European Commission

EU AGRICULTURAL OUTLOOK

FOR THE EU AGRICULTURAL MARKETS AND INCOME 2017-2030

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Agriculture and Rural Development

Note to the reader

This report presents the medium-term outlook for the major EU agricultural commodity markets and agricultural income to 2030, based on a set of coherent macroeconomic assumptions deemed most plausible at the time of the analysis. The projections assume a continuation of current agricultural and trade policies.

Our analysis is based on information available at the end of September 2017 for agricultural production and on an agro-economic model used by the European Commission[1]. It is accompanied by an uncertainty analysis quantifying potential variations of the results, stemming in particular from fluctuations in the macroeconomic environment and yields of the main crops. Specific scenarios are also developed for climate extreme events in the EU, Indian skimmed milk powder exports and an EU avian influenza outbreak.

As part of the validation process, an external review of the baseline and the uncertainty scenarios was conducted at an outlook workshop in Brussels on 19-20 October 2017. Valuable input was collected from high-level policymakers, European and international modelling and market experts, private companies and other stakeholders, as well as international organisations such as the OECD, the FAO and the World Bank.

This European Commission publication is a joint effort between the Directorate-General for Agriculture and Rural Development and the Joint Research Centre (JRC). Responsibility for the content rests with the Directorate-General for Agriculture and Rural Development. While every effort is made to provide a robust agricultural market and income outlook, strong uncertainties remain — hence the importance given to the uncertainty analysis. This publication does not necessarily reflect the official opinion of the European Commission.

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

[1] EU version of the OECD-FAO Aglink-Cosimo model. http://publications.jrc.ec.europa.eu/repository/bitstream/JRC92618/jrc92618%20online.pdf

EXECUTIVE SUMMARY

This report presents the outlook for the major EU agricultural commodity markets and for agricultural income until 2030. The outlook is based on a set of assumptions that are deemed plausible at this point in time.

Although EU biofuel policy changes after 2020 are still unclear, the biofuels market will remain policy-driven. Despite this, the main factor affecting the market after 2020 will be the reduction in overall petrol and diesel use. Reduced demand for biodiesel from vegetable oils will exert downward pressure on rapeseed production in the EU.

EU cereal prices are expected to progressively gain momentum, climbing to above EUR 170/t on average. This comes against the backdrop of restricted land availability, recovering energy prices and sustained demand. In this context, the possibility of price spikes cannot be ruled out, particularly in response to climate events.

Now that sugar quotas have come to an end, the EU is expected to become a net exporter of sugar.

The livestock sector should benefit from steadily growing world demand and affordable feed prices. This could open the way for the EU dairy sector to expand in response to increasing global and domestic demand, despite the difficulties linked to high price volatility.

In the last few years EU meat consumption per capita has recovered from the economic crisis. Looking forward, meat consumption is expected to stabilise before falling slightly. Poultry consumption and exports should continue to increase, while the marginal increase in pigmeat production will be exclusively driven by export demand. By contrast, beef production and consumption are expected to fall.

Finally, specialised crops such as fruit and vegetables, olive oil and wine are expected to continue their recent trends for stagnating or slightly decreasing consumption and growing exports.

Since the negotiations on the UK's exit from the EU are ongoing, the projections are made on basis of a European Union of 28 Member States, i.e. including the UK, for the full duration of the outlook period.

Arable crops

Utilised agricultural area has continued to decline in recent years, albeit at a slower pace. This trend is expected to continue, bringing utilised agricultural area to 172 million ha by 2030. The same trend applies to arable land over the outlook period. The share of permanent grassland in total utilised agricultural area will remain stable, in line with current CAP requirements.

The **biofuels** market continues to be driven by changes in policy. Developments after 2020 are hard to anticipate as they will take place in a new, as yet undecided policy environment. Under current assumptions, post-2020, the biggest driver will be the reduction in overall petrol and diesel use. We expect reduced fuel use to result in marked reductions in biodiesel and ethanol consumption by 2030. Given the existing production capacity, the production of biofuels should decrease less than consumption and be favoured over imports. The current lack of long-term investments continues to hamper the development of advanced biofuels.

Global **sugar** consumption is continuing to grow. However, changing consumer preferences and increasing health concerns are expected to reduce EU total sugar consumption by 5 % by 2030 in favour of isoglucose and other sweeteners. World sugar production is on the rise again after 2 years of global deficit, steering the sugar market back into surplus. Increased sugar production will maintain pressure in 2018 on the already low world white sugar price before it stabilises. With the end of sugar quotas, EU production is projected to increase by 12 % by 2030, making the EU a net exporter. The increase will be concentrated in the most cost-effective regions, driven by increases in sugar beet yield.

EU **cereal** production is expected to grow further to 341 million t by 2030, driven by feed demand, good export prospects (in particular for wheat) and increasing use of cereals in industry. However, stronger growth will be held back by the limited potential for expanding the areas under cultivation and by slower yield growth in the EU than in other regions of the world. Cereals stocks are expected to stabilise below historical levels, in particular for wheat and barley. Prices are expected to recover from their current lows to above EUR 170/t on average and at close to EUR 194/t for common wheat at the end of the period. We could see price spikes during the outlook period caused by climate events, particularly if these occur in successive years.

For **oilseeds**, the expected lower demand for vegetable oils from the biofuel market will create pressure on the rapeseed area. Increasing demand for protein meals will mainly be met by increasing soya bean imports and by domestic soya bean production. **Protein crops** recently experienced a strong revival, with record production in 2017/2018. This was driven by a favourable policy environment and good demand. However, area growth may slow down over the outlook period, given pressures on feed prices and input use. This, together with some yield improvements, will lead to a mild increase in production in the EU.

Feed use is expected to rise further over the outlook period in response to more poultry and dairy production and more intensive beef production. Feed prices, remaining below the high levels of recent years, will contribute to the animal production increase.

Milk and dairy products

Despite the difficulties faced in recent years, growing global and EU demand are expected to support world dairy markets in the long term. However, world market price variability will continue and short-term market unbalances cannot be ruled out.

Global trade in **whole milk powder, skimmed milk powder, cheese and butter** is expected to grow on average by 1 million t of milk equivalent per year. This is significantly below the average growth we have seen for almost all products in the last 10 years. The one exception is butter, for which trade will expand faster than in the last decade. China will remain the world's leading importer of dairy products. Shipments to China are expected to increase considerably, although less than in the past.

We expect the EU to supply 30 % of the increase in world import demand for whole milk powder, skimmed milk powder, cheese and butter. Including whey powder and fresh dairy products, EU exports are expected to grow on average by around 500 000 t of milk equivalent per year, mainly in cheese and skimmed milk powder.

In parallel, close to 900 000 t of milk per year would be needed to satisfy the growth in EU domestic use. This will be mainly for cheese and for the processing of other dairy products such as dairy desserts, fat-filled milk powders, infant milk formula, protein and whey concentrates. Alongside other commodities such as meat and tomatoes, more dairy products will be used as ingredients to meet the rising demand for processed foods such as pizza, prepared meals, pastry and cakes. By contrast, direct consumption of liquid milk is expected to continue decreasing.

Sustained EU and global demand is expected to drive an increase in EU **milk** production below 1 % per year (or 1.4 million t). This is an average given that weather and market conditions can affect milk yield strongly. This growth can be seen as moderate when we consider that the EU increased deliveries by 10 million t in 2 years between 2014 and 2016. However, since the EU will be competing with New Zealand and the US, this level of growth matches the potential increase in demand.

The room for the EU to increase production is limited by the need for sustainable use of natural resources. However, the same is true of its main competitors. At the same time, we will gradually see changes in production systems and a significant rise in organic production in response to consumers' expectations.

Meat

World population and income growth are expected to drive higher global meat demand. This will also contribute to higher EU meat exports, as EU meat consumption is stabilising at best. Still, 90 % of total EU meat production will go to EU consumers.

World meat consumption is expected to increase by 14 % between 2017 and 2030, mainly satisfied by increasing domestic production. This is almost equivalent to a year's total meat production in the EU.

EU per capita consumption is expected to continue increasing slightly in the first years of the outlook period. However, as we approach 2030, per capita consumption will drop back towards its current level, while poultry will take some market share from other meats. Consumption of fresh meat is expected to decrease, while overall consumption will be supported by further use of meat products as ingredients in processed products.

Beef production recovered in 2014-2016 after the restructuring of the dairy sector. Production is expected to stabilise in 2017, before returning to a downward trend. This will be mainly dictated by the declining size of the cow herd and lower domestic demand.

After several years of continuous decline, **sheep and goat** production and consumption are expected to increase marginally, thanks to improved profitability and the implementation of voluntary coupled support.

Thanks to booming exports to China, **pigmeat** prices recovered in 2016 and 2017. Pigmeat production took advantage of this short-term opportunity but is expected to expand only marginally by 2030 despite favourable feed prices. This is because of stabilising EU consumption and competition on the world market.

EU **poultry** meat production should expand by around 5 % over the outlook period, driven by promising growth in world import demand and domestic consumption. EU exports are expected to increase by 18 % by 2030 thanks to sales of different cuts of poultry meat and offal, and a wide portfolio of destinations. However, prices will be under pressure due to increased competition in the world market and will stay below the levels seen in 2011-2015.

Specialised crops

In the **olive oil** sector, further structural improvements during the outlook period are expected, resulting in improved yields and higher production. The highest growth is expected in Spain and Portugal. This additional production will serve both growing world demand and increasing EU consumption, apart from in the main producing countries, i.e. Spain, Italy, Greece and Portugal, where consumption will decrease further. The EU will strengthen its position as the biggest world producer and exporter of olive oil.

Further modernisation of the **apple** sector is expected to achieve higher yields, thanks to old orchards being partially replaced with new planting, new production methods, improved disease resistance and pest management. The increasing yields combined with a reduction in production area are expected to lead to a stabilisation of apple production. Consumption of fresh apples is expected to stabilise, while that of processed apples is likely to fall slightly. However, higher exports will make up for this decline.

EU total **wine** consumption is expected to stabilise after a long period of decline. However, total domestic use will decrease due to a reduction in other winemaking processes and products such as distillation, vinegar and vermouth. The EU is expected to maintain steady growth in wine exports, thanks to strong demand for wines with a geographical indication and sparkling wines. Overall, these developments will lead to a small decrease in EU production, while rising yields will not fully offset a decrease in the acreage of vineyards.

EU production of fresh **tomatoes** is expected to remain relatively stable despite increasing yields driven by longer production seasons. However, the value of production is likely to continue to rise as greater product segmentation adds value. Consumption of fresh tomatoes is expected to go down slightly. By contrast, consumption of processed tomatoes is expected to marginally grow, driven by higher demand as an ingredient and for food products that evoke a Mediterranean lifestyle.

Agricultural income

Total EU agricultural income is expected to decrease considerably in real terms over the outlook period. By contrast, agricultural income per worker is expected to increase slightly due to continued structural change and the numbers of people leaving agriculture. The expected increase in the value of production will be partly offset by the expected increase in production costs, stemming mainly from higher energy prices and stronger depreciation.

Environmental aspects

This report also discusses the market outlook's expected impact on certain environmental indicators such as those for emissions of greenhouse gases and air pollutants and the nitrogen surplus. Changes in the livestock sector will be a major factor for emissions. This is because most emissions of greenhouse gases in agriculture stem directly or indirectly from animal production. Emissions are expected to decrease as a result of a projected decrease in total EU livestock numbers by 2030. Compared with 2008, greenhouse gases are expected to fall by 1.5 % and ammonia emissions by 10 %.

In 2030, the projected average nitrogen surplus in the EU-28 will be 2.6 % lower than in 2008. The largest fall in the surplus is projected in EU regions where a reduction in herd size is expected. However, part of the projected fall is due to a general increase in nitrogen-use efficiency in the crop sector. Environmental pressures seem to be accumulating in some EU regions with a high density of livestock, with density still increasing in some places. These may face some challenges if they continue their specialisation trends.

Main assumptions

The outlook presented in this report assumes:

- a continuation of current agricultural and trade policies;
- normal agronomic and climatic conditions;
- no market disruption.

These assumptions imply relatively smooth market developments. This is because they correspond to the average trend agricultural markets are expected to follow. In reality markets tend to be much more volatile.

The 2030 outlook reflects current agricultural and trade policies, including future changes already agreed upon. The outlook takes account of the 2013 reform of the CAP and the options on how to implement it, but the level of aggregation of the model does not allow for all details to be modelled. The impacts of the 'Agricultural Omnibus package' on the CAP have not been explicitly taken into consideration in the models. Instead this was done through expert judgement.

Only free-trade agreements that are already in place or are about to enter into force are taken into account. This means that the agreements with Canada, with the Southern African Development Community and the update of the agreement with Ukraine are included, but not other trade agreements that have been negotiated but not signed or ratified, such as those with Japan and Vietnam. 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 2018.

