European Commission

EU AGRICULTURAL OUTLOOK

FOR MARKETS AND INCOME 2019-2030

Agriculture and Rural Development

NOTE TO THE READER

This report provides a medium-term outlook for major EU agricultural markets and agricultural income to 2030. It is based on a set of coherent macroeconomic assumptions deemed most plausible at the time of the analysis, including the continuation of current agricultural and trade policies. The analysis relies on information available at the end of September 2019 for agricultural production and on an agro-economic model used by the European Commission.

The analysis of a selected set of market uncertainties accompanies this report in order to quantify the potential for variation in the results. Possible variations stem in particular from fluctuations in the macroeconomic environment and in yields of the main crops and milk. Specific scenarios are also presented for plant-based protein intake, GM-free dairy farming, and the African swine fever outbreak in China.

As part of the preparatory process, an external review of the baseline and the scenarios around market uncertainties were conducted at an outlook workshop organised in Brussels on 23-24 October 2019. Valuable input was collected from high-level policy makers, European and international modelling and market experts, private companies and other stakeholders, and 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), but DG AGRI is responsible for the content. While every effort is made to provide a robust agricultural market and income outlook, strong uncertainties remain — hence the importance given to analysing them.

In DG AGRI, the report and underlying baseline were prepared by Sylvie Barel, Andrea Čapkovičová, François Chantret, Debora Gatelli, Sophie Hélaine, Beate Kloiber, Barthélemy Lanos, Jean-Marc Leonard, Fabien Santini, Jean-Marc Trarieux, Benjamin Van Doorslaer, Marijke van Schagen and David Zaitegui Pérez. DG AGRI's outlook groups and market units helped to prepare the baseline.

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We also appreciate the technical support and experience provided by Marcel Adenauer and Hubertus Gay from OECD, and by René Araujo Enciso and Javier Sánchez Álvarez from FAO.

The text on the sugar outlook at Member State-level was prepared by the Agmemod consortium: Martin Banse, Marlen Haß, Petra Salamon, Max-Emanuel Zirngibl (Thünen Institute), Ana Gonzalez Martinez, Roel Jongeneel, Myrna van Leeuwen (Wageningen Economic Research).

We are grateful to the participants of the October 2019 outlook workshop and to many other colleagues for their feedback during the preparation of the report.

Please cite this publication as: EC (2019), EU agricultural outlook for markets and income, 2019-2030. European Commission, DG Agriculture and Rural Development, Brussels.

This publication does not necessarily reflect the official opinion of the European Commission.

CONTENT

HIGHLIGHTS

This report presents the outlook for major EU agricultural markets and for agricultural income until 2030. It is based on a set of assumptions deemed plausible at the time of preparation. EU agriculture plays an essential role in delivering the European Green Deal outlined in the political guidelines for the 2019-2024 European Commission. In that context, this report provides a reliable measure of the contribution of EU agriculture to sustainable food and farming.

Societal demands will continue to shape agricultural markets over the next decade. People in the EU have increasingly pressing and at times conflicting expectations towards food. These expectations extend beyond food affordability to issues such as health, origin, convenience, environment, climate change and animal welfare. In addition, public policy choices addressing environment and climate change challenges have led to requirements being set in EU and national regulations, e.g. on nitrates and pesticides, which encourage the adaptation of production systems, e.g. with more crop rotation. While these developments often translate into higher production costs, they also bring opportunities to add value to production through increased market differentiation. Alternative production and marketing systems, such as local, organic, GM-free or other types of certified production will increase over the outlook period. At world level, supply will grow further — mainly in developing countries — but not as fast as demand in these markets. This will create opportunities for EU exports.

Despite higher competition, the production of cereals is projected to slightly increase for domestic feed and industrial uses, and to supply a steady global demand. Production of soya beans and pulses will continue to grow to address feed and food demand for locally produced plant-protein products. Sugar production is expected to increase, and so are sugar exports due to declining domestic demand.

The outbreak of African swine fever in Asia is already strongly impacting meat markets, but the implications for the whole market over the outlook period are still uncertain. In the short term, the significant growth in demand for Chinese imports, especially pigmeat, is expected to push prices up. As Chinese production recovers, prices should fall, leading to a decline in domestic pigmeat production. Poultry meat is expected to increase its share of total EU meat consumption, although total meat consumption is expected to decline slightly. By contrast, EU and global consumption of dairy products will continue to rise, leading to higher milk production in the EU.

Finally, production of specialised crops is expected to continue to steadily increase and trade in them to generally intensify. Domestic consumption of wine is due to further decline, and demand for olive oil is projected to increase in non-producing countries. The shift to different types of fruit and vegetables will continue in line with consumers' changing preferences.

Projections have been made on the basis of a European Union of 28 Member States, i.e. including the UK. The June 2018 common agricultural policy (CAP) proposals have not been taken into consideration, as they are still under discussion in the Council and the Parliament, and recently concluded free trade agreements that are not yet in force, such as EU-Mercosur, are not included.

EXECUTIVE SUMMARY

Overall trends

This outlook report aims to serve as a baseline for policy and market analysis and evaluation. It is based on the existing policy framework and on expected macroeconomic trends.

Under these assumptions, despite **labour** outflow (i.e. more workers leaving the agricultural sector than entering it), agriculture remains a key part of the fabric of the EU's rural communities and the primary **use of land**. Due to competition from other uses, total agricultural land use in the EU is expected to continue to decline, though at a slower pace than in the past decade, to 178 million ha by 2030. Already high on average, EU yields will grow more slowly than in the past. Advances in seed selection, management and technology will improve farmers' ability to integrate environmental policy requirements into production systems.

Most of the EU's produce will still be consumed domestically. Consumers in the EU and abroad will become more demanding about the food they consume, increasingly opting for local, organic or other certified products and shifting between food categories. With growing global demand and shifts in global trade flows, the EU will have opportunities to gain market shares in some export markets (e.g. dairy products) while facing increased competition in others (e.g. cereals).

Consumption trends

EU **food market developments** are driven by societal demands, whether related to health, environment, climate change or animal welfare. At the same time, due to busy lifestyles, sales of prepared and processed food, as well as snacks and on-the-go products, are increasing. This creates huge opportunities for further market shifts towards, for instance, convenience food.

Increasing demand for **organic** food is expected to boost EU supply in the short term. Over the medium term, challenges for conversion to organic farming, as well as further market shifts towards other environmentally-friendly alternatives, could, however, slow down the growth of organic production.

Changing **global consumption trends** and changes in production levels will affect global trade flows. With the increasing concentration of grain production in the main producing regions, global trade in this area is expected to continue to grow. Low per capita dairy consumption levels in Asia and Africa create a great opportunity for further growth of exports towards these regions. Diverging trends in meat consumption are also expected to result in shifts in trade flows.

Arable crops

The total EU area of oilseeds, permanent grassland and permanent crops is set to further decline. By contrast, the use of land for cereals, protein crops and fodder is expected to grow. Despite a net decline in EU agricultural land use, bigger yields could result in an overall increase in production.

The EU market for **cereals** will grow, with further shifts between products and increasing demand for feed and industrial uses. Wheat and maize growing areas are projected to expand at the expense of other cereals. Total EU cereal production could reach 320 million t by 2030. More competition from the other main producing regions, such as the Black Sea, will translate in a moderate increase of EU exports.

The strong growth in EU production of **protein crops** is projected to continue and reach 6.3 million t in the medium term. The main drivers will be the strong demand for plant-protein products and for more locally-produced protein sources, both for feed purposes and for human consumption.

A slight decrease in EU area is projected for **oilseeds**. The rapeseed area is expected to continue its decline, though at a slower pace, thanks to a steady demand for rape meal and the agronomic value of rape in crop rotation systems. Total EU production of oilseeds could remain stable in the medium term. The increase in demand for oilseed crushing is due to be met by additional imports, while the volume of imported meals could decline.

The EU **sugar** area is expected to stabilise in the medium term and EU production could be around 18.5 million t by 2030. The declining consumption of sugar is expected to be only partially substituted by a higher use of isoglucose in processed food. The increase of other sugar uses (e.g. industrial uses) will not offset this decline and the EU sugar sector will rely on opportunities in the world market.

Demand for **feed** (from arable crops, fodder and pasture) is increasingly driven by consumers' demands on farming practices. Feed differentiation from locally-produced, GM-free and organic crops will increase domestic feed production, despite mixed trends in animal production. Total feed use could reach 260 million t in the medium term, driven by increased inclusion of pulses and strong growth in soya bean meals.

Restrictions on the use of palm-based biodiesel are expected to significantly reduce the available supply of **biofuels**. The use of further agricultural feedstocks for ethanol and diesel production is projected to remain overall stable in the medium term, while the policy framework sets limits on using crops for fuels. Advanced biofuels are due to increase. In a context of decreasing fuel use, blending may increase significantly.

Milk and other dairy products

Sustainability requirements to reduce greenhouse gas, phosphate emissions and nitrates translate into a moderate growth in EU **milk** production to 179 million t by 2030. The sector will likely adapt farming practices, focusing notably on herd management and cows' nutrition. As a result, bigger yields will allow dairy herds to be reduced (by 1.4 million heads), and this will contribute to a reduction in emissions. Consumer demands are also expected to lead to further market shifts in terms of production systems and the range of dairy products offered. New products, notably for adult nutrition (e.g. for sports) will bring additional value to the sector.

At world level, population growth will increase global import demand for **dairy products**, and the EU is projected to remain the leading global supplier.

A large share of the EU milk production growth is expected to be channelled into **cheese** processing, driven by global demand but also by increasing domestic industrial uses. A further decline in EU **liquid milk** consumption will translate into a production decrease in total fresh dairy products. The EU demand for **butter** could continue to rise, though at a slower pace due to recent price hikes. The production of **milk powders**, especially skimmed milk and whey powders, should grow further thanks to sustained demand on the export market and for adult nutrition.

Meat

The recent outbreak of African swine fever in Asia reminds us of the unpredictability of global developments in **meat markets**. In the short term, trade diversion to China is expected for all meats, putting pressure on both global and EU markets, and causing uncertainties about the long-term global supply adjustment path. Lower availability of pigmeat in the EU market could lead to further market shifts between meats. Overall, EU annual meat consumption is projected to decline by 1.1 kg per capita by 2030, driven by social, ethical, health and environmental concerns.

Due to the significant rise in global demand, production of EU **pigmeat** for exports is expected to increase in the short term. High prices could lead to a stronger decline in EU consumption than previously anticipated. When Asian production recovers, EU prices should fall sharply and production decline significantly towards 2030.

As milk yields increase, the size of dairy herds is expected to gradually decline. Low profitability could also increase the decline in the total cow herd. The reduction of EU **beef** production in the main producing countries is projected to continue, despite slightly increasing beef prices towards 2030. EU beef consumption is expected to further decline, but new trade opportunities could lead to higher EU beef exports.

The EU production of **sheep** and **goat** meat is due to remain stable, supported by a steady domestic demand.

By contrast, the EU demand for **poultry** meat is projected to grow steadily over the outlook period. The EU's production could reach 16.5 million t by 2030, thanks also to strong global demand. Exports will mainly consist of cuts that are less in demand in the EU.

Specialised crops

The EU's **olive oil** production is expected to further intensify with an increase in production capacity. Domestic consumption could grow, mainly outside of the main producing countries. At global level, strong demand in traditional and new markets should lead to an increase in EU exports.

Total EU **wine** production and domestic use, both for human consumption and for distillation, is expected to further decline over the outlook period, though at a slower pace than in the previous decade. Despite strong competition from other world regions, EU exports could continue to grow, driven in particular by geographical indications and sparkling wines.

Although the EU's **apple** production area is projected to decrease, production could remain stable thanks to increasing yields. The decrease in consumption of both fresh and processed apples is expected to slow down over the medium term.

Peaches and **nectarines** face increasing competition from other summer fruits and their consumption is due to further drop. EU production is expected to decline slightly due to a decreasing growing area.

The EU's **orange** production is expected to stabilise over the medium term. Consumers' increasing preference for fresh juices over concentrates is due to translate into increasing production and imports for the fresh market, to the detriment of processed oranges.

The EU's production of fresh **tomatoes** is expected to remain relatively stable. The value of production should continue to rise thanks to a wider range of products. Domestic and global demand for processed tomatoes could lead to increased total EU production.

Agricultural income

This market outlook analyses how market trends would translate into farmers' **income**, given current assumptions and including sectors not explicitly covered herein. By 2030, average EU farm income could increase, due to a rising volume of production and appreciating prices. Nevertheless, the fall in pigmeat prices and the subsequent decrease of production, as well as lower prices for wheat, maize and soya beans in the beginning of the period, should translate in a decrease in income by 2025, mainly in the EU-15.

The labour outflow from the agricultural sector due to structural changes at EU level is expected to slow down. A wider range of profiles of agricultural workers and farm managers is expected, as are changes in the nature of their work, due to technological progress in machinery and equipment, and better decision-support tools.

Environmental and climate aspects

This report provides an environmental analysis of the medium-term developments of EU agricultural markets based on a set of environmental and climate indicators. These indicators include farm and food chain greenhouse gas (GHG) emissions or carbon footprint, nitrogen footprint, water consumption footprint and land footprint. The analysis presented in this report is likely to be an overestimation of the negative environmental and climate impact in the regions in question, as models cannot fully capture the beneficial effects of certain CAP measures in place and changes in farm management practices.

Ruminants' digestion is responsible for a significant share of GHG emissions. The projected sharp decrease in dairy cattle numbers is expected to contribute to a reduction in GHG emissions. On the other hand, higher crop yields and production could increase nitrous oxide emissions, as could manure application on fields. Bearing in mind that environmental analysis models do not account for ongoing and expected changes in farm practices, GHG emissions are projected to remain at a comparable level by 2030.

Using a life-cycle assessment approach, the analysis estimates the split of agricultural GHG emissions into farm gate emissions and post-farm gate emissions. The former includes the production of feed and other inputs such as fertilisers, while the latter accounts for additional emissions from land-use change, processing, transport, packaging and retail. The highest farm gate footprint per amount of protein is found for ruminant meat, followed by dairy products. The lowest footprint, far below the footprint from cereals, corresponds to proteins from pulses and soya beans. Results of food system emissions, including both farm gate and post-farm gate emissions, show that the EU has a lower food system footprint than the world average for most products.

Main assumptions

The 2030 outlook reflects current agricultural and trade policies, including future changes that have already been agreed. The outlook takes into account the 2013 reform of the CAP and the options for implementing it. However, the level of aggregation of the model does not allow all details to be modelled. The impact of the 'agricultural omnibus' package on the CAP has been taken into consideration based on expert judgement.

Only free trade agreements that are already in force are taken into account. These include the agreements with Japan, Canada, Singapore, the Southern African Development Community and the updated agreement with Ukraine. Other trade agreements that have been negotiated but not signed or ratified, such as those with Vietnam and Mercosur, and the updated one with Mexico, are not taken into account. The outlook takes account of Russia's import ban on agricultural products and foodstuffs, which is assumed to remain in place until the end of 2020.

Current climatic trends are expected to continue over the outlook period. The resulting changes in production have been considered through expert judgement. More specifically, crop and milk yields are expected to slow down due the climatic pressure. However, extreme events are not accounted for. Such scenarios are included in the uncertainty analysis described below and in the 2017-2030 outlook.

According to macroeconomic assumptions, the oil price will fall in the short term, down to USD 62/bbl in 2020, before rising again, reaching USD 83/bbl in 2030. A small appreciation of the euro is expected in the medium term, reaching USD 1.17/EUR by 2030. EU economic growth is expected to slow down in the short term to around 0.9% in 2020, but to grow in the medium term (i.e. 2020-2030) at around 1.2% per year.

These assumptions are based on the average trends expected for agricultural markets, so they presume market developments to be relatively smooth. However, in reality markets tend to be much more volatile.

An uncertainty analysis accompanying the baseline quantifies some of the upside and downside risks and provides background on possible variations in the results. In particular, it takes account of the variability in the macroeconomic environment and the yield for the main crops.

In addition, to address the implications of selected uncertainties, specific scenarios are analysed and presented throughout the report. These scenarios include a shift in diet towards a more plant-based protein intake, moving into completely GM-free European dairy farming model, and the severe drop in Chinese pigmeat supply following the African swine fever outbreak.

ABBREVIATIONS

ASF	African swine fever
AWU	annual working unit
BSE	bovine spongiform encephalopathy
CAP	EU common agricultural policy
CH_4	methane
CO_2	carbon dioxide
CPI	consumer price index
CV	coefficient of variation
EBA	'everything but arms'
EC	European Commission
ECB	European Central Bank
EFA	ecological focus areas
E10	blend of up to 10% ethanol and 90% gasoline
E85	blend of up to 85% ethanol and 15% gasoline
EU	European Union
EU-N13	EU Member States that joined in 2004 or later
EU-15	EU Member States before 2004
EU-27	EU Member States without the UK
EU-28	current EU Member States
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
ILUC	indirect land-use change
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
LCA	life-cycle assessment
LUC	land-use change
LULUCF	land use, land-use change and forestry
N	nitrogen
N_2O	nitrous oxide
NH_3	ammonia
OECD	Organisation for Economic Cooperation and Development
PDO	protected designation of origin
PGI	protected geographical indication
R&D	research and development
RED	Renewable Energy Directive
SMP	skimmed milk powder
TRQ	tariff-rate quota
UAA	utilised agricultural area
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
US	United States of America
USD	US dollar
WEI	water exploitation index
WMP	whole milk powder
WTO	World Trade Organization

bbl	barrel
eq.	equivalent
g	gram
hl	hectolitres
ha	hectare
kg	kilograms
l	litre
pp	percentage point
t	tonne
t.o.e.	tonne oil equivalent
w.s.e.	white sugar equivalent

INTRODUCTION BASELINE SETTING

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This chapter presents the main assumptions used for the projections in the medium-term outlook for major EU agricultural markets and agricultural income to 2030. It includes assumptions on 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 is based on a set of coherent macroeconomic assumptions. It assumes normal agronomic and climatic conditions, steady demand and yield trends, and no particular market disruption (e.g. from animal disease outbreaks, food safety issues, geopolitical event, etc.). In addition, the medium-term projections reflect current agricultural and trade policies, including future changes already agreed upon.

The economic outlook takes into account changes in macroeconomic conditions originating from the UK vote of June 2016 and the subsequent withdrawal negotiations, in terms of the economic growth rate and the exchange rate. Our projections include the UK in the EU for the full duration of the outlook period and assume a status quo in terms of trading relations.

BASELINE SETTING AND POLICY ASSUMPTIONS

The assumptions in this outlook imply relatively smooth market developments. In reality, however, markets are likely to be much more volatile. 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, in a given macroeconomic environment that was plausible at the time of analysis but not certain.

This outlook covers 2019-2030. The projections are based on the OECD and FAO Agricultural Outlook 2019-2028 updated with the most recent global macroeconomic and market data. The statistics and market information used are those available at the end of September 2019. A lower short- and higher mid-term crude oil price assumption has been retained, and adjustments to the economic growth path and recent currency developments have been taken into account.

As macroeconomic forecasts and yield expectations are by nature surrounded by uncertainty, a systemic uncertainty analysis around the baseline is performed. Such analysis enables us to illustrate possible developments caused by the uncertain conditions in which agricultural markets operate. This report presents possible price ranges around the expected baseline. A more systematic representation of the variability in agricultural markets stemming from these uncertainties is summarised in the section on 'Uncertainty analysis' of this introductory chapter.

In addition, to address the implications of selected uncertainties, **specific scenarios** are analysed and presented. Those analyse possible effects of: (i) a shift in European consumer's diet towards a more plant-based protein intake, (ii) moving towards GM-free European dairy farming and (iii) the severe drop in Chinese pigmeat supply following the African swine fever (ASF) outbreak. While the OECD-FAO outlook did not fully account for the extent of ASF impact in China, the baseline presented in this outlook partly draws from the results of that last scenario.

Our **policy assumptions** take the 2013 CAP reform into account, which fully entered into force in 2015. The following aspects of the reform have a particular impact on market and income developments: the absence of production quotas, the intervention mechanisms, the private storage, the decoupled basic payment scheme and the coupled payments. The European Commission's CAP post-2020 proposal of June 2018 is not included in the baseline.

Exceptional market measures can be deployed to address severe market disturbances. These are not explicitly modelled in the long term as the baseline does not include unforeseen market disruptions and as decisions for exceptional measures are taken on a case-by-case basis.

Given the geographical aggregation of the model, it is not always possible to capture the redistribution of direct payments between and within EU Member States or the targeted allocation of all coupled payments. Similarly, the voluntary capping of payments, specific schemes for small farmers and young farmers and the redistributive payment are not accounted for. Nevertheless, expert judgement incorporates several elements in the projections.

Environmental policies are not explicitly taken into account in the model. However, the effects of the Nitrate Directive and other environmental rules on water and air quality are factored into the analysis. The effects of 'greening' are taken into account to the extent possible. Three main components for greening could have an impact on the outlook[1]: (i) crop diversification, (ii) permanent grassland maintenance and (iii) ecological focus area (EFA) requirements. Overall, these environmental measures have little effect on aggregate production levels. The European Green Deal outlined by then-President-elect von der Leyen in July 2019 is also not accounted for.

Recent free trade agreements (FTA) already implemented (with Ukraine, Japan and Canada) are included, while the others (with Mercosur, Vietnam and the updated FTA with Mexico) are not. This outlook assumes the Russian ban on European agricultural exports to be lifted at the end of 2020. As Russia has become more and more self-sufficient in several agricultural sectors, lifting the ban would not translate in similar export levels as before the ban. The trade tensions between the US and China, and the tariffs following the Airbus case[2] are not explicitly modelled, although expert judgement partly accounts for the latter.

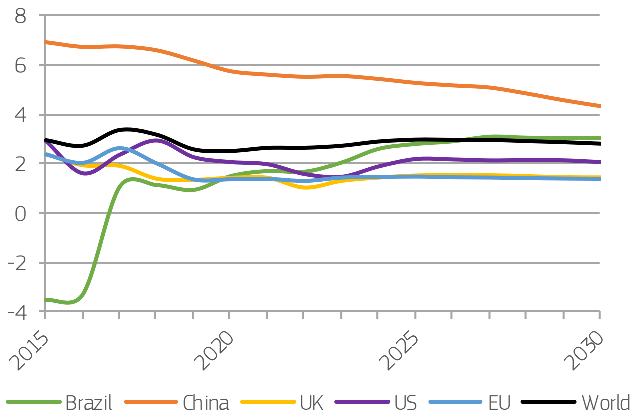
Our projections are based on a purely technical assumption of status quo in terms of trading relations between the EU-27 and the UK. That is justified given the further extension of the period provided for in Article 50[3], with a view to allowing for the finalisation of the ratification of the revised Withdrawal Agreement and the uncertainty on future economic relations between the EU and the UK.

1. European Commission (2016, 2017).
2. The US obtained in October 2019 the right to apply tariff sanctions to the EU in the framework of the dispute settlement 'European Communities and certain Member States – Measures Affecting Trade in Large Civil Aircraft' (DS316) at the World Trade Organization.
3. The Treaty on European Union, enacted by the Treaty of Lisbon in 2009, introduces in Article 50 a procedure for a Member State to withdraw voluntarily from the EU.

MACROECONOMIC ENVIRONMENT

Macroeconomic assumptions are based on a combination of the European Commission economic forecast for 2019-2021[4], and IHS Markit[5] macroeconomic forecasts for the longer term. The OECD provided additional information and a workshop held in October 2019 in Brussels validated assumptions through expert judgement.

GRAPH 1.1 Economic growth assumptions, GDP (%)



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

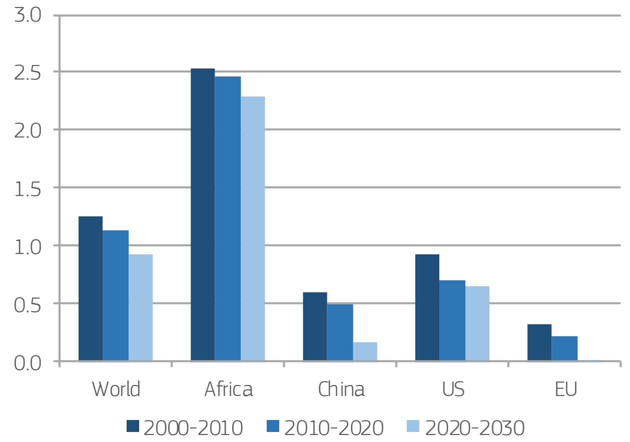
The trade tensions between the US and its partners, first and foremost China, are a key concern for the world economy. Global **economic growth** is expected to amount to 2.8% in 2030, with 4.3% in China, 2.1% in the US and 1.4% in the EU.

Oil prices are a strong driver of agricultural commodity prices as they impact production costs (through the cost of energy, fertilisers and other inputs), and competitiveness and demand for biofuels. In spite of the low economic growth in the EU and the shift towards renewable energy and gas, the decline in oil demand is expected to remain moderate. On the supply side, oil production is not projected to fall before 2040. At the time of drafting this report, due to over-supply, the oil price was forecast to fall to 62 USD/bbl in 2020. In light of new information on the difficulties for producing countries to agree on limiting production, the drop might be even stronger. Forecasters predict a rising oil price in the longer term, but they disagree on the scale of the increase. Therefore, for this report, we used an average between the OECD and IHS Markit forecasts, at 83 USD/bbl in 2030.

Exchange rates impact European agricultural exports, through a direct effect on competitiveness. As oil prices, exchange rates are very hard to predict, forecasters even project opposing trends for the USD/EUR exchange rate. In this outlook, we used an average between the OECD and IHS Markit forecasts. In the short term, favourable monetary and fiscal policies are expected to support the US dollar. In the longer term, the euro is projected to appreciate slightly from 1.12 USD/EUR in 2019 to 1.17 USD/EUR in 2030. According to IHS Markit, that trend can be justified by, for instance, a greater trade openness in the EU than in the US, a stronger focus on inflation at the European Central Bank (ECB) than at the US Federal Reserve, and a slower recovery after the crisis in the EU than in the US.

The next section of this introductory chapter describes in more detail possible developments caused by uncertain oil prices and exchange rates.

GRAPH 1.2 Population annual growth assumptions (%)



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

World **population growth**, as a key driver of demand growth, is expected to slow down to 0.9% per year over the outlook period. The outlook projects a major fall in Chinese population growth from 0.6% in 2010-2020 to less than 0.2% in 2020-2030, and a stabilisation of the European population by 2030. The African population now represents 17% of the global population, with 1.3 billion people. It is projected to continue growing relatively fast but at a slower pace: from 2.5% per year on average in 2010-2020 to 2.3% per year on average in 2020-2030. It could catch up with the Chinese population by 2025 and reach 1.7 billion people in 2030. As African food production is unlikely to keep up, African food imports are expected to continue rising.

4 European Commission (2019b).
5 https://ihsmarkit.com/

UNCERTAINTY ANALYSIS

Uncertainties around outlooks

Every outlook exercise carries its uncertainties, whether geopolitical, macroeconomic or simply related to unforeseen events or changes. The baseline projections presented in this report are based on a set of plausible assumptions that are the result of consulting market experts, scientific research and literature reviews. In this sense, the projections reflect the 'most likely' path of market developments.

For example, in addition to trade policies, the EU milk market is expected to be influenced by two broad trends in the outlook period. First on the consumption side, a shift in preferences for dairy consumption in Asia and elsewhere is expected to increase demand for dairy products produced in the EU. Second on the production side, yields are affected by an increasing share of organic producers (in response to a shift in consumption preferences) which, presumably, leads to increasing production costs and lower supply. The sum of these and other supply and demand shifts determines the net market effect. However, the inherent uncertainty of future developments and trends requires expert judgement. The EU milk price development until 2030 included in this outlook, for instance, is ultimately a matter of expert opinion and only one among many plausible price paths. In this chapter, we briefly summarise the uncertainty analysis linked to the development of underlying market drivers and trends.

As discussed above, many factors can affect commodity markets. These can be grouped into those that affect production and those that affect consumption. In this report, market uncertainty is assumed to derive from macroeconomic and yield developments deviating from their baseline trajectories (deemed most plausible at the time of the analysis). The yields and macroeconomic variables can be considered as proxies for the numerous underlying drivers affecting supply and demand. Specifically, the variables assessed in this analysis include the gross domestic product (GDP), the inflation, the exchange rate, the international crude oil price as well as crop and milk yields. These variables are the inputs going into the uncertainty analysis.

An input variable with a high level of variation historically, will also result in a large variation in market outcomes (prices, production, etc.). Therefore, it is interesting to know which of the input variables are most variable (uncertain) – i.e. the main drivers of market uncertainty. One measure of variability that allows for comparison across variables measured in different units is the coefficient of variation (CV)[6]. Input variables with high CV values are therefore more important drivers of market uncertainty than the ones with low CV values.

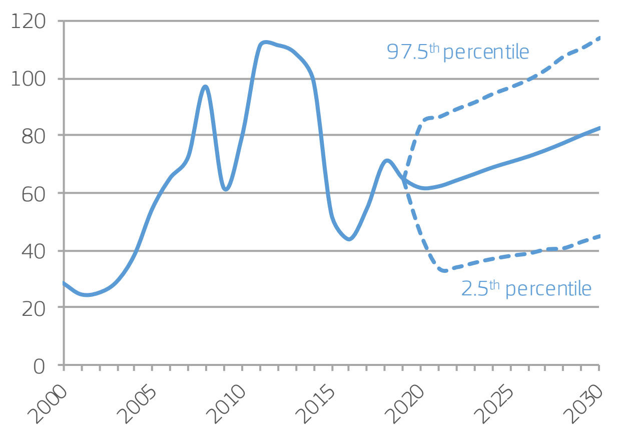
The main macroeconomic drivers of market uncertainty are the crude oil price (CV=19.5%) and the exchange rate (3.9%). Crop wise, the main drivers of uncertainty are the yields of sugar beet, rye, soya beans and oats (see Annex).

Another way to illustrate the uncertainty of a variable is to plot percentiles from its distribution. Throughout this report, 2.5th and 97.5th percentiles are frequently shown in graphs on price projections, highlighting in between dashed lines where 95% of alternative outcomes lie.

High uncertainty of oil price and exchange rates

The baseline projects a crude oil price at USD 82.6/bbl in 2030 with a 95% uncertainty range from USD 45.4/bbl to USD 114.3/bbl.

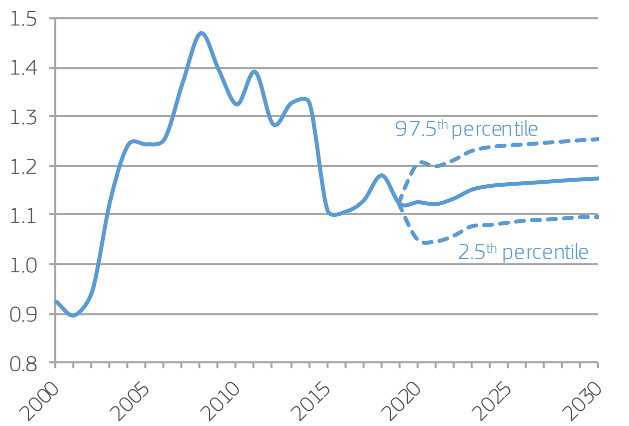
GRAPH 1.3 Oil price assumption (USD/bbl) and 95% uncertainty range



A similar analysis is carried out for the USD/EUR exchange rate, for which the CV is 3.9%. The CV for exchange rates of other currencies against the USD vary between 1.2% (yuan) and 9.9% (Brazilian real). The 95% uncertainty range around the 2030 baseline projection (at USD 1.17/EUR) lies between USD 1.10/EUR and USD 1.25/EUR.

6 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 2030 across 1 000 simulations).

GRAPH 1.4 Exchange rate assumption (USD/EUR) and 95% uncertainty range

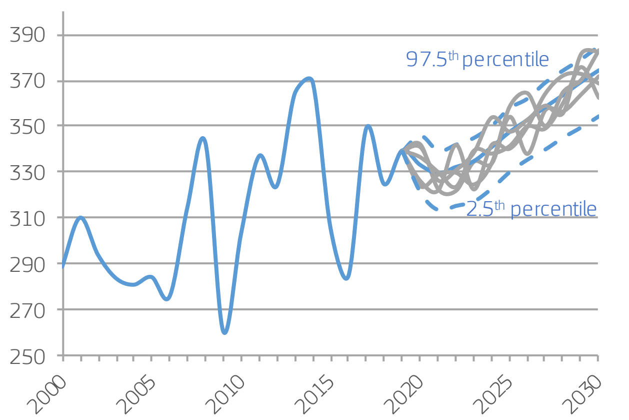


Crop markets strongly affected by uncertainties

Macroeconomic and yield uncertainty mainly affect crop markets: they directly affect production and related costs, with demand, exports, imports and ending stocks adjusting while markets find a new equilibrium. The crops with the highest degree of market uncertainty (related to producer prices) are oilseeds and derived products, and cereals (see Annex).

Macroeconomic and yield uncertainties affect other commodities as well, such as livestock products, mainly through feed markets. Important factors in livestock markets include the world crude oil price and the price of protein meals. However, producer prices for livestock products are generally less uncertain than the ones for crops.

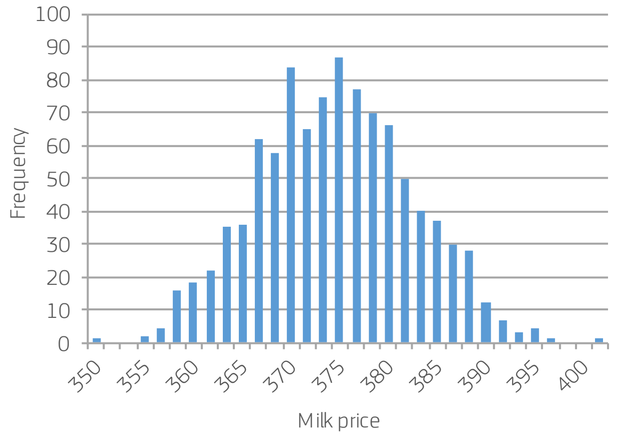
GRAPH 1.5 95% uncertainty range and five possible price paths for EU milk prices (EUR/t)



The main driver of uncertainty for biofuels is the crude oil price, which impacts consumption through policies such as the mandatory biofuel blending. Moreover, yield developments in vegetable oil markets affect biodiesel production which is of relevance in the EU. From a global perspective, uncertainties in sugar and maize markets have a significant impact on ethanol production, particularly in Brazil and the US.

Uncertainties of imports and exports are driven mainly by exchange rates that alter the relative competitiveness of EU commodities on international markets.

GRAPH 1.6 Distribution of EU milk price (EUR/t) outcomes by price range, 2030



Methodological background

The uncertainty analysis is based on the Aglink-Cosimo economic model, which is a mathematical representation of the global agricultural commodity markets and their links[7] to one another. In that model, macroeconomic country-specific variables including the GDP, the domestic currency/US dollar exchange rate, the consumer price index (CPI), the population size and the international oil price, affect production costs and/or consumption demand. A change in each of these variables will affect the markets for each commodity through model linkages. Commodity yields are endogenously determined within the model as are producer prices, production, etc. However, the model allows for changes to the equilibrium prices and quantities, as long as the basic market balances are obeyed. This attribute is exploited in connection with the baseline work as well as in connection with the uncertainty analysis[8].

A macroeconomic or yield time series which differs from the one going into the baseline will lead to set market outcomes that are different from the baseline values. In the uncertainty analysis, the model is solved for a large number of alternative macroeconomic and yield time series, and the resulting distribution of market prices is tabulated. The alternative macroeconomic and yield time series are generated from a statistical model, which is used to separate the random movements in the data over time from the ones that can be predicted from trends or historically stable relationships between the variables.

[7] See Araujo Enciso et al (2015).
[8] For more details, see Araujo Enciso et al (2017).

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CONSUMER TRENDS

/2

Societal demands will remain a key driver in shaping agricultural markets over the next decade. Consumers and citizens show increasingly pressing and at times conflicting expectations towards food, extending beyond food affordability to issues such as health, origin, convenience, environment, climate change, animal welfare, etc.

At the same time, global consumption per capita is increasing, as well as self-sufficiency in some parts of the world. This will likely change global trade flows and provide opportunities to the EU to gain market shares in some markets while facing heightened competition on others.

This chapter looks firstly into the drivers and evolution of consumption trends. It then provides a scenario on what would happen on agricultural markets if the EU diet would gradually shift towards a 50/50 ratio between animal and plant-based proteins. The chapter concludes with an outlook for organic products. While differentiation between organic and conventional production is not available in the Aglink-Cosimo model, projections for organic are largely based on expert judgement and literature review, taking into account historical trends in supply and demand.

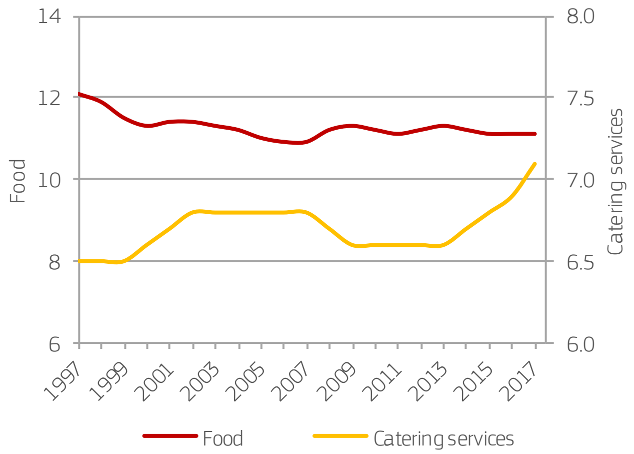
DRIVERS BEHIND CONSUMER TRENDS

Food market developments are driven by societal demands but consumers' behaviours may at times be seen as contradicting their claims. In any event, food remains at the centre of people's concerns.

Stable share of food in households' spending

EU households spend about 11% of their budget on food, a stable share for the last 10 years. At the same time, after a drop due to the 2008 economic crisis, spending on food services, including restaurants, cafés and canteens increased moderately, to more than 7% in 2017. With the expansion of food delivery how this trend will evolve remains to be seen.

GRAPH 2.1 Share of food and catering services on overall EU household expenditure (%)



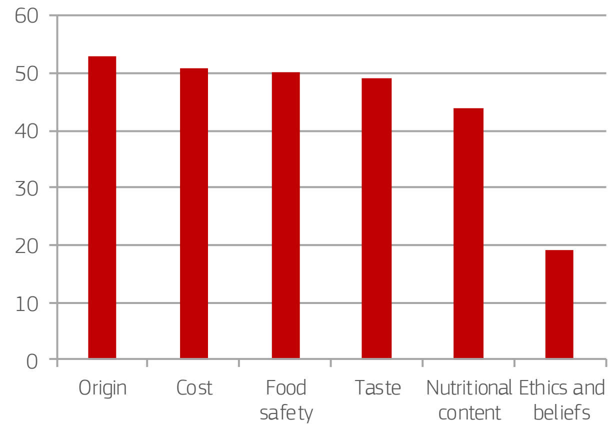
Source: DG Agriculture and Rural Development, based on Eurostat.

Challenging consumer demands

Regarding food safety, 35% of EU citizens are concerned about antibiotics, pesticides, environmental pollutants and food additives[9]. The same survey concluded that 50% of EU consumers pay attention to origin, cost, food safety and taste.

Consumers have more information available at hand (e.g. apps providing food composition). This leads to changes in their behaviour (e.g. buying less juices because of sugar content) and in recipes by the food industry (e.g. less additives, salt and sugar). At the same time, food becomes more functional and customised to specific consumers' needs. In relation to rising concerns about health, climate change and animal welfare, meat consumption is expected to slightly fall in the EU. The number of vegetarians and vegans is particularly high in the younger generation (above 8% in Germany, France, Italy and Poland[10]), and the number of flexitarians (consumers eating less meat) is increasing across all generations. Societal concerns lead also to an increasing demand for organic products, which is expected to support production growth in the medium term.

GRAPH 2.2 Most important factors for EU consumers when buying food (%)

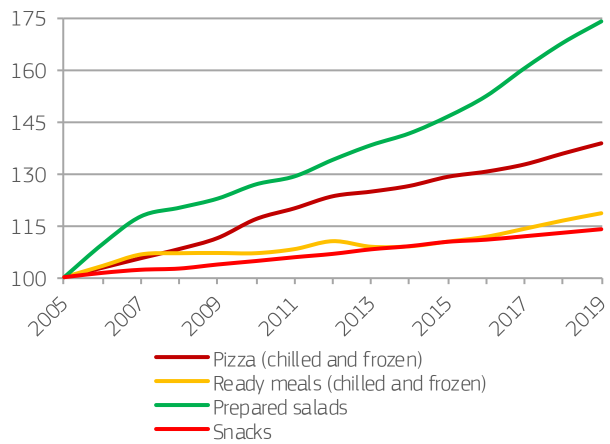


Source: European Food Safety Authority (2019).

Contradicting trends

Due to these societal concerns, a further move towards more natural products could be expected. However, busy lifestyles favour sales of ready meals, prepared salads and processed foodstuffs, as well as food deliveries. In addition, snacks are also becoming popular. Therefore, big opportunities arise for additional market differentiation towards convenient and ethic-friendly food providing consumers satisfying experiences.

