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NOTE TO THE READER

The report covers the EU in its current composition (EU-27). It presents the medium-term outlook for EU agricultural markets, income and environment to 2031, based on a set of macroeconomic assumptions deemed most plausible at the time of the analysis. Oil price, population forecasts (based on IHS Markit), the USD/EUR exchange rate and GDP forecasts (based on the European Commission's Forecast) were updated on 11 November 2021. The analyses of agricultural markets rely on information available at the end of September 2021 for agricultural production and trade and on an agro-economic model used by the European Commission (EC).

As EU countries are yet to prepare and submit their CAP Strategic Plans taking into account the post-2020 CAP reform, projections assume a continuation of current agricultural and trade policies. In the same vein, the level of ambition stemming from various policy initiatives such as the European Green Deal and in particular the targets of the Farm to Fork and Biodiversity strategies is yet to be reflected in the CAP Strategic Plans. Consequently, these are not taken into account. Only free trade agreements ratified at the end of September 2021 are reflected. Budget figures related to the 2021-2027 Multiannual Financial Framework were updated.

The report is also accompanied by an analysis of a selected set of market uncertainties. Possible variations stem in particular from fluctuations in the macroeconomic environment and in the yields of main crops and milk. Specific scenarios are also presented for a reduction of fat in diets, following a WHO recommendation and China's self-sufficiency in animal products.

In preparing the report, an external review of the baseline and the scenarios around market uncertainties was conducted at an outlook workshop organised online on 20-21 October 2021. During this event, valuable inputs were collected from high-level policy makers, European and international modelling and market experts, private companies and other stakeholders, as well as from international organisations such as the OECD and the FAO.

This European Commission report is a joint effort between the Directorate-General for Agriculture and Rural Development (DG AGRI) and the Joint Research Centre (JRC), with DG AGRI being responsible for the content. As uncertainty on macroeconomic developments and trade relations 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 supervised and/or prepared by Lucia Balog, Vincent Cordonnier (land use and cereals), Andrea Čapkovičová (overall coordination, milk, dairy products and olive oil), François Chantret (pigmeat and poultry, agricultural income and labour), Andrea Furlan (environment), Beate Kloiber, Adam Kowalski (fruit and vegetables) Dangiris Nekrasius (oilseeds, protein crops, sugar and biofuels), Jean-Marc Trarieux, Benjamin Van Doorslaer (beef, sheep and goatmeat) and Marijke van Schagen (wine, fruit and vegetables). DG AGRI's outlook groups and market units helped preparing the baseline.

The JRC team that contributed to this publication included: for the outlook (baseline preparation and uncertainty checks), Thomas Chatzopoulos (diet scenario, uncertainty analysis), Christian Elleby (China self-sufficiency scenario), Ignacio Pérez Domínguez (supervision of scenarios, macroeconomic outlook); for the preparation of the workshop, Manuel Gómez Barbero, Patricia Roman Ramos, Lucia Balog, Antonella Zona (the later both from DG AGRI); for the CAPRI baseline, Maria Bielza, Mariia Bogonos, Mihaly Himics, Jordan Hristov, Ignacio Pérez Domínguez, Amarendra Sahoo; for the environmental analysis, Maria Bielza, Renate Koeble and Franz Weiss. We also benefited from valuable suggestions and/or other contributions from Ana Luisa Barbosa, Bruna Grizzetti, Emmanuele Lugato, Sandra Poikane, Thomas Fellmann, Jean-Michel Terres, Rui Catarino, Jordan Hristov, Soeren Lindner from JRC. Marcel Adenauer and Hubertus Gay from the OECD also provided valuable technical support and expertise.

The text on processed apples, olive oil and table olives outlook at EU countries level was prepared by the AGMEMOD consortium, represented by: Ana Gonzalez Martinez, Roel Jongeneel, David Verhoog (Wageningen Economic Research).

We are grateful to the participants in the October 2021 outlook workshop and to many other colleagues for their feedback during the preparation of the report.

Finally, a special mention is due to our colleague and friend Hans Jensen from JRC who has been prevented to contribute this year for health reasons; our thoughts are with him and his family.

CONTENT

Executive Summary 4
Abbreviations 8

1/ **INTRODUCTION - BASELINE SETTING** **9**

Baseline setting and policy assumptions 10
Macroeconomic environment 12
Uncertainty analysis 13

2/ **ARABLE CROPS** **15**

Land use 16
Cereals 17
Oilseeds 18
Oilmeals and vegetable oils 19
Biofuels 20
Protein crops and rice 21
Feed 22
Sugar 23

3/ **MILK AND DAIRY PRODUCTS** **24**

Milk 25
Dairy products 27

4/ **MEAT PRODUCTS** **29**

Drivers of meat markets 30
Beef and veal 31
Pigmeat 32
Poultry meat 33
Sheep and goat meat 34

5/ **SPECIALISED CROPS** **35**

Olive oil 36
Olive oil - Spotlight on main producing countries 37
Table olives - Spotlight on main producing countries 38
Wine 39
Fruit & vegetables 40
Processed apples – Spotlight on main producing countries 42

6/ **WHAT IF SCENARIOS** **43**

Scenario: Reduction in EU total fat consumption 44
Scenario: Meat and dairy self-sufficiency in China 47

7/ **AGRICULTURAL INCOME AND LABOUR** **50**

Farm income 51
Agricultural labour 52

8/ **ENVIRONMENTAL ASPECTS** **53**

Introduction 54
Baseline projection of nutrients balance 56
Environmental impacts of nutrients surplus 59

9/ **ANNEX** **61**

Market outlook data 62
Uncertainty analysis results 78
References 80

EXECUTIVE SUMMARY

Main assumptions

This outlook covers the period from 2021 to 2031 and reflects agricultural and trade policies in place in November 2021. Global projections are based on the **OECD-FAO Agricultural Outlook 2021-2030** updated with the most recent macroeconomic and market data.

As is customary in this annual exercise, only implemented policy changes are incorporated in the outlook. This year, this rule is bound to pose problems of interpretation that require the reader's attention and understanding. EU countries are yet to prepare and submit their **CAP** Strategic Plans due to the delay in the decision of the future CAP. Therefore, a part of the new allocation of resources in the Multiannual Financial Framework (MFF) for 2021-2027, will only come into force in January 2023. As a result, our **policy assumptions exclude the recently agreed CAP reform** and work with the setting of current CAP, which fully entered into force in 2015, even beyond the agreed transition period (after 2022). Similarly, the targets **and** actions of **the Farm to Fork and Biodiversity strategies** are not taken into account. **In this respect, this medium-term outlook is a no-action baseline, thus setting the basis for comparison of the expected policy impacts that will be included in the subsequent baseline**.

Free trade agreements (FTAs) are included if they have entered into force. No new FTAs have been added compared to last year. 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 trade relationship is assumed, with some short-term trade disruptions due to additional border checks and logistical issues taken into account in the 2022 forecast only. WTO **tariff-rate quotas (TRQs)** have been recalculated following their apportionment between the EU-27 and the UK respectively.

According to **macroeconomic** assumptions, the **global economy** will rebound in 2021 and level off at an annual average level of growth of 2.7% by 2031. The **EU economy** should recover to pre-COVID-19 levels by 2023. Following several years of low inflation, the strong resumption of economic activity has been accompanied by an increase in commodity prices – mostly in energy prices, leading to a 10-year high in euro area **inflation** of 4.9 % in November 2021. The outlook assumes the EU inflation to stabilise at 1.9% per year by 2025. EU demand for oil will recover in 2021 and 2022 following economic growth and will gradually fall due to the shift towards renewables. The **oil price** is projected to reach 67 USD/bbl in 2021, rising moderately to 80 USD/bbl in 2031. The **euro** is expected to appreciate moderately in the medium term, reaching USD 1.2/EUR by 2031. These assumptions are based on yearly and average economic trends, in which market developments are presumed to take place relatively smoothly. In reality, however, markets tend to be much more volatile.

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.

Land use

The total **EU agricultural area** is projected to decrease slightly, mainly driven by reduced arable crops acreage. In the absence of supportive measures from the new CAP or European Green Deal related initiatives (yet to be implemented), the area dedicated to organic production is expected to reach 15% of the total agricultural land by 2031. This assumes that the demand for this type of production will continue to grow. As a result, the yearly rate of conversion from conventional to organic is assumed to remain as strong in 2022-2031 as in 2014-19. Additional support to the organic farming sector may result in an acceleration of the trend.

Arable crops

The total EU **cereal** area is projected to decrease to 51.2 million ha between 2021 and 2031, driven by a decrease in the main cereals areas. Yields of wheat and barley are expected to slightly decline, while maize yields may still increase due to yield improvements in eastern EU countries. This will translate to cereal production of 276 million t in 2031 (-2.5% compared to 2021). Domestic use is expected to decrease to 254.8 million t, mainly due to lower animal production and feed use. On the trade side, the EU will remain competitive but will face strong competition from other key actors, notably from the Black Sea region, leading to a reduction in market shares, in a growing market. The potential impact of the surge in fertilisers and energy prices on 2022 farmers' planting decisions represents the main short-term uncertainty.

EU **oilseed** area is due to be 10.7 million ha, similar to current levels. Oilseed yields are expected to slowly increase, particularly sunflower and soybeans while the situation of rapeseed is challenging, as it is more sensitive to unfavourable climatic conditions and to pest pressure. Combining area and yield assumptions, EU oilseed production is projected to be 31.2 million t in 2031. The EU is expected to remain a net importer of oilseeds throughout the projection period with imports declining towards the end of the period, following lower demand. Oilseed crushing volumes should remain stable despite the decline in demand for oilseed meals, at the expense of imports of meals. EU demand for vegetable oils is due to decline, triggered by lower non-food use. Imports of palm oil will be the most affected due to the projected decline in biodiesel demand.

Strong growth for EU protein crop production will be driven by an increase in area and yield improvements, and outpace the demand from feed and human consumption, leading to fewer imports. An increase in EU rice consumption will especially benefit countries that export through the 'Everything but Arms' regime.

The EU sugar area is due to stabilise in the medium term and EU production to slowly increase to 16.3 million t by 2031. A decline in human consumption of sugar is expected, reflecting a shift to diets with less sugar. The increase in sugar exports for processed products should compensate the decline in consumption. Competitive prices should allow the EU to reach parity in the sugar trade.

Demand for feed from arable crops is projected to decrease due to the decline in EU pig, beef and dairy herds. Organic dairy production increase and further extensification and diversification will increase the share in the feed ration of proteins coming from grass. Feed prices are due to decrease in the next couple of years and then appreciate until 2031.

In the medium term, biofuel demand will decrease following trends in road transport fuel use, partly mitigated by increasing blending rates. ILUC certification for biodiesel is expected to create challenges to palm oil, leading to lower imports. Ethanol production is projected to slightly decline in the medium term, while the production of advanced biofuels is due to increase, favoured by double counting towards blending mandates.

Milk and dairy products

Sustainability objectives could translate into a slowdown in annual growth in EU milk production (0.5% per year), which will reach 162 million t by 2031. The sector will also likely further improve farming practices, focusing on efficiency gains and on higher environmental standards, while adding value to final products. Alternatives to conventional systems will gain a greater market share, resulting in a lower annual yield growth (1.2% compared to 1.9% in 2011-2021) and offsetting stronger dairy herd reduction (-1.5 million cows by 2031). Organic milk production is expected to reach 8% in 2031 (3.5% in 2019), providing economic value, environmental benefits and satisfying societal demands (e.g. animal welfare).

Despite the slowdown of growth in the EU, it will remain the largest dairy supplier on the world market (30% of global dairy trade in 2031), ahead of New Zealand and the US. The strongest dairy demand growth will be recorded in Asia (more than 17% per year, excluding India), driven in particular by rising incomes and westernisation of diets. Increasing demand will cover final products such as cheese and fresh dairy products but potentially also value-added commodities for further processing domestically. Demand for organic dairy products is growing worldwide and creating considerable opportunities, including for the EU.

As in the past, cheese is expected to benefit most from the additional EU milk that will be produced by 2031 (annual growth rate 0.7%, taking close to 40%) while generating the highest value (around EUR 40 billion). SMP and whey powders will closely follow in contribution to growth in volume terms, with higher value gap (generating EUR 5 and 2.7 billion respectively). The EU market will remain the main user of domestically produced milk even if the share of exported milk could increase (17% compared to 15% in 2021).

Nutritional aspects and functionality will drive EU dairy demand, with organic consumption being supported also by public support measures. The availability of plant-based products could improve. Organic traditional dairy products (e.g. cheese, fresh dairy products and butter) benefit the most from existing demand while the expansion potential of organic milk powders remains high.

The growth in EU consumption of cheese, fresh dairy products and butter could remain relatively modest and expanding production could be absorbed by rising exports. The EU will keep its position in the global trade in milk powders. While the stimulus for SMP production will come from export growth, domestic use will drive production increases in whey powders and WMP.

By 2031, greater demand for milk proteins and the anticipated sustained, high valorisation of milk fat are expected to drive an increase in the EU raw milk price (around EUR 39/t by 2031).

Meat

World meat consumption is expected to continue growing by 1.4% per year, thanks to increasing population and higher income in developing countries. An additional 3.4 million t of meat imports globally will be needed to close the gap between domestic consumption and production in many countries.

Sustainability is expected to play an increasingly prominent role in EU meat markets, both for producers and for consumers. As consumers' environmental awareness, health considerations and convenience trends change, per capita EU meat consumption is projected to slightly decline to 67 kg by 2031.

Following the decline in the EU cattle herd, production of beef is expected to fall. EU beef consumption is due to decline by 0.9 kg per capita following the long-term trend. Meat export opportunities of meat may improve in the medium term but will be offset by a decline of live animal exports due the lower demand in Turkey and animal welfare concerns over long-distance transport. EU beef imports could also rise slowly but stay below the 2019 level because of high global demand.

The recovery of pigmeat production capacity in China will have a massive negative impact on EU exports. Moreover, health, environmental and societal concerns should shift consumer preferences away from pigmeat, resulting in a yearly decline in production of 0.8% in the period 2021-2031. Nevertheless, the EU is likely to remain the biggest pigmeat exporter in the world.

The increase in EU demand for **poultry** meat and in EU poultry production is set to slow. Consumers still see it as a healthy and sustainable product. Exports should continue to benefit from the valorisation of specific cuts that are less in-demand in the EU, but expansion will be limited by competition. Imports, mostly supplying foodservice, are expected to recover close to pre-COVID-19 levels.

The EU production and consumption of **sheep** and **goat** meat are projected to increase slightly. Exports of live animals are due to decrease, mainly due to animal welfare concerns and financial risk. Exports of meat are expected to catch up as a result of consolidation of trade with the UK and partners in the Middle East. Imports of sheep meat will recover in the short term but Australia and New Zealand will focus more on Asian markets.

However, current uncertainties surrounding the spread of ASF in different world and EU regions, ongoing free trade agreements' negotiations between UK and other countries and rising concerns of the contribution of EU feed imports to deforestation, could impose significant challenges to the meat sector in the future.

Specialised crops

EU **olive oil** production is due to grow and reach 2.5 million t by 2031, driven by improved profitability and value creation. However, climate change will remain a challenge, leading to annual variations in yield and oil quality. As per capita consumption remains low in the main EU export destinations, the potential for growth is high. Therefore, exports will expand and take a larger share of the available oil. Consumption growth in the EU is due to be driven by non-producing countries.

The EU **wine** sector is adapting to the changing lifestyles and preferences of new and older generations of consumers. The declining trend in consumption is expected to slow down, while other uses (production of alcohol, vinegar etc.) should slightly increase. EU exports should be driven by high demand for wine with a geographical indication (GI) and sparkling wines in general. These trends will result in a slight decline in EU wine production.

EU **apple** production is projected to remain stable thanks to increasing yields offsetting the decreasing area. Consumption is expected to slightly increase, driven by new apple varieties that better reflect consumer' preferences, while exports are due to stabilise as a result of increasing competition on export markets.

Declining area will push production of **peaches** and **nectarines** down. Also consumption is projected to decline. For canned and dried peaches, the current limited availability and high prices could make consumers (including foodservice) switch to other processed products.

Driven by a positive health image and demand for freshly squeezed orange juice, EU **orange** consumption is expected to increase slightly. Increasing consumer preferences for fresh oranges and fresh juices over concentrates should put pressure on the demand for oranges for processing. Net EU imports should increase to cover the demand gap.

The EU production of **fresh tomatoes** is projected to decline slightly because of strong foreign competition and an increasing demand for small-sized varieties with lower volumes. EU consumption and production of **processed tomatoes** should remain stable, hiding a shift to higher value-added products. Exports are projected to remain relatively stable.

Agricultural income and labour

Overall, the **value of EU agricultural production** is expected to increase by 0.7% per year. The value of crop production could decrease by -0.5% per year, a reversal of the past trend, while the growth in the value of animal products is due to slow down. The increase in intermediate costs is expected to slow down as well, while the share of energy and fertiliser costs will expand to 22%. The yearly increase in net value added is slowing down to 1%, compared to 3% in the period 2011-2021.

Agricultural **labour** is projected to decrease further but at a slower pace. The number of farms managed by younger farmers has marginally increased. **Farm income** per worker at constant 2010 prices is due to remain stable.

What if scenarios

Two scenarios were developed to address the implications of selected market uncertainties. The first scenario reflects a 30% gradual reduction in EU total fat consumption, as per the WHO-recommended level. As a result, demand shifts lead to lower domestic prices and improved trade balances for the fattier commodities with a low compromise of domestic production and total calories.

The second scenario explores the consequences of China becoming self-sufficient in meat and dairy products for food consumption. China is a leading importer of meat and dairy products and the EU is a major exporter, so a move to self-sufficiency has large impacts on the global agricultural markets in general and on the EU markets in particular.

Environmental aspects

This report presents an environmental analysis of the medium-term developments of EU agricultural markets with a focus on **nitrogen (N) and phosphorus (P) balances.** Compared to other chapters of the report, the analysis is performed on a previous version of the medium-term outlook (2019) and therefore does not necessarily take into account the exact same considerations on market developments as in chapters dedicated to specific sectors

As this analysis does not take into account targets of European Green Deal, the results needs to be seen as an illustration of impacts on N and P balances if no further actions are taken.

Based on these caveats, the average N surplus in 2030 for the EU is not expected to change significantly compared to 2012, whereas the P surplus is due to increase both in total and per hectare. Regional differences can be observed: while for some regions the nutrient surplus has decreased, in other regions there has been an increase. Most increases are driven by higher mineral fertiliser inputs, while in a few cases they are the result of an increase in manure from cattle.

N and P nutrients have different characteristics and therefore, require tailored reduction strategies to ensure compliance with future ambitions. The analysis shows that high nutrient surpluses are often related to high livestock densities. If livestock cannot be supplied with local feed, feed imports may lead to an oversupply of nutrients from manure, and consequently high nutrient surpluses. In those cases, a reduction of nutrient surpluses requires either a reduction in livestock or the processing and/or export of manure. By contrast, mineral fertilisation is less often the reason for excessive nutrient surpluses, but optimised fertilisation is important to contribute to the general reduction of nutrients emitted to the environment and to avoid nutrient scarcities in the future.

ABBREVIATIONS

ASF	African swine fever
AWU	annual working unit
CAP	common agricultural policy
CO_2	carbon dioxide
CV	coefficient of variation
DG	Directorate General
EBA	Everything But Arms
EC	European Commission
EEA	European Environmental Agency
EFA	ecological focus areas
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
GI	geographical indication
GM	genetically modified
HICP	harmonized index of consumer prices
ILUC	indirect land-use change
JRC	Joint Research Centre
MFF	Multiannual Financial Framework
MTO	medium-term outlook
N	nitrogen
N_2O	nitrous oxide
NFC	not from concentrates
NO_3	nitrate
OECD	Organisation for Economic Cooperation and Development
P	phosphorus
PDO	protected designation of origin
PGI	protected geographical indication
RBMP	River Basin Management Plans
RRF	Recovery and Resilience Fund
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
WHO	World Health Organization
WTO	Wolrd Trade Organization

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
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 EU's major agricultural markets and agricultural income to 2031. 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. Macroeconomic assumptions for the EU are based on the European Commission's Autumn 2021 Economic Forecast for 2021-2023 and IHS Markit macroeconomic forecasts for the longer term. The OECD and FAO provided the global agricultural outlook. Oil prices, population forecasts (based on IHS Markit), the USD/EUR exchange rate and GDP forecasts (based on the European Commission's Forecast) were updated on 11 November 2021.

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 2021, including agreed and ratified trade agreements only.

BASELINE SETTING AND POLICY ASSUMPTIONS

This medium-term outlook was prepared in a challenging environment. Post-COVID-19 demand recovery was observed as confinement measures were easing thanks to advanced vaccination campaigns. However, future development depends on the evolution of the sanitary situation and the risk of future infection waves is present. In addition, demand growth is further supported by available savings which could create some imbalance in an economic cycle .

The macroeconomic development brings a lot of uncertainty, with inflationary pressures growing at the moment as a consequence of the financial support measures implemented during the COVID-19 pandemic, and with energy prices and the cost of raw materials increasing. While food prices remained constant for some time and it is still premature to say whether the energy prices will remain high, the recent rise in inflation may concern more consumer' products at some point, food included. Disruptions in international trade due to shortages of containers and high freight costs bring some uncertainties as well, without a clear consensus regarding how long this could last.

This outlook covers the period from 2021 to 2031. The projections are based on the OECD-FAO Agricultural Outlook 2021-2030, updated with the most recent global macroeconomic and market data. The macroeconomic assumptions take into account the latest forecast and analysis available in early November 2021. The statistics and market information used to project the short-term market developments were those available at the end of September 2021.

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, the outlook cannot be considered to be a forecast. More precisely, these projections correspond to the average trend agricultural markets are expected to follow should policies remain unchanged within the period, in a given macroeconomic environment that was plausible at the time of analysis but not certain.

In order to provide more reliable comparison of trends, averages are used and refered to. In the case of arable crops, milk and dairy products and meats, these are basic averages for 2019-2021 (and 2009-2011 respectively) for 2021 (2011). For specialised crops, olympic averages of 2016-2020 are used for 2020, except for peaches and nectarines which use the basic average of 2018-2020.

Macroeconomic forecasts and crop yield expectations are by nature surrounded by uncertainty. To reflect this, a systemic **uncertainty analysis** around the baseline has been carried out. Such analysis enables us to illustrate possible developments caused by uncertain conditions in which agricultural markets operate. This report presents possible price ranges of agricultural products around the outlook 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 could be tested and an uncertainty analysis could be performed, some still remain unquantifiable or difficult to aggregate (e.g. changing consumer' perceptions and preferences).

Even if negotiations between the European Parliament and Council on the future Common Agricultural Policy (CAP) were concluded on 25 June 2021, the EU countries are yet to submit their CAP Strategic Plans, following an adoption of legislative acts at the end of 2021. Therefore, at the time of drawing up,this outlook our **assumptions** are that the current CAP, which fully entered into force in 2015, will continue to be implemented even beyond the agreed transition period (after 2022), taking into account the new allocation of resources in the Multiannual Financial Framework for 2021-2027. This allows the analytical work to be perfomed in a fixed policy environment.

In the same vein, the level of ambition stemming from policy initiatives such as the European Green Deal and in particular the targets of the Farm to Fork and Biodiversity Strategies[1] is yet to be reflected in the CAP Strategic Plans. As a consequence, these are not taken into account. Therefore, this Outlook is a no-action baseline, thus setting the basis for comparison of the expected policy impacts that will be included in the subsequent baseline.

Nevertheless, as some changes are already taking place, as a result of a growing awareness of the general public and the farming community with respect to the challenges presented by climate change as well as the need to better protect the environment, the outlook baseline reflects these evolutions to the extent possible. For example, the projected development of the organic sector in the baseline (15% of the EU agricultural area in 2031) is based on recent trends and expert judgement on what to expect with the current support and incentive policies, reflecting the growing demand for this type of production.

Crisis or market measures addressing severe market disturbances are not modelled: the baseline does not include

[1] COM(2020)381 and COM(2020)380.

unforeseen market disruptions and decisions to deploy those measures are taken on a case-by-case basis.

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

The analysis factors in the effects of the Nitrate Directive and other environmental rules on water and air quality. Other environmental policies are not explicitly taken into account in the model. The effects of 'greening' are also accounted for through its three components[2]: (i) crop diversification, (ii) permanent grassland maintenance and (iii) ecological focus area (EFA) requirements. Overall, these environmental measures have little impact on aggregate production levels.

Recent **free trade agreements** (FTAs) which already entered into force (with Ukraine, Japan, Vietnam and Canada) are included in the baseline, while the others (with Mercosur, the updated FTA with Mexico) are not. The Russian ban on EU agricultural exports has been prolonged until the end of 2022. However, even if this might be lifted in the future, it is observed that Russia is continuously improving its self-sufficiency in many agricultural products, and therefore the final impact could be limited for the EU.

With a link to this, some sectors (e.g. apples) have undergone restructuralisation which resulted in the replacement of varieties targeted to the Russian market, limiting further the return of exported volumes.

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 and some short-term trade disruptions due to additional border checks and logistical issues are taken into account in the 2022 forecast only. As the outlook is based on the OECD-FAO Agricultural Outlook 2021-2030, the UK market developments (and thus their assumptions on future trade agreements), are not modified in our work. The tariff-rate quotas are re-calculated, following their apportionment to the EU-27 and the UK respectively.

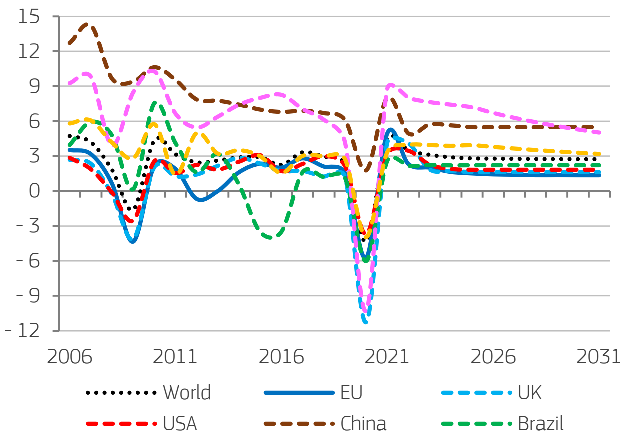
As uncertainties regarding macroeconomic developments and trade relations in the next 10 years remains high, it is important to highlight that this medium-term outlook presents a baseline for any future analytical and scenario work, which would allow test different development paths to be tested. This baseline may also provide a future reference to assess the impacts on agricultural markets of different legislative proposals that may be contemplated to implement the European Green Deal, the associated strategies and the related actions.

[2] European Commission (2016, 2017).

MACROECONOMIC ENVIRONMENT

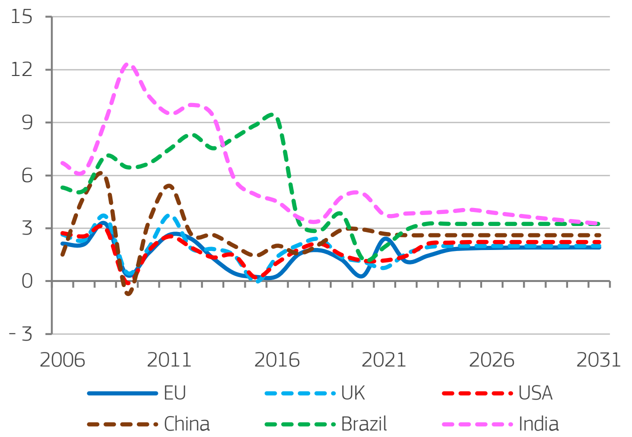
Economic indicators suggest a strong recovery after COVID-19 in 2021 at global level, with the EU recovering its pre-COVID-19 output levels in 2023 and moving towards expansion in the medium-term. The baseline scenario assumes that the global economic growth will level off at an annual average of 2.7% by 2031 (5.5% in China, 5.0% in India, 1.8% in the US and 1.4% in the EU). EU growth is expected to be supported by an improving labour market, high savings, favourable financing conditions and the full deployment of the Recovery and Resilience Fund (RRF). Real GDP is due to grow by 5.0% in 2021 (the same as in the euro area) and 2.3% in 2022, before decelerating to 1.6% in 2024. Most importantly, although the pace of growth is projected to remain uneven across countries and sectors, the EU is set to return onto its path of economic convergence.

GRAPH 1.1 GDP annual growth assumptions (%)



Source: DG Agriculture and Rural Development, based on AMECO, OECD-FAO, and IHS Markit.

GRAPH 1.2 Consumer prices annual growth assumptions (%)



Source: DG Agriculture and Rural Development, based on OECD-FAO and IHS Markit.

Following several years of low inflation, the strong resumption of economic activity has been accompanied by an increase in commodity prices – especially in energy prices. Annual inflation in the euro area hit a 10-year high of 4.9% in November (but only 2.3% per year on average over the two last years).[3] To a large extent, this increase reflects the economy catching up, as factors that dragged down prices during the COVID-19 pandemic in 2020 are ceasing to play a role this year. In 2021, consumer prices are expected to increase well above 5% in India, and around 4% in the US with more moderate levels in China (1%).

Energy prices are due to average above the pre-COVID-19 levels, which exerts pressure on agricultural markets. Oil prices are at about the same level as in 2019 (up by more than 60% compared to last year) and natural gas prices are more than twice as high as they were in the last two years. Higher energy prices increase production costs directly (fuel, electricity) and indirectly (fertilisers and other inputs). The EU demand for oil is assumed to recover in 2021 and 2022 following economic growth and could gradually fall due to the shift towards renewables over the next decade. Assuming an average between the OECD and IHS Markit projections, the oil price in this medium-term outlook is projected to reach 67 USD/bbl in 2021, moderately rising to 80 USD/bbl in 2031.

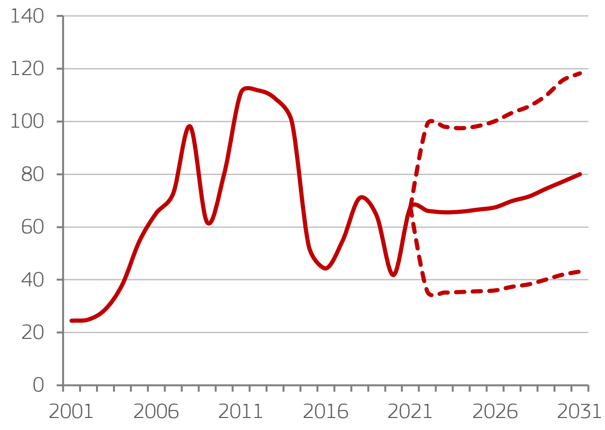
Exchange rates directly impact the competitiveness of EU agricultural exports. Forecasts for the USD/EUR exchange rate are sometimes contradictory and may change quickly given geopolitical circumstances. In the medium-term, it is assumed that the euro will appreciate slightly from 1.19 USD/EUR in 2021 to 1.20 USD/EUR in 2031, assuming a trend in-between the OECD and IHS Markit forecasts. The 'Uncertainty analysis' describes potential divergencies in oil prices and exchange rates and their impact on commodity markets.

World population growth, despite slowing down to 0.8% per year by 2031, will remain a key driver of demand growth. Africa will grow the most (25%), followed by Asia (6%) while the EU population will remain stable over the projection period. The projected population increase in developing countries around the world, along with rising incomes, will foster global food demand considerably. This will increase the demand for imported food goods as well and global trade in agricultural products will expand as a result.

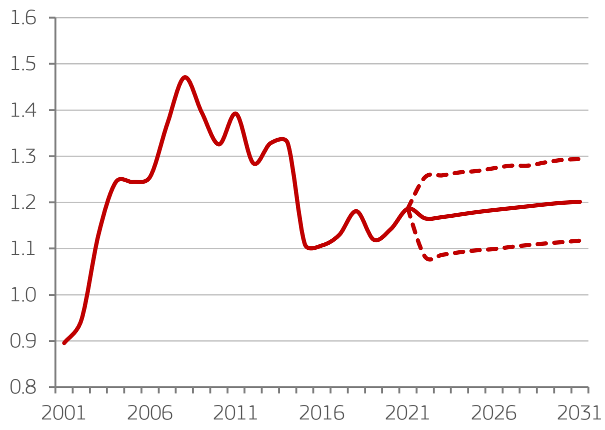
[3] Inflation refers to year-on-year percentage changes in the Harmonised Index of Consumer Prices (HICP). Flash estimate by Eurostat, https://ec.europa.eu/eurostat/documents/2995521/11563387/2-30112021-AP-EN.pdf/

UNCERTAINTY ANALYSIS

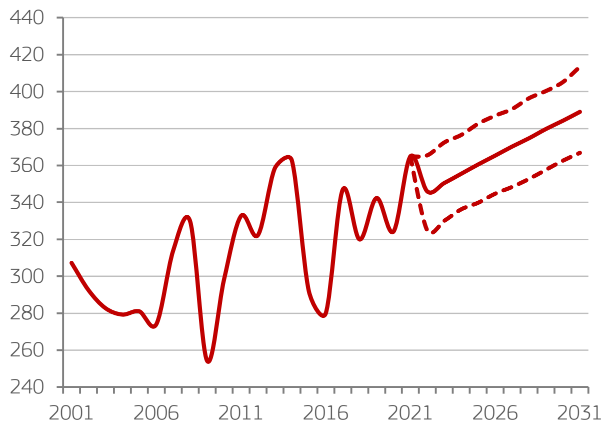
GRAPH 1.3 Oil price projection (USD/bbl) and uncertainty range



GRAPH 1.4 Exchange rate projection (USD/EUR) and uncertainty range



GRAPH 1.5 EU raw milk price projection (EUR/t) and uncertainty range



Sources of uncertainty

Every outlook carries uncertainties. This has been particularly evident since 2020 when COVID-19 led to a sharp drop in economic activities and unexpected impacts on economic sectors and countries worldwide.

The baseline projections presented herein 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 out of many possible trajectories, various possible outcomes have different probabilities of occurence. 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. 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 yield and macroeconomic variables are considered as proxies for numerous drivers of market developments (see ‘Methodology’ on the next page).

Highly uncertain oil prices and exchange rates

The baseline assumes the oil price to be USD 80/bbl in 2031. However, oil price projections are notoriously uncertain and may possibly range from USD 42/bbl to USD 121/bbl.

Energy prices affect agricultural markets through several channels. They affect production 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.

The baseline assumes that the exchange rate will appreciate slightly from 1.17 USD/EUR in 2022 to 1.20 USD/EUR in 2031. When uncertainty is factored in, the exchange rate ranges from 1.11 USD/EUR to 1.30 USD/EUR in 2031. A higher exchange rate implies a stronger euro that reduces the competitiveness of EU production. A higher price of EU products in USD leads 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

There is a relationship between the uncertainty of factors affecting supply and demand (e.g. oil prices, exchange rates, yields) and the uncertainty of agricultural commodity prices. As an example, milk price uncertainty results from the uncertainty of the underlying supply and demand factors. Even if market trends lead to a price that follows the solid line, that will probably not be the actual outcome. What can be said, however, is that the price is likely to end up somewhere between the two dashed lines provided that the underlying assumptions on market trends turn out to correspond to reality.

Methodology[4]

The uncertainty analysis presented in this report 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 quantify the uncertainty of baseline projections can be summarised as follows. First, 140 variables were treated jointly as partially stochastic using empirically observed variability from the period 2000-2020: 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). Next, statistical time-series models were used to separate random movements over time from trends in the 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 that account 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 96% successful runs (i.e. in 4% 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. As an example, EU raw milk prices in 2031 resulting from this procedure range from EUR 362/t to EUR 419/t. The area between the dashed lines represents about 98% of alternative outcome distributions in each year. Similar graphs are presented in various commodity chapters of this report.

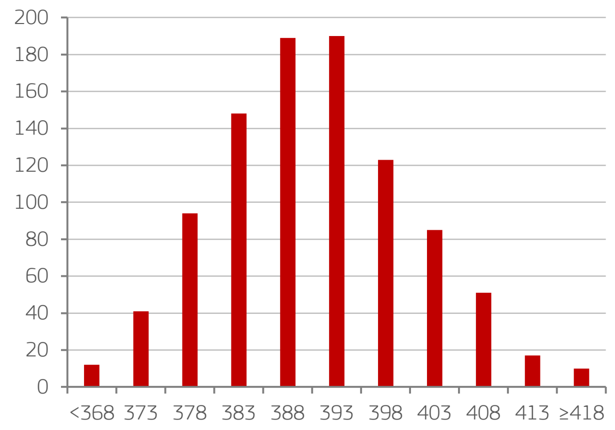
An input variable with a high level of historical variation will result in market outcomes (e.g. market balances, prices) that display notable variation, too. Therefore, it is interesting to know which of the input variables are most uncertain (i.e. drive uncertainty in market outcomes). An indicator of relative variability that allows for comparison across variables measured in different units is the coefficient of variation (CV, %)[5]. 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 in the uncertainty analysis is the crude oil price with a CV value of 21.2%. Exchange rates affecting trade are also fairly uncertain (e.g., $CV_{USD/EUR\ or\ EUR/USD}$ = 3.7%). In comparison, the CV values of EU GDP and the consumer price index are somewhat lower (see Appendix).