Macroeconomic assumptions include a continued low oil price level in the short term but a moderate increase to USD 90 per barrel by 2030. This is a lower level than assumed in previous outlooks. The euro is likely to remain competitive in the short term. In the medium term, we assume that the exchange rate will appreciate moderately, reaching USD 1.23/EUR by 2030. Economic growth in the EU in the short term is expected to be slightly stronger than previously forecasted, just above 2 %. In the medium term (i.e. 2020-2030), we assume an annual growth rate of between 1.5-1.8 %.

The economic outlook takes into account changes in macroeconomic conditions following the UK vote of June 2016, in terms of the economic growth rate and the exchange rate.

Uncertainty analysis and caveats

This outlook for EU agricultural markets and income is based on a specific set of assumptions about the future economic, market and policy environment. The baseline assumes normal weather conditions, steady yield trends and no market disruptions (e.g. from animal or plant disease outbreaks, food safety issues, etc.).

An uncertainty analysis accompanying the baseline quantifies some of the upside and downside risks and provides background on possible variation in the results. In particular, it takes account of the variability in macroeconomic environment and yield for the main crops and certain selected scenarios. The scenarios covered in this report include the effect of climate extremes on the EU cereals market, an avian flu pandemic in the EU and exports of skimmed milk powder from India.

ABBREVIATIONS

ASF	African swine fever
AWU	annual working unit
BRL	Brazilian real
CAP	EU common agricultural policy
CETA	Comprehensive Economic and Trade Agreement
CGF	corn gluten feed
CH_4	methane
CO_2	carbon dioxide
CPI	Consumer Price Index
CSI	consumer stress index
DDG	distillers dried grains
DME	dimethyl ether
EBA	'everything but arms'
EC	European Commission
EEA	European Environmental Agency
EFA	ecological focus areas
EIA	US Energy Information Agency
EU	European Union
EU-N13	EU Member States which 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
FAME	fatty acid methyl ester
FAO	Food and Agriculture Organization of the United Nations
FCR	feed conversion ratio
FDP	fresh dairy products
FFMP	fat-filled milk powders
FQD	Fuel Quality Directive
FSS	Farm Structure Survey
FTA	free-trade agreement
GDP	gross domestic product
GHG	greenhouse gas
GI	geographical indication
GM	genetically modified
HFCS	high-fructose corn syrup
HPF	high-protein feed
HVO	hydrotreated vegetable oil
IEA	International Energy Agency
IGC	International Grain Council
ILUC	indirect land-use change
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
LPF	low-protein feed
LULUCF	land use, land-use change and forestry
MPF	medium-protein feed
N	nitrogen
N_2O	nitrous oxide
NEC	National Emission Ceilings
NH_3	ammonia
OECD	Organisation for Economic Cooperation and Development
OPEC	Organization of Petroleum Exporting Countries
PDO	protected designation of origin
PEDv	porcine epidemic diarrhoea virus
PGI	protected geographical indication
PPS	purchasing power standard
PSA	private storage aid
RED	Renewable Energy Directive
R.O.W.	Rest of the world
SMP	skimmed milk powder
SPS	sanitary and phytosanitary
SSA	sub-Saharan Africa
TRQ	tariff-rate quota
UAA	utilised agricultural area
UCO	used cooking oil
UHT	ultra-high temperature processing
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
USA/US	United States of America
USD	US dollar
USDA	US Department of Agriculture
VCS	voluntary coupled support
WMP	whole milk powder
WTO	World Trade Organization

1st-gen.	first-generation
bbl	barrel
hl	hectolitres
ha	hectare
kg	kilograms
t	tonne
t.o.e.	t oil equivalent
w.s.e.	white sugar equivalent
c.w.e.	carcass weight equivalent
r.w.e.	retail weight equivalent
CV	coefficient of variation

1. INTRODUCTION — BASELINE SETTING

This report presents the medium-term outlook for the major EU agricultural commodity markets and agricultural income to 2030, based on a set of coherent macroeconomic assumptions. The baseline assumes normal agronomic and climatic conditions, steady demand and yield trends, and no particular market disruption (e.g. from animal disease outbreaks or food safety issues). In addition, the medium-term projections reflect current agricultural and trade policies, including future changes that have already been agreed upon.

These assumptions imply relatively smooth market developments. In reality, 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 were policies to remain unchanged in a given macroeconomic environment that is plausible at the time of analysis but not certain.

The economic outlook takes into account changes in macroeconomic conditions in terms of economic growth rate and exchange rate following the UK vote of June 2016. However, since the outcome of the negotiations about the conditions under which the UK will leave the EU are not known yet, the projections are made on basis of a European Union of 28 Member States, i.e. including the UK, throughout the outlook period.

Macroeconomic developments are difficult to predict. Compared to the previous year's outlook, this year's edition covers even a longer time period, from 2017 to 2030, and adaptations have been made accordingly: compared to last year's outlook, a lower 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.

The projections are based on the OECD and FAO Agricultural Outlook 2017-2026[2], updated with the most recent global macroeconomic and market data. Macroeconomic projections stem from the European Commission macroeconomic forecasts[3] and those published monthly by IHS Markit[4]. Statistics and market information used in this report are those available at the end of September 2017[5].

As macroeconomic forecasts and yield expectations are by nature surrounded by uncertainty, a systemic uncertainty analysis around the baseline is performed. Such analysis makes it possible to illustrate possible developments caused by the uncertain conditions in which agricultural markets operate. Throughout this report possible price ranges around the expected baseline are regularly presented.

A more systematic representation of the variability in agricultural markets stemming from these uncertainties is summarised at the end of the report. In addition, to address the implications of selected uncertainties, specific scenarios are analysed and presented in dedicated text boxes throughout the report. These include how the EU cereals market can be affected by climate extremes, a scenario involving a bird flu (avian influenza) pandemic in the EU and a scenario involving skimmed milk powder (SMP) exports from India.

For the third consecutive year, this report provides an outlook at Member State-level for a specific sector. This year the focus is on the beef sector.

Environmental and climate change constraints are increasingly driving the evolution of agricultural markets. Agricultural market developments will be further affected by the entry into force of the Paris agreement on climate change (COP21). In 2015, the EU also adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals. A specific chapter has been added to illustrate the environmental impact of this market outlook in terms of greenhouse gas (GHG) and ammonia emissions, nitrates balance and soil erosion.

1.1. Domestic policy assumptions

Our policy assumptions take account of the 2013 common agricultural policy (CAP) reform, which entered into force fully in 2015. The following aspects of the reform have a particular impact on market and income developments:

1) **expiry of milk quotas** in April 2015;

2) **expiry of the quota system for sugar and isoglucose** on 30 September 2017;

3) **intervention mechanisms:** up to 3 million t of common wheat, 50 000 t of butter and 109 000 t of SMP can be bought in each year at fixed intervention prices. Beyond these limits, intervention is open by tender. In 2016, these ceilings were increased for SMP up to 350 000 t as part of safety-net measures adopted to support the dairy sector. The Commission may also decide to open intervention by tender for durum wheat, barley, maize, paddy rice, and beef and veal;

4) **private storage:** the Commission can activate the private storage aided schemes (PSAs) for certain products (white sugar, olive oil, linseed, beef, pigmeat, sheep and goat meat, butter, SMP and PDO/PGI cheeses) if the market situation so requires. Since no specific trigger is laid down, these measures are not explicitly modelled. However, they were implemented

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[2] OECD/FAO (2017): 'OECD-FAO Agricultural Outlook 2017-2026.' OECD Publishing, Paris. http://www.agri-outlook.org/

[3] European Economic Forecast, Autumn 2017, November 2017.

http://ec.europa.eu/economy_finance/eu/forecasts/2016_autumn_forecast_en.htm

[4] https://ihsmarkit.com/

[5] Short-term outlook for EU agricultural markets in 2017 and 2018 (Autumn 2017 edition): http://ec.europa.eu/agriculture/markets-and-prices/short-term-outlook/index_en.htm.

in 2015 and 2016 for pigmeat, SMP, butter and, exceptionally, cheese;

5) **decoupled basic payment scheme**[6]**:** while decoupled payments do not affect production decisions, further convergence of direct payments among farmers combined with the new distribution of entitlements in the concerned countries may sometimes lead to major changes in farmers' subsidies and income. In addition, the redistribution of direct payments between Member States leads to a gradual increase of direct payments in the EU-N13 in parallel with a reduction in the EU-15;

6) **coupled payments:** Member States can couple up to 8 % of their direct payments allocation (up to 13 % in particular situations, or more if approved by the Commission). In 2014, 27 Member States decided to grant voluntary coupled support (VCS) between 2015 and 2020 for a maximum amount of EUR 4.2 billion per year. In the 2015 claim year, EUR 3.8 billion was spent on VCS. Coupled payments are granted per ha or per head, within maximum limits. They are added to commodity prices as a top-up to the revenue, which can influence production decisions.

Exceptional market measures can be deployed to address severe market disturbances. These are not explicitly modelled in the long run, as decisions are taken case by case. Nevertheless, the model does take into account the effects of the measures adopted in support of the dairy sector between 2014 and 2017, such as exceptional targeted aid to the livestock sectors and aid for the voluntary reduction of milk production.

The effects of **'greening'** are also taken into account to the extent possible. Over the past 2 years the Commission has published several reports evaluating greening[7]. Three main components for greening could have an impact on the outlook. Under the **crop diversification component**, the main crop of concerned farms should not represent more than 75 % of a farm's total arable land. The objective is to preserve soil quality. The **permanent grassland component** of greening should limit the reduction of areas with permanent grasslands. The third greening rule requires that 5 % of a farmer's arable land should be an **ecological focus area** (EFA). Farms under 15 ha and farms with high shares of permanent grassland are exempted. Overall, these environmental measures are expected to have little effect on aggregate production levels.

Given the geographical aggregation of the model, it is not always possible to capture the impact of redistribution of direct payments between and within Member States or the targeted allocation of all coupled payments. Similarly, the voluntary capping of payments over EUR 150 000 and specific schemes for small farmers and young farmers are not accounted for. Nor do we take into account the effect of the redistributive payment, a top-up to the basic payment for the first ha of the holding, as implemented by eight Member States. Nevertheless, several elements are included in the expert judgement used to produce the projections.

Environmental policies are not explicitly taken into account in this model. However, the effects of the Nitrates Directive and other environmental rules on water or air quality, as well as the need to reduce GHG emissions, are factored into the analysis.

In 2016 the Commission adopted a proposal affecting several policy areas (the 'Omnibus package'). The proposal had not yet been adopted by the legislators when this medium-term outlook was finalised, and its possible impacts have therefore not been taken into consideration.

1.2. Trade policy assumptions

As regards international trade negotiations and agreements, it is assumed that all commitments made under the Uruguay Round Agreement on Agriculture, in particular on market access and subsidised exports, are fulfilled. No assumptions are made as to the outcome of the Doha Development Round. The implications of the Nairobi Package of December 2015, in particular the Ministerial Decision on Export Competition Declaration, are taken into account, in particular the definitive phasing-out of all export subsidies.

The Comprehensive Economic and Trade Agreement (CETA) with Canada entered into force provisionally on 21 September 2017 and the impact of the agreement is reflected in this outlook. Additionally the updated trade related concessions for Ukraine are also incorporated.

However, bilateral and regional trade deals still to be signed or ratified, e.g. the FTAs with Vietnam and Japan, are not taken into account.

The food embargo introduced by Russia on August 2014 against the EU countries, the US, Canada, Australia and Norway (further expanded in 2015 and 2016 to cover Albania, Montenegro, Iceland, Lichtenstein and Ukraine) was extended in June 2017 until the end of 2018 (despite some exceptions for goods intended for baby food).

1.3. Macroeconomic environment

Macroeconomic assumptions are based on a combination of the European Commission economic outlook for the period until 2018 and for the longer term, based mainly on IHS Markit macroeconomic forecasts, combined with other sources like the International Monetary Fund, the World Bank or the US Energy Information Agency and expert judgement

[6] Historical budget expenditure and future budget allocation are used to calculate average per ha decoupled payments for the EU-15 and the EU-N13 (after applying transfers between the direct payment and the rural development envelopes as notified by the Member States).

[7] Most recent: Alliance Environnement and the Thünen Institute (2017). Evaluation study of the payment for agricultural practices beneficial for climate and the environment. https://ec.europa.eu/agriculture/evaluation/market-and-income-reports/greening-of-direct-payments_en.

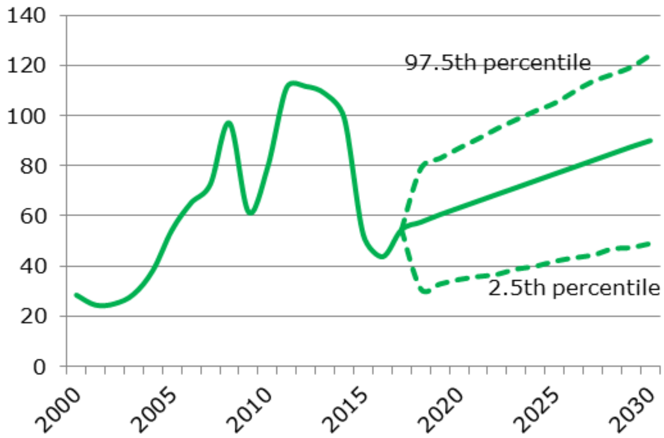
validated at the October 2017 Outlook Workshop in Brussels[8]. Assumptions cover energy prices (through the Brent crude oil price), population trends and several macroeconomic indicators such as economic growth, inflation and exchange rates for around 55 countries and groups of countries in the world.