GRAPH 2.3 Retail volumes of selected products in top 10 EU markets (2005=100)



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

9 European Food Safety Authority (2019).
10 Schierhorn C. (2017).

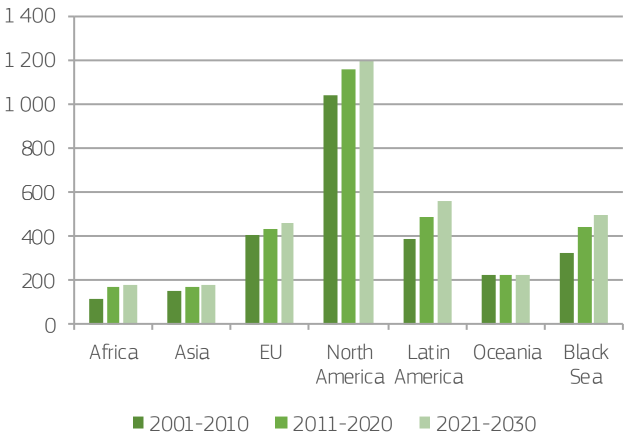
CONSUMER TRENDS

World grain consumption for animal feed strengthens

World demand for animal feed will grow, but also for human consumption and industrial uses (biofuel and bio-plastics). The main producing and exporting regions (the Americas, the EU and the Black Sea region) are expected to keep on specialising and increasing their share in global trade to meet this demand.

Wheat surplus in the EU as well as maize surplus in the US are projected to increase. Similarly, Latin America is foreseen to sharply increase its production of maize and soya beans to meet an increasing domestic feed demand, but also to target growing import needs in other continents. The Black Sea region is likely to increase its exports of wheat, maize and soya beans, while also increasing its consumption mainly targeted to feed.

GRAPH 2.4 Cereal consumption per capita (kg/capita/year)



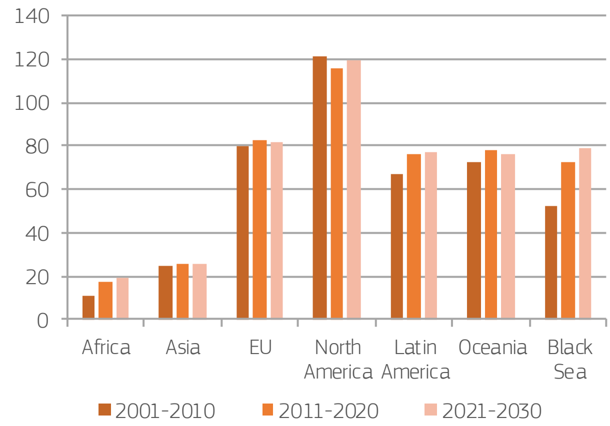
Note: Black Sea includes Russia, Ukraine and Kazakhstan. Latin America includes South America and Mexico.

Diverging trends in world meat consumption

The decrease in per capita consumption of bovine meat is projected to continue in many regions of the world (the EU, Latin America and Oceania) but could increase in other parts such as in African and Asian countries. The limited increase in production will result in reinforcing trade towards these regions. Both production and per capita consumption in North America are expected to increase slightly.

By contrast, world poultry consumption per capita is projected to increase. Both the Black Sea region and Asia could reduce its deficit (or become net exporters) while the population growth in Africa would lead to increasing imports. Concerning pigmeat, the EU and the Americas are expected to increase their exports to satisfy world demand. In the case of the Americas, per capita consumption will also rise.

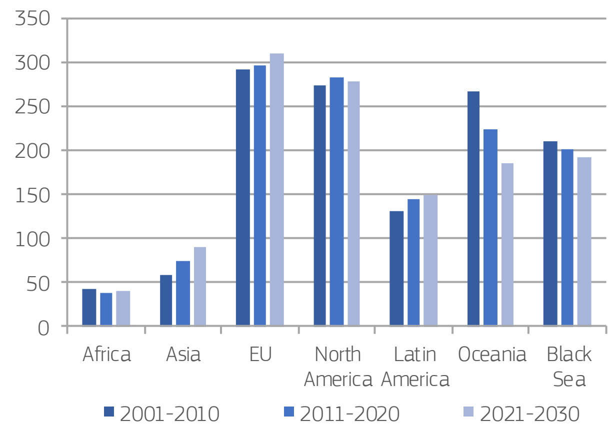
GRAPH 2.5 Meat consumption per capita (kg/capita/year)



Increasing appetite for dairy worldwide

The EU and the US continue to be at the top of the per capita dairy consumption rankings, reflecting strong dairy culinary traditions. In Oceania, particularly New Zealand, the sector is mainly relying on exports and per capita consumption is expected to decline. By contrast, Asia and Africa feature lower (but rising) in the per capita consumption rankings and show some possibilities for extra growth. On the production side, the projected growth in Asia and Latin America could further close the gap to meet a growing domestic demand.

GRAPH 2.6 Dairy products consumption per capita (kg/capita/year)



Note: Figures do not include butter. See dedicated section on 'Dairy products' for more details.

SCENARIO: A PROTEIN SHIFT IN THE EU DIET

Animal protein (meat, dairy, eggs and fish) plays a major role in EU diets. However, animal production raises sustainability and societal concerns related to environment, climate change, health and animal welfare. Moreover, excessive consumption of animal protein is considered to exert pressure on the global food system. As a consequence, in the EU, consumption trends indicate some increase in alternative plant-based diets, which could change the future balance of protein consumption. In particular, a gradual shift towards flexitarianism, including novel plant-based meat alternative products, and in the future lab-grown meat, could have a significant impact on agricultural production in the EU, over the next 10-20 years[11]. In the last few years, significant investments into alternative meat products have been made and plant based burgers are increasingly available on the market. This scenario looks at what would happen if the EU diet would structurally change over the next 10 years.

Scenario assumptions

In the latest OECD-FAO baseline[12], the EU diet sources 42% of its proteins from plants and 58% from animal products. Under this scenario, this ratio is gradually changed over 10 years to achieve a 50/50 ratio, based on assumptions taken in previous studies[13]. We achieve this by gradually reducing domestic consumption of animal products until reaching a 17% drop by 2030. At the same time, we increase the consumption of plant products to maintain the per capita consumption of calories, proteins and fats.

TABLE 1.1 Changes in weekly EU human consumption, compared to the baseline, 2030 (grams per capita)

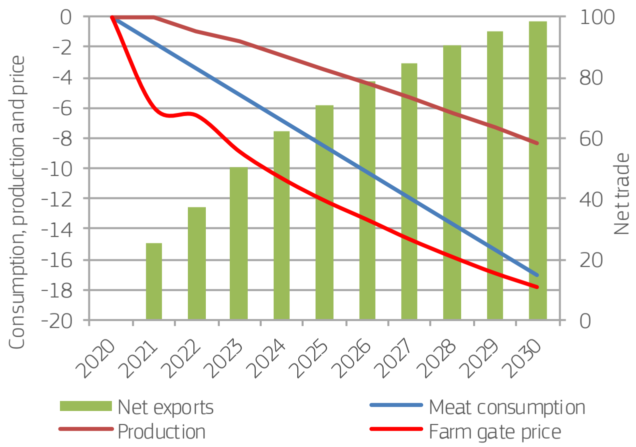
Plant Protein Sources		Animal Protein Sources	
Cereals	+44	Meat	-192
Pulses and soya beans	+106	Dairy	-609
Vegetables and nuts	+319	Fish and eggs	-103
Total	+469	Total	-904

Note: Meat products are aggregated in carcass weight and dairy products in milk equivalents (dairy decrease in product weight = 348 g/week).

Impacts on meat and dairy markets

The scenario shows that a diet shift towards plant protein would certainly pose challenges to the EU meat and dairy sectors. This decline in EU meat consumption exerts pressure on domestic meat prices, which would decrease by 18% in 2030 compared to the baseline. These lower producer prices would increase the competitiveness of the EU meat sector in global markets, leading to an increase of exports and a decrease of imports. Assuming no additional changes in trade policies, by 2030 net EU exports in meats would nearly double. In addition, EU meat production could decline by 8% in 2030.

GRAPH 2.7 Changes in EU meat markets, compared to the baseline, 2020 2030 (%)



Source: DG Agriculture and Rural Development, based on OECD-FAO Agricultural Outlook.

A similar logic applies to the dairy sector, where domestic consumption would also drop by 17% compared to the baseline in 2030. As a result, milk prices would drop by 17%, net exports in milk equivalents would increase by 53% and milk production would drop by 5% by the end of the baseline period.

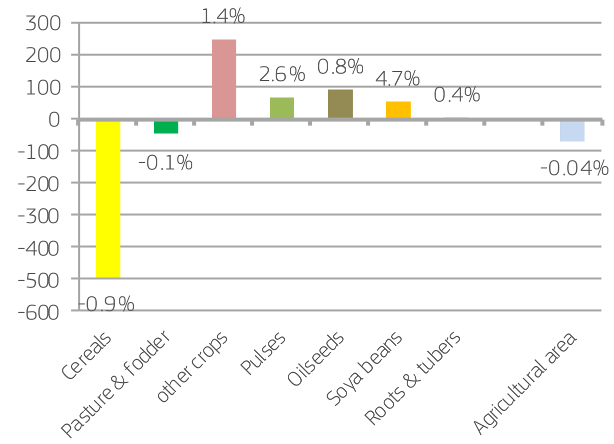
Given the drop in animal production, domestic livestock would decline compared to the baseline. The dairy cow herd would be cut by 3% with milk yield declining by 2%, and the suckler cow herd would decline by 7% in 2030, contributing to the reduction of 4% in the total EU cattle herd. Poultry numbers would also decline by 12%, while sheep and pig livestock would drop respectively by 3% and 6%. This lower number in livestock would also strongly affect feed demand.

11 Gerhardt et al. (2019).
12 OECD/FAO (2019).
13 INRA (2019).

Impacts on crop markets

In the arable crop sector, the increase of grains, pulses and other plant-based food for human consumption will not compensate for the decrease in demand for animal feed. Consequently, the EU agricultural harvested area could slightly decline. The soya bean area would show the most dynamic land-use change, increasing by 5% in 2030. The increase in soya bean demand for human consumption could be sourced from increased EU production and a growing share of imported soya would be used for food purposes rather than feed (given reduced protein meal feed demand). Similarly, the pulses area would increase due to higher human consumption. Notably, the area devoted to other crops widens due to a higher consumption of vegetables and nuts.

GRAPH 2.8 Changes in EU land use, compared to the baseline, 2030 (1 000 ha)



The decline in demand for feed implies that cereal prices drop by 6% in the EU, and cereal net exports increase by 38% in 2030 as imports decline and exports increase. The EU soya bean producer price increases by 19%, while the producer price of pulses remains stable.

Environmental impacts

This shift from animal to plant-based protein sources could also generate some potential beneficial impacts on the climate and the environment. For instance, the carbon footprint of the EU agricultural sector would be reduced by 6% (22 million t CO_2 eq) in 2030 compared to the baseline. This includes lower methane and nitrous oxide emissions, not taking into account Land Use and Land Use Change (LULUC) effects. Moreover, additional positive effects are to be obtained, with non-EU countries reducing their greenhouse gas (GHG) emissions by 33 million t CO_2 eq. This has to do with the fact that the EU could gain global market share in the meat and dairy markets and that, compared to its competitors, the EU has a more productive livestock system with less GHG emissions per product unit.

Conclusions

The impact of the diet shift on production and prices is only partly moderated by the EU's ability to increase its net export position. Moreover, this scenario does not take into account a potential similar dietary shift in other developed economies, reducing the EU's net export growth potential for meat and dairy products.

The assumed 'New diet 2030' does not introduce novel plant-based meat alternative products or lab-grown meat products into the diet. Instead, it includes an increased share of cereals, pulses, soya beans, vegetables and nuts in the consumer's shopping baskets. This excludes the processing stage of producing plant-based meat alternatives, which has a conversion rate of plant calories to plant-based meat alternative calories of roughly 75%. Consequently, the impact of a changing diet where plant-based meat alternatives replace conventional meat would require a more significant change in demand for pulses, soya, vegetable oils, roots and tubers than shown under this scenario.

This analysis was conducted at JRC.D.4 (Seville) with the in-house version of the Aglink-Cosimo model and using the global OECD-FAO 2019-2028 baseline as reference (http://www.agri-outlook.org/). How to cite this box: Jensen H. and Pérez Domínguez I. (2019), Scenario: A protein shift in the EU. In: EC (2019), EU agricultural outlook for markets and income, 2019-2030. European Commission, DG Agriculture and Rural Development, Brussels. Contact: hans.jensen@ec.europa.eu.

ORGANIC

Further growth in organic demand to boost supply

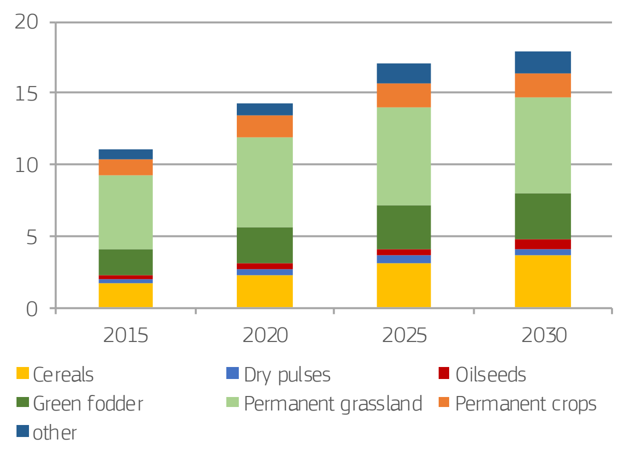
Growth rates of organic retail sales have been significant over the last years, and the EU market reached EUR 34.3 billion sales value in 2017[14]. Demand for organic produce is expected to continue to grow at a sustained rate until 2030. Addressing the demand for organic produce by converting agricultural systems has however proved to be challenging, as farmers need to implement very different production techniques. This entails, for example, higher reliance on labour due to reduced possibilities to use plant treatments and to stricter rules on animal welfare and medication. Higher production prices for organic products do not systematically offset production and conversion costs, which has translated in production lagging behind demand in the EU. Despite these challenges, organic production has strongly increased over the past 10 years and high growth rates indicate that the organic market has not yet reached maturity.

Market differentiation could slow down organic growth

The annual growth of production is expected to remain strong but lower over the second part of the outlook period[15], due to challenges for conversion. Market differentiation, such as zero pesticide labelling, could also weigh on the growth of the organic market. By 2030, the EU organic area could reach 18 million ha, or 10% of total agricultural land, against 7% in 2018. This represents a growth in land use of 3% per year, compared to an annual growth of 5% between 2006 and 2018. Slower development is projected in permanent pastures and permanent crops, where organic produce has already reached significant shares (9% and 12% respectively in 2017). These land uses are easier to convert to organic systems, and could mature at a quicker pace.

Production of organic arable crops is projected to keep increasing at a faster pace compared to pastures and permanent crops, given that production is strongly lagging behind demand, particularly for feed. This includes mainly cereals and oilseeds, but also sugar beet or pulses. For these crops, insufficient domestic supply is compensated by imports. Despite significant production growth, reliance on imports could remain high as demand also increases. Imports of organic products that are either not produced or produced in small quantities in the EU (e.g. coffee, tea, tropical fruits and nuts) are also expected to increase.

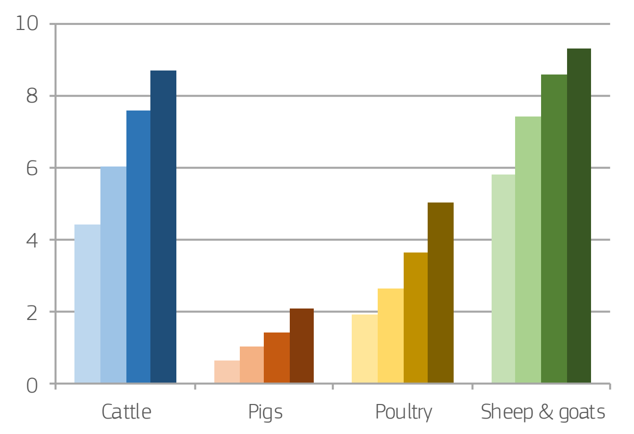
GRAPH 2.9 EU organic area by land use (million ha)



Facilitated by increasing availability of organic feed, organic livestock is projected to grow significantly for pigs and poultry. Organic pig production remains however very challenging to implement (e.g. outdoor access) and is projected to remain limited to 2% of the total livestock by 2030. The share of organic poultry livestock (including laying hens) could double from 2.5% to 5%.

In comparison, the share of organic cattle, sheep and goats is already high but their growth is projected to slow down. The number of organic dairy cows is however expected to continue growing at a sustained pace, which could translate into a 7% share of organic dairy milk production, up from 3% in 2017. Growth in organic dairy is mainly driven by increasing organic cheese production, while lower growth is expected in the already well-established organic milk production.

GRAPH 2.10 Share of organic livestock in total EU livestock, 2015-2020-2025-2030 (%)



14 Willer, H. and J. Lernoud (2019).

15 Organic production is not modelled separately from conventional in the Aglink-Cosimo model, and projections for organic are based on expert judgement and literature review, taking into account historical trends in supply and demand.

ARABLE CROPS

/3

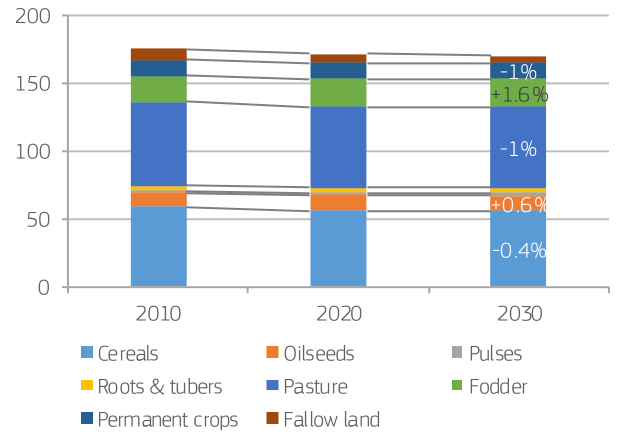
On the supply side, the EU arable crop area is expected to gradually decline compared to the last decade, but thanks to a small growth in yield a slight production growth is expected.

EU domestic demand for cereals and oilseeds remains driven mainly by feed use, although industrial uses will grow more rapidly. This year's medium-term outlook shows solid world demand over the outlook period, particularly targeted towards feed. EU cereal exports, however, will face increasing competition from key cereal exporting countries.

This chapter provides an overview of the outlook for arable crops (common wheat, durum wheat, barley, maize, rye, oats, other cereals, rapeseed, sunflower seed, 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 and continues with a closer look at cereals, rice, protein crops, oilseeds, sugar, the feed complex and biofuels.

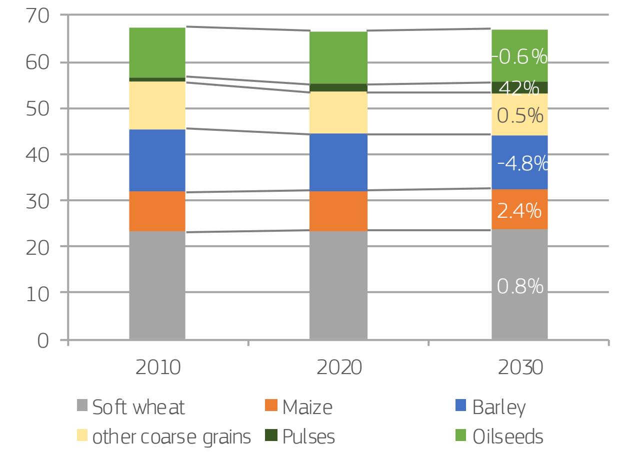
DEVELOPMENTS IN LAND USE

GRAPH 3.1 EU agricultural area (million ha)

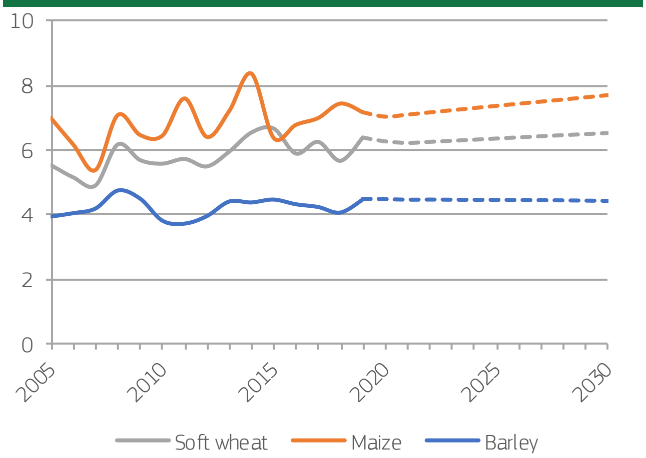


Note: Figures for 2010 and 2020 are 3-year averages.

GRAPH 3.2 Cereal, oilseed and pulses area in the EU (million ha)



GRAPH 3.3 EU yield for main cereals (t/ha)



Agricultural area loss is slowing down

The EU agricultural area is facing increasing competition from other land uses, such as afforestation and artificial areas (urban areas, roads). However, agriculture remains the largest occupation of land across the EU despite a slow decline towards 2030, at 174.4 million ha. Forests should continue to expand, mainly for silviculture and protected natural areas.

Pasture area is expected to continue to decline, although at a slower pace than in 2010-2020. The decrease should be around 1% of total pasture area, which should reach 59.7 million ha (stable share in the EU agricultural area). The limited decline should be mainly due to the demand for grass-fed dairy products (see section on 'Dairy products'). Furthermore, the increase of feed demand (through temporary grassland) as well as biogas production (from silage maize) could support an increase in the fodder area, to 20.8 million ha in 2030 (+2% compared to 2020).

Cereal and oilseed areas on a diverging trend with an increasing use of crop rotation

The EU cereal area is currently four times bigger than for oilseeds. The cereal area is projected to slightly increase (about 1%) and reach 55.6 million ha, while the oilseed area could lose about 200 000 ha to reach 11.4 million ha (see section on 'Oilseeds'). By contrast, the pulses area is due to expand the most (+4% per year over the outlook period), though at a slower pace than the previous decade (see section on 'Protein crops'), and reach 2.4 million ha in 2030.

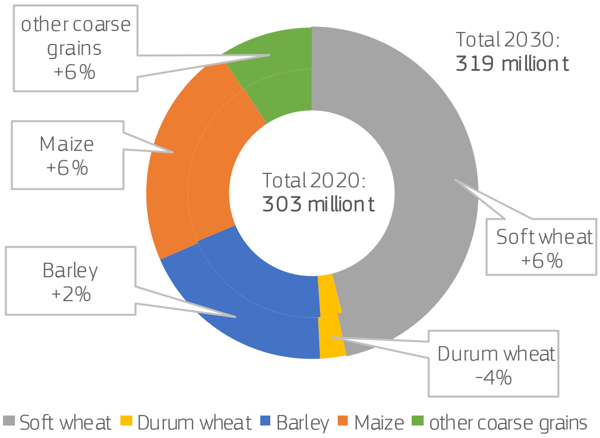
Crop rotation is key in farming practices and helps to maintain soil quality, in particular for nutrients' presence in soils. Furthermore, to cultivate wheat after rapeseed is recognised as beneficial, insofar as it breaks the pest cycles. Crop rotation systems are expected to be further developed across the EU and to result in an increase of the share of other cereals, such as oats, millet or sorghum.

Slow yield developments in the EU

The yield gap between EU Member States is due to further close in the outlook period. Yields are impacted by factors linked to public policy, such as a more restricted use of chemicals and technological progress in plant breeding, as well as by the increased number of extreme weather events. Farmers are however incentivised to develop alternative farming practices, and new technologies and advisory services are also expected to support them.

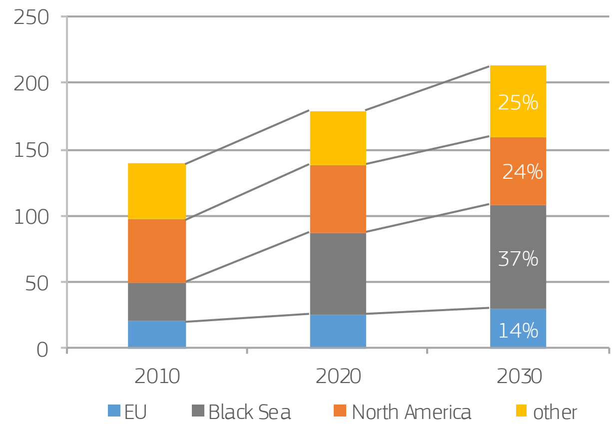
CEREALS

GRAPH 3.4 EU cereal production, 2020 (inner) and 2030 (outer)

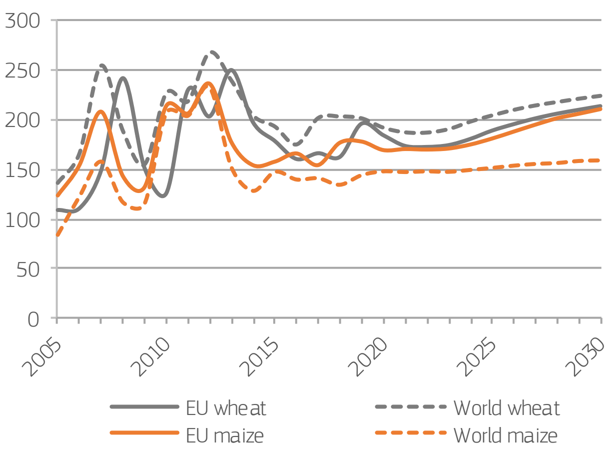


Note: Figures for 2020 and 2030 are 3-year averages.

GRAPH 3.5 World wheat exports (million t) and market shares in global trade (%)



GRAPH 3.6 EU and world prices for wheat and maize (EUR/t)



Area and yield developments result in an increase in total grain production

While total cereal area is expected to slightly increase, soft wheat and maize areas are expected to gain in the long run. Soft wheat area should expand towards the end of the outlook period and reach 23.8 million ha. A similar pattern is expected for maize, with increasing sowing area up to 8.8 million ha thanks to a strengthened demand for both animal feed and industrial purposes. By contrast, durum wheat and barley areas could slightly decline by around 0.5% annually, leading to 11.6 million ha of barley and 2.4 million ha of durum wheat in 2030. Total cereal production is projected to grow to 319 million t (5% increase compared to the average 2018-2020).

Dynamic EU domestic consumption

Feed use remains the first outlet for EU grains and represents 60% of the total consumption of the three main cereals: wheat, maize and barley. The EU market for feed is moving towards more locally produced and/or non-GM. This has an impact on food and feed demand for grains in terms of volume and even more in terms of value. The non-GM feed remains a question for maize and protein meals. Industrial uses are also increasingly significant in the EU with the expected uptake of the bio-economy (bio-plastics, pharmaceuticals or cardboard).

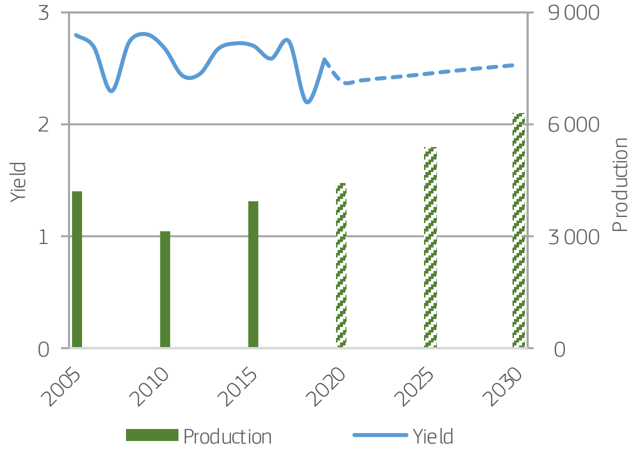
The EU remains a key player in global grain trade, but faces increasing competition

World wheat trade will continue to grow as global demand strengthens. The EU, thanks to high land productivity and close location to major importing markets, will remain the third main exporting region. Competition from nearby regions, such as the Black Sea, is becoming fierce. These exporters expand their market access while improving the quality of their crops and their logistical infrastructure. The Black Sea region is expected to gain additional market shares at the expense of the EU, which could export around 27 million t in 2030. The same trend is expected for barley, where EU exports could reach 9.1 million t. By contrast, EU maize imports will remain strong particularly at the beginning of the outlook period but are expected to stabilise ultimately due to a weakening demand for animal feed (see section on ‘Feed’).

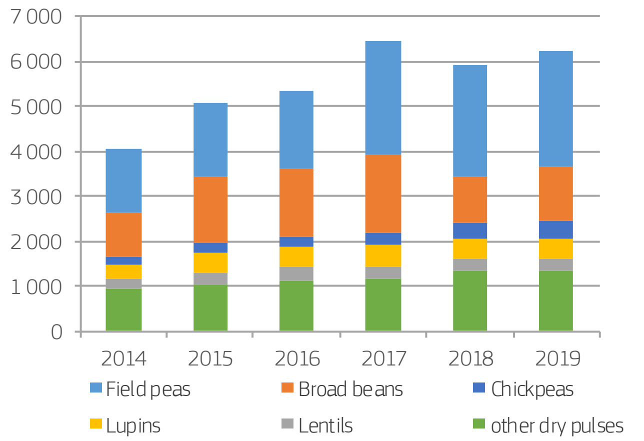
EU wheat and maize prices are expected to appreciate and reach EUR 214/t and EUR 211/t, respectively. EU wheat prices are expected to move towards the world price.

PROTEIN CROPS AND RICE

GRAPH 3.7 EU protein crops yield (t/ha) and production (t)



GRAPH 3.8 EU total consumption of pulses (t)



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

GRAPH 3.9 EU rice imports and human consumption (million t)

EU protein crops production still on the rise

The pulses area is expected to further expand and reach 2.3 million ha in 2030. This represents a 4% annual growth compared to 2019 (3-year average) from the low levels caused by adverse weather conditions. It represents a slight slowdown in growth compared to the 5% growth between 2010 and 2020, which is explained by changes in policies from 2015. A slight yield increase is expected in the long run thanks to improved farming practices, but at a slower pace than the previous decade. This is partly because protein crops are highly sensitive to weather conditions. Total production of pulses should reach 6.3 million t in 2030.

EU market expected to grow

The EU market is expected to grow due to the increasing demand for both food and feed. Human consumption of plant-based protein products, in particular chickpeas, lentils and broad beans, is expected to continue growing, in light of a more diversified diet across the EU. Consumption of protein crops into the feed rations is also likely to increase thanks to a demand for more diversified protein sources, and better availability (also due to more inclusion of protein crops in crop rotation systems).

With the short-term increase in demand and a delayed supply response, imports could increase at the beginning of the outlook period. Imports should stabilise and could ultimately decline towards 2030 and be replaced by increased domestic production.

Increasing consumption of rice

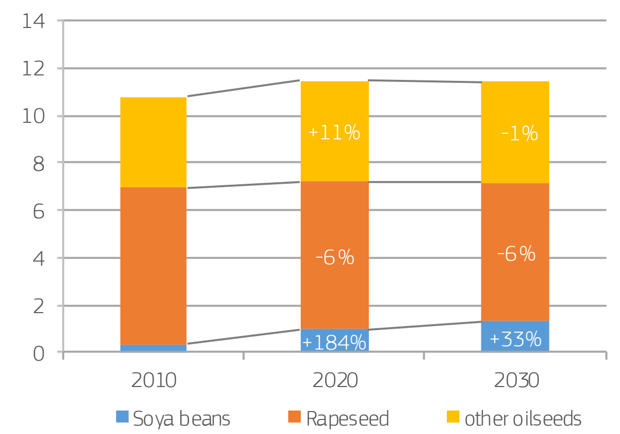
EU rice production is fairly low compared to other main staple food, but human consumption is widespread over the EU as part of different traditional dishes. Consumption per capita is expected to slightly increase (+0.3% by 2030) thanks to the diversification in diet and the inclusion of Asian cuisine in EU diets. Consumption in the EU is largely driven by the *Indica* type (long grain) compared to the *Japonica* type (medium grain).

On the supply side, EU production is mainly *Japonica* rice and is expected to slightly decline, largely due to consumers' preferences but also due to difficult production systems across the EU, both in terms of weather conditions and land preparation for submerged crops.

The increase in demand for *Indica* rice is expected to drive imports, especially from EBA countries (under the 'Everything But Arms' agreement). *Basmati* rice will also be imported from India and Pakistan to the UK (biggest EU importing country of rice).

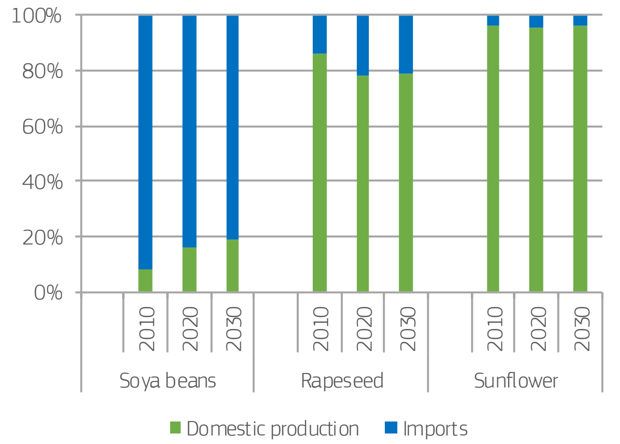
OILSEEDS

GRAPH 3.10 EU oilseed area (million ha)

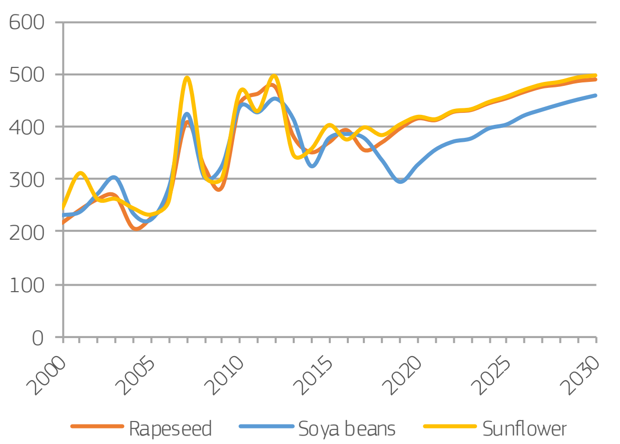


Note: Percentages show growth compared to 10 years before.

GRAPH 3.11 Oilseed produced and imported in the EU (% volume)



GRAPH 3.12 EU oilseed prices (EUR/t)



Declining oilseed area and production

The EU oilseeds area is projected to decrease slightly to 11.4 million ha in 2030 with diverging trends within the oilseeds complex. The rapeseed area is expected to continue its declining trend, especially in eastern EU Member States. It could drop to 5.8 million ha. The decline, compared to the previous decade, is expected to slow down, primarily because of its good value in crop rotation systems, particularly wheat. Demand for rape meal for dairy cows is also a contributing factor. The soya bean area should continue its rapid growth in the EU and reach 1.3 million ha in 2030 (+3% per year). Similarly to grains, yield development should be modest for the outlook period, with downward pressure linked to climate change and environmental policy requirements, despite positive prospects coming from improved farming practices and advisory services.

Overall, production of oilseeds could remain at the level of the 2017-2019 average[16], at 32 million t, with a substantial increase of soya beans production that could hit 4.1 million t at the end of the outlook period (20% of total soya beans use in the EU), replacing a declining rapeseed production.

Domestic consumption remains strong with increasing imports

The crushing industry is responsible for more than 90% of EU oilseed consumption. This should remain stable over the outlook period. Total consumption could slowly rise by 0.4% per year towards 2030, with a similar rise in total volumes crushed (see section on ‘Oilmeals’).

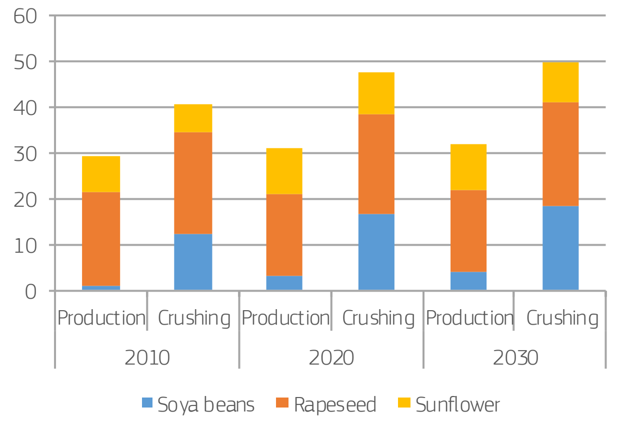
The EU will remain active in global oilseed trade, in particular for soya beans imports. Soya bean imports are expected to rise in the beginning of the outlook period to meet increasing demand for pigmeat production before stabilising towards the end of the outlook period at 17.2 million t. Overall, it is a modest increase of 2.1 million t compared to current levels. Rapeseed imports could also reach 5 million t.

African swine fever (ASF) as well as the ongoing US-China trade tensions have had a significant effect on the soya world market (re-routing) and on the world price. The soya bean price has been negatively impacted but is expecting to recover in the longer term. EU soya prices should follow the same trend and could reach EUR 460/t.

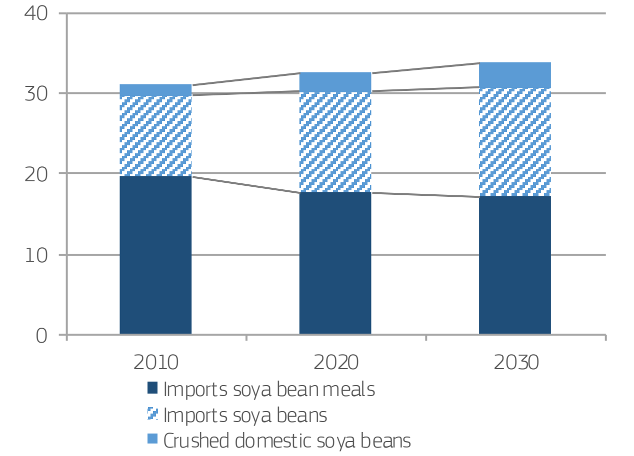
16 The comparison with the average 2017-2019 allows to include a high level in 2017 and a low level in 2019.

OILMEALS AND VEGETABLE OILS

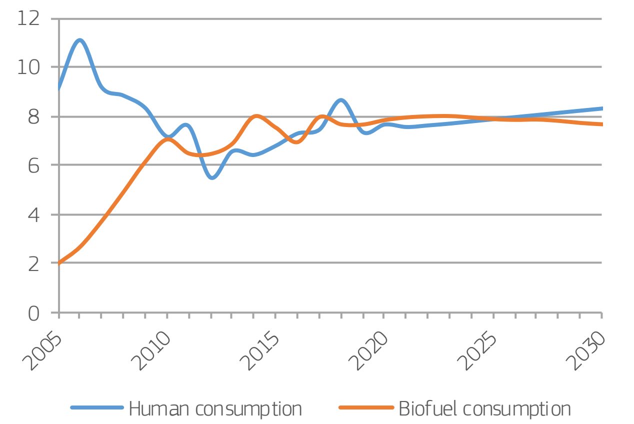
GRAPH 3.13 Oilseeds produced and crushed in the EU (million t)



GRAPH 3.14 Imports and domestically-produced soya beans in total crushing volumes (million t)



GRAPH 3.15 Oilseed oil consumption in the EU (million t)



Expansion of EU crushing is slowing down

Oilmeals are widely used by the feed industry as high-protein feed material (see section on 'Feed'). Meals are by-products of the oilseeds crushing for oil production. The total volume of oilseeds crushed in the EU is expected to slowly rise (+0.3%) following a significant growth in the previous decade (+1.6 % annually over 2010-2020). It is projected to reach 31.4 million t in 2030.

Rapeseed should remain the main crushed commodity in the EU thanks to ample availability. Close to 23 million t of rapeseed could be crushed in 2030. At the same time, soya beans are expected to continue gaining some share in total volumes crushed. 18.6 million t of soya beans should be crushed by the end of the outlook period, which represents around 40% (+2 pp compared to 2019) of total crushings. Sunflower crushing is projected to remain stable at 8.8 million t.

Imported meals continue to decline

The total EU volume of imported meals has been declining, but is now stabilised at around 23 million t per year. With the constant rise in domestic meal production, imports could slowly decline over the outlook period. It is projected that the EU will import around 22.7 million t of meals (soya, rape and sunflower). As for soya, the share of domestically crushed meals will continue to expand compared to imported meals.

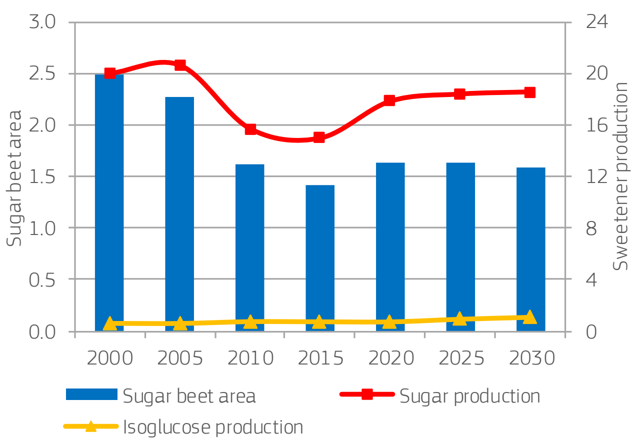
Stable production of vegetable oils

Vegetable oil production in the EU is projected to grow slightly by 0.2% per year and reach 16.7 million t in 2030. Besides the increasing meal demand for animal feed, market prospects for vegetable oils are limited. The development of the biofuel market during the previous decade has been the main driver of increased vegetable oil use. Further growth is limited by the restricted prospects for the increase in biodiesel production and by the rise of waste-based and advanced biofuels (see section on 'Biofuels'). The expected reduction of palm oil imports as a feedstock for biofuel production might stimulate the use of other domestically-produced oilseed oils. This will benefit soya bean oil, with an increase in use of 1.3% per year over the outlook period.