On average, the EU crops with the most uncertain yields are maize, soya bean, sunflower, sugarbeet and rye (see Appendix). 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 affecting 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 Appendix).

GRAPH 1.6 Distribution of EU raw milk price in 2031 (frequency of 1 000 runs)



[4] For more details see Araujo-Enciso et al. (2015 - model documentation; 2020 - methodology of uncertainty analysis).

[5] 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 2031 across 1 000 simulations).

ARABLE CROPS /2

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

EU production of arable crops is expected to decrease slightly in the medium term. Land competition in the EU coupled with the expansion of forest and pasture areas is projected to reduce the land available for arable crops.

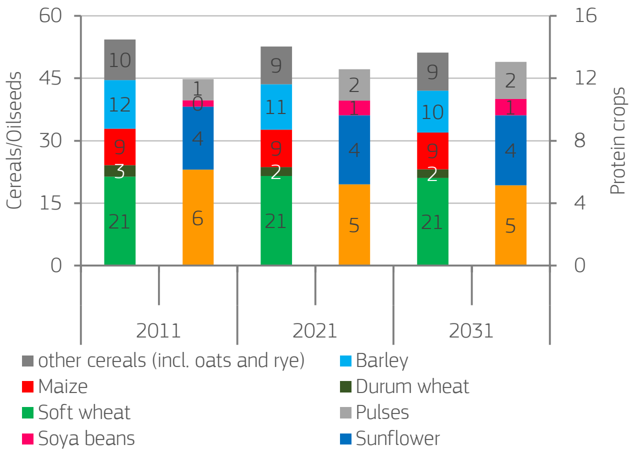
Demand for feed from arable crops is projected to decrease due to the decline in EU the pig, beef and dairy herd. Organic dairy production and further extensification and diversification are expected to increase the share of proteins for livestock feed coming from grass. Feed prices are to appreciate by 2031, driven by higher energy and fertiliser prices. The EU is expected to remain competitive in the world cereals market, although its market share should decline.

The EU oilseed market is expected be driven by the increasing use of edible oils while oil meals consumption could decline. Slowing demand for road transport fuels towards the end of the outlook period should weigh down on the biofuel demand. Demand for sugar for human consumption is also expected to decline, reflecting a shift to diets with less sugar.

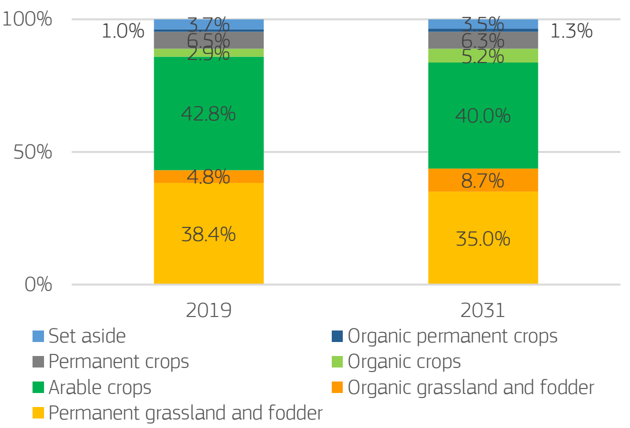
LAND USE

GRAPH 2.1 EU agricultural and forest area (million ha)

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



GRAPH 2.3 Share of conventional and organic cropland, permanent crops land and permanent grassland and fodder land in total UAA



Forest areas to exceed agricultural area in 2031

The total Utilised Agricultural Area (UAA) is projected to decline slightly, reaching 160.5 million ha in 2031. This reduction is likely to be the result of lower yields, which make production on marginal land less attractive, combined with a lack of generational renewal in remote rural areas and competition with forest and urban areas. The EU forest area has been increasing steadily in the last decade. The increased attention given to the climate change and the recognition of the role of forests in storing carbon should further support its expansion. The total forest area could reach 161.4 million ha in 2031, overtaking the agricultural area.

Arable land and pastures to decline

Most of the decline in the EU's total agricultural land will come from the reduction in crop areas. The cereal area could decline to 51.2 million ha in 2031 (-2.8% compared to 2021), with the downward trend in wheat and barley only partially offset by an increase in the areas sown with oats and rye (see the section on Cereals). The EU total oilseed area is expected to reach 11.3 million ha in 2026 before dropping to 10.7 million ha in 2031 (+1% compared to 2021) due to falling demand for oils (see the section on Oilseeds).

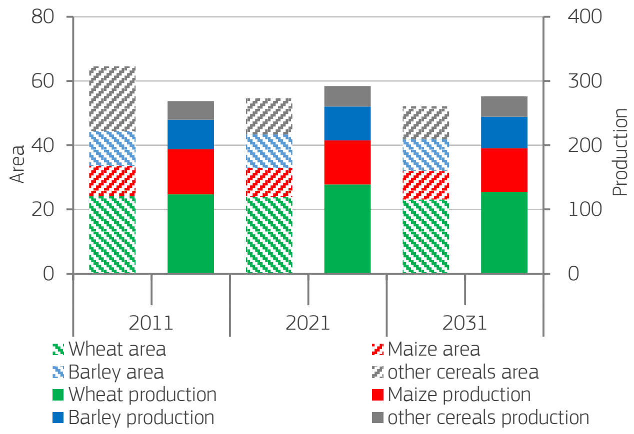
The continuous increase in permanent grassland observed in the past decade could end due to the reduction in the dairy and beef herds and the abandonment of marginal grasslands in remote rural areas. The total grassland area is expected to start declining in 2023 and reach 50.2 million ha in 2031 (-0.8% compared to 2021). The EU fodder area (e.g. temporary grassland, silage maize) is likely to remain stable at 20.0 million ha due to production intensification in the lowlands and demand for feedstock for biogas production.

Share of land under organic farming to increase

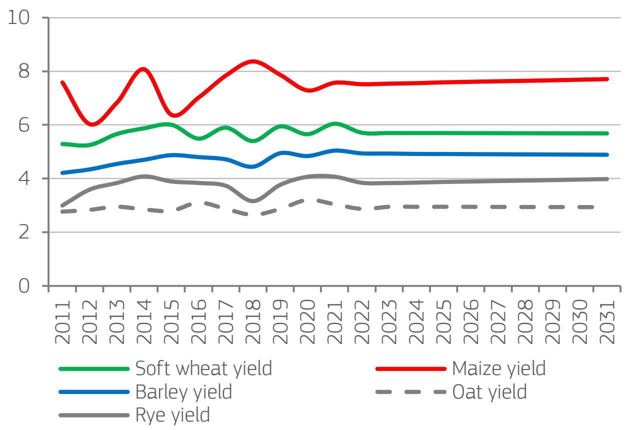
In the absence of supportive measures from the new CAP or European Green Deal related initiatives (yet to be implemented), the conversion rate of land from conventional to organic farming is expected to remain high in the next decade, as in the 2014-2019 period. This is thanks to a growing demand for those products resulting from the growing attention given to the climate change, and the way food is produced. Under this assumption, the share of organic land in total agricultural land could reach 15% in 2031. 20% of the permanent and temporary pasture land could be farmed organically, compared to 12% of the arable land. The latter would see an increase in the cultivation of organic cereals, as a response to additional demand for organic food and feed. The new CAP and other supportive measures resulting from the implementation of the European Green Deal could further support the development of the organic sector.

CEREALS

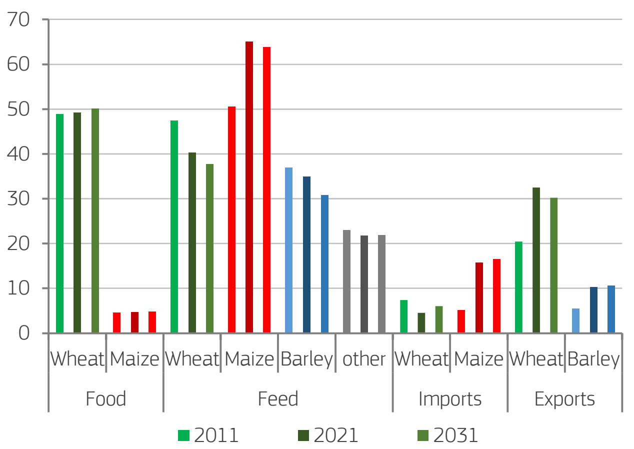
GRAPH 2.4 EU cereal area (million ha) and production (million t)



GRAPH 2.5 Change in cereal yields (t/ha)



GRAPH 2.6 EU use of selected cereals in food, feed and trade (million t)



Transition to more sustainable production systems expected to reduce cereal production

The expected reduction in the size of EU cereal area (-2.8% compared to 2021) combined with a decrease in yields could cause cereal production to fall to 276 million t in 2031 (-2.5% compared to 2021). The area used to produce cereals other than wheat, barley and maize (e.g. oats, rye and sorghum) is expected to increase by 1.1% between 2021-2031. This is the result of longer crop rotations and a more diversified crop mix; crop diversification is being used as a way to better control pests and diseases, adapt to climate risks and respond to growing demand for organic products. At the same time, the barley area is projected to decline (by 7.9% in 2021-2031 compared to 6.3% in 2011-2021). The areas sown with soft wheat and durum wheat could shrink to 21.1 and 2.0 million ha respectively in 2031 (-2.0% and -4.7% compared to 2021), while the total maize area could reach 8.9 million ha (-1.5% compared to 2021). Yields of wheat and barley are expected to decline slightly, driven by an increase in organic production, reduced variety of plant protection products available, environmental constraints and increased adoption of agro-ecological practices by farmers. Maize yields may still increase due to potential improvements in eastern EU countries. Wheat and barley production would hence decrease to 126.9 and 49.2 million t respectively in 2031 (down 5.3% and 8.9% on 2021 figures) while maize production could remain stable at 68.2 million t.

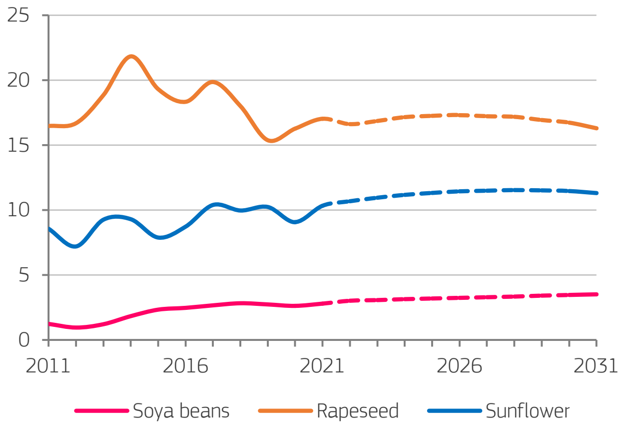
The surge in fertilisers' prices may affect farmers' planting decisions in 2022 and beyond. It may also accelerate the development of precision farming and lead to a more efficient use of nutrients, enabling to produce more with less inputs.

Decline in cereals consumption driven by lower demand for feed

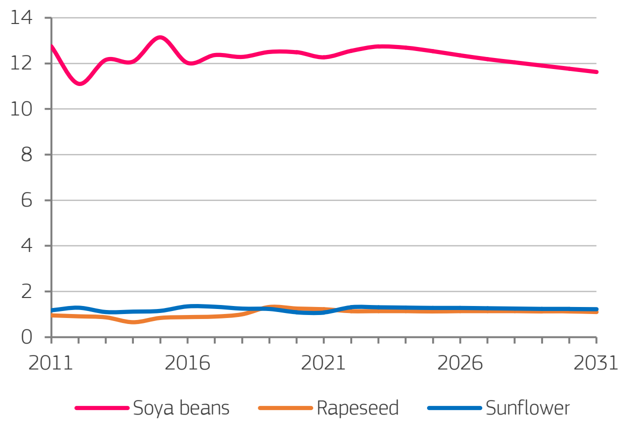
EU domestic cereal use is expected to reach 254.8 million t (-2.7% compared to 2021), essentially driven by the decline in feed use. Total cereal use in feed could decrease by 7.8 million t by 2031 (- 4.8% compared to 2021), with barley (-11.6%) and soft wheat (-6.4%) contributing more to this decline than maize (-1.8%). Cereal use in food is projected to increase by 0.2% per year. On the trade side, the EU is expected to remain competitive but will face strong competition from other key market players, notably from the Black Sea region. This will lead to a reduction in market shares in a growing export market. Imports of maize are due to rebound to 18.0 million t in 2022 and reach 16.5 million t in 2031 (+4.4% compared to 2021). Tensions on the cereal markets are expected to ease in 2022 and prices will start going down. However, wheat and maize prices are projected to rise again from 2025 to 2031.

OILSEEDS

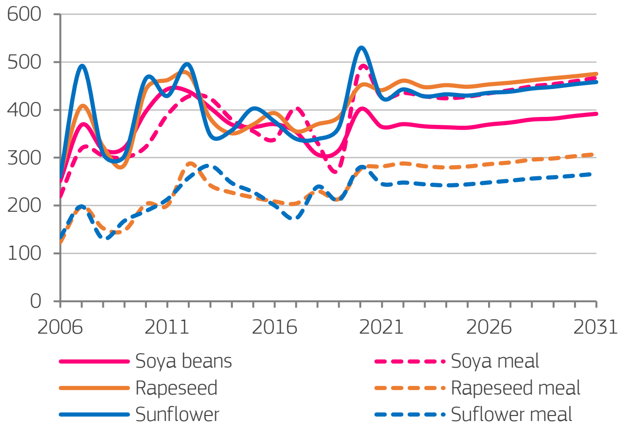
GRAPH 2.7 EU oilseed production (million t)



GRAPH 2.8 EU oilseed imports (including meals), million t of protein equivalent



GRAPH 2.9 EU oilseed and oilmeal prices (EUR/t)



EU oilseed area to peak in mid-2020s

The size of areas used for rapeseed and sunflower production in the EU are expected to peak in the middle of the outlook period, before declining in response to slowing demand for feed and oils. However, the soya bean area is projected to increase, driven by growing demand for GM-free beans for human consumption and the expanding organic dairy herd.

The EU oilseed area is due to total 10.7 million ha by the end of the projection period; this is similar to its current size. The rapeseed area should decline slightly to 5.1 million ha, compared to 5.2 million ha in 2019-2021, while the sunflower and soya bean areas are expected to increase by 0.1 million ha each to reach 4.5 and 1.0 million ha respectively.

Growth in rapeseed yields to slow significantly, soya bean production to increase

Oilseed yields are due to increase slowly. However, yield growth it is expected to be more challenging for rapeseed because it is more sensitive to extreme climatic conditions and pest pressure, and fewer pesticides products are available for it. Annual yield growth should amount to 0.3% for rapeseed, 1.4% for sunflower and 1.6% for soya beans in 2021-2031.

Based on the area and yield assumptions outlined above, EU oilseed production is due to peak at 32.1 million t in 2027 before declining, down to 31.2 million t by 2031. Rapeseed production could reach 16.2 million t (unchanged from the average for 2019-2021), while sunflower and soya beans production could increase to 11.3 and 3.5 million t respectively (up by 15% and 29%).

EU soya bean imports to decline due to lower demand

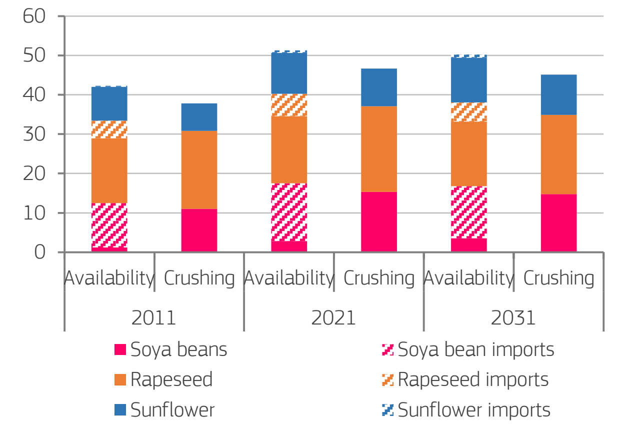
The EU is expected to remain a net importer of oilseeds in 2031. However, as demand for oilseeds is due to decline towards the end of the outlook period, imports are likely to decrease too.

Soya bean imports are expected to fall to 13.3 million t by 2031, from 14.8 million t in 2019-2021. Rapeseed imports are also due to decrease, from an average of 5.9 million t to 4.9 million t by 2031. Imports of sunflower are expected to remain stable at around 0.8 million t throughout the next decade. In terms of protein equivalent, imports are set to decline by 6% to 14 million t.

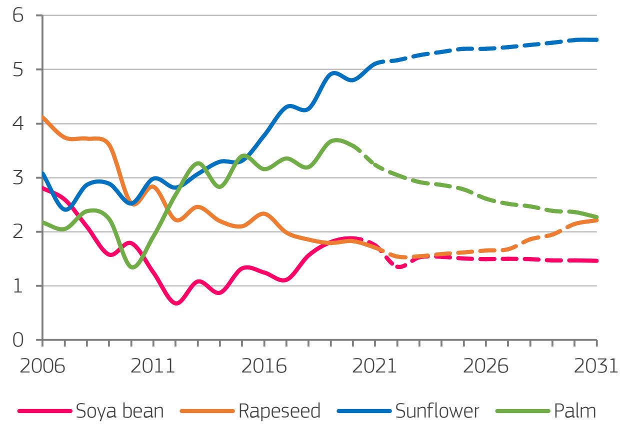
The EU is likely to remain a minor exporter with a combined oilseed export volume of around 1million t per year.

OILMEALS AND VEGETABLE OILS

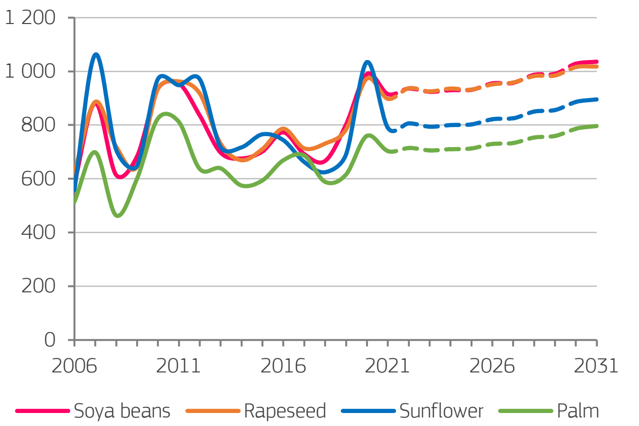
GRAPH 2.10 EU oilseed availability and crushing (million t)



GRAPH 2.11 EU use of oil in food (million t)



GRAPH 2.12 EU vegetable oils prices (EUR/t)



EU oilseed crushing stable despite decline in demand for meals

The oilseed sector has two market outlets: protein and oil. Oilseed meals (protein) and vegetable oils are produced by crushing oilseeds. EU demand for oilseed meals is expected to decline in line with diminishing demand for animal feed. On top of that, demand for meals is due to fall faster than demand for feed due to continuing improvements in feed conversion ratio. An ongoing shift to organic production may also reduce demand for high-protein feed in favour of other feed sources (e.g. green pastures).

Oilseed crushing volumes should remain relatively stable due to healthy demand for domestically produced oils. This is expected to enable a stable supply of oilseed meals. As demand from the livestock sector is projected to decline, imports of oilseed meals are set to fall too. Soya bean meal imports, for example, are due to decline from 18.0 million t in 2022 to 16.0 million t in 2031, absorbing the biggest share of the drop in demand for animal feed.

In terms of the share of different oilseeds in the total amount used for crushing, sunflower is expected to gain at the expense of rapeseed due to its greater availability (a result of increased area and better yields).

Decline in EU vegetable oils decline driven by falling non-food use, palm oil hit hardest

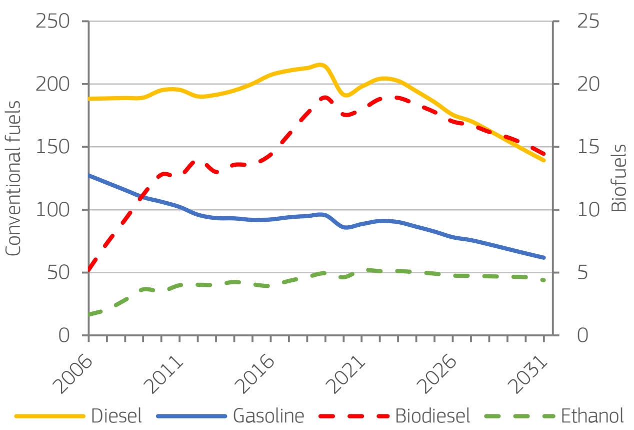
The demand for vegetable oils for food use is expected to remain stable, at around 11.6 million t. For domestically produced oils, sunflower and rapeseed should gain in share at the expense of soybean oil as their use in processed food looks set increase.

The increased use of sunflower and rapeseed oils in food will also impact imports. Imports of palm oil are expected to decline significantly, from 6.5 million t in 2021, to 4.0 million t by 2031. However, most of this decrease is expected to result from falling demand for biodiesel (see the section on Biofuels) and growth in demand for oils of other origins (e.g. olive oil).

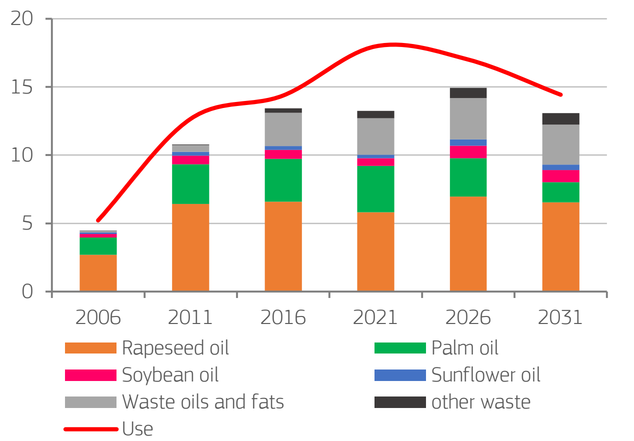
Given the limited growth in rapeseed production, prices for rapeseed oil are expected to rise a little faster than for other oils and reach EUR 1000/t by 2031. World soya bean prices are due to increase more slowly than rapeseed prices, allowing soya beans to maintain their position as an attractive option for crushing. However, increasing demand for biodiesel worldwide could drive up soya oil prices.

BIOFUELS

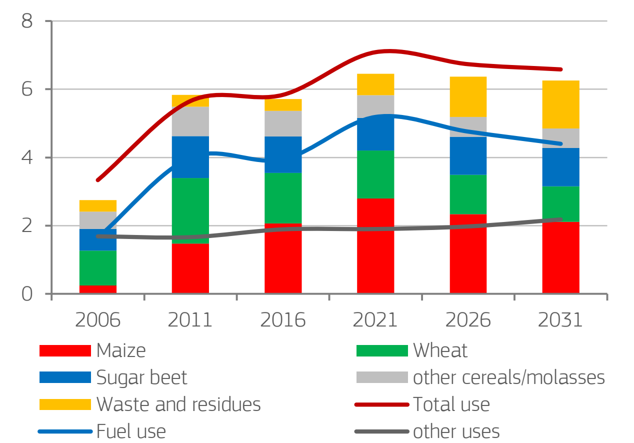
GRAPH 2.13 EU conventional fuels and biofuels use (billion l)



GRAPH 2.14 EU biodiesel feedstock and biodiesel use (billion l)



GRAPH 2.15 EU ethanol feedstock and ethanol use (billion l)



Biofuel demand to decrease as road transport fuel use starts to trickle away

As biofuels are consumed by blending them with fossil fuels, demand for biofuels is directly linked to demand for road transport fuel. The shift to sustainable transportation is progressing well, which will have a significant effect on the consumption of fuels for road transport.

Projections based on the Joint Research Centre's POLES energy model show that diesel and gasoline should reach peak use in 2022. EU fossil fuel use is expected to decline thereafter. By 2031, the use of both fossil fuels is due to drop by 32% from peak levels to 139 billion l for diesel and 62 billion l for gasoline.

The change demand for road fuel will directly affect demand for biofuels. However, thanks to increased blending, the demand for biofuels will fall less sharply than demand for fossil fuels. EU biodiesel use is expected to peak at 18.9 billion l in 2023, then decline by 24% to reach 14.3 billion l in 2031. Bioethanol use should be less affected, as bioethanol also has non-fuel applications. Nevertheless, ethanol use is due to peak at 7.1 billion l in 2023; then decline by 10% to reach 6.4 billion l in 2031.

Palm oil to be squeezed out as biodiesel feedstock

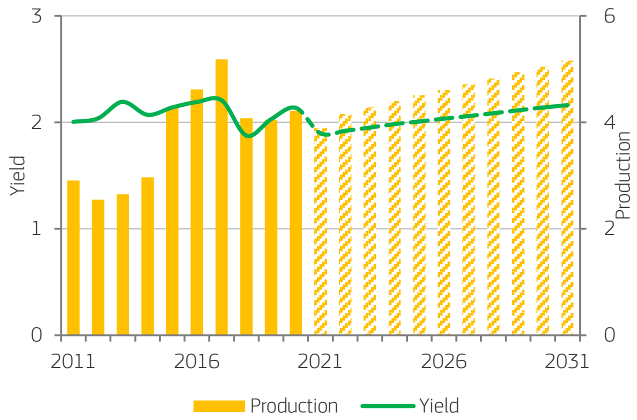
Most of the decline in biodiesel feedstock is expected to concern palm oil, which is likely to face difficulties in securing the required ILUC certification. Rapeseed oil use is expected to be similar in 2031 to 2021, representing around half of biodiesel feedstock. Conversely, the use of other feedstock from sunflower and soybean oil should increase, but remain relatively low (10%). The production of advanced biodiesel from waste oils and fats should increase, bolstered by double counting in blending mandates.

As for ethanol production, maize is projected to remain the principal feedstock, with a share of around 44%. Wheat use for ethanol is due to decrease, while ethanol production from other cereals and sugar beet should remain relatively stable. Growth is only expected in the production of advanced ethanol from waste and residues. Again, this will be driven by double counting towards blending mandate targets.

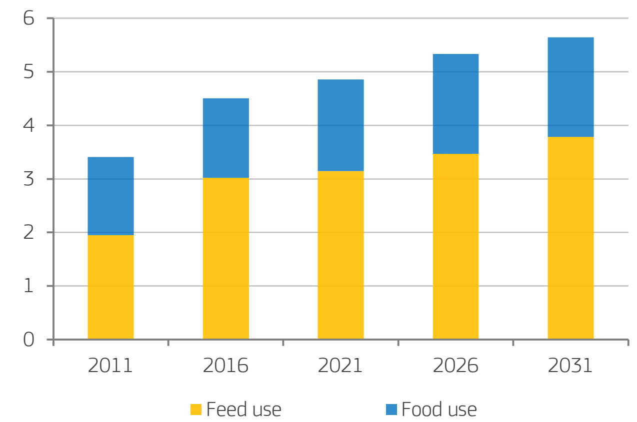
The EU is expected to remain a net importer of biofuels. Biodiesel imports are likely to be limited by the ongoing application of countervailing duties on imports from Argentina and Indonesia. In the medium term, difficulties with palm oil certification and decreasing demand could drag down imports of biodiesel while ethanol imports should remain relatively stable throughout the outlook period.

PROTEIN CROPS AND RICE

GRAPH 2.16 EU protein crop yield (t/ha) and production (million t)

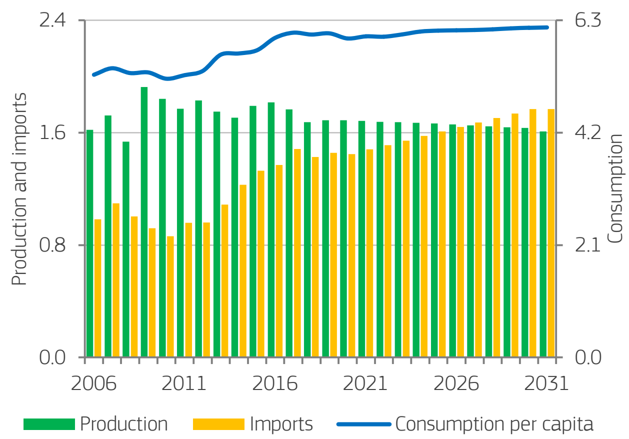


GRAPH 2.17 EU pulse consumption (million t)



Note: Percentage change corresponds to decade evolution.

GRAPH 2.18 EU rice production and imports (million t) and per capita consumption (kg)



Growth in EU protein crops production to outpace use

Protein crops include peas, field beans, lentils, chickpeas and other dry pulses. In recent years, the EU area allocated to protein crops has increased significantly. This trend has been driven by policy incentives and increasing domestic consumption, which is the result of both wider inclusion in feed rations and growing popularity for human consumption, linked to an expansion of plant-based products. Furthermore, certain protein crops, such as legumes, fix nitrogen in the soil and help to reduce the use of nitrogen fertilisers. Protein crops also bring benefits in crop rotation systems. However, farmers are quite reluctant to expand cultivation of these crops because they are agronomically demanding their yields are more variable than those of other crops. Lower yields and the lack of suitable varieties are also obstacles. Therefore, growing demand has mostly been met by increased imports until now.

During the outlook period, the area under protein crops is projected to increase by 19% on 2021 figures and reach 2.4 million ha in 2031. The conducive policy environment, good market prospects and agronomic benefits of growing protein crops should ensure that they continue to be included in the rotation. As these crops continue to attract interest, yields are projected to increase by 14% during the outlook period due to research and innovation in genetics and farming practices, coupled with increasingly efficient rotation systems. Given the projected increases in area and yields, production is expected to grow significantly, climbing by 33% to reach 5.2 million t in 2031.

Domestic consumption is due to grow by 14% in the next 10 years to reach 5.6 million t in 2031. Most of the growth is expected to come from use of protein crops as feed (+24% compared to 2021). As production is due to grow faster than consumption, imports of protein crops should decline by about 37%, while import dependency should drop to 14% (25% currently) of total consumption.

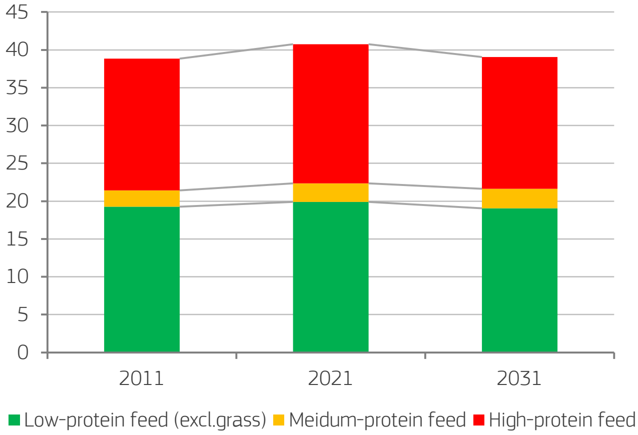
Increasing EU consumption of rice

EU rice production, which consists mainly of *Japonica* rice, is expected to decline slightly as EU rice production systems face difficulties in terms of weather conditions and land preparation for submerged crops, leading to a slight decline in sowing area.

EU rice consumption is due to grow by 0.25% per year. In particular, the increase in demand for *Indica* rice should drive up imports, especially from countries that benefit from zero-tariff under the 'Everything But Arms' (EBA) regime. These imports are expected to increase by around 5% per year, while imports from non-EBA countries are due to decline slightly.

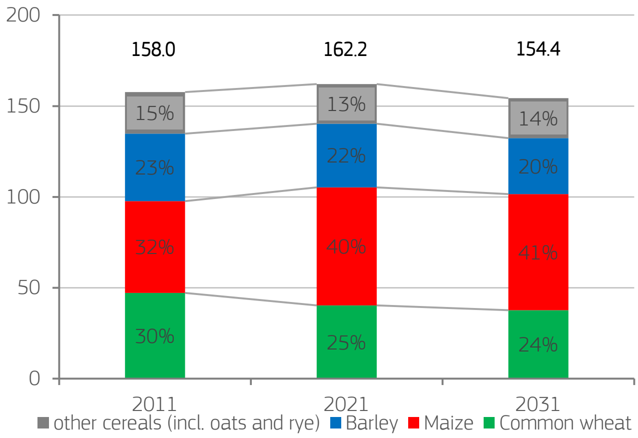
FEED

GRAPH 2.19 EU total feed demand (million t of protein equivalent)

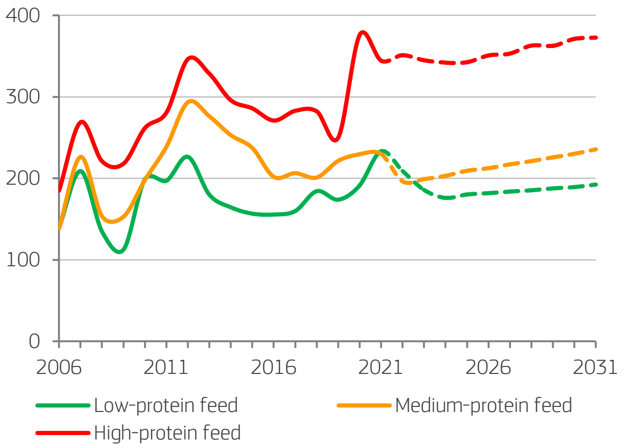


Note: Protein content of feed material in average: 10.7% for low, 27% for medium, 37% for high protein feed[6].

GRAPH 2.20 EU total cereal use in feed (million t)



GRAPH 2.21 EU nominal feed prices (EUR/t)



EU demand for feed to decrease due to lower pigmeat production and smaller beef and dairy herds

Demand for feed in the EU could fall due to the expected decline in EU pigmeat production (-7.8% by 2031), and in suckler and dairy herds (see 'Beef and veal' section), coupled with higher prices and better feed conversion ratios resulting from genetic improvement. This decline should partly offset the projected growth of the poultry sector and further increases in milk production. The latter will come from ongoing restructuring in the dairy sector, as EU countries with lower productivity continue to close the gaps to more efficient and more intensive production systems.

The projected increase in the organic dairy production as well as the further extensification and diversification of dairy production systems will also push the share of livestock feed proteins coming from grass. However, the model does not cover grass production and the graphs do not include it.

Cereal and high-protein meal usage to decline

Overall feed use is projected to fall to 39.1 million t in protein equivalent in 2031 (down 4.1% compared to 2021). The use of low-protein feed (with less than 15% protein content; excluding grass), is set to decline by 4.3% by 2031, driven by decreasing cereal use in feed (-7.8 million t compared to 2021). Use of high-protein feed (over 30% protein content), which includes oilseed meals, fish meals and skimmed milk powder, is projected to decrease even more by 2031 (- 5.1%). The factors behind this decline include a reduction in crushing in the EU (lowering the availability of oilseed meals), environmental and climate concerns around imports of soya meals for use in feed rations, and high prices. By contrast, increased availability of protein crops in the EU could boost the use of medium-protein feed (between 15-30% protein content) by 4.2% compared to 2021.

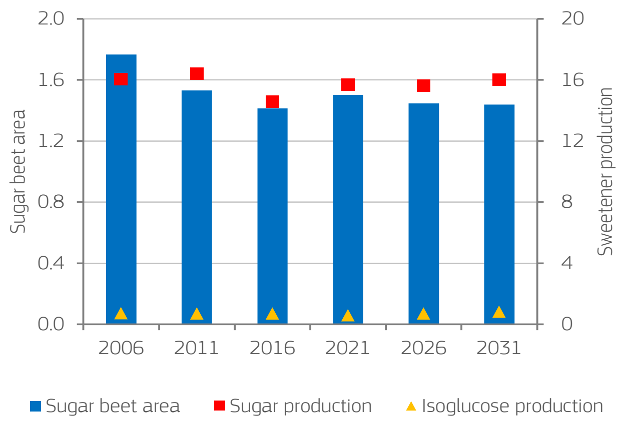
Prices to rise in the longer term

With cereal prices expected to peak in 2021, decline briefly, then rise slowly between 2024 and 2031, low-protein feed prices are due to follow a similar trend. Medium-protein feed prices could start increasing as early as 2023. Prices for high-protein feed are expected to remain high over the outlook period, compared to previous decades, as projected in the OECD-FAO Outlook 2021-2030.

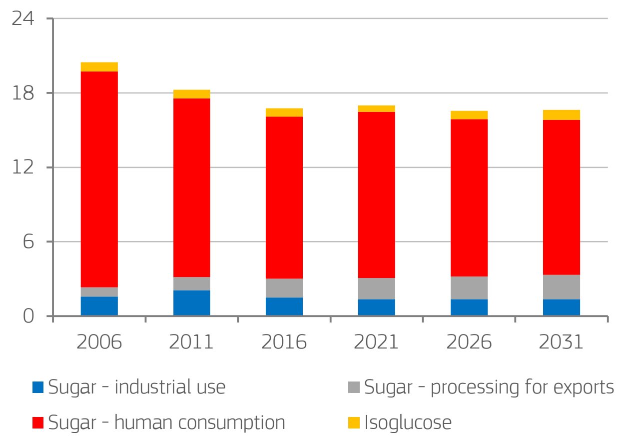
[6] Source: EU feed protein balance sheet.