After the very low prices for **crude oil,** down to below USD 30/bbl in January 2016, prices picked up during 2016-2017, reaching reach well above USD 60/bbl in mid-November 2017. The overall 2017 average oil price is assumed to reach USD 55/bbl, around 25 % higher than in 2016 (for more details see Table 9.1 in Chapter 9).

The rise in oil prices since the record low at the beginning of 2016 can be explained by strong demand driven by stronger world economic growth, particularly in 2017. The high supply levels in 2015 and 2016 were reduced in 2017, mainly due to production cuts by both OPEC[9] and non-OPEC members. The cuts represent around 1.6 million barrels per day of supply. Inventories were high, particularly in 2016, but were released onto the market in the first half of 2017, holding back a price recovery.

The price increase in the second half of 2017 has been substantial, up to levels above USD 60/bbl, despite a higher supply due to a return into the market of producers such as Libya and Nigeria, together with a recovery in shale oil production in the US. The Saudi Arabian government has renewed its statement on a continuation of the liquidation of stocks during 2017-2018. The price has therefore been supported by expectations on future lower stock levels. Major forecasting institutes believe that the current agreement between OPEC members to hold back production is likely to be prolonged to the end of 2018[10].

Graph 1.1 Oil price assumption (USD/bbl) and uncertainty range



The impact of hurricane Harvey on the Brent crude oil price has been limited. The spread between Brent oil and West Texas Intermediate (WTI) went up to historically high levels due to production interruptions and therefore lower demand from US refineries.

Strong demand is expected to continue for the forthcoming years due to a recovery of global economic growth. The crude oil price is therefore assumed to slowly continue on an upward trend, reaching USD 60/bbl in 2019[11]. Upside price risks stem from stronger production cuts by OPEC, lower production in the US shale oil sector and higher economic growth, with a stronger demand for oil as an outcome.

In the longer term, the assumption is that the oil price will rise to USD 90/bbl by 2030[12]. There is consensus among oil price projections[13] on a gradual price increase up to 2030 although projections for 2030 from different international organisations range from about USD 70/bbl to USD 110/bbl, in nominal terms. This increase in oil price reflects a continuing demand growth, particularly from emerging economies, and higher extraction costs for the non-conventional oil that will be needed to meet increasing world demand. However, the projections from most forecasters have been revised downwards since 2016. Reasons for this include increased electrification in the transport sector, and technology gains resulting in higher energy efficiency and lower extraction costs for additional quantities.

With 95 % certainty this outlook considers that the oil price should be between USD 49/bbl and USD 124/bbl in 2030.

Oil price affects the agricultural outlook in the sense that it has implications on: (i) production costs (directly through the cost of energy, or indirectly through the cost of fertilisers and other inputs); and (ii) the competitiveness of biofuels and demand for them.

Continued world **population** growth drives demand and supports prices for agricultural commodities. However, population growth is slowing down in Europe, North America, Russia and China, being instead concentrated in Africa and Asia. The annual population increase, currently just above 80 million people per year, should decelerate by 2030 down to 70 million people per year. World population is expected to grow by 13 % in the period 2017-2030. In Europe the population is expected to remain rather stable (+0.7 %) during the same time period, but the situation differs widely between Member States, with the EU-15 expected to grow by 2 % while the EU-N13 is expected to shrink by 4.5 %

EU **economic growth** in 2017 and 2018 is expected to be slightly stronger than in the forecast made at the

[8] http://publications.jrc.ec.europa.eu/repository/handle/JRC109451

[9] The Organization of Petroleum Exporting Countries (OPEC) is a permanent intergovernmental organisation of 14 oil-exporting developing nations that coordinates and unifies the petroleum policies of its member countries. http://www.opec.org

[10] www.ihsmarkit.com

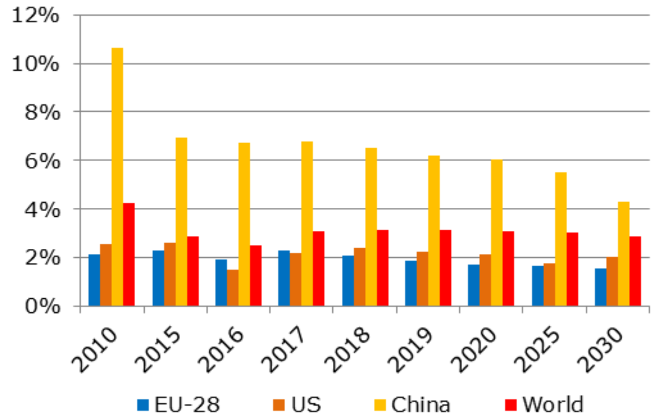
[11] EU agricultural medium-term outlook 2017, baseline.

[12] EU agricultural medium-term outlook 2017, baseline.

[13] US Energy Information Agency (EIA) (2016). 'Annual Energy Outlook 2016' http://www.eia.gov/forecasts/aeo/

beginning of 2017. A number of factors have had a positive impact on the EU's economic growth path, such as resilient private consumption, improvements in labour markets, looser financing conditions and stronger global economic growth. Investments are expected to pick up from previous low levels. EU-28 economic growth is expected to stand at 2.3 % in 2017, 2.1 % in 2018 and 1.9 % in 2019.

Graph 1.2 Economic growth assumptions (%)



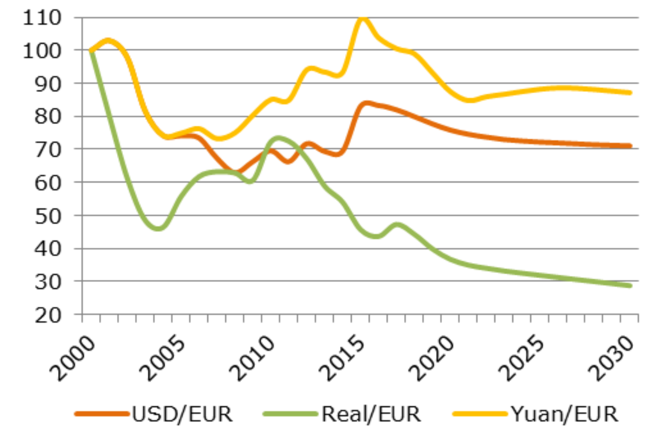
Source: European Commission and IHS Markit

World economic growth is assumed to be slightly higher than last year's assumption, reaching 3.1 % in 2017, 3.2 % in 2018 and 3.1 % in 2019. The macroeconomic situation in Brazil and Russia is expected to normalise from the previous recession and return to growth in 2017, supported by higher commodity prices. Major forecasting institutes see China as continuing to grow, although at lower levels than in the past. The US economy is showing strong momentum and is expected to remain strong during 2018 and beyond. Economic growth directly impacts the demand for agricultural commodities, both domestically and in the main export markets.

Potential growth in EU exports is also affected by **exchange rates,** which have a direct effect on competitiveness. In the short term (up to 2020), it is generally expected that the exchange rate between the euro and the US dollar will remain between 1.10 and 1.20, similar to last year's assumptions. The exchange rate with the currencies of the EU's main competitors, such as the Brazilian real and the New Zealand dollar, is likely to depreciate in the short term, hampering the development of EU exports.

In the medium term (2020-2030) the euro is generally[14] assumed to appreciate against the US dollar[15]. Since macroeconomic development in the EU is expected to remain stable, the euro is also expected to continue appreciating in the medium term against the Brazilian real, the rouble and the New Zealand dollar, while stabilising against the Chinese yuan.

Graph 1.3 Exchange rate assumptions (year 2000=100)



Source: IHS Markit

The macroeconomic conditions are particularly uncertain and there may be more downward risks than upward potentials. The European economic forecasts mention, in particular, factors which could potentially weigh on economic growth, such as: increased geopolitical tension and tighter global financial conditions (e.g. a faster or stronger tightening of US monetary policy). Further risks could be related to a higher global risk aversion, high corporate debt in China or more inward-looking policies in the US. The EU also faces risks over the outcome of the Brexit negotiations. A stronger than expected appreciation of the euro would constitute another downside risk. The report includes a systemic uncertainty analysis in Chapter 8.

[14] Based on forecasts presented or referred to by the World Bank, the IMF, the OECD, IHS Markit.

[15] In the baseline for the EU agricultural medium-term outlook 2017, the exchange rate is set at USD 1.23/EUR in 2030.

2. ARABLE CROPS

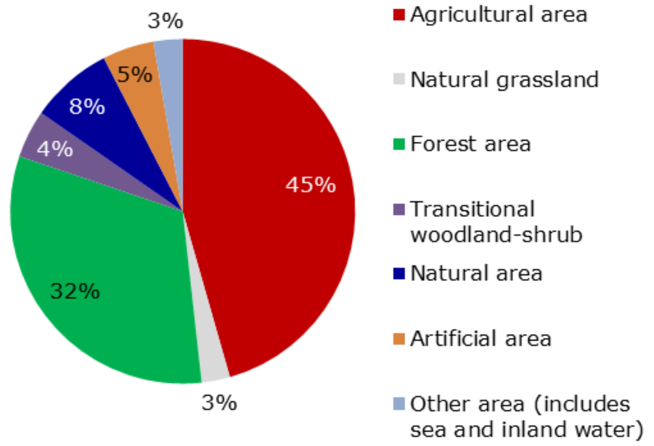
On the supply side, the arable crop area in the EU is expected to continue its decline, which (alongside a small growth in yield) limits further expansion in production. EU domestic demand for cereals and oilseeds remains mainly driven by feed use, although industrial uses will grow more rapidly. As in the previous outlook, this year's medium-term outlook continues to show solid world demand creating opportunities for increased EU cereal exports.

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 some processed products (sugar, vegetable oils, protein meals, biodiesel and ethanol). It looks first at land-use developments and continues with a closer look at biofuels, sugar, the various cereals, including rice, as well as oilseeds and the feed complex.

2.1. Land-use developments

Currently agricultural land covers about 45 % of EU territory.

Graph 2.1 Share of agriculture in total land cover



From 2011 to 2016, utilised agricultural area (UAA) decreased by 0.7 % in the EU-28. By contrast, forest area increased by 1 % in total over the period 2010-2015. Arable land slightly decreased, reaching a share of 62 % of the UAA. Permanent grassland accounts for one third of the UAA (slowly but steadily increasing in share) while permanent crops have a stable though slightly declining share, at around 5 % of the total UAA.

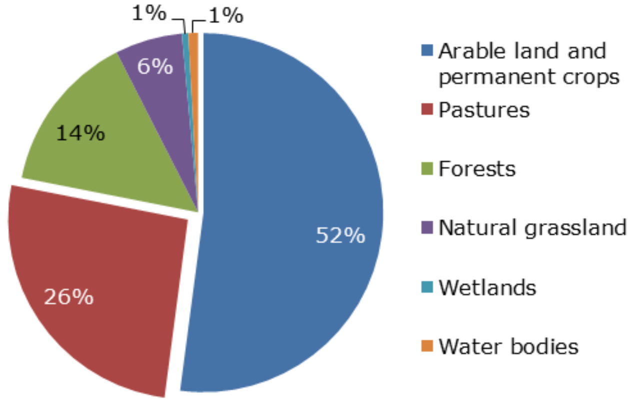
What about the UK?

The UK's total land use was relatively stable over the last ten years, recording a slight decrease of 2 %. However, the fall in arable land was much more significant (-7 %), compensated by a similar increase of permanent crops and a much stronger increase of fallow land. This increase in the permanent crops area in relative terms has been predominantly driven by the rise of wine production in the UK, which almost doubled since 1999, but is still at a very low level (1 700 ha in 2015).

Challenges ahead

Urbanisation and other artificial land development (as transport, infrastructures, and construction sites), but also afforestation are the main threats to agricultural land. According to the European Environmental Agency (EEA) (2016), 78 % of uptake by urbanisation and artificial land comes from existing agricultural land (arable land, permanent crops and pastures, and mixed agricultural areas).

Graph 2.2 Contribution of land categories to uptake by urbanisation and other artificial land development (2006-2012)



Source: EEA, 2016

On the other side of the spectrum, environmental matters will also play a role in land-use development. Environmental aspects will increase pressure on agricultural and natural land to be used for environmental benefits such as carbon storage. Production of biomass for other purposes (in the chemical industry or as an energy source) could also challenge edible agricultural production and is likely to play a significant role in land price. Land degradation (resulting from soil erosion, nutrient depletion and salinisation) will also add more pressure on existing agricultural land.