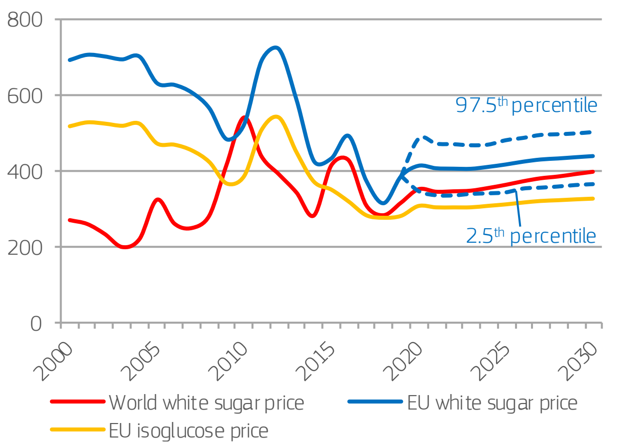
Human consumption of palm and sunflower oil is also significant. Over the outlook period, sunflower oil, the most favoured oil in retail and food services, is facing increased competition from other oils, such as rapeseed oil. Palm oil use in food is also expected to decline, pressured by health and environmental concerns notably around farming practices in producing countries.

SUGAR

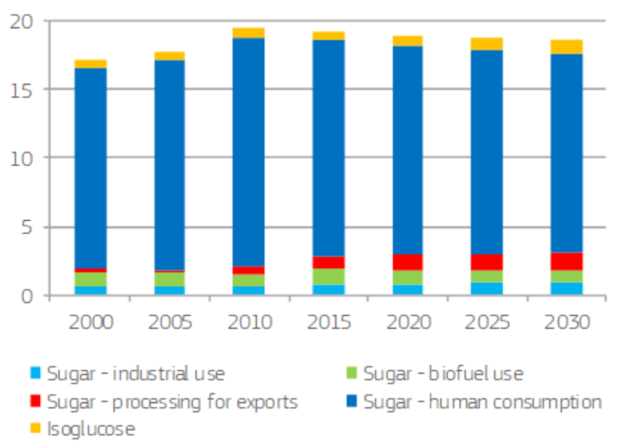
GRAPH 3.16 Sugar beet area (million ha) and caloric sweetener production (million t) in the EU



GRAPH 3.17 EU sweetener prices (EUR/t)



GRAPH 3.18 Sweetener use in the EU (million t)



Growing sugar production driven by increasing yields

While sugar beet producers have just experienced two consecutive years with below average yields due to adverse weather conditions, production is projected to recover, with annual yields improving from 74 t/ha in 2017-2019 to 78 t/ha by 2030. Higher sugar and sugar beet prices than the current low prices are anticipated to improve crop profitability. This could stabilise the sugar beet area around 1.6 million ha with only limited further decline.

EU sugar production is projected to reach 18.5 million t in 2030. World production continues to increase to a projected 213 million t, stimulated by global demand. As a consequence the share of EU sugar in global production could slightly fall from 10% to 9%. The projection for isoglucose production stabilises at 1 million t in 2030, while starch is largely directed towards more profitable alternative industrial uses.

Rising EU sugar surplus increases EU exports

While low sugar availability in the EU over the short term is leading to significant imports, over the outlook period increasing EU production and declining EU consumption are projected to result in a progressive decline in imports to 1.3 million t by 2030. EU sugar export capacity is expected to increase and exports could reach 2.2 million t by 2030, with the Near and Middle East remaining significant export destinations for EU refined sugar.

EU sugar prices show an increasing trend, in line with world prices, with the gap between world and EU prices closing to EUR 40/t as EU exports increase.

Continuing downward pressure on consumption

Human sugar consumption is expected to remain under pressure from health concerns, leading to an annual decrease of 0.8% in the outlook period. In particular, consumption of soft drinks and confectionary follows a declining trend. While increasing sugar prices could allow isoglucose to gain a larger share in total caloric sweetener consumption, sugar is however projected to be mainly substituted by non-caloric sweeteners.

Demand for other sugar uses would be insufficient to offset this decline, as human consumption is the main outlet (around 85% of sugar uses). However, an increase in the use of sugar is expected for industrial uses (pharmaceuticals, cosmetics) as well as through an increase in exports of processed products. A slight decline could occur in the use for ethanol (see section on 'Biofuels'). The combination of these trends would result in a total demand for sugar of around 17.6 million t by 2030 (-0.6% per year).

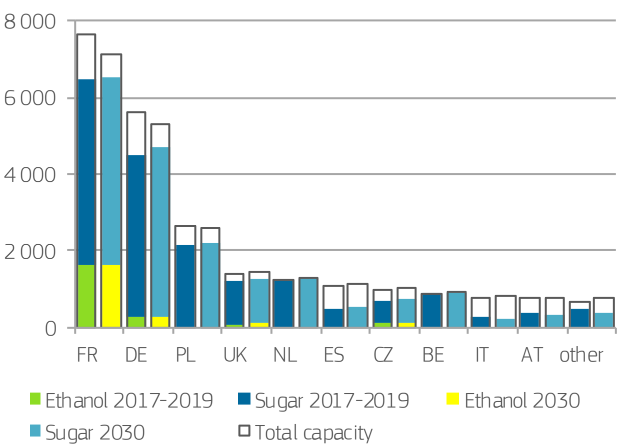
SUGAR – DEVELOPMENTS IN EU MEMBER STATES

Stable sugar production in major producing EU Member States, despite factory closures

Following the abolition of the quota regime in 2017, the EU sugar sector is currently undergoing a consolidation phase. Over the outlook period, this process is expected to continue, leading to a concentration of sugar and isoglucose production in the most competitive EU Member States. In the first years of the post-quota period, domestic sugar prices have dropped sharply in the EU because of a production surplus and intensive competition among EU sugar producers fighting for market shares on the EU single market. Moreover, the world market price of sugar has also been on a declining trend since 2017 due to a global production surplus.

Consequently, factory closures have been announced by Südzucker AG and Cristal Union. By 2020, four factories will shut down in France and two in Germany, with a combined total processing capacity of about 800 000 t of sugar. In addition, one factory has been closed in Poland in 2019. This may come as a surprise as these three countries are the largest EU sugar producers, located in the 'beet belt' and considered as being the most competitive, apart from Belgium and the Netherlands. In addition, France, Germany and Poland are among the EU Member States that expanded the beet area most significantly following the abolition of the quota system (France: +19%, Germany: +21%, Poland: +22%; average 2017-2019 compared to the average 2014-2016). However, to reduce fixed costs and increase competitiveness, sugar companies seek to run existing factories at their capacity limit. Therefore, factory closures will not necessarly lead to a decline in sugar production. Instead, the reduction in processing capacities may only result in a higher capacity utilisation rate for the remaining factories.

GRAPH 3.19 Beet slicing capacity utilisation in selected Member States, 2017-2019 and 2030 (1 000 t w.s.e.)



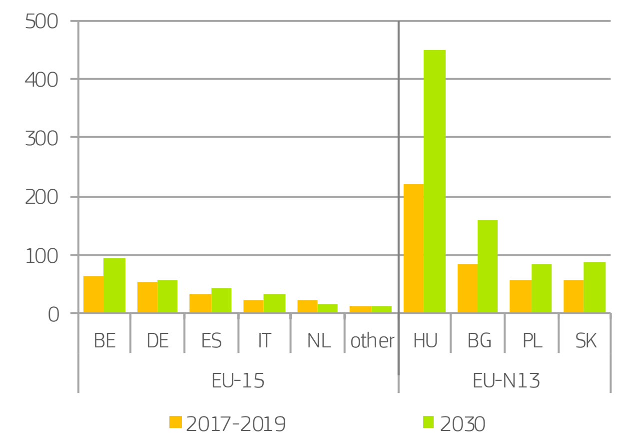
Source: AGMEMOD simulation.

Among the major sugar producing EU Member States, only the Netherlands and Belgium are producing at their estimated capacity limit. They are also expected to continue to produce to capacity until 2030. In France, Germany and Poland sugar production is projected to remain stable, despite factory closures, leading to a higher capacity utilisation rate in 2030. Moreover, sugar production in other smaller sugar producing EU Member States is expected to decline. The strongest decline in relative terms is projected for Greece (-47%), Italy (-21%) and Romania (-19%) as these three countries are among the EU sugar producers with the highest production costs.

Only moderate growth of isoglucose production concentrated in eastern European Member States

In contrast to sugar production, which can be increased by lengthening the beet processing campaign, a substantial increase in isoglucose production requires investments in additional production capacities. Before the abolition of the quota system, investments were made in Hungary and Bulgaria. However, most recent developments have shown a decline in isoglucose production in most EU Member States. This might be explained by the sharp drop in sugar prices, at which isoglucose production and investments in additional production capacities are no longer profitable. Furthermore, health concerns linked to isoglucose may discourage food processors to switch from sugar to isoglucose, even in market situations where isoglucose has a price advantage over sugar. Against this background, EU isoglucose production is expected to increase only moderately over the outlook period.

GRAPH 3.20 Isoglucose production in selected Member States, 2017-2019 and 2030 (1 000 t dry weight)



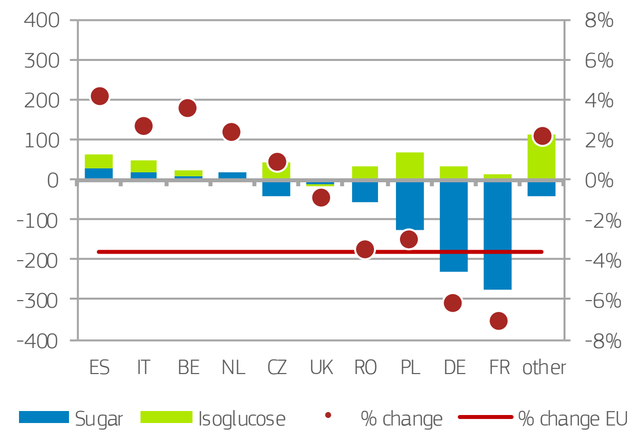
Source: AGMEMOD simulation.

Growth of isoglucose production is concentrated in eastern European countries, while production levels in EU-15 Member States are only expected to recover from the decline observed in the first two years following the abolition of the quota system given the price recovery.

Overall negative trend in total sweetener consumption, limited growth in some southern EU Member States

Over the past decades, sugar consumption has been stagnating in the EU at a high level. However, in recent years, consumption of sugar has been subject of public debate and several EU Member States have introduced policy measures to reduce sugar consumption through, e.g. taxes, reformulation strategies or nutritional labelling. These policy measures as well as shifting consumer preferences due to health concerns linked to high levels of sugar intake (obesity, non-communicable diseases such as type-2-diabetes, cardiovascular diseases, etc.) are expected to result in a negative trend in total sweetener consumption in most EU Member States.

GRAPH 3.21 Change in domestic sweetener use in selected Member States, 2017-2019 compared to 2030 (1 000 t w.s.e and %)



Source: AGMEMOD simulation.

Total EU sweetener demand is expected to decline by 4% between 2017-2019 and 2030. At EU Member State level, relative changes among the major sweetener consuming countries range from an increase of 4% in Spain to a decline of 7% in France. While in the Netherlands, Belgium and Czechia the slight increase in total sweetener consumption can only be attributed to population growth, in Spain and Italy a slight increase in per capita consumption is expected as this trend has already been observed in the past. The strongest decline in total sweetener demand is expected for the top 3 sweetener consuming EU Member States that are France, Germany and Poland, as well as for Romania. While the decline in Poland and Romania is a result of a negative trend in population, in France and Germany per capita consumption is expected to decline as both countries have introduced policies to reduce sweetener consumption.

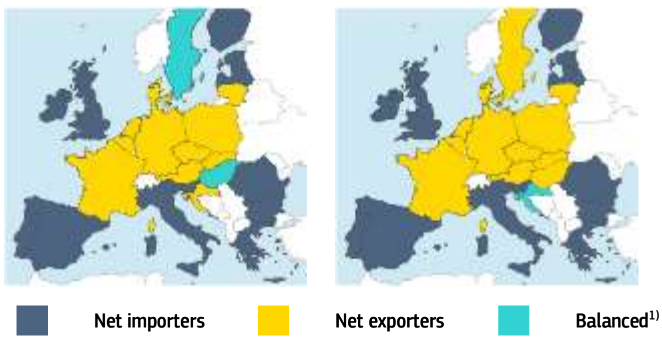
In contrast to the negative trend in total sweetener consumption projected for most EU Member States, isoglucose consumption is expected to grow. However, at aggregated EU level the share of isoglucose in total sweetener consumption remains at a rather low level of 5% by 2030. At EU Member State level, growth of isoglucose consumption is concentrated in eastern European countries, namely Poland, Czechia, Hungary, Romania, Slovakia and Bulgaria. Among the EU-15 Member States, the strongest increase in absolute terms is expected for Spain, Germany, Italy and Greece. This regional pattern of growth in isoglucose consumption can be explained by the fact that isoglucose as a liquid sweetener is not transported over long distances and therefore consumed domestically or exported to neighbouring countries only.

No significant changes in regional net trade pattern at EU Member State level

Before the abolition of the quota system, the EU was a net importer of sweetener as production quotas were set at a level below EU sweetener consumption and sugar exports were restricted to 1.4 million t due to WTO commitments. In the first year following the abolition of the quota system, the EU increased exports significantly and became a net exporter. However, over the outlook period the EU sweetener market is expected to be broadly balanced as net exports are expected to not exceed 0.8 million t.

The traditional net exporting countries of sweetener are mostly central European Member States, whereas the large net importing countries are mainly located in the south of the EU, except the UK. Over the outlook period, these regional net trade patterns are not expected to change significantly as only three countries are projected to change their net trade position. Due to the growth of isoglucose production Hungary is expected to switch from a broadly balanced market to a net exporter of sweetener. Also Sweden would move to a net exporting position, whereas Croatia would turn from a net exporter to a broadly balanced market as a consequence of a decline in sugar production.

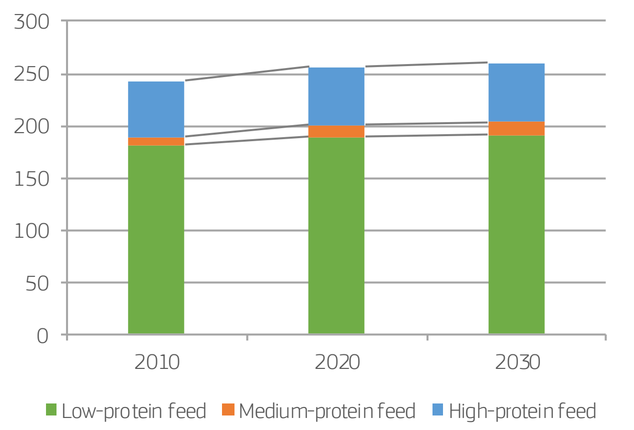
MAP 3.1 Sweetener net trade position of Member States, 2017-2019 (left) and 2030 (right)



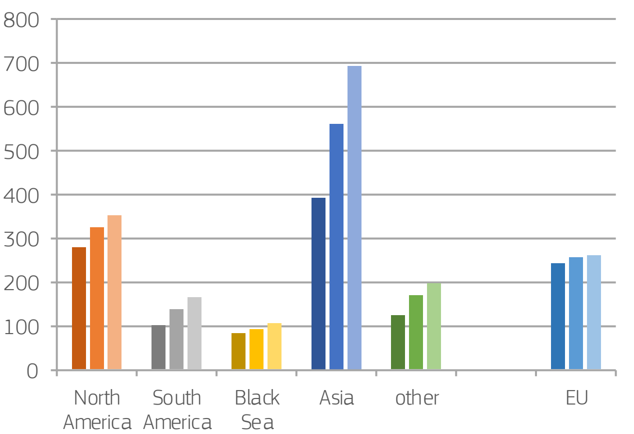
Source: AGMEMOD simulation.
1) Net trade volume < 10% of production.

FEED

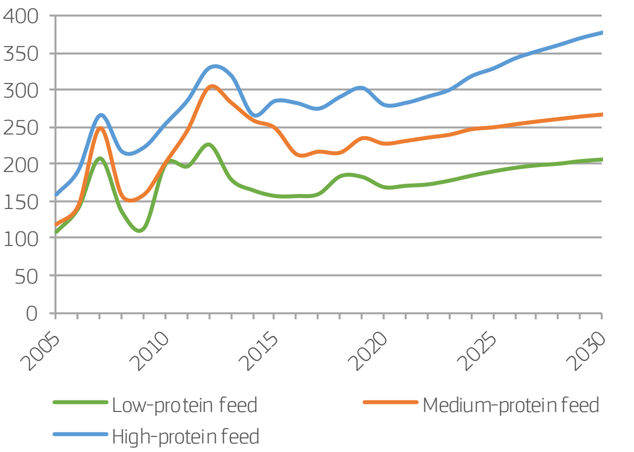
GRAPH 3.22 EU total feed demand (million t)



GRAPH 3.23 Global feed demand, 2010-2020-2030 (million t)



GRAPH 3.24 EU price of the different feed types (EUR/t)



Low-protein feed remains the primary material for EU compound feed

Low-protein feed is feed material with less than 15% protein content. It includes main grains (wheat and coarse grains) as well as cereal brans and molasses. It represents almost 60% of the raw materials used in feed (in volume), and is largely composed of wheat and maize. This is projected to remain the same in the outlook period, where maize will still be the first feed ingredient, accounting for 40% of total volume of feed grains, and wheat remaining second at 30%. A large share of feed, not represented in Graph 3.22, is also sourced from pasture, estimated at 940 million t of grass for the 2018/2019 marketing year (taking into account the drought over the summer), with a protein content of around 2.5%[17]. Feed from pasture could increase, particularly from temporary grassland, which can also be enriched with fodder legumes.

Medium-protein feed are feed ingredients with a protein content between 15% and 30%. They include pulses such as field peas and broad beans, as well as corn-gluten feed and distillers dried grains. Pulses are increasingly used in the feed rations but are challenging to expand due to a relative high price compared to other materials. Nevertheless, its use for feed is expected to increase over the outlook period thanks to increasing demand for locally-produced and/or non-GM feed and the increased use of pulses within crop rotation systems.

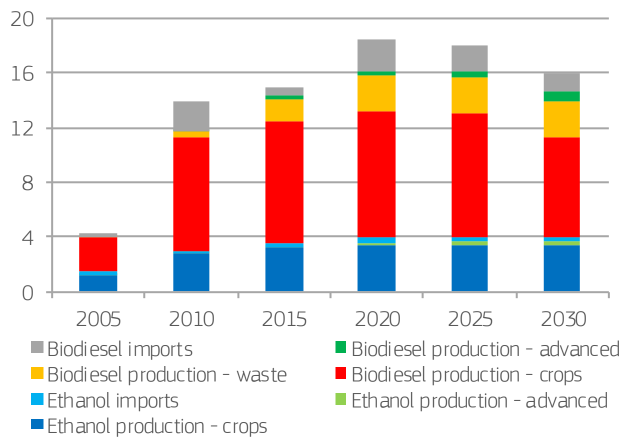
High-protein feed, such as oilseeds meal, fishmeal and skimmed milk powder, contains more than 30% protein. Around 57 million t of high-protein feed is expected to be consumed in the EU in 2030. Soya bean meals are expected to remain at the top of this category, and its use could reach 31 million t.

On the demand side, the market is driven by increasingly ambitious consumer expectations on farming practices, environmental and ethical considerations, but also on origin and animal welfare. This could stimulate the feed market and foster market differentiation. Price premiums for non-GM feed products or for products complying with more stringent but more costly production rules, could support farmers to meet such demands. While a balance between protein and amino acid content has to be met for feed, the final choice lies in the price ratios on the world market between the commodities described above. Feed prices are expected to increase over the outlook period, particularly for high-protein feed that will follow the increase in soya bean prices.

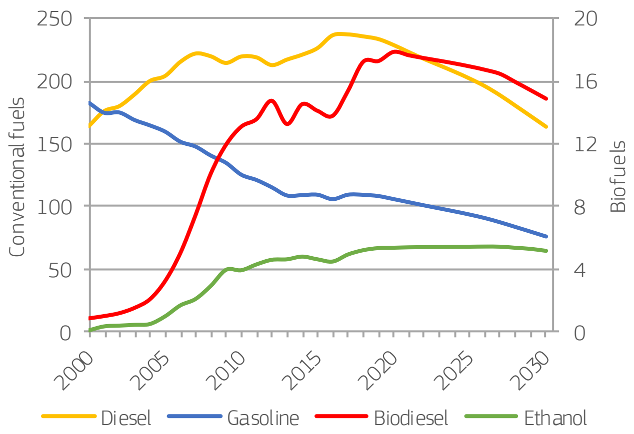
[17] EU feed protein balance sheet.

BIOFUELS

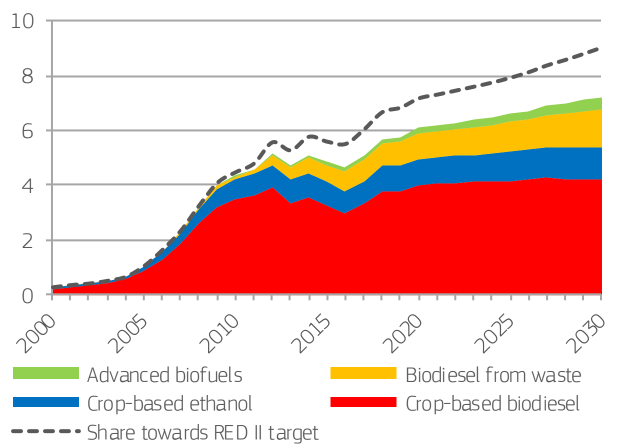
GRAPH 3.25 EU biofuel supply (million t.o.e.)



GRAPH 3.26 Conventional fuel and biofuel use in the EU (billion l)



GRAPH 3.27 Biofuel shares in EU transport energy (%)



Note: The accounted share of biofuels towards RED II targets includes double-counting of advanced biofuels and of biodiesel from waste.

Declining use of palm biodiesel lowers biofuel supply

The 2018 recast Renewable Energy Directive (RED II - Directive (EU) 2018/2001) provides the general policy framework for biofuels in the EU by 2030. It sets targets for renewables in transport (14% by 2030), as well as for advanced biofuels, while limiting the contribution of crop-based biofuels. It also requires the phasing-out by 2030 of those biofuels with high risk of inducing indirect land-use change (ILUC). Palm biodiesel has been assessed by the EU as a potentially high-ILUC biofuel, due to the significant land expansion of palm oil crops since 2008. Therefore, palm-based biodiesel will need to be certified as 'low ILUC-risk' in order to count towards the target (Commission Delegated Regulation (EU) 2019/807).

The current share of palm oil in EU produced biodiesel is estimated at around 22%, while further palm-based biodiesel is imported from Indonesia and Malaysia. Under the RED II requirements, supply of palm-based biodiesel is projected to significantly decline by 75% by 2030. Renewed anti-subsidy tariffs on Argentinian soya oil biodiesel, in place since early 2019, only translate to a minor decrease of imports.

The outlook for the production of crop-based biofuels, other than palm, are overall stable. Some limited increase in the use of sunflower oil is projected, in compensation of declining palm oil use, as well as some substitution of sugar-crops for cereals-based ethanol due to the price environment (see section on 'Cereals'). Despite the end of anti-dumping duties on ethanol imports from the US, imports are not expected to increase beyond the estimated 2019 levels, due to the market entry costs, the increasing demand on the US domestic market and Brazilian demand for US corn-based ethanol. While production of advanced biofuels is projected to increase, growth remains moderate and is constrained by current and planned production capacity and required investments. Biodiesel from waste oils and fats will remain below the maximum contribution under RED II, as the costs for collecting used cooking oils limit the availability of feedstock supply and keep costs high.

Declining conventional fuel and biofuel consumption

While ethanol fuel use could remain stable, biodiesel consumption is projected to decline by 2030 (-1.5% per year), however at a slower rate than conventional fuel use (-3.2% per year). The total energy share of renewables in transport could reach 7.2%, up from the current 5.7%. The energy share of crop-based biofuels is projected to increase by 0.7 pp, while the remaining increase is driven by a higher share of advanced and waste-based biofuels. In particular, blending of ethanol (in volume) could increase by almost 2 pp to 6.8% due to the further expansion of E10 and E85.

MILK AND DAIRY PRODUCTS

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/4

This chapter presents the projections for the milk and dairy markets.

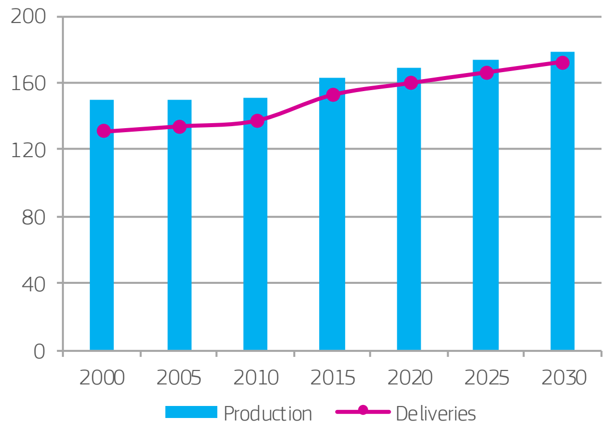
By 2030, EU milk production growth will slow down due to increasing environmental requirements and further differentiation of dairy products demanded by consumers (e.g. organic, pasture-based, local). Further yield gains will allow for dairy herd reductions and contribute to emissions' reduction.

The price gap between skimmed milk powder and butter is expected to get back to normal, leading to an increase in the EU raw milk price, stimulating production growth and reflecting the growing importance and higher share of value-added products.

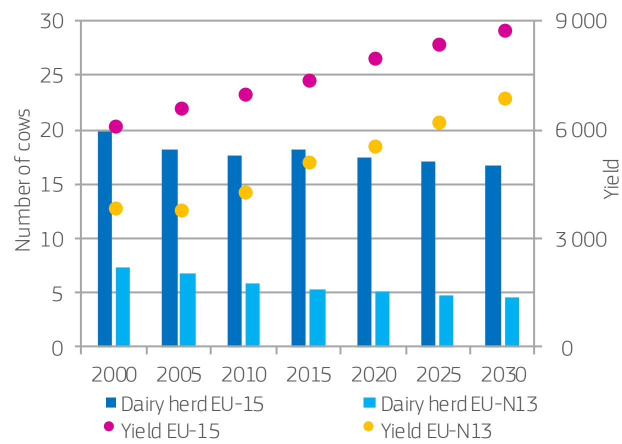
Increasing self-sufficiency in many developing countries will slow down global import dairy demand growth. Nevertheless, the EU is projected to remain a leading global dairy supplier.

MILK

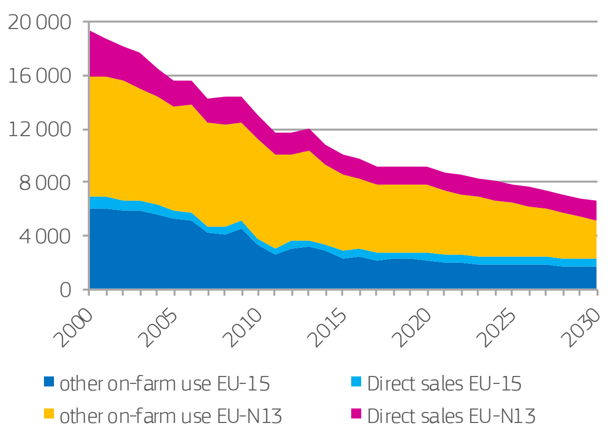
GRAPH 4.1 EU milk production and deliveries (million t)



GRAPH 4.2 Number of cows (million heads) and yield (kg/cow) in the EU



GRAPH 4.3 Trends of on-farm milk use, including direct sales (1 000 t)



Sustainability requirements to limit milk production growth

EU milk production is expected to continue growing to 179 million t by 2030, but at a slower pace (+0.6%) than in 2008-2019 (+1% per year on average).

Milk production is currently declining in the Netherlands due to the obligation to reduce phosphates' emissions. The debate is also very active on nitrates in several EU Member States. In addition, as ruminants (cattle, sheep and goats) are responsible for about 5% of total EU GHG emissions, the obligation to reduce emissions will condition milk production developments further. Several practices are already in place, mainly focusing on herd management and cows' nutrition. Some leading EU dairies have announced their long-term targets to become carbon neutral through not only methane reduction but also by improving carbon sequestration. This could be done by increasing the share of temporary pasture in the rotation[18], as well as by keeping cover crops as long as possible. In addition, farmers could benefit from using manure more efficiently by turning it into renewable energy or by putting it back to the nutrient cycle.

By 2030, average yields are expected to grow from 7 300 kg/cow in 2019 to 8 340 kg/cow. The projected yield annual growth (+1.2%) is however slower than in 2008-2019 (+1.9% per year) due to the increasing diversity of production systems. Thanks to these efficiency gains, the number of dairy cows could be reduced by 1.4 million, to 21.2 million heads (6% below the 2019 level). At the same time, increasing yields could lead to a reduction in GHG emitted per kg of milk.

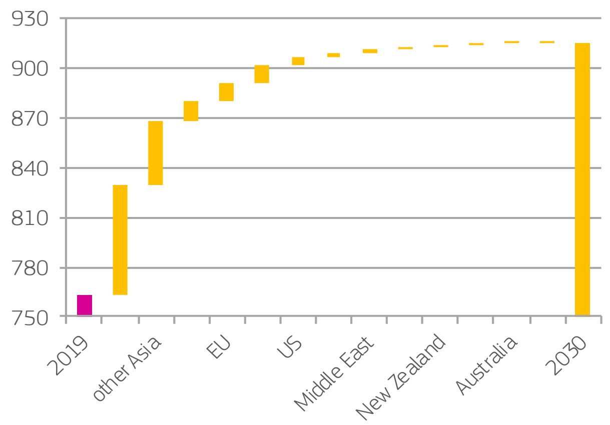
Demand-driven differentiation of production systems

Besides sustainability requirements, increasing social demands will lead to a further differentiation of products produced in different production systems. For example, EU organic milk production is assumed to increase to 7% of EU milk production in 2030 (compared to 3% in 2017). In addition, GM-free, pasture and hay-based, animal welfare and other certified milk production systems are expected to gain market shares.

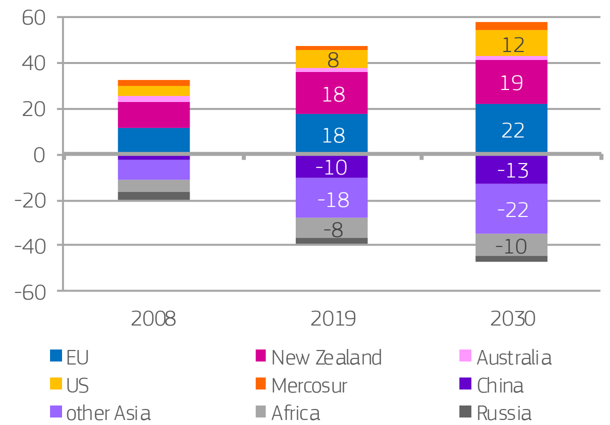
The increasing demand for quality and authenticity is also likely to lead to a growing number of consumers buying food on farmers' markets, directly at the farm or via other community-supported schemes. This may reverse the currently declining trend of direct sales towards 2030.

18 Pellerin, S., Bamière, L. et al. (2019)

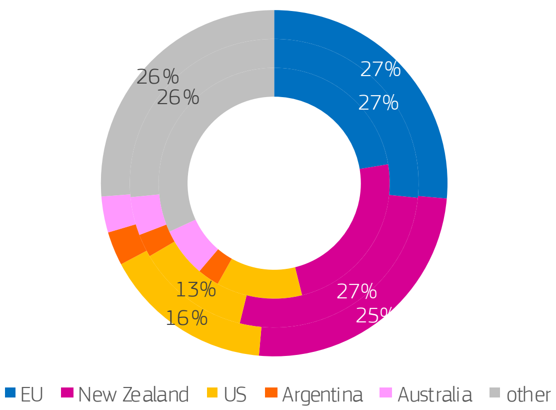
GRAPH 4.4 World milk production growth by region (million t)



GRAPH 4.5 Milk surplus/deficit by world region (million t)



GRAPH 4.6 Share of main exporters on world dairy trade, 2008 (inner), 2019 (middle), 2030 (outer)



EU production growth ahead of main competitors

Despite a slowdown, EU annual milk production growth (+1 million t per year on average by 2030) is expected to be bigger than for the EU's main competitors: +0.5 million t per year in the US that benefits from economies of scale and efficiency gains, and slightly below +0.1 million t per year in New Zealand that is constrained by environmental and resource limits.

However, the EU is only expected to contribute 8% to world milk production growth by 2030. The projected global increase is due to be almost 14 million t per year, more than in 2008-2019. Developing countries should contribute the most, mainly India (above 40%), Asia (25%, other than China and Japan) and Africa (8%), increasing their self-sufficiency.

Developing countries to remain in deficit

While milk production is expected to grow significantly in developing countries, it will not fully satisfy increasing demand and many regions will remain in milk deficit (consumption higher than domestic production). Population growth, increased frequency of purchases and the development of cooling systems will play an important role in increasing demand in Africa. In Asia, income growth and changing consumption habits will drive an increasing demand for processed dairy products such as fresh dairy products or cheese, while dairy ingredients are currently more in demand.

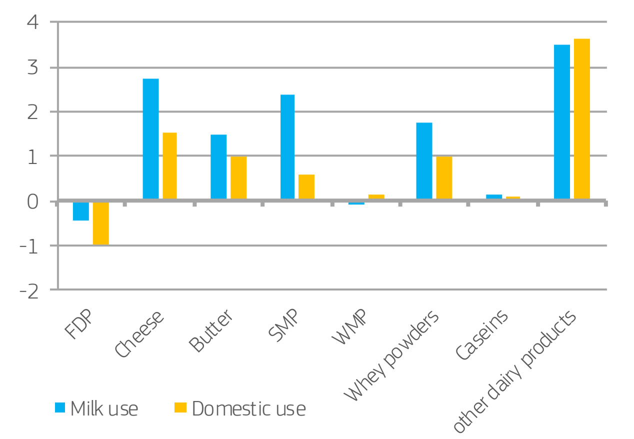
Overall, global import growth in demand is expected to slow down to less than 0.9 million t per year by 2030 (compared to 2.1 million t in the last period). Sustained demand for dairy powders will contribute most to this additional growth (75%), driven by demand for processing into fresh dairy products in final destinations, followed by cheese (18%).

The EU to lead dairy trade by 2030

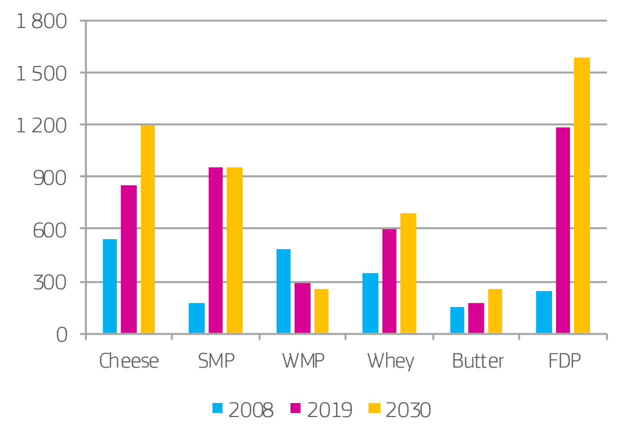
The EU is expected to supply 27% of world dairy trade in 2030, ahead of New Zealand (25%) and the US (16%). The decline in demand for imports is expected to also reduce the annual volume of EU dairy exports to more than half compared to 2008-2019 (around 250 000 t of milk equivalent). However, the EU will strengthen its position in cheese trade, which is expected to contribute the most to the overall EU dairy export growth (44%), followed by standard whey powders (26%), butter (19%) and fresh dairy products (14%). By contrast, given record 2019 EU shipments, SMP exports should not rise above this level.

DAIRY PRODUCTS

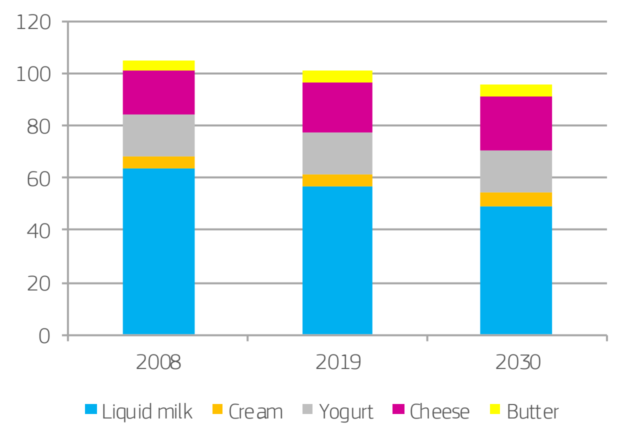
GRAPH 4.7 Milk and domestic use change in the EU, selected dairy products, 2019 to 2030 (million t milk equivalent)



GRAPH 4.8 EU exports of selected dairy products (1 000 t product weight)



GRAPH 4.9 EU consumption of selected dairy products (kg per capita)



Strong domestic and global demand for EU cheese

Responding to the increase of both global and domestic demands, EU cheese production is expected to absorb 24% of the overall EU milk production growth. More than half of cheese production growth will be directed towards the domestic market, for industrial use notably, due to the popularity of convenience food products and new consumption trends such as on-the-go snacking. In addition, cheese is an important part of an increasingly popular vegetarian diet. As a result, EU cheese per capita consumption is due to increase by almost 1 kg over the outlook period to 20.2 kg by 2030.

On export markets, the EU is expected to strengthen its market share by 6 pp by 2030 (to 34%). Asian countries will remain the largest import markets. By 2030, Japan will become the largest global cheese importer. However, China will grow at the fastest rate (almost 7% per year on average).

Increasing EU exports of fresh dairy products

The expected further decline of 7 kg per capita in liquid milk consumption (to below 50 kg), explains the expected decrease of EU consumption of fresh dairy products (FDP). This decline is due to be partially offset by an increasing consumption of yogurts (+0.1 kg per capita) and cream (+0.4 kg). By 2030, fresh dairy products consumption is expected to reach 82 kg per capita, i.e. 40% less absolute decline than in 2008-2019.

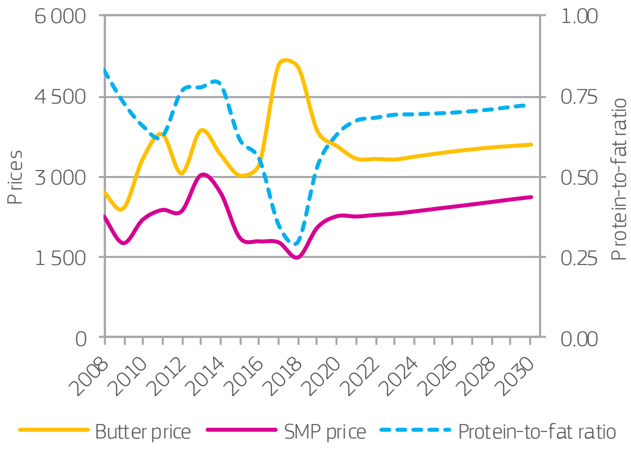
The consumption of fresh dairy products is increasing worldwide. Strong drivers include changing consumption habits, (eating and drinking them directly instead of importing ingredients), as well as customisation to consumers' needs. As a result, the EU is expected to improve its net exports at a growth rate close to 3% per year on average by 2030.

EU butter prices back to previous levels

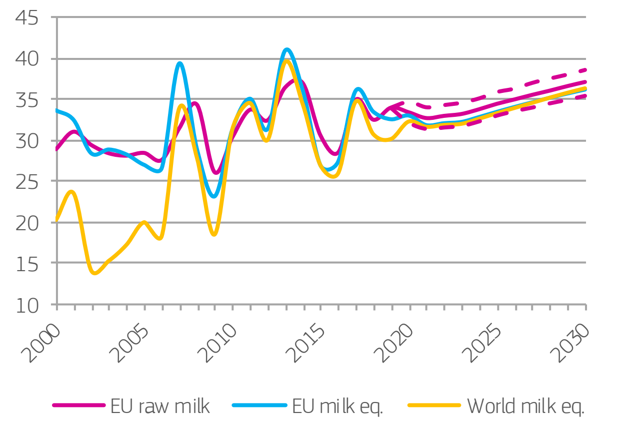
With high butter prices in 2018-2019, some processors adapted recipes, replacing butter with cheaper vegetal fats. Yet, butter is a key ingredient for the texture of viennoiserie and is appreciated by consumers, who increasingly demand products that are more natural. Therefore a modest increase in domestic consumption of 0.3 kg per capita is expected by 2030.

As New Zealand, the main butter exporting country, will have limited production expansion capacities, the EU is expected to gain further market shares in global trade (+6 pp by 2030, to 22%). However, the share of EU butter exports on EU butter production is due to remain below 10%. The expected butter production increase of 0.8% per year will then be driven mainly by EU demand.

