye, Oats and other cereals*
Note: the other cereals marketing year is July/June

TABLE 8.12 EU rice balance (million t milled equivalent)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**1.6**	**1.7**	**1.7**	**1.7**	**1.7**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**-1.3%**	**-0.1%**
Yield	**4.1**	**4.1**	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**	**0.5%**	**0.0%**
Imports	2.5	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	9.0%	0.6%
Exports	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8%	4.7%
Consumption	**3.7**	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**	**3.6**	**4.1%**	**-0.3%**
Beginning stocks	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	2.1%	-0.1%
Ending stocks	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.9%	-0.1%
EU price in EUR/t	581	567	574	583	591	597	601	605	610	615	628	-0.4%	0.8%

Note: the rice marketing year is September/August

TABLE 8.13 EU oilseed* (grains and beans) market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**30.2**	**30.2**	**30.5**	**30.9**	**31.1**	**31.4**	**31.7**	**32.0**	**32.3**	**32.6**	**32.9**	**1.5%**	**0.9%**
Rapeseed	17.8	17.5	17.5	17.7	17.7	17.8	17.9	18.0	18.1	18.2	18.3	0.3%	0.3%
Sunseed	9.8	10.0	10.1	10.2	10.4	10.5	10.6	10.8	10.9	11.1	11.2	2.6%	1.3%
Soya beans	2.6	2.8	2.9	3.0	3.0	3.1	3.2	3.2	3.3	3.4	3.5	8.6%	2.9%
Imports	21.6	21.9	21.8	21.4	21.0	20.7	20.4	20.1	19.8	19.5	19.3	2.8%	-1.1%
Exports	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.3	0.9%	2.0%
Consumption	**51.2**	**51.1**	**51.0**	**51.0**	**51.0**	**51.0**	**50.9**	**50.9**	**50.9**	**50.9**	**51.0**	**2.1%**	**0.0%**
of which crushing	46.7	46.5	46.4	46.4	46.3	46.3	46.3	46.3	46.2	46.2	46.3	2.0%	-0.1%
Beginning stocks	3.0	2.6	2.5	2.7	2.8	2.7	2.7	2.7	2.7	2.7	2.7	-1.3%	-0.9%
Ending stocks	2.5	2.5	2.7	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	-1.9%	0.8%
EU price in EUR/t (rapeseed)	630	587	594	513	515	522	524	526	529	536	542	3.2%	-1.5%

**Rapeseed, soya bean, sunflower seed and groundnuts*
Note: the oilseed marketing year is July/June

TABLE 8.14 EU oilseed yields

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Rapeseed	3.2	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.4	3.4	1.1%	0.5%
Sunflower seed	2.1	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	1.5%	1.6%
Soya beans	2.6	2.9	2.9	2.9	3.0	3.0	3.0	3.0	3.1	3.1	3.1	0.1%	1.6%

TABLE 8.15 EU oilseed meal* market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Production	29.4	28.7	28.6	28.5	28.5	28.5	28.4	28.4	28.3	28.3	28.3	2.0%	-0.4%
Imports	19.5	20.1	19.9	19.9	19.7	19.4	19.2	18.9	18.6	18.3	18.1	-1.2%	-0.7%
Exports	2.1	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	1.1%	0.4%
Consumption	46.7	46.9	46.6	46.5	46.1	45.8	45.5	45.1	44.7	44.4	44.2	0.6%	-0.6%
Beginning stocks	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0%	-1.8%
Ending stocks	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0%	-1.8%
EU price in EUR/t (soya bean meal)	514	473	469	420	416	418	417	419	423	426	435	3.1%	-1.7%

*** Tables include rapeseed, soya beans, sunflower and groundnuts; in Table vegetable oil palm oil, cottonneseed oil, palmkernel oil and coconut oil are added*
Note: the oilseed meal marketing year is July/June

TABLE 8.16 EU oilseed oil* market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Production	16.3	16.2	16.1	16.2	16.2	16.2	16.2	16.2	16.2	16.3	16.3	2.1%	0.0%
Imports	2.1	3.9	4.1	4.1	4.2	4.2	4.2	4.2	4.2	4.1	4.0	0.5%	6.8%
Exports	2.2	2.3	2.3	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	3.0%	0.8%
Consumption	16.2	18.0	18.1	18.0	18.1	18.0	18.1	18.1	18.1	18.0	18.1	1.7%	1.1%
Beginning stocks	1.2	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	4.3%	-2.1%
Ending stocks	1.2	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.8%	-1.9%
EU price in EUR/t (rapeseed oil)	1 317	1 239	1 284	1 132	1 143	1 142	1 151	1 158	1 165	1 182	1 198	3.4%	-0.9%

*** Tables include rapeseed, soya beans, sunflower and groundnuts; in Table vegetable oil palm oil, cottonneseed oil, palmkernel oil and coconut oil are added*
Note: the oilseed oil marketing year is July/June