Public policies affecting land allocation

According to the EEA (2017), the overall land system is a delicate balance between market, socioeconomic and, ultimately, public policy forces. Indeed, policies can give a certain impulse, but often the effect on land allocation remains small. Furthermore, a recent study from the JRC based on quantitative analysis showed that the greening obligations (as one type of policy) are expected to have a minor effect of 1.5 % up or down on agricultural production in the medium term[16].

In 2015, the ecological focus areas (EFA) requirement (i.e. to have 5 % of EU arable land under EFA) applied

[16] Review of greening after one year. Commission staff working document. 2016.

to 68 % of EU arable land and up to 90 % in certain Member States. Several land covers are eligible under the EFA obligation: (i) planting areas with nitrogen-fixing crops, catch crops or green cover; (ii) landscape features; (iii) fallow land. In total, EFAs covered 9 % of arable land in the EU. Under the EFA coverage, nitrogen-fixing crops take up the lion's share, accounting for almost 40 % (after weighting factors[17]) of total EFA areas. Fallow land is the second preferred option across the EU (38 %), followed by catch crops (15 % of the total EFAs) [18].

It was decided in the Omnibus Regulation to ban the use of plant protection products on productive crops under EFA. This could affect the development of nitrogen-fixing crops such as protein crops or soya beans in the future. However, other factors will also play a supportive role (policy support through VCS, market demand for plant proteins grown in the EU, agronomic benefits of protein crops, etc.) and therefore a drop in nitrogen-fixing crop area is not expected. All in all, it is expected that the share of EFAs in the total land area will decrease slightly over the outlook period but still remain largely above the minimum requirement of 5 %.

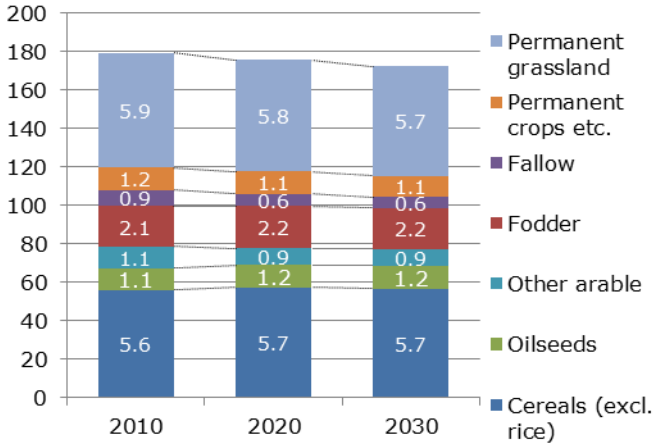
The greening rule on crop diversification is not expected to lead to major area changes at aggregated level. Individual farms may be impacted, but the anticipated overall net effect is not significant. According to the review of greening after one year, about 1 % of the total EU arable land would need to be reallocated, showing an overall good level of compliance for this practice. Nevertheless, reallocation would predominantly target farms that cultivate one crop, particularly wheat, maize or barley.

Further decrease of UAA by 2030, at a slower pace

Agricultural land outflow is expected to continue throughout the outlook period, although at a rate of -0.2 % UAA per year. By 2030, UAA is foreseen to reach a total of 172 million. This is a significant slowdown in the loss of UAA compared to the last decade (-0.4 % per year) although the trend was already slowing down in the aftermath of the economic crisis.

EU arable land is expected to decrease by 3 % over the outlook period, and reach 104 million ha by 2030. The decrease is similar to that for permanent crops (-4 %) and permanent grassland (-3 %), and is in line with past developments. The main reduction in arable land is expected for fallow land area, which would be reduced by 162 000 ha per year (-2.6 %), on average, a much slower pace than in the past. The permanent crops area (mainly vineyards, apple trees and olive trees) is expected to decline by 3 % over the outlook period, mainly due to the reduction in vineyards' acreage across the EU. Permanent grassland will slightly decrease by 2 million ha (-3 %) over the period.

Graph 2.3 Agricultural land-use developments in the EU (million ha)



Concerning the main cereal crops, the land used for common wheat, as well as for maize and rye, is expected to increase in the outlook period. The increase in area for common wheat and maize in the EU-N13 is expected to be much more dynamic than in the EU-15. Still, there will be a break in the downward trend for the maize area in the EU-15, which will remain stable over the outlook period. This is in contrast with the significant decrease seen in the past decade (see section 2.4). For the oilseed complex, sunflower seeds and soya beans are expected to gain area in the EU. The rapeseed area is expected to decrease in the outlook period. The protein crops area (pulses like peas and beans) is also expected to grow in the outlook period (see section 2.6).

Opportunities and challenges for yield development

Recent statistics on yield development for major crops in the EU show only marginal growth. This comes against the backdrop of the high levels achieved, mainly in the EU-15.

Natural and environmental constraints are expected to put pressure on yield development across the globe, and also in the EU. Climate change in the form of extreme weather events could have substantial effects on yields (see Box 2.5). Also, pressure on the use of plant protection products could have an impact on yield developments. On the other hand, new technologies are also expected to take off in the outlook period. The new technologies are expected to lead to reductions in production costs (through equipment and new machinery) but also to boost yields (more efficient seeding/irrigation systems and disease control in the field). Precision farming techniques will be increasingly used to monitor plants' development in the field and better target the needs as well as to ease farm management. Indeed, with the increasing availability of satellite images and widespread use of information technologies, farmers are expected to obtain greater access to decision aid tools through software.

[17] EFAs are subject to weighting factors depending on their expected environmental value.

[18] All figures about EFA are from the Review of greening after one year. Commission staff working document. 2016.

2.2. Biofuels

Current policy uncertainty and reduced fuel use over the whole outlook period are expected to result in a stagnation of consumption and production in the first outlook years, followed by a general decline both for the biodiesel and the ethanol market. The projections assume a 5.8 % proportion of biofuels in total transport energy by 2020 (as accounted for under the Renewable Energy Directive) and a relatively stable level afterwards[19].

A heated debate around the new EU policy framework 2020-2030

The growth of the biofuel industry since the early 2000s has been driven by developments in EU legislation. Three pieces of EU legislation determine current EU demand and to a large extent EU production by setting out sustainability criteria for production and procedures for verifying compliance:

- the Renewable Energy Directive (RED), which entered into force in 2009, set an overall binding target of sourcing 20 % of EU energy needs from renewables such as biomass, hydro, wind and solar power by 2020. Member States have to cover at least 10 % of their transport energy use from renewable sources (including biofuels);
- the Fuel Quality Directive (FQD), which requires fuel producers to reduce the GHG intensity of transport fuels by 2020;
- the Indirect Land-Use Change (ILUC) Directive[20] from 2015, amending both the RED and FQD, which addresses the risk that some production pathways increase overall GHG emissions due to indirect land-use change. It did this by introducing a 7 % cap on renewable energy coming from food or feed crops in the transport sector.

In 2014, the 2030 Energy and Climate Framework was agreed on by the European Council. It sets overall targets of a 40 % cut in GHG emissions (1990-2030), a 27 % renewable energy target and an increase in energy efficiency of at least 27 % by 2030, to be reviewed by 2020 with a target of 30 % in mind. In 2015, the Paris Climate Agreement reached a global agreement on the reduction of GHG emissions, but without a detailed timetable or country-specific goals for emissions.

To translate these general targets into policy, a proposal for the recast of the Renewables Energy Directive (RED II proposal) was adopted by the European Commission at the end of 2016. The proposal includes the gradual phase-out of food- and feed-based biofuels (reduction from 7 % in 2021 to 3.8 % in 2030) and sets minimum blending shares for advanced biofuels (minimum 1.5 % in 2021, rising to 6.8 % in 2030). A new Annex IX sets out the list of feedstocks which can count towards the advanced biofuels targets. The Directive also differentiates waste, residuals and other sources which can fully contribute towards the minimum advanced blending (part A) from those whose contribution is limited (part B, namely used cooking oils, animal fats and molasses).

Although the above policy proposal gives a clear direction for the future of EU biofuel markets, views in the European Council and Parliament are divided and uncertainties remain over the outcome. As at the time of writing this report the outcome of the co-decision is unknown, the outlook projections assume a policy *status quo* post-2020, not taking into account the RED II proposal.

National biofuel mandates to increase further by 2020

Member States have been setting biofuel mandates, i.e. national biofuel blending targets, to implement the RED Directive. These are mostly driven by: (i) the 2020 national targets under the RED Directive, which set the shares of energy that should come from renewable sources in gross final energy consumption; and (ii) the overall EU target for renewables in transport (10 %).

Therefore, most national policies set targets in terms of energy share. The level of biofuel mandates have been increasing over the last years[21] and will continue to increase in many Member States up to 2020. The graph below shows the national mandates for 2017 and 2020 for the 20 Member States which have set targets in terms of energy shares. Double counting[22] is allowed in 11 Member States[23], though in France a cap is set on the maximum share of double counting (0.3 % for ethanol and 0.35 % for biodiesel). Biofuels are counted if they comply with a minimum 50 % GHG emissions reduction (compared to their respective fossil fuels) for existing plants and a 60 % reduction for new plants from 2017 onwards (default values for GHG emissions reduction are provided in Annex V to the RED Directive).

[19] Methodological foreword: the biofuel module within the OECD-FAO Aglink-Cosimo model has been modified since the previous EU Agricultural Outlook published in December 2016. In particular, market-driven biofuel demand has been added to the previously mainly mandate-based module. The changes in methodology may impact to some extent the comparability of this year's results with previous years.

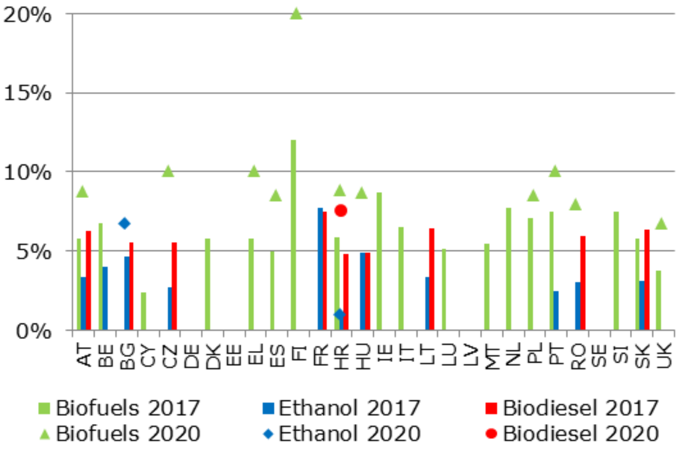
[20] Directive (EU) 2015/1513 of the European Parliament and of the Council of 9 September 2015 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources (OJ L239, 15.9.2015, p. 1).

[21] In 2017, mandates increased in nine Member States: Belgium, Croatia, Finland, France, Ireland, Italy, the Netherlands, Slovakia and Spain.

[22] Under the RED, biofuels produced from ligno-cellulosic, non-food cellulosic, waste or residue materials can be counted twice towards the target for renewables, as they provide for additional environmental benefits, in particular higher GHG emissions reduction.

[23] Austria, Belgium, Croatia, France, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal and Slovenia.

Graph 2.4 National mandates for biofuel shares in transport energy



Germany replaced in 2015 its share-based mandates with GHG emissions reduction targets. Such targets favour hydrotreated vegetable oil (HVO)[24] and used cooking oil (UCO) based biodiesel, which provide higher GHG reduction savings than other biofuels. While overall biofuel consumption contracted in the first years of the mandate, it is expected to increase in 2017 with an increase in the mandate from a 3.5 % to 4 % GHG emissions reduction. The Czech Republic's mandate also includes an obligation to reduce GHG emissions, though in addition to the volume-based mandates.

A number of Member States have not set national mandates. In some cases, other national biofuel policies have been put in place, such as in Sweden, where biofuels were exempted from taxation up to 2016.

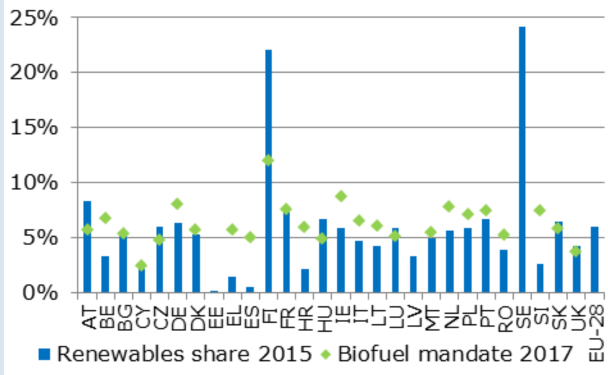
Box 2.1 Member States policies after 2020

Most Member States have mandates set in legislation up to 2020. Few have set targets beyond this date. The exception is Italy, which has extended the minimum biofuel share for 2020 up to 2022. The UK recently presented a proposal for targets up to 2032, but this is not yet adopted at the time of writing this report.

While the RED Directive does not set any European target after this date, national targets will have to be laid down in the National Energy and Climate plans and it is still uncertain in the current policy context what will happen with national mandates after 2020.