SUGAR

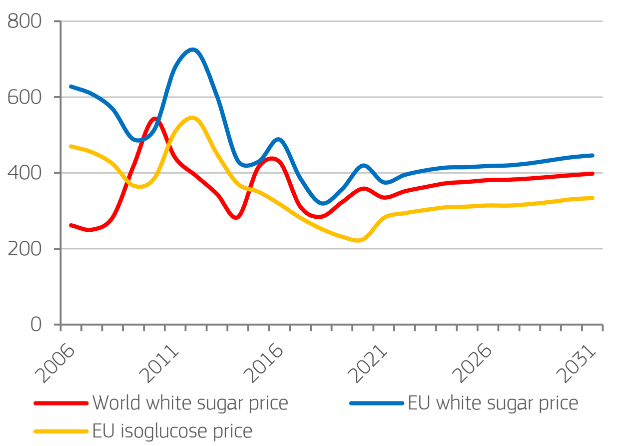
GRAPH 2.22 EU sugar beet area (million ha) and caloric sweetener production (million t)



GRAPH 2.23 EU sweetener use (million t)



GRAPH 2.24 EU and world sweetener prices (EUR/t)



Production growth limited by stabilisation in area and smaller increase in yields

The total area used for sugar beet production in the EU is expected to stabilise at just under 1.5 million ha in 2031, after an initial decline in several of the main EU sugar beet producing countries. In the past few years, sugar beet yields have grown far less than previously (+1.7 t/ha in 2000-2010 compared to +0.2 t/ha in 2010-2020) and this trend is due to continue in the medium term. This change is primarily due to difficulties related to the use of pesticides and the ban of some of them, especially neonicotinoid substances.

As a result of these developments, sugar production is expected to increase slowly, from an average of 15.5 million t in 2019-2021 to 16.0 million t in 2031.

EU isoglucose production is due to grow faster than sugar production, rising to over 800 000 t in 2031 from around 600 000 t currently. Nevertheless, this growth could be limited by competition from competitively priced sugar and other sweeteners.

Consumption continues to fall due to diminishing use in food

By contrast, sugar consumption is expected to decline by 0.5% per year, reaching 15.9 million t in 2031. This will mainly be driven by the established trend of declining domestic human consumption, which reflects the consumer shift to healthier diets.

However, different developments are expected for other uses of sugar (which account for around 15% of total sugar consumption): sugar exports in processed food products are projected to grow by 2.5% per year, while industrial use is set to remain stable.

Sugar exports and imports to reach parity

World and EU sugar prices have aligned since the end of the EU sugar reform and the end of sugar production quotas in 2017, and the EU price has since maintained a relatively stable premium over the world price. In 2021-2031, prices are expected to slowly increase.

Due to rising production and falling internal demand, EU exports are expected to increase. Imports of sugar are due to shrink for the same reasons, but the EU price premium could limit the decline. By 2031, EU exports are projected to reach the level of imports at around 1.6 million t.

MILK AND DAIRY PRODUCTS

/3

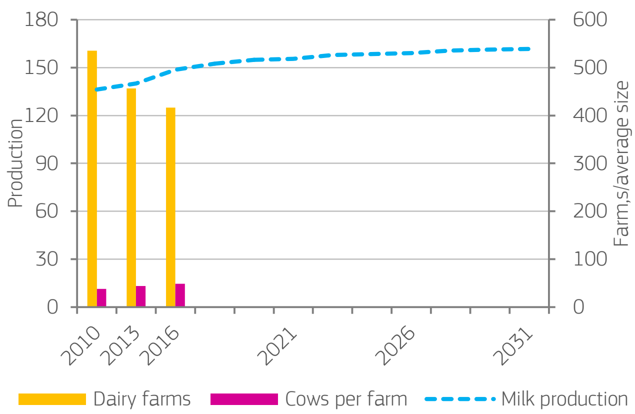
This chapter presents the projections for milk and dairy products. The EU milk production is expected to provide sustainable solutions for dairy farmers, the climate and society, while increasing in productivity. In addition, consumer demand for dairy products originating in alternative production systems could grow further, thus preventing further EU dairy herd decline. In particular, organic production could be supported both by global and EU demand, not only for traditional dairy products, but also for milk powders.

Nutritional aspects and functionality will drive EU dairy demand. The growth in EU consumption of cheese, fresh dairy products and butter could remain relatively low and expanding production could be absorbed by growing exports. The EU will retain its position in the global milk powders trade. While the stimulus for SMP production will come from export growth, domestic use will drive production increases in whey powders and WMP. Overall, the EU should remain the largest dairy exporter.

By 2031, greater demand for milk proteins and the anticipated sustained strong valorisation of milk fat are expected to drive an increase in the EU raw milk price.

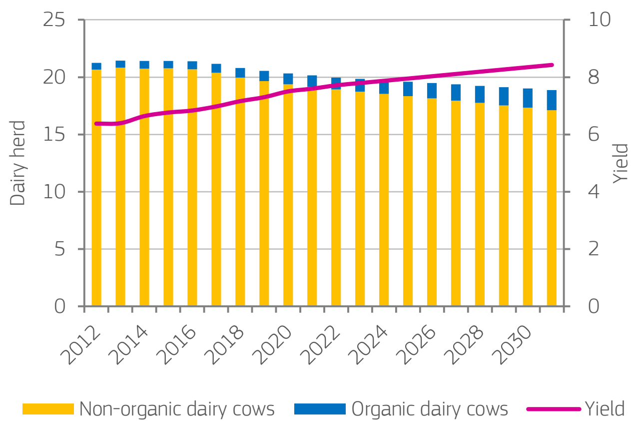
MILK

GRAPH 3.1 Development of EU milk production (million t), number of dairy farms (1 000) and their average size

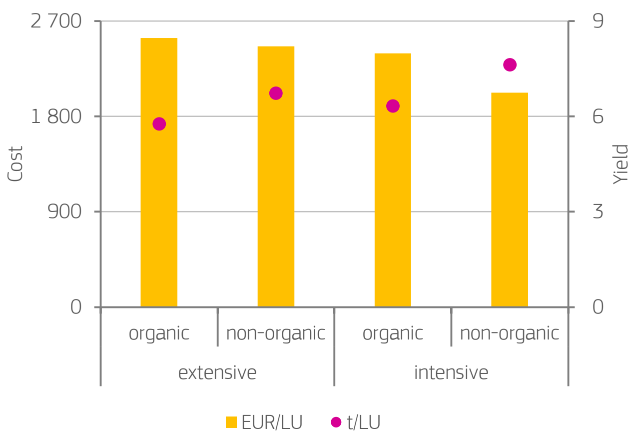


Source: DG Agriculture and Rural Development, based on Eurostat.

GRAPH 3.2 EU dairy herd (million heads) and yield development (t/cow)



GRAPH 3.3 Total cost and milk yield per LU in organic and non-organic dairy production systems



Note: extensive category takes into account the regional livestock density below 1.4 LU per forage area.
Source: DG Agriculture and Rural Development, based on FADN.

EU milk production growth to slow down

In the next 10 years, EU milk production will continue providing sustainable solutions to dairy farmers, climate and society. Farmers – the number of whom is declining - could further benefit from efficiently managed costs and operations, for example through sustainable feeding strategies and better herd management. Economic advantages generated by the latter, thanks to controlled fertility and longer lifespans of cows, could provide benefits in the form of productivity gains when combining best performing breeds or keeping them for the most productive lactations (usually the second and third). In addition, value creation will remain a growth factor and dairy products, especially cheese, might further benefit from existing quality schemes. In France, a showcase example, PGI and PDO dairy products already represented around 12.5% of national dairy milk collection in 2020, generating around EUR 2.4 billion (AOP-CNAOL, 2021).

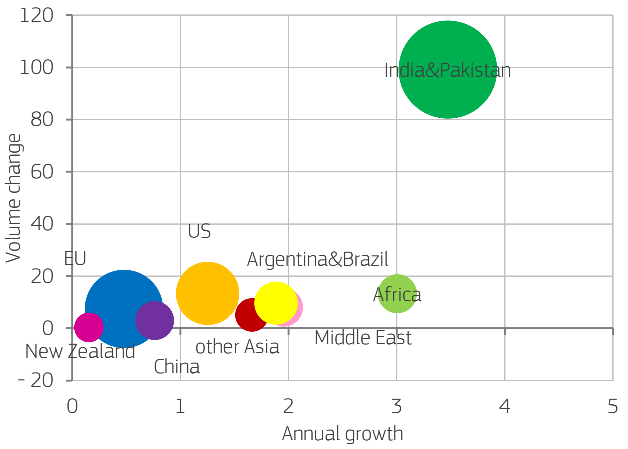
EU milk production will need to comply with higher environmental standards, leading to emissions' reduction, also via reduced replacement rates. In addition, benefits for biodiversity and soil health through the provision of valuable nutrients will lead to the growth of pasture-based (extensive) production systems which currently represent around 19% of EU milk production (based on 2019 FADN data). Organic milk production is also expected to grow, and will provide economic value through a higher price, environmental benefits and benefits for animal welfare, being recognised via outdoor grazing and reduced used of antibiotics.

Because of the above-mentioned factors, EU milk production growth could slow down to 0.5% per year and reach around 162 million t by 2031. Alternatives to conventional systems (usually of lower yields) will also grow, reducing annual yield growth (1.2% compared to 1.9% in 2011-2021); and offsetting further dairy herd reduction (-1.5 million cows by 2031). As a result, GHG emission per t of milk could be reduced by 11%.

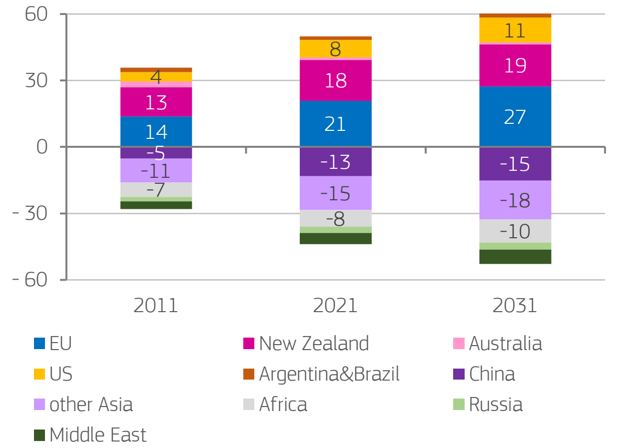
Organic milk production to gain market share

While EU organic milk represented around 3.5% of the EU milk pool in 2019, it is likely to grow and could reach 8% in 2031. To satisfy this growth, the EU organic dairy herd is expected to double. Higher costs compared to non-organic dairy farms (+18% in intensive and 3% in extensive systems, based on 2019 FADN data), higher sensitivity to annual fluctuations in weather creating some uncertainty on milk output and availability of feed and demand reaction will require efforts along the food chain to fully valorise the existing benefits of organic milk production. In addition, some other production systems might be a more attractive alternative to farmers, with relatively high recognition by consumers already (e.g. GM-free).

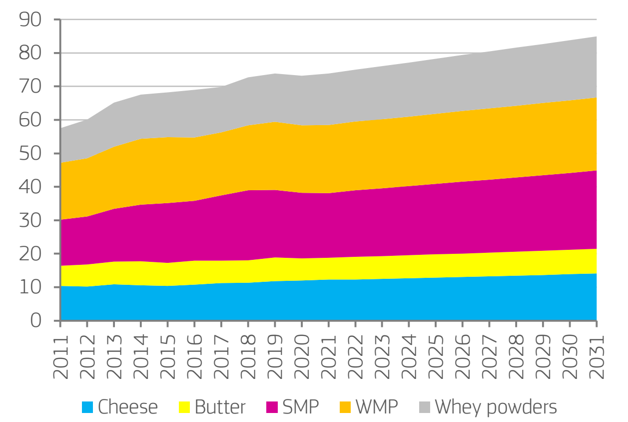
GRAPH 3.4 Global milk production growth by selected regions in 2021-2031 (million t and %)



GRAPH 3.5 Milk surplus/deficit by selected regions (million t)



GRAPH 3.6 Global imports of selected dairy products (million t of milk equivalent)



Leading EU position in global dairy trade to remain

Of the EU's biggest competitors, the EU milk production growth will lie between New Zealand's (+0.2% per year) and that of the the US (+1.2%). However, they will only account for around 13% of global growth between 2021-2031 while developing countries will grow the most, mainly driven by herd increase. This will create further concerns about the sustainability of those production systems and global GHG emission balance.

Despite the reduced growth, the EU will remain the largest dairy trade supplier (30% of global dairy trade in 2031) as the trade expansion of New Zealand, the EU's main competitor, will be limited with the reduced production growth. By contrast, the US could gain (+2.5 pp), creating some tensions in dairy commodities in particular. As a result, the EU will continue contributing to global food security while supplying an increasing demand for quality products as well.

Dairy demand growth is expected to be the strongest in Asia (more than 17% per year, excluding India), driven in particular by rising incomes and the westernisation of diets resulting in increasing use of dairy in foodservices. Asia should be followed by Africa (14% per year), supported by a strong population and income growth. However, in both cases per capita consumption will remain far below the levels in traditional dairy consumer markets for which growth could remain limited, given the already high maturity.

Following recent trends, increasing demand for value-added products might not only support an increase in exports of final products such as cheese, and fresh dairy products, but also result in an increase of flows for higher value-added commodities intended for processing in some destinations. This is already the case for EU infant formula, for which exports to China fell in 2021. To some extent, this was compensated by increasing exports of whey powders and processing into infant formula domestically.

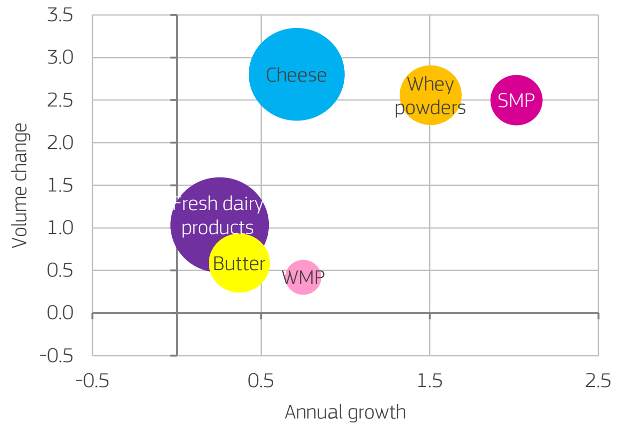
EU to benefit from growing global organic demand

The focus on ethics, food safety and health concerns are among the reasons why the demand for organic dairy products is growing worldwide. It leads not just to growing retail sales, but also to more frequent use in foodservice, even in some well-established fast food chains. However, as organic products are usually used as an ingredient, the direct recognition by consumers remain a challenge unless some labelling is present.

The US dominates the organic food market in size, while China could record the highest (2-digit) growth in the future, with 44% of consumers already actively seeking organic products (Euromonitor, 2021). There is strong potential for dairy in the organic infant formula market for which the import demand could grow in China despite a drop in its conventional category. Accordingly, there could be considerable opportunities for EU organic dairy products in trade as well.

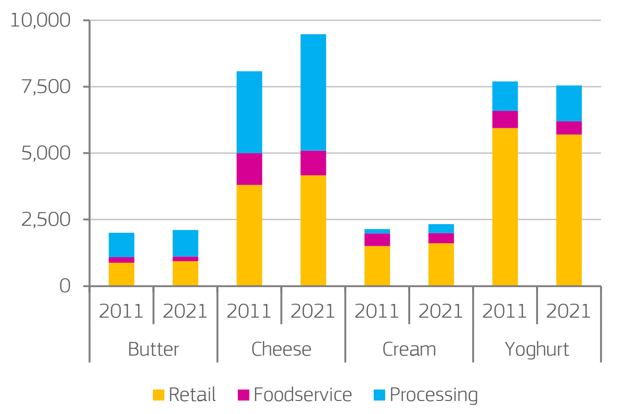
DAIRY PRODUCTS

GRAPH 3.7 EU production growth of selected dairy products in 2021-2031 (million t of milk equivalent and %)



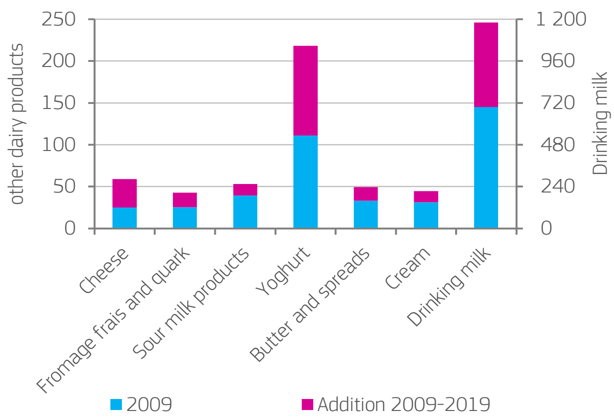
Note: The size of bubbles illustrates average 2019-2021 volumes in milk equivalent.

GRAPH 3.8 EU domestic use of selected dairy products per channel (1 000 t of product weight)



Source: DG Agriculture and Rural Development, based on Euromonitor International: Packaged Food, industry edition, 2021.

GRAPH 3.9 EU retail volume sales of selected organic dairy products (1000 t)



Source: DG Agriculture and Rural Development, based on Euromonitor International: Packaged Food, industry edition, 2021.

EU cheese creating the greatest value

As health remains prominent in consumer considerations about sustainable diets (46%), dairy could benefit from such concerns thanks to its nutritional richness. This advantage is followed by fairness of wages and workers' rights (11%), and support for local economies while only 8% perceive a sustainable diet as organic or good for the planet (Eurobarometer 505, 2020). Nevertheless, these attributes too allow dairy producers to create products that appeal to consumers. As in the past, cheese is set to benefit most from additional EU milk produced by 2031 (+0.7% per year, close to 40%) while generating the highest value (around EUR 40 billion). SMP and whey powders will closely follow in volume terms contribution to growth, but with higher value gap (EUR 5 billion and 3.5 billion respectively). The EU market will remain the main user of EU milk even if exports could gain some shares (17% in 2031 compared to 15% in 2021).

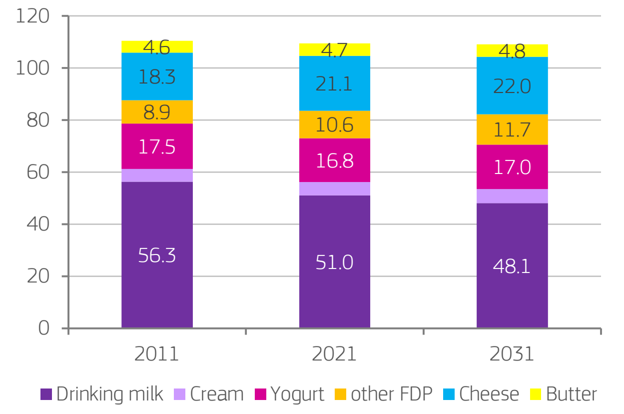
Nutrition and functionality to drive EU dairy demand

Among different channels, retail will remain important for traditional dairy products (cheese, butter, fresh dairy products), while processing uses could gain in reaction to trends of convenience and adding a dairy ingredient to different food products. Innovation in flavours and textures could also be targeted to differentiated uses in cooking or foodservices. Nutritional and clinical dairy products could satisfy demand for products supporting specific health needs while functionality trend could support active ageing and lifestyles. These will favour demand for milk proteins - whey powders in particular. The presence of plant-based products could become more evident also outside the liquid market. Soya-based products are continuing to lose their prominent role and in order to satisfy requirements for taste and textures, other segments are gaining (e.g. almonds, oat, peas).

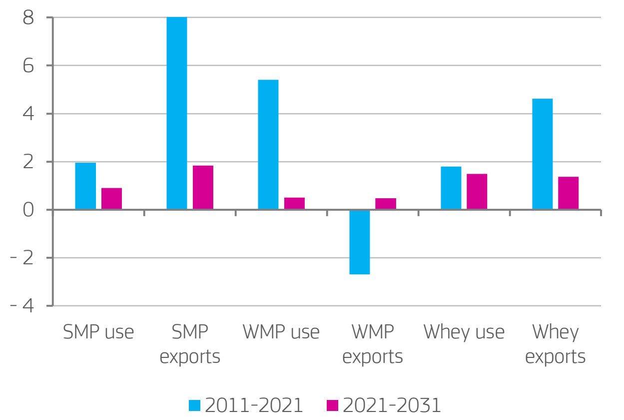
Scale supporting organic milk powders to grow

Organic traditional dairy products benefit the most from the existing demand, while the economic returns on investment into processing in niche markets of organic milk powders (co-products of traditional dairy products) limit their current expansion. However, the potential for expansion remains high, as their retail shares range from 1.5% in cheese to 6% in drinking milk and sour milk products. At the same time, in 2009-2019, cheese recorded the highest absolute growth, while the relative increase in drinking milk remained lower. This is due to a stronger competition from other alternative systems. Many public sector initiatives in the organic sourcing of food could support demand while the increasing scale could help transform niche markets into more mainstream ones, thus better utilising the growing organic milk stream.

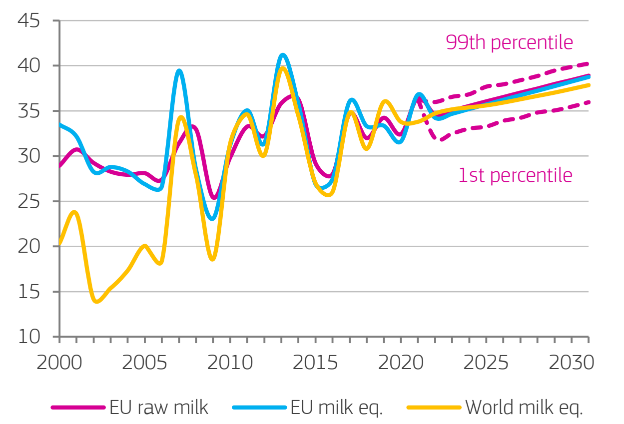
GRAPH 3.10 EU per capita consumption of selected dairy products (kg)



GRAPH 3.11 Annual change of EU use and exports of SMP, WMP and whey powders (%)



GRAPH 3.12 Milk prices (EUR/t) and uncertainty range



Consumption of traditional dairy products stable

In 2021-2031, more than half (57%) of the expanding EU cheese production (0.7% per year) could be absorbed by growing exports (3% per year) which would allow the EU to remain the largest cheese exporter (47%). At the same time, the domestic per capita consumption growth could be limited (2kg less than in 2011-2021), given the already high level.

EU fresh dairy products could benefit from increasing exports as well (around 1.8 million t in 2031) while consumption in the EU, the main user, could slow down the decline (-0.2% compared to -0.5%). This is mainly due to an increasing interest in organic and other differentiated products, which is expected to support drinking milk and yoghurt while home cooking could favour cream consumption. As a result, EU production could remain stable compared to the relatively high average of 2019-2021.

Export demand could support EU butter production (+45 000 t) due to the limited growth of New Zealand as the global butter trade would continue growing at a similar pace to 2011-2021 (+10% compared to 2021) while EU demand growth could be relatively stable (0.2% per year).

EU to remain competitive in milk powders' global trade

Sustained increase in domestic processing use, growing import demand for high quality ingredients and an existing milk deficit in some expanding dairy consumers' markets will support growth in EU milk powders' production, albeit lower than that in 2011-2021. As a result, the EU could keep its position in global SMP, whey powders (both more than 30%) and WMP (12%), in the latter case taking some markets from New Zealand.

While for SMP, the main stimulus will come from export growth (more than 1 million t reached by 2031, +2% per year), domestic processing uses will drive production growth in whey powders and WMP (70% and 60% production share in 2031). Organic milk powders use in nutritional and clinical products (such as different age formulas) could also increase.

EU raw milk price to increase

By 2031, the stronger global demand for milk proteins and expected sustained strong valorisation of milk fat are due to drive an increase in EU raw milk price (around EUR 39/t). Protein to fat ratio could remain comparable to the current level (0.7).

Production of high value-added products and market differentiation into quality products and alternative production systems will add to this development and help to offset some rising costs, especially stemming from increasing energy and feed prices. Benefits will be derived in both domestic and global markets, in line with rising health and sustainability awareness and willingness to remunerate farmers for their environmental and social sustainability efforts, such as animal welfare.

MEAT PRODUCTS

/4

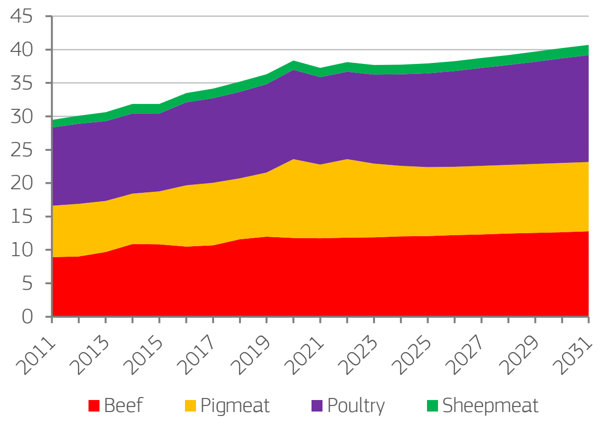
This chapter presents the drivers of EU meat markets and introduces projections for beef and veal, pigmeat, poultry, and sheep and goat meat.

Sustainability and societal concerns should take a more prominent role in shaping EU meat production and consumption. In this context, the most important outcomes that could be evident by 2031 include (i) lower per capita consumption, (ii) lower production based on more efficient and environmentally friendly systems, along with fewer animals, and (iii) reduced exports of live animals. Poultry will be the only sector to clearly expand in terms of production and consumption.

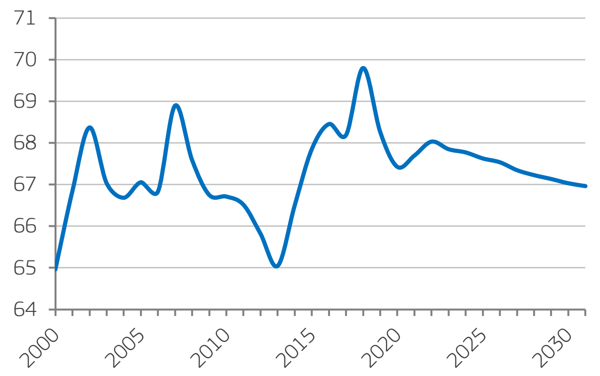
The dependencies vis-à-vis global markets and current events add to uncertainties. EU prices, although generally higher, will continue to to reflect changes in world prices. Although world consumption and import demand are expected to expand, opportunities for EU export growth should mostly benefit the poultry sector. The outbreaks of and subsequent recovery from African Swine Fever (ASF) in Asia, and the episodes of ASF in some EU countries, the aftermath of Brexit and the current COVID-19 pandemic have resulted in a great deal of uncertainty on global and EU meat markets.

DRIVERS OF MEAT MARKETS

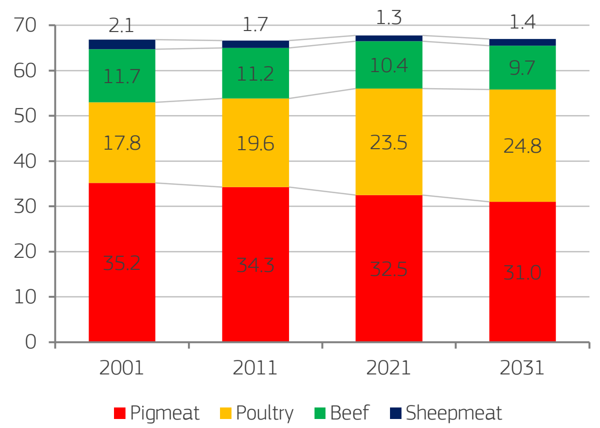
GRAPH 4.1 Global import demand (million t c.w.e.)



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 2031, world meat consumption is expected to continue growing (+1.4% per year), thanks to increasing population and income in developing countries. While a large part of world demand will be met by domestic production, an additional 3.4 million t of meat imports (especially of poultry and beef) will be needed to cover the gap in many countries, on top of the 37.3 million t currently. The EU will benefit only to a limited extent from the additional demand, mainly for poultry meat. The share of EU exports on the global trade will decline from 20% currently to 17% by 2031 due to declining pigmeat exports to Asia. The recovery pathway of China and other Asian countries from ASF will play a determining factor.

A bigger role for sustainability in meat production and environmental awareness in consumption

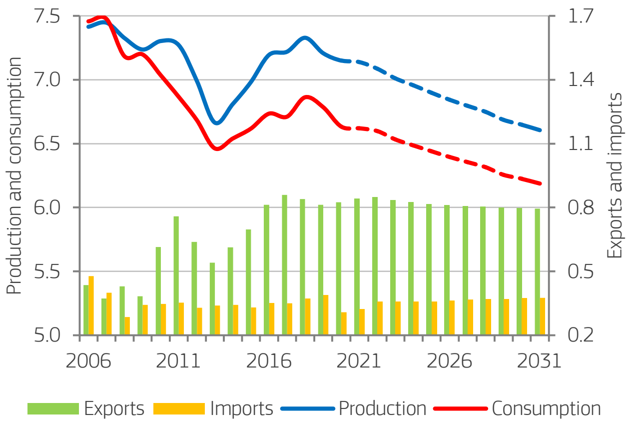
Sustainability, with its environmental, economic and societal objectives, will play an increasingly prominent role in EU meat markets, for both producers and consumers. Although modernisation, innovative technologies and change in farming practices will lead to more efficient and more environmentally-friendly meat production, the investment decision remains a challenge. The way rising concerns of the contribution of EU feed imports to deforestation will impact the meat sector is still unclear. Consumer concerns about the environment and climate change will result in greater attention being paid to the production process and to product origin (e.g. local markets, organic and other quality schemes, animal welfare and environmental footprint). Other drivers of 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). Lab meat is not expected to become a competitor for meat in the next 10 years because of problems with consumer acceptance and price. Plant-based meat alternatives represented around 1% of total meat sales in 2020. This sector will grow in importance but will still represent only a very small market share.

EU per capita meat consumption drops to 67 kg

After a dip in consumption due to COVID-19 and the shortage of meat in China, EU meat consumption is set to decline from 69.8 kg in 2018 to 67 kg retail weight per capita by 2031, contrary to the trend at world level. The overall decline will be accompanied by a shift in the consumer basket. Beef is expected to continue its declining trend. Meanwhile, the ongoing replacement of pigmeat by poultry meat consumption will continue. Sheep meat consumption is due to increase slightly thanks to the diversification of the meat diet and changes in the EU population (religious traditions and migration).

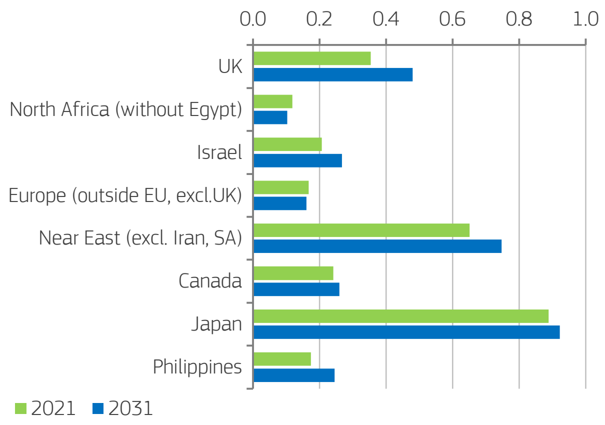
BEEF AND VEAL

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



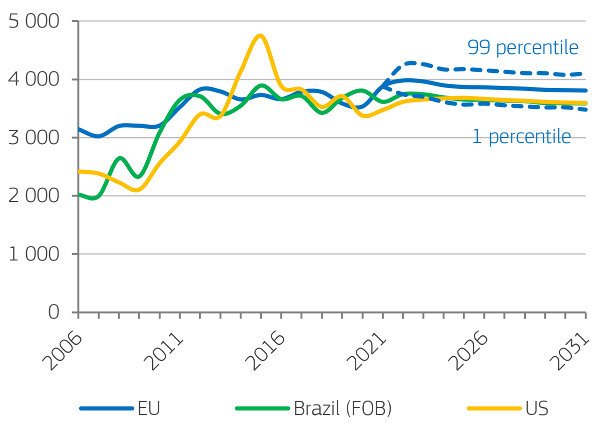
Note: Gross indigenous production; trade includes live animals.

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



EU beef production and consumption falling

Continuing its downward trend from 2018 onwards, EU gross beef production is expected to fall by 0.6 million t (-8%) between 2021 and 2031. The total EU cow herd is set to decrease by 2.1 million heads (-7%) by 2031. The dairy herd should decline progressively as milk yield increases (see the section on Milk). The suckler cow herd is set to decrease to 10.1 million heads by 2031 (-665 000 heads), due to low profitability and increasing environmental concerns. This decline hides opposing developments in different EU countries. Voluntary coupled support and 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 thus compensate for the drop in the number of slaughtered animals, while a shift to organic production systems may partially counteract this trend.

EU beef apparent consumption, low in 2020 and 2021 due to the effects of COVID-19, will continue its downward trend. By 2031, it could drop from 10.6 kg to 9.7 kg per capita.

Modest change in EU trade, with exports of meat offsetting exports of live animals

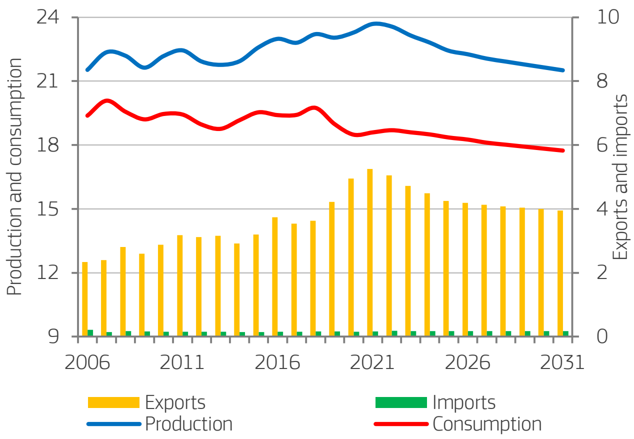
World demand for beef is increasing, both for live animals and for meat, but competition is high. EU exports of live animals are expected to decline gradually (-3.6% per year) due to lower demand from Turkey and concerns over animal welfare in long-distance transport. EU meat exports are due to improve moderately by 2031 (+0.6% per year), mainly thanks to continuing or rising demand of existing trade partners. The UK will remain the main destination and trade should rebound after the decline since 2019, but probably not to the same level as before Brexit. Future trade agreements between the UK and Australia/US might change this picture drastically. The EU will keep exporting to high-value markets in neighbouring countries (Switzerland, Norway). Recent FTAs have opened additional access to certain niche markets for high-value beef cuts (Japan, Canada). EU beef imports, which fell sharply due to the effects of the COVID-19 lockdown measures and Brexit, will come back quickly and will slowly increase by 2031, but will stay below the 2019 level because of high demand outside the EU.

EU beef prices to follow world price developments

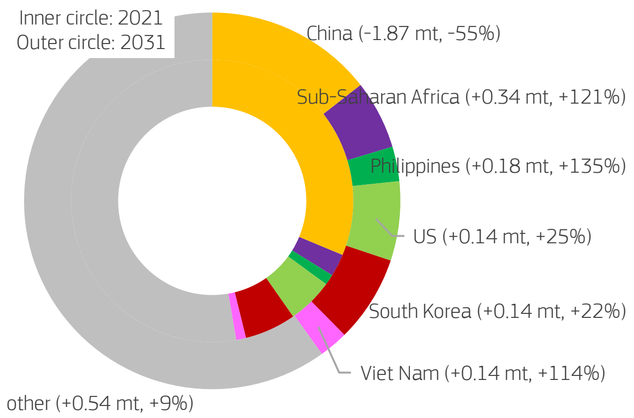
Current restocking in Brazil and Australia will put some pressure on prices in the short run, helped by export restrictions in Argentina. Afterwards, beef prices are expected to stabilise between EUR/t 3 700 and 3 800 due to high international demand.