TABLE 8.17 EU vegetable oil* market balance (million t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Production	16.3	16.2	16.2	16.2	16.2	16.3	16.3	16.3	16.3	16.3	16.4	2.0%	0.0%
Imports	9.6	11.0	10.8	10.5	10.2	9.9	9.7	9.4	9.1	9.0	8.9	1.1%	-0.8%
Exports	2.5	2.5	2.6	2.7	2.8	2.8	2.8	2.8	2.7	2.7	2.6	2.2%	0.8%
Consumption	23.5	24.9	24.6	24.1	23.9	23.6	23.4	23.1	22.9	22.8	22.7	1.7%	-0.3%
of which food and other use	12.3	12.9	13.0	13.2	13.2	13.1	13.0	13.0	12.9	12.8	12.7	1.9%	0.4%
of which bioenergy	11.2	11.9	11.6	11.0	10.7	10.5	10.4	10.1	10.0	10.0	9.9	1.5%	-1.2%
Beginning stocks	1.4	1.2	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.4%	-1.9%
Ending stocks	1.4	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.8%	-1.8%

*** Tables include rapeseed, soya beans, sunflower and groundnuts; in Table vegetable oil palm oil, cottonneseed oil, palmkernel oil and coconut oil are added*
Note: the vegetable oil marketing year is July/June

TABLE 8.18 EU sugar market balance (million t white sugar equivalent)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Sugar beet production (million tonnes)	**107.1**	**109.7**	**109.3**	**108.9**	**108.5**	**108.1**	**107.8**	**107.5**	**107.2**	**106.9**	**106.7**	**0.0%**	**0.0%**
of which for ethanol	8.7	9.3	9.2	9.1	9.1	9.1	9.1	9.2	9.2	9.2	9.2	-2.2%	0.5%
of which processed for sugar	98.4	100.4	100.0	99.8	99.4	99.0	98.7	98.4	98.1	97.8	97.5	0.2%	-0.1%
Sugar production*	**15.3**	**15.9**	**15.8**	**15.8**	**15.7**	**15.7**	**15.7**	**15.6**	**15.6**	**15.6**	**15.5**	**-0.2%**	**0.1%**
Imports	1.4	1.6	1.8	1.5	1.5	1.5	1.5	1.5	1.4	1.4	1.4	-7.8%	0.3%
Exports	0.8	0.8	0.9	1.1	1.3	1.3	1.4	1.5	1.5	1.5	1.5	-7.0%	6.2%
Consumption	**16.6**	**16.4**	**16.3**	**16.2**	**16.1**	**16.0**	**15.9**	**15.8**	**15.7**	**15.6**	**15.5**	**-0.4%**	**-0.7%**
Beginning stocks**	1.7	1.3	1.6	2.2	2.3	2.3	2.3	2.2	2.1	2.1	2.0	-0.4%	1.9%
Ending stocks**	1.4	1.6	2.2	2.3	2.3	2.3	2.2	2.1	2.1	2.0	2.0	-4.8%	3.7%
EU white sugar price in EUR/t	439	465	429	389	386	392	391	390	391	394	400	-3.7%	-0.9%

** Sugar production is adjusted for carry forward quantities and does not include ethanol feedstock quantities.*
*** Stocks include carry forward quantities. 2005-2019 data for EU28.*

TABLE 8.19 EU isoglucose market balance (million t white sugar equivalent)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Isoglucose production	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.8**	**-1.9%**	**2.4%**
Isoglucose consumption	*0.5*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	-3.0%	3.5%
share in Sweetener use (%)	*3.0*	*3.3*	*3.4*	*3.5*	*3.7*	*3.8*	*3.9*	*4.1*	*4.2*	*4.3*	*4.5*	-2.5%	4.0%
Imports	*0.003*	*0.005*	*0.004*	*0.004*	*0.004*	*0.005*	*0.005*	*0.005*	*0.005*	*0.006*	*0.006*	-14.5%	6.8%
Exports	*0.079*	*0.045*	*0.047*	*0.041*	*0.038*	*0.036*	*0.034*	*0.032*	*0.030*	*0.029*	*0.029*	8.4%	-9.5%