However, some Member States are already at or above their target. It is assumed that those Member States will pursue their efforts and biofuel mandates will remain in place, at least at their 2020 level. Moreover, if more Member States turn towards GHG emissions reduction targets, this could potentially boost advanced biofuels as these have classically higher default values for GHG emissions reduction. At the same time, a number of Member States are lagging behind their targets, either due to the absence of legislation or bad implementation.

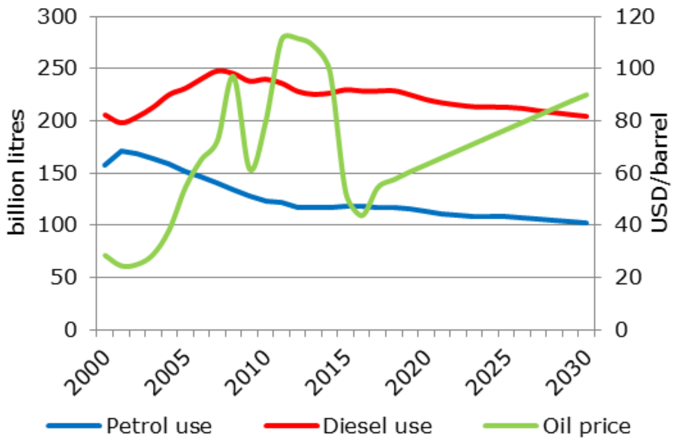
Graph 2.5 National reported renewable energy shares and national mandates



Biofuel consumption is set to decrease with an overall reduction in fuel use

The main market driver for biofuels consumption is fuel use in road transport. Innovation towards reduced fuel consumption of vehicles and initiatives for cleaner transport have been putting downward pressure on fuel use. While a decreasing trend in petrol fuel use has already been observed since the early 2000s, diesel use is currently stagnating[25]. This is explained by the switch in the last decade from petrol to diesel, and by the recovery from the 2008 crisis of road freight transport, which is heavily reliant on diesel. Fuel efficiency is, however, expected to offset the increased demand for diesel, and diesel use may start declining in the coming years. Overall, road transport fuel use is expected to decrease by 13 % for petrol and by 11 % for diesel by 2030. Besides energy efficiency initiatives and innovation, the increasing oil price over the outlook period is also playing a role.

Graph 2.6 EU-28 fuel use and world oil price



While higher oil prices increase biofuels' competitiveness, the reduction in fuel use limits demand for biofuels: as indicated above, biofuel

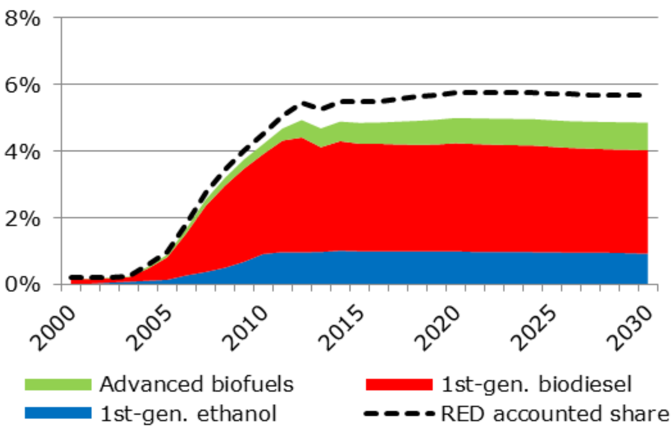
[24] HVO biodiesel is produced from vegetable fats and oils through an alternative process, i.e. hydrotreating as opposed to esterification used to produce Fatty Acid Methyl Esters (FAME) biodiesel.

[25] Consumption estimates for diesel and petrol-type fuels are taken from the EU reference scenario 2016 developed by the JRC and the Commission's Directorate-General for Climate Action using the POLES model.

demand is strongly policy-driven, while biofuel mandates are mostly share-based, i.e. a given percentage of total fuel consumption. At a constant biofuel share, reduced fuel use will reduce biofuel use to the same proportion.

The share of first-generation biofuels in total transport energy is expected to slightly decrease over time, from 4.2 % in 2017 to 4 % by 2030. The current lack of long-term investments in the development of advanced biofuels production capacity limits the current prospects for advanced biofuels to a moderate increase, from 0.68 % to 0.83 % by 2030.

Graph 2.7 Biofuel shares in transport energy

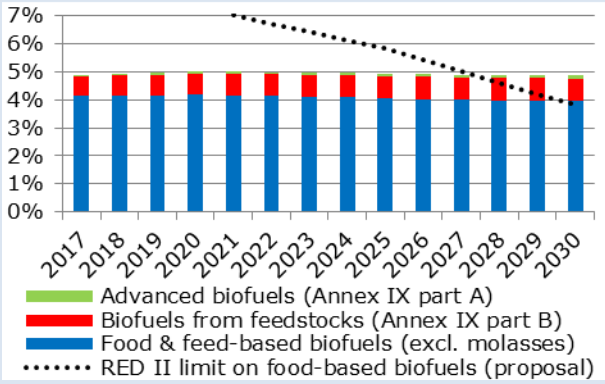


The RED-accounted share[26] towards the 10 % target of renewable energy in transport by 2020 is expected to reach 5.8 % by 2020 and then remain relatively stable with minor decreases. This is based on the assumption that as long as the RED II proposal is not adopted, no further targets will be set at European level post-2020.

Box 2.2 RED II proposal

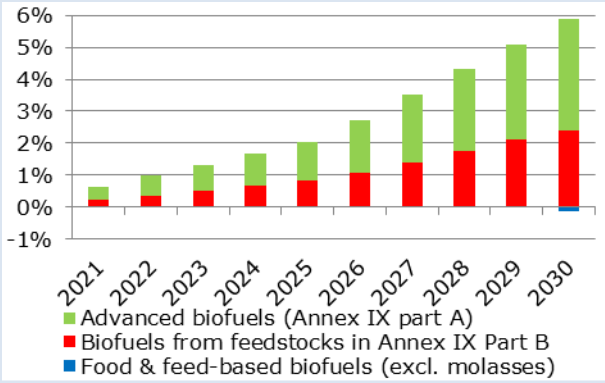
Were the RED II proposal endorsed by the European Council and Parliament, then food and feed-based biofuel consumption would only be slightly above the proposed cap in the last year of the outlook, with a food and feed-based share of 3.9 %. This would exclude molasses, which are considered under Annex IX part B of the RED II proposal. The necessary contraction in consumption of biofuels from food and feed would remain limited to 0.1 percentage points, or 0.4 million tonne oil equivalent (t.o.e.). Production is therefore unlikely to be heavily affected: biofuels from overproducing Member States (i.e. overproducing in comparison to the national consumption needs) could be redistributed to other Member States. This is expected to mitigate the impact of the RED II proposal in single countries.

Graph 2.8 Biofuel shares in transport energy and impact of RED II limit



Similarly, to reach the targets for advanced biofuels under Annex IX part A, the share of advanced biofuels from waste and residuals should increase by 3.5 percentage points and the share of biofuels from used cooking oils, animal fats and molasses by 2.4 percentage points.

Graph 2.9 Gap in biofuel shares in transport energy under the RED II (percentage points)



This is based on the assumption that biofuels from feedstocks under Annex IX part B are up to their maximum contribution. The gap between the current production capacity of advanced biofuels and the RED II target is thus huge.

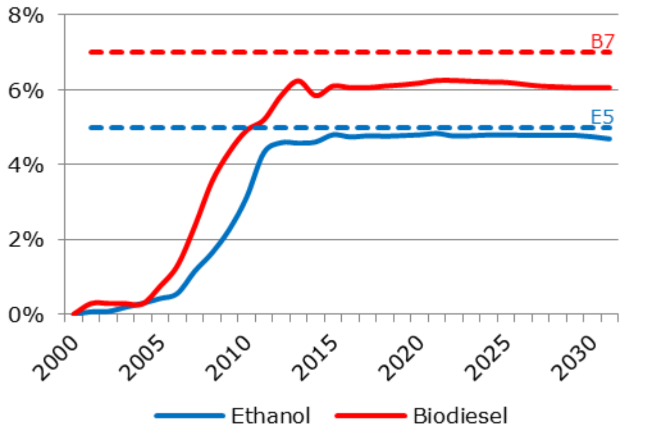
Both the ethanol and biodiesel shares are expected to remain, on average, below the blend walls, i.e. the proportion of biofuels that can be mixed with fossil fuels for use in the current fleet. Diesel cars are currently certified for blends with up to 7 % biodiesel by volume (FAME or dimethyl ether (DME), which is found under the name of B7 in most Member States). However, as the average hides significant variation between Member States, the outlook requires the use of drop-in diesel substitutes[27] such as HVO or engines adjusted to use higher blends. For ethanol the blend wall is higher, at 10 % ethanol in volume (around 6.7 % in energy terms). However, the most used blend is E5, which contains only 5 % bioethanol. To increase ethanol share, higher blending could be deployed: E10 is currently available in Belgium, Finland, France and Germany. Alternatively, the

[26] The RED-accounted share of biofuels is calculated on the basis of the share of biofuel consumption in total fuel consumption, with double counting for advanced biofuels.

[27] Drop-in fuels are renewable fuels which may be used without blend walls and without engine modifications.

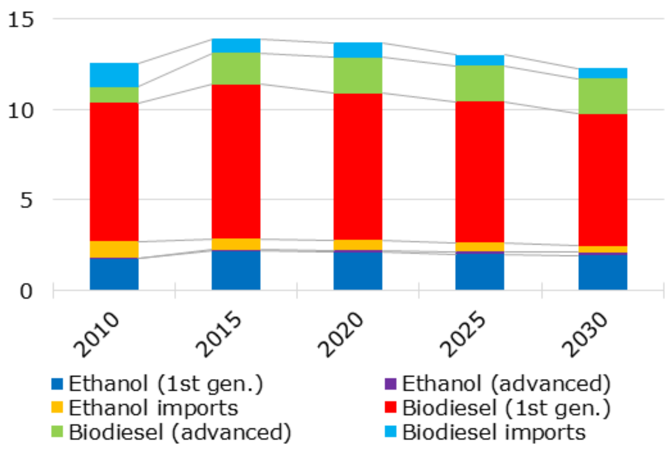
consumption of E-85 could be promoted but this seems less likely as it requires specific engines.

Graph 2.10 Biofuel share in total petrol and diesel use in the EU (in volume share)



European production remains the main source of biofuel consumption. While the EU General Court's rulings on antidumping duties on Argentinian and Indonesian biodiesel are foreseen to result in slightly higher imports over the next couple of years, over the outlook period imports of biofuels are expected to gradually decrease along consumption to maximise use of European production capacity.

Graph 2.11 EU biofuel consumption by source (million t.o.e.)

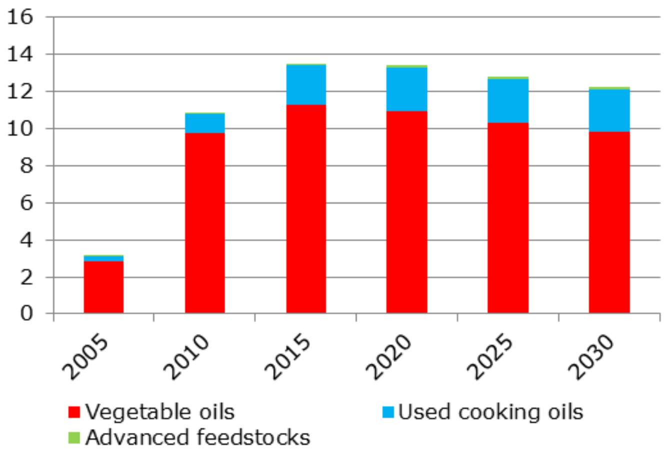


Fuel use reduction is expected to affect biofuel production downwards

Biofuel production has been relatively stable over the last few years. However, over the medium term, contraction in consumption is expected to affect the sector.

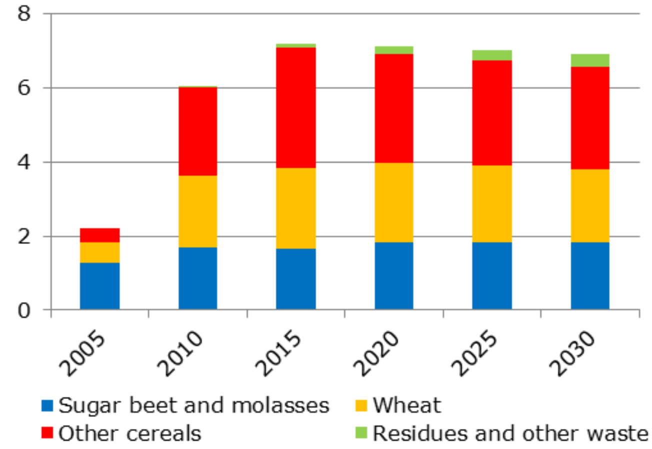
Biodiesel production is expected to stabilise around 13.5 billion litres until 2020, decreasing slightly afterwards following the drop in diesel demand. Looking at the feedstock used, biodiesel based on waste such as tallow and used cooking oil is increasing towards 2020 as a direct effect of double counting allowed under the RED regulation. However, further growth is limited by availability and the cost of sourcing these used vegetable oils. Uses of vegetable oils, including the palm oil, are expected to be little affected between now and 2020. By 2020, 43 % of the demand for vegetable oils could come from biofuel demand, indicating the importance of the sector in the total oil demand. From 2020, the use of vegetable oils will go down following decreased energy demand on the EU market. Overall biodiesel production is expected to be 12.3 billion litres in 2030, a decrease of 9 % on 2017.