PIGMEAT

GRAPH 4.7 EU pigmeat market balance (million t)

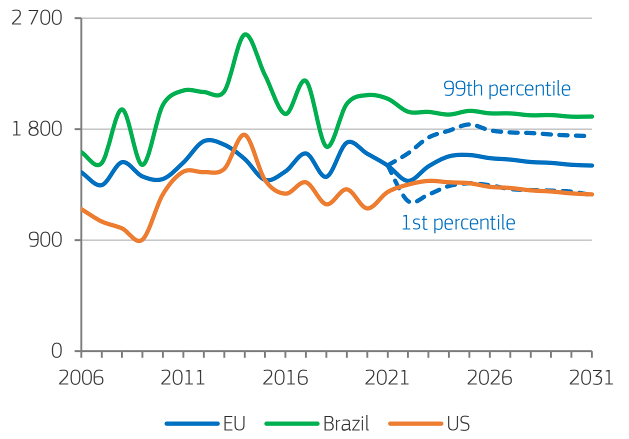


GRAPH 4.8 Shares of selected pigmeat importers on global imports



Note: Sub-Saharan Africa includes South Africa.

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



EU pigmeat exports to decline

Uncertainties remain especially concerning recovery from and bans due to ASF. China is expected to have fully recovered its production capacity by 2026, drastically reducing its reliance on imports. That should have a massive impact on EU pigmeat exports which are predominantly directed to China at the moment. While exports increased by 5.3% per year in 2011-2021, they are projected to decrease by 1.9% per year in 2021-2031.

The total import demand from Sub-Saharan Africa, the Philippines, the US, South Korea and Viet Nam is due to increase the most (together +94 000 t per year in 2021-2031). However, that will not compensate for the drop in demand from China (-187 000 t per year).

EU pigmeat consumption to continue decreasing and production to start declining

In the EU, health, environmental and societal concerns should continue shifting consumer preferences and weigh negatively on EU pigmeat consumption. As a result, apparent EU pigmeat consumption per capita is projected to decrease by 0.5% per year, from 32.5 kg in 2021 to 31 kg in 2031, in line with the trend in the past decade.

Benefitting from good exports in spite of ASF, the EU pigmeat sector increased production by 0.6% per year in 2011-2021. However, ASF will have lasting effects in the EU, while export opportunities should gradually shrink overall. Therefore, EU pigmeat production is projected to decrease by 0.8% per year in 2021-2031.

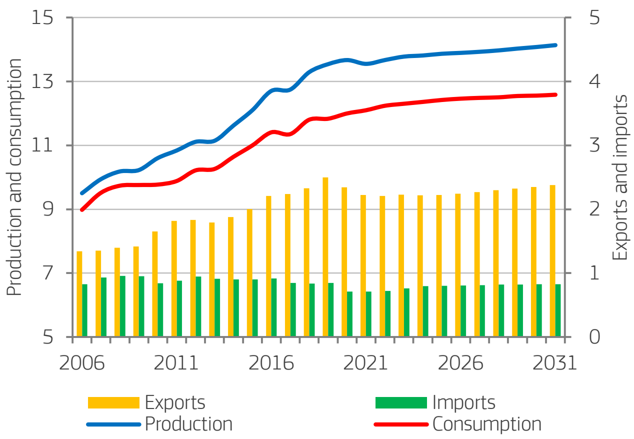
The EU is likely to remain the world's biggest exporter of pigmeat, with a 37% market share in 2031, slightly below its 2021 market share of 40%.

EU pigmeat prices to remain contained

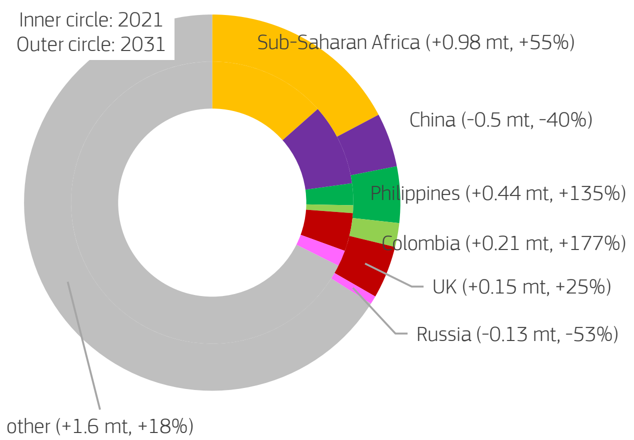
Asian demand and ASF in other regions of the world could push prices up until 2025. Then, EU prices are expected to decrease slowly, in line with an increasing world supply, to reach EUR 1 500/t by 2031.

POULTRY MEAT

GRAPH 4.10 EU poultry meat market balance (million t)

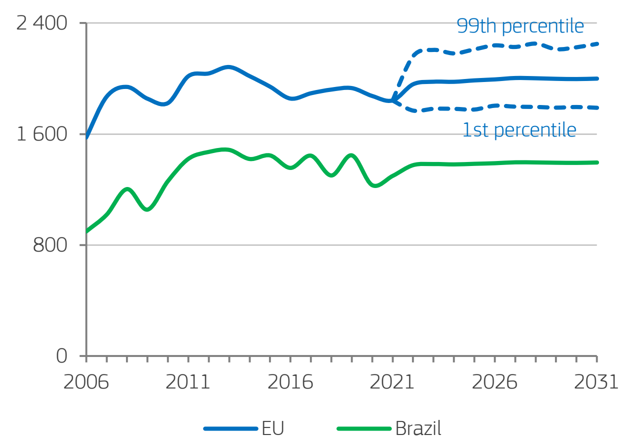


GRAPH 4.11 Shares of selected poultry importers on global imports



Note: Sub-Saharan Africa includes South Africa.

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



Increase in EU poultry production and consumption to slow down

The increase in EU poultry consumption could slow down, from the 2% rise per year in 2011-2021 to a 0.5% rise in 2021-2031. In other words, the apparent consumption per capita could increase from 23.5 kg in 2021 to 24.8 kg in 2031. That should be driven by continued changes in consumer preferences, stemming from a healthier image of poultry compared to other meats (especially pigmeat), the greater convenience to prepare it and the absence of religious constraints regarding its consumption.

Adapting swiftly to the changes in demand, EU poultry production is expected to continue increasing during the outlook period by 0.4% per year, albeit slowing down compared to the past decade (2.6%).

EU trade to start stagnating overall but dynamics are changing

EU poultry exports showed a dynamic expansion in 2011-2021 (3.7% per year), with the main products exported being those less in demand in the EU (wings, legs and offal). Currently, as they are facing fierce competition – especially from Brazil, increase in EU poultry exports are due to be limited until 2031.

However, a number of export opportunities stand out. The expected increase in total imports by Sub-Saharan Africa, the Philippines, Colombia and the UK combined could reach 178 000 t per year until 2031. On the other hand, while China imported pigmeat as well as poultry to compensate for its lost pigmeat production capacity, it is likely to reduce both its poultry and pigmeat imports. As a result, the EU could lose share in the global trade, from 16% in 2021 to 13% in 2031.

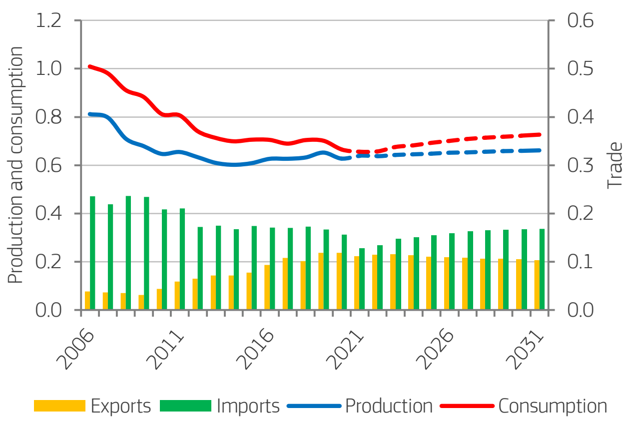
EU poultry imports, mostly supplying foodservice, should recover and reach almost pre-COVID-19 levels by 2026.

EU poultry price to stabilise at a high level

After a drop in 2020-2021 due to COVID-19, the EU poultry price started to recover. It is expected to almost plateau as soon as 2022, and then slowly increase towards EUR 2 000/t by 2031.

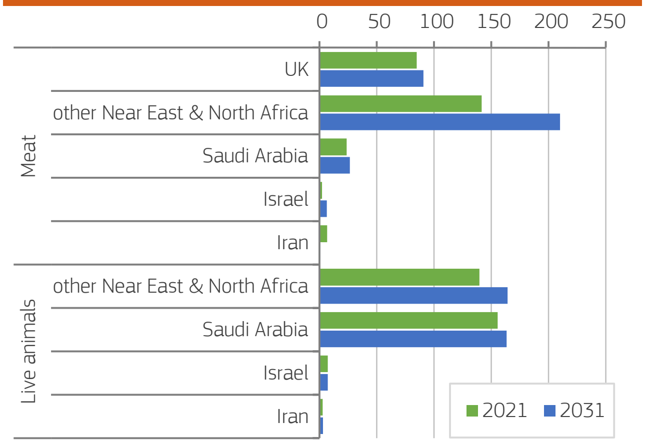
SHEEP AND GOAT MEAT

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

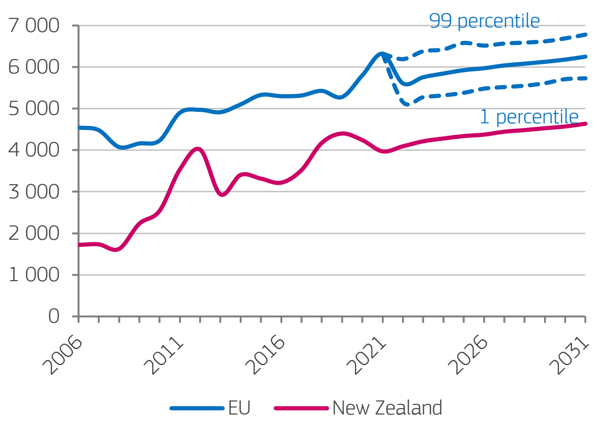


Note: Production corresponds to gross indigenous production; trade includes live animals.

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



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



EU production and consumption slightly up

Following the reversed trend of the last years, EU sheep meat production is expected to increase slightly by 3.5% per year in 2021-2031 (to 660 000 t), underpinned by the implementation of voluntary coupled support, tight world supply and improving prices for producers. Production will remain concentrated in a few EU countries, with slaughterings in Spain, Greece, France and Ireland representing more than half of total EU production in 2020.

EU per capita consumption of sheep meat is expected to gain slightly by 2031 and reach 1.4 kg per capita thanks to the diversification of the meat diet and consumption patterns in the EU population (religious tradition and migration). In general, sheep meat consumption is less sensitive to price changes but more affected by seasonal demand peeks related to religious celebrations during the year.

EU trade turned down by Asian demand and competition

EU exports of live animals are expected to decline by 2031 to 38 000 t (-33% compared to 2021), mainly due to animal welfare concerns of long-distance transport and financial risks of certain trade destinations. EU meat exports are expected to catch up in 2022 and reach 65 000 t by 2031. It will be based on a consolidation and further expansion of trade with partners in the Middle East. The UK imports represents currently almost half of the EU meat exports. There is a lot of uncertainty on the possible impact of a trade agreement between the UK and Australia/New Zealand on EU exports. If transport problems during COVID-19 are resolved, EU imports will recover in the short-run and slightly increase by 2031 to 166 000 t. Even though the EU is still a major export destination, Australia and New Zealand will focus more on closer Asian markets. While Australia is expected to fill its EU tariff rate quotas (TRQs), New Zealand's production capacity is due to be unable to serve both the Asian and European market. An additional disadvantage for Australia and New Zealand is the current international logistical bottleneck of transport ships.

Prices following upward trend

After the peak in 2021, EU prices are to follow an upward trend, following the developments in world market prices. A significant gap between the EU and the prices in New Zealand, and Australia will remain, reflecting the lower production and labour costs of these two countries, and lower pressure from the world market.

SPECIALISED CROPS

/5

This chapter looks into three specialised sectors: olive oil, wine, and fruit and vegetables. These sectors are not included in the Aglink-Cosimo model, and projections are based on expert judgement and literature reviews, taking into account historical trends. Price developments are not explicitly incorporated into the projections.

Projections of fruit and vegetables are limited to apples, peaches and nectarines, oranges and tomatoes. Other specialised crops, equally fundamental to EU agriculture, are not covered in the projections.

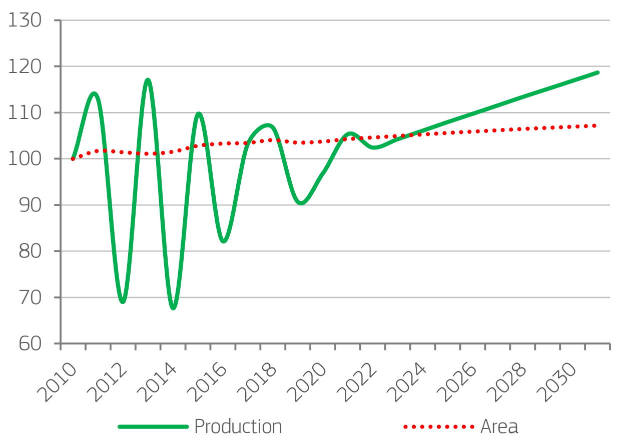
EU olive oil production is due to grow, driven by improved profitability and value creation. However, climate change will remain a challenge. As per capita consumption remains low in the main export destinations, the potential to grow EU exports is high. Growth in the EU consumption is expected to be driven by non-producing countries, while the main producing countries could slow down their decline.

The EU wine sector is adapting to the changing lifestyles and preferences of new and older generations of consumers. These changes are expected to slow down the decline in trend in consumption. Exports are expected to grow. Overall, these trends will result in a slight decline in EU wine production.

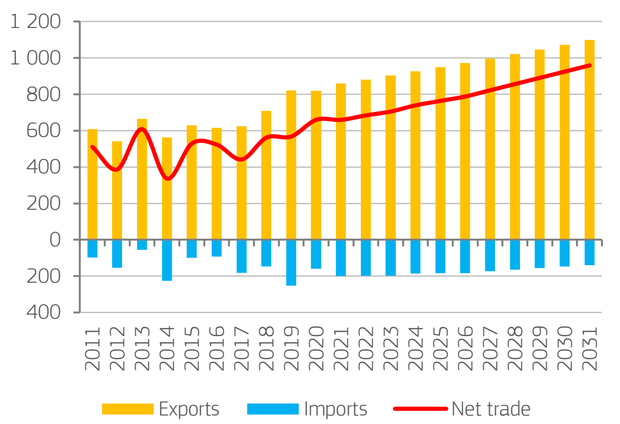
Increasing health awareness and promotional campaigns appear to positively influence the consumption of fresh fruit and vegetables. Shifts between products will continue, driven by changing consumer preferences and lifestyles. Conversely, the consumption of processed fruit is projected to decline, while the consumption of processed tomatoes is expected to remain stable.

OLIVE OIL

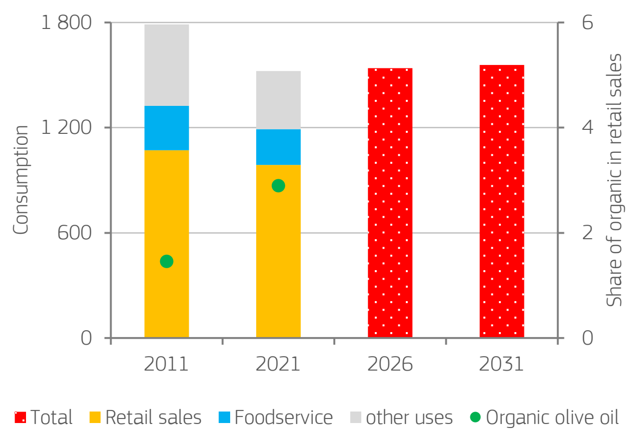
GRAPH 5.1 EU olive oil production and area development (2010=100)



GRAPH 5.2 EU olive oil trade (1000 t)



GRAPH 5.3 EU olive oil consumption per channel (1 000 t) and share of organic retail sales (%)



Note: Consumption in 2011 and 2021 represent olympic averages while organic retail sales correspond to given year due to linear trend.
Source: DG Agriculture and Rural Development, based on Euromonitor International: Packaged Food, industry edition, 2021 (2011, 2021).

Efficiency and value driving olive oil production growth

The recovery of EU olive oil prices in 2020/21 has stimulated investments into new olive tree plantations. Behind this, the value creation in broader terms remains significant, leading to improved profitability especially in super intensive systems. These systems are characterised by a quick entry into production (usually the second or third year) and contribute to high quality output with minimised losses thanks to a fully mechanized production cycle from planting, to prunning to harvesting. Increasing organic olive oil production and quality schemes are other examples of how to bring value to EU olive oil production growth.

However, climate change will remain a challenge, leading to annual variations in yields as well as quality of oil. To manage this, resistant varieties are expected to replace current ones. Meanwhile water scarcity and competition with other uses could remain a challenge for future yield development which is due to increase by 1% per year until 2031. While keeping area development relatively stable (with new plantations replacing old ones), EU olive oil production could reach 2.5 million t by 2031 (+22% compared to 2020*).

Increasing importance of EU exports on market balance

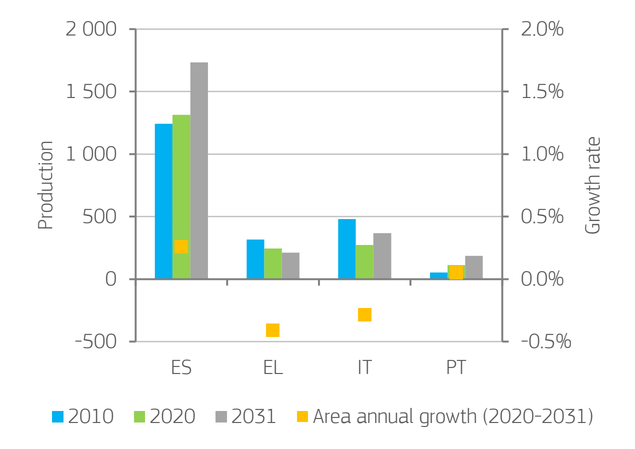
EU exports will become more important with the production increase (from 35% in 2020 to 44% in 2031). As per capita consumption remains low in the main EU export destinations, the potential to grow is evident. The EU could continue to benefit from the positive health image of olive oil, and its well-known quality, resulting in 1 million t of EU exports by 2031. The value creation should be sustained via exports of bottled and high-quality olive oil (including organic) even if some commoditisation might not be prevented. EU imports could remain high, reflecting increasing production in non-EU countries.

EU consumption growing in non-producing countries

The growth in EU consumption is expected to be driven by non-producing countries (from 21% in 2020 to 32% in 2031) as the historically high per capita consumption in the main EU producing countries could drop further (-0.6% per year, compared to -3% in 2010-2021). In general, retail sales are the dominant channel (around 65% in 2021) in which organic olive oil gains some shares (around 3% in 2021). This label is more appealing for consumers in non-traditional markets (e.g. 20% in Finland, 31% in Denmark) while it ranges from 0.5% to 2% in main producing countries, for which the authenticity and quality perception is more culturally grounded. However, in both cases it could provide an incentive to prevent an even bigger decline although the price will remain main incentive to buy.

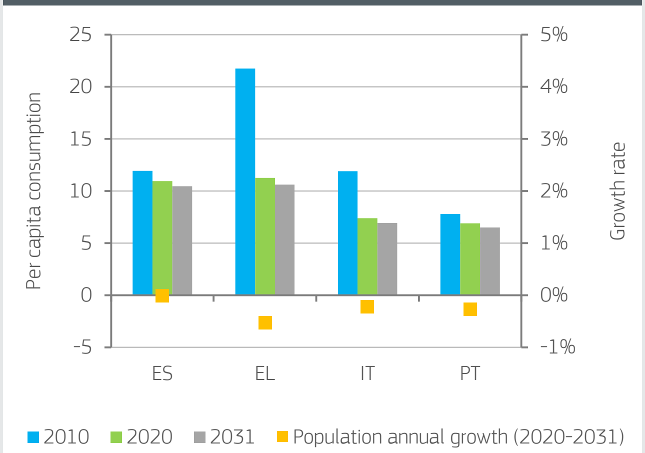
OLIVE OIL – SPOTLIGHT ON MAIN PROCUDING COUNTRIES

GRAPH 5.4 Olive oil production (1 000 t) and olives for oil area growth (%)



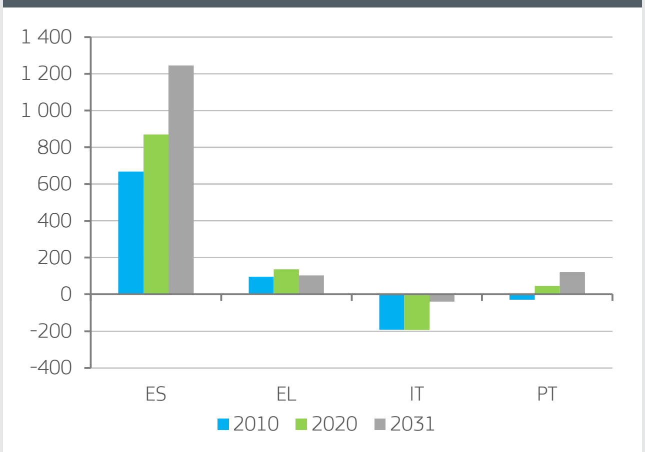
Note: 2010 and 2020 represent olympic averages (in all graphs).
Source: AGMEMOD simulation.

GRAPH 5.5 Olive oil per capita consumption (kg) and population growth (%)



Source: AGMEMOD simulation.

GRAPH 5.6 Olive oil net trade development (1 000 t)



Source: AGMEMOD simulation.

Production growth prospects differentiated across the EU

Olive oil production is projected to follow an heterogenous pattern across the EU. In particular, annual average production increases in the range of 2.5% to 5% are expected in Spain, Italy and Portugal, mainly driven yield increases. A limited decline in production is expected in Greece reflecting a combination of a small area decline with a lagging yield development. The COVID-19 pandemic has also affected the sector, which was facing labour shortages in the course of 2020, especially in less-mechanized harvest systems. Diseases such as *Xylella Fastidiosa* and weather and climatic events (e.g. heat waves and droughts) are the key uncertainties that could prevent the realisation of the expected production increases.

Limited consumption growth in main producing countries

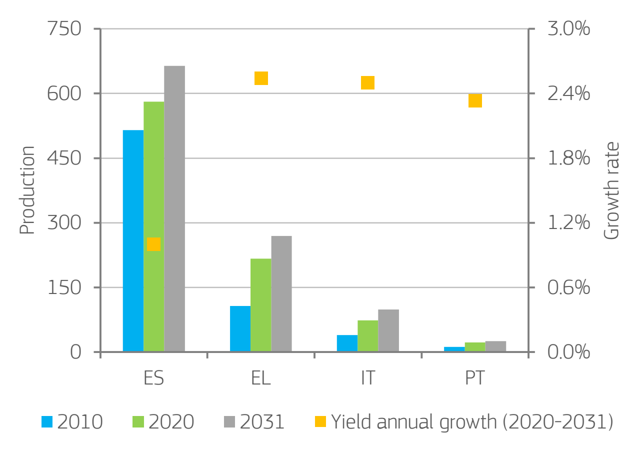
A slight decline in per capita consumption of olive oil is projected for all main EU producing countries, with annual declines ranging from -0.4 to -0.6%. This decline reflects the maturity of the market and different consumption styles of younger generations. Looking at other EU countries, a still increasing trend is expected, reaching per capita consumption of 1.5 kg by 2031. Overall, the olive oil consumption is increasing due to a growing consumer awareness of its positive health effects as well as an increasing popularity of the Mediterranean diet.

Continuation of the current trade developments

By 2031, Portugal and Spain are expected to increase their net export position (compared to average 2016-2020). Specifically, in 2020-2031, net exports of Spain and Portugal could grow by 3% and 9% per year respectively. Greece is also projected to maintain its net exporting position, although at a lower volumes, showing an average annual decline of around -2.5% per year by 2031. In contrast, Italy's net dependence on olive oil imports decline due to the increase in its production by almost 3% in 2031 compared to the reference period 2016-2020. Overall, Spain is expected to remain a key player in the global olive oil market, which could use the projected expansion of production capacities to satisfy the emerging demand from the Asia-Pacific region in particular. Moreover, exports of Spain and Portugal to Brazil have shown a potential to grow. The EU imports of olive oil from African countries are often benefiting from specific trade arrangements (e.g. EU-Tunisia Association Agreement providing this country a duty-free import quota). Some competition from outside the EU could also increase due to the recent expansion of olive groves in the Southern Hemisphere, but with a limited impact on EU global competitiveness given the relative size to the EU market.

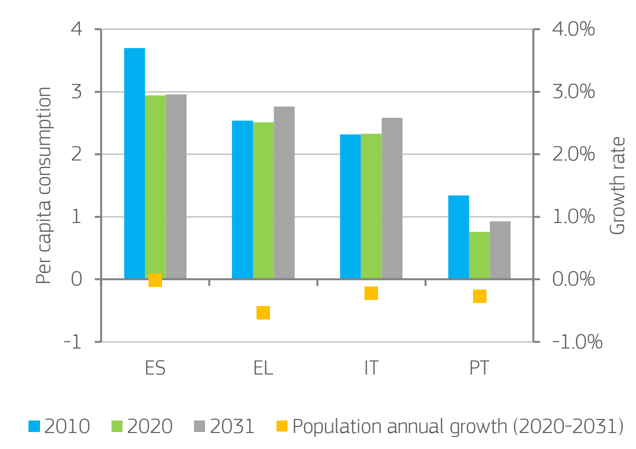
TABLE OLIVES – SPOTLIGHT ON MAIN PROCUDING COUNTRIES

GRAPH 5.7 Table olives production (1 000 t) and yield growth (%)



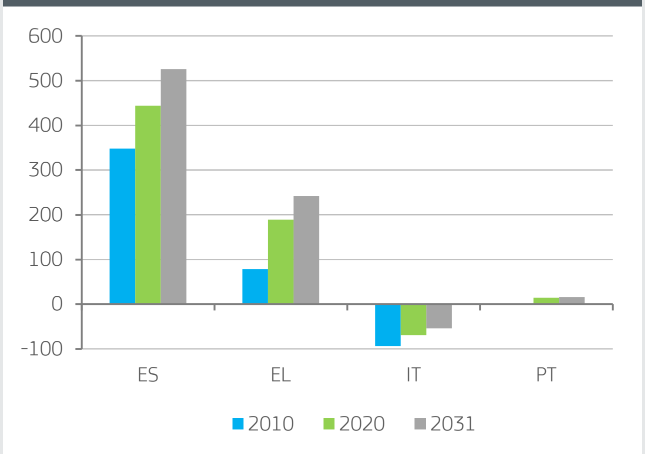
Source: AGMEMOD simulation.

GRAPH 5.8 Table olives per capita consumption (kg) and population growth (%)



Source: AGMEMOD simulation.

GRAPH 5.9 Table olives net trade development (1 000 t)



Source: AGMEMOD simulation.

EU table olives production to expand but climatic events remain a challenge

Production of table olives in main EU producing countries is expected to increase in the coming years, reflecting positive yield developments as well as an area expansion, especially in Spain, Italy and Portugal (while area is slightly declining in Greece). In 2020-2031, production in these countries could rise by 1-2.5% per year. There is also a small production of table olives in France (currently at around 1 200 t). The importance of the threat that 'adverse' climatic conditions and water scarcity could impose for olive growers in the Mediterranean region is increasing. Therefore, the development of olive tree varieties more resistant to extreme weather and droughts (as well as pests and diseases) will play an important role in the expected production development.

Rising EU consumption of table olives

In Spain, per capita consumption of table olives is expected to remain around the current level in 2031 (almost 3 kg). However, an increase is projected in Italy, Greece and Portugal. A stronger growth is expected for the latter, with an annual growth rate of almost 2% for the period 2020-2031, but starting from a lower basis. A similar trend is observed for other EU countries, for which consumption per capita is expected to reach 1.2 kg in 2031. This expected increase in consumption would lead to an increase in the imports of the EU non-producing countries. Health benefits and a positive image of Mediterranean cuisine are key drivers behind the expected increase in consumption of table olives, similar to the olive oil.

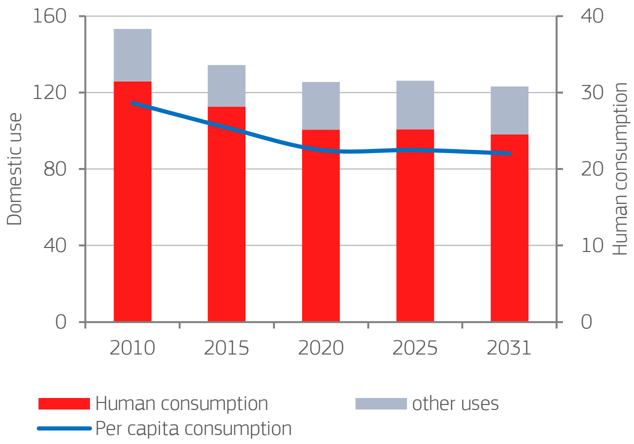
Increasing trends for net exports

Overall, positive net exports developments are expected. In particular, net exports are projected to increase in Spain, Greece and Portugal, with an annual growth rate of around 1-2%. In Italy, net imports of table olives are expected to decline (from 71 600 t in 2020 to around 54 000 t in 2031). When looking at the period 2006-2031, a structural change in the net trade position of Portugal is observed as it has moved from being a net importer to having a net exporting position, which is likely to remain in the coming years, supported by demand in Brazil.

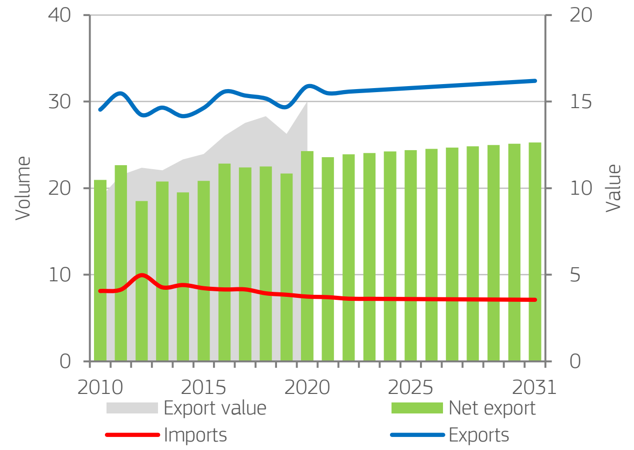
By 2031, the main EU producing countries are expected to maintain their strong trade position, with increasing intra-EU trade flows, as well as external ones (e.g. growing exports to the US). Nevertheless, the competition from Egypt, Algeria and Turkey, which face lower labour costs, could be an important source of uncertainty for the EU market.

WINE

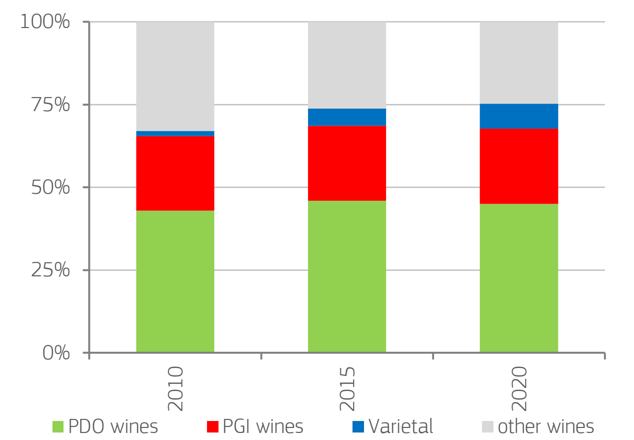
GRAPH 5.10 EU wine domestic use (million hl) and human per capita consumption (l)



GRAPH 5.11 EU wine trade in volume (million hl) and value (billion EUR)



GRAPH 5.12 EU wine production share by categories



Source: DG Agriculture and Rural Development, based on MS notifications.

EU wine consumption slowing down

By 2031, EU wine consumption is projected to reach 22 l per capita. This is 0.4 l less compared to 2020 and shows that the declining trend has slowed (-0.2% per year in 2020-2031 compared to -24.% in 2010-2020). However, large differences between EU countries could remain.

EU domestic wine use is due to reach 123 million hl by 2031, the decline in human consumption being only partially compensated with a slight increase in the use of vinified production for other uses (e.g. distillation and the production of processed products).

The EU wine sector is adapting to changing lifestyles which have been accelerated by the COVID-19 pandemic. Differences in preferences between older and newer generations of consumers are emerging.

Due to COVID-19, sustainability concerns among consumers have increased, being reflected in a growing demand for organic and natural wines, but has also led to new behaviour in consumption of wine (home consumption). This is reflected also in increasing purchase of wine online which is flourishing and expected to develop further, also boosting demand.

Driven by COVID-19 and the temporary closure of the foodservice, new generations of consumers, more conscious of consuming alcohol in moderation, are fueling the demand for wines with a lower alcohol content and sparkling wines, which can also be consumed on a variety of occasions.

Growth of EU wine exports

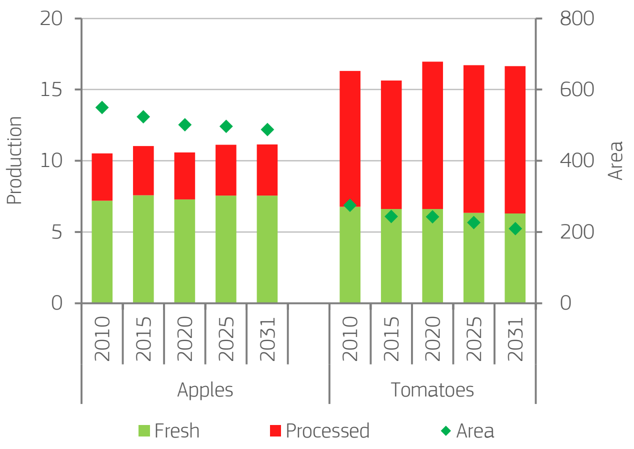
Following stable export volumes between 2016 and 2019, and a big drop in 2019/20 due to COVID-19, exports rose to a record high level in 2020/21. EU wine exports are projected to continue to grow to 32.2 million hl (+0.5% per year) by 2031, driven by high demand for EU wine with a geographical indication (GI) and sparkling wines in general. Furthermore, there is still demand for entry-level (low-priced) wines and the EU could also further develop this market.

Stable area along with declining yields

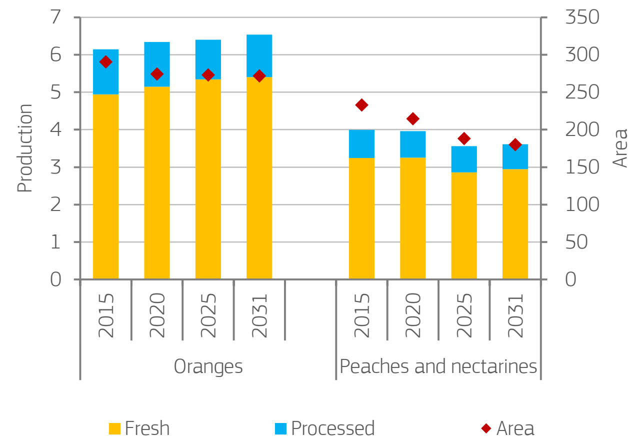
By 2031, the total area in the EU covered by vineyards is expected to remain stable, with an increasing share covered by high quality wines (e.g. PDO/PGI and organic wines with potentially lower average yields). The potential decline of yields could be partially compensated by the use of new varieties, more adapted to climate change. As a result EU wine production could decline to 149 million hl (-0.2% per year) by 2031.

FRUIT & VEGETABLES

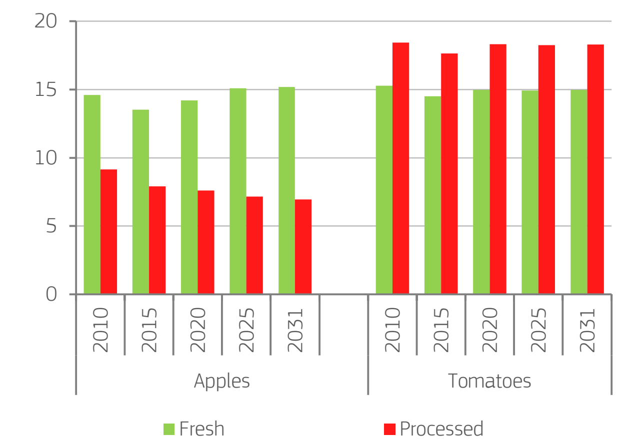
GRAPH 5.13 EU apples and tomatoes production (million t) and area (1000 ha)



GRAPH 5.14 EU oranges, peaches and nectarines production (million t) and area (1000 ha)



GRAPH 5.15 Per capita consumption of apples and tomatoes (kg)



Stable EU production of fruit and vegetables

By 2031, the production of both fresh tomatoes and peaches and nectarines is due to decrease (by -0.4% and -0.5% respectively per year). The decline in tomato production is mainly driven by the strong drop of winter production in Spain and a shift to small-sized tomatoes which have a lower volume but higher added value. Spanish producers are also switching to other, more profitable crops in winter due to strong competition from Morocco. For peaches and nectarines, the continued decrease in the area under cultivation is pushing production down.