Note: the isoglucose marketing year is October/September

TABLE 8.20 EU biofuels market balance (million t oil equivalent)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Production	**16.8**	**17.6**	**17.4**	**17.3**	**17.4**	**17.2**	**17.3**	**17.4**	**18.0**	**18.0**	**18.0**	**3.9%**	**0.7%**
Ethanol	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.4	2.3%	0.4%
...based on wheat	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	-1.2%	-2.6%
...based on maize	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.1	7.7%	-2.3%
...based on other cereals	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-3.1%	-0.8%
...based on sugar beet and molasses	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	-2.2%	0.5%
...advanced	0.1	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.6	3.3%	15.6%
Biodiesel	13.5	14.3	14.1	14.0	14.0	13.8	14.0	14.1	14.7	14.7	14.6	4.4%	0.8%
...based on rape oils	5.8	6.0	5.9	5.7	5.7	5.7	5.8	5.8	6.0	6.0	6.0	1.1%	0.4%
...based on palm oils	3.0	3.1	2.9	2.6	2.3	2.0	1.8	1.6	1.4	1.4	1.3	2.4%	-7.7%
...based on other vegetable oils	0.8	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.1%	3.6%
...based on waste oils	3.1	3.3	3.4	3.5	3.5	3.6	3.7	3.7	3.7	3.8	3.8	21.3%	1.9%
...other advanced	0.8	0.8	0.8	1.2	1.4	1.3	1.5	1.8	2.5	2.4	2.3	33.4%	11.3%
Net trade	- 2.4	- 2.0	- 1.9	- 2.0	- 1.9	- 1.8	- 1.6	- 1.5	- 1.3	- 1.4	- 1.3	2.8%	-6.2%
Ethanol imports	*0.6*	*0.5*	*0.5*	*0.5*	*0.5*	*0.6*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	6.3%	-3.3%
Ethanol exports	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.4*	*0.4*	3.5%	3.5%
Biodiesel imports	*3.0*	*2.5*	*2.5*	*2.6*	*2.6*	*2.5*	*2.4*	*2.3*	*2.2*	*2.3*	*2.3*	3.4%	-2.4%
Biodiesel exports	*0.9*	*0.8*	*0.9*	*0.9*	*0.9*	*0.9*	*1.0*	*1.0*	*1.1*	*1.1*	*1.1*	7.3%	2.0%
Consumption	**18.7**	**18.8**	**19.0**	**18.8**	**19.3**	**19.1**	**19.2**	**19.3**	**19.3**	**19.4**	**19.8**	**3.6%**	**0.6%**
Ethanol for fuel	2.4	2.4	2.5	2.6	2.8	2.9	3.1	3.2	3.2	3.2	3.2	2.3%	2.7%
non fuel use of ethanol	1.1	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	2.9%	-6.2%
Biodiesel	13.5	14.3	14.1	14.0	14.0	13.8	14.0	14.1	14.7	14.7	14.6	4.4%	0.8%
Gasoline consumption	56.8	58.0	56.9	55.6	54.8	54.0	53.1	52.1	50.7	49.4	48.2	-2.4%	-1.6%
Diesel consumption	168.3	173.5	170.4	165.4	161.2	157.1	152.5	147.7	142.2	137.7	133.6	0.1%	-2.3%
Biofuels energy share (% RED counting)	**9.8**	**9.7**	**10.1**	**10.6**	**11.2**	**11.4**	**11.9**	**12.5**	**13.4**	**13.9**	**14.5**	**6.0%**	**4.0%**
Energy share: 1st-generation	6.0	5.8	5.9	5.8	6.0	6.1	6.2	6.3	6.1	6.4	6.7	1.9%	1.2%
Energy share: based on waste oils	1.9	1.9	2.1	2.3	2.5	2.6	2.8	3.1	3.6	3.7	3.8	21.6%	7.2%
Energy share: other advanced	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	30.2%	17.7%
Energy share: Ethanol in Gasoline	4.4	4.3	4.6	4.9	5.3	5.6	5.9	6.2	6.5	6.6	6.7	5.6%	4.4%
Energy share: Biodiesel in Diesel	9.1	8.9	9.1	9.3	9.7	9.8	10.2	10.5	10.9	11.4	12.0	3.8%	2.9%
Ethanol producer price in EUR/hl	70	62	62	60	59	59	60	60	59	60	60	1.6%	-1.6%
Biodiesel producer price in EUR/hl	104	99	96	92	92	92	92	92	92	95	95	1.9%	-0.9%

TABLE 8.21 EU milk market balance

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Dairy cows (million heads)	**20.0**	**19.6**	**19.4**	**19.2**	**19.0**	**18.8**	**18.6**	**18.4**	**18.3**	**18.1**	**17.9**	**-0.6%**	**-1.1%**
Milk yield (kg/cow)	**7549**	**7653**	**7719**	**7783**	**7849**	**7915**	**7981**	**8046**	**8111**	**8177**	**8243**	**1.8%**	**0.9%**
Dairy cow milk production (million t)	**150.8**	**149.9**	**149.8**	**149.5**	**149.3**	**149.0**	**148.7**	**148.4**	**148.1**	**147.8**	**147.5**	**1.2%**	**-0.2%**
Total cow milk production (million t)	**153.4**	**152.6**	**152.4**	**152.2**	**152.0**	**151.7**	**151.4**	**151.2**	**150.9**	**150.6**	**150.3**	**1.1%**	**-0.2%**
Fat content of milk (%)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	0.1%	0.1%
Non-fat solid content of milk (%)	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.7	9.7	9.7	0.3%	0.1%
Delivered to dairies (million t)	**144.4**	**143.5**	**143.7**	**143.6**	**143.5**	**143.4**	**143.3**	**143.2**	**143.1**	**142.9**	**142.7**	**1.4%**	**-0.1%**
Delivery ratio (%)	*94.1*	*94.1*	*94.3*	*94.4*	*94.5*	*94.6*	*94.6*	*94.7*	*94.8*	*94.9*	*95.0*	0.3%	0.1%
On-farm use and direct sales (million t)	9.0	9.1	8.7	8.6	8.4	8.3	8.1	8.0	7.8	7.7	7.6	-2.4%	-1.8%
EU Milk producer price in EUR/t (real fat content)	419.8	474.7	460.0	422.9	421.1	423.9	425.4	430.2	433.3	437.3	443.3	2.8%	0.5%