Graph 2.12 EU biodiesel feedstock (billion litres)



The outlook for ethanol production is projected to gradually decrease to 6.9 billion litres in 2030, an overall decrease of 6 % compared to 2017. Bioethanol production is expected to decrease less than consumption, while lower imports will avoid accumulation of stocks.

Graph 2.13 EU ethanol feedstock (billion litres)



Feedstock use will, however, be more dynamic than in the case of biodiesel. In recent years, maize has replaced wheat as the most important ethanol feedstock in the EU and this trend is expected to continue over the outlook period. The share of sugar beet and molasses used has been rather stable but is expected to slightly increase following expiry of the sugar quota in 2017. The additional sugar production will provide for additional molasses after processing sugar. Its increased potential as feedstock is also to be considered in the light of its inclusion in the feedstocks which may contribute to the RED II advanced biofuels targets. Ethanol production from sugar can also be an alternative gateway for directing sugar oversupply. The size of this increase will depend on the relation between the world market price for sugar and the ethanol parity, i.e. the rate at which it becomes more lucrative to switch to ethanol production over sugar.

While about 3.7 % of EU wheat demand was directed to ethanol in 2017, this share is expected to decline to 3.1 % by 2030. The share of maize demand will follow a similar trend from 8.6 % in 2017 to 6.5 % in 2030. Demand of sugar beet and molasses for ethanol production is likely to increase in quantity but remain relatively stable in percentage, in line with the increased sugar production over the period.

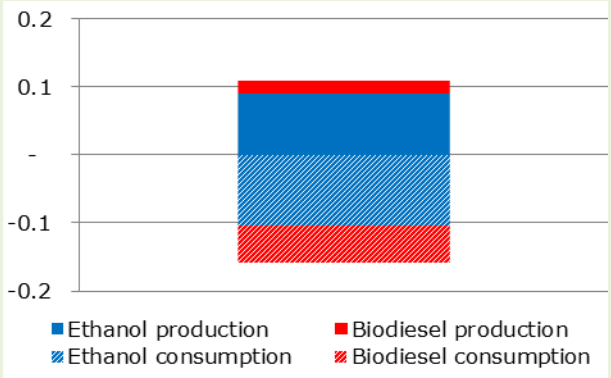
What about the UK?

Over 12 % of the EU ethanol production is produced in the UK, around 0.9 billion litres in 2016/2017. Consumption is slightly higher at 1 billion litres, which is 13 % of EU consumption. On a population-basis, UK ethanol consumption is at the EU average.

Six ethanol plant operators share the UK ethanol production market. The three largest producers are Crop Energies, Ineos and Vivergo. Two others are owned by sugar producers AB Sugar and Tereos Internacional, while the last producer, Cargill, is active on the cereal and oilseed market.

Although 19 production plants are reported in the UK, biodiesel production is around 0.2 billion litres (1.5 % of EU production). Consumption is also lower for biodiesel at around 0.5 billion litres, which is 4 % of EU consumption.

Graph 2.14 UK biofuel production and consumption in 2016/2017 (billion litres)



The UK's biofuel trade in volume with non-EU countries is marginal. In 2016/2017, 0.45 billion litres of ethanol and 0.46 billion litres of biodiesel were imported by the UK from other EU countries, while 0.36 billion litres of ethanol and 0.22 billion litres were exported to EU countries.

2.3. Sugar

The current marketing year represents a turning point for the sugar sector. The end of EU sugar production quotas on 1 October 2017 brought perceivable structural changes which reshape the whole European sugar market and its competitive positioning on the world sugar market. Over the medium term, EU sugar production is projected to increase by 12 % compared to the average production of the last 5 years under the quota regime. Lower EU prices, resulting in a lower gap between EU prices and world white sugar prices at around EUR 40/t, are expected to halve imports and double exports.

World sugar consumption increases further while EU consumption is under pressure

World sugar consumption has seen a continuous growth over the last decade with annual increases of about 4-5 million t annually, driven by population increase but also by increased consumption per capita in large parts of the world. This trend is expected to continue throughout the outlook period with the increase in population and a growth of per capita consumption from 23 kg in 2016/2017 to 26 kg by 2030. Growth is mainly driven by India, China and Pakistan, which will represent almost 40 % of additional demand by 2030.

While increased consumption is expected in almost all countries, EU consumption is under pressure from changing consumer preferences. Consumption trends show clear preferences towards more natural, environmentally-friendly and healthier food: the last decade has seen emerging food practices including organic food, local food circuits and short supply chains, as well as growing interest for homemade food. These new trends are a manifestation of consumers' desire to be better informed about the origin, content and production practices of food consumed, and to approve of them. For instance, consumers are increasingly concerned about sugar contents, due to the high obesity rates in developed countries and the health issues which it may bring, such as diabetes, heart diseases and cancer. Retail sales confirm this trend, with a small reduction (around 1-2 %) in per capita consumption of confectionery and soft drinks in the EU-28 over the last 5 years. According to the World Health Organization, free[28] sugar intake represents between 7 % and 17 % of the total caloric intake, with high variations between countries and consumer profiles. Its recommendation is to limit the intake of free sugars to less than 10 % and even suggests reducing this intake to less than 5 %.

Several food companies have responded to the changes in demand and regularly announce their commitment to reduce added sugars in recipes. Reducing sugar requires, however, a balanced approach between respecting consumers' taste for

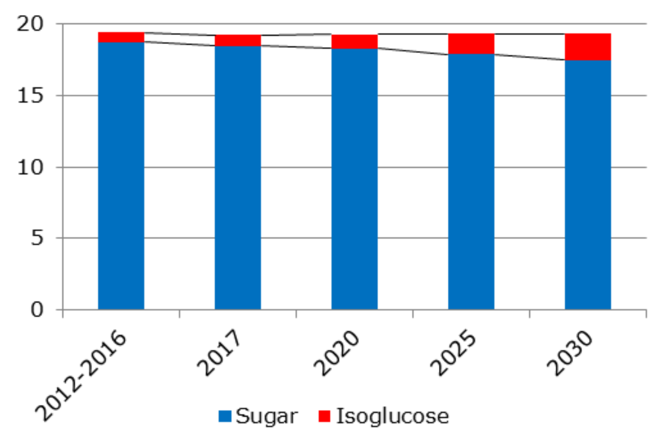
[28] Free sugars include all sugars added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and fruit juices.

sweetness and meeting the sugar reduction targets. Isoglucose, a starch-based sweetener, plays a major role in revisited recipes. While at world level isoglucose represents already 7 % of caloric sweetener consumption, its share in EU consumption is 4 %. The end of the EU quota on isoglucose production is expected to reverse this situation and allow for isoglucose substituting sugar in consumption to a share that could reach 9 % by 2030/2031. Low caloric high-intensity sweeteners, such as pure fructose or stevia, are also considered in industry recipes. None of these alternatives is, however, a perfect substitute to sugar, in particular with regard to its structure and taste profile.

Several countries have introduced 'soda taxes'. These taxes, applied on soft drinks, sports drinks and energy drinks, are designed to reduce consumption of drinks with added sugars. In economic terms, the aim of the soda tax is to correct the externalities of sugary drinks, specifically the higher healthcare costs they generate. Soda taxes are implemented in Finland, France and Hungary (broadened to all products with unhealthy sugar levels). In 2018, they will also be implemented in Ireland and the UK. The European soft drinks industry has also announced it will voluntarily stop selling soft drinks containing added sugars to schools in the EU from end 2018.

Overall, EU sugar consumption is expected to decrease from 18.5 million t in 2017/2018 to 17.5 million t in 2030/2031 (-5 %), while isoglucose could grow from 0.8 to 1.8 million t white sugar equivalent (w.s.e).

Graph 2.15 Caloric sweetener consumption in the EU-28 (million t w.s.e)

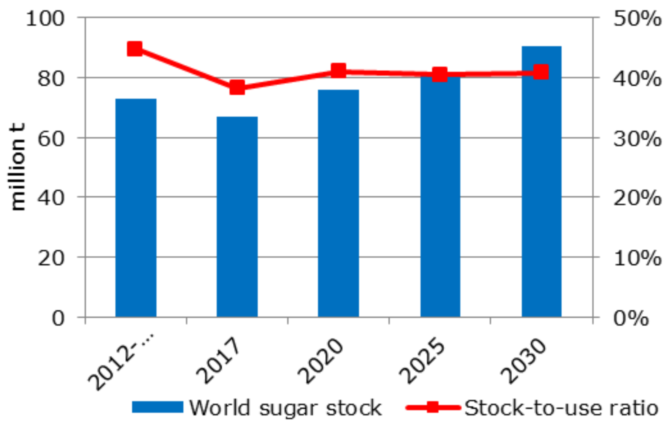


Continuous increase in world white sugar production

The expected output from 2017/2018 production would allow world sugar production to be in surplus again. This situation is not expected to change, unless there is a significant weather-related change in production. Indeed, to address the increasing global demand, world white sugar production is expected to increase further, at a similar pace to consumption, reaching 228 million t in 2030, i.e. a growth of 27 %. Brazil and Thailand would play a dominant role in this increase, with 33 % and 46 % more sugar produced respectively. The growth in Brazil would be supported by the further devaluation of the Brazilian real expected in the outlook period, which would favour the profitability and competitiveness of the Brazilian sugar industry, leading to increased acreage for sugar cane. Several sugar plants already started investing in developing cane crush and sugar production capacity. Production in Thailand is on the rise due to production switches from rice to sugar, resulting in expanded areas for sugar cane.

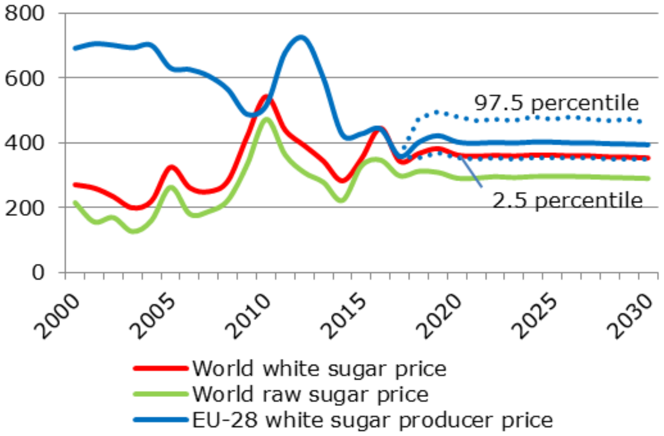
The world deficit has resulted in soaring world sugar prices, with London white sugar No 5 averaging EUR 445/t in 2016/2017, almost EUR 100/t more than the year before. However, world sugar prices declined again strongly from EUR 513/t in February 2017 to EUR 310/t in September 2017, with unexpected production increases in Pakistan and additional sugar supply from Brazil. The Brazilian oil industry (Petrobras) introduced tax adjustments on gasoline over the summer of 2017, leading to a switch from sugar production to ethanol. The expected lower Brazilian sugar supply could contribute to stabilising world sugar prices over the next months. World sugar prices are expected to remain at a low level in 2017/2018, with the outlook being for higher production and a return to surplus availability. In the medium term, a relatively stable stock-to-use ratio would support a price for sugar at around EUR 360/t up to 2030. While a low white sugar premium is forecast for 2017/2018, around EUR 45/t, it is expected to hover around EUR 65/t over the outlook period.

Graph 2.16 World sugar stock and stock-to-use ratio



The EU white sugar price averaged EUR 443/t in 2016/2017, just below the world price. By its nature, the monitored EU price follows world market price developments with a certain delay, as it covers to a large extent sugar under longer term contracts. Like world prices, the EU white sugar price is expected to remain low over the next year, around EUR 40/t above London white sugar No 5.

Graph 2.17 Sugar prices (EUR/t)

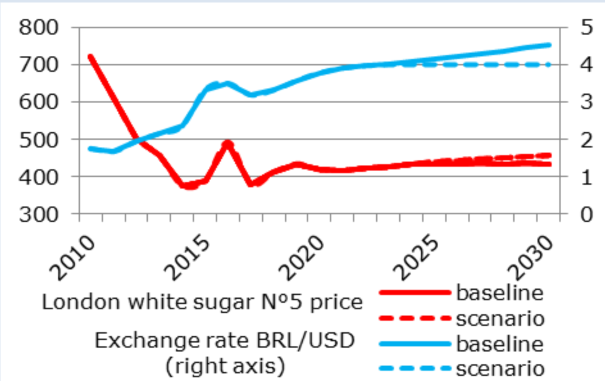


Box 2.3 Brazilian production under the assumption of a stronger real

The exchange rate of the Brazilian real and the US dollar will play a key role in sugar's final price level. With the continued devaluation of the real expected in the outlook, Brazilian sugar producers would receive an increasing raw sugar price in local currency, despite it being flat in US dollar terms throughout the outlook period.