The total usable EU apple production is expected to remain stable by 2031, at 11.1 million t. This is the result of the decreasing area under cultivation and increasing yields resulting from the introduction of new, high-yielding dwarf varieties and improved agronomic management. It is projected that in 2031 7.6 million t of apples will be consumed fresh, while 3.6 million t could be used for processing.

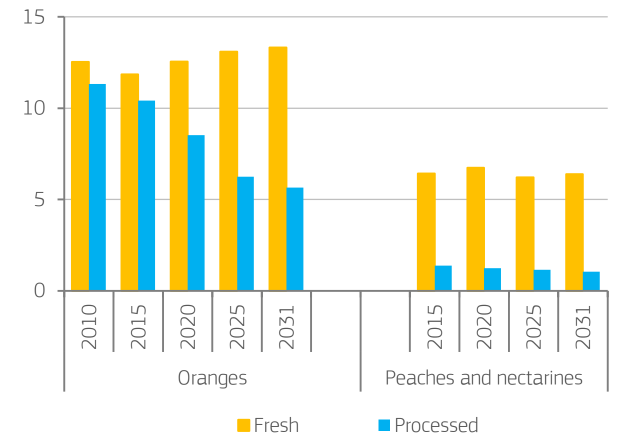
Also the production of tomatoes for processing is due to remain stable at around 10.4 million t. Production is shifting from highly concentrated products, such as tomato paste to less concentrated and higher value added products such as canned tomatoes, passata, tomato sauces and organic products.

EU fresh fruit consumption to increase while processed consumption decreases

By 2031, the EU consumption of fresh fruit and vegetables is expected to increase, driven by an increasing consumer awareness of the benefits of adopting a diet rich in fruit and vegetables, as well as public initiatives to promote their consumption. However, there are significant differences across sectors and between EU countries. In particular, the EU consumption of fresh oranges is due to increase to 13.3 kg per capita (+0.5% per year). The consumption of freshly squeezed orange juices in supermarkets, cafes and restaurants will boost their consumption.

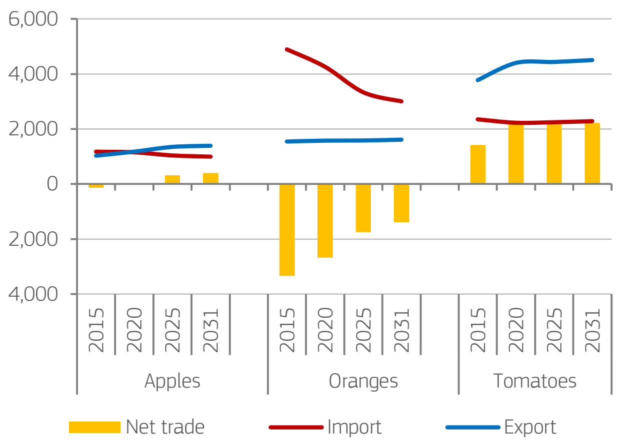
Over the same period, the EU per capita consumption of fresh apples is expected to increase to 15 kg (+0.6% per year), driven by changing apples varieties to varieties which better reflect consumers' preferences, in particular in Poland. Despite the projected increase, the apple is losing competition from more trendy products such as tropical fruits and berries. Also peaches are losing share in the total fruit basket and the consumption of peaches and nectarines is projected to decline to 6.4 kg per capita.

GRAPH 5.16 Per capita consumption of oranges, peaches and nectarines (kg)



GRAPH 5.17 EU trade of selected fresh fruit and vegetables (1 000 t)

GRAPH 5.18 EU trade of selected processed fruit and vegetables (1 000 t)



By 2031, the EU per capita consumption of fresh tomatoes is expected to remain stable (15 kg), with an increased consumption of small sized tomatoes pushing the per capita consumption down while the trend to more 'snacking' of tomatoes is due to push demand up.

In contrast to the increased consumption of fresh fruit and vegetables, the EU consumption of processed fruit[7] is expected to continue to decline. This is due to a continuing decline of juices which represent the largest share. On the other hand, the EU consumption of compote (especially compote that is organic and without added sugar) and cider should continue to rise up. For canned and dried peaches, the current limited availability and high prices could also affect consumption in the medium term, as consumers (including foodservice) might switch to other processed products.

Meanwhile, the EU consumption of processed tomatoes is due to remain stable (18 kg). Despite increasing demand for processed food, the quantity of processed tomatoes used remains the same. This is the result of a declining concentration of raw tomatoes in processed products due to mixtures with other vegetables, among other reasons.

Stabilisation of EU exports of fresh fruit and vegetables

By 2031, EU exports of fresh apples and tomatoes are expected to stabilise at 1.1 million t and 390 000 t respectively (-1.2% and -1.8% per year). Russia, which used to be the largest EU export market and which is still banning the imports of fruit and vegetables from the EU, is increasingly self-sufficient. The export potential into new markets remains limited because of phytosanitary restrictions and increased competition from neighbouring countries, in particular for apples.

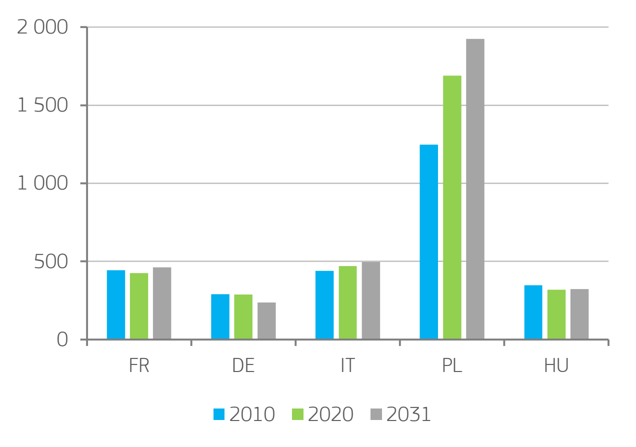
While by 2031, EU imports of fresh apples are due to decline (-3% per year compared to 2020) driven by the increased domestic availability of high quality apples, imports of fresh tomatoes could continue to increase (+2.7% per year). In case of fresh tomatoes. the largest volumes currently come from Morocco, but it is expected that the share of imports from Turkey and Tunisia will increase strongly in the outlook period.

Despite a strong global demand for processed tomatoes, EU exports expressed in fresh equivalent of raw tomatoes, are expected to remain stable. This is the result of growing demand for higher added value products with a lower concentration. Still, the EU should remain a net importer of concentrate.

[7] This outlook covers projections for apples, peaches and nectarines and oranges, both for fresh consumption and for processing.

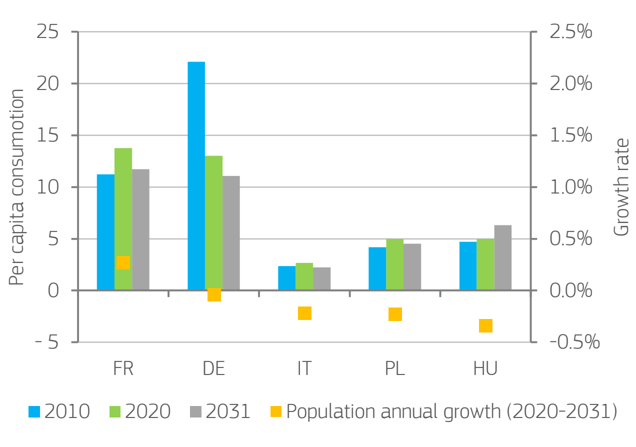
PROCESSED APPLES – SPOTLIGHT ON MAIN PRODUCING COUNTRIES

GRAPH 5.19 Production of processed apples (1 000 t)



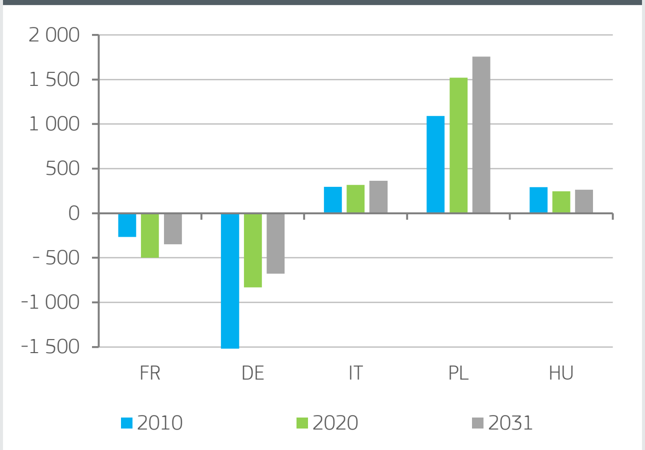
Note: 2010 and 2020 represent olympic averages (in all graphs).
Source: AGMEMOD simulation.

GRAPH 5.20 Per capita consumption of processed apples (kg) and population growth (%)



Source: AGMEMOD simulation.

GRAPH 5.21 Net trade development of processed apples (1 000 t)



Source: AGMEMOD simulation.

Poland remains the top EU producer

By 2031, the production of processed apples is projected to increase in France, Italy and Poland, ranging from 0.5% to 1.2% per year. In Hungary, the production is projected to slightly increase (by 0.2% per year). By contrast, the production in Germany could fall to 236 000 t by 2031, a decline of almost 2% per year compared to 2020. In other EU producing countries, the volumes delivered by the apple processing industry are expected to decline to 150 000 t in 2031. Furthemore, the supply of apples to the processing industry could become more volatile due to the impact of adverse weather conditions.

Negative prospects on the demand side

Per capita consumption of apples in processed form (e.g. juices, compotes) is projected to decline in France, Germany, Italy and Poland. Opposite dynamics are expected in Hungary with an annual growth of 2.1%. On the demand side, the main reason behind the projected decline are the maturity of the market which makes the 'traditional' product less attractive for consumers, as well as the health concerns related to the high sugar content of certain products. Nevertheless, the impact of these negative elements could be partly offset by the expansion of innovative products such as local juices, smoothies, cold-pressed juices or novel products including coconut water.

Trade: a continuation of the recent past

In general terms, the main EU producing countries are due to maintain their current net trade position. In particular, net imports are projected to decline in France and Germany, registering average annual declines of around 2 to 3%. However, for Italy, Poland and Hungary, net exports are projected to increase by 2031. The largest increase is expected in Poland (around 2% per year). The rest of the EU is likely to increase its reliance on imports, which could reach around 924 000 t in 2031. For the EU overall, a shift towards a structural net exporting position is expected for the 2021-2031 period. This trend reflects the overall decline in consumption of concentrates and the increasing consumer interest in local and new products (e.g. not-from-concentrates (NFC), cold-pressed) which are most likely to be produced domestically.

WHAT IF SCENARIOS

/6

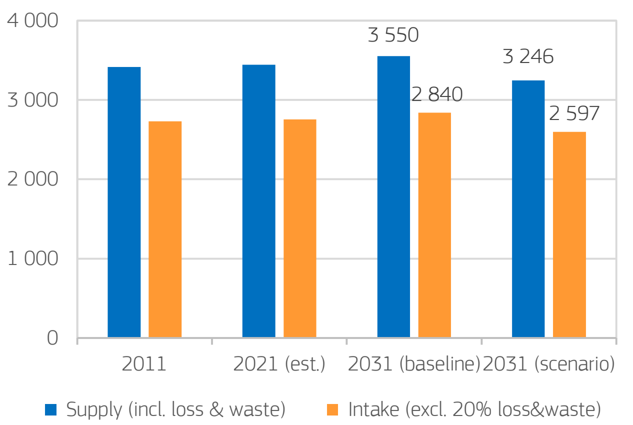
This chapter presents two scenarios developed to address the implications of selected market uncertainties.

In the first scenario, a gradual reduction in total EU fat consumption to the WHO-recommended level of 30% is modelled. The associated shifts in demand lead to lower domestic prices and improved trade balances for the fattier commodities with a limited impact on domestic production and total calories.

In the second scenario the consequences of China becoming self-sufficient in meat and dairy products for food consumption are explored. China is a leading importer of meat and dairy products and the EU is a major exporter, so a move to self-sufficiency would have a significant impact on global agricultural markets in general and on EU markets in particular.

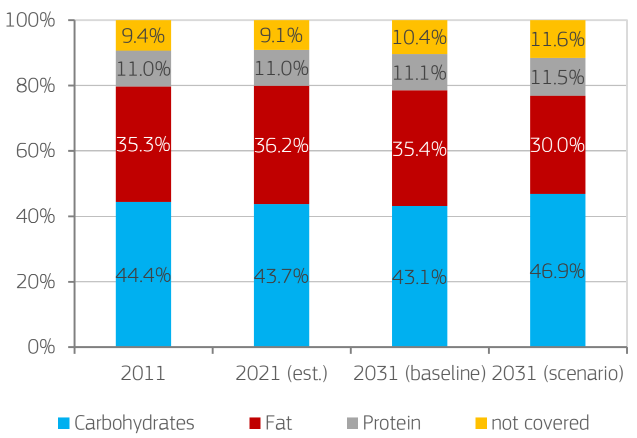
REDUCTION IN EU TOTAL FAT CONSUMPTION

GRAPH 6.1 EU daily per capita calories (kcal)



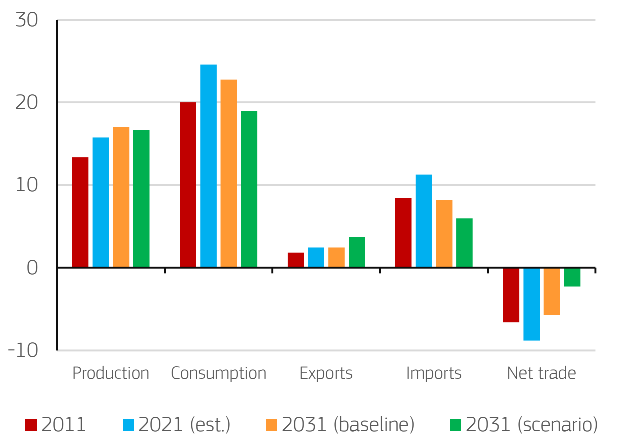
Note: Supply (intake) shows calories available for consumption (consumed) and therefore includes (excludes) any food loss and waste.

GRAPH 6.2 Macronutrients in EU daily per capita calorie supply



Note: "Not covered' refers to macronutrients from commodities that are not explicitly modelled and/or clearly mapped to food balance sheets.

GRAPH 6.3 EU vegetable oils (million t)



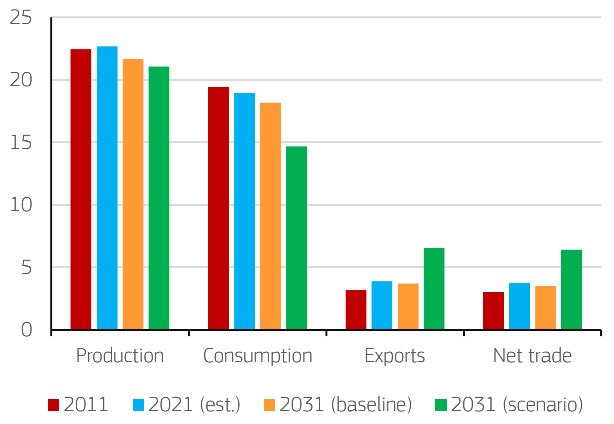
Background

Increased production of processed foods, rapid urbanisation and changing lifestyles have led in recent decades to a shift in dietary patterns across the globe. As a result, many people are now consuming more food high in fat, sugar and salt/sodium at the expense of fruit, vegetables, whole grain and legumes. As a long-standing advocate of healthy lifestyles, the World Health Organization (WHO) often presents recommendations on the basic principles of diversified, balanced and healthy diets. For example, to reduce the risk of developing non-communicable diseases and conditions, such as diabetes, heart disease, stroke and cancer, reduced consumption of fat, sugar and salt is recommended. Fats, in particular, *"should not exceed 30% of total calorie intake to prevent unhealthy gain weight in the adult population"*. This scenario, therefore, examines the market impacts of a modelled reduction in EU total fat consumption from a baseline situation (2022-2031) to the WHO-recommended level.

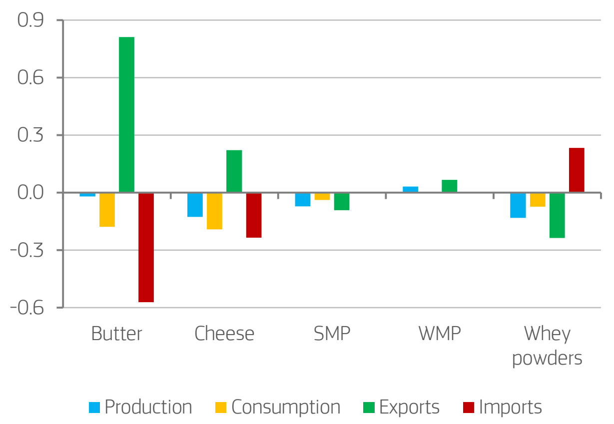
Based on a combination of information from food balance sheets (FAO) with the supply-demand model used to produce this outlook, projected EU food use from the latest OECD-FAO Agricultural Outlook (OECD-FAO, 2021) was converted to calories and broken down as a sum of macronutrients at the commodity level. Hence, baseline EU calorie supply in 2031 was calculated at 3 550 kcal per person per day (+3% compared to 2021). In the macronutrient mix, carbohydrates, fat and protein account for 43.1% (1 531 kcal), 35.4% (1 259 kcal) and 11.1% (393 kcal), respectively.

About 77% of all modelled calories from fats in 2031 are attributed to vegetable oils, some dairy products and pigmeat. A drop in food demand for the highest contributing commodities was modelled: sunflower, palm, soya bean and rapeseed oils, butter, cheese, fresh dairy products and pigmeat. Specifically, food demand for dairy products and pigmeat was reduced by about 18% in the scenario while that for all oils by about twice as much to account for their fat-supply contribution. The shocks on oils were allocated endogenously based on food-demand elasticities and, therefore, are not uniform. Shocks of higher magnitude had also been tested on a single commodity-group basis; not only was the WHO recommendation of 30% not achieved in any of those cases but also extreme market reactions prevailed.

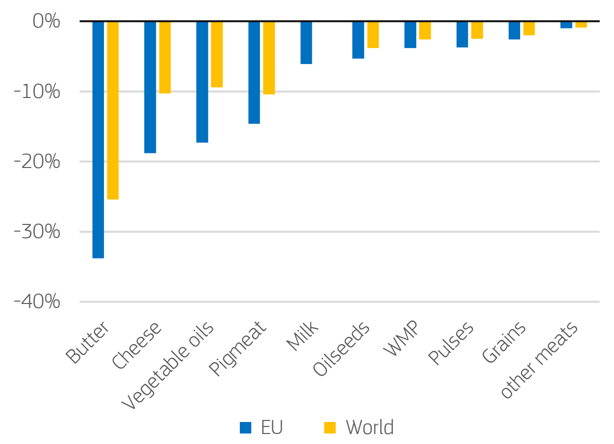
GRAPH 6.4 EU pigmeat (million t c.w.e.)



GRAPH 6.5 EU dairy products (% change vs baseline in 2031)



GRAPH 6.6 EU and world market prices (% change vs baseline in 2031)



Note: For a rough conversion of EU producer prices changes (displayed) to consumer-price changes, an average factor of 0.35 can be used.
Source of all graphs in this chapter: JRC, based on OECD-FAO (2021), FAOSTAT (2021) and EC (2020).

Assumptions

1) Fattier food will become less popular (i.e., demand curve will shift to the left) as a result of changing consumer preferences on the basis of health considerations. The shift is assumed to occur *autonomously* (i.e. consumers make their own buying decisions with no qualitative effect on supply) and *incrementally* (i.e. linearly increasing until 2031, when the full expected shock is achieved). 2) No distinction is made between saturated and unsaturated fats or meat cuts due to data limitations. 3) Lost calories, and subsequently lost protein or carbohydrates are compensated partially and only through endogenous market adjustments. 4) Fish and seafood, fruit, vegetables and olive oil are covered through exogenous information and do not interact with modelled markets. Consumption and calories remain unchanged at the baseline levels for these commodities. 5) A similar demand or dietary shift is not assumed to occur in the rest of the world; the latter, however, does adjust to the imposed EU demand shocks through trade.

Results

A shift towards lower total consumption of the fattier commodities leads to a decline in daily per capita calorie supply by 304 kcal compared with the baseline (-8.6%, from 3 550 to 3 246 kcal) in 2031. The relative contribution of modelled fats drops to the WHO-recommended level of 30% (-284 kcal, to 975 kcal). Carbohydrates and protein fall by about 20 kcal in total but gain relative importance due to the lower calorie supply. The ratio of plant- to animal-based calories supplied remains stable at 2.5:1. All in all, per capita weekly consumption falls as follows: butter by 17g, cheese by 84g, pigmeat by 119g, vegetable oils by 179g, and fresh dairy products by 345g.

The shocks decrease consumption and prices of the fattier commodities while high import demand from the rest of the world leads to an improvement of EU trade balances throughout. Net trade for all vegetable oils increases by 60%, albeit remaining negative. Imports fall by 23% (palm oil) to 60% (rapeseed oil) and exports rise by 40% (soya bean oil) to a staggering 80% (sunflower oil). A notable effect is the changing net-trade position of sunflower oil, where the EU becomes a net exporter in the scenario with a positive balance of 0.2 million t, presumably driven by increasing import demand from Asia and the Middle East.

Pigmeat consumption drops by 19% (-3.5 million t c.w.e.) in the scenario, which is a record low. However, most of the forgone consumption is compensated by increased exports (+2.9 million t, +78% compared with the baseline). This record-high figure is the result of an unusually low domestic pigmeat price of about EUR 1 300/t (i.e. close to 2007 level). Along with falling international prices due to price transmission, the EU takes over a some global market share from the US, Brazil and Canada (0.8 million t) to supply other -mostly Asian- markets. China, for example, produces less (-1.7%) and imports more (+79%) of their favourite meat from global markets at a lower price. At the same time EU pigmeat production reduces by 3% from the baseline level of 21.7 million t.

The impacts are differentiated in the dairy mix due to product complementarities. Production of butter and cheese drop by 2% and 13%, respectively, as a result of a roughly uniform demand drop (18-19%). While most of the forgone butter consumption (79%) is offset through higher exports and lower imports, exports make up for only 20% of the forgone cheese production. In absolute terms, however, the increase in butter and cheese exports is 9 times greater than the decrease in imports. Milk production drops by 2% due to lower domestic demand for dairy products thus leading to a lower dairy herd (-2.5%). Milk powders are affected indirectly in the market. Domestic consumption, production and exports of skimmed milk powder drop due to higher prices, while Africa and the Middle East appear to be importing whole milk powder from global markets. Due to lower cheese production, domestic prices of co-products such as casein and whey powder increase, and therefore their production drops.

The most prominent EU producer price impacts can be noted for the shocked commodities, ranging from -32% (butter) to -15% (pigmeat). Due to cross-commodity effects the prices of other products fall to a lower extent. For example, milk prices drop by 6% due to lower demand for dairy products, oilseed crop prices by 5% due to lower food demand for oils, and grain prices by 3% due to lower feed demand. As the EU is well integrated into world markets, the resulting change in international reference prices of the shocked commodities ranges from -25% (butter) to -9% (vegetable oils).

Concluding remarks

A potential and gradual shift towards lower fat consumption in the EU could lead to lower domestic prices and improved trade balances for the fattier commodities with a fairly low impact on domestic production (down to -13%; case of cheese) and total calories. The subsequent lower dairy herd and pigmeat production could also stimulate a drop in total agricultural greenhouse gas (GHG) emissions by 4 Mt CO2eq (-1.2% compared with the baseline).

In interpreting these scenario results, three important remarks ought to be made. First, potentially increasing popularity of healthier diets – and the associated demand shifts – may lead to a qualitative adaptation of the supply side that was not modelled herein (e.g. animals may be raised with more muscle and less fat). Second, a potential decomposition of total fats to saturated and unsaturated fats (ongoing work) could alter the magnitude of demand shocks and, hence, the associated market impacts. Finally, if big exporting or importing markets followed a similar dietary shift, EU exports of the shocked commodities would be less strong than presented herein.

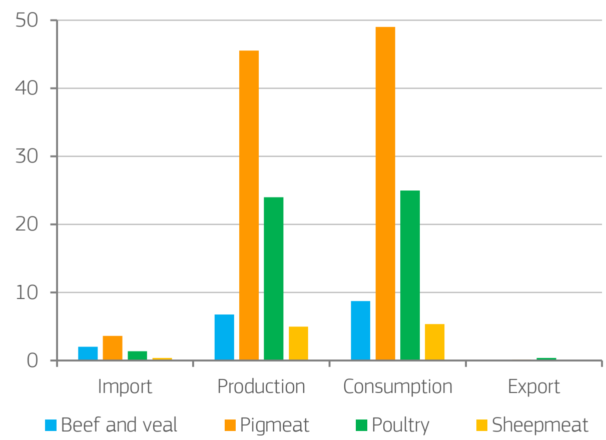
It is important to note that another WHO recommendation pertains to limiting sugar intake to a maximum of 5-10% of total calories. According to our calculations, sugars account for 8.9% and 9.8% of EU calorie supply in the baseline and scenario, respectively. Although the relative contribution of sugars is higher in the scenario by design (i.e. because total calories are lower), sugar accounts for 317 kcal per person per day in either case. Therefore, albeit at the higher end of the spectrum, this particular WHO recommendation seems to be met with the configurations of market balances examined herein.

Disclaimer

This simulation experiment does not necessarily reflect the official opinion of the European Commission (Aglink-Cosimo model user) or the OECD and the FAO (model developers).

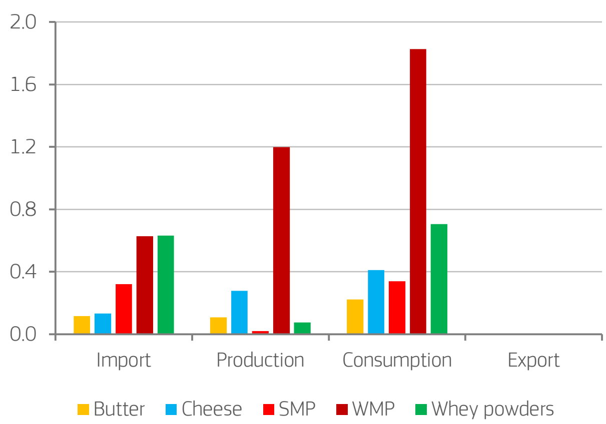
MEAT AND DAIRY SELF-SUFFICIENCY IN CHINA

GRAPH 6.7 Chinese meat market balance in 2021 (million t)



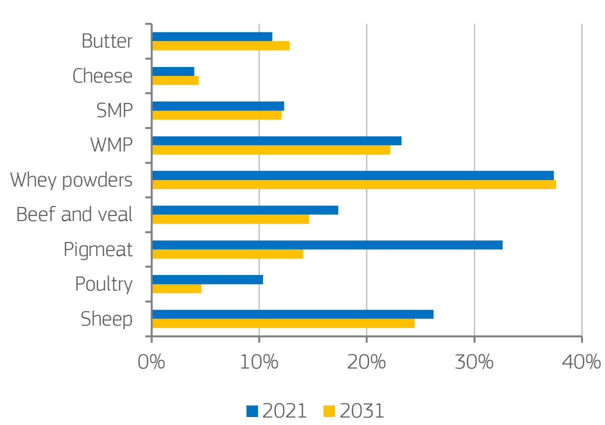
Source: OECD-FAO (2021).

GRAPH 6.8 Chinese dairy market balance in 2021 (million t)



Source: OECD-FAO (2021).

GRAPH 6.9 Chinese world market import shares in 2021 and 2031



Source: OECD-FAO (2021).

The meat and dairy market in China

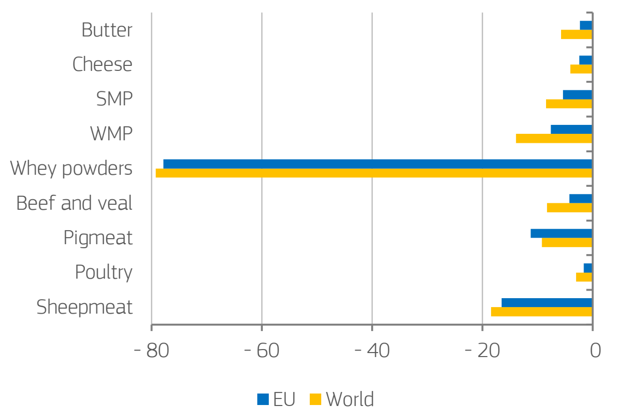
China is the world's largest producer of pigmeat and sheep meat, the second largest producer of poultry and the fourth largest producer of beef. Pigmeat is the most consumed meat in China followed by poultry, beef and sheep meat. The Chinese SSR[8] of pigmeat, poultry and sheep meat is currently around 95% while its beef SSR is somewhat lower at around 75%. Although China sources most of its meat for consumption domestically, it is still the world's largest importer of pigmeat and sheep meat and the second largest importer of beef and poultry (based on 2017-2021 average). The EU is by far the largest exporter of pigmeat to China with exports projected to surpass 2 million t in 2021. However, this only represents around 4% of the total Chinese pigmeat consumption.

China's dairy market is much smaller than its meat market, as Chinese consumers are only gradually discovering new dairy products given their historically high lactose intolerance levels, which also affect the choice of products. Consumption (in processing) and production is dominated by whole milk powder (WMP). Domestically produced WMP is primarily used as a way to store seasonal Chinese milk production surpluses. Whey powder is the second most produced dairy product and it is, unlike the other commodities, also used for feed purposes (pigmeat in particular) in addition to human consumption (for nutritional products). In relative terms, China's dairy import dependency is well above its import dependency for meat. The SSR for cheese and WMP is around 66%. This means that China relies on imports to cover around one third of its domestic consumption. The Chinese butter SSR is around 50% and the whey powder and skimmed milk powder (SMP) SSRs are around 60% and 10%, respectively. Due to the size of its economy and population, China is among the top 5 consumer markets for 3 out of the 5 dairy commodities considered. It is the top consumer of WMP, the second largest consumer of whey powder and the fourth largest consumer of SMP. China is also the second largest producer of WMP. It is the world's largest importer of butter, WMP and whey powder as well as the second largest importer of SMP.

Meat consumption in China is projected to increase by almost 11 million t over the next 10 years. Most of this increase is from pigmeat consumption, which is projected to rise by 9.5 million t

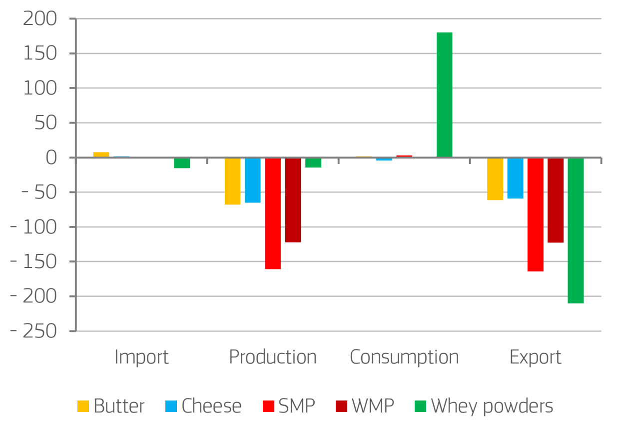
[8] A country's self-sufficiency ratio (SSR) is defined as the ratio of domestic production to domestic availability (production + imports – exports). An SSR below 1 implies that a country is a net importer and an SSR above 1 implies that it is a net exporter. In the text, we convert the shares into percentages, e.g. 0.95 is referred to as 95%.

GRAPH 6.10 World market and EU price impacts(% change vs baseline in2031)



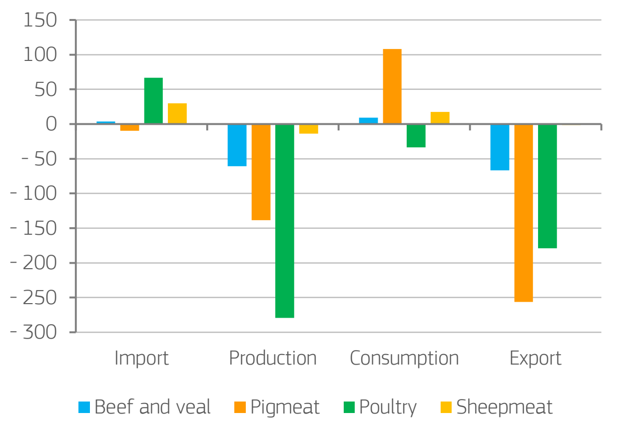
Source: JRC, based on OECD-FAO (2021).

GRAPH 6.11 EU meat market impacts (1 000 t difference vs baseline in 2031)



Source: JRC, ***based on*** *OECD-FAO (2021)*

GRAPH 6.12 EU dairy market impacts(1 000 t difference vs baseline in 2031)



Source: JRC, based on OECD-FAO (2021)

in the baseline. On the other hand, total meat imports are projected to decrease by almost 3 million t in the same period.

Dairy consumption is projected to increase modestly by around 200 000 t in the baseline and most of the expected increase is from imported dairy products. Recently, the Chinese government announced several self-sufficiency goals related to animal production. The announced SSR goals were i) 95% for pigmeat, ii) 85% for beef and sheep, iii) 70% for raw milk and iv) 'basic self-sufficiency' for poultry and eggs. As mentioned above, China's current SSRs for pigmeat, poultry and sheep meat are around 95% and its beef SSR is around 75%. Its dairy SSRs are substantially lower.

Chinese food self-sufficiency in meat and dairy

Under this scenario, it is assumed that China achieves self-sufficiency in meat and dairy for human consumption towards the end of the projection period in 2031. For whey powder, the food consumption share is assumed to reach 40% in 2031[9]. Currently, around half of the whey powder in China is used for feed and with an assumed increase in pigmeat production, some whey imports are sustained. The additional meat and dairy production in China due to loss of imports is assumed to drive up the feed consumption share by 10 pp by 2031. All other dairy (and meat) commodities are assumed to be consumed solely as food.

EU and world market price impacts

The size of the impacts of the world market price under this scenario are proportional to the Chinese world market import shares in the baseline. That is, the commodities with the largest world market price changes in this scenario are those where China has the largest market share in the baseline. Among dairy commodities, these are whey powder (38%), WMP (22%), SMP and butter (12-13%). As regards meat commodities, these are sheep (24%), beef and pigmeat (14-15%). Chinese poultry and cheese imports are projected to amount to around 5% of world exports in 2031.

Large world market import shares for whey powder, WMP, sheep meat, beef, pigmeat, SMP and butter translate into large price decreases on the world market due to the much lower demand for exports. The lower demand for EU exports of meat and dairy leads to lower producer prices, especially for pigmeat. Whey powder is particularly affected due to the large Chinese world market import share, but also because it is a co-product from cheese production whose import demand also decreases.

[9] This percentage refers to food consumption relative to total consumption consisting of food, feed and other (industrial) uses. Similarly for the feed consumption share.

Impacts on the EU market balance for meat and dairy

The loss of import demand for meat and dairy in China would inevitably lead to lower EU exports. EU pigmeat exports in particular would fall by 256 000 t (slightly more than 25% of the 2031 EU export to China in the baseline). As a result, EU production of pigmeat would fall by 138 000 t and consumption would increase by 108 000 t because of the lower prices. Additional EU pigmeat exports to other countries than China account for the remaining difference between EU pigmeat exports to China in the baseline and the scenario.

EU dairy exports and production would also decrease because of the lower import demand in China. Other dairy exporters such as New Zealand would also be strongly affected and, in general, the additional export supply leads to more competition, lower prices and production as well as higher consumption. As mentioned, whey is a by-product of cheese production and the EU is the world's leading exporter of both products. The loss of whey exports to China, which would cause the price to fall dramatically, would lead to a large increase in consumption of whey powder in the EU food industry.

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AGRICULTURAL INCOME AND LABOUR

/7

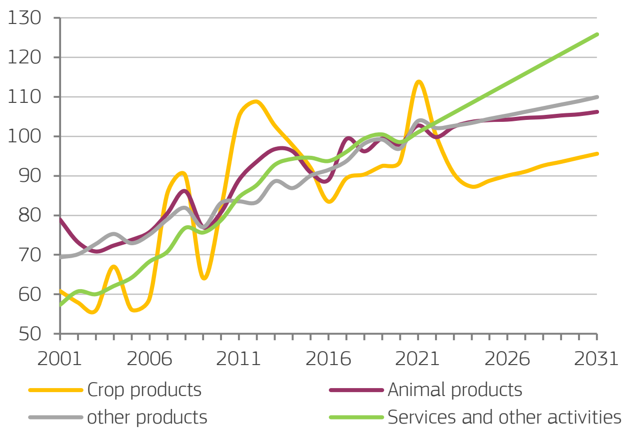
This chapter analyses how changes in agricultural markets over the next decade will affect farmers' income. The analysis is based on assumptions – including as regards agricultural sectors not explicitly covered by this outlook exercise – and the Economic Accounts for Agriculture. The current situation regarding public support applies throughout the outlook period.