TABLE 8.22 EU fresh dairy products market balance (1 000 t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**37 690**	**37 280**	**36 828**	**36 659**	**36 586**	**36 501**	**36 440**	**36 345**	**36 246**	**36 138**	**35 995**	**-0.3%**	**-0.5%**
of which fresh milk	23 321	22 972	22 760	22 551	22 343	22 138	21 934	21 732	21 532	21 334	21 138	-0.6%	-1.0%
of which cream	2 483	2 431	2 458	2 486	2 513	2 541	2 570	2 598	2 627	2 657	2 686	1.2%	0.8%
of which yogurt	7 644	7 544	7 530	7 517	7 503	7 490	7 476	7 463	7 450	7 437	7 423	-0.3%	-0.3%
Net trade	1 247	1 443	1 406	1 429	1 489	1 604	1 666	1 696	1 721	1 737	1 758	12.4%	3.5%
Consumption	**36 443**	**35 837**	**35 422**	**35 230**	**35 098**	**34 898**	**34 773**	**34 649**	**34 525**	**34 401**	**34 237**	**-0.5%**	**-0.6%**
of which fresh milk	22 596	22 109	21 706	21 333	21 066	20 828	20 622	20 414	20 205	19 994	19 782	-0.9%	-1.3%
of which cream	2 274	2 253	2 264	2 278	2 293	2 310	2 330	2 351	2 372	2 392	2 408	0.5%	0.6%
of which yogurt	7 410	7 395	7 366	7 346	7 326	7 315	7 315	7 314	7 312	7 310	7 307	-0.5%	-0.1%
per capita consumption (kg)	**81.1**	**78.9**	**78.4**	**78.2**	**78.2**	**78.0**	**77.8**	**77.6**	**77.4**	**77.3**	**77.0**	**-0.7%**	**-0.5%**
of which fresh milk	50.3	48.7	48.0	47.4	47.0	46.6	46.1	45.7	45.3	44.9	44.5	-1.1%	-1.2%
of which cream	5.1	5.0	5.0	5.1	5.1	5.2	5.2	5.3	5.3	5.4	5.4	0.4%	0.7%
of which yogurt	16.5	16.3	16.3	16.3	16.3	16.3	16.4	16.4	16.4	16.4	16.4	-0.7%	0.0%
of which other FDP	9.3	9.0	9.0	9.5	9.8	9.9	10.1	10.2	10.4	10.6	10.7	0.6%	1.4%

TABLE 8.23 EU cheese market balance (1 000 t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**10 685**	**10 758**	**10 810**	**10 845**	**10 892**	**10 939**	**10 985**	**11 031**	**11 079**	**11 127**	**11 176**	**1.6%**	**0.5%**
Imports	206	197	199	202	204	206	208	210	212	213	215	1.7%	0.4%
Exports	1 391	1 389	1 420	1 430	1 454	1 477	1 499	1 522	1 546	1 569	1 596	2.3%	1.4%
Consumption	**9 521**	**9 567**	**9 579**	**9 617**	**9 642**	**9 668**	**9 694**	**9 719**	**9 745**	**9 771**	**9 796**	**1.5%**	**0.3%**
per capita consumption (kg)	**21.2**	***21.1***	***21.2***	***21.4***	***21.5***	***21.6***	***21.7***	***21.8***	***21.9***	***21.9***	***22.0***	**1.4%**	**0.4%**
Variation in stocks	- 20	0	10	0	0	0	0	0	0	0	0		
EU market price in EUR/t (Cheddar)	3 885	4 515	4 402	3 942	3 944	3 976	3 991	4 024	4 054	4 088	4 146	2.7%	0.7%

TABLE 8.24 EU butter market balance (1 000 t)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	2022-2032
Production	**2 332**	**2 296**	**2 310**	**2 314**	**2 319**	**2 324**	**2 328**	**2 332**	**2 336**	**2 341**	**2 346**	**1.7%**	**0.1%**
Imports	34	36	35	36	36	36	36	37	37	37	37	-3.6%	0.9%
Exports	273	258	260	261	263	265	265	267	268	269	272	2.5%	0.0%
Consumption	**2 105**	**2 073**	**2 085**	**2 089**	**2 092**	**2 095**	**2 099**	**2 102**	**2 105**	**2 109**	**2 112**	**1.4%**	**0.0%**
per capita consumption (kg)	**4.7**	***4.6***	***4.6***	***4.6***	***4.7***	***4.7***	***4.7***	***4.7***	***4.7***	***4.7***	***4.7***	**1.2%**	**0.1%**
Ending Stocks	123	100	100	100	100	100	100	100	100	100	100	5.0%	-2.1%
of which private	123	100	100	100	100	100	100	100	100	100	100	5.1%	-2.1%
of which intervention	0	0	0	0	0	0	0	0	0	0	0		
EU market price in EUR/t (EU-14)	4 784	5 562	5 013	4 555	4 551	4 619	4 619	4 677	4 706	4 748	4 815	3.5%	0.1%
EU intervention price in EUR/t	2 218	2 218	2 218	2 218	2 218	2 218	2 218	2 218	2 218	2 218	2 218		

TABLE 8.25 EU SMP market balance (1 000 t)