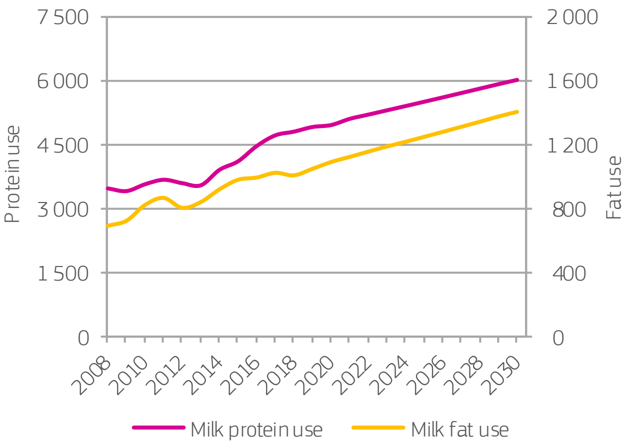
GRAPH 4.10 EU butter and SMP price (EUR/t), protein–to-fat ratio



GRAPH 4.11 EU milk price (EUR/t) and uncertainty range



GRAPH 4.12 Use of milk fat and protein in other dairy and non-dairy products (1 000 t)



Protein-to-fat price ratio back to previous level and milk price increasing

The price gap between SMP and butter is expected to get back to normal, with the EU butter price around EUR 3 600/t by 2030 whereas SMP price is projected close to EUR 2 600/t. Therefore, protein-to-fat ratio is due to increase slightly.

Following these developments, the EU milk equivalent and EU raw milk prices should remain above the world milk price, stimulating production growth and reflecting the growing importance and higher share of value-added products.

EU SMP and whey strong on world market

The EU is expected to remain competitive despite the increasing SMP price. With an expected production increase over the outlook period (+1.7% per year), exports by 2030 could again reach the record level of 2019 when most intervention stocks stored in 2015-2016 were released. The EU will remain the second largest exporter after the US. By 2030, import demand will grow by more than 3 million t, mainly in Asia (56%). This represents only one third of the growth in 2008-2019.

The global trade growths of WMP and whey powder are also expected to slow down as many countries are developing their production capacities (42% and 53% respectively of the absolute growth in 2008-2019). In this context, the EU is projected to decrease WMP exports by 1% per year, while still increasing whey exports by 1.4% annually (down from a growth above 5% in 2008-2019).

The domestic market is due to remain a major outlet for WMP and whey powder. Main drivers are a growing demand for processing (e.g. WMP to chocolate). Moreover, whey powder is used in nutritional products for adults (sport, senior and clinical). In total, around 4 million t of milk equivalent will go into the processing of dairy powders.

Growing demand for other dairy products and processed products with dairy ingredients

Over the outlook period, processing of milk fat and protein into other dairy and non-dairy products (e.g. lactose, infant formula, fat-filled powders) is expected to increase. This increase will be driven by strong demand and positive returns. These products are processed domestically and marketed in the EU or exported. By 2030, an additional 3.5 million t of milk equivalent is expected to be used in their production (+30% of milk production growth).

SCENARIO: 100% GM-FREE MILK

The increasing demand for products' differentiation has major implications on production systems. In the dairy sector, besides organically-produced milk, pasture-based and others, GM-free labels are gaining market shares.

In some EU Member States (Austria and Sweden), 100% of milk is produced without genetically modified (GM) feed. In Germany (biggest EU milk producing country), around half of the raw milk is GM-free. In addition, organic milk, which is also GM-free, has a high market share in some EU Member States. In Denmark, for example, 32% of the drinking milk consumed is organic[19].

Nowadays, in order to satisfy protein feed demand, EU dairy farmers rely largely on imported GM protein feed, particularly soya. Therefore, turning GM-free implies changes in feeding strategies, in particular substituting imported GM soya with other protein sources.

To assess the EU market implications of an increasing demand for GM-free dairy products, this scenario analyses a hypothetical case where the EU fully transitions to 100% GM-free milk production within four years.

According to the EU Feed Protein Balance Sheet for 2018/2019, 77% of total feed consumption in the EU is produced domestically. However, oilseed meals, which contribute to around a quarter of the total EU feed use, are mostly imported and only 26% is produced in the EU. More specifically, soya meal contributes to 16% of the total EU feed use and only 3% of it is produced domestically. The main exporters of soya beans and meal to the EU are Brazil, the US, Argentina and Ukraine, where, with the exception of Ukraine, almost all soya beans are GM varieties. Cultivation of GM soya beans is not currently authorised in Ukraine. Brazil also produces some non-GM soya beans which are mainly exported to the EU.

Scenario assumptions

To simulate the transition, in 2020 it is assumed that the supply of GM-free milk targets first the demand for drinking milk, organic production and the countries already GM-free, i.e. around 25% of EU milk production. In the following years, the share is gradually increasing by an additional 25 pp up to 100%. Consequently, EU imports of soya beans and meal are assumed to gradually decrease by an amount corresponding to the amount of GM soya consumed in the milk sector[20]. To compensate, an increase in fodder production is assumed. For the additional pasture and fodder area, a protein yield of 0.5 t/ha is assumed and for maize and barley a protein content of 8% and 10% dry matter protein, respectively[21].

This shock does not take into account that part of the imported soya for cows could be re-directed to other livestock sectors, and vice versa for other feed stocks (e.g. rape meal). In addition, it assumes that other imported feed stocks are non-GM. The additional costs arising from the need to segregate GM-free crops are not considered.

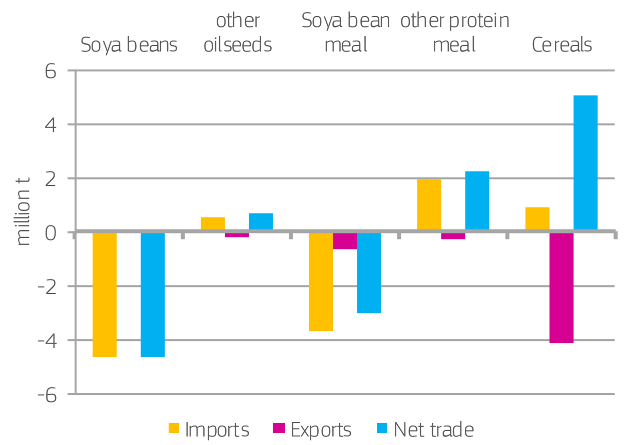
Impacts on crop markets

By turning 100% GM-free, the composition of dairy feed turns into 13% less soya meal, 9% more meal from other oilseeds (rapeseed and sunflower in particular) and 5% less cereals. The EU soya bean area increases by 51% (+0.6 million ha) and the pasture and fodder area by 2.8 million ha. The change in production systems towards more pasture and fodder pushes the cereal and other oilseed area down.

As a reaction to increasing demand, the EU price of soya beans experiences a substantial increase of 53% whereas the rapeseed and wheat prices increase more moderately by 8% and 3%, respectively.

The EU trade balance (exports - imports) for other oilseeds and meals (e.g. rapeseed and sunflower seed and –meal) as well as cereals is expected to worsen because of the reduction in soya bean and meal imports. The increase in imports of other oilseeds and meals compensates for declining soya imports. Domestic production of other oilseeds is restricted by the assumed increase in the pasture and fodder area.

GRAPH 4.13 Changes in EU trade flows, 2030 compared to the baseline



19 European Commission (2019c).

20 Around 8.3 million t of soya meal is consumed in the EU milk sector according to an estimation carried out by DG AGRI based on data from the European Feed Manufacturers' Federation (FEFAC) and information on dairy production systems provided by IDELE.

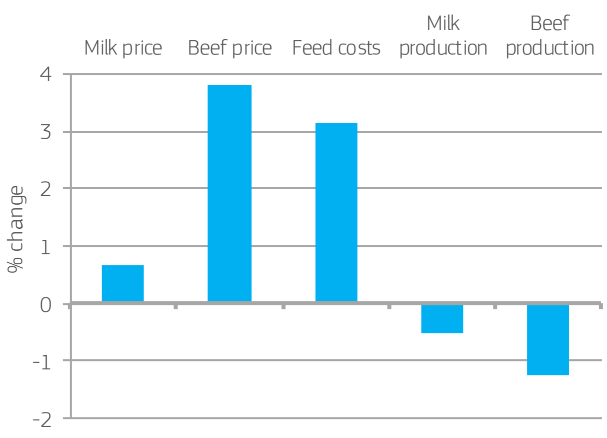
21 The pasture and fodder protein yield is based on the CAPRI model database and the barley and maize protein contents are based on the EU Feed Protein Balance Sheet for 2018/2019.

TABLE 4.1 Changes in EU feed consumption, land use and producer prices, 2030 compared to the baseline

	Absolute change	Percentage change (%)
Feed consumption		
Soya bean meal	-4 223	-13.2
Meal from other oilseeds	2 287	9.0
Cereals	-5 863	-3.3
Land use		
Pasture and fodder	2 203	2.8
Soya bean	590	51.0
Other oilseeds	-261	-2.4
Cereals	-2 050	-3.7
Total agricultural land use	210	0.1
Producer prices		
Soya bean	226	53.3
Rapeseed	36	8.1
Maize	0.5	0.3
Other coarse grains	3.5	2.1
Wheat	6.3	3.4

Note: Feed consumption in 1 000 t, land in 1 000 ha and prices in EUR/t.

GRAPH 4.14 Changes in EU milk and beef markets, 2030 compared to the baseline



Impacts on milk and beef markets

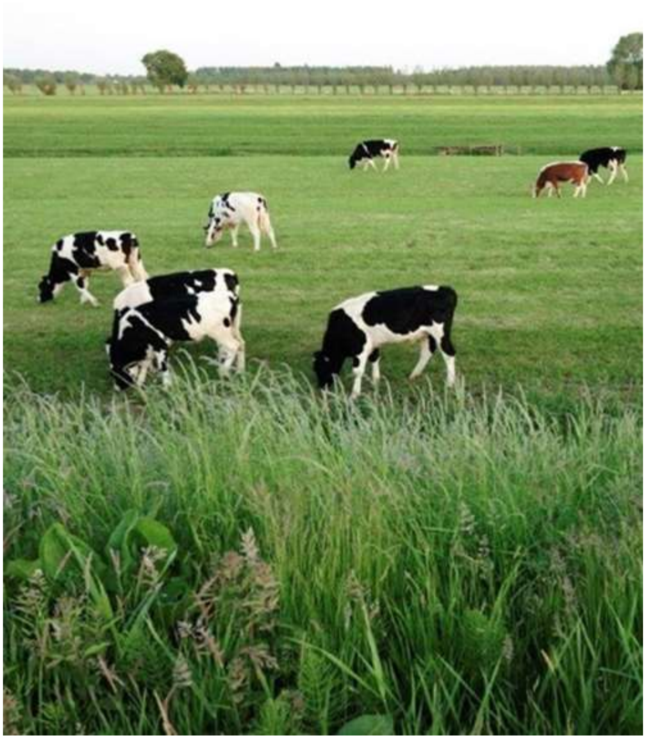
These important changes in feed rations lead to a modest decline in milk production of 0.5% or 886 000 t as the impact on yield is low (-0.2%). Beef and veal production, which is closely linked to milk production, decreases by 1.3% due to a reduction in the herd size (-0.9%). Production losses are mainly caused by an increase in feed costs (+3.1%), which pushes up the price of milk and beef by 0.7% and 3.8%, respectively.

Conclusions

The outcome of the scenario is consistent with literature suggesting that a switch to GM-free feed in the dairy sector would have substantial impacts on land use, whereas the effects on milk and beef markets could be fairly modest. Simulating a switch to GM-free feed for all EU livestock would lead to different results given the bigger need for alternative feed and the difficulty to replace soya in the feed ration of pigs and poultry.

There are a few quantitative studies assessing the importance of GM-feed. For instance, Issanchou and Gohin (2019)[22] report a 27% increase in French soya bean production and a 24% increase in the producer price resulting from an approximate doubling of consumer demand for animal products fed with non-GM crops in France. Production of other oilseed crops and cereals only change marginally. The producer price and production of non-GM cattle increases by 11% and 36%, respectively.

This analysis was conducted at JRC.D.4 (Seville) with the in-house version of the Aglink-Cosimo model and using the global OECD-FAO 2019-2028 baseline as reference (http://www.agri-outlook.org/). How to cite this scenario: Elleby C. and Pérez Domínguez I. (2019), SCENARIO: 100% GM-FREE MILK. In: EC (2019), EU agricultural outlook for markets and income, 2019-2030. European Commission, DG Agriculture and Rural Development, Brussels. Contact: christian.elleby@ec.europa.eu.



22 Issanchou A. & Gohin A. (2019).

MEAT PRODUCTS

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The outbreak of African swine fever in Asia is having a strong impact on meat markets, leading to major uncertainties in global developments. In the short term, significant growth in Chinese meat demand is expected to divert trade to China, particularly for pigmeat, but also for other meats. This will exert pressure on both global and EU markets, pushing prices up. As Chinese production recovers, prices should fall, leading to a decline in domestic pigmeat production.

EU meat consumption is projected to fall modestly, driven by social, ethical, health and environmental considerations. Lower pigmeat supply on the EU market could lead to further consumption shifts between meats. Poultry meat is expected to continue gaining shares in total EU meat consumption.

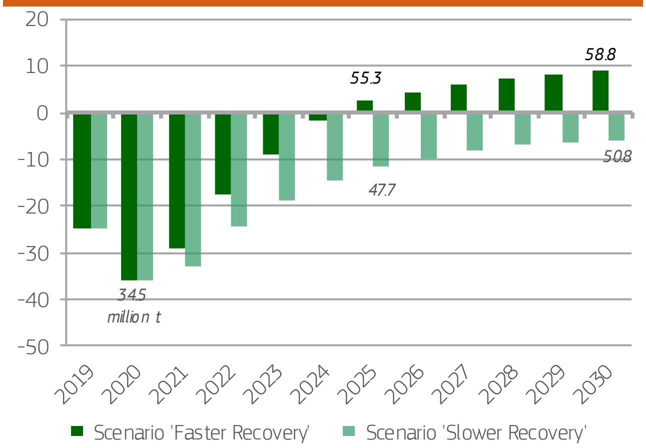
This chapter begins with the results of a scenario that simulates the impact of the potential pigmeat production disruptions on China. It then looks at global and domestic meat consumption, and finally gives projections for the different meats: pigmeat, beef and veal, sheep and goat meat, and poultry meat.

SCENARIO: AFRICAN SWINE FEVER IN CHINA

African swine fever (ASF) is a viral disease of pigs and wild boars. Healthy animals may become infected by direct contact with infected pigs, wild boars and contaminated farm equipment or by ingestion of contaminated material (e.g. carcass disposal, household waste and swill feed). Infected animals typically die within 10 days. The disease does not affect humans or other animal species. Since 2005, countries that have officially reported the disease have more than doubled[23]. However, nowhere has ASF been more devastating than in China, the world's top producer, consumer, and importer of pigmeat.

ASF has become endemic in China (mainland) in less than a year. National authorities have been implementing various measures not only to stop the disease from spreading but also to stabilise regional pigmeat supplies and prices. Notwithstanding the projections released in April 2019 by the Chinese Ministry of Agriculture and Rural Affairs in the context of China's Agricultural Outlook 2019-2028, late-summer estimates painted an even gloomier picture for the sector. Successive cutbacks due to rapid spread of the virus, early slaughtering and aggressive liquidation (when ASF was reported in close proximity) have all led to an expected production drop in China of at least one third by late 2020. Market outlets anticipate a sluggish recovery of pigmeat production and the domestic herd to pre-ASF levels (2018) that may take from a few years to over a decade.

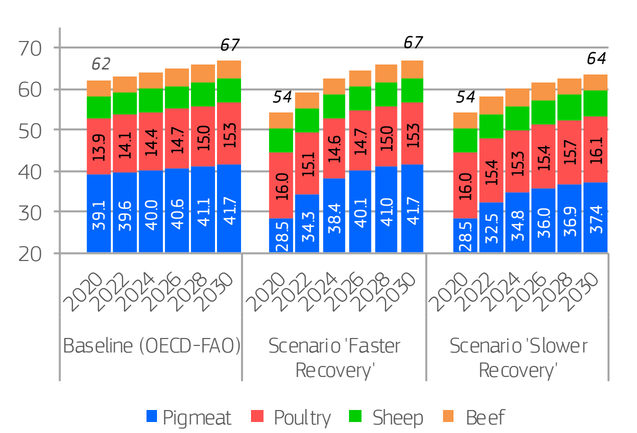
GRAPH 5.1 Pigmeat production in China (% change vs. 2018)



Against this background, this section presents key results from the simulation of potential pigmeat production disruptions in China. **Two scenarios** are considered (see Graph 5.1), that include both a 25% drop in 2019 and a further 15% drop in 2020, and **two alternative onward trajectories**: a faster recovery, where production in 2030 surpasses the pre-ASF level, and a slower recovery, where production in 2030 ends up below the pre-ASF level. These two pathways reflect two alternative rates of farm restructuring and herd restocking[24].

In 2020, Chinese pigmeat production may see a record low of 34.5 million t. Supply and pig herd will likely not return to the pre-ASF levels of 54 million t and 440 million heads before 2025 (scenario 'faster recovery'). Smaller farms will likely keep phasing out mainly because they cannot afford effective biosecurity. By contrast, larger and more modern units will keep taking rigorous preventive or 'post-mortem' biosecurity measures. Irrespective of the farm size, Chinese producers will generally remain hesitant to restock for as long as exposure to the disease and risk of total herd loss remain high.

GRAPH 5.2 Meat consumption in China (kg per capita)



The protein supply gap caused by higher pigmeat prices has already stimulated a search towards alternative sources of animal protein in 2019. This situation is expected to continue (see Graph 5.2). The substitution effect will materialise with more poultry meat both produced domestically – as its lower price and shorter production cycle make it respond to market signals rather quickly – and imported. In addition, relatively recent market movements such as higher imports of red meat (beef and sheep) from Oceania and South America, and rising seafood protein demand will also play a role[25]. Meat consumption per capita is expected to fall from 62 kg to 54 kg in 2020 reflecting a large drop in pigmeat consumption

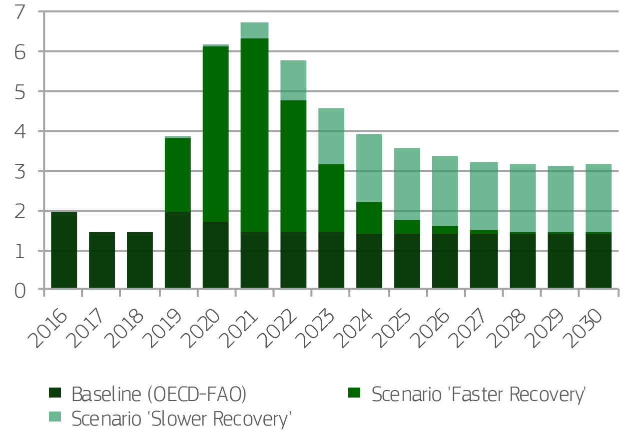
23 As reported at the 87th general session of the World Organisation for Animal Health (OIE).

24 The analysis is based on the following key assumptions: (i) a marketable vaccine will not be made available before 2021; (ii) higher pigmeat prices will contribute to inflation, which is taken endogenously into account; (iii) China's tariffs on all imported pigmeat will remain at 12% (baseline) till 2030; and (iv) no further productivity growth will occur other than that already reflected in the OECD-FAO baseline.

25 Fish is not included in the quantitative analysis.

(11 kg) and a partial compensation with other meat types (3 kg). Depending on the scenario, meat consumption may or may not return to pre-ASF levels; in the latter case, a gap of at least 3 kg/capita will remain throughout the outlook period.

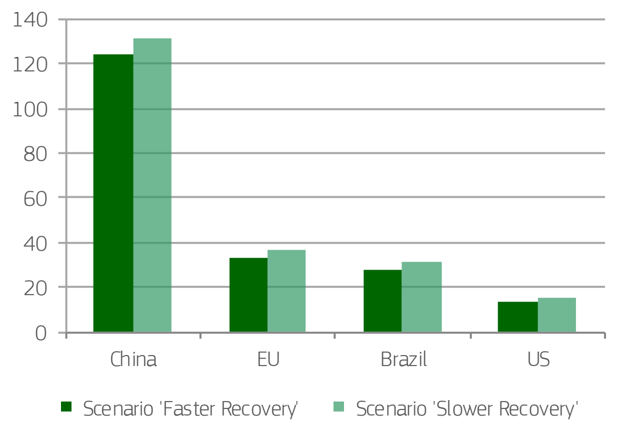
GRAPH 5.3 Pigmeat imports in China (million t)



China's imports will not stop growing any time soon potentially remaining above pre-ASF levels by 2030 (scenario 'slower recovery'; see Graph 5.3). According to the scenario results, in the short term about one third of the production gap of 20 million t is expected to be covered by imports. Redistribution of global trade flows appears unavoidable in light of the import growth. The expected expansion in Chinese and world pigmeat import demand will be followed by higher exports not only from key exporters (the EU, the US, Brazil and Canada) but also secondary ones (e.g. Russia, Mexico). Production expansion outside China would peak within the next two to three years. Depending on the scenario, EU and Brazilian production would rise by up to 6% and 27% respectively until 2022 (compared to 2018). EU producers are generally well placed to profit due to a rare combination of events that include access to a market that exhibits high meat demand and prices (China), access to low-cost feed, and US/China trade tensions. EU pigmeat exports to China will soon reach unprecedented levels which, according to scenario results, may go as high as 3 million t in the near future. Environmental policy constraints will, however, limit production growth in most EU Member States and, therefore, total EU exports (see section on 'Pigmeat'). By contrast, Brazil's exports will likely see much higher relative growth.

It is generally expected that China's pigmeat sector will overcome the ASF crisis, with more consolidated and vertically integrated units in a decade. For this to happen, the government is actively revisiting, planning or implementing biosecurity and R&D countermeasures, economic incentives for strategic herd recovery, tracking of animals, the strategic national reserve, and trade partnerships. In the short term, nonetheless, given the size of the loss of domestic production and the country's appetite for its favourite meat, transmission of higher meat prices to world markets (see Graph 5.4) and lower feed demand seem inevitable.

GRAPH 5.4 Pigmeat producer prices (average % change compared to OECD-FAO baseline, 2019-2021)



This analysis was conducted at JRC.D.4 (Seville) with the in-house version of the Aglink-Cosimo model and using the global OECD-FAO 2019-2028 baseline as reference (http://www.agri-outlook.org/). How to cite this text: Chatzopoulos T. and Pérez Domínguez I. (2019), Scenario: African swine fever in China. In: EC (2019), EU agricultural outlook for markets and income, 2019-2030. European Commission, DG Agriculture and Rural Development, Brussels. Contact: thomas.chatzopoulos@ec.europa.eu

MEAT CONSUMPTION

World consumption and import demand increase …

According to the latest OECD-FAO projections, world meat consumption[26] is set to grow by 46 million t between 2019 and 2030, reaching 374 million t, or 35.7 kg per capita[27]. This represents an increase of nearly 1 kg per person. However, the average annual growth of total consumption (+1.1 %) will be slower than in 2009-2019 (+2 % per year). Population and economic growth in developing countries, albeit slower than in the previous decade, will largely contribute to higher consumption. A large part of world demand will be met through domestic production but imports will be needed to cover the gap in many countries.

… but major uncertainty over the impact of ASF in Asia

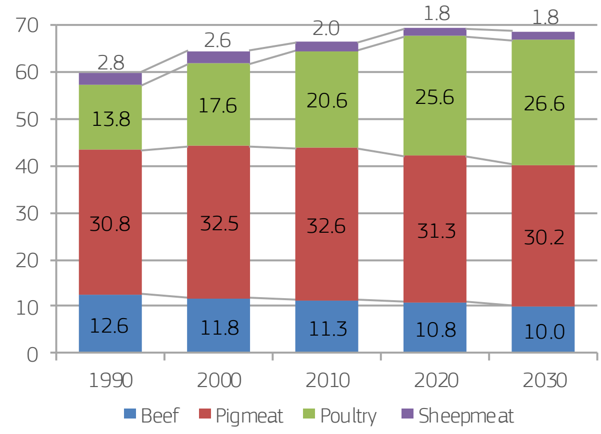
Due to the recent outbreak of African swine fever (ASF) in Asia, there is a lot of uncertainty about the future world meat import demand. China is already the largest export destination and this will only become bigger, not only for pigmeat, but for all meats. In the short term, as world meat production will not be able to cope with this increased import demand, trade diversion to Asia is to be envisaged, putting less pressure on certain EU meat markets as a result. Moreover, EU meat exports can take advantage of this additional demand, especially for pigmeat, certain poultry cuts and offal.

In 2014, Russia introduced sanitary and economic import restrictions on a range of agricultural products from several countries, including the EU. These restrictions have been extended until 31 December 2020 and no or only a very partial recovery of EU meat exports is expected after this date.

Slight decline in EU meat consumption, with a changing consumer meat basket

Meat consumption per capita in the EU has so far been on an upward trend. After the economic crisis and a dip in 2013 (due to the restructuring of the dairy sector, new regulations affecting the pigmeat sector and tight meat supply in general) consumption has recovered strongly since 2013 (+4.7 kg per capita until 2019). This is thanks to the improved economic situation for households and ample supplies of all meat categories, despite growing export volumes.

GRAPH 5.5 EU meat consumption by meat type (kg per capita)



EU meat consumption is expected to decline from 69.8 kg to 68.7 kg per capita by 2030 for several reasons: growing social and ethical concerns, environmental and climate worries, health claims, an ageing European population (eating smaller portions) and lower meat availability on the domestic market. The overall decline will be accompanied by a shift in the consumer basket. Beef is expected to continue its downward trend. Meanwhile, the ongoing replacement of pigmeat by poultry meat consumption will go even faster, due to an increased import demand for pigmeat in Asia. Sheepmeat[28] consumption is expected to increase slightly thanks to the diversification of the meat diet and changes in the EU population (religious beliefs and migration).

Other trends in meat consumption are to be considered: changing dietary patterns (flexitarians, vegetarians and vegans), especially among young consumers; the increasing importance consumers attach to the origin of meat and how it has been produced (organic, animal welfare, environmental footprint); and a shift from fresh meat towards more processed meat and preparations. Lab-grown meat could become a competitor for meat but consumer acceptance and environmental footprint remain unclear.

Overall, the downward trend is not visible yet in the available statistics. Diverging trends across EU Member States make the assessment at EU level even more difficult. Although the factors outlined above will very probably result in a future downward trend, the exact timing of the turning point cannot be predicted.

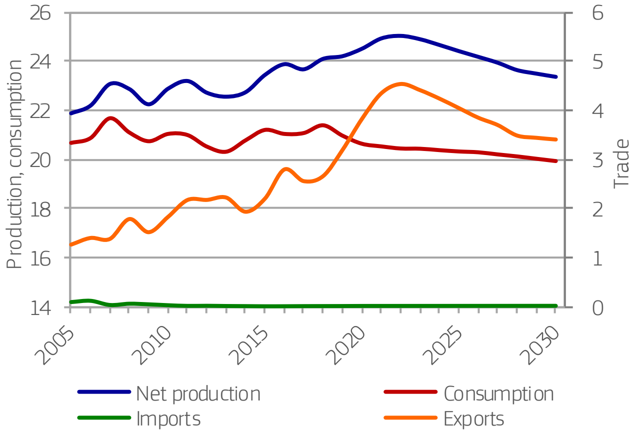
26 Consumption in this chapter refers to 'apparent use' in a balance sheet approach, i.e. production plus imports minus exports.

27 Consumption per capita is measured in retail weight. Coefficients to convert carcass weight into retail weight are 0.7 for beef and veal, 0.78 for pigmeat and 0.88 for poultry and sheepmeat.

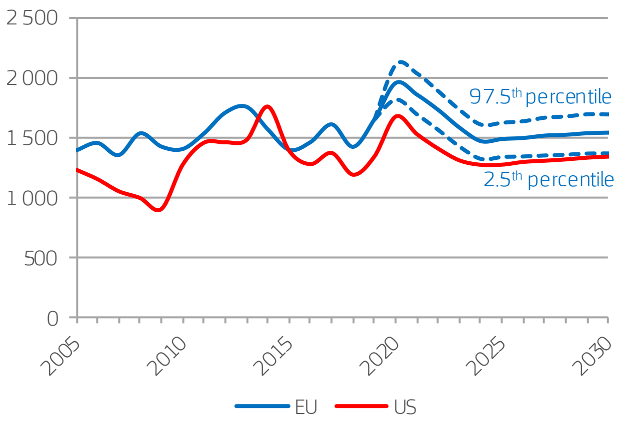
28 Refers to both sheep and goat meat.

PIGMEAT

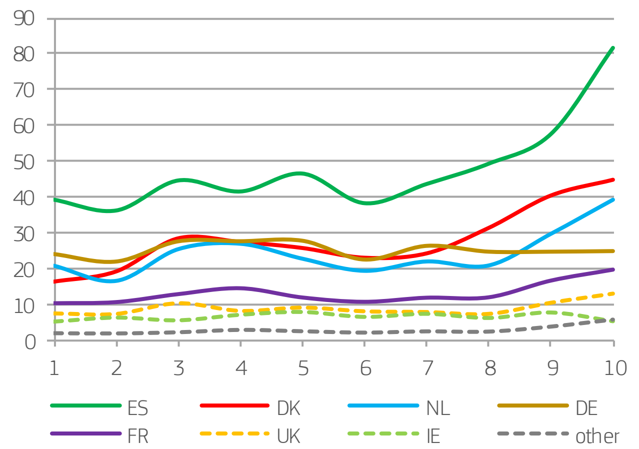
GRAPH 5.6 EU pigmeat market developments (million t)



GRAPH 5.7 Pigmeat prices (EUR/t) and uncertainty range



GRAPH 5.8 Monthly EU pork exports (meat+offal) to China by Member State, January-October 2019 (1 000 t)



Source: DG Agriculture and Rural Development, based on TAXUD customs surveillance data.

ASF outbreak in Asia will lead to production growth and soaring trade in the first years of the outlook period

The pigmeat outlook is particularly uncertain this year given the severe impact of African swine fever (ASF) on the supply of several Asian countries, particularly China. By the end of 2020, Chinese production is expected to fall by more than 35% compared to 2018. The resulting supply gap would more than double the world import demand of 2018, and represent more than 80% of the EU pigmeat production. Therefore, the gap can only be partially covered by imports, which will significantly rise, as high prices in China should make producers in exporting countries divert products normally consumed locally. Chinese pigmeat production will only begin to recover from 2021, if the disease is contained, and could be stabilised by 2025 if the restructuring of its pigmeat industry is successful and rapid.

EU pigmeat production is limited by public policy choices stemming in particular from environmental concerns in several EU Member States (e.g. Germany and the Netherlands), and by the ASF risk in central and eastern Europe. However, the current surge in world demand and prices will allow for growth in other countries, particularly those with access to Asian markets (e.g. Spain). Once Chinese production begins to recover, EU production and prices should decline significantly. By the end of the outlook period, EU production is expected to fall to pre-2018 levels, as some consumers will not return from poultry to pigmeat consumption.

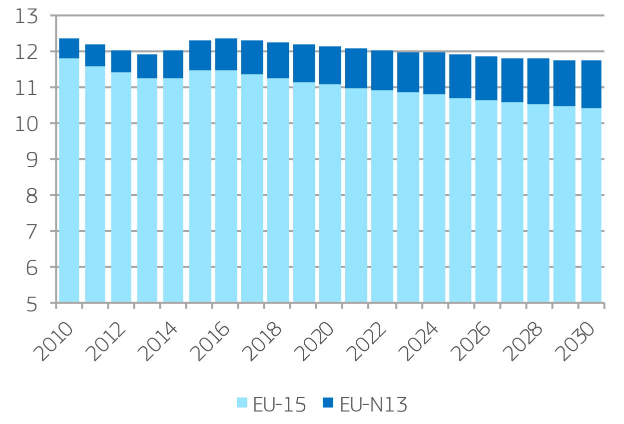
EU pigmeat exports have already risen significantly in 2019, driven by Chinese demand. Shipments should remain high over the outlook period, peaking around 2022, and falling as Chinese supply recovers. However, EU exports are expected to remain higher than today by 2030, as other trade partners may not have managed to recover completely from ASF. Major uncertainties for the outlook period are the level of Chinese demand by then, and if ASF will be kept out of the main EU export countries. EU pigmeat imports should remain very low.

Pigmeat consumption per capita is already declining in some EU Member States, as consumers tend to favour poultry, which is cheaper and perceived as a healthier choice. The high prices in the first years of the outlook period should accelerate this trend. As a result, pigmeat consumption may fall to 30.2 kg per capita, compared to an average of 32.3 kg in 2015-2018.

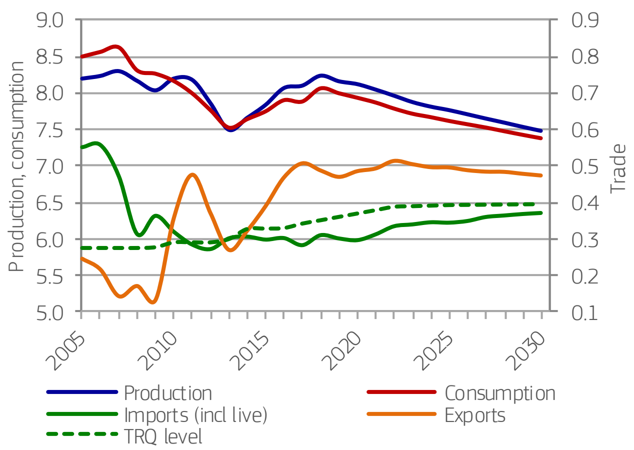
EU pigmeat prices are already rising in 2019 following Chinese demand, and should still rise in 2020. Prices should remain high until Chinese production recovers, and may fall sharply depending on the speed of the recovery and how much the production of EU competitors (the US, Brazil and Canada) grows. Once the situation stabilises, EU prices should remain at around EUR 1 500/t by the end of the outlook period.

BEEF AND VEAL

GRAPH 5.9 EU suckler cow herd (million heads)

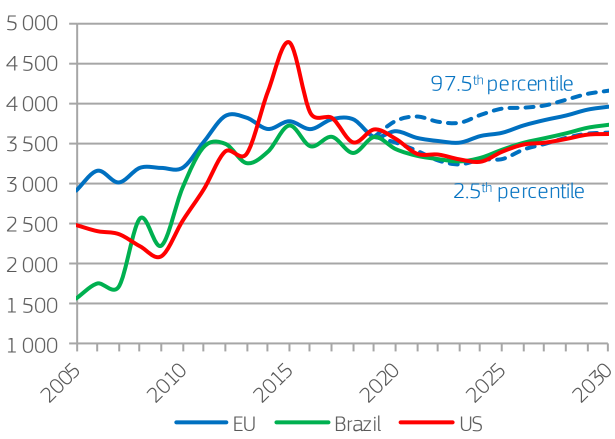


GRAPH 5.10 EU beef and veal market developments (million t)



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

GRAPH 5.11 Beef meat prices (EUR/t) and uncertainty range



Decline in cow numbers determines beef production potential

Recent developments in the suckler cow herd have been influenced by the voluntary coupled support in some EU Member States and the low profitability of beef production. The last two livestock surveys showed a decline in the main producing EU Member States, except for Poland and Spain. This trend is expected to continue over the outlook period, accompanied by a partial shift from EU-15 to EU-N13 (Poland, Hungary, Czechia). In addition, a gradual decline in the dairy herd is projected in both EU-15 and EU-N13 as milk yields continue to increase. Overall, the total EU cow herd (suckler and dairy combined) would decline by almost 1.8 million heads or -5% by 2030. Despite a slight increase in average slaughter weight by 2030, EU gross beef production is expected to return to its downward trend and fall by 700 000 t or -9.3% compared to 2019. The production drop will take place against a background of slightly increasing feed and beef prices in the second half of the outlook period.

Beef consumption in the EU is expected to resume its downward trend, from 10.6 kg to 10 kg per capita between 2019 and 2030. These figures hide different developments across the EU: consumption should remain relatively stable in EU-N13 at a level of 4.3 kg per capita, while EU-15 will show a significant decline of 1.2 kg to a level of 11.3 kg per capita.

EU exports expected to improve thanks to trade opportunities

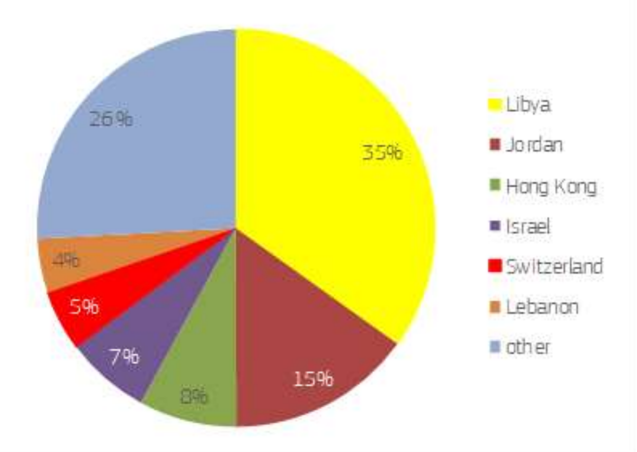
Competition on the world market is severe, both for live animals and meat. Exports of live animals are expected to gradually decline because of a lower demand from Turkey and animal welfare concerns. Thanks to the trade agreement with Japan, new niche markets and the lifting of BSE-related bans, meat exports are expected to improve by 18% compared to 2019. The assumed removal of the import ban by Russia would enable some beef exports to Russia to resume but at very low levels due to Russia's increased self-sufficiency and lower purchasing power. EU beef imports rise slowly, following the gradual increase of tariff-rate quotas (TRQs) opened under free-trade agreements. The TRQs for high-quality beef are expected to be completely filled, while some minor ones opened to less competitive partners will remain unused.

EU beef prices to follow world price developments

Ample supplies from Brazil, the US and Argentina will continue to put downward pressure on world and EU beef prices in the coming years. In the second half of the outlook period, beef prices should rise due to a deceleration in world production.

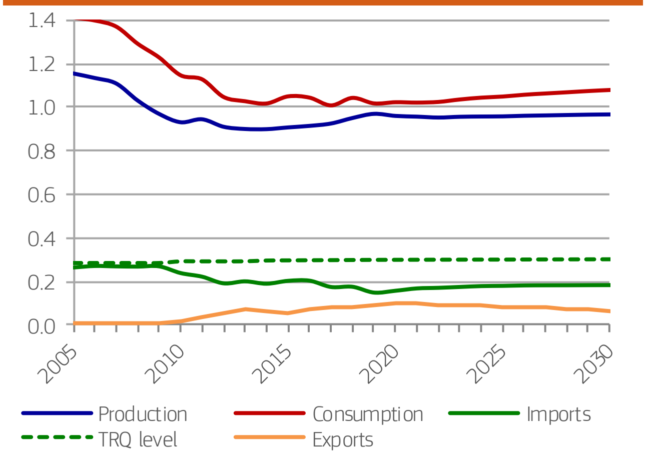
SHEEP AND GOAT MEAT

GRAPH 5.12 Share of EU exports by destination, average 2017-2018 (%)



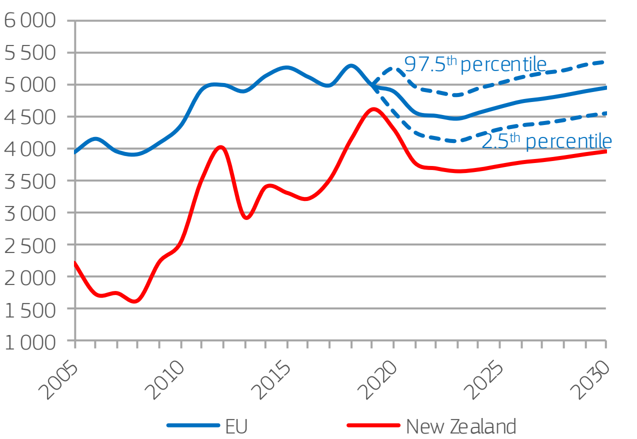
Source: DG Agriculture and Rural Development, based on Eurostat.

GRAPH 5.13 EU sheep and goat meat market developments (million t)



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

GRAPH 5.14 Sheep meat prices (EUR/t) and uncertainty range



Production and consumption to stabilise

Sheepmeat production is expected to remain relatively stable during the outlook period, between 950 000 t and 965 000 t, supported by the implementation of voluntary coupled support in most sheep-producing EU Member States. Production will remain concentrated in a few EU Member States, with slaughtering in the UK and Spain representing almost half of total production in 2018. In the medium term, the production potential will be stimulated by prospects of improved returns for producers. That said, low potential for exports will keep production for the domestic market.

Sheepmeat consumption is expected to rise to 1.8 kg per capita by 2030. This constitutes an increase around 100 g per person or +6% compared to 2019. Sheepmeat consumption, which is the lowest compared to other meats, is also relatively less affected by price developments.

EU trade limited by global competition

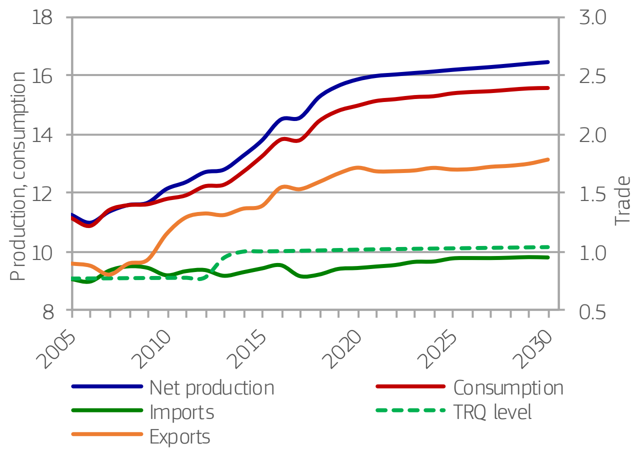
EU exports of live animals are expected to slowly decline over the outlook period to 40 000 t (-34% compared to 2019), and focus on destinations in the Mediterranean area. Exports of meat will be low due to the tough international competition. Australia and New Zealand, which represent 80% of international trade, are expected to keep their dominant position on the world market. Even though the EU is still a major export destination, Australia and New Zealand will focus more on the closer Asian markets. While Australia is expected to fill its EU TRQ, New Zealand production capacity is expected to be unable to serve both the Asian and European market. After the 2020 low, EU imports will increase but stay clearly below the total volume of TRQs opened by the EU.