At EU level, the analysis shows a slight increase in farm income per annual work unit at constant prices by 2031, despite higher energy prices that will weigh on fertiliser and feed expenditures.

The continued labour outflow from agriculture due to structural changes at EU level is projected to slow. The share of younger farm managers is expected to increase, as are opportunities for developing new skills to produce more while mitigating environmental impacts.

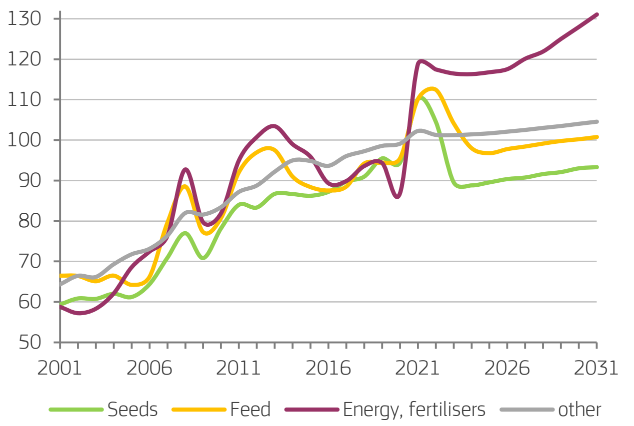
FARM INCOME

GRAPH 7.1 Value of EU agricultural outputs (average 2019-2021=100)

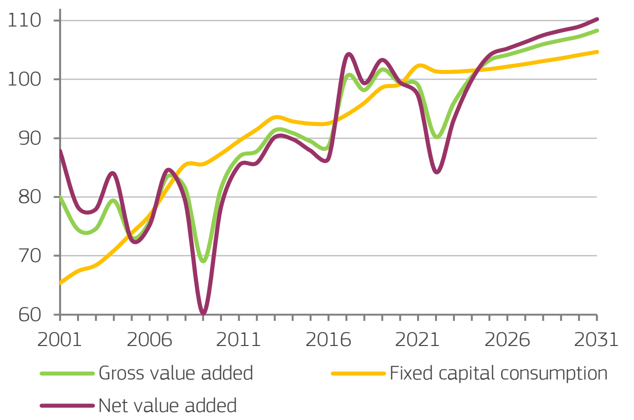


Note: Crop products include cereals, oilseeds, pulses and sugar beet. Animal products include milk, beef and veal, pigmeat, poultry, sheep and goat meat, and eggs. Other products include fruits, vegetables, wine, and olive oil.

GRAPH 7.2 Intermediate costs per category (average 2019-2021=100)



GRAPH 7.3 Composition of farm income (average 2019-2021=100)



Agricultural output to expand further

Assuming cereal prices returning to pre-2021 levels as of 2022, the value of crop products (15% of agricultural output in 2021) in turn should drop in 2022 and 2023 after a spike in 2021. After that, it is expected to recover gradually until 2031 (1.3% per year). Overall in 2021-2031, the value of crop products could decrease by 0.4% per year, despite rising quantities and prices of oilseeds. This is a reversal of the past trend: in 2011-2021, the value of crop products grew by 1.8% per year. The value of animal products (36% of agricultural output in 2021) increased by 2% per year in 2011-2021. This increase is due to slow down to 0.6% per year during the projection period. This modest increase is mainly attributable to increasing quantities and prices of milk, eggs and poultry. Overall, the total value of EU agriculture production is expected to increase by 0.7% per year in 2021-2031, down from 2% in 2011-2021.

Energy and fertiliser costs to increase sharply

Energy and fertiliser costs have accounted for 18% of intermediate costs since 2017. Those costs are strongly linked to crude oil and natural gas prices, which have increased sharply in 2021. Therefore, in spite of further efficiency gains expected in the use of fertilisers, those energy and fertiliser costs are due to increase the most: by 2.7% per year during the projection period (up from 1.6% in 2011-2021). By 2031, they are expected to represent of 22% of all costs. Due to smaller cultivated areas and smaller livestock herds, the increase in other costs (seeds, feed, plant protection products, veterinary expenses, etc.) should remain contained. Overall, the increase in intermediate costs is expected to slow down, from 1.8% per year in 2011-2021 to 0.7% per year in 2021-2031.

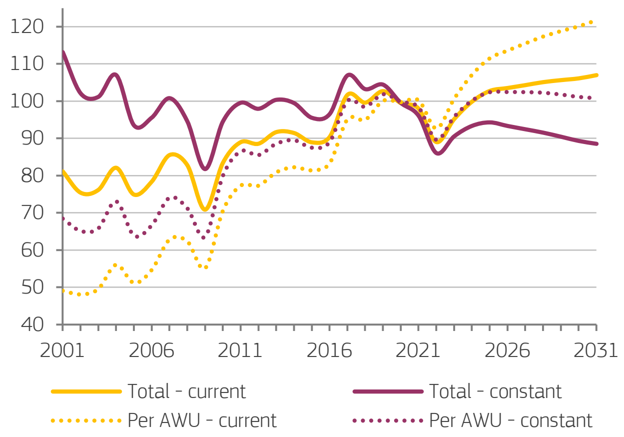
Increase in net value added to slow down

Value of production minus intermediate costs equals gross value added. The latter is due to increase by 0.8% per year during the projection period. Digitalisation, specialisation and sophistication of assets (like buildings and equipments) could increase during the projection period. If so, capital may wear off or become obsolete quicker and fixed capital consumption[10] could continue increasing. In the last two decades, this increase slowed down. In line with this trend, a limited increase of 0.5% per year is assumed in 2021-2031. This means the magnitude of fixed capital consumption relative to the gross value added would decrease slightly, from 35% in 2021 to 34% in 2031. Gross value added minus fixed capital consumption equals net value added. The latter is expected to increase by 1% per year during the projection period, compared to 3% in 2011-2021.

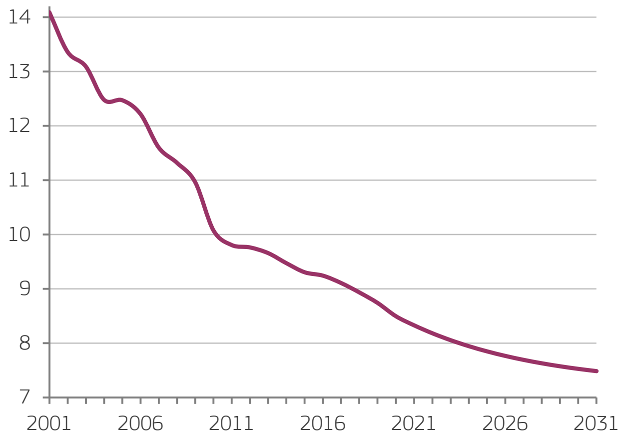
[10] The fixed capital consumption accounts for the loss of economic value of capital, because of it wearing off or becoming obsolete.

AGRICULTURAL LABOUR

GRAPH 7.4 Farm income at current and constant 2010 prices (average 2019-2021=100)



GRAPH 7.5 Farm income at current and constant 2010 prices (average 2019-2021=100)



Note: AWU stands for Annual Work Unit.

Farm income at constant prices per worker to remain stable

Net value added plus subsidies minus taxes equals farm income. The latter is expected to increase by 0.7% per year between 2021 and 2031, slowing down from 2.1% in 2011-2021. This growth should be mainly due to an increase in production value.

In contrast to results presented so far (at current prices), results at constant 2010 prices are corrected for inflation. Between 2021 and 2031, relative high inflation of (+1.9% per year) is expected. Total farm income at constant 2010 prices is projected to decrease by 1.2% per year during the projection period.

At sector level, the outflow of the labour force should offset this decline. Farm income at constant prices per worker is expected to remain almost stable. On average, it should increase by 0.1% per year between 2021 and 2031 (compared to 2.7% in 2011-2021).

Agricultural labour to continue shrinking

Agricultural labour – measured in annual work units (AWU) – is projected to decrease by -1.3% per year in 2021-2031, slowing down compared to the 1.9% decrease in 2011-2021. Eastern EU countries (particularly Poland and Romania) are expected to have the strongest outlflow of agricultural workforce, both in relative and in absolute terms. This is due to an ongoing concentration of farms (i.e. the emergence of fewer yet bigger farms) and more mechanisation.

In general, new skill sets will be required to produce more with fewer workers, and a smaller environmental impact and tools that are more sophisticated.

Number of farms managed by younger farmers marginally increased

The number of farms managed by farmers aged 44 or under increased by 3 200 per year between 2005 and 2016. This trend is expected to continue during the projection period, which represents an opportunity to adapt farmers' training to new challenges. At the same time, the number of farms managed by farmers aged over 45 decreased by 245 000 per year.

The share of farms managed by women increased slightly between 2005 and 2016, from 25% to 29%. However, they decrease in number by 1.6% or 52 000 per year. The number of farms managed by men decreased more rapidly, by 2.2% or 190 000 per year.

ENVIRONMENTAL ASPECTS

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/8

This chapter presents an environmental analysis of a set of environmental and climate indicators based on the medium-term developments of EU agricultural markets. The modelling projections use the CAPRI medium-term baseline, taking into account the trends of the 2019 EU Agricultural Medium Term Outlook, and therefore does not reflect the new CAP reform.

The focus is on the nitrogen (N) and phosphorus (P) balances. Firstly, the current policy framework and the CAP indicators on nutrients are highlighted. The modelling projections for 2030 are then presented, for N and P balances and their components. Finally, the potential impacts of the surplus on the atmosphere, hydrosphere, soil accumulation and soil losses are described.

Under the assumptions described above, the average EU N balance is not expected to undergo significant changes, whereas the P surplus is expected to increase both in total and per hectare while regional differences can be observed for both.

The analysis shows that high nutrient surpluses are often related to high livestock densities. If livestock cannot be fed with local feed, feed imports may lead to an oversupply of nutrients from manure and, consequently, high nutrient surpluses. In those cases, a reduction of nutrient requires either a reduction in livestock or the processing and/or export of manure. By contrast, mineral fertilisation is less often the reason for excessive nutrient surpluses, but optimised fertilisation is important to contribute to the general reduction of nutrients emitted to the environment, and to avoid nutrient scarcities in the future.

INTRODUCTION

Policy context[11]

Nutrients are essential for plant growth:. However, adding more nutrients than plants can use increases the risk of nutrients leaching into the surrounding environment causing environmental problems. Several legal acts address this issue: the Nitrates Directive, the Water Framework Directive, the Urban Waste Water Treatment Directive, the Marine Strategy Framework Directive, and the EU Fertilisers Regulation. Furthermore, other legal acts are indirectly related to nutrient balances, such as the National Emission Reduction Commitments Directive, the Habitats Directive; and the Birds Directive.

The common agricultural policy (CAP) includes measures to promote a more sustainable nutrient management. It aims to help achieve the EU's future environmental policy objectives to reduce nutrient loss, and also pays attention to monitoring the impact of nutrients on the water status through the use of indicators, specifically for the nutrient surplus from agriculture and the nitrate content in water. However, as new CAP reform and the targets of European Green Deal are excluded from this analysis, the presented results should be understand as no-action scenario.

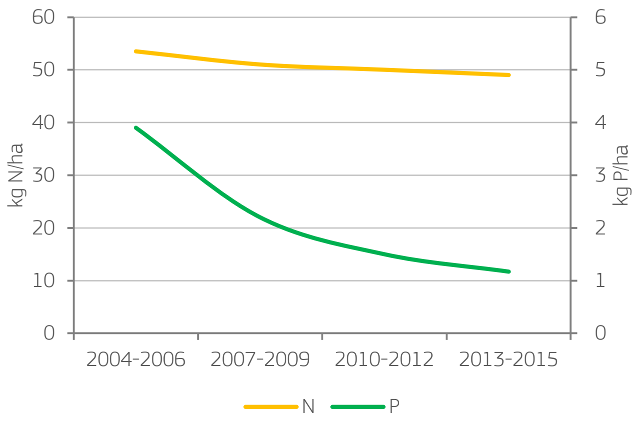
Nutrient surplus indicators

Eurostat receives the input for the nutrient surplus indicator the EU countries. They use different methods to calculate their nutrient balances, as the indicator is not designed for comparisons between countries but for monitoring trends. The average value for the nitrogen (N) surplus is around 50– kg/ha while for phosphorus (P) it is between 1 and 4 kg/ha and year. Even though values for P seem much lower, the threshold for environmental pollution is also much lower (see the next section).

Although the average nitrogen surplus for the EU decreased only slightly by 9% between 2005 and 2014, the phosphorus balance dropped significantly by almost 70% in the same period. In specific EU countries, however, there have been very large reductions over the last 20 years, for example in: the Netherlands (from 30 to 4 kg P/ha); Belgium (from 28 to 5 kg P/ha); Malta (from 40 to 30 kg P/ha); and Denmark (from 15 to 7 kg P/ha).

The gross nutrient surplus indicator provides only total values by country, which makes it difficult to detect pollution problems in specific areas. Therefore, there is an additional indicator on nitrates in freshwater.

GRAPH 8.1 Gross nitrogen and phosphorus balance on agricultural land, EU (kg N or P per ha UAA)



Source: JRC, based on Eurostat.

Nitrates in freshwater indicator

The indicator on nitrates in freshwater (i.e. surface water and groundwater) is useful to detect hotspots. There is a wide network of monitoring stations that measure nutrient concentration in the water.

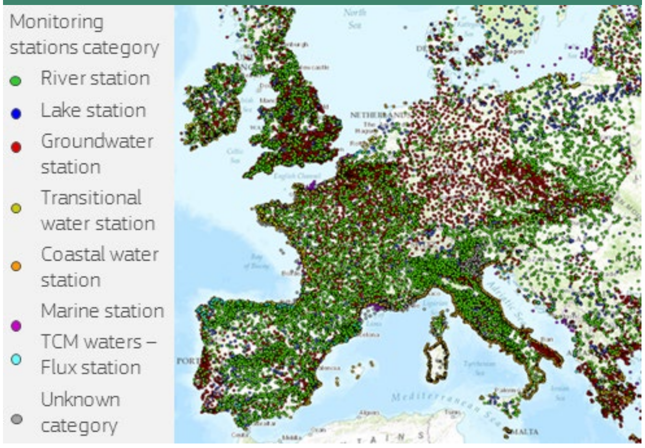
The water quality indicator distinguishes high, moderate and poor quality. Moderate quality indicates a nitrate concentration above the natural standard but below the hazardous level. Poor quality indicates a concentration above the hazardous level.

For **groundwater,** the threshold for poor quality is 50– mg NO_3/l (i.e. 11.3 mg N/l) under the Nitrates Directive. The natural concentration of NO_3 in groundwater is below 10– mg/l;. For water bodies that show concentrations above 25 mg/l (5.6 mg N/l), the Nitrate Directive requires more frequent monitoring (every four years instead of eight). In line with this–25 mg is also the threshold to differentiate high quality water from moderate quality water (low levels of pollution).

For **surface water**, the natural concentration of nitrates in freshwater is about 1 mg NO_3/l. It is assumed that concentrations over 10 mg NO_3/l (2 mg N/l) cause eutrophication and other negative effects on aquatic ecosystems. Therefore, this is the limit to differentiate high quality from moderate–quality water bodies. The threshold for highly polluted water bodies or poor quality is set at 5.6– mg N/l (EC, 2020).

[11] Compared to other chapters of the report, this analysis is performed on a previous version of the medium-term outlook (2019) and therefore does not necessarily take into account the same considerations on market developments as in chapters dedicated to specific sectors.

MAP 8.1 Overview of WISE SoE monitoring stations



Source: WISE Water Framework Directive Quality Elements maps, contain information from the 2nd River Basin Management Plans (RBMPs) reported by EU countries and Norway (EEA, 2020).

The Water Framework Directive classifies nitrogen and phosphorus concentrations into five levels: high, good, moderate, poor and bad. In surface water, the distinction between good and moderate depends on the eutrophication status. However, each water body has a different threshold, as nutrient concentrations for eutrophication depend on many factors. These include size and depth of the water body, temperature, water exchange rate, siliceous/calcareous waters, etc. The quartiles of the thresholds in some EU countries show that the range of N and P thresholds is very wide. The order of magnitude for P levels also appears to be very different from that for N levels.

TABLE 8.1 Boundaries[12] of EU countries differentiating bad and moderate status (eutrophication) from good and high status (mg/L)[13]

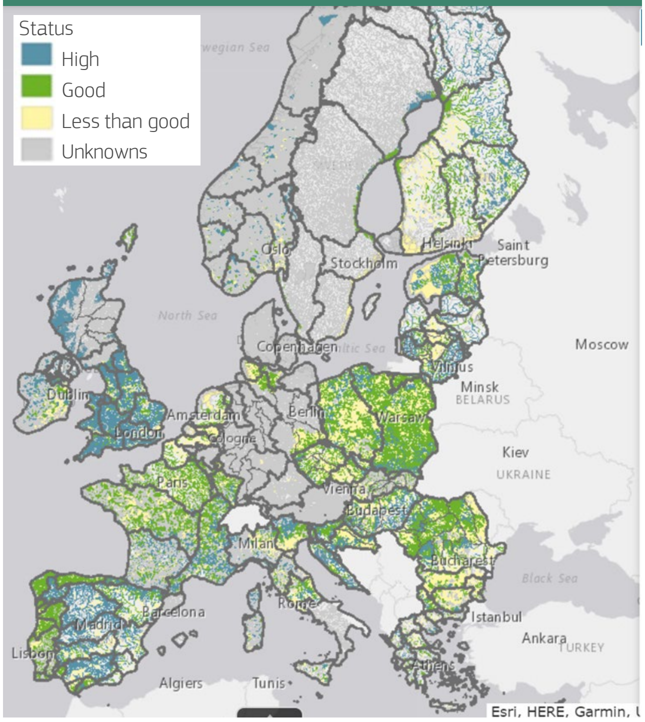
	Total Phosphorus	*Total Nitrogen*
Lakes	*0.009 – 0.062*	*0.25 - 2*
Rivers	*0.008 – 0.200*	*0.25 – 2.5*

Source: JRC, based on Phillips et al. (2018).

Nitrates in coastal areas

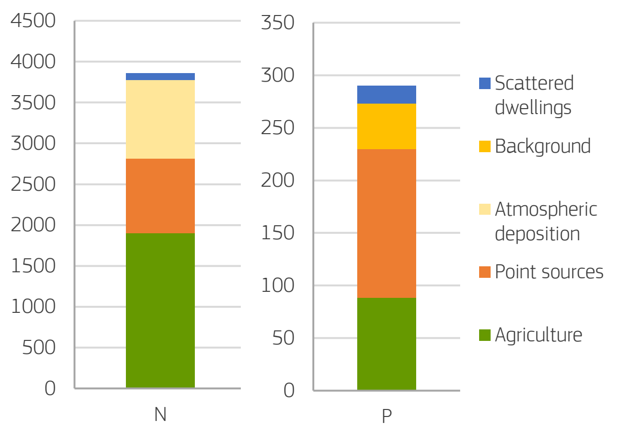
The estimated amount of nutrients that reach coastal areas from various sources is based on a simulation with the GREEN model (Grizzetti et al., 2021). For nitrogen, the main source is agriculture (almost 50%), followed by atmospheric deposition (25%) and urban and industrial waste water discharges (point sources) (24%). For phosphorus, urban and industrial sources represent the highest share (50%), while agriculture represents 30%.

MAP 8.2 Quality element status of surface water: nitrogen conditions



Source: WISE Water Framework Directive Quality Elements maps, contain information from the 2nd River Basin Management Plans (RBMPs) reported by EU countries and Norway (EEA., 2020).

GRAPH 8.2 Amount of nutrients that reach coastal areas from different sources (reference scenario 2012, 1000 t per year)



Source: : Grizzetti et al.(2021).

[12] Boundaries excluding those set using expert opinion and the distribution of nutrients in all water bodies approach.

[13] Values provided here correspond: the minimum, to the minimum value among those recorded for the 25th quartiles for the different lake broad types and river broad types. The maximum, to the maximum value of the 75th quartiles of the different lake broad types and river broad types.

BASELINE PROJECTION OF NUTRIENTS BALANCE

Estimating the nitrogen and phosphorus surplus

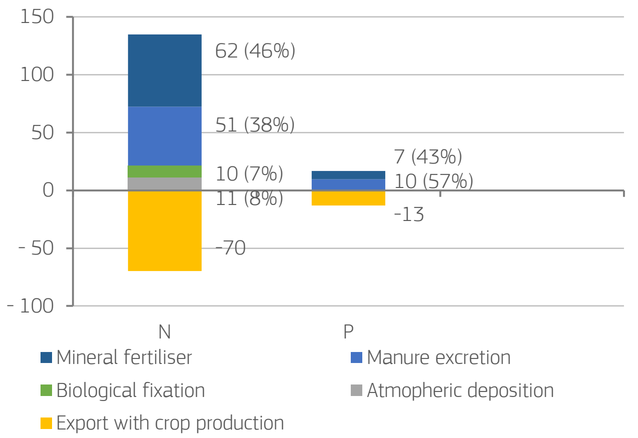
Nutrient surplus projections for 2030 are calculated with the CAPRI model[14]. The nutrient surplus is the difference between nutrient inputs and outputs. The nutrient surplus indicated in CAPRI is an indication of the "pressure" from agricultural production, not the actual excess of nutrients that goes into the soil/water. In fact, the simulation has some limitations . For example, in some regions, the simulation does not explicitly include constraints to nutrient application (e.g. Nitrate Directive implementation, manure processing or export to other regions)[15]. This can lead to an overestimation of the surplus.

The nutrient surplus projections for 2030 show mineral fertiliser and manure inputs of a similar order of magnitude. Instead, atmospheric deposition and biological fixation inputs are much lower for nitrogen. For phosphorus, biological fixation does not occur and atmospheric deposition is negligible. Nutrient outputs correspond to the exports with harvested crops.

The projected average nitrogen surplus in the EU is 65 kg/ha and the phosphorus surplus is 3.6 kg/ha, a bit higher than the CAPRI refence values from 2012[16]: 63 kg/ha for N and 2.7 kg/ha for P values (these values are higher than those estimated by Eurostat). This increase is mainly due to higher fertilisation rates (driven mostly from higher cereals yields than in 2012, which compensate the assumed efficieny gains in the use of mineral fertiliser), and a slightly higher manure excretion per UAA hectare (from poultry increase and decrease of UAA).

It can be noted that the relative shares for manure excretion and mineral fertilisers in total fertilisation are not proportional, as manure has a higher share of phosphorus (57%) than nitrogen (38%). This is because the P/N ratio in manure is higher than the average crop requirements. Therefore, a very high share of fertilisation from manure, calculated based on nitrogen needs, might result in an oversupply of phosphorus. However, this is not the case for all crops. For example, leguminous cropes often require both P and K fertilisation, whereas nitrogen fertilisation is often not necessary.

GRAPH 8.3 Amount of nutrients that reach coastal areas from different sources (reference scenario 2012, 1000 t per year)



Source: JRC, based on 2021 CAPRI MTO baseline [2030; MTO 2019], EC (2020)

Regional distribution of nitrogen and phosphorus surplus

Although the EU average projected surplus of nitrogen for 2030 is 65 kg/ha, regional values can be two or three times higher. Areas with intensive livestock production are most likely to have the highest surplus in 2030. These are in particular the Benelux countries and Lombardy (Italy), followed by Brittany (France) and Catalonia (Spain). In southern Ireland, there is also an expected negative impact from mineral fertilisation.

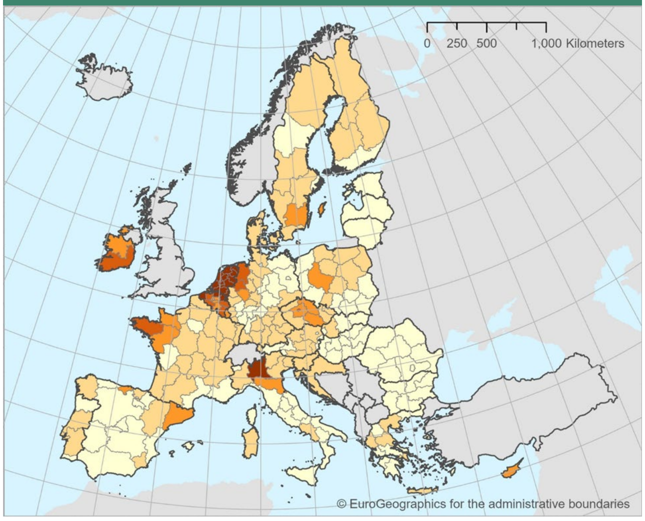
Surplus problems stemming from high animal density are due to a combination of factors. High imports of feed, particularly in intensive grain/maize/soybean-based systems, result in nutrient inputs that exceed local crops needs. This is particularly due to the high costs of transporting manure. Because of these high costs, manure is treated as waste dumped on the available area rather than as a nutrient resource. Additionally, some characteristics and limitations of manure compared to mineral fertilisers play part in excessive nutrient application, in particular the timing of application of manure, which is often not ideal due to storage limitations; the N/P ratio, which cannot be adjusted to crop needs; and the chemical composition of manure.

[14] This exercise is based on the 2021 CAPRI model medium-term baseline projection until 2030, calibrated to the 2019 EU agricultural medium-term outlook.. The CAPRI model provides harmonised projections on the production of the main agricultural commodities, land use and herd sizes, at EU countries and regional levels. The CAPRI baseline projections on the regional agricultural output (including livestock herd size) can be directly linked to the development of several environmental aspects.

[15] For a wider information on the caveats please refer to the section at the end of the chapter.

[16] In this execise we compare with 2012 and not with 2021, which is the comparison year in other sections of this report. CAPRI is a comparative static model, which means that the model has results only for a reference base year and the projection year. As the 2030 projection was calculated from the base year 2012, this is the only year that can be shown for comparison.

MAP 8.3 Regional distribution of projected nitrogen surplus in 2030 (kg N per ha)



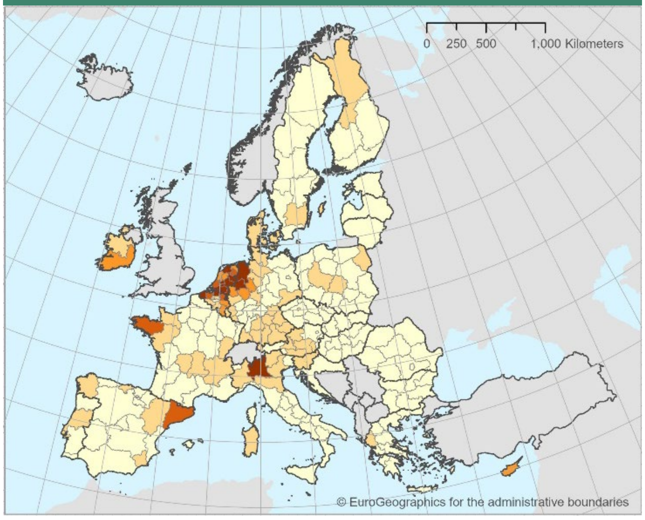
Source: JRC, based on 2021 CAPRI MTO baseline [2030; MTO 2019], EC (2020).

While mineral fertilisers are designed to be rapidly available to crops, manure contains nutrients in organic and inorganic forms. Manure inorganic nitrogen is prone to losses due to volatilisation when applied on the surface. The availability of organic nutrients in manure depends on microbial activity, which requires a certain temperature and humidity. Therefore, it is challenging to adjust the application rates of manure to factor in reduced nutrient availability.

Based on the results, there is a minor change in the EU average nitrogen surplus in 2030 compared to the reference year 2012 (+1 kg N/ha, i.e. +2%). While in some regions there has been a decrease in the nitrogen surplus (e.g. in Malta and Germany), other regions show increases that are more or less significant;. These are worrying mainly in regions where values are already high. The increase in the Netherlands is due to an increase in animal excretion (+17 kg N/ha);. This is related to an increase in manure from cattle (+26 kg N/ha), which is partially compensated by a decrease in manure from pigs (-11 kg N/ha). In most other regions, however, the increase is due to higher mineral fertilisation.

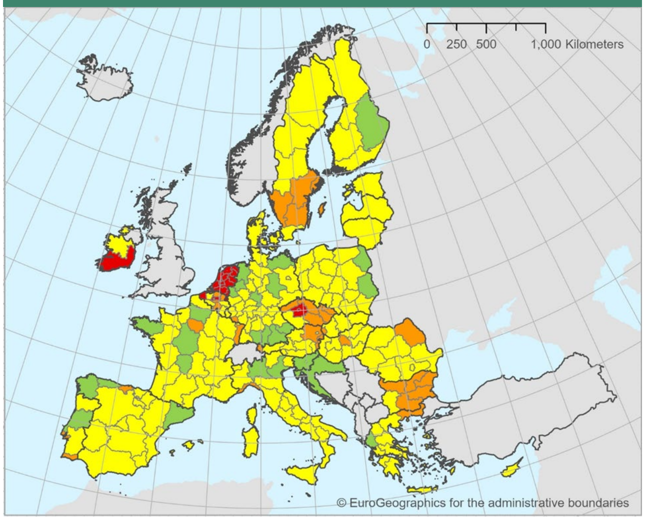
For the phosphorus surplus, an average value of less than 4 kg P/ha is projected. Regional values vary between a negative surplus (i.e. deficit) in some Bulgarian regions (up to 4 kg P/ha) to more than 30 kg P/ha in the Netherlands. The low values in Bulgaria are due to a relatively low manure excretion (<25% of phosphorus crop requirements) which mineral fertilisation cannot sufficiently compensate. Also for phosphorus, the projection shows an increase in certain problematic areas, mainly in the Netherlands.

MAP 8.4 Regional distribution of projected nitrogen manure excretion in 2030 (kg N per ha)



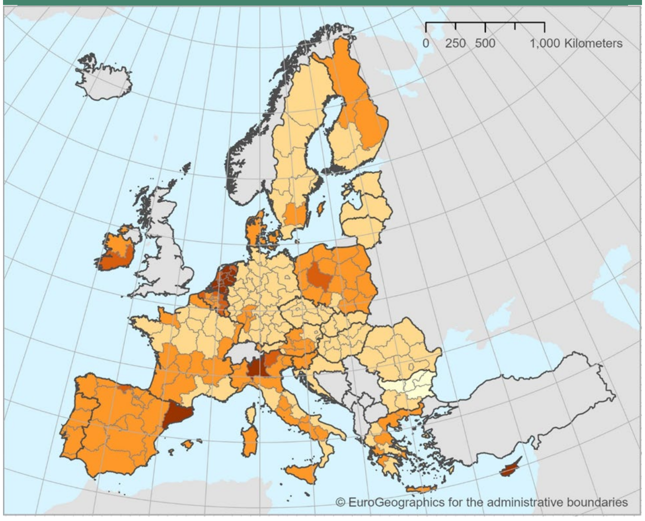
Source: JRC, based on 2021 CAPRI MTO baseline [2030; MTO 2019], EC (2020).

MAP 8.5 Change in projected nitrogen surplus from 2012 to 2030 (kg N per ha)



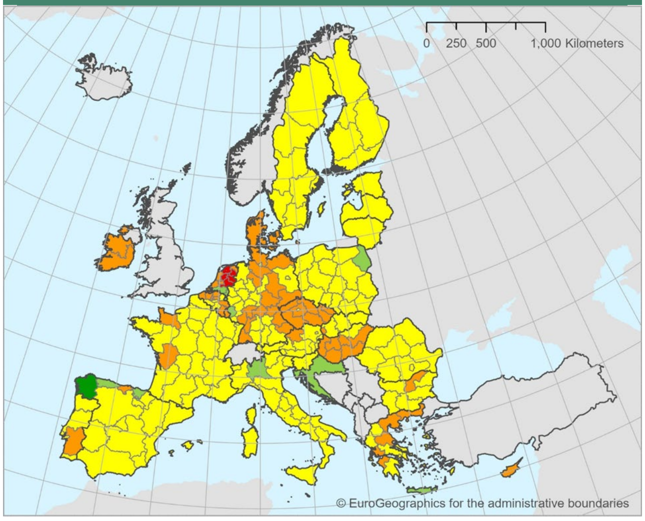
Source: JRC, based on 2021 CAPRI MTO baseline [2030; MTO 2019], EC (2020).

MAP 8.6 Regional distribution of projected phosphorus surplus in 2030 (kg P per ha)



Source: JRC, based on 2021 CAPRI MTO baseline [2030; MTO 2019], EC (2020).

MAP 8.7 Change in projected phosphorus surplus from 2012 to 2030 (kg P per ha)



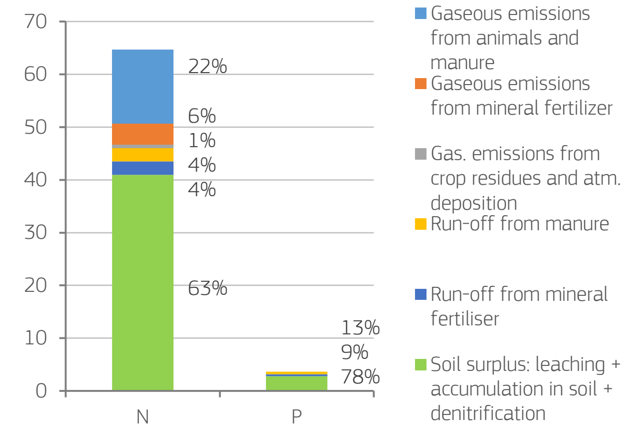
Source: JRC based on 2021 CAPRI MTO baseline [2030; MTO 2019], EC (2020).

ENVIRONMENTAL IMPACTS OF NUTRIENT SURPLUS

Nutrient emissions to the atmosphere and water

Nutrient surpluses have various impacts on the environment. Projections for 2030 show that at EU level, approximately 30% of the nitrogen surplus released into the atmosphere. Gaseous emissions are mainly greenhouse gases and ammonia. These cause problems such as climate change, air pollution and, acidification. Approximately 40% of the nitrogen surplus is leached into water. This causes health hazards (particularly to babies and young animals), harm to living resources and to aquatic ecosystems, andor interferes with other uses of water, (including freshwater and marine coastal areas). Most nitrogen is soluble or available to plants in the short term (<1 year), so leaching is rather substantial (32%). From the remaining part, a fraction is released over time to the air through the denitrification process, mostly as nitrogen gas (which is not polluting) and the greenhouse gas N_2O, very small fraction is leached into water because of erosion.

GRAPH 8.4 Emissions and losses from nutrient surplus in 2030 (kg N or kg P per ha per year)



Source: JRC, based on 2021 CAPRI MT) baseline [2030; MTO 2019], EC (2020).

Conversely, phosphorus is never lost to the air, only to the water, because of runoff:. This causes mainly eutrophication problems in surface waters. A large share of the phosphorus that enters the soil gets fixed or absorbed in the soil. It is estimated that only around 20% of the soil phosphorus is inorganic phosphorus dissolved in a water/soil solution that is readily available for plant uptake (Prasad and Chakraborty, 2019). Therefore, leaching is often very low. However, there are other factors that decrease the absorption capacity of the soil, and, therefore, increase the leached amount.

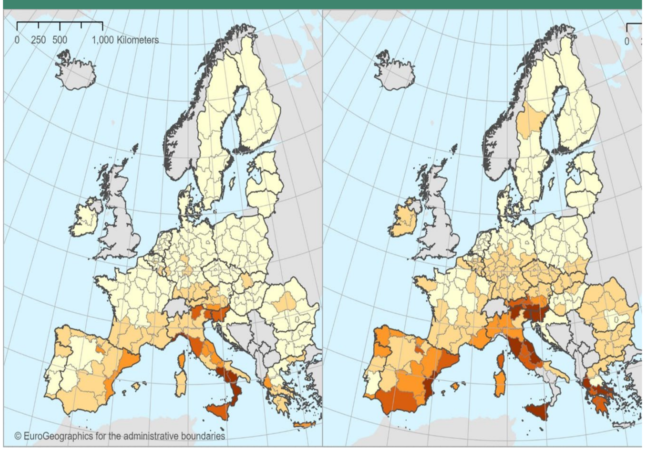
These factors include: phosphorus saturation, a high water table level, artificial drainage, a sandy texture, highly organic soils (peat), shallow soils, low pH (Al, Fe) and high pH (Ca).

Bomans et al. (2005) found that soils with low P-binding capacity are located mainly in the northern EU countries (Finland, the Netherlands, Germany, Poland, the Baltic states). In southern countries like Spain, Portugal, Italy, Slovenia and Greece, erosion is the main risk factor for P losses.