												Annual growth (%)	
	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2012-2022	2022-2032
Production	1 441	1 422	1 459	1 488	1 497	1 508	1 516	1 527	1 537	1 549	1 563	**3.8%**	**0.8%**
Imports	33	30	27	27	27	27	27	27	27	27	27	5.1%	-1.8%
Exports	763	701	715	718	727	737	745	755	765	776	790	4.4%	0.3%
Consumption	697	751	770	797	798	798	799	799	800	800	801	**1.3%**	**1.4%**
Ending Stocks	97	130	130	130	130	130	130	130	130	130	130	-5.1%	3.0%
of which private	97	130	130	130	130	130	130	130	130	130	130	0.4%	3.0%
of which intervention	0	0	0	0	0	0	0	0	0	0	0		
EU market price in EUR/t (EU-14)	2 873	3 306	3 306	3 011	2 989	2 986	3 002	3 028	3 053	3 081	3 124	2.3%	0.8%

TABLE 8.26 EU WMP market balance (1 000 t)

												Annual growth (%)	
	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2012-2022	2022-2032
Production	650	564	556	548	543	538	533	527	522	517	512	**0.2%**	**-2.4%**
Imports	17	11	13	14	14	13	13	13	12	12	12	-5.5%	-3.2%
Exports	299	241	233	224	218	211	204	197	190	184	178	-3.0%	-5.1%
Consumption	368	334	335	338	339	341	342	343	344	345	346	**3.5%**	**-0.6%**
EU market price in EUR/t (EU-14)	3 633	3 852	3 933	3 632	3 626	3 627	3 640	3 664	3 686	3 719	3 775	2.6%	0.4%

TABLE 8.27 EU whey market balance (1 000 t)

												Annual growth (%)	
	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2012-2022	2022-2032
Production	2 144	2 106	2 143	2 171	2 202	2 233	2 264	2 295	2 326	2 357	2 388	**2.2%**	**1.1%**
Imports	46	42	49	50	50	51	51	51	51	51	51	-1.1%	1.1%
Exports	688	688	719	726	734	743	750	757	763	770	779	3.9%	1.3%
Consumption	1 502	1 460	1 473	1 496	1 518	1 541	1 564	1 589	1 613	1 637	1 660	**1.3%**	**1.0%**
EU market price in EUR/t (EU-14)	962	1 114	1 142	1 120	1 136	1 153	1 167	1 180	1 193	1 206	1 224	1.1%	2.4%

TABLE 8.28 EU beef and veal meat market balance (1 000 t c.w.e.)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Total number of cows (million heads)	**30.6**	30.0	29.7	29.5	29.3	29.0	28.8	28.5	28.3	28.1	27.8	-0.4%	-0.9%
of which dairy cows	20.0	19.6	19.4	19.2	19.0	18.8	18.6	18.4	18.3	18.1	17.9	-0.6%	-1.1%
of which sukler cows	10.6	10.4	10.3	10.3	10.2	10.2	10.1	10.1	10.0	10.0	9.9	0.0%	-0.6%
Gross Indigenous Production	**7 104**	**7 045**	**6 992**	**6 916**	**6 826**	**6 735**	**6 670**	**6 621**	**6 586**	**6 533**	**6 469**	**-0.1%**	**-0.9%**
Imports of live animals	1.3	0.7	1.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	-0.2%	4.8%
Exports of live animals	211	190	195	192	190	188	182	176	170	164	158	3.3%	-2.8%
Net Production	**6 895**	**6 855**	**6 798**	**6 726**	**6 638**	**6 550**	**6 490**	**6 447**	**6 418**	**6 371**	**6 313**	**-0.2%**	**-0.9%**
Imports (meat)	315	369	356	359	364	366	365	366	368	369	371	-0.8%	1.6%
Exports (meat)	574	566	580	588	598	605	618	621	626	635	641	1.0%	1.1%
Net trade (meat)	259	198	224	230	234	240	253	255	258	266	270	3.9%	0.4%
Consumption	**6 637**	**6 662**	**6 570**	**6 486**	**6 405**	**6 312**	**6 239**	**6 192**	**6 160**	**6 105**	**6 043**	**-0.3%**	**-0.9%**
per capita consumption (kg r.w.e.)*	***10.3***	***10.3***	***10.2***	***10.1***	***10.0***	***9.9***	***9.8***	***9.7***	***9.7***	***9.6***	***9.5***	**-0.5%**	**-0.8%**
EU market price in EUR/t	4 072	4 320	4 207	4 094	4 101	4 084	4 048	4 044	4 042	4 041	4 066	1.5%	0.0%

** r.w.e. = retail weight equivalent; Coefficient to transform carcass weight into retail weight is 0.7 for beef and veal.*