Under the scenario[29] *of a stronger real, the real to dollar exchange rate is assumed to be stable at BRL 4/USD from 2023 onwards instead of a gradual increase to BRL 4.53/USD. Under this assumption, Brazilian sugar production would be 4.3 % lower by 2030 and Brazilian exports would consequently decrease by 5.9 % (-4 % for raw sugar versus -11% for white sugar, which indicates potentially lower investments in sugar refining plants). World prices would be up almost EUR 17/t in reaction to lower supply. Benefits on the European market would be a higher producer price (+EUR 15.8/t), higher production (+71 000 t) and higher exports (+138 000 t).*

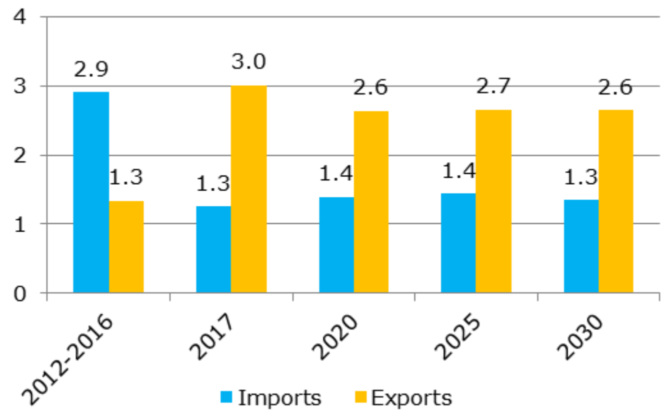
Graph 2.18 World white sugar prices (USD/t) and BRL/USD exchange rate



A strong increase in EU white sugar production in the first years after the quota, levelling off in latter part of the period

At 16.8 million t of white sugar, 2016/2017 was an average production year for the EU. This resulted in stocks of 1.3 million t going into the post-quota environment. The end of the quotas from 1 October 2017 represents a clear break with previous years, with an expected 2017/2018 white sugar production of 20.5 million t. This additional supply would be partly exported, as the EU is no longer bound by the WTO export limit of 1.4 million t, and partly used to rebuild some stocks. Imports, by contrast, are expected to fall back substantially following the reduction of the price gap between the EU price and the world price to EUR 40/t, making the EU a less attractive export destination. Most post-quota imports will come under the duty-free agreements as the CXL duty[30] of EUR 98/t will be challenging for most exporters given the reduced gap. Imports are expected to be around 1.4 million t annually. In particular, the increased availability of beet sugar should lower raw cane sugar imports. The EU is hence expected to become a net exporter of sugar in the post-quota period, although subject to fluctuations linked to weather conditions and the world price level.

Graph 2.19 EU-28 trade (million t)

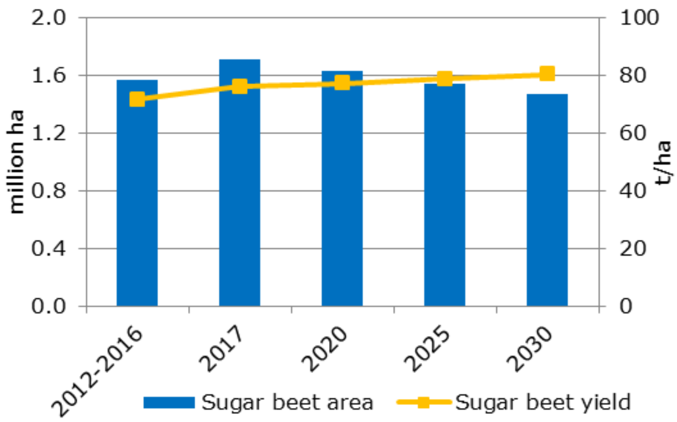


In an environment of higher production, combined with decreasing consumption and increased competition from isoglucose, it is difficult to see how EU sugar prices can remain substantially above EUR 400/t. This is expected to lead to some market adjustments, with production reductions in some less productive areas. After the initial strong production increase, EU production is estimated at about 18.9 million t by 2030, which is 12 % above the average production of the last 5 years under the quota regime. The sugar beet area expanded in 2017/2018 but is expected to contract afterwards, compensated by a continued yield increase.

[29] The scenario is run under deterministic simulations of changes in the exchange rate. Other variables, such as oil price and ethanol parity, remain unchanged compared to the baseline.

[30] The CXL duty is a preferential import tariff granted for within quota imports to countries with whom the EU has economic partnership agreements. These CXL sugar concessions are granted under the Schedule CXL pursuant to the WTO commitments of the EU under the General Agreement on Tariffs and Trade (GATT).

Graph 2.20 EU-28 sugar beet area (million ha) and sugar beet yield (t/ha)[31]



Two other market developments are expected as a result of the expiry of the quota. First, as already indicated above, the production quota for isoglucose (or high-fructose corn syrup — HFCS) will also disappear. Once the sugar market stabilises post-quota, isoglucose is expected to be competitive, especially in regions with a sugar deficit and excess supply of cereals. By 2030, the production of isoglucose is expected to reach 1.9 million t.

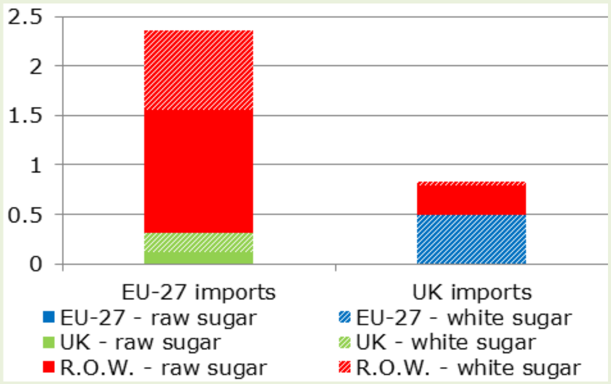
Secondly, the use of sugar beet and molasses for biofuel is expected to increase in volume. This is due to the increased availability of sugar beet and molasses resulting from higher sugar production. The share of sugar beets and molasses directed to ethanol should remain stable.

What about the UK?

Sugar beet production in the UK has shown a steady decline over the years. While the sugar beet area was still around 170 000 ha in the early 2000s, it further decreased to around 90 000 ha in 2015-2017. In other words, sugar beet growers do not seem to have reacted to the end of sugar quotas with increased production. The sugar beet area in the UK represents nowadays slightly over 5 % of the cultivated EU-28 beet area. While sugar beet yield is on average 4 % lower than in the rest of the EU-28, the sugar content of beets processed into sugar in the UK has been 2 % higher. This brings the estimated UK sugar production to almost 1.1 million t in 2017/2018, up from 0.9 million t in the preceding marketing year.

In terms of trade, while exports from the UK to non-EU countries are minimal, the UK exports close to 0.4 million t to EU-27 countries. Imports into the UK from non-EU countries are mainly raw sugar (23 % of overall EU-28 imports of raw sugar over the last five marketing years), slightly over 0.3 million t in 2016/2017. White sugar originates mainly from other EU-27 countries, with imports close to 0.5 million t in 2016/2017.

Graph 2.21 EU-27 and UK sugar imports (million t) in 2016/2017



Two operators share UK sugar production: (i) AB Sugar, currently the sole sugar beet processor active in the UK, but soon to be joined by a new production plant to be operated by Northern Sugar, a subsidiary of Al Khaleej Sugar; and (ii) Tate & Lyle Sugars, which refines imported raw sugar cane into white sugar and syrups and thus has a strong interest in keeping high imports of raw cane sugar.

[31] Tonnes of sugar beets harvested per ha, without consideration for the sugar content of beets.

2.4. Cereals

EU cereal production is expected to continue its growth to 341 million t by 2030, driven by feed demand (in particular for maize), good export prospects (in particular for wheat) and industrial uses gaining importance. Stronger growth is, however, constrained by the limited potential for area expansion and slower yield growth in the EU compared with other regions of the world. Maize stocks are assumed to recover from their current low level while wheat and barley stocks remain significantly above the 2012 level over the outlook period, albeit below historical levels. Prices are expected to recover somewhat from the current low at close to EUR 194/t for common wheat at the end of the period.

In 2017/2018, ample global supply but lower cereals harvest in Europe

Following last year's record grain harvest estimated at over 2 100 million t, the International Grain Council (IGC) forecasts that world grain production will decline slightly by 3 % to around 2 070 million t in 2017/2018. This is mainly driven by lower maize outputs, especially in the US. Wheat output is expected to remain high, just below the record high level of last year. In spite of large grain production, the growing demand in 2017/2018, outpacing supply, may push ending stocks downwards to slightly below 500 million t. Food, feed and industrial use are expected at an all-time high, with especially strong demand for food and industrial use. A new record in maize consumption is expected (driven by strong food, feed and industrial demand). For wheat, even with a growing demand, especially for food use, an increase in global stocks is anticipated, mainly driven by further accumulation in China. Barley consumption is expected to decline, because the estimated feed use in China will be lower. A large global supply, in a context of ample stocks, means that world prices are expected to remain low in the coming period.

At close to 300 million t, total EU cereal production for 2017/2018 is expected to be 1.5 % higher than the last campaign, but still 1.6 % below the last five-year average, mainly due to a reduction in area (of 1 %). Hot and dry conditions throughout the summer have been of major concern in the southern part of the EU. EU production of common wheat is expected to significantly increase this year (+5 %) to reach 139 million t. This is particularly due to a good increase in yields in the north-western part of Europe, following last year's yield drop in France due to unfavourable weather. Maize production is expected to remain low for the third consecutive year (59 million t), 8 % below the five-year average. EU barley production is expected to slightly decline to 58 million t, particularly due to lower spring barley output. Total EU cereal exports are forecast to slightly decrease to around 38 million t in 2017/18. EU stock levels are expected to be at their lowest point in the last 10 years.

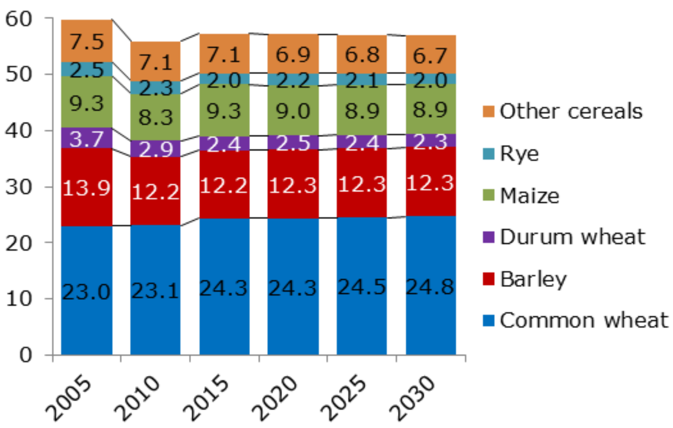
What about the UK?

Common wheat is a major crop in the UK, as it represents almost 50 % of the total value of cereals production. Wheat production increased by 10 % from 2010 to 2015, and good yields have been recorded this year thanks to favourable weather conditions. Barley production has been very dynamic and reached up to 6.5 million t in 2016, a 50 % increase compared to 2010. Although the EU-27 is a strong net cereal exporter, imports from the UK reach between 2 and 4 million t every year, which is close to 20 % of EU-27 cereal imports in 2016. For most cereals the EU-27 is a net importer with respect to the UK, in particular for soft wheat and barley. The only notable exception is maize, for which the EU-27 is a net exporter vis-à-vis the UK and trades 20 % of its total exports with the UK (representing 0.7 million t). The UK is also a significant importer of pasta, which has stabilised at a high level since 2011, around 300 000 t.

Yield changes are the main production driver

Advances in breeding and pest control techniques, mainly tailored to the main cereal crops, as well as better demand prospects, are expected to further propel the relative profitability of these crops compared to the smaller cereal crops. Several recent consolidation waves in the seed and chemical input sectors demonstrate the drive towards economies of scale. In addition, the demand side is dominated by a few large processors and traders shipping large volumes with relatively small margins.