Phosphorus surplus and erosion between surplus and scarcity

Given the relevance of erosion in adding phosphorus to the soil content, we have estimated potential phosphorus losses due to erosion. In this context, it is important to factor in that P soil pools or fractions have various levels of availability to plants, depending on their chemical characteristics. Alewell et al. (2020) estimate that around 48% of soil phosphorus has various chemical forms that enable it to be available for uptake immediately or within a few months;. This is called: the plant-absorbable fraction. The rest, approximately 52%, has other forms (e.g. occluded inorganic phosphorus, or it is associated to minerals such as apatite). These become available only in the medium to very long term. Therefore, it can be useful to differentiate between the plant-absorbable fraction lost with erosion and total phosphorus erosion, including non-plant-absorbable phosphorus.

MAP 8.8 Estimation of potential P losses with erosion in 2030: plant-available phosphorus (left) and total phosphorus (right) (kg P per ha per year)



Source: JRC, based on 2021 CAPRI MTO baseline [2030; MTO 2019], EC (2020) and P content by region calculated from Alewell et al. (2020).

The EU average for erosion of plant-absorbable phosphorus is around 1.1 kg P/ha. However, in regions more prone to erosion (mostly Mediterranean regions), losses can be several times higher. The EU average for total eroded phosphorus is

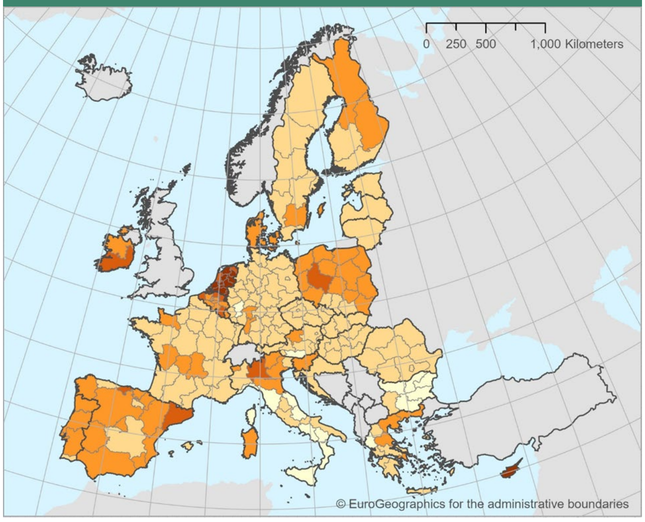
2.1 kg/ha/year. The non–plant absorbable fraction does not pollute water in the short term, but will be released and pollute over the medium to long term. However, its loss will always result in an impoverishment of the soil.

To see the impact of erosion on the phosphorus surplus, we have substracted from the surplus (estimate for 2030, see above) the estimated potential plant-absorbable P erosion. Among the regions turning out to be at risk of P depletion, we can distinguish:

- regions where this is due to high erosion (regions in southern Italy, Carinthia in Austria, Corsica in France);
- regions with low P surplus (mainly five regions in Bulgaria, also Koblenz in Germany); and
- regions with a combination of low P surplus and moderate P erosion (other central and southern Italian regions, north-western Greece).

Alewell et al. (2020) estimated that Africa,–South America and eastern EU countries have the highest depletion rates. Their chemical fertilisers application rates are low (due to the high costs of chemical fertilisers) and/or they often lack effective organic P management.

MAP 8.9 Regional distribution of projected phosphorus surplus minus estimated erosion of plant-absorbable P in 2030 (kg P per ha)



Source: JRC based on 2021 CAPRI MT) baseline [2030; MTO 2019], EC (2020) and P content by region calculated from Alewell et al. (2020).

Mineral nitrogen fertilisers are obtained from a chemical procedure that uses nitrogen from the air and natural gas (methane);. Phosphorus mineral fertilisers, however, are produced from phosphate rock, a non-renewable natural resource that is not substitutable. The EU has less than 1% of the production capacity and less than 1% of the world's reserves of phosphate rock (mainly in Finland). The EU, therefore, depends strongly on imports of phosphorus, which come mainly from three countries: the USA, Morocco and China. Therefore, phosphorus and phosphate rock have the status of a critical raw material for the EU;. Furthermore, the European Commission has made a legislative proposal under the circular economy action plan to create a single market for fertilisers made from secondary raw materials (e.g. domestic organic waste).

Caveats

Please note that the analysis looks only at the pressure of nitrogen and phosphorus pollution produced by farms, not at the final impacts of this pollution on the air and water.

Furthermore, some legislative constraints, like fertilisation limits or ammonia reduction targets, are not explicitly included. For example, fertilisers application may exceed legal thresholds allowed by the Nitrates Directive in some regions. In the real world, manure trade, processing of nutrients from animal waste, etc. can avoid this overuse.

The different methods used to calculate manure excretions for phosphorus and nitrogen. While nitrogen in manure is estimated as the difference between nitrogen inputs from feed and outputs from animal products, phosphorous in manure is estimated in proportion to animal production. Therefore, efficiency gains in animal feeding are not included. This results in an overestimation of the phosphorous projected increase. is another aspect of the model that is currently undergoing improvement. The CAPRI model also looks at the distribution of nutrients from manure to crops for phosphorus and nitrogen independently;. This does not happen in the real world, unless there is manure processing.

Lastly, it is important to recall that the baseline is a "business-as usual" projection, that does not factor in future policies and environmental targets.

Concluding remarks

Reducing nutrient pollution is key for the EU;. Reduction strategies, however, need to factor in the multiple characteristics of nutrients. The analysis shows that, while some regions are prone to high nutrient surpluses, others may be at risk of having nutrient deficits. Farm advisory services may help farmers optimizse their fertilisation strategy. Reducing soil erosion would appears important in specific regions to avoid phosphorus losses. The analysis also identified the need to address the overuse of manure in livestock-intensive regions.

ANNEX /9

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, basic averages are used for 2021 (2019-2021) in the majority of balances. In the case of some specialised crops, olympic averages are used instead for the period 2016-2020 to take into account stronger inter-annual variations in production.

MARKET OUTLOOK DATA

TABLE 9.1 Baseline assumptions on key macroeconomic variables

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Population growth (EU-27)	0.1%	0.1%	0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Real GDP growth (EU-27)	0.3%	2.3%	2.0%	1.6%	1.5%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
Inflation (Consumer Price Index)	1.5%	1.3%	1.6%	1.9%	1.9%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Exchange rate (USD/EUR)	1.1	1.17	1.17	1.17	1.18	1.18	1.19	1.19	1.20	1.20	1.20
Oil price (USD per barrel Brent)	58	66	66	66	67	67	70	72	74	77	80

Sources: DG AGRI estimates based on the European Commission macroeconomic forecasts and IHS Markit

TABLE 9.2 EU agricultural income (2019-2021=100)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Factor income in nominal terms	100.0	89.0	95.1	99.8	102.7	103.5	104.3	105.1	105.6	106.1	106.9
Factor income in real terms	100.0	86.0	90.5	93.3	94.3	93.3	92.4	91.5	90.4	89.3	88.5
Labour input	100.0	96.0	94.5	93.2	92.1	91.1	90.3	89.5	88.9	88.3	87.8
Factor income in real terms per labour unit	100.0	89.6	95.8	100.1	102.4	102.4	102.4	102.3	101.8	101.1	100.8

TABLE 9.3 EU area under arable crops (million ha)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Cereals	**52.6**	**51.8**	**51.8**	**51.7**	**51.6**	**51.5**	**51.5**	**51.4**	**51.3**	**51.2**	**51.2**	**-0.3**	**-0.3**
Common wheat	21.5	21.6	21.4	21.3	21.3	21.3	21.2	21.2	21.1	21.1	21.1	0.1	-0.2
Durum wheat	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	-2.6	-0.5
Barley	10.9	10.5	10.8	10.7	10.6	10.5	10.4	10.3	10.3	10.2	10.1	-0.7	-0.8
Maize	9.0	8.9	8.7	8.7	8.8	8.8	8.8	8.8	8.8	8.8	8.9	0.3	-0.1
Rye	2.1	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	-1.8	0.1
Other cereals	6.9	6.7	6.7	6.7	6.8	6.8	6.9	6.9	6.9	7.0	7.0	-0.3	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**	**-1.2**	**-0.6**
Oilseeds	**10.6**	**10.9**	**11.1**	**11.2**	**11.2**	**11.3**	**11.2**	**11.2**	**11.0**	**10.9**	**10.7**	**0.0**	**0.1**
Rapeseed	5.2	5.4	5.5	5.5	5.6	5.6	5.5	5.5	5.4	5.3	5.1	-1.6	-0.2
Sunseed	4.4	4.6	4.6	4.7	4.7	4.7	4.7	4.7	4.6	4.6	4.5	1.0	0.1
Soyabeans	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8.6	1.2
Sugar beet	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.0	-0.4
Roots and tubers	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	-1.1	-0.5
Pulses	2.0	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	4.0	1.8
other arable crops	4.6	4.7	4.5	4.3	4.2	4.2	4.3	4.3	4.4	4.6	4.8	1.3	0.5
Fodder (green maize, temp. grassland etc.)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.7	0.0
Utilised arable area	**93.4**	**93.1**	**93.1**	**92.9**	**92.9**	**92.8**	**92.7**	**92.7**	**92.6**	**92.5**	**92.5**	**0.1**	**-0.1**
set-aside and fallow land	5.8	5.7	5.7	5.7	5.7	5.7	5.7	5.6	5.6	5.6	5.6	-3.5	-0.3
Share of fallow land	*6.2%*	*6.1%*	*6.1%*	*6.1%*	*6.1%*	*6.1%*	*6.1%*	*6.1%*	*6.1%*	*6.1%*	*6.1%*	-3.6	-0.2
Total arable area	99.2	98.8	98.7	98.6	98.5	98.5	98.4	98.3	98.2	98.2	98.1	-0.2	-0.1
Permanent grassland	50.6	50.7	50.6	50.6	50.5	50.5	50.4	50.4	50.3	50.3	50.2	0.0	-0.1
Share of permanent grassland in UAA	*31.3%*	*31.4%*	*31.3%*	*31.4%*	*31.3%*	*31.3%*	*31.3%*	*31.3%*	*31.3%*	*31.3%*	*31.3%*	0.1	0.0
Orchards and others	12.0	12.1	12.1	12.1	12.1	12.1	12.2	12.2	12.2	12.2	12.2	0.3	0.2
Total utilised agricultural area	161.9	161.5	161.4	161.3	161.2	161.1	161.0	160.8	160.7	160.6	160.5	-0.1	-0.1

TABLE 9.4 EU cereals market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**288.7**	**279.0**	**278.7**	**277.7**	**277.6**	**277.2**	**277.1**	**276.7**	**276.5**	**276.1**	**276.1**	**0.8**	**-0.4**
Imports	22.2	23.6	24.4	23.6	23.4	23.8	24.1	24.1	24.2	24.1	24.1	4.6	0.8
Exports	47.6	42.7	44.0	43.5	43.9	44.4	44.8	44.9	45.1	45.2	45.4	5.0	-0.5
Consumption	**261.8**	**262.5**	**260.9**	**258.6**	**257.7**	**256.9**	**256.4**	**255.9**	**255.6**	**255.1**	**254.9**	**0.2**	**-0.3**
of which food and industrial	88.4	89.4	88.8	87.9	88.1	88.3	88.7	89.3	89.9	90.5	90.1	-0.2	0.2
of which feed	162.2	162.2	161.5	160.3	159.3	158.5	157.8	156.9	156.2	155.2	154.5	0.3	-0.5
of which bioenergy	11.2	10.9	10.7	10.5	10.3	10.1	9.9	9.8	9.6	9.4	10.3	2.0	-0.9
Beginning stocks	40.2	43.7	41.1	39.3	38.4	37.8	37.5	37.5	37.4	37.3	37.2	-1.1	-0.8
Ending stocks	41.6	41.1	39.3	38.4	37.8	37.5	37.5	37.4	37.3	37.2	37.2	0.5	-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	15.9%	15.7%	15.1%	14.8%	14.7%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	0.3	-0.9

Note cereals marketing year is July/June

TABLE 9.5 EU wheat market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**133.9**	**130.6**	**129.3**	**128.9**	**128.7**	**128.4**	**128.1**	**127.8**	**127.5**	**127.1**	**126.9**	**0.8**	**-0.5**
Imports	4.5	4.1	5.0	5.2	5.3	5.4	5.5	5.6	5.8	5.9	6.0	-4.8	2.9
Exports	32.5	28.8	29.0	28.8	29.1	29.3	29.6	29.7	29.9	30.0	30.2	4.8	-0.7
Consumption	**104.9**	**106.6**	**106.3**	**105.8**	**105.2**	**104.5**	**104.1**	**103.7**	**103.4**	**103.0**	**102.7**	**-0.7**	**-0.2**
of which food and industrial	61.2	61.4	61.4	61.2	61.3	61.2	61.4	61.6	61.8	62.0	61.3	0.0	0.0
of which feed	40.4	42.0	41.8	41.5	41.0	40.4	39.8	39.3	38.8	38.3	37.8	-1.6	-0.7
of which bioenergy	3.3	3.2	3.1	3.1	3.0	2.9	2.9	2.8	2.7	2.7	3.6	-2.1	1.0
Beginning stocks	10.9	14.7	14.0	13.1	12.5	12.2	12.2	12.2	12.1	12.1	12.1	-2.3	1.1
Ending stocks	11.9	14.0	13.1	12.5	12.2	12.2	12.2	12.1	12.1	12.1	12.1	0.7	0.2
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 9.6 EU common coarse grains market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**154.8**	**148.4**	**149.4**	**148.8**	**148.9**	**148.9**	**149.0**	**148.9**	**149.0**	**149.0**	**149.2**	**0.8**	**-0.4**
Imports	17.7	19.5	19.4	18.4	18.1	18.3	18.5	18.4	18.4	18.2	18.1	10.0	0.3
Exports	15.1	13.9	15.1	14.7	14.8	15.1	15.2	15.2	15.2	15.2	15.1	5.6	0.0
Consumption	**157.0**	**155.9**	**154.6**	**152.8**	**152.5**	**152.4**	**152.4**	**152.2**	**152.3**	**152.1**	**152.2**	**0.8**	**-0.3**
of which food and industrial	27.2	28.0	27.4	26.6	26.8	27.1	27.3	27.7	28.1	28.4	28.8	-0.6	0.6
of which feed	121.8	120.2	119.7	118.8	118.4	118.1	118.0	117.6	117.4	116.9	116.7	1.0	-0.4
of which bioenergy	8.0	7.7	7.5	7.4	7.3	7.2	7.1	7.0	6.8	6.7	6.6	4.5	-1.8
Beginning stocks	29.4	29.0	27.1	26.2	25.9	25.6	25.4	25.4	25.3	25.2	25.1	-0.7	-1.5
Ending stocks	29.7	27.1	26.2	25.9	25.6	25.4	25.4	25.3	25.2	25.1	25.1	0.5	-1.7
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 9.7 EU common wheat market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**126.4**	**123.1**	**121.8**	**121.4**	**121.2**	**121.0**	**120.8**	**120.4**	**120.2**	**119.9**	**119.7**	**1.0**	**-0.5**
Yield	**5.9**	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**	**5.7**	**1.0**	**-0.3**
Imports	2.1	1.8	2.6	2.7	2.7	2.8	2.9	2.9	3.0	3.1	3.1	-8.8	4.2
Exports	31.4	27.7	27.9	27.8	28.0	28.3	28.6	28.7	28.9	29.0	29.2	5.2	-0.7
Consumption	**95.8**	**97.6**	**97.3**	**96.8**	**96.2**	**95.5**	**95.0**	**94.7**	**94.3**	**93.9**	**93.6**	**-0.8**	**-0.2**
of which food and industrial	52.3	52.6	52.6	52.4	52.4	52.3	52.5	52.7	52.9	53.1	53.3	0.0	0.2
of which feed	40.2	41.8	41.6	41.3	40.8	40.2	39.6	39.1	38.6	38.1	37.6	-1.6	-0.7
of which bioenergy	3.3	3.2	3.1	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.6	-2.1	-2.2
Beginning stocks	8.9	13.2	12.7	11.8	11.3	11.0	11.0	11.0	11.0	11.0	11.0	-3.4	2.1
Ending stocks	10.1	12.7	11.8	11.3	11.0	11.0	11.0	11.0	11.0	11.0	11.0	0.4	0.8
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	206	206	187	178	183	186	188	192	195	198	202	1.0	-0.2
EU intervention price in EUR/t	101	101	101	101	101	101	101	101	101	101	101	0.8	0.0

Note the common wheat marketing year is July/June

TABLE 9.8 EU durum wheat market balance (million t)

												Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Production	**7.5**	**7.5**	**7.5**	**7.5**	**7.4**	**7.4**	**7.4**	**7.3**	**7.3**	**7.2**	**7.2**	**-1.8**	**-0.4**
Yield	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**0.8**	**0.1**
Imports	2.4	2.3	2.4	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.9	1.3	1.7
Exports	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-3.4	-1.0
Consumption	**9.1**	**9.0**	**8.9**	**9.0**	**9.0**	**9.0**	**9.0**	**9.0**	**9.1**	**9.1**	**9.1**	**-0.3**	**0.1**
of which food and industrial	8.9	8.8	8.8	8.8	8.8	8.8	8.9	8.9	8.9	8.9	8.0	-0.1	-1.1
of which feed	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-6.0	-1.1
of which bioenergy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0		
Beginning stocks	2.0	1.5	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	6.0	-5.7
Ending stocks	1.7	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	2.9	-4.7

Note the durum wheat marketing year is July/June

TABLE 9.9 EU barley market balance (million t)

												Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Production	**54.0**	**52.0**	**53.2**	**52.5**	**52.1**	**51.6**	**51.1**	**50.6**	**50.2**	**49.6**	**49.2**	**0.9**	**-0.9**
Yield	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**	**1.5**	**-0.1**
Imports	1.5	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	3.8	-1.2
Exports	10.2	9.8	10.9	10.7	10.8	10.8	10.8	10.8	10.7	10.7	10.6	6.4	0.3
Consumption	**44.2**	**43.5**	**44.3**	**43.0**	**42.6**	**42.1**	**41.6**	**41.1**	**40.7**	**40.3**	**39.9**	**-0.7**	**-1.0**
of which food and industrial	8.9	8.9	9.3	8.5	8.5	8.5	8.6	8.5	8.5	8.5	8.6	-1.0	-0.4
of which feed	34.9	34.1	34.6	34.1	33.6	33.1	32.6	32.2	31.8	31.3	30.9	-0.6	-1.2
of which bioenergy	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-1.5	0.7
Beginning stocks	3.8	5.2	5.3	4.6	4.7	4.7	4.7	4.8	4.8	4.8	4.9	-11.4	2.3
Ending stocks	4.9	5.3	4.6	4.7	4.7	4.7	4.8	4.8	4.8	4.9	4.9	-7.4	-0.1
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		
EU price in EUR/t	189	210	176	174	175	177	178	180	181	182	183	1.5	-0.3

Note the barley marketing year is July/June

TABLE 9.10 EU maize market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Production	**68.1**	**66.7**	**65.8**	**66.0**	**66.5**	**66.8**	**67.1**	**67.4**	**67.6**	**67.9**	**68.2**	**0.7**	**0.0**
Yield	**7.6**	**7.5**	**7.5**	**7.6**	**7.6**	**7.6**	**7.6**	**7.6**	**7.7**	**7.7**	**7.7**	**0.5**	**0.2**
Imports	15.8	18.0	17.8	16.8	16.6	16.8	17.0	16.9	16.9	16.7	16.6	11.8	0.5
Exports	4.4	3.7	3.7	3.5	3.6	3.8	3.8	3.9	3.9	3.9	3.9	4.4	-1.2
Consumption	**82.0**	**81.0**	**79.9**	**79.4**	**79.5**	**79.8**	**80.2**	**80.4**	**80.6**	**80.7**	**80.9**	**2.2**	**-0.1**
of which food and industrial	10.4	11.0	10.8	10.9	11.0	11.1	11.2	11.3	11.5	11.6	11.7	-1.5	1.2
of which feed	65.1	63.8	63.0	62.6	62.6	63.0	63.4	63.5	63.7	63.8	63.9	2.6	-0.2
of which bioenergy	6.5	6.3	6.1	6.0	5.9	5.8	5.6	5.5	5.4	5.3	5.2	7.0	-2.2
Beginning stocks	21.1	16.2	16.1	16.1	16.0	16.0	16.0	16.0	16.0	16.0	16.0	5.0	-2.7
Ending stocks	18.6	16.1	16.1	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	3.9	-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	206	222	190	165	170	171	173	175	177	179	182	1.1	-1.2

Note the maize marketing year is July/June

TABLE 9.11 EU other cereals* market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Production	**32.7**	**29.8**	**30.3**	**30.3**	**30.4**	**30.5**	**30.7**	**30.9**	**31.2**	**31.4**	**31.7**	**0.6**	**-0.3**
Yield	**3.6**	**3.5**	**3.5**	**3.5**	**3.4**	**3.4**	**3.4**	**3.4**	**3.5**	**3.5**	**3.5**	**1.3**	**-0.4**
Imports	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-5.4	-4.5
Exports	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	2.1	3.9
Consumption	**30.7**	**31.4**	**30.5**	**30.4**	**30.5**	**30.5**	**30.5**	**30.7**	**30.9**	**31.1**	**31.4**	**-0.2**	**0.2**
of which food and industrial	7.9	8.1	7.3	7.3	7.3	7.5	7.5	7.8	8.0	8.3	8.6	1.1	0.8
of which feed	21.8	22.3	22.1	22.1	22.1	22.1	22.0	21.9	21.9	21.9	21.9	-0.5	0.0
of which bioenergy	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-2.6	-0.4
Beginning stocks	4.4	7.6	5.8	5.5	5.2	4.9	4.6	4.6	4.5	4.4	4.3	-2.4	-0.3
Ending stocks	6.3	5.8	5.5	5.2	4.9	4.6	4.6	4.5	4.4	4.3	4.2	1.9	-3.9

** Rye, Oats and other cereals*

Note the other cereals marketing year is July/June

TABLE 9.12 EU rice balance (million t milled equivalent)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Production	**1.7**	**1.7**	**1.7**	**1.7**	**1.7**	**1.7**	**1.7**	**1.6**	**1.6**	**1.6**	**1.6**	**-0.9**	**-0.5**
Yield	**4.0**	**4.1**	**4.1**	**4.1**	**4.1**	**4.1**	**4.1**	**4.1**	**4.1**	**4.1**	**4.1**	**0.3**	**0.2**
Imports	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.8	1.8	4.8	1.9
Exports	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	1.4	3.8
Consumption	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.8**	**2.8**	**2.7**	**1.5**	**0.0**
Beginning stocks	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	2.9	-0.3
Ending 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
EU price in EUR/t	629	634	620	623	623	626	627	631	634	637	647	0.6	0.3

Note the rice marketing year is September/August

TABLE 9.13 EU oilseed* (grains and beans) market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Production	**28.8**	**30.3**	**30.9**	**31.4**	**31.7**	**32.0**	**32.0**	**32.1**	**31.8**	**31.7**	**31.1**	**0.7**	**0.8**
Rapeseed	16.2	16.6	16.9	17.1	17.2	17.3	17.2	17.2	16.9	16.7	16.3	-1.1	0.0
Sunseed	9.9	10.7	11.0	11.2	11.3	11.4	11.5	11.5	11.5	11.5	11.3	2.8	1.4
Soya beans	2.7	3.0	3.1	3.1	3.2	3.2	3.3	3.4	3.4	3.5	3.5	9.1	2.6
Imports	22.1	19.6	20.5	20.6	20.5	20.4	20.2	20.1	19.9	19.8	19.5	3.3	-1.2
Exports	1.1	1.2	1.1	1.1	1.2	1.1	1.1	1.1	1.2	1.2	1.2	-0.3	0.9
Consumption	**50.7**	**48.5**	**50.3**	**50.9**	**51.1**	**51.2**	**51.1**	**51.0**	**50.6**	**50.3**	**49.5**	**2.0**	**-0.2**
of which crushing	46.2	44.2	45.8	46.3	46.5	46.6	46.5	46.4	46.1	45.8	45.0	1.9	-0.3
Beginning stocks	3.7	2.6	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.7	2.7	1.3	-3.2
Ending stocks	3.0	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.7	2.7	2.7	-1.2	-0.9
EU price in EUR/t (rapeseed)	426	461	448	452	448	453	457	462	466	470	475	0.7	1.1

**Rapeseed, soya bean, sunflower seed and groundnuts*

Note the oilseed marketing year is July/June

TABLE 9.14 EU oilseed yields

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Rapeseed	**3.1**	**3.1**	**3.1**	**3.1**	**3.1**	**3.1**	**3.1**	**3.1**	**3.2**	**3.2**	**3.2**	**0.5**	**0.2**
Sunflower seed	**2.2**	**2.3**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.5**	**2.5**	**2.5**	**2.5**	**1.8**	**1.2**
Soya beans	**2.9**	**3.2**	**3.2**	**3.2**	**3.2**	**3.3**	**3.3**	**3.3**	**3.3**	**3.3**	**3.4**	**0.5**	**1.4**

TABLE 9.15 EU oilseed meal* market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Production	**29.1**	**27.8**	**28.2**	**28.5**	**28.6**	**28.4**	**28.2**	**27.9**	**27.6**	**27.2**	**26.8**	**2.0**	**-0.8**
Imports	19.8	21.9	21.6	21.4	21.1	20.8	20.5	20.3	20.0	19.8	19.6	-1.2	-0.1
Exports	2.0	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	1.2	0.9
Consumption	**46.9**	**47.9**	**48.0**	**48.0**	**47.7**	**47.1**	**46.7**	**46.1**	**45.6**	**44.9**	**44.2**	**0.5**	**-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	0.1	-0.1
Ending stocks	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	-0.2
EU price in EUR/t (soya bean meal)	397	435	428	424	428	435	441	449	454	460	467	1.6	1.6

**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 9.16 EU oilseed oil* market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Production	**15.9**	**15.4**	**15.9**	**16.1**	**16.2**	**16.2**	**16.2**	**16.2**	**16.1**	**16.0**	**15.7**	**1.8**	**-0.2**
Imports	2.9	3.7	3.8	3.9	3.8	3.6	3.2	3.1	3.1	3.0	2.9	3.2	-0.1
Exports	2.2	2.8	3.2	3.4	3.4	3.1	2.9	2.6	2.4	2.0	1.6	5.8	-3.0
Consumption	**15.7**	**16.2**	**16.0**	**16.1**	**16.2**	**16.4**	**16.4**	**16.6**	**16.7**	**16.9**	**17.0**	**0.8**	**0.8**
Beginning stocks	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	2.0	-1.3
Ending stocks	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	3.0	-1.4
EU price in EUR/t (rapeseed oil)	885	933	930	935	936	947	964	977	992	1 008	1 028	0.4	1.5

**Rapeseed-, soya bean-, sunflower seed- and groundnut-based oils.*

Note the oilseed oil marketing year is July/June

TABLE 9.17 EU vegetable oil* market balance (million t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Production	**16.0**	**15.4**	**16.0**	**16.2**	**16.2**	**16.3**	**16.3**	**16.2**	**16.1**	**16.0**	**15.7**	**1.8**	**-0.2**
Imports	10.6	11.7	11.7	11.6	11.2	10.5	9.7	9.3	8.9	8.5	8.3	2.2	-2.4
Exports	2.4	3.0	3.5	3.6	3.6	3.4	3.1	2.9	2.6	2.2	1.9	4.5	-2.6
Consumption	**23.7**	**24.0**	**23.7**	**23.6**	**23.4**	**23.1**	**22.7**	**22.5**	**22.3**	**22.2**	**22.2**	**1.4**	**-0.7**
of which food and other use	13.8	12.8	12.8	12.8	12.9	12.9	12.9	13.2	13.2	13.5	13.6	2.1	-0.2
of which bioenergy	9.8	11.2	11.0	10.8	10.5	10.3	9.7	9.3	9.1	8.7	8.6	0.5	-1.3
Beginning stocks	1.3	1.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.9	-1.3
Ending stocks	1.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.3	-1.3

**Rapeseed- soya bean-, sunflower seed- and groundnut-based oils plus cottonseed oil, palm oil, palm kernel oil and coconut oil.*

Note the vegetable oil marketing year is July/June

TABLE 9.18 EU sugar market balance (million t white sugar equivalent)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Sugar beet production (million tonnes)	**108.4**	**106.6**	**106.1**	**105.7**	**106.1**	**106.2**	**106.1**	**106.0**	**106.0**	**106.1**	**106.2**	**0.1**	**-0.2**
of which for ethanol	9.1	11.3	11.3	11.2	11.2	11.2	11.2	11.3	11.3	11.3	11.3	-0.8	2.1
of which processed for sugar	99.3	95.3	94.8	94.5	94.9	95.0	94.9	94.8	94.8	94.8	94.9	0.2	-0.4
Sugar production*	**15.0**	**15.6**	**15.5**	**15.5**	**15.6**	**15.6**	**15.7**	**15.8**	**15.9**	**15.9**	**16.0**	**-0.6**	**0.6**
Imports	1.7	1.8	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.4	-4.5	-1.5
Exports	0.9	1.1	1.1	1.1	1.2	1.5	1.5	1.6	1.7	1.7	1.7	-7.6	6.6
Consumption	**16.6**	**16.4**	**16.2**	**16.2**	**16.1**	**16.0**	**16.0**	**16.0**	**16.0**	**15.9**	**15.9**	**-0.2**	**-0.4**
Beginning stocks**	1.9	2.1	2.1	2.3	2.5	2.6	2.6	2.6	2.5	2.4	2.4	2.9	2.5
Ending stocks**	2.0	2.1	2.3	2.5	2.6	2.6	2.6	2.5	2.4	2.4	2.3	2.9	1.4
EU white sugar price in EUR/t	384	395	407	414	415	418	420	426	434	441	446	-3.7	1.5

** Sugar production is adjusted for carry forward quantities and does not include ethanol feedstock quantities.*

*** Stocks include carry forward quantities.*

TABLE 9.19 EU isoglucose market balance (million t white sugar equivalent)

												Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Isoglucose production	**0.6**	**0.6**	**0.6**	**0.7**	**0.7**	**0.7**	**0.7**	**0.8**	**0.8**	**0.8**	**0.8**	**-2.0**	**3.5**
Isoglucose consumption	*0.5*	*0.6*	*0.6*	*0.6*	*0.6*	*0.7*	*0.7*	*0.7*	*0.7*	*0.8*	*0.8*	-3.0	4.4
share in Sweetener use (%)	*3.0*	*3.4*	*3.5*	*3.7*	*3.8*	*4.0*	*4.1*	*4.3*	*4.4*	*4.6*	*4.7*	-2.7	4.6
Imports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-14.4	1.1
Exports	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	-5.2

Note the isoglucose marketing year is October/September

TABLE 9.20 EU biofuels market balance (million t oil equivalent)

												Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Production	**13.9**	**15.3**	**15.2**	**15.2**	**15.1**	**15.0**	**14.5**	**14.1**	**13.9**	**13.6**	**13.5**	**2.5**	**-0.3**
Ethanol	3.1	3.1	3.1	3.1	3.2	3.2	3.2	3.1	3.1	3.1	3.1	1.8	0.2
...based on wheat	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	-2.6	-2.1
...based on maize	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	7.2	-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	-2.1	0.1
...based on sugar beet and molasses	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	-0.8	1.1
...advanced	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	-0.5	13.5
Biodiesel	10.8	12.3	12.2	12.1	11.9	11.8	11.3	10.9	10.7	10.4	10.3	2.7	-0.5
...based on rape oils	5.0	5.9	5.6	5.5	5.4	5.5	5.3	5.3	5.2	5.2	5.2	0.2	0.2
...based on palm oils	2.7	2.8	2.8	2.7	2.5	2.2	1.9	1.7	1.5	1.2	1.2	1.4	-7.9
...based on other vegetable oils	0.7	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	-0.1	4.0
...based on waste oils	2.0	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	21.6	1.2
...other advanced	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	32.7	5.6
Net trade	- 2.1	- 2.8	- 3.0	- 2.8	- 2.5	- 2.3	- 2.2	- 2.0	- 1.7	- 1.5	- 1.3	0.7	-4.8
Ethanol imports	*0.6*	*0.7*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	3.6	-0.7
Ethanol exports	*0.3*	*0.3*	*0.2*	*0.2*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	*0.3*	7.0	1.3
Biodiesel imports	*3.1*	*2.9*	*3.1*	*2.9*	*2.8*	*2.8*	*2.9*	*2.8*	*2.7*	*2.6*	*2.5*	3.6	-1.9
Biodiesel exports	*1.3*	*0.5*	*0.4*	*0.4*	*0.6*	*0.8*	*0.9*	*1.0*	*1.2*	*1.3*	*1.5*	10.1	1.3
Consumption	**17.7**	**18.3**	**18.4**	**18.0**	**17.4**	**16.8**	**16.6**	**16.1**	**15.8**	**15.4**	**14.7**	**3.7**	**-1.9**
Ethanol for fuel	2.5	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.2	2.8	-1.1
non fuel use of ethanol	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	0.9	1.4
Biodiesel	14.3	14.8	14.9	14.5	14.0	13.4	13.2	12.8	12.4	12.0	11.4	4.0	-2.3
Gasoline consumption	68.9	69.6	68.9	66.1	63.1	59.7	57.9	55.4	52.6	49.9	47.3	-1.6	-3.7
Diesel consumption	173.0	175.5	174.1	167.1	159.5	150.9	146.5	140.1	133.2	126.3	119.7	0.4	-3.6
Biofuels energy share (% RED counting)	**8.1**	**8.4**	**8.5**	**8.8**	**9.0**	**9.3**	**9.4**	**9.6**	**10.0**	**10.3**	**10.4**	**5.2**	**2.5**
Energy share: 1st-generation	5.8	5.9	5.9	5.9	5.9	5.8	5.9	6.0	6.0	6.1	6.0	2.7	0.2
Energy share: based on waste oils	1.1	1.2	1.3	1.4	1.5	1.7	1.7	1.8	1.9	2.1	2.2	18.8	6.8
Energy share: other advanced	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.8	9.6
Energy share: Ethanol in Gasoline	3.6	3.8	3.8	3.9	4.0	4.1	4.2	4.4	4.5	4.8	4.8	4.4	2.8
Energy share: Biodiesel in Diesel	8.3	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.4	9.5	9.5	3.6	1.4
Ethanol producer price in EUR/hl	50	57	59	59	60	60	60	61	61	61	62	-0.9	2.1
Biodiesel producer price in EUR/hl	78	97	107	101	91	88	90	87	86	85	85	0.3	0.9

TABLE 9.21 EU milk market balance

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Dairy cows (million heads)	**20.3**	**20.0**	**19.9**	**19.7**	**19.6**	**19.5**	**19.4**	**19.2**	**19.1**	**19.0**	**18.9**	**-0.6**	**-0.7**
Milk yield (kg/cow)	**7466**	**7715**	**7795**	**7873**	**7952**	**8032**	**8112**	**8192**	**8271**	**8350**	**8428**	**1.9**	**1.2**
Dairy cow milk production (million t)	**151.8**	**154.1**	**154.8**	**155.3**	**155.9**	**156.5**	**157.1**	**157.6**	**158.1**	**158.7**	**159.1**	**1.3**	**0.5**
Total cow milk production (million t)	**154.2**	**156.4**	**157.2**	**157.8**	**158.4**	**159.0**	**159.6**	**160.1**	**160.7**	**161.2**	**161.7**	**1.2**	**0.5**
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	0.0
Non-fat solid content of milk (%)	9.6	9.6	9.6	9.6	9.7	9.7	9.7	9.7	9.7	9.7	9.7	0.3	0.1
Delivered to dairies (million t)	**144.7**	**146.8**	**148.3**	**149.0**	**149.8**	**150.5**	**151.2**	**152.0**	**152.6**	**153.3**	**153.9**	**1.6**	**0.6**
Delivery ratio (%)	*93.8*	*93.8*	*94.3*	*94.4*	*94.6*	*94.7*	*94.8*	*94.9*	*95.0*	*95.1*	*95.2*	0.3	0.1
On-farm use and direct sales (million t)	9.5	9.7	8.9	8.8	8.6	8.5	8.3	8.2	8.0	7.9	7.8	-2.6	-2.0
EU Milk producer price in EUR/t (real fat content)	343.9	345.8	350.4	355.5	360.6	365.3	370.3	374.7	379.8	384.2	389.1	1.5	1.2