TABLE 8.29 EU sheep and goat meat market balance (1 000 t c.w.e.)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Gross Indigenous Production	**630**	**630**	**631**	**634**	**638**	**640**	**641**	**642**	**643**	**644**	**645**	**-0.2%**	**0.2%**
Imports of live animals	4	4	3	3	3	3	3	3	3	3	3	12.5%	-3.9%
Exports of live animals	55	49	53	51	50	49	48	47	46	46	45	10.7%	-1.9%
Net Production	**579**	**584**	**581**	**586**	**591**	**594**	**596**	**598**	**600**	**601**	**603**	**-0.8%**	**0.4%**
Imports (meat)	139	144	139	136	134	132	130	128	126	124	122	-3.3%	-1.3%
Exports (meat)	50	46	52	53	54	55	56	57	58	59	60	3.2%	1.9%
Net trade (meat)	-90	-98	-87	-83	-80	-77	-74	-71	-68	-65	-62	-5.6%	-3.6%
Consumption	**669**	**683**	**667**	**669**	**671**	**671**	**670**	**669**	**668**	**667**	**665**	**-1.6%**	**-0.1%**
per capita consumption (kg r.w.e.)*	***1.3***	***1.3***	***1.3***	***1.3***	***1.3***	***1.3***	***1.3***	***1.3***	***1.3***	***1.3***	***1.3***	**-1.8%**	**0.1%**
EU market price in EUR/t	6 517	6 429	6 186	6 024	5 978	5 943	5 878	5 863	5 850	5 841	5 900	3.3%	-1.0%

** r.w.e. = retail weight equivalent; Coefficient to transform carcass weight into retail weight is 0.88 for sheep and goat meat.*

TABLE 8.30 EU pigmeat market balance (1 000 t c.w.e.)

	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual growth (%) 2012-2022	Annual growth (%) 2022-2032
Gross Indigenous Production	**23 122**	**22 327**	**22 100**	**21 863**	**21 568**	**21 391**	**21 266**	**21 194**	**21 111**	**21 016**	**20 921**	**0.4%**	**-1.0%**
Imports of live animals	1	2	2	2	2	2	2	2	2	2	2	21.8%	0.6%
Exports of live animals	38	48	50	50	50	50	50	50	50	50	50	-4.0%	2.7%
Net Production	**23 085**	**22 281**	**22 051**	**21 814**	**21 520**	**21 342**	**21 217**	**21 145**	**21 063**	**20 967**	**20 873**	**0.4%**	**-1.0%**
Imports (meat)	127	142	145	137	133	129	126	122	118	114	109	-2.1%	-1.5%
Exports (meat)	4 547	3 832	3 715	3 529	3 470	3 428	3 378	3 341	3 302	3 297	3 277	4.2%	-3.2%
Net trade (meat)	4 420	3 690	3 570	3 391	3 337	3 299	3 252	3 219	3 184	3 183	3 168	4.5%	-3.3%
Consumption	**18 666**	**18 591**	**18 481**	**18 423**	**18 183**	**18 043**	**17 965**	**17 926**	**17 879**	**17 784**	**17 705**	**-0.3%**	**-0.5%**
per capita consumption (kg r.w.e.)*	***32.4***	***31.9***	***31.9***	***31.9***	***31.6***	***31.5***	***31.4***	***31.3***	***31.3***	***31.2***	***31.1***	**-0.5%**	**-0.4%**
EU market price in EUR/t	1 634	1 669	1 625	1 545	1 532	1 521	1 501	1 491	1 475	1 465	1 474	0.6%	-1.0%

** r.w.e. = retail weight equivalent; Coefficient to transform carcass weight into retail weight is 0.78 for pigmeat.*

TABLE 8.31 EU poultry market balance (1 000 t c.w.e.)

												Annual growth (%)	
	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2012-2022	2022-2032
Gross Indigenous Production	**13 380**	**13 125**	**13 347**	**13 452**	**13 484**	**13 516**	**13 547**	**13 565**	**13 585**	**13 604**	**13 627**	**2.1%**	**0.2%**
Imports (meat)	783	990	905	881	876	881	886	892	898	904	910	-1.3%	1.5%
Exports (meat)	2 198	2 104	2 184	2 245	2 265	2 286	2 305	2 325	2 339	2 353	2 371	2.1%	0.8%
Net trade (meat)	1 414	1 114	1 279	1 365	1 389	1 405	1 419	1 434	1 441	1 449	1 461	4.8%	0.3%
Consumption	**11 965**	**12 012**	**12 068**	**12 087**	**12 095**	**12 111**	**12 128**	**12 132**	**12 144**	**12 155**	**12 165**	**1.8%**	**0.2%**
per capita consumption (kg r.w.e.)*	***23.4***	***23.3***	***23.5***	***23.6***	***23.7***	***23.8***	***23.9***	***23.9***	***24.0***	***24.0***	***24.1***	**1.7%**	**0.3%**
EU market price in EUR/t	2 092	2 105	2 088	2 000	1 998	2 026	2 034	2 035	2 033	2 036	2 057	0.7%	-0.2%

** r.w.e. = retail weight equivalent; Coefficient to transform carcass weight into retail weight is 0.88 for poultry meat.*

TABLE 8.32 Aggregate EU meat market balance (1 000 t c.w.e.)