Prices reduced followed by recovery

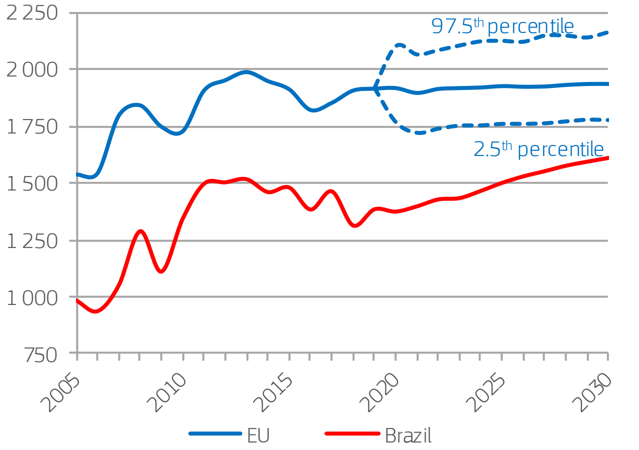
After the 2018 peak, EU prices are expected to follow a downward adjustment, followed by a recovery in the second half of the outlook period, similarly to the world market price. A significant gap between the EU and the world price (New Zealand) will remain, reflecting higher production costs, the presence of border protection and lower pressure from the world market.

POULTRY MEAT

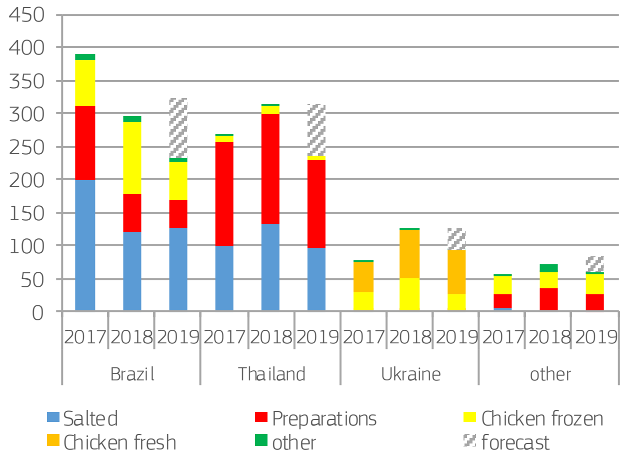
GRAPH 5.15 EU poultry meat market developments (million t)



GRAPH 5.16 Poultry meat prices (EUR/t) and uncertainty range



GRAPH 5.17 EU poultry meat imports by product type (1 000 t)



Source: DG Agriculture and Rural Development, based on Eurostat (forecast from October 2019).

Poultry production growth to continue

EU poultry meat production is driven by EU consumer demand. This demand has been rising consistently for many years, as consumers enjoy the advantages of the product (affordability, convenience, healthy image and limited GHG emissions), and production has followed. EU consumers buy mostly the more expensive cuts (breasts) while cheaper cuts are often exported to markets where they are most valorised (e.g. wings to Asia, halves and quarters to Africa). That said, there are also some shipments of fresh products to Switzerland, small in volume but significant in value, and some exports (on a downward trend) of frozen broilers to Saudi Arabia. Therefore, production will keep growing driven by domestic demand with a part of that production exported.

In the last decade, EU poultry production grew at a yearly average of 3%, and it should continue growing in the first years of the outlook period while high domestic pigmeat prices favour poultry meat. Production growth will be faster in the EU-N13, where significant investments keep taking place, capitalising lower costs. Once the effect of the African swine fever (ASF) outbreak in Asia weakens, growth should slow down and stabilise in the EU-15 while still continuing within the EU-N13. By the end of the outlook period, EU poultry production should reach 16.5 million t (+5% compared to 2019).

World import demand for poultry meat is expected to grow strongly in the first years of the outlook period, as poultry replaces less abundant and expensive pigmeat. Demand should grow particularly in ASF-affected countries (China, Vietnam, the Philippines, etc.), but also in Africa and the Middle East. EU poultry exports will benefit from increased world demand and are due to rise following production growth, reaching 1.8 million t by 2030 (+7% compared to 2019).

EU poultry imports have been falling in the last two years, due to sanitary restrictions on shipments from Brazil, but they have begun to recover in 2019. Over the outlook period, total imports should grow gradually to close to the total volume of TRQs opened by the EU (around 1 million t as of 2019). Out-of-quota tariffs effectively restrict imports. However, when EU prices of chicken breasts rise significantly, imports from competitive trade partners, such as Brazil in 2018, may take place beyond TRQs, at full duty.

Poultry meat consumption should continue growing in the EU, particularly in the first years of the outlook period, and reach 26.6 kg per capita by the end of the outlook period.

EU poultry meat prices are expected to remain stable over the outlook period, as production quickly follows changes in demand.

SPECIALISED CROPS

/6

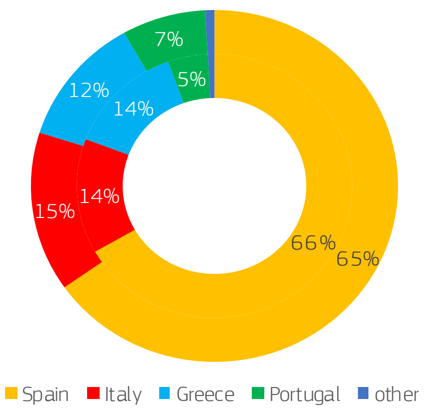
This chapter looks into a selection of specialised crops: olive oil, fruit and vegetables, and wine. Unlike commodities covered in other chapters, these sectors are not included in the Aglink-Cosimo model, and projections are largely based on expert judgement and literature review, taking into account historical trends in supply and demand. Price developments are not explicitly incorporated.

Due to the large degree of differentiation within these markets, these sectors cannot be covered in full. For fruit and vegetables in particular, projections are limited to apples, peaches and nectarines, oranges and tomatoes. Other specialised crops, equally fundamental to EU agriculture, such as flowers and ornamental plants, are not covered in the projections.

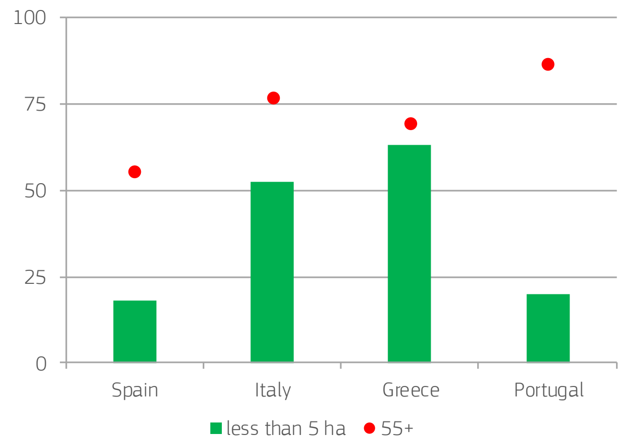
Overall, specialised crops are expected to continue their recent trends and trade is generally due to intensify. Domestic consumption of wine could further decline, while demand for olive oil is expected to increase in non-producing countries. Health promotion campaigns appear to lead to an increased consumption of fruit and vegetables, and shifts between products will continue, driven by consumers' changing preferences and lifestyles.

OLIVE OIL

GRAPH 6.1 Share of olive oil production by producing Member State, average 2014-2018 (inner) and 2030 (outer)

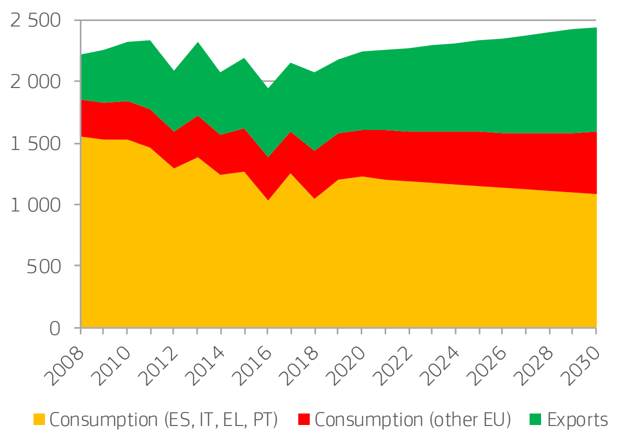


GRAPH 6.2 Share in total UAA of specialised olive growers with less than 5 ha, and share of their owners 55 years and older, 2016 (%)



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

GRAPH 6.3 EU consumption and exports of olive oil (1 000 t)



Production expansion driven by increasing yields

In recent years, higher than average olive oil prices and lower profitability of alternative crops has led to an expansion of the areas of olives for oil (mainly irrigated, intensive or super intensive) in the Iberian Peninsula. By contrast, the expansion was rather limited in Italy and Greece. Environmental concerns about water use and the impact of monoculture in certain areas, and recent competition with more profitable crops (e.g. almonds), are expected to slow down this expansion over the outlook period (to +0.2% per year on average).

Nevertheless, productivity is expected to be the main driver of production growth. This is mainly due to increasing yields, resulting from new plantations, irrigation systems and continuously improving agronomic conditions of trees. The speed of change may also be influenced by consumers' increasing preference for early-harvest olive oil (of lower yields) and specialised mono-varietal oils, for their organoleptic qualities.

By 2030, the EU's olive oil production is expected to grow by around 400 000 t (+1.1% per year on average). It is expected to grow at the fastest rate in Portugal (+88% compared to the trimmed average for 2014-2018). Growth is also expected in other Member States (+30%), mainly thanks to value creation strategies (e.g. organic production).

Farm succession will remain a challenge, particularly in Italy and Greece, where most farms are smaller than 5 ha, and where around 70% of the owners of these small farms are 55 years and older.

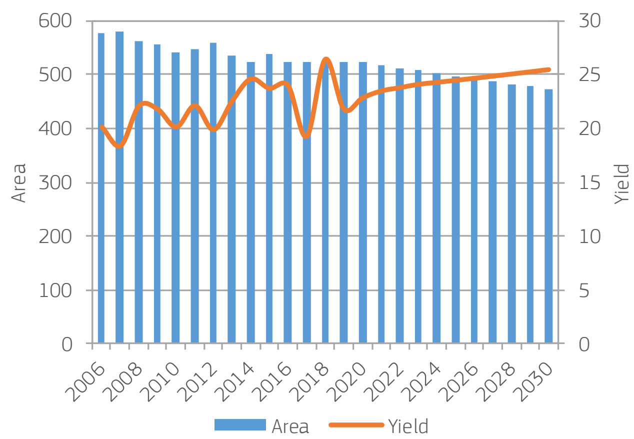
Growth in demand outside main producing countries

Factors that could influence future olive oil consumption include the increasing popularity of eating out and of convenience food, and younger generations' concerns about their health and the environment. In the EU's main producing countries, the declining trend is expected to slow down by 2030 (falling to -0.8% per year on average compared to 3% in 2004-2018). In other Member States the increasing trend is expected to accelerate (+3.3% compared to +2.3%), mainly thanks to awareness campaigns and the incorporation of olive oil into modern lifestyles (e.g. foodservices). By 2030, the share of these Member States in the total EU consumption is expected to grow by 8 pp (to 32%).

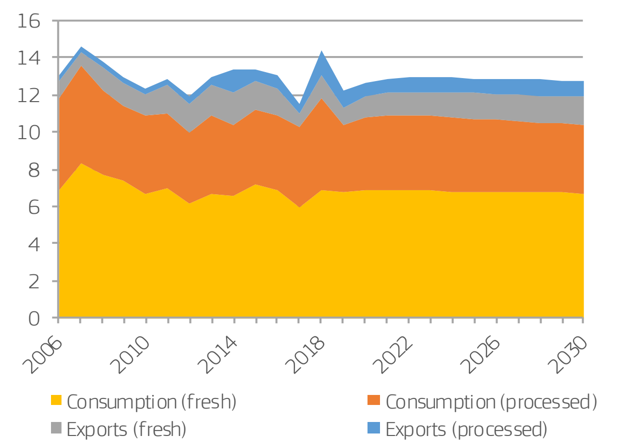
The growth potential of EU exports is high (+3.3% per year on average) due to the lower per capita consumption in many parts of the world. Targeted promotion campaigns are expected to play a role in increasing trade to traditional and new export markets.

APPLES

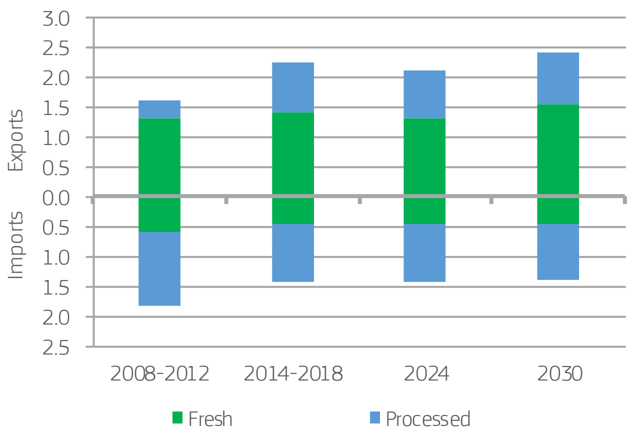
GRAPH 6.4 EU apple orchard area (1 000 ha) and average yield (t/ha)



GRAPH 6.5 EU apple consumption and exports (1 000 t)



GRAPH 6.6 EU trade of apples (million t)



Stable production with increasing quality

The EU's apple production is projected to remain stable over the outlook period at 12 million t driven by a decreasing area (-0.8% per year) and an increasing yield. While these developments are expected to take place in all apple producing countries, the modernisation of the Polish apple sector (estimated at around 25% of EU production) will be a major driver. Old orchards will be partially replaced by new planting varieties that better meet consumer preferences. The concentration of production on larger farms and the use of new production methods will allow the average yield to increase. Modernisation of the sector will also favour the cooperation within the, still very scattered, Polish apple sector. This should lead to improved quality and marketing of Polish apples.

Decline of EU apple consumption slowing down

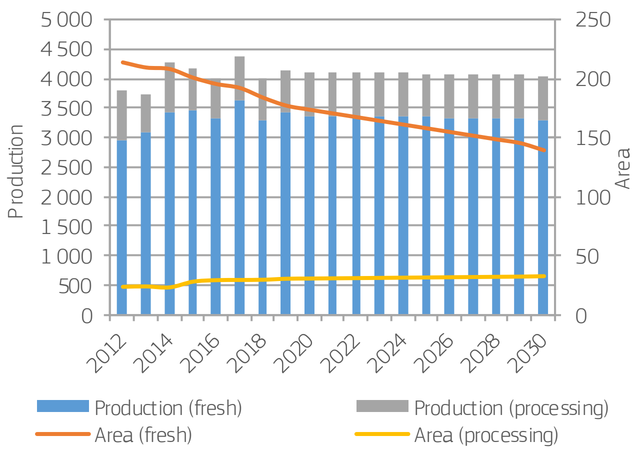
By 2030, the increased number of apple varieties, which better reflect consumers' diverse preferences, and improved quality are expected to result in a slowdown in the decline in consumption (-0.1% compared to -1% in the previous period). The decline in the consumption of processed apples is also expected to slow down (-1% per year compared to -1.3% over the last decade). Whereas the decline in consumption of juices (around 65% of processed apples) is expected to continue, the consumption of other products such as cider and compote (estimated at around 25% and 10% of processed apples, respectively) is expected to increase. The growth in cider consumption is observed particulary in non-traditional markets in central and eastern Europe. Children and young adults are driving the growth in compote consumption in the EU. With regard to juices, consumers seek more fresh juices, often chilled, which are perceived to be of better quality.

EU exports of fresh apples to grow moderately

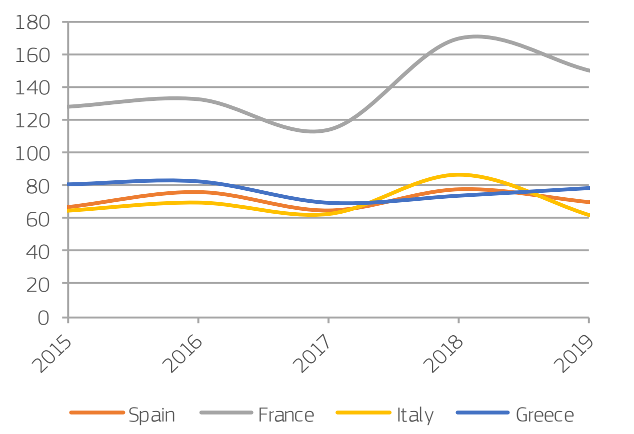
Exports of fresh apples are expected to continue to grow but at a slower rate than in the past (0.7% per year, compared to 3.6% in the previous period). Despite the opening of new markets and the expected increase in quality, the growth in exports remains moderate, in particular because of phytosanitary restrictions in non-EU countries. Imports of fresh apples should remain stable (around 500 million t) thanks to their high quality and EU demand in summer months (to ensure all year round availability). Trade in processed apple products, mainly apple juice concentrate, depends largely on EU and global availability and on the prices of apples as raw material. In the outlook period, EU exports are expected to remain stable, though there will be strong year-on-year variations related to weather conditions and the resulting EU harvest. Nevertheless, the EU is due to remain a net importer of concentrate throughout the period.

PEACHES AND NECTARINES

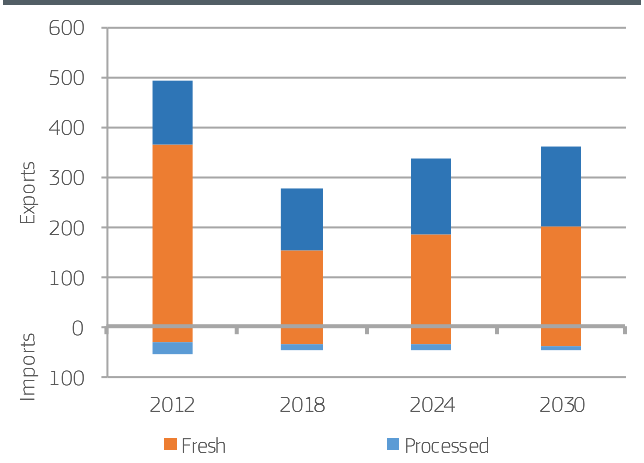
GRAPH 6.7 EU production (1 000 t) and area (1 000 ha) of peaches and nectarines for fresh and processing markets



GRAPH 6.8 Average EU prices of peaches (EUR/100kg)



GRAPH 6.9 EU trade of peaches and nectarines, fresh and processed (1 000 t fresh equivalent)



Low prices pushing production down

The EU's production of peaches and nectarines is concentrated in four Member States (Spain, Italy, Greece and France) which accounted for 97% of EU production in 2019/2020. By 2030, the EU's production is expected to stabilise at around 4 million t (-0.3 % per year), though with high annual variations due to weather conditions.

The EU's production of peaches for fresh consumption (around 85% of total production) is projected to decrease by -0.4% per year to around 3.3 million t by 2030, driven by a (further) restructuration of the sector in Spain after a production boom between 2012 and 2017 (+54%).

In the highly competitive EU market, low prices particularly in Spain, Italy and Greece are expected to maintain the area decline (-3% per year up to 2030, similar to the decline of the last seven years). In France, where 90% of the production is sold on the national market and prices are much higher due to consumers' preference for national products, the decline in area may be smaller. By contrast, the EU's production of peaches for processing is expected to slightly increase over the outlook period (+0.2% per year) driven by increasing production in Greece, the largest EU producing country (61%) of canned peaches (+16% in 2016-2018 compared to 2012-2014). This expected increase would outweigh the decrease in production in Spain and Italy.

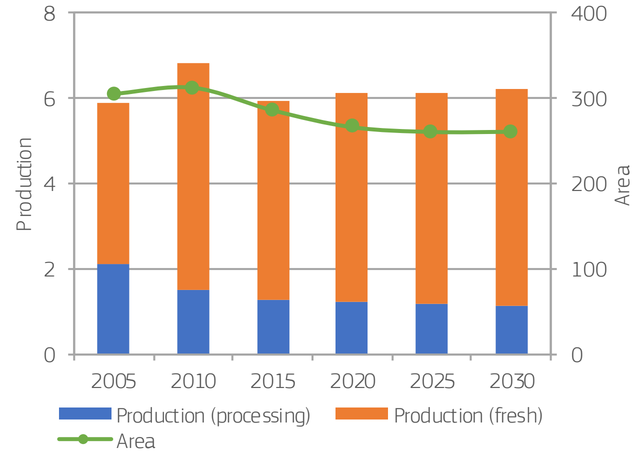
High variability in consumption of fresh peaches and nectarines

The EU per capita consumption of fresh peaches and nectarines increased by around 4% per year during the last five years, due to high availability and low prices. However, it is expected that EU per capita consumption will decrease over the outlook period (-0.5 % per year) to around 6 kg/capita because of competition with other summer fruits and expected price increases due to limited production growth in the longer term. Consumers easily switch to other types of fruit in the summer, for example melons, which are increasingly available in supermarkets, including in ready-to-eat packages as convenience food, in particular when the quality of peaches and nectarines falls below expectations. The consumption of peaches for processing is expected to decline over the outlook period (-0.4% per year).

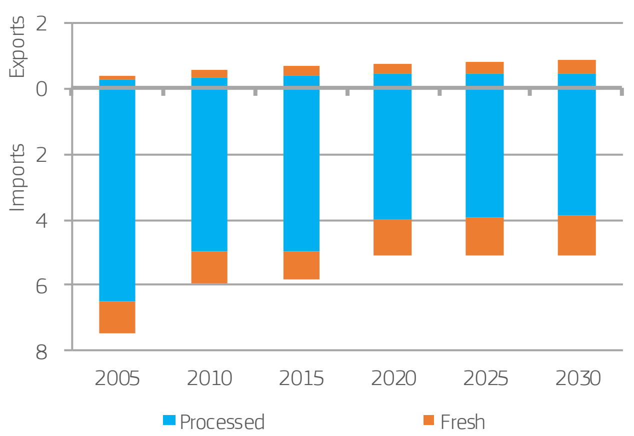
By 2030, exports of fresh peaches and nectarines are expected to slowly grow (+0.4% per year) after a fall of 11% in 2014-2019 because of the Russian ban. Imports, mainly outside the production season, are expected to increase in line with the trend over the last period (1% per year).

ORANGES

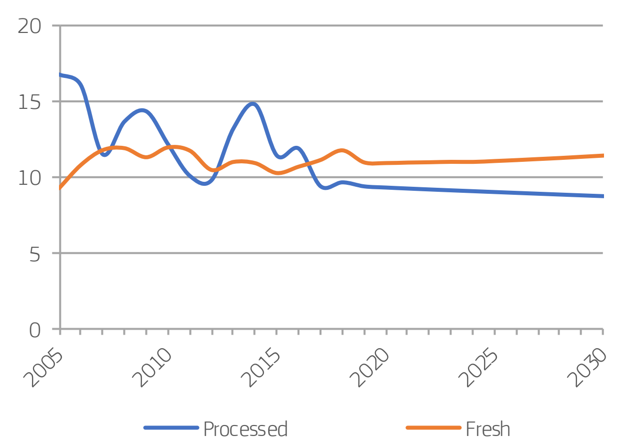
GRAPH 6.10 EU oranges production (million t fresh equivalent) and area (1 000 ha)



GRAPH 6.11 EU trade of oranges (million t fresh equivalent)



GRAPH 6.12 EU consumption of oranges (kg fresh equivalent per capita)



Stabilisation of area and production

While there has been a steady decrease in the EU's orange tree area in recent years, it is projected to stabilise over the outlook period. Only minor improvements to yields are expected given that the latest planted orchards have now reached maturity and that yield increases of new plantings will be mostly offset by ageing orchards (in 2017, 46% of orchards were older than 25 years). An increase in organic area (19% of total orange tree area in 2018) can also decrease yields. This could result in a stable production by 2030 at 6.2 million t. The share of production directed to the processing sector, primarily juices, is expected to slightly decrease (-1% per year) in favour of the fresh market. Spain and Italy are due to remain the two main producing countries with over 80% of production.

High dependency on imports of juices

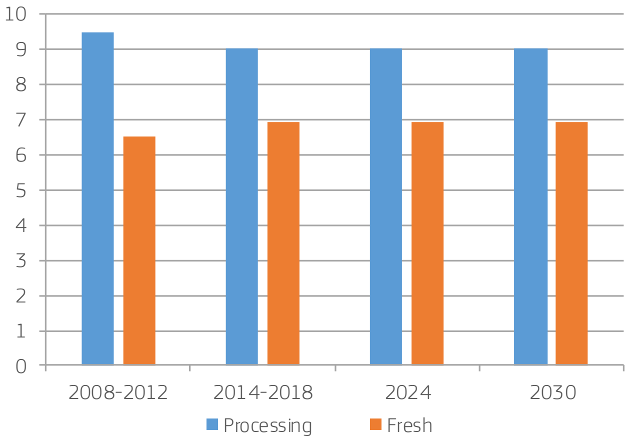
The EU is highly dependent on imported orange juice (both concentrated and non-concentrated). It accounts for over 80% (in fresh equivalent) of juices consumed in the EU. While proportionally imports will remain high, the overall quantity of imported processed oranges could decrease towards 2030 (-2% per year), in line with decreasing juice consumption. In particular, imports of orange juice concentrates have declined sharply, having been largely replaced by non-concentrated orange juice. Boosted by demand, imports of fresh oranges could increase by 2% annually. Exports, of both processed and fresh orange juice are expected to continue to increase, but at a slower rate than in the past (+2% per year, compared to +4% in 2008-2018). The main destination remains Europe: Switzerland, Norway and Serbia.

Switching preferences between processed and fresh

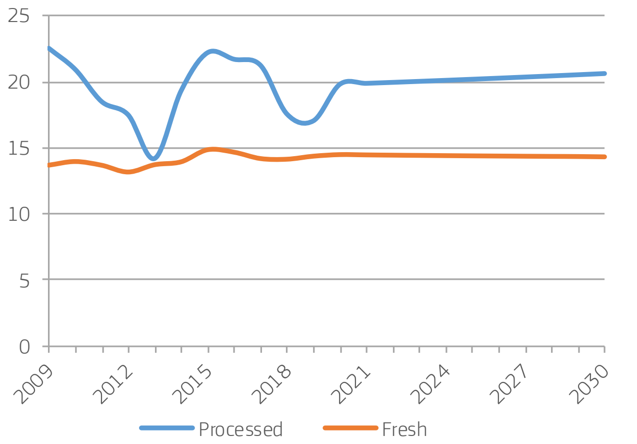
While overall consumption per capita of oranges (fresh and processed) has been decreasing (-2% per year in 2008-2018), there has been an increasing preference for fresh over processed over the last decade. While the per capita consumption of oranges (total fresh and processed) is expected to slow down to -1%, a stronger decrease of processed oranges is projected (-2%). This will translate into a per capita consumption of 8.8 kg of processed oranges and 11.4 kg of fresh oranges in 2030 (from respectively 11 kg and 10.9 kg in 2018). Within the fresh market, consumption of table oranges is due to decline in favour of fruit that is easier to eat, while the consumption of freshly squeezed juice in supermarkets, cafés and restaurants is driving the overall increase in consumption.

TOMATOES

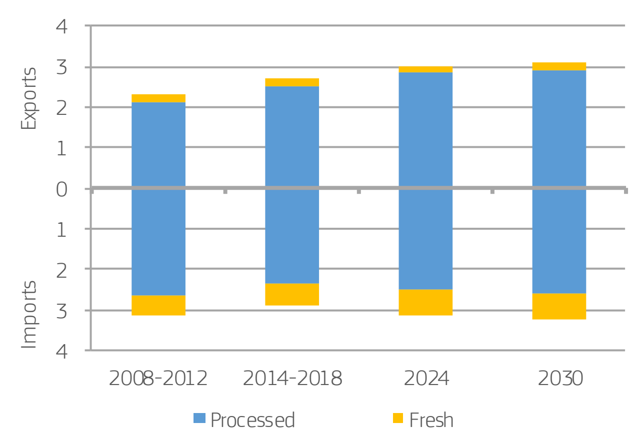
GRAPH 6.13 EU production of tomatoes for fresh consumption and for processing (million t)



GRAPH 6.14 EU per capita consumption of fresh and processed tomatoes (kg fresh tomato equivalent)



GRAPH 6.15 EU trade of fresh and processed tomatoes, including inward processing (million t fresh equivalent)



EU tomato production stable but with more added value

By 2030, the EU's production of fresh tomatoes is expected to remain stable compared to the 2014-2018 trimmed average, at around 7 million t. The increasing yield driven by the extension of the production seasons is partly offset by an increasing share of small tomatoes and other varieties of higher added value with lower volumes produced (e.g. cherry and cocktail tomatoes).

By contrast, the EU's production of tomatoes for processing, which is a separate production stream, is expected to increase by 0.3% per year over the outlook period. The growth is expected to be mainly driven by increasing yields, particularly in the main traditional producing countries (Spain, Italy and Portugal) as well as in Poland.

Slightly increasing demand for processed tomatoes

The EU per capita consumption of fresh tomatoes is expected to remain stable in absolute value (around 14 kg), but with an increasing share of small tomatoes and other varieties with higher added value.

The apparent per capita consumption of processed tomatoes, is expected to slightly increase to 21 kg by 2030 (in fresh tomato equivalent; +0.3% per year). This growth is mainly driven by increasing demand for convenience food and processed foodstuffs such as prepared meals.

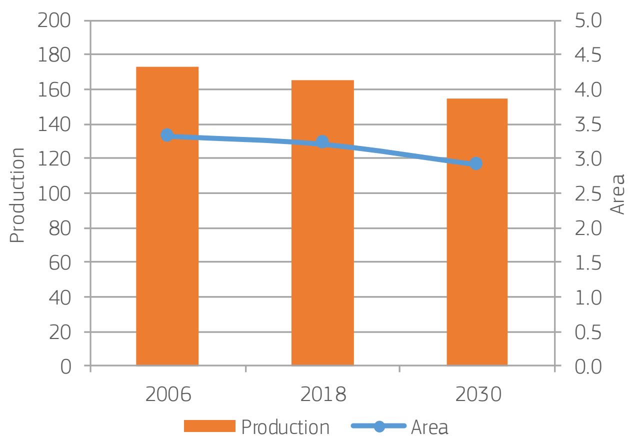
Improved quality driving EU export growth

EU exports of fresh tomatoes are expected to increase over the outlook period (+3.6% per year). Imports of fresh tomatoes have significantly increased over the last decade (+3% per year) and are due to continue to grow but at a slower pace (+1% per year). The growth will come in particular from Morocco, which already accounted for 80% of total EU imports in 2018. The significant out-of-quota imports shows that Morocco's potential to export more to the EU depends on their capacity to increase production and on the current competition between tomatoes and more lucrative products in Morocco (such as berries).

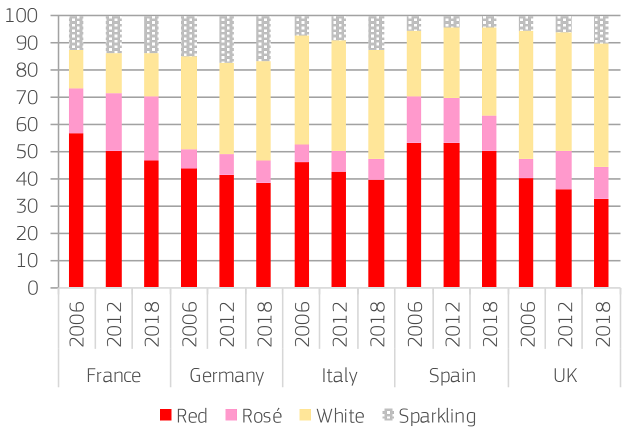
The EU has been a net exporter of processed tomatoes since 2017. Italy is projected to maintain this position, with expected growth of exports to be stronger (+0.9% per year) than the growth of imports (0.7% per year).

WINE

GRAPH 6.16 EU wine production (million hl) and vineyard area (million ha)

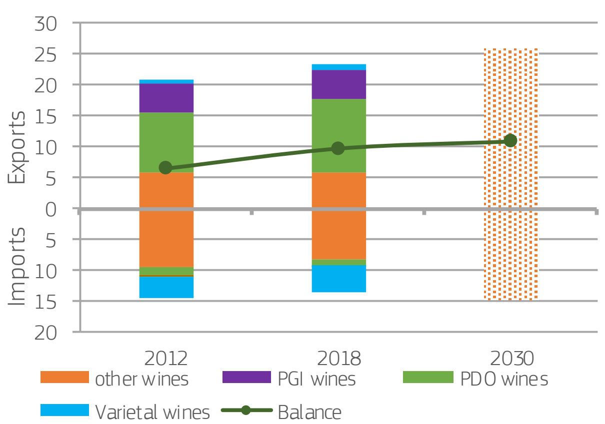


GRAPH 6.17 Share of main wine types in top 5 EU wine consuming countries (% volume retail sales)



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

GRAPH 6.18 EU wine trade (million hl)



Diverging consumption trends

The EU is the largest consumer of EU wines (80% of EU production) with five Member States (France, Italy, Spain, Germany and the UK) accounting for over 70% of the EU wines consumed. Driven by health concerns and changing consumption patterns, the EU's annual per capita consumption is decreasing. This trend is expected to continue but at a slower rate (-0.4% per year) to reach around 25 l per capita by 2030. However, large differences between countries could remain. The wine sector is adapting to a new generation of consumers with changing lifestyles and preferences. In particular, red wine consumption, often associated with the traditional dinner at home, is decreasing across the EU. Demand for white, rosé and sparkling wine, which generally have a lower alcohol content and can be consumed on a variety of occasions, is growing.

The overall declining consumption of wine, together with a further expected decline of the use of vinified production for 'other uses' (e.g. distillation and the production of 'processed/elaborated products') is projected to lead to a decline in total domestic use of vinified production (-0.5% per year) by 2030.

Slowdown in growth of EU exports

EU exports have grown strongly over the last decade (+6.1% per year). While the volume of exports has recently stabilised, their value has continued to grow. Despite strong competition from wine producing countries outside of the EU and possible trade tensions, in particular with the US, EU exports are expected to keep on growing to reach 26 million hl in 2030 (+1% per year). The increase in exports is driven by the high demand for EU wine with a geographical indication (GI) and sparkling wines in general.

Further decline in EU area and production

Due to the decline in EU demand and the slowdown of trade, the EU's wine production is projected to decline to 155 million hl (-0.5% per year) by 2030, although with annual variability due to climate conditions. The main reason for this decrease is the increasing abandonment of small vineyards (-0.9% per year) due to ageing farm owners and/or difficulties to compete on the market. Some of the abandoned vineyards will be replanted, in particular in zones eligible for producing GI wines. Abandonment of smaller areas and the resulting further concentration of wine production is not expected to lead to strong yield increases. Indeed, to ensure the quality of wine (particularly GI wines), and as the production of organic wines and wines using less farm inputs increases, yields are constrained.

AGRICULTURAL INCOME

/7

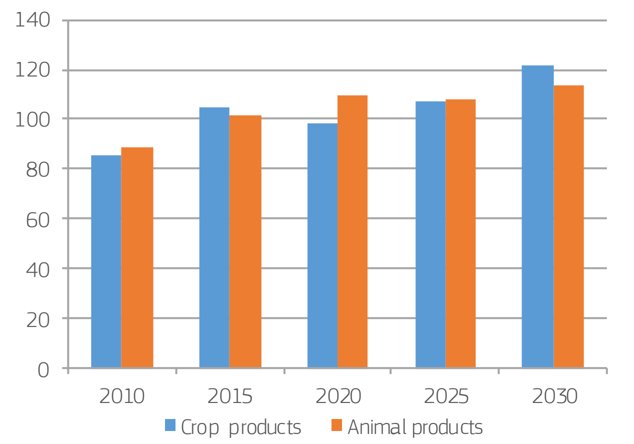
This section analyses how changes in agricultural markets over the outlook period affect farmers' income. The analysis is based on current assumptions, and includes agricultural sectors not explicitly covered by this outlook exercise. The current public support situation is applied to the entire outlook period.

At EU level, the analysis shows a slight increase of the agricultural income per annual working unit (AWU) in nominal terms throughout the outlook period, despite higher energy prices that affect feeding expenditure. The income gap between the EU-15 and EU-N13 is expected to narrow.

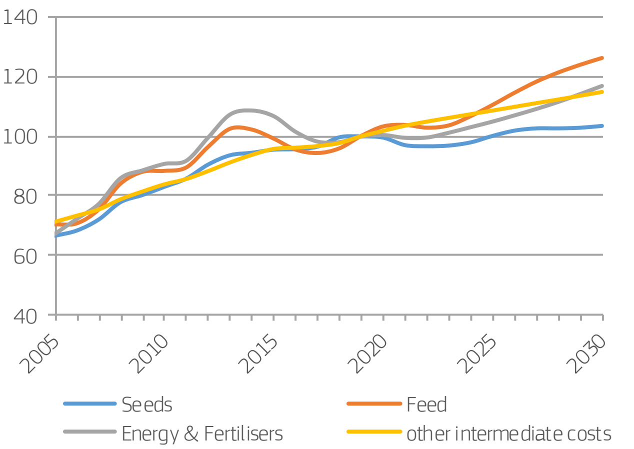
The continued labour outflow from agriculture to other sectors, due to structural changes at EU level, is expected to slow down. Increasing diversification of the job profiles of both agricultural workers and farm managers is expected, as well as changes in the nature of the work of farm managers. Such changes are driven by technological progress in machinery, equipment and decision-support tools.

FARM INCOME

GRAPH 7.1 Crop and animal value of production in the EU (average 2013-2015=100)

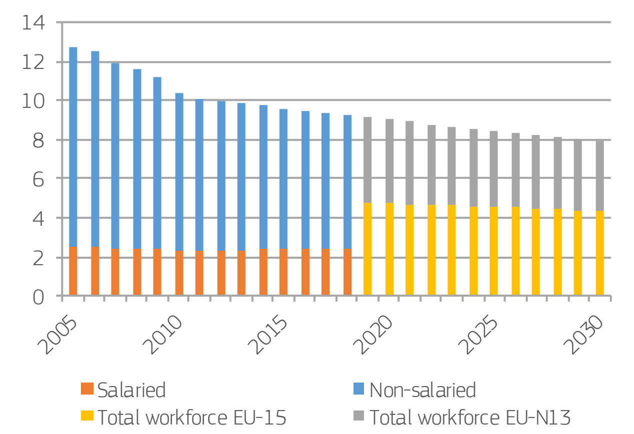


GRAPH 7.2 Farm costs of EU production (average 2017-2019=100)



Note: A moving 3-year average is applied.

GRAPH 7.3 Number of agricultural workers in the EU (million)



Value of agricultural production will rise

The total value of animal and crop production is expected to increase in the outlook period. This is due to both high prices and increasing production. Nominal prices are due to appreciate, especially for milk powders and soya beans, which are expected to rise by 3% per year (see dedicated sections).

Several trends are observed in the value of meat production. Firstly, EU pigmeat prices are expected to fall after the peak in demand following the African swine fever (ASF) outbreak in Asia, and to ultimately stabilise. Secondly, combined with an expected decrease in volume, the value of EU pigmeat production is projected to slightly decline towards 2030 (-2% compared to the average for 2017-2019). Bovine production value will also fall in the medium term, while poultry production value will continue to rise.

Feeding costs and contractual staff on the rise

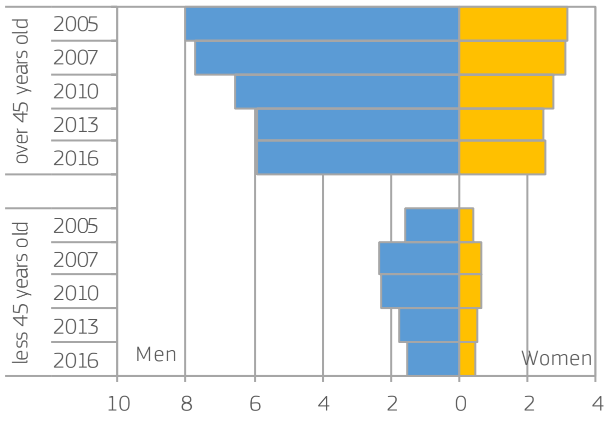
Prices of feed materials are expected to rise at both EU and global level. This is partly due to higher oil prices (see dedicated section), but also to additional environment-related costs on the production side. An important assumption taken from the OECD-FAO outlook is the global price of soya beans, which is set to rise significantly in the outlook period as demand increases.

Other intermediate costs are also expected to rise. These include veterinary expenses, maintenance, plant protection products, as well as the cost of temporary contracted staff and machinery rent. Temporary hired labour is projected to rise alongside the trend towards less involvement of family labour in the farming sector.