TABLE 9.22 EU fresh dairy products market balance (1 000 t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**38 476**	**38 489**	**38 477**	**38 455**	**38 443**	**38 456**	**38 463**	**38 491**	**38 489**	**38 505**	**38 486**	**-0.1**	**0.0**
of which fresh milk	23 726	23 837	23 718	23 600	23 482	23 364	23 247	23 131	23 015	22 900	22 786	-0.5	-0.4
of which cream	2 471	2 506	2 544	2 582	2 621	2 660	2 700	2 740	2 781	2 823	2 865	1.3	1.5
of which yogurt	7 762	7 797	7 801	7 800	7 799	7 798	7 797	7 795	7 794	7 793	7 792	-0.1	0.0
Net trade	1 025	1 334	1 371	1 398	1 437	1 501	1 560	1 640	1 687	1 754	1 785	11.6	5.7
Consumption	**37 451**	**37 156**	**37 105**	**37 058**	**37 006**	**36 954**	**36 903**	**36 852**	**36 802**	**36 751**	**36 701**	**-0.3**	**-0.2**
of which fresh milk	22 843	22 386	22 302	22 199	22 096	21 992	21 888	21 782	21 676	21 567	21 457	-0.8	-0.6
of which cream	2 326	2 351	2 366	2 375	2 383	2 392	2 401	2 409	2 418	2 426	2 434	0.8	0.5
of which yogurt	7 547	7 578	7 598	7 600	7 603	7 604	7 606	7 607	7 607	7 606	7 605	-0.2	0.1
per capita consumption (kg)	**84.2**	***83.2***	***83.0***	***82.7***	***82.6***	***82.4***	***82.2***	***81.9***	***81.9***	***81.8***	***81.8***	**-0.5**	**-0.3**
of which fresh milk	51.0	49.8	49.6	49.4	49.2	49.0	48.8	48.6	48.5	48.3	48.1	-1.0	-0.6
of which cream	5.2	5.2	5.3	5.3	5.3	5.3	5.4	5.4	5.4	5.4	5.5	0.7	0.5
of which yogurt	16.8	16.9	16.9	16.9	16.9	16.9	17.0	17.0	17.0	17.0	17.0	-0.4	0.1
of which other FDP	10.6	10.8	10.8	10.9	11.0	11.1	11.2	11.3	11.4	11.5	11.7	1.7	1.0

TABLE 9.23 EU cheese market balance (1 000 t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**10 672**	**10 868**	**10 945**	**11 003**	**11 067**	**11 131**	**11 197**	**11 260**	**11 325**	**11 389**	**11 455**	**1.8**	**0.7**
Imports	208	190	192	195	197	199	202	204	206	209	211	2.4	0.1
Exports	1 401	1 503	1 540	1 573	1 610	1 648	1 687	1 727	1 766	1 807	1 848	3.1	2.8
Consumption	**9 478**	**9 555**	**9 597**	**9 625**	**9 655**	**9 682**	**9 711**	**9 737**	**9 765**	**9 791**	**9 818**	**1.6**	**0.4**
per capita consumption (kg)	**21.1**	***21.3***	***21.3***	***21.4***	***21.5***	***21.6***	***21.7***	***21.7***	***21.8***	***21.9***	***22.0***	**1.4**	**0.4**
Variation in stocks	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		
EU market price in EUR/t (Cheddar)	3 072	3 228	3 304	3 270	3 295	3 320	3 346	3 370	3 397	3 421	3 447	1.0	1.2

TABLE 9.24 EU butter market balance (1 000 t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**2 367**	**2 395**	**2 401**	**2 407**	**2 414**	**2 421**	**2 428**	**2 435**	**2 442**	**2 450**	**2 456**	**1.9**	**0.4**
Imports	39	34	34	34	34	34	34	34	35	35	35	-3.5	-1.2
Exports	289	299	301	304	308	312	317	321	325	330	334	3.1	1.5
Consumption	**2 109**	**2 130**	**2 134**	**2 137**	**2 140**	**2 143**	**2 146**	**2 149**	**2 151**	**2 154**	**2 157**	**1.4**	**0.2**
per capita consumption (kg)	***4.7***	***4.7***	***4.7***	***4.8***	***4.8***	***4.8***	***4.8***	***4.8***	***4.8***	***4.8***	***4.8***	**1.3**	**0.3**
Ending Stocks	138	145	145	145	145	145	145	145	145	145	145	4.9	0.5
of which private	138	145	145	145	145	145	145	145	145	145	145	8.5	0.5
of which intervention	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0
EU market price in EUR/t (EU-14)	3 744	3 706	3 707	3 725	3 743	3 761	3 783	3 800	3 824	3 842	3 862	1.7	0.3
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	3.1	-0.4

TABLE 9.25 EU SMP market balance (1 000 t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**1 496**	**1 556**	**1 598**	**1 629**	**1 658**	**1 687**	**1 715**	**1 741**	**1 768**	**1 797**	**1 826**	**4.4**	**2.0**
Imports	40	27	27	27	27	27	27	27	27	27	27	7.8	-3.9
Exports	869	859	881	897	917	938	959	978	999	1 020	1 042	8.1	1.8
Consumption	**741**	**724**	**745**	**758**	**768**	**777**	**783**	**790**	**797**	**804**	**811**	**2.0**	**0.9**
Ending Stocks	90	90	90	90	90	90	90	90	90	90	90	-10.1	0.0
of which private	90	90	90	90	90	90	90	90	90	90	90	-1.8	0.0
of which intervention	0	0	0	0	0	0	0	0	0	0	0		
EU market price in EUR/t (EU-14)	2 262	2 316	2 367	2 419	2 468	2 515	2 562	2 610	2 656	2 704	2 752	0.7	2.0

TABLE 9.26 EU WMP market balance (1 000 t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**717**	**718**	**723**	**728**	**733**	**739**	**745**	**752**	**759**	**765**	**772**	**1.0**	**0.7**
Imports	33	28	26	25	24	22	21	19	18	16	15	1.1	-7.5
Exports	329	330	330	331	332	334	336	338	340	343	345	-2.7	0.5
Consumption	**420**	**416**	**419**	**422**	**425**	**427**	**430**	**433**	**436**	**439**	**442**	**5.4**	**0.5**
EU market price in EUR/t (EU-14)	2 928	2 801	2 826	2 857	2 887	2 917	2 948	2 978	3 010	3 041	3 073	1.3	0.5

TABLE 9.27 EU whey market balance (1 000 t)

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	2021-2031
Production	**2 122**	**2 217**	**2 245**	**2 271**	**2 298**	**2 326**	**2 354**	**2 381**	**2 409**	**2 436**	**2 464**	**2.7**	**1.5**
Imports	55	43	49	50	50	50	51	51	51	51	51	0.4	-0.8
Exports	690	739	759	763	768	770	774	778	782	787	791	4.6	1.4
Consumption	**1 487**	**1 522**	**1 534**	**1 558**	**1 581**	**1 606**	**1 630**	**1 654**	**1 678**	**1 700**	**1 724**	**1.8**	**1.5**
EU market price in EUR/t (EU-14)	818	657	691	743	794	829	873	922	969	1 030	1 084	1.6	2.9

TABLE 9.28 EU beef and veal meat market balance (1 000 t c.w.e.)

												Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Total number of cows (million heads)	**31.1**	30.7	30.5	30.3	30.1	29.9	29.7	29.6	29.4	29.2	29.0	-0.4	-0.7
of which dairy cows	20.3	20.0	19.9	19.7	19.6	19.5	19.4	19.2	19.1	19.0	18.9	-0.6	-0.7
of which sukler cows	10.8	10.7	10.6	10.6	10.5	10.4	10.4	10.3	10.2	10.2	10.1	0.1	-0.6
Gross Indigenous Production	**7 166**	**7 085**	**7 011**	**6 959**	**6 901**	**6 843**	**6 795**	**6 748**	**6 685**	**6 647**	**6 605**	**-0.1**	**-0.8**
Imports of live animals	2	1	2	2	2	2	2	2	2	2	2	5.7	0.7
Exports of live animals	236	250	225	210	200	194	188	182	176	170	164	7.4	-3.6
Net Production	**6 932**	**6 837**	**6 788**	**6 751**	**6 702**	**6 651**	**6 609**	**6 569**	**6 511**	**6 479**	**6 443**	**-0.3**	**-0.7**
Imports (meat)	338	358	359	356	357	362	366	368	370	372	374	-0.2	1.0
Exports (meat)	591	600	611	615	618	618	621	622	626	627	631	2.3	0.7
Net trade (meat)	252	242	252	259	261	256	254	253	256	254	257	7.4	0.2
Consumption	**6 680**	**6 598**	**6 534**	**6 489**	**6 441**	**6 396**	**6 356**	**6 315**	**6 255**	**6 225**	**6 187**	**-0.5**	**-0.8**
per capita consumption (kg r.w.e)*	***10.4***	***10.3***	***10.2***	***10.1***	***10.0***	***10.0***	***9.9***	***9.9***	***9.8***	***9.8***	***9.7***	**-0.7**	**-0.7**
EU market price in EUR/t	3 667	3 981	3 968	3 896	3 870	3 862	3 854	3 837	3 824	3 812	3 815	1.0	0.4

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

TABLE 9.29 EU sheep and goat meat market balance (1 000 t c.w.e.)

												Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Gross Indigenous Production	**640**	**637**	**643**	**645**	**648**	**651**	**653**	**656**	**658**	**660**	**662**	**-0.3**	**0.3**
Imports of live animals	4	3	2	2	2	2	2	2	2	2	2	17.5	-6.0
Exports of live animals	61	61	57	53	49	47	45	43	42	40	38	17.7	-4.6
Net Production	**583**	**579**	**588**	**594**	**601**	**606**	**610**	**614**	**618**	**622**	**626**	**-1.1**	**0.7**
Imports (meat)	147	132	146	149	154	157	161	163	164	165	166	-3.9	1.3
Exports (meat)	55	54	58	61	61	62	63	63	64	65	65	5.4	1.7
Net trade (meat)	-91	-78	-88	-88	-92	-95	-98	-100	-100	-100	-101	-6.8	1.0
Consumption	**675**	**657**	**676**	**683**	**693**	**701**	**709**	**714**	**718**	**722**	**726**	**-2.1**	**0.7**
per capita consumption (kg r.w.e)*	***1.3***	***1.3***	***1.3***	***1.3***	***1.4***	***1.4***	***1.4***	***1.4***	***1.4***	***1.4***	***1.4***	**-2.3**	**0.8**
EU market price in EUR/t	5 801	5 608	5 762	5 837	5 913	5 962	6 040	6 084	6 131	6 182	6 254	2.7	0.8

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

TABLE 9.30 EU pigmeat market balance (1 000 t c.w.e.)

											Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Gross Indigenous Production	**23 333**	**23 559**	**23 140**	**22 810**	**22 429**	**22 264**	**22 061**	**21 922**	**21 784**	**21 649**	**21 514**	**0.6**	**-0.8**
Imports of live animals	1	1	1	1	1	1	1	1	1	1	1	13.3	-3.0
Exports of live animals	28	17	26	26	26	26	26	26	26	26	26	-10.2	-0.8
Net Production	**23 306**	**23 543**	**23 115**	**22 785**	**22 404**	**22 239**	**22 037**	**21 897**	**21 759**	**21 625**	**21 489**	**0.6**	**-0.8**
Imports (meat)	160	182	177	173	174	174	174	174	173	174	174	0.0	0.9
Exports (meat)	4 781	5 031	4 698	4 461	4 225	4 159	4 102	4 057	4 012	3 970	3 925	5.5	-2.0
Net trade (meat)	4 621	4 849	4 521	4 288	4 051	3 985	3 928	3 884	3 839	3 796	3 751	5.8	-2.1
Consumption	**18 685**	**18 694**	**18 594**	**18 497**	**18 353**	**18 254**	**18 108**	**18 014**	**17 920**	**17 828**	**17 738**	**-0.4**	**-0.5**
*per capita consumption (kg r.w.e)**	*32.5*	*32.5*	*32.2*	*32.1*	*31.9*	*31.7*	*31.5*	*31.4*	*31.2*	*31.1*	*31.0*	**-0.5**	**-0.5**
EU market price in EUR/t	1 599	1 381	1 499	1 580	1 590	1 565	1 553	1 534	1 527	1 511	1 505	1.0	-0.6

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

TABLE 9.31 EU poultry market balance (1 000 t c.w.e.)

												Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Gross Indigenous Production	**13 587**	**13 670**	**13 777**	**13 812**	**13 866**	**13 894**	**13 928**	**13 971**	**14 028**	**14 078**	**14 136**	**2.6**	**0.4**
Imports (meat)	756	722	762	795	800	806	813	820	822	824	826	-1.6	0.9
Exports (meat)	2 355	2 206	2 231	2 220	2 222	2 243	2 268	2 296	2 321	2 348	2 377	3.7	0.1
Net trade (meat)	1 599	1 485	1 469	1 425	1 422	1 437	1 455	1 476	1 499	1 524	1 551	8.0	-0.3
Consumption	**11 978**	**12 240**	**12 303**	**12 360**	**12 421**	**12 461**	**12 486**	**12 503**	**12 545**	**12 557**	**12 585**	**2.0**	**0.5**
*per capita consumption (kg r.w.e)**	*23.5*	*24.0*	*24.1*	*24.2*	*24.3*	*24.4*	*24.5*	*24.6*	*24.7*	*24.7*	*24.8*	**1.9**	**0.5**
EU market price in EUR/t	1 883	1 960	1 978	1 977	1 988	1 995	2 005	2 003	1 999	1 997	2 000	-0.1	0.6

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

TABLE 9.32 Aggregate EU meat market balance (1 000 t c.w.e.)

												Annual growth (%)	
	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2011-2021	2021-2031
Gross Indigenous Production	**44 726**	**44 952**	**44 571**	**44 227**	**43 844**	**43 652**	**43 438**	**43 298**	**43 155**	**43 034**	**42 917**	**1.0**	**-0.4**
Imports of live animals	7	5	4	5	5	5	5	5	5	5	5	12.1	-3.2
Exports of live animals	325	328	308	289	275	267	259	251	243	236	228	4.5	-3.5
Net Production	**44 408**	**44 629**	**44 268**	**43 943**	**43 573**	**43 390**	**43 184**	**43 052**	**42 917**	**42 803**	**42 694**	**1.0**	**-0.4**
Imports (meat)	1 400	1 393	1 443	1 474	1 485	1 499	1 514	1 525	1 529	1 535	1 540	-1.4	1.0
Exports (meat)	7 781	7 891	7 597	7 356	7 126	7 082	7 054	7 038	7 023	7 009	6 998	4.7	-1.1
Net trade (meat)	6 381	6 497	6 154	5 883	5 642	5 583	5 540	5 513	5 494	5 474	5 458	6.8	-1.6
Consumption	**38 018**	**38 189**	**38 107**	**38 029**	**37 907**	**37 812**	**37 659**	**37 546**	**37 439**	**37 332**	**37 236**	**0.3**	**-0.2**
*per capita consumption (kg r.w.e)**	*67.8*	*68.0*	*67.8*	*67.8*	*67.6*	*67.5*	*67.3*	*67.2*	*67.1*	*67.0*	*67.0*	**0.2**	**-0.1**
of which Beef and Veal meat	10	10	10	10	10	10	10	10	10	10	10	-0.7	-0.7
of which Sheep and Goat meat	1	1	1	1	1	1	1	1	1	1	1	-2.3	0.8
of which Pig meat	33	32	32	32	32	32	32	31	31	31	31	-0.5	-0.5
of which Poultry meat	24	24	24	24	24	24	25	25	25	25	25	1.9	0.5

** 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 9.33 EU egg market balance (1 000 t)*

	avg 2019-2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2011-2021	Annual growth (%) 2021-2031
Production	6 364	6 568	6 595	6 629	6 665	6 700	6 735	6 770	6 804	6 840	6 878	**0.8**	**0.8**
Imports	60	54	56	58	61	63	65	67	70	72	74	2.4	2.1
Exports	348	404	420	436	452	469	485	501	517	534	550	4.0	4.7
Total use	6 076	6 218	6 231	6 251	6 274	6 295	6 315	6 336	6 356	6 378	6 402	**0.7**	**0.5**
per capita consumption (kg)	*13.5*	*13.9*	*13.9*	*14.0*	*14.0*	*14.1*	*14.1*	*14.2*	*14.3*	*14.3*	*14.4*	**0.5**	**0.6**

** eggs for consumption*

TABLE 9.34 EU olive oil market balance (1 000 t)

	avg 2016-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2010-2020	Annual growth (%) 2020-2031
Production	2 034	2 233	2 175	2 213	2 251	2 289	2 327	2 364	2 402	2 440	2 478	2 516	**-0.3**	**1.9**
of which ES+PT	1479	1 696	1 622	1 654	1 687	1 721	1 752	1 785	1 817	1 848	1 880	1 911	0.9	2.8
of which IT+EL	540	520	533	539	545	551	557	563	569	575	581	587	-4.3	1.1
Imports	167	200	197	198	186	185	184	174	164	155	147	139	3.4	-1.4
Exports	718	860	881	903	926	949	972	996	1 021	1 046	1 072	1 099	5.1	3.9
Consumption	1 476	1 520	1 524	1 527	1 531	1 535	1 538	1 542	1 546	1 549	1 553	1 557	**-1.8**	**0.3**
of which ES-IT-EL-PT	1156	1 160	1 143	1 133	1 124	1 115	1 106	1 097	1 088	1 079	1 070	1 062	-2.9	-0.8
of which other EU	319	360	381	394	407	419	432	445	457	470	483	495	3.0	4.0
per capita ES-IT-EL-PT (kg)	*9.0*	*9.3*	*9.2*	*9.1*	*9.0*	*8.9*	*8.9*	*8.8*	*8.7*	*8.6*	*8.5*	*8.5*	-3.1	-0.6
per capita other EU (kg)	*1.0*	*1.1*	*1.2*	*1.2*	*1.3*	*1.3*	*1.4*	*1.4*	*1.4*	*1.5*	*1.5*	*1.6*	**2.8**	**4.0**
Ending stocks	547	383	350	330	310	300	300	300	300	300	300	300	-3.6	-5.3

Note the olive oil marketing year is October/September

**Difference and annual growth based on 5-year trimmed average for 2010 and 2020*

TABLE 9.35 EU wine market balance (million hectolitres)

	avg 2016-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2010-2020	Annual growth (%) 2020-2031
Area (million ha)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	**-0.7**	**0.0**
Yield (hl/ha)	47.7	44.9	47.4	47.3	47.2	47.	46.9	46.8	46.7	46.6	46.5	46.4	**0.0**	**-0.2**
Vinified production	153	144	152	151	151	151	150	150	150	149	149	149	**-0.9**	**-0.2**
of which 5 main producer MS	138	128	137	135	136	136	136	135	135	135	134	134	-0.5	-0.3
other EU MS	15	16	15	15	15	15	15	15	15	14	14	14	-3.0	-0.2
Imports	8	7	7	7	7	7	7	7	7	7	7	7	2.6	-1.0
Exports	31	31	31	31	31	32	32	32	32	32	32	32	4.1	0.5
Domestic use	128	127	128	127	127	126	126	125	125	124	124	123	**-1.7**	**-0.4**
Human consumption	102	102	102	101	101	101	100	100	99	99	99	98	**-2.2**	**-0.2**
per capita consumption (l)	*22.8*	*22.7*	*22.7*	*22.6*	*22.6*	*22.5*	*22.4*	*22.3*	*22.3*	*22.2*	*22.1*	*22.1*	**-2.4**	**-0.2**
Other uses	27	25	26	26	26	25	25	25	25	25	25	25	**-0.9**	**0.0**
Ending stocks	169	168	168	168	168	168	168	168	168	168	168	168	0.2	-0.3

Note the wine marketing year is August/July

**Difference and annual growth based on 5-year trimmed average for 2010 and 2020*

TABLE 9.36 EU apples market balance (1 000 t fresh equivalent)

	avg 2016-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2010-2020	2020-2031
Area (million ha)	**501**	**503**	**501**	**500**	**498**	**497**	**495**	**494**	**493**	**491**	**490**	**488**	**-0.9**	**-0.2**
Yield (t/ha)	*23.2*	*25.*	*23.4*	*23.5*	*23.5*	*23.6*	*23.7*	*23.7*	*23.8*	*23.9*	*23.9*	*24.0*	**1.3**	**0.2**
Gross production	**11 604**	**12 550**	**11 734**	**11 733**	**11 732**	**11 730**	**11 729**	**11 728**	**11 727**	**11 725**	**11 724**	**11 723**	**0.4**	**0.0**
of which losses and feed use	702	766	637	626	616	605	595	591	582	573	563	563	-1.9	-2.0
of which usable production	10 903	11 784	11 097	11 107	11 115	11 125	11 134	11 137	11 145	11 153	11 161	11 160	0.5	0.1
Production (fresh)	**7 167**	**7 684**	**7 544**	**7 548**	**7 552**	**7 557**	**7 561**	**7 560**	**7 563**	**7 567**	**7 572**	**7 568**	**0.1**	**0.3**
Imports (fresh)	351	275	273	270	268	265	263	260	258	255	253	250	-4.3	-3.0
Exports (fresh)	1 246	1 100	1 078	1 069	1 060	1 060	1 060	1 060	1 060	1 060	1 060	1 060	-0.8	-1.2
Consumption (fresh)	**6 262**	**6 795**	**6 738**	**6 749**	**6 759**	**6 762**	**6 764**	**6 760**	**6 761**	**6 762**	**6 765**	**6 758**	**-0.1**	**0.6**
per capita (kg)	*14.0*	*15.1*	*15.0*	*15.1*	*15.1*	*15.1*	*15.1*	*15.1*	*15.1*	*15.2*	*15.2*	*15.2*	**-0.3**	**0.6**
Variation in stocks (fresh)	396	520	0	0	0	0	0	0	0	0	0	0	5.8	0.0
Production (for processing)	**3 735**	**4 100**	**3 553**	**3 559**	**3 564**	**3 568**	**3 573**	**3 577**	**3 582**	**3 586**	**3 589**	**3 592**	**-0.1**	**0.8**
Imports (processed)	1 229	1 000	1 056	1 049	1 042	1 034	1 027	1 020	1 013	1 006	999	992	-3.9	-1.3
Exports (processed)	1 273	1 500	1 332	1 339	1 346	1 353	1 359	1 366	1 373	1 380	1 387	1 394	2.8	1.5
Apparent consumption (processed)	**3 691**	**3 600**	**3 260**	**3 243**	**3 226**	**3 208**	**3 189**	**3 171**	**3 152**	**3 134**	**3 115**	**3 095**	**-1.6**	**-0.9**
per capita (kg)	*8.3*	*8.0*	*7.3*	*7.2*	*7.2*	*7.2*	*7.1*	*7.1*	*7.1*	*7.0*	*7.0*	*7.0*	**-1.8**	**-0.8**

Note the apples marketing year is August/July

**Difference and annual growth based on 5-year trimmed averages for 2010 and 2020*

*** Consumption and trade figures of processed apples are expressed in fresh apple equivalent. For further info please see the STO methodology:*

https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/markets/outlook/short-term_en

TABLE 9.37 EU tomatoes market balance (1 000 t fresh equivalent)

	avg 2016-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2010-2020	2020-2031
Production (total)	**16 980**	**17 523**	**16 738**	**16 729**	**16 721**	**16 712**	**16 703**	**16 694**	**16 685**	**16 677**	**16 668**	**16 659**	**0.4**	**-0.2**
Production (fresh)	**6 645**	**6 208**	**6 379**	**6 370**	**6 361**	**6 353**	**6 344**	**6 335**	**6 326**	**6 318**	**6 309**	**6 300**	**-0.2**	**-0.4**
Imports (fresh)	558	703	708	712	717	722	726	731	736	741	745	750	1.6	2.7
Exports (fresh)	480	332	435	410	400	390	390	390	390	390	390	390	-1.0	-1.8
Apparent consumption (fresh)	**6 723**	**6 579**	**6 652**	**6 672**	**6 678**	**6 684**	**6 680**	**6 676**	**6 672**	**6 668**	**6 664**	**6 660**	**0.0**	**-0.1**
per capita (kg)	*15.0*	*14.7*	*14.8*	*14.9*	*14.9*	*14.9*	*14.9*	*14.9*	*14.9*	*15.0*	*15.0*	*15.0*	**-0.2**	**0.0**
Production (for processing)	**10 335**	**11 315**	**10 359**	**10 359**	**10 359**	**10 359**	**10 359**	**10 359**	**10 359**	**10 359**	**10 359**	**10 359**	**0.8**	**0.0**
Imports (processed)	2 298	3 687	2 222	2 229	2 235	2 242	2 248	2 254	2 261	2 267	2 274	2 280	-0.5	0.2
Exports (processed)	4 397	3 812	4 396	4 407	4 419	4 431	4 442	4 454	4 465	4 477	4 488	4 500	1.8	0.2
Apparent consumption (processed)	**8 235**	**11 190**	**8 186**	**8 180**	**8 175**	**8 170**	**8 165**	**8 160**	**8 155**	**8 149**	**8 144**	**8 139**	**0.1**	**-0.1**
per capita (kg)	*18.4*	*24.9*	*18.3*	*18.2*	*18.3*	*18.3*	*18.3*	*18.3*	*18.3*	*18.3*	*18.3*	*18.3*	**-0.1**	**0.0**

**Difference and annual growth based on 5-year trimmed averages for 2010 and 2020*

*** Consumption and trade figures of processed tomatoes are expressed in fresh tomato equivalent. For further info please see the STO methodology:*

https://ec.europa.eu/info/food-farming-fisheries/farming/facts-and-figures/markets/outlook/short-term_en

TABLE 9.38 EU peaches and nectarines market balance (1 000 t fresh equivalent)

	avg 2018-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2010-2020	2020-2031
Production (total)	3 790	3 421	3 440	3 458	3 477	3 496	3 515	3 534	3 553	3 572	3 591	3 610	-1.4	-0.4
Area (1000 ha) (fresh)	206	197	192	191	190	188	187	186	184	183	181	180	-2.3	-1.2
Yield (t/ha) (fresh)	17.5	17.7	17.3	17.5	17.8	18.	18.3	18.5	18.8	19.	19.3	19.6	1.7	1.0
Production (fresh)	3 082	2 951	2 816	2 830	2 845	2 859	2 874	2 888	2 903	2 917	2 932	2 946	-1.6	-0.4
Imports (fresh)	30	50	38	39	40	41	42	43	45	46	47	48	6.2	4.4
Exports (fresh)	222	101	106	111	116	121	126	131	135	140	145	150	-11.3	-3.5
Apparent consumption (fresh)	2 890	2 900	2 747	2 758	2 769	2 780	2 790	2 801	2 812	2 823	2 834	2 844	-0.4	-0.1
per capita (kg)	*6.5*	*6.5*	*6.1*	*6.2*	*6.2*	*6.2*	*6.2*	*6.3*	*6.3*	*6.3*	*6.4*	*6.4*	-0.6	-0.1
Area (million ha) (for processing)	30	30	30	30	30	30	30	30	30	30	30	30	3.9	-0.1
Yield (t/ha) (for processing)	23.7	15.9	24.5	24.3	24.	23.8	23.6	23.4	23.1	22.9	22.7	22.5	-4.5	-0.5
Production (for processing)	707	469	723	716	709	703	696	689	683	676	670	664	-0.6	-0.6
Imports (processed)	7	9	6	6	6	6	6	6	6	6	6	6	-9.2	-1.1
Exports (processedt)	168	156	191	192	193	194	195	196	197	198	199	200	1.8	1.6
Apparent consumption (processed)	546	322	538	530	523	515	507	500	492	485	477	470	-1.4	-1.3
per capita (kg)	*1.2*	*0.7*	*1.2*	*1.2*	*1.2*	*1.2*	*1.1*	*1.1*	*1.1*	*1.1*	*1.1*	*1.1*	-1.6	-1.3

TABLE 9.39 EU oranges market balance (1 000 t fresh equivalent)

	avg 2016-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Annual growth (%) 2010-2020	2020-2031
Production (total)	6 351	6 380	6 315	6 356	6 373	6 398	6 411	6 441	6 463	6 487	6 510	6 537	-0.4	0.3
Area (million ha)	275	274	274	274	273	273	273	273	273	272	272	272	-1.3	-0.1
Yield (t/ha)	23.1	23.3	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	24.	0.9	0.4
Production (fresh)	5 148	5 380	5 302	5 330	5 334	5 346	5 346	5 363	5 372	5 383	5 393	5 407	0.1	0.5
Imports (fresh)	892	900	905	910	915	920	925	930	935	940	945	950	1.6	0.7
Exports (fresh)	436	390	394	398	402	406	410	414	418	422	426	430	2.1	0.1
Apparent consumption (fresh)	5 605	5 890	5 813	5 842	5 847	5 860	5 861	5 879	5 889	5 901	5 912	5 927	0.2	0.5
per capita (kg)	*12.6*	*13.1*	*13.0*	*13.0*	*13.1*	*13.1*	*13.1*	*13.2*	*13.2*	*13.2*	*13.3*	*13.3*	0.0	0.5
Production (for processing)	1 202	1 000	1 013	1 026	1 039	1 052	1 065	1 078	1 091	1 104	1 117	1 130	-1.8	-0.5
Imports (processed)	4 157	3 550	3 495	3 440	3 385	3 330	3 275	3 220	3 165	3 110	3 055	3 000	-1.8	-3.1
Exports (processed)	1 509	1 100	1 570	1 575	1 580	1 585	1 590	1 595	1 600	1 605	1 610	1 615	-0.9	0.2
Apparent consumption (processed)	3 850	3 450	2 938	2 891	2 844	2 797	2 750	2 703	2 656	2 609	2 562	2 515	-2.6	-3.7
per capita (kg)	*8.6*	*7.7*	*6.5*	*6.4*	*6.3*	*6.2*	*6.1*	*6.0*	*5.9*	*5.9*	*5.8*	*5.7*	-2.8	-3.7

Note the oranges marketing year is October/September

TABLE 9.40 EU self-sufficiency rate (%)

CROP SECTORS	EU-27										
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Arable crops											
Overall Cereals	110	106	107	107	108	108	108	108	108	108	108
Wheat	128	123	122	122	122	123	123	123	123	123	124
Coarse grains	99	95	97	97	98	98	98	98	98	98	98
Common wheat	132	126	125	125	126	127	127	127	127	128	128
Durum wheat	83	84	84	83	83	82	82	81	80	80	79
Barley	122	120	120	122	122	123	123	123	123	123	123
Maize	83	82	82	83	84	84	84	84	84	84	84
Other cereals	106	95	100	100	100	100	101	101	101	101	101
Rice	63	62	62	61	61	60	60	60	60	59	60
Oilseed	57	63	61	62	62	62	63	63	63	63	63
Oilseed meal	62	58	59	59	60	60	60	61	61	61	61
Oilseed oil	101	95	99	100	100	99	99	98	96	94	92
Vegetable oil	68	64	67	68	69	70	72	72	72	72	71
Sugar	90	95	96	96	97	98	98	99	99	100	101
Isoglucose	114	108	107	107	106	106	106	106	105	105	105
Biofuels	78	84	83	85	87	89	87	87	88	88	92
Specialised crops											
Olive oil	138	147	143	145	147	149	151	153	155	158	160
Wine	119	113	119	119	119	119	120	120	120	120	120
Apples (fresh)	114	113	112	112	112	112	112	112	112	112	112
Apples processed	101	114	109	110	110	111	112	113	114	114	115
Tomatoes (fresh)	99	94	96	95	95	95	95	95	95	95	95
Tomatoes (processed)	125	101	127	127	127	127	127	127	127	127	127
Peaches & nectarines	110	106	105	105	106	106	107	107	108	108	108
Oranges (fresh)	92	91	91	91	91	91	91	91	91	91	91
Oranges (processed)	31	29	34	35	37	38	39	40	41	42	44

Note Figures for arable crops, olive oil, wine, apples and oranges refer to marketing years (200X means 200X/200X+1).

ANIMAL SECTORS	EU-27										
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Dairy products											
Fresh dairy products	103	104	104	104	104	104	104	104	105	105	105
Cheese	113	114	114	114	115	115	115	116	116	116	117
Butter	112	112	113	113	113	113	113	113	114	114	114
SMP	202	215	215	215	216	217	219	220	222	223	225
WMP	171	172	173	173	173	173	173	174	174	174	175
Whey	143	146	146	146	145	145	144	144	144	143	143
Meat											
Beef and veal	107	107	107	107	107	107	107	107	107	107	107
Pigmeat	125	126	124	123	122	122	122	122	122	121	121
Poultry	113	112	112	112	112	111	112	112	112	112	112
Sheep and goat	95	97	95	95	94	93	92	92	92	91	91

UNCERTAINTY ANALYSIS RESULTS

TABLE 9.41 Macroeconomic uncertainty in 2031 (CV, %)

Region	Consumer price index	GDP deflator	GDP	Exchange rate (domestic currency /USD)	Oil price
Australia	0.3	1.6	1.1	6.2	-
Brazil	1.4	1	1.8	9.1	-
Canada	0.2	0.6	1.2	2.7	-
China	0.8	1	0.8	1.5	-
EU	0.7 (EU-14), 0.9 (EU-13)	0.6	1.5	3.7	-
India	0.7	0.6	2.6	3.6	-
Indonesia	1.5	1.9	1.1	3.2	-
Japan	0.5	0.4	1.3	5.1	-
New Zealand	0.4	0.5	1.2	3.4	-
Russia	1.7	3.4	2.3	7.3	-
United Kingdom	0.6	0.6	2.2	5.3	-
United States	0.5	0.3	1	-	-
World	-	-	-	-	21.1

TABLE 9.42 Yield uncertainty in 2031 (CV, %)

Commodity/Region	Argentina	Australia	Brazil	Canada	China	EU-14	EU-13	India	Indonesia	Kazakhstan	Mexico	New Zealand	Paraguay	Russia	Thailand	Ukraine	United States	Vietnam
Barley	7.9	2.3	-	8	-	4.1	7.4	-	-		0.8	-	-	0.5	-	-	1.1	-
Common wheat	11	16	9.4	4.9	1.8	4.2	12	2.3	0.6	14	6.5	0.6	8.5	12	0.6	11	3.1	0.6
Durum wheat	-	-	-	-	-	4.9	5.2	-	-	-	-	-	-	-	-	-	-	-
Maize	5.3	1	7.7	6.1	0.7	4.6	19	0.3	0.4	0.4	7.3	1	7.2	0.5	0.4	14	2.6	0.5
Milk	0.6	18	0.6	0.4	0.1	0.2	0.2	0.3	0.3	0.3	0.1	2.3	0.2	0.4	0.2	0.2	0.3	0.3
Oats	-	0.4	-	6.1	-	4.8	6.4	-	-	-	-	-	-	0.2	-	-	0.1	-
Other coarse grains	4.9	1.9	1.9	6.6	0.8	-	-	0.4	0.4	0.4	0.8	1	9.6	0.4	0.4	18	2	0.4
Other oilseeds	43	19	0	4.5	1.9	3	9.8	0.9	1.2	12	0	0	14	8.1	1.2	12	0	1.3
Palm oil	-	-	0	-	0	-	-	0.8	3.4	-	0	-	0.8	-	0.7	-	-	-
Rapeseed	-	20	0	4.5	2.1	3.3	7.1	-	-	-	0	0	-	0.2	-	-	0	-
Rice	0.6	0.1	1.6	-	12	5	0.7	3.2	0.1	0.2	0.1	-	0.3	0.4	-	0.3	4.5	2.7
Rye	-	-	-	-	-	7.4	9.3	-	-	-	-	-	-	0.1	1.6	-	-	-
Soya bean	16	0	4.5	4.3	1	7.5	15	0.9	1.8	7.7	0	-	12	0.6	1.7	7.9	6	1.8
Sugarbeet	-	-	-	1.4	2.9	9.5	8.2	0.3	0.3	-	-	-	-	15	-	0.2	5.6	-
Sugarcane	18	4.4	4.9	-	1.6	-	-	3.5	0.3	-	0.3	-	0.5	-	11	-	5.8	0.3
Sunflower seed	53	-	0	-	4.7	4.8	16	-	-	-	0	-	-	9.7	-	-	0	-

TABLE 9.43 Price uncertainty in 2031 (CV, %)

Commodity	EU market (producer) price	International reference price
Barley	9.2	-
Beef and veal	3.4	4.3 (ATL)
Biodiesel	9.9	9.2
Butter	4.4	4.3
Casein	1.3	0
Cereal brans	8.1	7
Cheese	3.1	3.2
Corn gluten feed	8.5	7.8
Cotton	3.8	2.4
Dried beet pulp	12.3	12.8
Dried distillers grains	8.9	8.2
Ethanol	5.5	6.1
High fructose corn syrup	4.8	6.8
Maize	10.1	9.9
Meat and bone meal	0	7
Milk	2.5	-
Molasses	8.8	7.6
Other coarse grains	9.4	8
Other oilseeds	26.4	26
Pigmeat	7.1	5.4 (ATL)
Poultry	4.7	4.1
Pulses	7.9	6.1
Rapeseed	26.8	-
Rice	6.2	5.1
Roots and tubers	4.7	6.3
Sheep	3.7	2.5
Skim milk powder	2	2.1
Soya bean	36.9	37.6
Sunflower seed	26.5	-
Total protein meal	15.4	16.6
Vegetable oils	17.9	15.5
Wheat	12.4	11.6
Whey powder	7.9	9.2
White sugar	10.2	6.1
Whole milk powder	2.9	2.5

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