												Annual growth (%)	
	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2012-2022	2022-2032
Gross Indigenous Production	**44 236**	**43 126**	**43 069**	**42 865**	**42 516**	**42 282**	**42 124**	**42 022**	**41 926**	**41 797**	**41 662**	**0.8%**	**-0.6%**
Imports of live animals	6	6	6	6	6	6	6	6	6	6	6	9.3%	-0.7%
Exports of live animals	304	287	298	293	290	287	280	273	266	260	253	2.8%	-1.8%
Net Production	**43 939**	**42 846**	**42 777**	**42 578**	**42 232**	**42 002**	**41 850**	**41 755**	**41 666**	**41 543**	**41 415**	**0.8%**	**-0.6%**
Imports (meat)	1 365	1 644	1 545	1 513	1 508	1 509	1 507	1 508	1 509	1 511	1 512	-1.5%	1.0%
Exports (meat)	7 368	6 548	6 532	6 415	6 387	6 375	6 356	6 344	6 324	6 344	6 349	3.3%	-1.5%
Net trade (meat)	6 003	4 904	4 987	4 902	4 880	4 866	4 849	4 837	4 815	4 833	4 837	4.8%	-2.1%
Consumption	**37 937**	**37 946**	**37 786**	**37 665**	**37 353**	**37 138**	**37 003**	**36 919**	**36 851**	**36 711**	**36 578**	**0.3%**	**-0.4%**
per capita consumption (kg r.w.e.)*	***67.5***	***66.8***	***66.9***	***66.9***	***66.7***	***66.5***	***66.3***	***66.3***	***66.2***	***66.1***	***66.0***	**0.2%**	**-0.2%**
of which Beef and Veal meat	10	10	10	10	10	10	10	10	10	10	10	-0.5%	-0.8%
of which Sheep and Goat meat	1	1	1	1	1	1	1	1	1	1	1	-1.8%	0.1%
of which Pig meat	32	32	32	32	32	31	31	31	31	31	31	-0.5%	-0.4%
of which Poultry meat	23	23	23	24	24	24	24	24	24	24	24	1.7%	0.3%

** r.w.e. = retail weight equivalent; Coefficients to transform carcass weight into retail weight are 0.7 for beef and veal, 0.78 for pigmeat and 0.88 for both poultry meat and sheep and goat meat*

TABLE 8.33 EU egg market balance (1 000 t)*

												Annual growth (%)	
	avg 2020-2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2012-2022	2022-2032
Production	**6 365**	**6 461**	**6 501**	**6 517**	**6 544**	**6 570**	**6 595**	**6 619**	**6 641**	**6 667**	**6 683**	**1.0%**	**0.5%**
Imports	45	50	52	54	56	58	60	62	64	66	68	3.5%	4.3%
Exports	278	270	280	290	300	310	320	330	340	350	356	2.3%	2.5%
Total use	**6 131**	**6 241**	**6 273**	**6 281**	**6 300**	**6 318**	**6 335**	**6 351**	**6 365**	**6 383**	**6 395**	**1.0%**	**0.4%**
per capita consumption (kg)	***13.6***	***13.7***	***13.9***	***14.0***	***14.0***	***14.1***	***14.2***	***14.2***	***14.3***	***14.3***	***14.4***	**0.8%**	**0.5%**

** eggs for consumption*

TABLE 8.34 EU self-sufficiency rate (%)

CROP SECTORS	EU-27										
	avg 2020-22	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Arable crops											
Overall Cereals	108	106	106	107	107	107	107	107	107	107	107
Wheat	127	120	120	122	123	123	123	123	123	123	123
Coarse grains	97	98	97	97	97	97	97	97	97	97	97
Common wheat	131	122	124	126	127	127	127	127	127	127	128
Durum wheat	82	90	82	82	82	82	81	81	80	80	79
Barley	121	121	122	123	123	124	124	125	125	126	126
Maize	81	82	82	82	82	82	81	80	80	79	79
Other cereals	100	101	100	100	100	101	101	101	101	101	101
Rice	44	47	47	47	47	46	46	46	46	45	45
Oilseed	59	59	60	60	61	62	62	63	63	64	65
Oilseed meal	63	61	61	61	62	62	62	63	63	64	64
Oilseed oil	101	90	89	90	90	90	90	90	90	90	90
Vegetable oil	70	65	66	67	68	69	70	70	71	72	72
Sugar	92	97	97	98	98	98	99	99	99	100	100
Isoglucose	115	107	108	106	106	105	104	104	104	103	103
Biofuels	90	93	92	92	90	90	90	90	93	93	91

Note: Figures for arable crops refer to marketing years (200X means 200X/200X+1).

ANIMAL SECTORS	EU-27										
	avg 2020-22	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Dairy products											
Fresh dairy products	103	104	104	104	104	105	105	105	105	105	105
Cheese	112	112	113	113	113	113	113	113	114	114	114
Butter	111	111	111	111	111	111	111	111	111	111	111
SMP	207	189	189	187	188	189	190	191	192	194	195
WMP	177	169	166	162	160	158	156	154	152	150	148
Whey	143	144	145	145	145	145	145	144	144	144	144
Meat											
Beef and veal	107	106	106	107	107	107	107	107	107	107	107
Pigmeat	124	120	120	119	119	119	118	118	118	118	118
Poultry	112	109	111	111	111	112	112	112	112	112	112
Sheep and goat	94	92	95	95	95	95	96	96	96	97	97