Farm labour force is moving away from traditional family farms

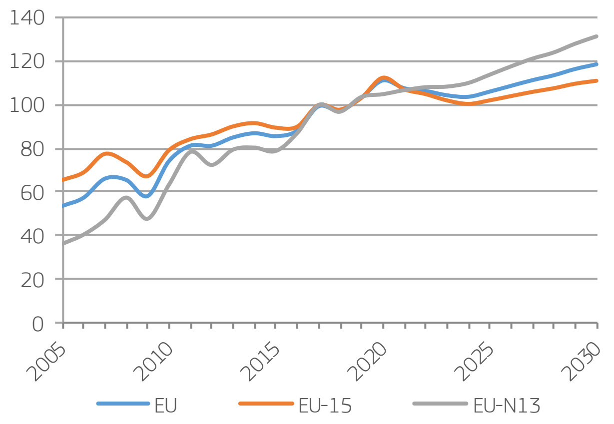
The number of EU farmers has been falling steadily: during 2008-2018, 2.3 million farmers left the sector and were not replaced. In the projection period, it is expected that the pace of departure will slow down, as we have seen in the aftermath of the 2008 economic crisis. Furthermore, it is expected that the EU-N13 will continue to experience this structural transformation to the farming sector, while in the EU-15, labour force should decline more moderately. In 2030, 7.9 million people (annual working unit) should manage or work in a farm across the EU. It is also expected that the number of hired workers will remain stable or possibly rise slightly, due to the labour organisation transition in the sector.

GRAPH 7.4 Number of EU farms by manager's age and sex (million)



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

GRAPH 7.5 EU farm income (average 2017-2019=100, nominal terms per labour unit)



Note: The decline from 2021 is largely due to the fall of EU pigmeat prices after the rises in 2019-2020, but also to the decrease of pigmeat production from 2023 (particularly in the EU-15), and the lower prices in the commodity markets (e.g. wheat, maize and soya beans) in the beginning of the period.

Agricultural labour force is changing in nature

In 2016, the ratio between farm managers older than 45 and those younger was four to one. While the number of farmers aged 45+ stabilised between 2010 and 2016, the number of younger farmers has steadily declined. The generational renewal is a tremendous challenge for the sector as many farmers are retiring and fewer farmers' children are taking over from them. As highlighted in the Actif'Agri report29, new types of family organisation can be a challenge to the traditional family farm structure, as family members increasingly work outside the farming sector. However, farmers' personal and professional lives remain very much interlinked due to the nature of the work.

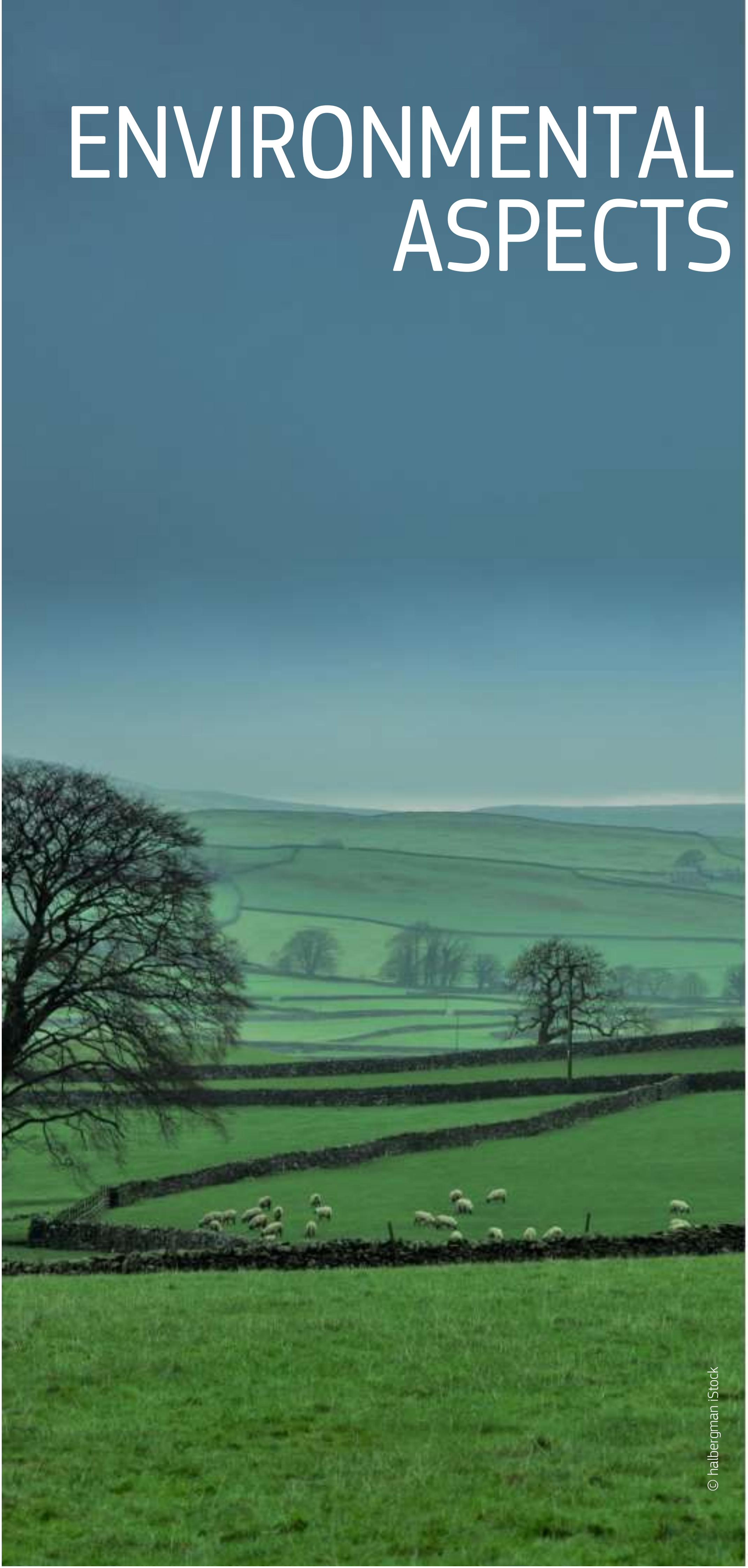
This development increases the need for contracted staff (engaged through a contract provider, not hired staff) to perform specific tasks. Farm managers can find this particular labour force through their personal network or through employer organisations, interim agencies or consultancy firms. Working on a farm can therefore be less vocational and become, as in any other sector, a business opportunity. Entering the sector as a farm manager still requires a large amount of capital, however, to buy machinery and land, though there are alternative ways of acquiring land.

The profiles of both agricultural workers and farm managers can become increasingly diverse, and their transfer between economic sectors more fluid. As evidenced in the Actif'Agri report, the backgrounds and education of farmers entering the sector are gradually becoming more diverse, meaning that they bring their work experience from other sectors into the farming community.

The nature of farm managers' work is also evolving rapidly alongside technological progress in machinery and equipment, and better decision-support tools. It is expected that 'Farming 4.0' – the combination of digital and precision agriculture – will continue to provide farmers with increasingly targeted information and tools, which could at the same time improve the environmental efficiency of agriculture.

[29] Forget V. et al (2019).

ENVIRONMENTAL ASPECTS



/8

This chapter presents an environmental analysis of the medium-term developments of EU agricultural markets based on a set of environmental and climate indicators. These indicators include farm and food chain greenhouse gas (GHG) emissions or carbon footprint, nitrogen footprint, water consumption footprint and land footprint.

The environmental analysis is based on the 2019 CAPRI baseline, which provides a medium-term outlook for the year 2030 for the EU and global agricultural commodity markets. The baseline provides harmonised projections for the main agricultural commodities, land use and herd sizes, at Member State and regional levels. The baseline covers current CAP policies, assuming the continuation until 2030 of CAP post-2013 and of Member State policy options. This reflects the impact on regional agricultural output development, including livestock herd size, with a direct impact on environmental aspects.

Although requirements laid down in the CAP, and EU and national environmental legislation are implicitly taken into account (e.g. limitation of the number of animals, change in production, etc.), this modelling analysis does not explicitly take into account the full spectrum of environmental rules and the adaptation of techniques farmers and food stakeholders will implement. This leads to an overestimation of the negative environmental and climate impact in the regions in question.

PLANETARY BOUNDARIES

Planetary boundaries: keeping the planet in its safe operating space

Improving environmental sustainability requires tackling environmental threats on air, water, land, biodiversity, soil and marine resources, as well as on the climate. For instance, those caused by greenhouse gases and nitrogen. Planetary boundaries is a concept proposed by a group of Earth system and environmental scientists in 2009[30], and then improved in 2015[31]. The aim was to define a 'safe operating space for humanity'. The framework is based on scientific evidence showing that human actions have become the main driver of global environmental change. If these actions exceed certain limits, they will cause irreversible change. Planetary boundaries are therefore proposed as safety borders: within them, irreversible environmental changes can be avoided and humanity can thrive.

As of 2009, the planetary boundaries for biogeochemical flows and biosphere integrity have been exceeded, while others are in imminent danger of being crossed, namely earth surface change and climate change. While countries are making efforts to fight the climate change danger, the Paris climate target remains difficult to reach. Water is not a threat globally, but there are serious issues with water scarcity in several world regions.

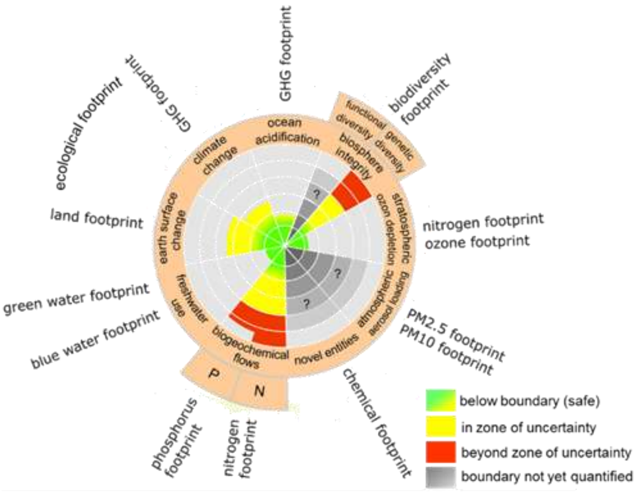
How can we measure if 'we' as a society or as citizens are living within the planetary boundaries? Inventory approaches such as those taken by the United Nations Framework Convention on Climate Change (UNFCCC) use a sectoral approach quantifying emissions from economic activities. Life-cycle assessment (LCA) models quantify emissions over a product's entire life cycle. They give a comprehensive picture of the (embedded) environmental effect that a product has across all relevant economic sectors and from all regions where the effect occurs. The effects can be calculated for individual or aggregate goods, and at production or consumption level. Environmental footprints are therefore useful tools to 'connect' the individual choices with their environmental consequences, and to evaluate different options for satisfying a demand – for example the demand for sustainable healthy, safe and nutritious food.

In this chapter we will look at some members of the 'environmental footprint family' and assess the pressure of the EU food system on the environment within the EU: carbon footprint, nitrogen footprint, water footprint and land footprint.

[30] The group was led by Johan Rockström from the Stockholm Resilience Centre and Will Steffen from the Australian National University (Rockström et al. 2009).

[31] Steffen et al. (2015).

FIGURE 8.1 Performance of environmental footprints with respect to global planetary boundaries



Source: DG JRC, based on Vanham et al. (2019).

Which units are appropriate for quantifying environmental footprints?

Generally, footprints are measured per kg of product (e.g. for carbon footprint, kg CO2 equivalents / kg product). This would be the most intuitive method, as statistics are commonly given in fresh weight. However, other metrics might be preferred as they relate more closely to the nutrition quality (kcal or protein in product) or indicate total impact (kg CO2 equivalents per capita and per year).

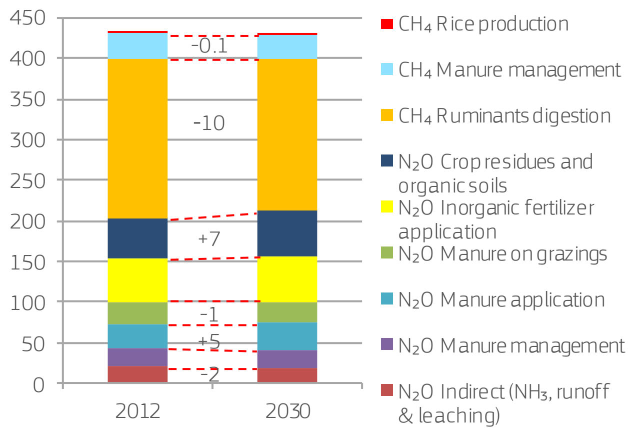
Nitrogen is a special case as this nutrient is both a critical input for crop and livestock production, but also one of the key macro-nutrients in a nutritious diet. Measuring the nitrogen footprint in kg of nitrogen emission per protein (or of nitrogen) consumed is therefore an important indicator of the nutrient-use efficiency of the EU food system.

GHG EMISSIONS FROM AGRICULTURE

GHG emissions

The projection of greenhouse gas (GHG) emissions decreases very slightly between 2012, the year used as a reference for the environmental baseline, and the CAPRI projection for 2030. It must be reminded that this modelling analysis represents an overestimation of the EU agriculture footprint, as the modelling exercise does not take into account new technologies, changes of practices and policy developments. GHG emissions in CAPRI are calculated using IPCC methodology as described by Pérez Domínguez et al. (2016). Carbon sequestration in grasslands has not been included in the analysis. In 2030, ruminants' digestion is expected to be responsible for 43% of agricultural non-CO22 GHG emissions, slightly below the 45% in 2012. This decrease (-5%, -10 million t CO2 eq) is associated with the decrease in dairy cattle numbers and the expected increase in productivity. Nevertheless, this decrease will be offset by an increase in nitrous oxide (N2O) emissions, mostly from higher crop yields and production but also from manure application on fields. The total amount of manure will slightly decrease; this change is a consequence of expected changes in manure management, which tends to reduce ammonia (NH3) but increase nitrous oxide (N2O) emissions.

GRAPH 8.1 EU agricultural non-CO_2 GHG emissions sources in 2030 (million t CO_2 equivalent)[32]



Source: DG JRC, based on the 2019 CAPRI baseline[33].

Life-cycle assessment methodology: Quantifying the carbon footprint in the CAPRI model

The method of calculating GHG emissions used in the CAPRI model follows the logic of the UNFCCC. It estimates emissions by production activity, and assigns them to the land, animals and regions where the emissions are created. A life-cycle assessment (LCA) approach uses these data and converts them into total emissions embedded in a product. To do this, decisions have to be taken on how to 'split' emissions if one activity generates multiple products. A 'cradle-to-farm gate' LCA adds all emissions of products until sold from the farm. They account for emissions associated with producing feed and with other required inputs such as fertilizers. A 'farm-to-fork' LCA goes further and accounts for additional emissions coming from processing, transport, packaging and consumption of food.

Emission allocation between products

The emissions from primary products that are destined for human consumption are taken into account at the level of primary products (e.g. wheat). However, if the primary products are used as input for another agricultural production, they are allocated to that production. Therefore, animal products (meat and milk) include emissions from all animal feed, and account for young animals that take part in the production, etc. At the same time, emissions from animal production activities are partly assigned to crops if manure is used as fertilizer.

In an 'attributional' LCA, the allocation of emissions from a same source between different products (e.g. meat and milk) is done to capture the cause of the emissions. Here the allocation of emissions between meat and milk[34] is done proportionally to the crude protein (nitrogen) content of the products. Emissions between animal products and manure are split according to the economic value of the products, however. This is also the case for secondary products of a very different nature (oilseeds giving oil and oil cakes) as they serve different purposes.

Emissions not included

Currently, only agricultural CH_4 and N_2O emissions plus emissions from the production of mineral fertilizers have been included in the analysis. Emissions from energy (electricity, fuel for tractors, transformation of feed in animal concentrates, etc.) have not been included. Also, only some post-farm gate emissions are calculated in CAPRI (such as processing activities related to milk and oil products). For others, CAPRI results are complemented with data from literature. This is also true for carbon sequestration and emissions from land use and land-use change that are not included in the CAPRI version used here (an estimate of them is given in the section on 'Food system emissions').

32 AR4 (IPCC Fourth Assessment Report: Climate Change 2007) conversion factors have been used for CH_4 and N_2O into CO_2 equivalent (25 and 298 respectively).

33 The 2019 CAPRI baseline is calibrated to the medium-term outlook of the European Commission published in 2017, and it provides projections for the agricultural sector for 2030.

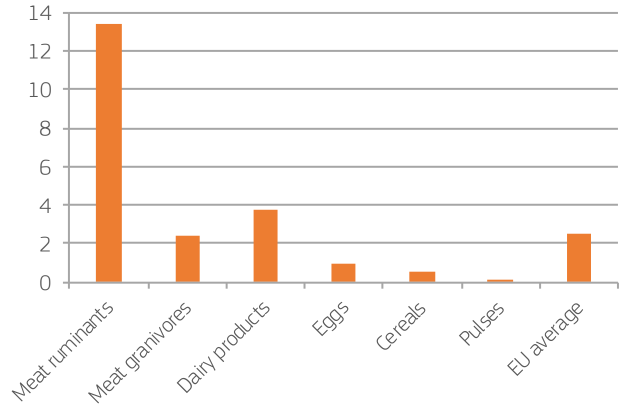
34 Other animal products such as wool or leather have not been included in the analysis.

Farm gate GHG footprint

In this section we show the farm gate footprints[35] of GHG emissions (GHG emissions in the rest of the food chain will be analysed in the next section). An animal product's footprint is calculated on the basis of carcass weight. A footprint expressed per kg of proteins refers to nitrogen available in edible products.

The highest GHG footprint per 100g protein is found to be for ruminants' meat, followed by dairy products. Consideration of carbon sequestration in grassland and emissions from indirect land-use change would decrease the footprints from grassland ruminants, and increase the footprints of animals based on feed concentrates. The lowest footprint, far below the footprint from cereals, is for protein from legumes (pulses and soya). Note that the methodology used here does not allocate all emissions in the dairy herd to dairy products, but distributes them among dairy products and meat. This method does not take into account that the quality of meat from beef and dairy herds might be different.

GRAPH 8.2 EU farm gate GHG footprints of food consumed by food type, 2030 (kg CO_2 eq per 100g protein)

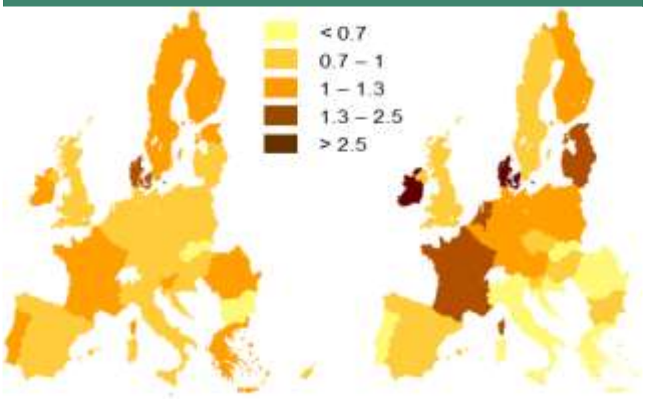


Source: DG JRC, based on the 2019 CAPRI baseline.

The projected average farm gate footprint for the agricultural commodities produced in the EU (including exports and imports of intermediary products, but not imports of final products) is more than 500 million t CO_2 eq. Divided by the population, this results in 1 t CO_2 eq per year. The footprint of the amounts consumed per capita (taking into account imports minus exports) is a bit lower, almost 0.9 t CO_2 eq. Of these emissions, more than 80% of agricultural CH_4 and N_2O emissions are associated directly or indirectly through production of feed with the consumption of animal products. For comparison, global emissions of CH_4 and N_2O from agriculture are estimated to be between 9% and 14% of total GHG emissions from human activity[36]. Therefore, depending on the Member State, food consumption per capita corresponds to 0.6-1.3 t CO_2 eq farm gate GHG emissions from global crop and livestock production.

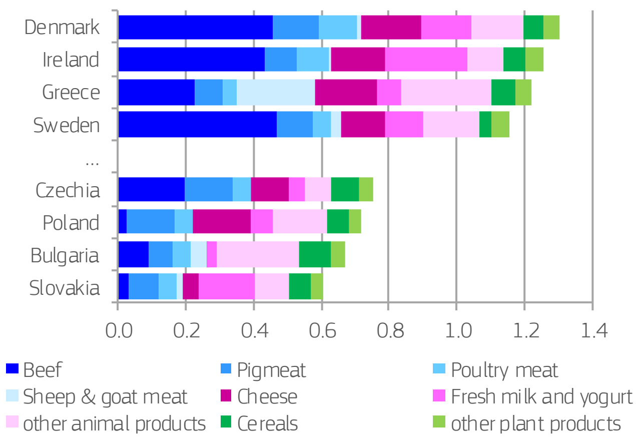
The farm gate footprint differs significantly between the production and the consumption of products. Those countries producing higher amounts of beef and veal or dairy products have higher production footprints, but the consumption footprints can be lower if exports of animal products are significant (e.g. Ireland, France). The highest farm gate GHG footprints of food consumed per capita are mostly in northern countries with a high proportion of animal products in their diet (e.g. Denmark, Ireland, Sweden) while the lowest are mostly in eastern countries (Poland, Bulgaria and Slovakia). Among Mediterranean countries, the highest footprint is in Greece, at 1.2 t CO_2 eq, due to the high consumption of sheep and goat meat and milk.

MAP 8.1 Farm gate GHG footprints of food consumed (left) and produced (right) by Member State, 2030 (t CO_2 eq per capita)



Source: DG JRC, based on the 2019 CAPRI baseline.

GRAPH 8.3 Farm gate GHG footprints of food consumed in selected Member States, 2030 (t CO_2 eq per capita)



Source: DG JRC, based on the 2019 CAPRI baseline.

35 CH_4 and N_2O emissions from farms plus CO_2 emissions from fertilizer production.

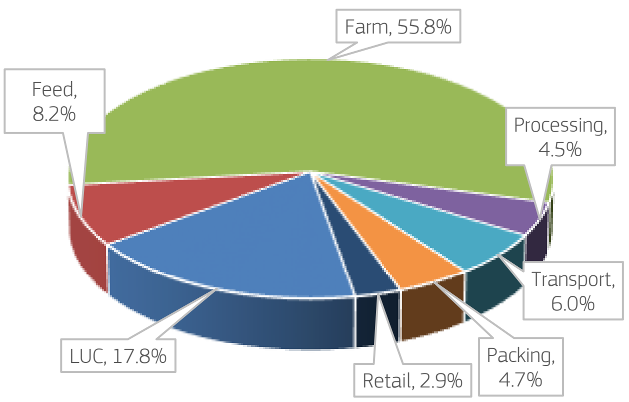
36 IPCC 2019 : Climate change and land, Chapter 5 : Food security, Table 5.4; values converted.

FOOD SYSTEM EMISSIONS

Food system emissions types

In addition to the emissions calculated in the farm gate footprint, food system emissions include emissions and sequestration from land use and land-use change (LULUC[37]), processing, transport, packing and retail of foodstuffs[38]. Poore and Nemececk (2018) estimate food system GHG emissions by using a comprehensive meta-analysis of published LCA studies from all products and world regions. Their analysis suggests that post-farm emissions account for 18% of the food system emissions.

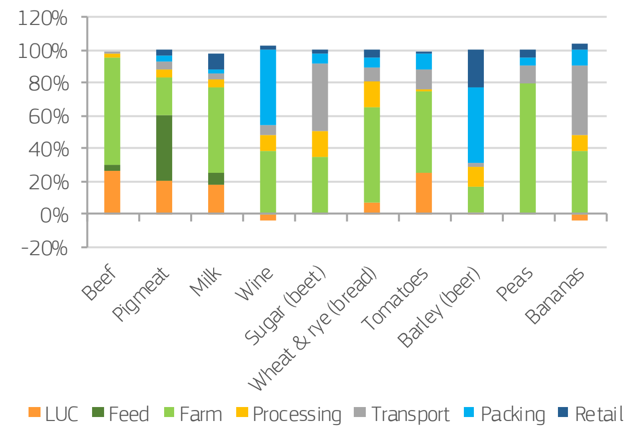
GRAPH 8.4 Global annual GHG emission shares (%)



Source: DG JRC, based on Poore and Nemecek (2018).

However, there are important differences between products due to factors such as: (i) transportation distances; (ii) transformation processes undergone before retail; (iii) the choice of the package material; and (iv) the need of cooling during storage. Therefore, although emissions from processing of certain vegetables can be zero, they can reach an estimated 15%, e.g. for products such as bread. While the average share of transport to total emissions was estimated at 6%, it was estimated to be more than 40% for bananas. These values are obviously due to the usually high transport distances of these products, but also to their relative low emissions at farm level compared with other products, such as meat, for which transport emissions are 1%, much lower than the average. Packaging exceeds 45% of the annual emission share for products such as beer and wine, mostly due to the high emissions from manufacturing glass and cans and the low farm gate emissions for their main raw materials.

GRAPH 8.5 Share of global GHG emissions by stage in the food system, for selected products (%)

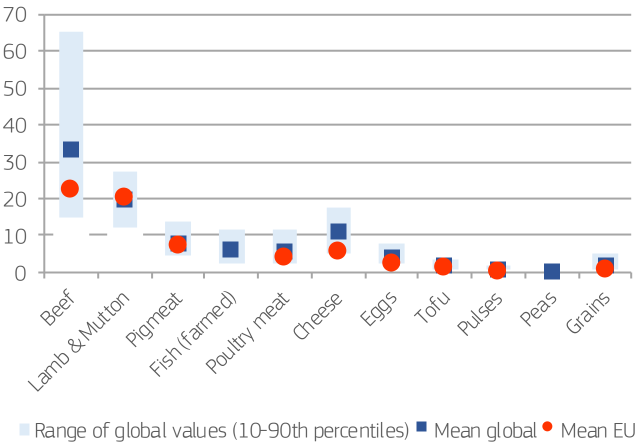


Source: DG JRC, based on Poore and Nemecek (2018).

Food system GHG footprint in the EU

To compare the EU food systems footprints with global data from the Poore and Nemecek database, CAPRI results are complemented with emissions from LULUC for feed imports by Weiss and Leip (2012) and with post-farm world average values by Poore and Nemecek (2018). Results show that the EU has low food system footprints for most products, even though high efficiency benefits at production stage are partly reduced by emissions from LULUC and energy use in the supply chain.

GRAPH 8.6 Comparison of food system footprint between EU 2030 and world 2012 (kg CO_2 eq per 100g protein)



Sources: Global footprint from metareview by Poore and Nemecek (2018); EU footprint from DG JRC, based on the 2019 CAPRI baseline, LULUCF from Weiss and Leip (2012), post-farm from Poore and Nemecek (2018).

[37] Carbon stock changes due to changes in land use or land management for forests, grassland, cropland, wetlands, settlements or other lands (only those associated to food production). In UNFCCC GHG inventories, these are reported in the LULUCF sector (land use, land-use change and forestry), which is separated from the 'agriculture' category.

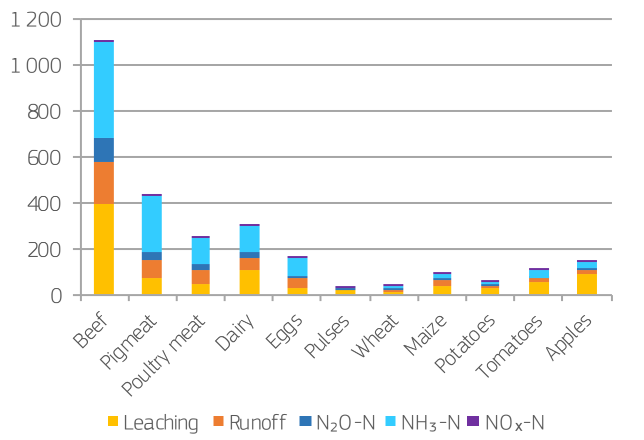
[38] Full food system emissions include emissions from consumption (preparation of meals) and waste management.

NITROGEN FOOTPRINT

Nitrogen footprint per kg of protein

Agricultural activities cause nitrogen in the form of ammonia, nitrous oxide and other nitrogen oxides to be emitted to the air, causing air pollution. These emissions also affect water, through leaching and runoff, leading to high concentrations of nitrates and eutrophication. Agricultural measures have already resulted in a moderate 15% reduction in total agricultural nitrogen inputs for the EU (excluding Croatia) since the 1980s (Sutton et al. 2011). We present here the nitrogen[39] footprint calculated using the same methodology as for GHG, for EU production only. The projection assumes changes in manure that reduce ammonia (NH_3) but increase nitrous oxide (N_2O) emissions. Farm gate nitrogen footprints are calculated for produced food (including exports) and include emissions from imported inputs (e.g. feed). Nitrogen emissions from energy consumption are not included, as they occur for example during transport or processing.

GRAPH 8.7 EU nitrogen emissions to air and water, 2030 (g N per kg protein produced)

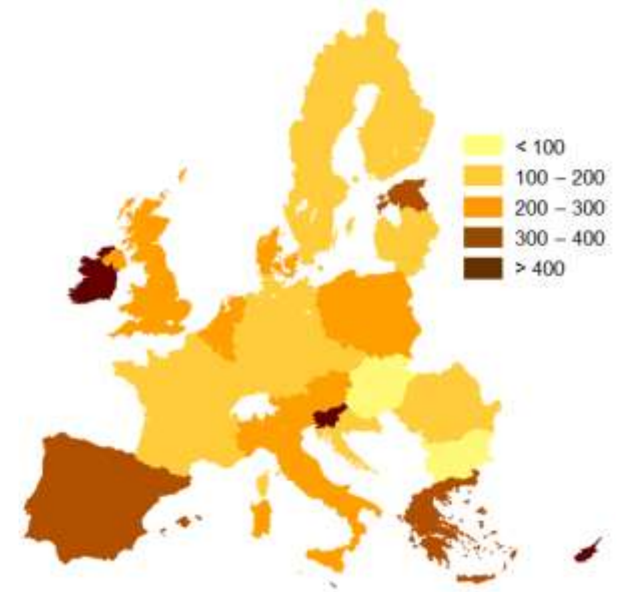


Source: DG JRC, based on the 2019 CAPRI baseline.

The nitrogen footprint at farm gate production of animal products is around 10 times that of crops. The highest nitrogen footprint is for beef. This is because of the lower productivity of beef compared to that of pig and poultry meat due to the ruminants' digestion system. However, ruminants can produce edible proteins from non-edible biomass that grows on land not suitable for growing crops (i.e. permanent pastures). In addition, extensive grazing systems are essential for maintaining farmland biodiversity.

The nitrogen footprint of crops is lower for pulses than for cereals. This is due to lower nitrogen emissions obtained from biological nitrogen fixation in leguminous crops and to their high relative content of protein. In the EU, wheat is a major source of dietary proteins. Fruit and vegetables are also an important part of a healthy diet because of their vitamin and fibre content. Despite their low nitrogen content, some fruit and vegetables are grown intensively using a relatively high amount of fertilizer, which also leads to higher nitrogen footprints than other crops.

MAP 8.2 Nitrogen footprint per kg of protein produced by Member State, 2030 (g N per kg edible protein)



Source: DG JRC, based on the 2019 CAPRI baseline.

The EU's average nitrogen production footprint is close to 250 g N per kg of produced edible protein, while country values range from less than 100 g/kg to more than 400 g/kg. High nitrogen footprints are found in Ireland and Slovenia due to their high share of beef production, and in Mediterranean countries that often have low yield extensive grazing production systems. The lowest footprints are found in Hungary, Slovakia, Bulgaria and Czechia. As the model does not consider trade or the processing of manure in some European regions (e.g. the Netherlands, part of Belgium and Germany), the nitrogen footprint in those regions is slightly overestimated, while the nitrogen footprint in regions that import manure is slightly underestimated.

Nitrogen footprints are a good measure of nitrogen-use efficiency of products and diets, but do not directly quantify the impact on water and air. This depends on many other factors, such as how much of the nitrogen is reduced during air or water transport before it can exert a damaging effect, and how vulnerable the receiving ecosystem is. Therefore, at similar nitrogen footprint level, nitrogen's impact on the environment might be lower in extensive systems than in more intensive systems, though those effects are difficult to quantify.

[39] For the methodology for calculating nitrogen in Capri, see Leip et al. 2014.

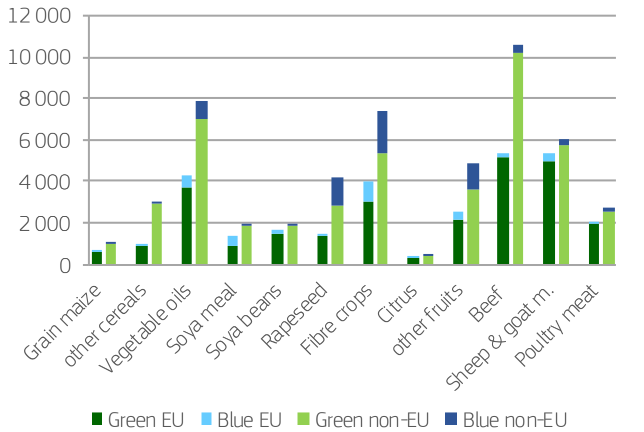
WATER CONSUMPTION

Water footprint per kg of product

As defined by the Water Footprint Network[40] 'the water footprint measures the amount of water used to produce each of the goods and services we use'. It can be measured for a single process (e.g. growing rice), for a product, for a company, etc. It can also tell us how much water is being consumed by a country, in a river basin, from an aquifer or by a consumer.

It is useful to differentiate water from precipitation (green water), water used for irrigation from surface water (rivers and lakes) and groundwater (blue water). An irrigated crop can have a green and blue water footprint at the same time, which will depend on the share of water that the crop receives from each source. A rain-fed crop only consumes green water.

GRAPH 8.8 Water footprint for selected commodities in EU and non-EU exporting countries, 2030 (litres per kg of product)



Source: DG JRC, based on the 2019 CAPRI; water footprint factors from the Water Footprint Network (Mekonnen and Hoekstra, 2011).

Mekonnen and Hoekstra (2011)[41] have estimated water footprint factors by country and by a large number of products. Based on their data, the average water footprint of meat is around 5 000 l/kg of product for ruminants and 1 000 l/kg for poultry meat. The large majority of the water footprint for meat consists of green water, including precipitations on the grazed areas. The water footprint for beef is more than 10 000 l/kg on average in the countries from which the EU imports beef. The water footprint factors for crops are the highest for vegetable oils and for fiber crops, close to 4 000 l/kg in the EU and almost double in non-EU exporting countries. Fiber crops (cotton and other fabrics) have a high share of blue footprint, indicating that they are often grown in places where rainfall is not high enough. A high share of blue footprint indicates significant pressure on water resources, which in certain places has led to water stress in rivers and lakes or the depletion of aquifers.

Water footprint for EU production and EU imports

The total water footprint of EU agricultural production projected for 2030 amounts to 610 billion m^3 of water, of which approximately 15% corresponds to imported intermediate products from non-EU countries. Plant products for final use are responsible for almost 60% (353 billion m^3) of the total water footprint, while the total water extraction of plant products including those used for feed would amount to more than 480 billion m^3. Among plant products, cereals have the highest water footprint (25% of the total). Meat's footprint (including feed and animal production) is slightly above a quarter of the total water extraction, with almost 18% from pigs and poultry and less than 8% from beef and veal. Dairy products account for 13%. Overall, water abstraction for irrigation in the EU was reduced by 22% since the 1990s (European Environment Agency, 2016).

A high water footprint in a region does not necessarily mean a water problem, as water stress depends on the relation between water consumption and water availability, in particular precipitation (Vanham et al. 2018). However, if products with a high water footprint are produced in places or during periods with water stress, this can lead to serious environmental and societal problems. Seasonal water stress can occur even if annual precipitation is high, as was the case in the EU during the summer of 2018. However, even if water availability is sufficient, a high water footprint could signal that water use is inefficient.

In some cases, fulfilling water requirements results locally in groundwater aquifers being depleted and river flows dropping below critical minimum flow conditions. Also the water temperature of the remaining river flows is occasionally too high. This may cause restrictions of use for other sectors of the economy, i.e. industrial or energy cooling water. The use of blue water for crop production should be evaluated taking the needs of other sectors (households, energy, industry, tourism, etc.) and the environment into account.

40 https://waterfootprint.org/en/about-us/

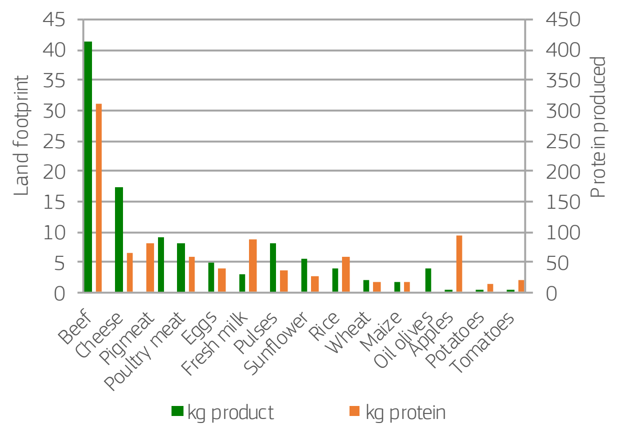
41 Mekonnen and Hoekstra (2011): 'Water footprint factors for the different crops have been estimated in function of the crop evapotranspiration in each region. Therefore, they only take into account the water evapotranspirated by the plants, which equals the abstracted water minus losses and return flows.'

LAND FOOTPRINT

Land footprint per kg of product

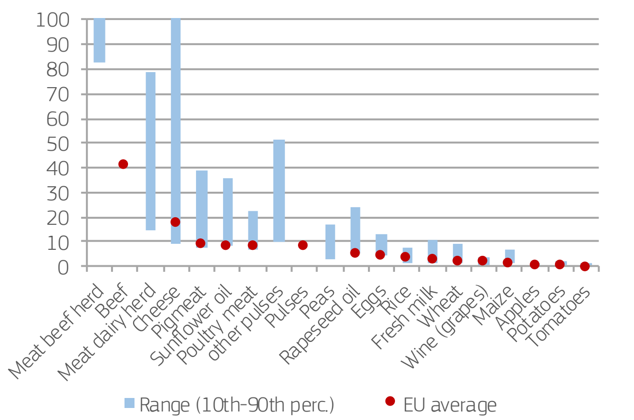
The land footprint measures the surface area needed to produce a product. For crops, it is close to the inverse of the yield, but also includes the land required for agricultural inputs, such as manure utilised as fertiliser. The land footprint of animal products, as for other footprints, includes the land footprint of feed crops and that of grassland.

GRAPH 8.9 EU land footprint of product and protein produced, 2030 (m^2 per kg)[42]



Source: DG JRC, based on the 2019 CAPRI baseline.

GRAPH 8.10 EU land footprint compared to global range, 2030 (m^2 per kg of product produced)



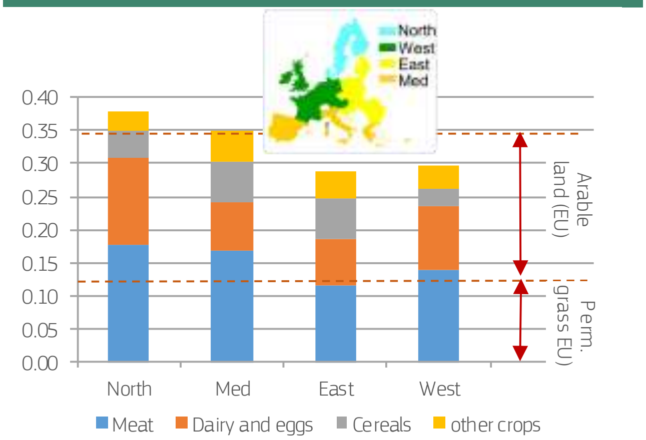
Sources: EU from DG JRC, based on the 2019 CAPRI baseline; 10th and 90th percentiles from Poore and Nemecek metareview (2018).

Animal products require more land per kg of product, particularly those from grazing animals. Among plant products, protein crops (pulses) and oleaginous crops have the highest land footprint, being also those with lower yields and usually a higher nutrient (caloric or protein) content. Fruit and vegetables use very little land per unit weight. Compared with global data taken from the literature, data for the EU confirm land-use-efficient production systems, with average footprints often very close to the lowest 10th percentile of the global range.

Land footprint per capita

The average EU consumer will require 0.30 ha of land to produce the animals and crops they consume in one year (CAPRI baseline 2030). This calculation is based on consumption projections to which production factors are applied, and calculated with a 'cradle to farm gate' approach only for the EU. It is likely to be an underestimation of the real land footprint, due to lower average land-efficiency in countries from where the EU imports food and to the fact that some foods not produced in Europe (e.g. cacao and coffee) are not included. For comparison, the UAA per capita projected for 2030 in the EU is around 0.34 ha, of which 0.12 ha are permanent grassland and 0.22 ha arable land.