UNCERTAINTY ANALYSIS RESULTS

TABLE 8.35 Macroeconomic uncertainty in 2032 (CV, %)

Region	Consumer price index	GDP deflator	Real GDP	Exchange rate (dom. currency/USD)	Oil price
Australia	0.4	1.5	0.8	6.2	-
Brazil	1.3	1	1.8	9.1	-
Canada	0.3	0.9	1.3	2.7	-
China	0.9	1.6	1	2.5	-
United Kingdom	0.6	0.7	1.9	5.1	-
Indonesia	1.5	1.9	1.1	3.7	-
India	0.8	0.6	2.4	3.8	-
Japan	0.5	0.4	1.2	5.5	-
New Zealand	0.4	0.6	0.9	4.9	-
Russia	1.8	3.4	2.5	8.6	-
United States	0.6	0.5	1.1	-	-
EU-27	0.7	0.3	1.7	4	-
World	-	-	-	-	23.8

TABLE 8.36 Yield uncertainty in 2032 (CV, %)

Commodity/Region	Argentina	Australia	Brazil	Canada	China	EU-14	EU-13	Indonesia	India	Kazakhstan	Mexico	Malaysia	New Zealand	Paraguay	Russia	Thailand	Ukraine	United States	Vietnam
Barley	7.4	2.3	-	11.3	-	3.8	7.7	-	-	-	0.8	-	-	-	0.4	-	-	1.2	-
Common wheat	10.4	17.5	9.1	7.6	2	3.9	11.6	0.5	2.2	13.7	9.4	0.5	0.5	8.4	12.6	0.5	10.5	3.2	0.5
Durum wheat	-	-	-	-	-	4.9	5.1	-	-	-	-	-	-	-	-	-	-	-	-
Maize	6.2	0.9	7.4	5.9	0.8	4.3	18.9	0.4	0.3	0.4	6.4	0.4	0.9	8.3	0.4	0.4	13.8	2.6	0.4
Milk	0.6	19.9	0.8	0.1	0.1	0.2	0.2	0.3	0.5	0.3	0.1	0.3	2.2	0.2	0.5	0.2	0.2	0.4	0.3
Oats	0	0.5	-	8.3	-	0.6	9.8	-	-	-	0	-	-	-	0.3	-	-	0.1	-
Other coarse grains	4.3	1.8	1	9.7	0.9	-	-	0.4	0.4	0.4	0.8	0.4	1.6	10.3	0.5	0.4	18.1	2.1	0.4
Other Oilseeds	41.7	21.1	0	4.3	0.8	2.6	10	0.8	0.6	11.2	0	0.8	0	14.7	7.8	0.7	12.3	0	0.8
Palm oil	-	-	0	-	0	-	-	3.4	0.5	-	0	3.7	-	0.5	-	0.4	-	-	-
Rapeseed	0	21.5	0	4.3	1	2.9	7.5	-	-	-	0	-	0	-	0.2	-	-	0	-
Rice	0.7	0.1	1.4	-	11.2	4.8	0.8	0.1	3.1	0.3	0.2	0.3	-	0.3	0.5	1.6	0.3	4.9	2.5
Rye	0	-	-	0	-	7.3	9.5	-	-	-	-	-	-	-	0.1	-	-	-	-
Soybean	17	0	4.5	4.2	0.5	6.5	14.3	0.9	0.4	7.7	0	0.9	-	11.1	0.3	0.8	7.6	5.6	0.8
Sugarbeet	-	-	-	1.5	3	9.4	8.6	-	-	-	-	-	-	-	14.5	-	0.3	5.7	-
Sugarcane	19.4	4.1	5.4	-	1.6	-	-	0.4	3.4	-	0.4	-	-	0.4	-	12.2	-	6.6	0.4
Sunflower seed	50.9	0	0	0	2.2	5.1	15.5	-	-	-	0	-	-	-	9.5	-	-	0	-

TABLE 8.37 Price uncertainty in 2032 (CV, %)

Commodity	EU domestic producer price	International reference price
Barley	9.9	-
Beef and Veal	3.9	4.3
Biodiesel	10.5	9.9
Butter	3.9	4.6
Casein	1.3	0
Cereal brans	8.2	7.6
Cheese	2.9	3.3
Corn Gluten Feed	8.6	8
Cotton	4.3	2.2
Dried beet pulp	11.6	11.5
Dried Distillers Grains	8.6	8.1
Ethanol	5.7	5.5
High fructose corn syrup	4.4	7
Maize	9.1	8.9
Meat and bone meal	0	8
Milk	2.3	-
Molasses	9.7	8.1
Other coarse grains	9.2	9
Other Oilseeds	15.6	15.9
Pork	8.7	7.6
Poultry	5.2	5.5
Pulses	6.8	4.3
Rapeseed	15	-
Rice	7.2	6.3
Roots and tubers	4.1	6
Sheep	5.6	4.7
Skim milk powder	2	2.4
Soybean	17.2	17.3
Sunflower seed	17.1	-
Total Protein Meal	10.9	11.2
Vegetable oils	10.6	9.8
Wheat	11.3	10.5
Whey powder	3.4	3.9
White sugar	12	7.4

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