GRAPH 8.11 EU land footprint, 2030 (ha per capita)

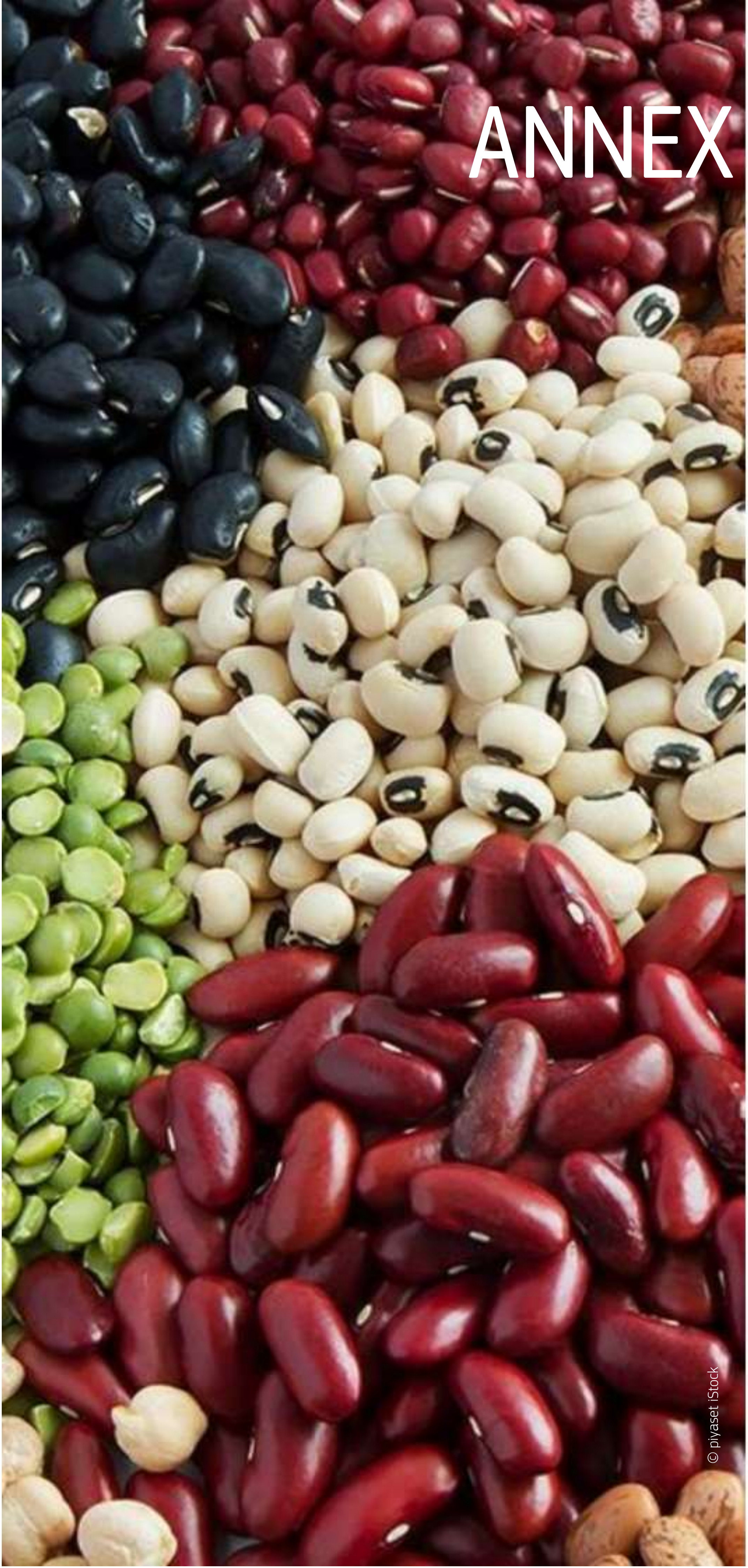


Source: DG JRC, based on the 2019 CAPRI baseline.

The average land footprint per capita is higher than the rest of the EU in northern Europe and in the Mediterranean due, respectively, to the higher proportion of animal products in the diet and to more extensive production systems. In western Europe, land footprint is higher than in eastern Europe due to more intensive agriculture, due to a higher proportion of animal products in the diets and the higher consumption per capita (waste included).

The land footprint gives an indication of the possible pressure on land increasing the (indirect) risk of deforestation and land fragmentation into natural habitats. The share of permanent grassland is however an important element for biodiversity.

[42] Meat in kg of carcass weight, protein refers to human edible protein.



ANNEX /9

UNCERTAINTY ANALYSIS RESULTS

TABLE 9.1 Macroeconomic uncertainty in 2030 (CV, %)

Region	Consumer price index	GDP deflator	GDP	Exchange rate (domestic currency /USD)	Oil price
Australia	0.3	1.7	0.4	6.5	-
Brazil	0.8	0.6	1.6	9.9	-
Canada	0.2	0.6	0.5	2.5	-
China	0.8	1.0	0.7	1.2	-
EU	0.7	0.3	1	3.9	-
Indonesia	1.4	1.9	0.4	3.5	-
India	0.7	0.6	0.9	3.8	-
Japan	0.4	0.4	0.8	5.9	-
New Zealand	0.4	0.5	0.7	3.8	-
Russia	1.5	3.2	2.3	6.6	-
United States	0.5	0.3	0.6	-	-
World	-	-	-	-	19.5

TABLE 9.2 Yield uncertainty in 2030 (CV, %)

Commodities	Argentina	Australia	Brazil	Canada	China	EU-15	EU-N13	India	Indonesia	Kazakhstan	Malaysia	Mexico	New Zealand	Paraguay	Russia	Thailand	Ukraine	United States	Vietnam
Barley	9.0	2.0	-	8.0	-	4.0	7.0	-	-	-	-	0.7	-	-	0.5	-	-	0.9	-
Common wheat	10.0	12.0	11.0	5.0	2.0	4.0	12.0	2.0	0.5	10.0	0.5	7.0	0.5	9.0	13.0	0.4	11.0	3.0	0.4
Durum wheat	-	-	-	-	-	5.0	6.0	-	-	-	-	-	-	-	-	-	-	-	-
Maize	5.0	1.0	8.0	6.0	0.8	5.0	19.0	0.2	0.4	0.3	0.4	6.0	0.8	8.0	0.5	0.3	15.0	3.0	0.4
Milk	0.5	13.0	1.0	0.3	0.1	-	-	0.2	0.3	0.2	0.2	0.1	2.0	0.3	0.4	0.1	0.2	0.3	0.2
Oats	-	0.4	-	7.0	-	7.0	7.0	-	-	-	-	-	-	-	0.2	-	-	-	-
Other coarse grains	5.0	2.0	1.0	7.0	0.6	-	-	0.3	0.4	0.3	0.3	0.6	0.7	11.0	0.4	0.3	17.0	2.0	0.3
Other oilseeds	39.0	15.0	-	3.0	0.9	3.0	10.0	0.6	0.8	12.0	0.8	-	-	19.0	8.0	0.7	12.0	-	0.8
Palm oil	-	-	-	-	-	-	-	0.5	2.0	-	4.0	-	-	0.5	-	0.4	-	-	-
Rapeseed	-	15.0	-	3.0	1.0	3.0	6.0	-	-	-	-	-	-	-	0.2	-	-	-	-
Rice	0.5	0.1	1.0	-	6.0	4.0	0.6	3.0	0.1	0.2	0.2	0.1	-	0.2	0.4	1.0	0.2	5.0	3.0
Rye	-	-	-	-	-	8.0	11.0	-	-	-	-	-	-	-	0.1	-	-	-	-
Soya beans	16.0	-	5.0	5.0	0.5	7.0	15.0	0.6	0.9	7.0	0.9	-	-	13.0	0.3	0.8	8.0	5.0	0.9
Sugar beet	-	-	-	1.0	3.0	9.0	8.0	-	-	0.2	0.2	-	-	-	15.0	-	0.3	5.0	-
Sugar cane	19.0	4.0	5.0	-	2.0	-	-	4.0	0.4	-	0.2	0.4	-	0.5	-	8.0	-	4.0	0.3
Sunflower seeds	45.0	-	-	-	2.0	5.0	16.0	-	-	-	-	-	-	-	9.0	-	-	-	-

TABLE 9.3 Price uncertainty in 2030 (CV, %)

Commodities	EU domestic producer price	International reference price
Barley	8.0	-
Biodiesel	8.6	8.2
Dried beet pulp	10.8	10.5
Butter	4.0	3.8
Beef and veal	2.9	3.5
Casein	1.3	0.0
Cereal brans	7.2	5.6
Corn gluten feed	7.4	6.6
Cheese	2.8	2.9
Cotton	4.0	1.8
Dried distillers grains	7.7	7.3
Ethanol	6.4	6.2
High fructose corn syrup	5.8	4.8
Maize	9.2	8.4
Meat and bone meal	0.0	9.0
Milk	2.1	-
Molasses	8.5	6.5
Other coarse grains	8.1	6.7
Other oilseeds	15.9	16.5
Pigmeat	5.5	4.0
Protein meal	10.1	10.5
Pulses	5.1	3.5
Poultry	5.0	3.3
Rice	5.7	4.3
Rapeseed	15.0	-
Roots and tubers	6.1	2.5
Soya beans	18.4	18.6
Sunflower seeds	18.4	-
Sheep	4.4	1.6
Skimmed milk powder	2.0	1.8
White sugar	8.1	5.4
Vegetable oils	11.1	9.5
Whole milk powder	2.6	2.2
Wheat	9.7	8.9
Whey powder	9.1	9.7

MARKET OUTLOOK DATA

TABLE 9.4 Baseline assumptions on key macroeconomic variables

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Population growth (EU)	**0.1%**	**0.3%**	**0.3%**	**0.3%**	**0.3%**	**0.2%**	**0.2%**	**0.2%**	**0.2%**	**0.0%**	**-0.1%**
EU-15	0.1%	0.5%	0.5%	0.4%	0.4%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%
EU-N13	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.3%	-0.4%
World	1.2%	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%	1.1%	0.9%	0.8%
Real GDP growth (EU)	**-0.4%**	**0.3%**	**1.7%**	**2.3%**	**2.0%**	**2.6%**	**2.0%**	**1.4%**	**1.4%**	**1.5%**	**1.4%**
EU-15	-0.5%	0.2%	1.6%	2.2%	1.9%	2.4%	1.8%	1.2%	1.2%	1.4%	1.3%
EU-N13	0.8%	1.2%	3.0%	4.0%	3.1%	4.8%	4.4%	3.8%	3.1%	2.7%	2.6%
World	2.6%	2.7%	2.9%	3.0%	2.8%	3.4%	3.2%	2.6%	2.5%	3.0%	2.8%
Inflation (Consumer Price Index)	**2.6%**	**1.5%**	**0.6%**	**0.1%**	**0.3%**	**1.7%**	**1.9%**	**1.4%**	**1.4%**	**1.8%**	**1.7%**
EU-15	2.5%	1.5%	0.6%	0.2%	0.3%	1.7%	1.9%	1.3%	1.3%	1.7%	1.7%
EU-N13	3.7%	1.4%	0.2%	-0.4%	-0.2%	1.8%	2.1%	2.5%	2.5%	2.2%	2.1%
Exchange rate (USD/EUR)	**1.28**	**1.33**	**1.33**	**1.11**	**1.11**	**1.13**	**1.18**	**1.12**	**1.11**	**1.16**	**1.17**
Oil price (USD per barrel Brent)	**112**	**109**	**99**	**52**	**44**	**55**	**71**	**65**	**62**	**71**	**83**

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

TABLE 9.5 EU agricultural income (2017-2019=100)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Factor income in nominal terms	**88.6**	**91.6**	**91.8**	**88.7**	**90.5**	**100.6**	**97.4**	**102.0**	**108.4**	**96.4**	**100.3**
of which EU-15	90.4	92.2	92.9	90.1	90.5	100.4	97.5	102.1	110.2	95.5	99.1
of which EU-N13	81.5	89.2	87.6	83.5	90.7	101.5	96.8	101.7	101.2	100.3	104.9
Factor income in real terms	**93.2**	**96.7**	**93.1**	**90.6**	**93.2**	**102.1**	**97.5**	**100.5**	**105.0**	**85.9**	**82.6**
of which EU-15	94.8	97.2	92.9	92.3	92.4	101.5	97.6	100.8	107.3	86.2	83.1
of which EU-N13	86.9	94.6	93.9	84.0	96.4	104.1	96.8	99.1	95.9	84.6	80.7
Labour input	**108.9**	**107.7**	**105.5**	**103.5**	**102.6**	**101.2**	**100.0**	**98.7**	**97.4**	**90.9**	**84.6**
of which EU-15	104.8	102.6	101.6	100.9	100.8	100.7	100.0	99.3	98.3	93.8	89.5
of which EU-N13	112.8	112.5	109.2	106.1	104.4	101.7	100.0	98.2	96.6	88.2	79.8
Factor income in real terms per labour unit	**85.6**	**89.8**	**88.2**	**87.5**	**90.8**	**100.8**	**97.5**	**101.8**	**107.7**	**94.5**	**97.7**
of which EU-15	90.5	94.7	91.4	91.5	91.6	100.8	97.6	101.6	109.1	91.9	92.8
of which EU-N13	77.0	84.1	86.0	79.2	92.4	102.4	96.8	100.9	99.3	95.9	101.2

TABLE 9.6 EU area under arable crops (million ha)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Cereals	**57.6**	**57.6**	**57.9**	**57.3**	**56.7**	**55.2**	**55.1**	**56.5**	**56.0**	**55.7**	**55.6**
Common wheat	23.3	23.4	24.4	24.3	24.3	23.4	23.1	23.9	23.7	23.6	23.8
Durum wheat	2.6	2.4	2.3	2.4	2.8	2.5	2.5	2.3	2.5	2.4	2.3
Barley	12.5	12.4	12.4	12.2	12.3	12.0	12.3	12.2	12.2	11.9	11.6
Maize	9.8	9.8	9.6	9.3	8.6	8.3	8.3	8.8	8.6	8.7	8.8
Rye	2.4	2.6	2.2	1.9	1.9	1.9	1.9	2.2	2.2	2.1	2.0
Other coarse grains	7.1	7.0	7.0	7.1	7.0	7.0	7.0	7.0	6.9	7.0	7.1
Rice	**0.5**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
Oilseeds	**11.0**	**11.8**	**11.5**	**11.6**	**11.5**	**12.0**	**12.0**	**11.0**	**11.4**	**11.4**	**11.4**
Rapeseed	6.2	6.7	6.7	6.5	6.5	6.7	6.9	5.7	6.1	6.0	5.8
Sunseed	4.3	4.6	4.3	4.2	4.1	4.3	4.1	4.4	4.3	4.3	4.2
Soyabeans	0.4	0.5	0.6	0.9	0.8	1.0	1.0	1.0	1.0	1.2	1.3
Sugar beet	1.7	1.6	1.6	1.4	1.5	1.8	1.7	1.7	1.6	1.6	1.6
Roots and tubers	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.4	1.3
Pulses	1.0	0.9	1.0	1.6	1.7	1.9	1.6	1.5	1.9	2.2	2.5
other arable crops	4.7	3.5	3.6	4.0	4.5	4.5	4.9	4.7	3.9	3.9	3.6
Fodder (green maize, temp. grassland etc.)	20.9	21.3	21.3	20.7	20.6	20.4	20.6	20.4	20.4	20.6	20.8
Utilised arable area	**99.1**	**99.0**	**99.2**	**98.8**	**98.8**	**98.0**	**98.2**	**98.0**	**97.5**	**97.4**	**97.3**
set-aside and fallow land	7.6	7.1	7.1	6.9	6.5	6.5	6.8	6.6	6.4	6.1	5.7
Share of fallow land (%)	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Total arable area	**106.6**	**106.1**	**106.3**	**105.7**	**105.3**	**104.5**	**104.9**	**104.6**	**104.0**	**103.5**	**103.0**
Permanent grassland	59.1	59.5	59.6	60.5	60.5	60.9	60.4	60.4	60.3	60.0	59.7
Share of permanent grassland in UAA (%)	*33.3*	*33.5*	*33.5*	*34.0*	*34.0*	*34.3*	*34.1*	*34.2*	*34.2*	*34.2*	*34.2*
Orchards and others	11.6	11.7	11.8	11.9	11.9	12.0	11.9	11.9	11.8	11.8	11.7
Total utilised agricultural area	**177.3**	**177.3**	**177.6**	**178.1**	**177.7**	**177.5**	**177.2**	**176.9**	**176.1**	**175.3**	**174.4**

TABLE 9.7 EU cereals market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**280.6**	**303.7**	**326.3**	**310.0**	**295.2**	**304.2**	**289.2**	**312.1**	**308.9**	**313.4**	**319.9**
of which EU-15	202.0	209.9	222.4	216.1	193.8	200.3	185.7	206.0	203.3	203.8	205.5
of which EU-N13	78.6	93.7	103.9	93.9	101.4	103.9	103.5	106.1	105.6	109.6	114.4
Consumption	**270.9**	**269.9**	**279.2**	**280.1**	**278.6**	**281.4**	**282.9**	**288.0**	**290.1**	**294.1**	**296.6**
of which food and industrial	102.1	100.6	101.8	102.3	102.5	103.6	102.0	104.5	104.9	107.8	109.9
of which feed	152.6	153.0	160.1	161.3	160.0	161.2	164.9	165.7	163.3	166.0	165.7
of which bioenergy	8.9	10.3	10.7	10.9	12.3	12.6	13.1	13.6	13.6	13.6	13.6
Imports	**17.0**	**20.0**	**16.6**	**22.1**	**20.2**	**25.3**	**31.3**	**23.4**	**25.9**	**29.4**	**29.3**
Exports	**32.6**	**44.1**	**52.3**	**51.9**	**40.0**	**34.6**	**35.3**	**39.8**	**40.7**	**42.4**	**43.3**
Ending stocks	28.5	35.3	43.5	40.6	34.5	45.3	44.7	50.2	48.4	50.4	54.4
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stock-to-use ratio (%)	*10.5*	*13.1*	*15.6*	*14.5*	*12.4*	*16.1*	*15.8*	*17.4*	*16.7*	*17.1*	*18.3*

Note: the cereals marketing year is July/June.

TABLE 9.8 EU wheat market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**134.3**	**144.3**	**157.4**	**160.9**	**144.6**	**152.0**	**138.6**	**154.0**	**152.4**	**153.9**	**157.5**
of which EU-15	100.9	104.7	113.9	115.9	98.7	104.8	95.4	106.9	105.6	106.3	108.4
of which EU-N13	33.4	39.6	43.5	45.0	45.9	47.2	43.2	47.1	46.8	47.6	49.1
Consumption	**116.5**	**113.9**	**124.8**	**128.3**	**124.8**	**125.5**	**125.4**	**126.6**	**124.7**	**125.4**	**126.7**
of which food and industrial	59.3	59.2	59.3	59.9	60.3	60.5	60.6	60.7	59.9	60.3	60.4
of which feed	45.2	42.7	52.5	56.1	52.8	53.0	52.8	53.4	51.5	52.3	52.1
of which bioenergy	4.3	4.4	4.4	4.5	4.5	4.7	5.2	5.2	5.2	5.2	5.2
Imports	**5.0**	**3.7**	**5.7**	**6.6**	**5.0**	**5.5**	**5.4**	**5.7**	**5.8**	**5.8**	**5.7**
Exports	**22.0**	**31.2**	**34.6**	**34.0**	**26.6**	**22.5**	**22.4**	**26.6**	**27.3**	**28.1**	**28.5**
Ending stocks	10.9	11.8	13.3	16.4	12.5	20.2	14.5	18.7	19.3	20.9	23.4
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: the wheat marketing year is July/June.

TABLE 9.9 EU coarse grains market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**146.3**	**159.4**	**168.9**	**149.1**	**150.5**	**152.2**	**150.6**	**158.1**	**156.4**	**159.5**	**162.4**
of which EU-15	101.1	105.3	108.5	100.2	95.1	95.5	90.2	99.0	97.7	97.5	97.1
of which EU-N13	45.2	54.2	60.4	48.9	55.4	56.7	60.3	59.0	58.7	62.0	65.3
Consumption	**154.5**	**156.0**	**154.4**	**151.8**	**153.8**	**155.9**	**157.5**	**161.3**	**165.4**	**168.7**	**169.9**
of which food and industrial	42.8	41.4	42.5	42.3	42.2	43.1	41.4	43.8	45.0	47.5	49.5
of which feed	107.4	110.4	107.6	105.2	107.2	108.3	112.1	112.3	111.8	113.7	113.6
of which bioenergy	4.6	5.9	6.4	6.4	7.8	8.0	7.9	8.4	8.4	8.4	8.4
Imports	**12.0**	**16.3**	**10.9**	**15.5**	**15.2**	**19.8**	**25.8**	**17.7**	**20.1**	**23.7**	**23.6**
Exports	**10.6**	**12.9**	**17.7**	**17.9**	**13.4**	**12.1**	**13.0**	**13.2**	**13.4**	**14.3**	**14.8**
Ending stocks	17.6	23.5	30.1	24.2	22.0	25.0	30.3	31.5	29.1	29.4	31.0
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 9.10 EU common wheat market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**125.9**	**136.2**	**149.7**	**152.5**	**135.0**	**143.1**	**129.8**	**146.1**	**143.4**	**145.4**	**149.3**
of which EU-15	92.7	96.8	106.4	107.8	89.5	96.4	87.2	99.5	97.1	98.3	100.7
of which EU-N13	33.2	39.4	43.3	44.7	45.4	46.8	42.7	46.6	46.4	47.2	48.6
Yield (t/ha)	**5.4**	**5.8**	**6.1**	**6.3**	**5.6**	**6.1**	**5.6**	**6.1**	**6.1**	**6.2**	**6.3**
Consumption	**107.8**	**105.3**	**116.2**	**119.2**	**115.5**	**116.1**	**116.0**	**117.2**	**116.0**	**116.2**	**117.5**
of which food and industrial	58.5	58.5	58.7	58.8	59.0	59.1	59.2	59.3	59.2	59.3	59.4
of which feed	45.0	42.6	52.4	55.5	52.0	52.2	52.0	52.6	50.8	51.5	51.4
of which bioenergy	4.3	4.4	4.4	4.5	4.5	4.7	5.2	5.2	5.2	5.2	5.2
Imports	**3.6**	**1.8**	**2.9**	**4.1**	**3.3**	**4.0**	**4.1**	**4.2**	**4.2**	**3.9**	**3.9**
Exports	**20.6**	**30.1**	**33.4**	**32.8**	**25.2**	**21.4**	**21.4**	**25.5**	**26.2**	**27.0**	**27.4**
Ending stocks	9.8	10.5	11.5	14.0	9.6	17.6	12.2	16.9	16.8	18.5	21.0
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	204	251	197	179	160	166	162	196	184	189	214
World price in EUR/t	268	240	205	194	176	202	204	202	192	205	224
World price in USD/t	344	319	272	215	194	228	241	226	213	238	264
EU intervention price in EUR/t	101	101	101	101	101	101	101	101	101	101	101

Note: the common wheat marketing year is July/June.

TABLE 9.11 EU durum wheat market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**8.4**	**8.0**	**7.7**	**8.4**	**9.7**	**8.8**	**8.8**	**7.9**	**9.0**	**8.4**	**8.2**
of which EU-15	8.2	7.9	7.5	8.1	9.2	8.4	8.2	7.4	8.5	8.0	7.7
of which EU-N13	0.2	0.2	0.2	0.3	0.5	0.4	0.5	0.5	0.5	0.5	0.5
Yield (t/ha)	**3.2**	**3.4**	**3.4**	**3.4**	**3.5**	**3.5**	**3.5**	**3.4**	**3.6**	**3.5**	**3.5**
Consumption	**8.7**	**8.6**	**8.6**	**9.1**	**9.3**	**9.4**	**9.4**	**9.4**	**8.7**	**9.2**	**9.2**
of which food and industrial	0.8	0.6	0.6	1.1	1.3	1.4	1.4	1.3	0.7	1.0	1.0
of which feed	0.2	0.1	0.1	0.6	0.8	0.8	0.8	0.8	0.7	0.8	0.8
of which bioenergy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imports	**1.5**	**1.9**	**2.8**	**2.5**	**1.7**	**1.5**	**1.3**	**1.6**	**1.6**	**1.8**	**1.9**
Exports	**1.4**	**1.1**	**1.2**	**1.2**	**1.4**	**1.1**	**0.9**	**1.1**	**1.1**	**1.1**	**1.0**
Ending stocks	1.2	1.3	1.9	2.4	3.0	2.7	2.3	1.8	2.5	2.4	2.4

Note: the durum wheat marketing year is July/June.

TABLE 9.12 EU barley market balance sheet (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**55.0**	**61.1**	**60.7**	**61.9**	**60.0**	**58.8**	**56.5**	**61.9**	**61.8**	**61.5**	**61.2**
of which EU-15	44.4	49.9	48.8	50.5	48.4	47.3	46.3	51.0	50.4	50.0	49.5
of which EU-N13	10.6	11.2	11.9	11.5	11.5	11.6	10.2	11.0	11.4	11.5	11.7
Yield (t/ha)	**4.4**	**4.9**	**4.9**	**5.1**	**4.9**	**4.9**	**4.6**	**5.1**	**5.1**	**5.2**	**5.3**
Consumption	**48.6**	**48.0**	**47.3**	**47.9**	**52.8**	**50.9**	**46.6**	**49.9**	**52.2**	**51.4**	**50.9**
of which food and industrial	11.4	11.4	11.4	11.6	11.7	11.6	11.6	11.7	14.2	13.9	14.5
of which feed	37.2	36.6	35.9	36.3	41.2	39.3	35.0	38.2	38.0	37.4	36.3
of which bioenergy	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.7
Imports	**0.1**	**0.0**	**0.1**	**0.3**	**0.4**	**0.5**	**0.1**	**0.2**	**0.2**	**0.2**	**0.2**
Exports	**7.8**	**8.8**	**12.7**	**14.2**	**8.7**	**9.0**	**8.0**	**8.7**	**8.8**	**9.0**	**9.1**
Ending stocks	5.1	8.5	8.4	7.6	5.5	4.0	5.2	8.0	6.8	7.6	7.9
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EU price in EUR/t	224	175	168	153	140	157	187	182	147	167	178
World price in EUR/t	254	242	216	265	242	220	202	197	196	203	213
World price in USD/t	326	322	287	294	268	249	238	220	217	236	251

Note: the barley marketing year is July/June.

TABLE 9.13 EU maize market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**59.6**	**67.0**	**78.0**	**59.3**	**63.1**	**65.1**	**69.3**	**66.7**	**65.5**	**68.5**	**71.6**
of which EU-15	39.4	38.2	43.9	34.3	31.9	33.9	30.6	31.7	31.7	31.8	31.8
of which EU-N13	20.2	28.9	34.1	25.0	31.2	31.2	38.7	35.1	33.8	36.7	39.7
Yield (t/ha)	**6.1**	**6.9**	**8.1**	**6.4**	**7.4**	**7.9**	**8.3**	**7.6**	**7.6**	**7.9**	**8.1**
Consumption	**73.2**	**77.6**	**76.8**	**73.9**	**70.2**	**74.8**	**84.1**	**82.8**	**82.9**	**86.8**	**88.5**
of which food and industrial	16.0	16.5	16.5	16.6	17.1	17.4	17.7	17.8	15.8	17.7	18.5
of which feed	57.2	61.2	60.4	57.3	53.1	57.4	66.4	65.0	63.6	66.5	67.7
of which bioenergy	3.0	4.3	4.7	4.7	6.0	6.2	6.5	6.9	6.9	6.9	6.9
Imports	**11.0**	**15.0**	**9.6**	**13.5**	**13.5**	**17.9**	**24.2**	**16.0**	**18.3**	**21.8**	**21.7**
Exports	**1.8**	**3.1**	**4.0**	**2.2**	**2.7**	**1.8**	**3.5**	**2.9**	**2.8**	**3.6**	**3.7**
Ending stocks	9.6	10.0	15.7	11.5	14.4	19.9	24.9	21.9	19.8	19.8	21.1
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	236	177	154	158	166	154	177	178	169	181	211
World price in EUR/t	233	153	129	148	140	142	135	145	149	152	160
World price in USD/t	299	203	172	164	156	160	160	162	164	177	188

Note: the maize marketing year is July/June.

TABLE 9.14 EU other cereals* market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**31.7**	**31.3**	**30.2**	**27.9**	**27.5**	**28.3**	**24.8**	**29.4**	**29.1**	**29.4**	**29.6**
of which EU-15	17.3	17.2	15.8	15.4	14.7	14.3	13.4	16.4	15.6	15.7	15.7
of which EU-N13	14.4	14.1	14.5	12.4	12.7	14.0	11.4	13.0	13.5	13.7	13.9
Yield (t/ha)	**4.0**	**4.2**	**4.2**	**4.2**	**4.1**	**4.2**	**3.8**	**4.3**	**4.3**	**4.3**	**4.4**
Consumption	**32.6**	**30.3**	**30.3**	**30.0**	**30.7**	**30.3**	**26.8**	**28.6**	**30.3**	**30.5**	**30.5**
of which food and industrial	15.3	13.5	14.6	14.1	13.4	14.2	12.2	14.3	15.0	16.0	16.5
of which feed	13.0	12.6	11.4	11.7	12.9	11.6	10.7	9.1	10.2	9.8	9.5
of which bioenergy	1.3	1.3	1.4	1.3	1.4	1.3	1.0	0.9	0.9	0.9	0.8
Imports	**0.8**	**1.2**	**1.2**	**1.7**	**1.3**	**1.4**	**1.5**	**1.5**	**1.7**	**1.7**	**1.7**
Exports	**0.9**	**1.0**	**1.0**	**1.4**	**2.0**	**1.3**	**1.5**	**1.6**	**1.8**	**1.7**	**2.0**
Ending stocks	2.9	5.0	6.1	5.1	2.1	1.1	0.1	1.6	2.5	2.1	2.0

** Rye, oats and other cereals.*

Note: the other cereals marketing year is July/June.

TABLE 9.15 EU rice balance (million t milled equivalent)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**1.8**	**1.7**	**1.7**	**1.8**	**1.8**	**1.8**	**1.7**	**1.8**	**1.8**	**1.8**	**1.8**
of which EU-15	1.8	1.7	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
of which EU-N13	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Yield (t/ha)	**4.0**	**4.0**	**3.9**	**4.1**	**4.0**	**4.0**	**4.0**	**4.0**	**4.0**	**4.1**	**4.1**
Consumption	**2.4**	**2.5**	**2.5**	**2.6**	**2.7**	**2.7**	**2.8**	**2.8**	**2.8**	**2.8**	**2.8**
Imports	**1.0**	**1.1**	**1.2**	**1.3**	**1.4**	**1.5**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**
Exports	**0.4**	**0.4**	**0.4**	**0.4**	**0.5**	**0.5**	**0.4**	**0.5**	**0.5**	**0.5**	**0.5**
Ending stocks	0.5	0.5	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
EU price in EUR/t	593	511	578	596	561	555	575	562	551	595	628
World price in EUR/t	458	402	327	356	367	367	378	390	387	397	415
World price in USD/t	588	534	435	395	407	415	447	436	428	462	488

Note: the rice marketing year is September/August.

TABLE 9.16 EU oilseed* (grains and beans) market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**27.4**	**31.5**	**35.4**	**32.1**	**31.3**	**35.1**	**32.8**	**29.7**	**31.4**	**31.8**	**32.0**
of which EU-15	17.5	18.0	20.2	18.7	16.7	18.2	16.5	14.2	15.8	15.8	15.7
of which EU-N13	9.9	13.5	15.2	13.4	14.6	16.9	16.3	15.5	15.6	16.0	16.3
Rapeseed	19.2	21.0	24.3	21.8	20.1	22.0	20.0	16.9	18.5	18.3	17.9
Sunflower seeds	7.2	9.3	9.3	7.9	8.7	10.4	10.0	9.9	9.9	10.0	10.0
Soya beans	1.0	1.2	1.8	2.4	2.5	2.7	2.8	2.9	3.0	3.5	4.1
Yield (t/ha)											
Rapeseed	3.1	3.1	3.6	3.4	3.1	3.3	2.9	3.0	3.0	3.1	3.1
Sunflower seeds	1.7	2.0	2.2	1.9	2.1	2.4	2.4	2.3	2.3	2.3	2.4
Soya beans	2.2	2.6	3.2	2.7	3.0	2.8	3.0	2.9	2.9	3.0	3.0
Consumption	**42.0**	**45.6**	**47.0**	**47.6**	**46.7**	**49.0**	**50.6**	**49.7**	**49.2**	**51.1**	**52.0**
of which crushing	40.8	44.4	45.7	45.9	44.8	47.1	48.7	47.4	47.4	48.8	49.8
Imports	**16.0**	**17.4**	**15.8**	**18.5**	**19.0**	**18.7**	**19.9**	**20.9**	**21.0**	**21.9**	**22.0**
Exports	**0.6**	**1.1**	**1.3**	**0.9**	**0.9**	**1.0**	**0.8**	**0.8**	**0.7**	**0.7**	**0.7**
Ending stocks	2.3	2.4	3.0	2.9	3.7	5.1	4.3	2.8	3.2	3.2	3.2
EU price in EUR/t (rapeseed)	475	382	351	370	393	355	370	396	415	454	490
World price in EUR/t (soya beans)	708	692	541	439	447	456	442	420	436	505	559
World price in USD/t (soya beans)	551	521	407	396	404	403	374	375	394	434	475

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

Note: the oilseed marketing year is July/June.

TABLE 9.17 EU oilseed meal* market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**25.8**	**28.1**	**28.8**	**29.4**	**28.5**	**29.7**	**31.1**	**30.5**	**29.8**	**30.7**	**31.4**
of which EU-15	21.6	23.4	23.6	24.6	23.6	24.4	25.8	25.1	24.8	25.7	26.5
of which EU-N13	4.2	4.7	5.2	4.8	4.9	5.4	5.3	5.4	5.0	5.0	4.9
Consumption	**45.9**	**49.4**	**50.0**	**52.2**	**49.6**	**51.3**	**52.0**	**52.0**	**52.8**	**53.6**	**54.1**
Imports	**21.1**	**22.0**	**22.3**	**23.8**	**22.1**	**22.8**	**22.0**	**22.6**	**23.6**	**22.9**	**22.8**
Exports	**1.1**	**0.9**	**1.0**	**1.0**	**1.1**	**1.2**	**1.1**	**1.2**	**0.9**	**0.8**	**0.7**
Ending stocks	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EU price in EUR/t (soya bean meal)	428	424	380	355	338	404	371	376	343	407	470
World price in EUR/t	699	705	546	399	379	442	426	407	407	461	492
World price in USD/t	544	531	411	359	342	391	360	364	368	397	418

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

Note: the oilseed meal marketing year is July/June.

TABLE 9.18 EU oilseed oil* market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**14.2**	**15.5**	**16.1**	**15.7**	**15.5**	**16.5**	**16.8**	**16.1**	**16.1**	**16.4**	**16.6**
of which EU-15	11.3	12.3	12.7	12.6	12.2	12.9	13.3	12.7	12.7	13.0	13.2
of which EU-N13	2.9	3.3	3.4	3.2	3.2	3.6	3.5	3.4	3.4	3.4	3.4
Consumption	**20.0**	**21.9**	**22.7**	**23.1**	**22.5**	**24.0**	**24.8**	**23.4**	**23.6**	**23.9**	**24.4**
Imports	**1.5**	**1.5**	**1.5**	**1.9**	**2.1**	**2.1**	**2.4**	**2.1**	**2.4**	**2.3**	**2.3**
Exports	**1.7**	**1.5**	**1.7**	**1.7**	**1.7**	**1.6**	**1.6**	**1.7**	**1.8**	**1.7**	**1.7**
Ending stocks	0.8	1.1	1.1	1.0	1.1	1.0	1.0	1.0	0.8	0.9	0.9
EU price in EUR/t (rapeseed oil)	918	731	669	710	786	748	728	733	805	845	848
World price in EUR/t (vegetable oil)	1 291	1 215	980	821	883	845	766	762	788	952	1 076
World price in USD/t (vegetable oil)	1 005	915	737	740	798	748	649	681	713	818	916

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

Note: the oilseed oil marketing year is July/June.

TABLE 9.19 EU vegetable oil* market balance (million t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**12.0**	**12.4**	**12.5**	**12.3**	**12.4**	**12.7**	**12.6**	**12.5**	**12.5**	**12.5**	**12.5**
of which EU-15	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
of which EU-N13	2.9	3.3	3.4	3.2	3.2	3.6	3.5	3.4	3.4	3.4	3.4
Consumption	**21.0**	**23.4**	**24.2**	**24.5**	**23.8**	**26.0**	**26.6**	**24.6**	**24.8**	**24.5**	**23.2**
of which food and other use	12.0	13.8	13.1	14.0	14.0	14.7	15.8	14.0	14.3	14.3	14.8
of which bioenergy	9.0	9.6	11.1	10.5	9.8	11.3	10.9	10.7	10.5	10.2	8.4
Imports	**1.9**	**1.7**	**1.9**	**1.8**	**1.9**	**1.7**	**1.8**	**1.8**	**2.0**	**1.9**	**1.9**
Exports	**9.1**	**10.0**	**9.9**	**10.5**	**10.3**	**10.7**	**11.1**	**10.3**	**10.5**	**9.9**	**9.6**
Ending stocks	1.2	1.5	1.5	1.5	1.5	1.3	1.2	1.3	1.1	1.1	1.1

** 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 9.20 EU sugar market balance (million t white sugar equivalent)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Sugar beet production (million tonnes)	**114.1**	**109.0**	**131.0**	**101.9**	**112.4**	**143.1**	**119.7**	**119.4**	**119.0**	**123.4**	**123.7**
of which EU-15	93.5	88.8	106.7	84.6	89.0	117.2	96.8	97.6	96.2	98.9	98.8
of which EU-N13	20.6	20.2	24.3	17.3	23.4	26.0	22.9	21.7	22.7	24.5	25.0
Sugar beet yield (t/ha)	**69.0**	**69.1**	**80.3**	**71.7**	**75.0**	**81.5**	**69.0**	**72.2**	**73.2**	**75.8**	**78.4**
Sugar production	***17.5***	***16.8***	***19.5***	***14.9***	***16.8***	***21.3***	***17.6***	***17.5***	***17.8***	***18.4***	***18.5***
of which EU-15	*14.2*	*13.6*	*15.8*	*12.3*	*13.2*	*17.4*	*14.2*	*14.2*	*14.3*	*14.6*	*14.7*
of which EU-N13	*3.3*	*3.2*	*3.7*	*2.6*	*3.6*	*3.9*	*3.4*	*3.3*	*3.5*	*3.7*	*3.8*
Sugar quota	13.5	13.5	13.5	13.5	13.5	0.0	0.0	0.0	0.0	0.0	0.0
Consumption	**19.1**	**19.2**	**19.5**	**18.6**	**17.7**	**19.0**	**18.6**	**18.6**	**18.2**	**17.9**	**17.6**
of which human consumption	16.1	16.4	16.0	15.8	15.2	16.2	15.7	15.7	15.3	14.9	14.5
of which for industrial uses	0.8	0.8	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.9
of which for biofuels	1.5	1.3	1.7	1.1	0.8	0.9	1.0	1.0	1.0	0.9	0.9
of which net exports in processed products	0.7	0.7	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.3
Imports	**3.7**	**3.2**	**2.8**	**2.9**	**2.5**	**1.3**	**1.8**	**1.9**	**1.9**	**1.3**	**1.3**
Exports	**1.3**	**1.4**	**1.4**	**1.4**	**1.3**	**3.4**	**1.5**	**1.3**	**1.3**	**1.8**	**2.2**
Ending stocks*	3.2	2.6	4.0	1.9	2.2	2.4	1.7	1.3	1.5	2.1	2.0
EU white sugar price in EUR/t	721	587	425	432	491	374	314	385	413	416	438
World white sugar price in EUR/t	392	344	283	416	429	310	284	317	353	364	399
World white sugar price in USD/t	504	457	376	462	475	351	335	355	390	424	469

** Stocks include carry forward quantities.*

Note: the sugar marketing year is October/September.

TABLE 9.21 EU isoglucose market balance (million t white sugar equivalent)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.6**	**0.6**	**0.6**	**0.7**	**0.9**	**1.0**
of which EU-15	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
of which EU-N13	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.7	0.8
Isoglucose quota	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Consumption	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.6**	**0.6**	**0.6**	**0.7**	**0.9**	**1.0**
share in Sweetener use (%)	*3.5*	*3.5*	*3.3*	*3.4*	*3.7*	*2.9*	*3.0*	*3.2*	*3.7*	*4.6*	*5.3*
Imports	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exports	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0

Note: the isoglucose marketing year is October/September.

TABLE 9.22 EU biofuels market balance sheet (million t oil equivalent)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**11.9**	**12.7**	**14.8**	**14.2**	**13.9**	**15.5**	**15.3**	**15.5**	**15.8**	**15.8**	**14.2**
Ethanol	3.0	3.1	3.5	3.3	3.2	3.3	3.3	3.5	3.5	3.6	3.6
of which based on wheat	1.0	1.0	1.0	0.9	1.0	1.0	0.9	1.0	1.0	1.0	1.0
of which based on maize	0.7	0.8	1.1	0.9	1.0	1.2	1.3	1.4	1.4	1.4	1.4
of which 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
of which based on sugar beet and molasses	0.9	0.9	1.0	1.1	0.7	0.8	0.7	0.8	0.8	0.8	0.7
of which based on other agricultural crops	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
of which advanced	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3
Biodiesel	8.8	9.6	11.3	10.9	10.8	12.2	12.0	12.0	12.3	12.2	10.6
of which based on rape oil	4.9	5.2	6.0	5.6	5.3	6.0	5.8	5.8	5.9	5.9	5.7
of which based on palm oil	2.2	2.4	2.7	2.5	2.4	2.7	2.6	2.5	2.6	2.3	0.7
of which based on other vegetable oils	0.7	0.7	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.9	0.9
of which based on waste oils	0.9	1.2	1.6	1.7	2.1	2.2	2.4	2.5	2.6	2.6	2.7
of which advanced	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.7
Consumption	**26.6**	**24.3**	**26.8**	**25.8**	**25.3**	**27.9**	**31.1**	**31.2**	**32.2**	**30.9**	**27.6**
Ethanol	3.2	3.3	3.6	3.4	3.3	3.4	3.7	3.7	3.8	3.8	3.7
of which for fuel use	2.3	2.3	2.4	2.3	2.3	2.5	2.6	2.7	2.7	2.7	2.6
of which for other uses	*0.9*	*0.9*	*1.2*	*1.0*	*1.1*	*0.9*	*1.1*	*1.0*	*1.1*	*1.1*	*1.1*
Biodiesel	11.7	10.5	11.6	11.2	11.0	12.3	13.7	13.8	14.2	13.5	11.9
of which for fuel use	11.6	10.4	11.4	11.1	10.8	12.1	13.6	13.6	14.1	13.3	11.7
of which for other uses	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
Net trade	**- 3.1**	**- 1.5**	**- 0.6**	**- 0.5**	**- 0.5**	**- 1.0**	**- 2.7**	**- 2.3**	**- 1.8**	**- 1.5**	**- 1.2**
Ethanol imports	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.5	0.4	0.4	0.4
Ethanol exports	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Biodiesel imports	2.9	1.5	0.6	0.6	0.7	1.2	3.2	2.7	2.2	1.8	1.3
Biodiesel exports	0.1	0.3	0.2	0.2	0.3	0.3	0.5	0.7	0.6	0.6	0.3
Gasoline consumption	88.1	83.2	83.4	83.6	81.0	83.7	83.6	82.8	81.0	71.6	58.4
Diesel consumption	182.9	186.6	190.0	194.5	203.3	203.9	202.5	200.7	196.6	173.6	140.7
Biofuels energy share (% RED counting)	**5.6**	**5.3**	**5.8**	**5.6**	**5.5**	**6.1**	**6.7**	**6.9**	**7.2**	**8.0**	**9.1**
of which 1st-generation	4.7	4.2	4.4	4.1	3.8	4.2	4.7	4.7	5.0	5.2	5.4
of which based on waste oils	0.4	0.4	0.6	0.6	0.8	0.8	0.8	0.9	0.9	1.1	1.4
of which other advanced	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.5
of which ethanol share in gasoline	2.7	2.9	3.0	2.8	2.8	3.0	3.2	3.3	3.4	3.9	4.5
of which biodiesel in diesel	6.4	5.6	6.0	5.7	5.4	6.0	6.7	6.8	7.2	7.7	8.3
Biofuels blending in volume (%)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Ethanol blending in gasoline	4.0	4.3	4.4	4.2	4.2	4.5	4.8	4.9	5.1	5.8	6.8
Biodiesel blending in diesel	6.9	6.1	6.6	6.2	5.8	6.5	7.3	7.4	7.8	8.4	9.1
Ethanol producer price in EUR/hl	63	61	48	55	50	55	48	59	63	68	72
Biodiesel producer price in EUR/hl	91	84	69	69	72	74	74	76	91	90	91

Note: The biofuels energy share under RED counting includes double-counting of waste-based and other advanced ethanol and biodiesel, while the energy shares of waste-based and other advanced biofuels, as well as of ethanol and biodiesel do not include double-counting.

TABLE 9.23 EU milk market balance

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Dairy cows (million heads)	**23.0**	**23.3**	**23.3**	**23.4**	**23.3**	**23.1**	**22.7**	**22.6**	**22.5**	**21.8**	**21.2**
of which EU-15	17.6	17.8	17.9	18.1	18.1	17.9	17.6	17.4	17.3	17.0	16.7
of which EU-N13	5.5	5.4	5.4	5.2	5.2	5.1	5.1	5.1	5.1	4.8	4.5
Milk yield (kg/cow)	**6 496**	**6 489**	**6 737**	**6 860**	**6 917**	**7 068**	**7 246**	**7 325**	**7 421**	**7 862**	**8 342**
of which EU-15	7 083	7 040	7 273	7 356	7 404	7 567	7 787	7 881	7 969	8 335	8 733
of which EU-N13	4 621	4 684	4 951	5 134	5 209	5 321	5 384	5 438	5 558	6 196	6 908
Dairy cow milk production (million t)	**149.7**	**150.9**	**157.1**	**160.3**	**161.1**	**163.0**	**164.3**	**165.3**	**166.6**	**171.7**	**176.8**
of which EU-15	124.3	125.4	130.5	133.5	134.2	135.7	136.8	137.4	138.2	141.8	145.4
of which EU-N13	25.4	25.5	26.6	26.8	26.9	27.3	27.5	27.9	28.4	29.9	31.4
Total cow milk production (million t)	**152.7**	**153.9**	**159.7**	**162.9**	**163.4**	**165.3**	**166.7**	**167.6**	**168.9**	**174.0**	**179.0**
of which EU-15	124.5	125.7	130.7	133.7	134.4	136.0	137.0	137.6	138.4	142.0	145.7
of which EU-N13	28.2	28.3	29.0	29.2	29.0	29.3	29.7	30.0	30.5	32.0	33.4
Delivered to dairies (million t)	**141.0**	**141.9**	**148.9**	**152.8**	**153.7**	**156.1**	**157.5**	**158.4**	**159.8**	**166.2**	**172.5**
of which EU-15	121.0	122.0	127.4	130.9	131.5	133.3	134.2	134.8	135.7	139.6	143.4
of which EU-N13	20.0	19.9	21.5	21.9	22.2	22.9	23.3	23.6	24.1	26.6	29.1
On-farm use and direct sales (million t)	11.7	12.0	10.8	10.1	9.8	9.2	9.2	9.2	9.2	7.8	6.6
of which EU-15	3.6	3.6	3.3	2.8	2.9	2.7	2.8	2.8	2.7	2.4	2.3
of which EU-N13	8.2	8.4	7.5	7.3	6.8	6.4	6.4	6.4	6.4	5.4	4.3
Delivery ratio (%)	**92.3**	**92.2**	**93.2**	**93.8**	**94.0**	**94.5**	**94.5**	**94.5**	**94.6**	**95.5**	**96.3**
of which EU-15	97.1	97.1	97.5	97.9	97.8	98.0	98.0	98.0	98.0	98.3	98.4
of which EU-N13	71.0	70.2	74.1	75.1	76.5	78.0	78.4	78.6	78.9	83.0	87.2
Fat content of milk (%)	4.0	4.0	4.0	4.0	4.1	4.0	4.0	4.1	4.1	4.1	4.1
Non-fat solid content of milk (%)	9.4	9.4	9.4	9.4	9.6	9.7	9.7	9.7	9.7	9.8	9.9
EU Milk producer price in EUR/t (real fat content)	324	364	369	305	284	349	324	339	334	344	370

TABLE 9.24 EU cheese market balance (1 000 t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**9 605**	**9 711**	**9 937**	**10 204**	**10 449**	**10 589**	**10 693**	**10 779**	**10 855**	**11 182**	**11 549**
of which EU-15	8 233	8 316	8 526	8 735	8 915	8 994	9 079	9 151	9 207	9 435	9 676
of which EU-N13	1 372	1 396	1 411	1 469	1 534	1 596	1 614	1 628	1 648	1 747	1 873
Consumption	**8 914**	**9 000**	**9 280**	**9 534**	**9 746**	**9 820**	**9 920**	**9 991**	**10 048**	**10 218**	**10 416**
of which EU-15	7 634	7 697	7 940	8 107	8 231	8 269	8 362	8 410	8 458	8 512	8 615
of which EU-N13	1 279	1 303	1 340	1 427	1 515	1 552	1 557	1 580	1 590	1 706	1 801
per capita consumption (kg)	**17.7**	**17.8**	**18.3**	**18.7**	**19.1**	**19.2**	**19.3**	**19.4**	**19.5**	**19.8**	**20.2**
of which EU-15	19.1	19.2	19.7	20.0	20.2	20.3	20.4	20.5	20.5	20.5	20.8
of which EU-N13	12.2	12.4	12.8	13.6	14.5	14.9	15.0	15.2	15.4	16.7	17.9
Imports	77	75	77	61	71	60	59	59	59	62	62
Exports	768	786	721	719	800	829	832	847	866	1 026	1 195
Stock variation	**0**	**0**	**13**	**14**	**- 26**	**0**	**0**	**0**	**0**	**0**	**0**
EU market price in EUR/t (Gouda)	3 040	3 391	3 383	2 651	2 531	3 257	3 063	3 134	3 179	3 272	3 575
World market price in EUR/t	2 976	3 299	3 368	3 007	2 791	3 406	3 093	3 486	3 486	3 430	3 737
World market price in USD/t	3 823	4 381	4 474	3 336	3 090	3 848	3 652	3 900	3 853	3 988	4 390

TABLE 9.25 EU fresh dairy products market balance (1 000 t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**46 706**	**46 816**	**46 480**	**46 809**	**46 276**	**46 315**	**45 719**	**45 475**	**45 287**	**44 714**	**43 820**
of which EU-15	40 428	40 431	40 058	40 194	39 625	39 520	38 919	38 608	38 386	37 551	36 494
of which EU-N13	6 279	6 385	6 422	6 615	6 651	6 795	6 800	6 868	6 901	7 163	7 326
of which fresh milk	31 733	31 790	31 366	31 275	30 764	30 708	30 131	29 961	29 764	28 666	27 141
of which cream	2 516	2 583	2 639	2 741	2 736	2 785	2 697	2 724	2 755	2 912	3 078
of which yogurt	8 129	8 077	7 967	8 056	8 160	8 212	8 217	8 255	8 294	8 492	8 701
Net trade	**573**	**641**	**791**	**950**	**1 153**	**1 109**	**1 075**	**1 184**	**1 326**	**1 664**	**1 587**
Consumption	**46 134**	**46 175**	**45 689**	**45 859**	**45 123**	**45 207**	**44 644**	**44 291**	**43 961**	**43 050**	**42 233**
of which EU-15	41 076	40 928	40 657	40 814	39 937	40 018	39 475	39 214	38 909	37 767	36 692
of which EU-N13	5 058	5 247	5 032	5 045	5 186	5 188	5 168	5 077	5 052	5 283	5 541
of which fresh milk	31 547	31 301	31 048	30 809	29 830	30 002	29 399	29 163	28 838	26 705	25 475
of which cream	2 411	2 491	2 542	2 594	2 557	2 631	2 509	2 524	2 542	2 650	2 756
of which yogurt	8 070	7 993	7 895	7 971	8 111	8 185	8 139	8 178	8 221	8 251	8 261
per capita consumption (kg)	**92.0**	**91.7**	**90.5**	**90.6**	**89.1**	**89.2**	**87.8**	**86.8**	**85.9**	**83.3**	**81.6**
of which EU-15	102.8	102.0	100.9	100.8	98.3	98.1	96.5	95.6	94.5	91.2	88.4
of which EU-N13	47.5	49.4	47.5	47.7	49.2	49.3	49.2	48.4	48.3	51.0	54.2
of which fresh milk	62.5	61.8	61.1	60.5	58.4	58.6	57.3	56.7	56.0	51.7	49.4
of which cream	4.8	4.9	5.0	5.1	5.0	5.1	4.9	4.9	4.9	5.1	5.3
of which yogurt	16.0	15.8	15.5	15.6	15.9	16.0	15.9	15.9	16.0	16.0	16.0

TABLE 9.26 EU butter market balance (1 000 t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**2 165**	**2 124**	**2 239**	**2 301**	**2 393**	**2 414**	**2 438**	**2 490**	**2 530**	**2 626**	**2 716**
of which EU-15	1 915	1 874	1 978	2 023	2 094	2 112	2 131	2 175	2 203	2 261	2 303
of which EU-N13	250	250	261	277	299	302	307	315	327	365	413
Consumption	**2 054**	**2 034**	**2 100**	**2 121**	**2 209**	**2 257**	**2 290**	**2 322**	**2 363**	**2 419**	**2 474**
of which EU-15	1 788	1 764	1 823	1 811	1 877	1 927	1 961	1 990	2 016	2 055	2 092
of which EU-N13	266	269	277	310	332	330	329	332	346	364	382
per capita consumption (kg)	**4.1**	**4.0**	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.5**	**4.6**	**4.7**	**4.8**
of which EU-15	4.5	4.4	4.5	4.5	4.6	4.7	4.8	4.9	4.9	5.0	5.0
of which EU-N13	2.5	2.6	2.6	3.0	3.2	3.2	3.2	3.2	3.3	3.6	3.8
Imports	**33**	**21**	**25**	**3**	**3**	**3**	**9**	**11**	**11**	**12**	**12**
Exports	**144**	**111**	**165**	**182**	**186**	**160**	**157**	**179**	**179**	**219**	**254**
Ending Stocks	**100**	**95**	**125**	**135**	**115**	**106**	**105**	**120**	**105**	**105**	**105**
of which private	100	95	125	135	115	105	105	120	105	105	105
of which intervention	0	0	0	0	0	1	0	0	0	0	0
EU market price in EUR/t	3 062	3 869	3 418	3 020	3 230	5 096	5 059	3 854	3 575	3 427	3 601
World market price in EUR/t	2 583	3 023	2 825	2 869	2 937	4 748	4 147	2 860	3 118	3 057	3 234
World market price in USD/t	3 318	4 015	3 753	3 183	3 251	5 364	4 898	3 200	3 446	3 555	3 799

TABLE 9.27 EU SMP market balance (1 000 t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**1 107**	**1 109**	**1 457**	**1 537**	**1 560**	**1 529**	**1 531**	**1 577**	**1 656**	**1 752**	**1 892**
of which EU-15	951	959	1 235	1 324	1 342	1 327	1 308	1 347	1 424	1 463	1 542
of which EU-N13	156	150	222	213	218	202	223	230	232	289	350
Consumption	**675**	**697**	**722**	**740**	**767**	**797**	**851**	**853**	**849**	**891**	**933**
of which EU-15	587	598	617	627	641	635	690	717	709	721	726
of which EU-N13	88	100	105	112	126	162	160	136	140	170	207
Imports	**2**	**5**	**2**	**3**	**4**	**2**	**3**	**5**	**2**	**2**	**2**
Exports	**520**	**417**	**638**	**695**	**579**	**780**	**821**	**945**	**839**	**862**	**960**
Ending Stocks	**70**	**80**	**170**	**279**	**501**	**456**	**319**	**95**	**65**	**65**	**65**
of which private	70	80	170	250	150	80	220	95	65	65	65
of which intervention	0	0	0	29	351	376	99	0	0	0	0
EU market price in EUR/t	2 345	3 011	2 691	1 856	1 791	1 772	1 494	2 049	2 254	2 386	2 605
World market price in EUR/t	2 461	3 312	2 825	1 951	1 802	1 813	1 685	2 324	2 426	2 576	2 827
World market price in USD/t	3 163	4 399	3 753	2 165	1 994	2 048	1 990	2 600	2 682	2 996	3 321

TABLE 9.28 EU WMP market balance (1 000 t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**649**	**724**	**756**	**721**	**734**	**779**	**731**	**694**	**686**	**678**	**680**
of which EU-15	594	666	695	669	686	736	690	655	648	640	642
of which EU-N13	55	57	61	52	47	44	41	39	38	38	38
Consumption	**266**	**353**	**368**	**330**	**365**	**388**	**398**	**413**	**416**	**423**	**431**
of which EU-15	231	310	330	296	328	353	363	381	387	391	396
of which EU-N13	35	42	38	34	37	35	35	33	29	32	35
Imports	**3**	**3**	**1**	**4**	**6**	**2**	**2**	**2**	**4**	**4**	**4**
Exports	**386**	**374**	**390**	**395**	**375**	**393**	**334**	**283**	**275**	**259**	**254**
EU market price in EUR/t	2 735	3 526	3 051	2 393	2 352	2 921	2 717	2 881	2 809	3 256	3 760
World market price in EUR/t	2 517	3 537	2 836	2 229	2 190	2 739	2 545	2 771	2 740	3 099	3 614
World market price in USD/t	3 234	4 698	3 768	2 474	2 424	3 095	3 005	3 100	3 029	3 604	4 246

TABLE 9.29 EU whey market balance (1 000 t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**1 865**	**1 919**	**1 854**	**1 903**	**1 813**	**1 904**	**1 943**	**1 957**	**1 976**	**2 081**	**2 192**
of which EU-15	1 622	1 654	1 605	1 634	1 568	1 656	1 685	1 698	1 711	1 797	1 888
of which EU-N13	243	265	250	269	245	248	257	259	265	284	304
Consumption	**1 381**	**1 411**	**1 359**	**1 372**	**1 270**	**1 353**	**1 362**	**1 377**	**1 395**	**1 450**	**1 511**
Imports	**7**	**8**	**8**	**7**	**10**	**15**	**18**	**18**	**18**	**13**	**13**
Exports	**492**	**516**	**504**	**538**	**553**	**566**	**598**	**598**	**599**	**644**	**694**
EU market price in EUR/t	962	1 017	964	755	708	866	761	802	826	1 000	1 192
World market price in EUR/t	988	1 035	988	791	681	902	792	852	796	927	1 135
World market price in USD/t	1 269	1 375	1 312	877	754	1 019	936	954	880	1 078	1 334

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

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Net Production	**22 714**	**22 555**	**22 737**	**23 436**	**23 866**	**23 660**	**24 082**	**24 189**	**24 489**	**24 393**	**23 355**
of which EU-15	19 323	19 251	19 278	19 903	20 261	20 049	20 381	20 547	20 810	20 577	19 981
of which EU-N13	3 391	3 304	3 459	3 533	3 605	3 611	3 701	3 641	3 679	3 815	3 373
Consumption	**20 543**	**20 333**	**20 803**	**21 229**	**21 065**	**21 100**	**21 419**	**20 990**	**20 791**	**20 343**	**19 949**
of which EU-15	16 210	16 199	16 312	16 525	16 281	16 279	16 414	16 114	15 911	15 694	15 412
of which EU-N13	4 333	4 133	4 491	4 704	4 784	4 822	5 004	4 876	4 748	4 649	4 536
per capita consumption (kg r.w.e.)*	**31.8**	**31.3**	**31.9**	**32.5**	**32.2**	**32.2**	**32.6**	**31.8**	**31.5**	**30.7**	**30.2**
of which EU-15	31.7	31.5	31.6	31.8	31.2	31.1	31.3	30.6	30.1	29.6	29.0
of which EU-N13	32.1	30.7	33.4	35.1	35.8	36.1	37.6	36.7	35.8	35.5	35.3
Imports (meat)	20	16	14	11	12	14	15	16	17	18	19
Exports (meat)	2 191	2 238	1 948	2 218	2 813	2 574	2 678	3 214	3 715	4 068	3 426
Net trade (meat)	**2 171**	**2 222**	**1 934**	**2 207**	**2 801**	**2 560**	**2 663**	**3 198**	**3 698**	**4 050**	**3 406**
EU market price in EUR/t	1 705	1 753	1 564	1 396	1 460	1 607	1 420	1 650	1 952	1 485	1 539
US market price in EUR/t	1 457	1 477	1 752	1 386	1 277	1 369	1 189	1 341	1 670	1 272	1 339
US market price in USD/t	1 872	1 961	2 328	1 538	1 413	1 546	1 404	1 500	1 846	1 479	1 573

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

TABLE 9.31 EU beef and veal meat market balance (1 000 t c.w.e.)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Total number of cows (million heads)	**35.1**	**35.2**	**35.4**	**35.7**	**35.6**	**35.4**	**34.9**	**34.8**	**34.6**	**33.7**	**32.9**
of which dairy cows	23.0	23.3	23.3	23.4	23.3	23.1	22.7	22.6	22.5	21.8	21.2
of which suckler cows	12.2	12.0	11.9	12.1	12.3	12.3	12.3	12.2	12.2	11.9	11.8
Gross Indigenous Production	**7 855**	**7 486**	**7 655**	**7 835**	**8 070**	**8 104**	**8 242**	**8 164**	**8 124**	**7 761**	**7 472**
of which EU-15	6 975	6 654	6 756	6 870	7 044	7 023	7 156	7 091	7 036	6 729	6 494
of which EU-N13	880	832	898	966	1 025	1 081	1 086	1 073	1 088	1 032	978
Imports of live animals	0	0	0	0	0	0	0	0	0	0	0
Exports of live animals	159	108	114	178	219	235	234	197	199	176	151
Net Production	**7 696**	**7 378**	**7 541**	**7 657**	**7 851**	**7 869**	**8 008**	**7 967**	**7 925**	**7 585**	**7 321**
Consumption	**7 761**	**7 521**	**7 641**	**7 747**	**7 907**	**7 883**	**8 068**	**7 998**	**7 934**	**7 613**	**7 373**
of which EU-15	7 268	7 087	7 139	7 239	7 352	7 309	7 470	7 380	7 310	6 987	6 762
of which EU-N13	493	433	502	508	555	574	598	618	624	626	612
per capita consumption (kg r.w.e.)*	**10.8**	**10.4**	**10.5**	**10.6**	**10.8**	**10.8**	**11.0**	**10.9**	**10.8**	**10.3**	**10.0**
of which EU-15	12.7	12.4	12.4	12.5	12.7	12.5	12.8	12.6	12.4	11.8	11.4
of which EU-N13	3.3	2.9	3.4	3.4	3.7	3.9	4.0	4.2	4.2	4.3	4.3
Imports (meat)	275	304	308	300	304	285	312	303	299	346	372
Exports (meat)	210	161	208	211	248	271	252	272	290	317	320
Net trade (meat)	**- 65**	**- 143**	**- 100**	**- 89**	**- 56**	**- 15**	**- 61**	**- 31**	**- 9**	**- 28**	**- 52**
EU market price in EUR/t	3 838	3 816	3 676	3 772	3 675	3 797	3 796	3 577	3 649	3 630	3 953
World market price in EUR/t (Brazil)	3 496	3 257	3 399	3 723	3 466	3 582	3 383	3 581	3 430	3 424	3 732
World market price in USD/t (Brazil)	4 492	4 326	4 515	4 130	3 836	4 047	3 995	4 006	3 792	3 981	4 384

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

TABLE 9.32 EU sheep and goat meat market balance (1 000 t c.w.e.)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Gross Indigenous Production	**910**	**900**	**899**	**907**	**914**	**925**	**950**	**969**	**960**	**957**	**966**
of which EU-15	791	782	776	790	785	797	790	803	788	770	759
of which EU-N13	119	118	123	117	128	128	160	166	172	188	207
Imports of live animals	0	0	0	0	0	0	0	0	0	0	0
Exports of live animals	27	34	36	38	52	52	51	61	61	50	40
Net Production	**883**	**866**	**862**	**869**	**862**	**872**	**899**	**908**	**899**	**907**	**926**
Consumption	**1 049**	**1 029**	**1 019**	**1 052**	**1 046**	**1 010**	**1 045**	**1 020**	**1 025**	**1 051**	**1 081**
of which EU-15	961	946	935	973	962	928	934	938	940	971	1 003
of which EU-N13	88	83	84	79	84	82	111	82	84	80	78
per capita consumption (kg r.w.e.)*	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**	**1.7**	**1.8**	**1.7**	**1.8**	**1.8**	**1.8**
of which EU-15	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1
of which EU-N13	0.7	0.7	0.7	0.7	0.7	0.7	0.9	0.7	0.7	0.7	0.7
Imports (meat)	190	200	189	202	203	173	174	146	155	178	182
Exports (meat)	25	36	32	20	19	34	29	35	29	35	27
Net trade (meat)	**- 166**	**- 164**	**- 157**	**- 183**	**- 184**	**- 139**	**- 145**	**- 111**	**- 126**	**- 144**	**- 155**
EU market price in EUR/t	5 000	4 903	5 144	5 272	5 123	4 994	5 301	4 993	4 898	4 660	4 957
World market price in EUR/t	4 010	2 929	3 406	3 310	3 220	3 522	4 151	4 622	4 310	3 735	3 962
World market price in USD/t	5 152	3 890	4 525	3 672	3 564	3 979	4 903	5 172	4 764	4 343	4 654

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

TABLE 9.33 EU poultry meat market balance (1 000 t c.w.e.)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Net Production	**12 716**	**12 805**	**13 263**	**13 788**	**14 495**	**14 557**	**15 252**	**15 628**	**15 844**	**16 170**	**16 430**
of which EU-15	9 855	9 853	10 091	10 318	10 691	10 664	11 049	11 246	11 308	11 374	11 427
of which EU-N13	2 861	2 952	3 172	3 470	3 803	3 894	4 203	4 382	4 536	4 796	5 003
Consumption	**12 233**	**12 285**	**12 719**	**13 254**	**13 831**	**13 814**	**14 462**	**14 813**	**15 052**	**15 412**	**15 596**
of which EU-15	9 795	9 839	10 196	10 608	11 005	10 999	11 515	11 804	11 914	12 316	12 542
of which EU-N13	2 438	2 446	2 523	2 647	2 826	2 816	2 947	3 009	3 073	3 096	3 053
per capita consumption (kg r.w.e.)*	**21.3**	**21.4**	**22.0**	**22.9**	**23.8**	**23.7**	**24.8**	**25.4**	**25.7**	**26.3**	**26.6**
of which EU-15	21.6	21.6	22.3	23.1	23.8	23.7	24.8	25.3	25.5	26.2	26.6
of which EU-N13	20.4	20.5	21.2	22.3	23.8	23.8	25.0	25.5	26.1	26.7	26.8
Imports (meat)	841	791	821	855	882	789	802	850	858	941	949
Exports (meat)	1 324	1 311	1 365	1 388	1 546	1 532	1 593	1 665	1 650	1 699	1 784
Net trade (meat)	**483**	**520**	**544**	**533**	**664**	**743**	**791**	**814**	**792**	**758**	**835**
EU market price in EUR/t	1 955	1 991	1 951	1 914	1 822	1 854	1 909	1 917	1 920	1 929	1 938
World market price in EUR/t	1 503	1 516	1 460	1 480	1 384	1 463	1 314	1 385	1 375	1 501	1 610
World market price in USD/t	1 931	2 014	1 940	1 642	1 532	1 653	1 552	1 550	1 520	1 745	1 891

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

TABLE 9.34 Aggregate EU meat market balance (1 000 t c.w.e.)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Net Production	**44 010**	**43 604**	**44 403**	**45 750**	**47 073**	**46 958**	**48 242**	**48 692**	**49 157**	**49 055**	**48 032**
Consumption	**41 587**	**41 168**	**42 182**	**43 281**	**43 848**	**43 808**	**44 993**	**44 821**	**44 605**	**44 419**	**43 998**
of which EU-15	34 235	34 072	34 582	35 344	35 599	35 515	36 333	36 236	36 075	35 967	35 719
of which EU-N13	7 352	7 096	7 600	7 938	8 249	8 294	8 660	8 585	8 530	8 452	8 279
per capita consumption (kg r.w.e.)*	**65.7**	**64.9**	**66.3**	**67.9**	**68.6**	**68.4**	**70.2**	**69.8**	**69.7**	**69.1**	**68.7**
of which EU-15	68.1	67.5	68.3	69.5	69.8	69.4	70.9	70.5	70.0	69.6	69.1
of which EU-N13	56.5	54.8	58.7	61.4	64.1	64.5	67.5	67.1	66.8	67.1	67.0
of which Beef and Veal meat	10.8	10.4	10.5	10.6	10.8	10.8	11.0	10.9	10.8	10.3	10.0
of which Sheep and Goat meat	1.8	1.8	1.8	1.8	1.8	1.7	1.8	1.7	1.8	1.8	1.8
of which Pigmeat	31.8	31.3	31.9	32.5	32.2	32.2	32.6	31.8	31.5	30.7	30.2
of which Poultry meat	21.3	21.4	22.0	22.9	23.8	23.7	24.8	25.4	25.7	26.3	26.6
Imports (meat)	1 326	1 311	1 332	1 368	1 402	1 261	1 303	1 315	1 329	1 483	1 522
Exports (meat)	3 749	3 747	3 553	3 837	4 627	4 410	4 551	5 186	5 683	6 119	5 556
Net trade (meat)	**2 423**	**2 435**	**2 221**	**2 469**	**3 225**	**3 150**	**3 248**	**3 871**	**4 355**	**4 636**	**4 034**

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

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production	**6 272**	**6 509**	**6 509**	**6 695**	**6 758**	**6 786**	**6 940**	**7 065**	**7 144**	**7 418**	**7 674**
of which EU-15	4 917	5 121	5 094	5 266	5 307	5 307	5 449	5 546	5 616	5 773	5 907
of which EU-N13	1 355	1 388	1 414	1 430	1 451	1 479	1 491	1 520	1 528	1 645	1 766
Total use	**6 149**	**6 329**	**6 287**	**6 438**	**6 539**	**6 612**	**6 734**	**6 836**	**6 909**	**7 153**	**7 380**
of which EU-15	4 960	5 090	5 030	5 173	5 268	5 333	5 448	5 543	5 607	5 821	6 025
of which EU-N13	1 189	1 239	1 257	1 265	1 272	1 279	1 286	1 294	1 302	1 332	1 355
per capita consumption (kg)	**12.2**	**12.5**	**12.4**	**12.6**	**12.8**	**12.9**	**13.1**	**13.3**	**13.4**	**13.9**	**14.3**
of which EU-15	12.4	12.7	12.5	12.8	13.0	13.1	13.3	13.5	13.6	14.1	14.5
of which EU-N13	11.3	11.8	12.0	12.1	12.2	12.3	12.4	12.5	12.6	13.0	13.5
Imports	**38**	**21**	**14**	**19**	**18**	**23**	**28**	**19**	**19**	**22**	**24**
Exports	**160**	**201**	**235**	**277**	**237**	**197**	**234**	**248**	**254**	**286**	**318**

** Eggs for consumption.*

TABLE 9.36 EU olive oil market balance (1 000 t)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Area (1000 ha)	**4 756**	**4 741**	**4 761**	**4 822**	**4 844**	**4 850**	**4 907**	**4 915**	**4 918**	**4 919**	**4 916**
of which ES+PT	2 778	2 778	2 790	2 798	2 818	2 846	2 863	2 870	2 876	2 891	2 903
of which IT+EL	1 932	1 917	1 924	1 977	1 979	1 956	1 997	1 997	1 994	1 979	1 963
of which other EU MS	46	47	48	47	47	48	48	48	48	49	50
Production	**1 463**	**2 483**	**1 435**	**2 324**	**1 742**	**2 188**	**2 264**	**2 057**	**2 076**	**2 212**	**2 366**
of which ES+PT	677	1 873	903	1 512	1 352	1 397	1 889	1 390	1 448	1 575	1 718
of which IT+EL	773	596	522	795	377	775	360	650	610	619	629
of which other EU MS	12	14	9	17	12	17	15	17	17	18	19
Consumption	**1 601**	**1 731**	**1 572**	**1 626**	**1 385**	**1 597**	**1 433**	**1 575**	**1 613**	**1 589**	**1 589**
of which ES+IT+EL+PT	1 291	1 386	1 236	1 265	1 040	1 258	1 050	1 202	1 226	1 146	1 082
of which other EU MS	310	345	335	361	345	339	383	373	386	443	507
per capita ES+IT+EL+PT (kg)	10.1	10.8	9.6	9.9	8.1	9.8	8.2	9.4	9.6	9.0	8.6
per capita other EU MS (kg)	0.8	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.3
Imports	**153**	**53**	**225**	**97**	**90**	**180**	**145**	**100**	**91**	**124**	**83**
Exports	**489**	**601**	**508**	**573**	**558**	**563**	**648**	**610**	**633**	**746**	**860**
Total Ending Stocks	426	631	211	433	323	531	859	829	750	550	550

Note: the olive oil marketing year is October/September.

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

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Area (million ha)	559	536	525	539	524	522	523	522	523	497	473
Yield (t/ha)	**20**	**23**	**25**	**24**	**24**	**19**	**26**	**22**	**23**	**24**	**25**
Gross production	**11 098**	**12 091**	**12 896**	**12 768**	**12 552**	**10 041**	**13 813**	**11 374**	**11 933**	**12 163**	**12 038**
of which losses and feed use	712	787	838	822	798	632	860	698	720	691	639
of which usable production	11 098	12 091	12 896	12 768	12 552	10 041	13 813	11 374	11 933	12 163	12 038
Production (fresh)	**7 113**	**7 742**	**7 919**	**8 345**	**7 938**	**6 163**	**7 608**	**7 176**	**7 574**	**7 686**	**7 786**
Apparent consumption (fresh)	**6 157**	**6 713**	**6 538**	**7 210**	**6 895**	**5 982**	**6 853**	**6 776**	**6 847**	**6 796**	**6 710**
per capita (kg)	12.2	13.3	12.9	14.2	13.6	11.7	13.4	13.2	13.4	13.2	13.1
Exports (fresh)	**1 564**	**1 605**	**1 782**	**1 586**	**1 475**	**737**	**1 213**	**900**	**1 196**	**1 360**	**1 546**
Imports (fresh)	**608**	**576**	**401**	**451**	**432**	**556**	**459**	**500**	**470**	**470**	**470**
Production (for processing)	**3 273**	**3 562**	**4 139**	**3 601**	**3 817**	**3 247**	**5 345**	**3 500**	**3 639**	**3 785**	**3 612**
Consumption (processing)	**3 842**	**4 219**	**3 853**	**3 988**	**4 010**	**4 305**	**5 021**	**3 600**	**3 903**	**3 936**	**3 649**
per capita (kg)	7.6	8.3	7.6	7.9	7.9	8.4	9.8	7.0	8.1	7.7	7.1
Exports (processed)	**380**	**415**	**1 154**	**595**	**709**	**503**	**1 337**	**950**	**751**	**809**	**872**
Imports (processed)	**949**	**1 072**	**868**	**982**	**901**	**1 561**	**1 013**	**1 050**	**1 015**	**960**	**909**

Note: the apples marketing year is August/July.

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

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production (total)	3 791	3 736	4 260	4 184	3 986	4 362	4 000	4 147	4 107	4 082	4 038
Area (1000 ha) (fresh)	214	209	208	201	196	192	184	177	174	158	140
Yield (t/ha) (fresh)	14	15	17	17	17	19	18	19	19	21	24
Production (fresh)	2 960	3 086	3 439	3 473	3 312	3 622	3 283	3 418	3 374	3 344	3 295
Apparent consumption (fresh)	2 626	2 810	3 108	3 204	3 117	3 398	3 163	3 288	3 233	3 191	3 132
per capita (kg)	5.2	5.6	6.1	6.3	6.1	6.7	6.2	6.4	6.3	6.2	6.1
Imports (fresh)	32	32	26	28	31	27	35	34	34	35	37
Exports (fresh)	366	308	357	297	226	251	155	165	175	188	200
Area (million ha) (for processing)	23	24	23	28	29	29	30	31	31	32	33
Yield (t/ha) (for processing)	36	28	36	25	23	25	24	24	24	23	23
Production (for processing)	831	650	821	711	675	740	716	728	733	738	743
Apparent consumption (processed)	724	558	711	588	549	628	604	597	599	594	588
per capita (kg)	1.4	1.1	1.4	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.1
Imports (processed)	22	18	19	16	17	18	12	11	11	10	8
Exports (processedt)	129	111	130	138	142	130	124	143	145	153	163

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

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Area (million ha)	293	293	287	286	279	272	272	269	267	261	261
Yield (t/ha)	20	22	22	21	23	23	24	23	23	23	24
Production (total)	5 829	6 479	6 312	5 931	6 325	6 206	6 639	6 136	6 111	6 109	6 203
Production (fresh)	4 760	5 005	5 061	4 645	4 834	4 952	5 276	4 886	4 871	4 919	5 063
Apparent consumption (fresh)	5 287	5 574	5 551	5 234	5 466	5 703	6 041	5 646	5 636	5 709	5 878
per capita (kg)	10.5	11.0	10.9	10.3	10.7	11.1	11.8	11.0	10.9	11.1	11.4
Imports (fresh)	816	887	833	892	950	1 050	1 084	1 100	1 110	1 160	1 210
Exports (fresh)	288	318	343	303	318	299	318	340	345	370	395
Production (for processing)	1 069	1 474	1 251	1 286	1 491	1 254	1 363	1 250	1 240	1 190	1 140
Apparent consumption (processed)	4 978	6 726	7 547	5 846	6 103	4 841	4 986	4 860	4 830	4 680	4 530
per capita (kg)	9.9	13.3	14.9	11.5	11.9	9.5	9.7	9.5	9.4	9.1	8.8
Imports (processed)	4 297	5 643	6 650	4 947	4 968	3 983	4 018	4 030	4 015	3 940	3 865
Exports (processed)	388	392	354	387	356	396	396	420	425	450	475

Note: the oranges marketing year is October/September.

TABLE 9.40 EU tomatoes market balance (1 000 t fresh equivalent)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Production (total)	14 919	14 378	16 654	18 422	17 848	17 983	16 223	16 744	17 517	17 677	17 839
Production (fresh)	6 483	6 873	6 884	7 271	7 108	6 807	6 726	6 855	6 923	6 923	6 923
Apparent consumption (fresh)	6 663	6 950	7 071	7 550	7 474	7 246	7 237	7 365	7 435	7 403	7 363
per capita (kg)	13.2	13.7	14.0	14.9	14.7	14.2	14.2	14.4	14.5	14.4	14.3
Imports (fresh)	445	441	488	481	525	570	628	629	630	635	640
Exports (fresh)	265	364	301	202	159	131	117	118	118	155	200
Production (for processing)	8 436	7 505	9 770	11 151	10 740	11 177	9 497	9 890	10 594	10 754	10 916
Apparent consumption (processed)	8 860	7 199	9 807	11 295	11 071	10 863	8 997	8 750	10 178	10 396	10 616
per capita (kg)	17.5	14.2	19.4	22.3	21.8	21.3	17.6	17.1	19.9	20.2	20.7
Imports (processed)	2 621	2 171	2 280	2 537	2 966	2 245	2 178	2 413	2 430	2 515	2 600
Exports (processed)	2 198	2 477	2 243	2 393	2 636	2 559	2 678	3 553	2 845	2 873	2 900

TABLE 9.41 EU wine market balance (million hectolitres)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2025	2030
Area (million ha)	3	3	3	3	3	3	3	3	3	3	3
Yield (t/ha)	47	53	48	53	53	42	57	49	51	52	53
Vinified production	151	169	156	169	171	133	183	156	161	158	155
Domestic use	148	148	151	158	155	141	153	150	152	148	144
of which human consumption	131	128	131	132	132	126	129	130	129	128	126
of which other uses	17	20	20	26	23	15	24	20	23	20	18
per capita consumption (l)	25.9	25.3	25.9	26.0	25.9	24.7	25.2	25.3	25.3	24.9	24.5
Imports	15	14	14	14	14	14	14	14	14	14	15
Exports	21	21	22	22	24	24	23	24	23	25	26
Total Ending Stocks	153	167	163	167	172	155	176	172	172	172	172

Note: the wine marketing year is August/July.

SCENARIO DATA: 100% GM-FREE MILK

TABLE 9.42 Changes to EU trade flows, 2030, scenario compared to baseline

	(1)		(1) + (2)		(1) + (2) + (3)	
	Absolute change	Percentage change (%)	Absolute change	Percentage change (%)	Absolute change	Percentage change (%)
Milk and beef markets						
Milk production	-729	-0.4	-1 002	-0.6	-886	-0.5
Beef production	-78	-1.0	-112	-1.5	-97	-1.3
Milk price	2	0.5	3	0.9	2	0.7
Beef price	104	2.8	178	4.7	142	3.8
Ruminant feed costs		2.3		3.9		3.1
Feed consumption						
Soya bean meal	-4 105	-12.8	-4 222	-13.2	-4 223	-13.2
Meal from other oilseeds	2 258	8.9	2 332	9.2	2 287	9.0
Cereals	708	0.4	31	0.02	-5 863	-3.3
Land use						
Pasture and fodder	-66	-0.1	2 186	2.8	2 203	2.8
Soya beans	651	56.2	586	50.6	590	51.0
Other oilseeds	-5	-0.1	-288	-2.6	-261	-2.4
Cereals	-463	-0.8	-1 963	-3.5	-2 050	-3.7
Total agricultural land use	64	0.04	227	0.1	210	0.1
Producer prices						
Soya beans	196	46.0	232	54.5	226	53.3
Rapeseed	18	4.0	40	8.9	36	8.1
Maize	0.2	0.1	4	2.0	0.5	0.3
Other coarse grains	2	1.3	12	7.2	3	2.1
Wheat	1	0.7	9	4.6	6	3.4

Note: Absolute change for production is in 1 000 t, for prices in EUR/t, for feed consumption in 1 000 t and for land use in 1 000 ha. (1) is the exogenous decrease in EU soya imports. (2) is the exogenous increase in pasture and fodder area and (3) is the exogenous change in coarse grains feed consumption.

TABLE 9.43 Changes to EU trade flows, 2030, scenario compared to baseline (1 000 t)

	(1)			(1) + (2)			(1) + (2) + (3)		
	Imports	Exports	Net imports	Imports	Exports	Net imports	Imports	Exports	Net imports
Soya beans	-4 647	0	-4 647	-4 647	0	-4 647	-4 647	0	-4 647
Other oilseeds	274	-51	324	542	-217	759	518	-210	728
Soya bean meal	-3 671	-657	-3 014	-3 671	-670	-3 001	-3 671	-668	-3 003
Other protein meal	1 760	-289	2 048	1 997	-312	2 309	1 939	-307	2 247
Cereals	873	-2 154	3 027	2 968	-7 010	9 978	934	-4 147	5 081

Note: (1) is the exogenous decrease in EU soya imports. (2) is the exogenous increase in pasture and fodder area and (3) is the exogenous change in coarse grains feed consumption.

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Please cite this publication as: EC (2019), EU agricultural outlook for markets and income, 2019-2030. European Commission, DG Agriculture and Rural Development, Brussels.

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