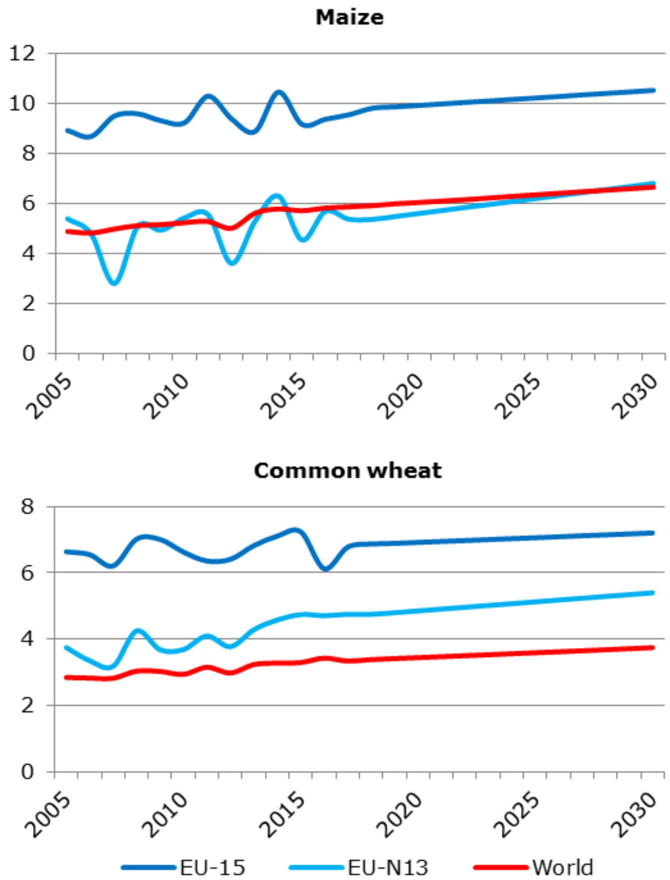
Graph 2.22 Cereal area development



For the outlook period, we anticipate only modest growth (below 0.5 % per year) in the main cereals area, with slightly higher growth for common wheat compared to maize and barley given better price prospects and more rapid growth in the EU-N13 than in the EU-15. This modest growth comes at the expense of other cereals (mainly oats) but also of other arable crops in the second half of the period, such as rapeseed and sugar beet, two crops characterised by market uncertainty. The durum wheat area is also expected to contract slightly.

Towards 2030 most of the growth is expected to come from the yield side. Several opposing drivers are at play. In the EU-15, yields are close to their agro-economic and bio-physical maximum, whereas in the EU-N13 there is more scope for growth. Climate change, and the associated higher probability of adverse weather conditions, will have differing impacts in different parts of the EU. The scenario in Box 2.5 illustrates the potential effect of agro-climatic variability on yield. Advances in technology, especially precision farming, are expected to take off over the outlook period. While they have the potential to increase yields, their main advantage lays in more efficient resource management. However, expectations regarding agriculture's contribution to environmental (and climate) targets, such as reducing nitrogen surplus, as well as controversy over the current use of pesticides (see for example neonicotinoids) might mean that farmers will adapt their agronomic practices. Finally, alternative farming systems such as organic farming are also expected to gain ground. These practices normally do not attain the same yield levels as conventional farming. Taking all these factors together, we project mild yield growth towards 2030.

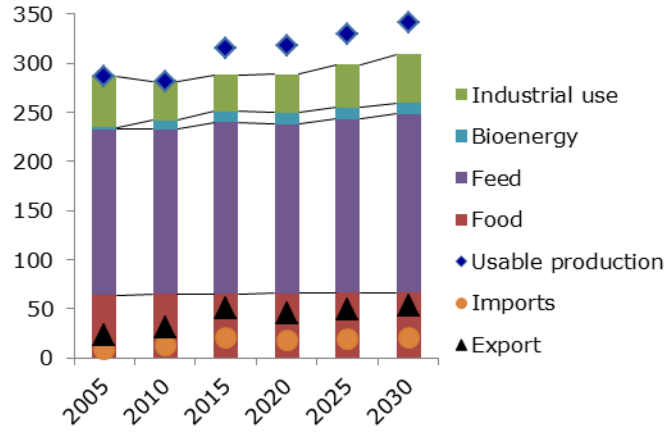
Graph 2.23 Yield development (t/ha) for maize and common wheat



Demand growth propelled by good feed and export prospects, while industrial uses gain importance

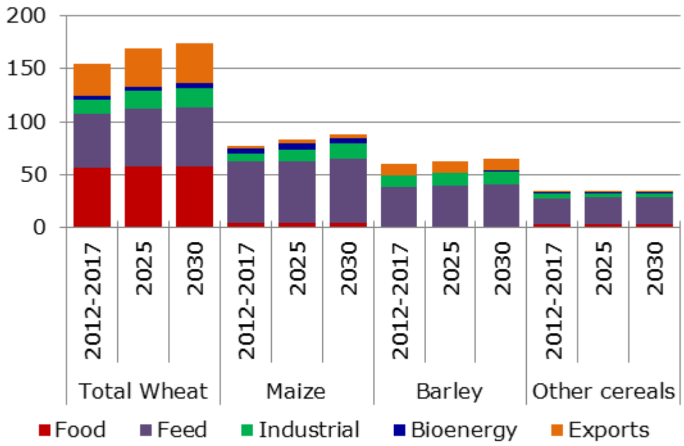
EU cereal demand is expected to increase by 10 % by 2030 compared to the 2012-2017 average.

Graph 2.24 EU cereal market developments (million t)



While the feed market remains the most important outlet in quantity, industrial (non-feed) use is expected to be the most dynamic in growth. Feed demand, for maize in particular, is expected to grow due to the increase in dairy and meat (mainly poultry) production. Cheap availability of maize imports will also play a role in supplying feed demand in the EU. With the expected surge of the bio-economy, industrial uses (mainly through the starch industry) will also further increase, giving impetus to both wheat and maize demand. Maize will in particular profit from the growth in isoglucose demand. Demand for cereals for the production of ethanol is expected to slightly decrease in the later part of the outlook period (see section 2.2 on biofuels). The overall share of the ethanol in total cereals domestic demand is expected to remain limited at 4 %.

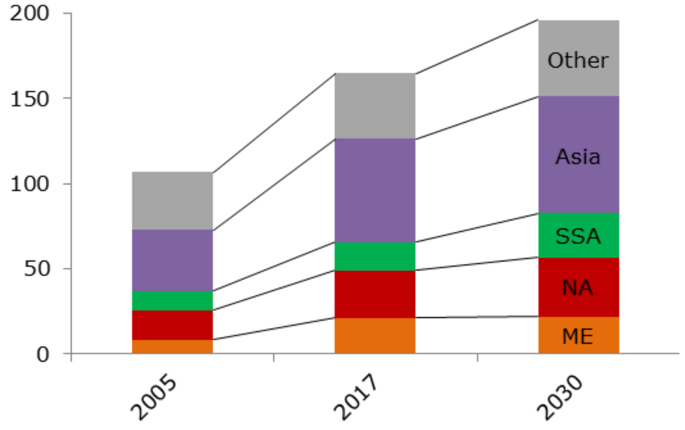
Graph 2.25 Demand for EU cereals (million t)



The prospects for EU cereal exports are positive, with a further 35 % increase over the 2012-2017 average, with particular export opportunities for wheat in the Mediterranean, sub-Saharan Africa and the Gulf.

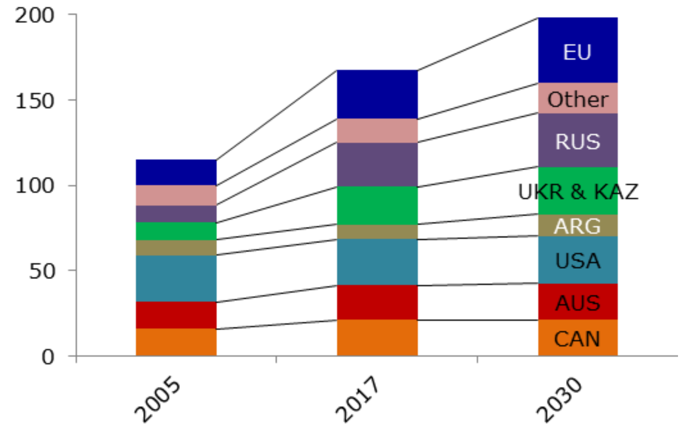
While traditional wheat producing countries such as the US, Australia and Canada are expected to stabilise their exports, Russia, Ukraine and Kazakhstan are expected to continue their recent expansion, driven by large investments in both production and logistics. Still, quality of grains is a pending issue in those regions, where production, and thus exports, are mainly of low- to medium-protein rate wheat. Argentina is also expected to expand production and gain market share. Given its competitive prices, the EU is projected to increase its share of global exports further from 17 % in 2017 to above 19 % in 2030. Barley exports are expected to recover only towards the second half of the outlook period, when the trade towards China could resume.

Graph 2.26 Main common wheat importing regions (million t)



Note: SSA=sub-Saharan Africa; NA=north Africa; ME= Middle East

Graph 2.27 Main common wheat exporting regions (million t)



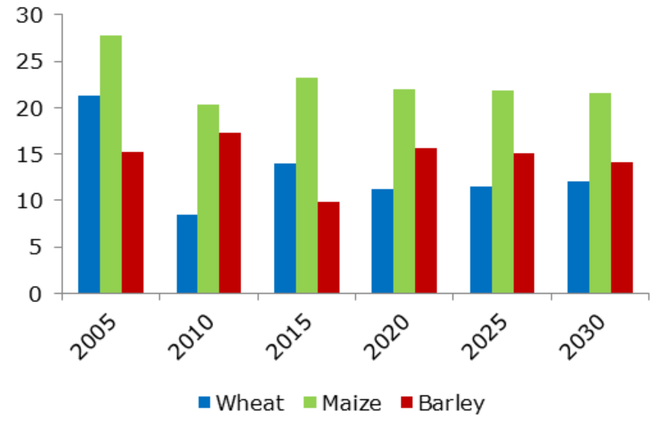
Note: RUS=Russia; UKR & KAZ=Ukraine and Kazakhstan; ARG=Argentina; AUS=Australia; CAN=Canada

With small rises in cereal production and growth of exports and domestic demand, imports of cereals, mainly maize, are expected to increase by 11 % over the outlook period to cover EU demand.

Stock-to-use ratios normalise at fairly low levels

With an EU maize stock-to-use ratio of 21 % in 2017/2018, maize stocks are expected to recover mildly from the low in 2016/2017 (in 2014/2015 the ratio was 29 %). Also during the outlook period, stocks are expected to stabilise around a ratio of 21 %. Wheat and barley stock-to-use ratios are also projected to remain rather stable throughout the outlook period, at around 12 % and 14 % respectively. These levels are higher than the 2012 low, but remain well below before 2010 levels.

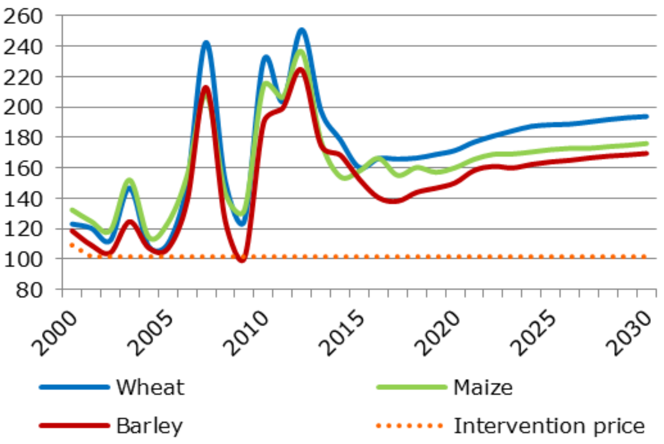
Graph 2.28 EU stock-to-use ratios (%)



Prices only increase moderately

EU cereal prices are expected to remain below the peaks of 5 years ago but above the long-term average, between EUR 170/t and EUR 194/t in 2030. Prices in the early years of the outlook period are expected to be lower than in the longer term, driven by ample global supply, low energy and input costs, and a relatively weak euro. Barley prices are expected to remain low due to ample availability of other coarse grains and reduced demand from China, driven by its maize destocking policy. Towards the end of the outlook period, when the Chinese demand is expected to resume, barley prices are expected to align again with maize prices. Due to good export demand, common wheat prices are assumed to remain above coarse grain prices over the outlook period. However, from 2019 they are expected to be affected by an expected re-appreciation of the euro against the US dollar. Generally, all prices show an upward path from 2020 onwards. This may be related to the increasing energy and input costs assumed in the second half of the outlook period. The relatively low stock-to-use ratios indicate that prices may react to any unexpected production shortfall in the EU or major supplying regions.

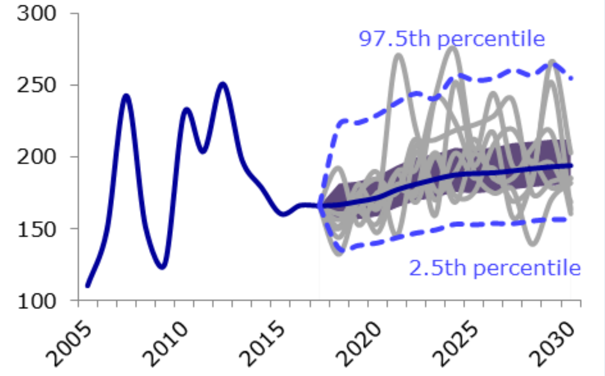
Graph 2.29 EU cereal prices (EUR/t)



Box 2.4 Price uncertainty in the medium-term outlook

While the baseline assumes normal weather conditions, allowing for stable yield development and a specific macroeconomic environment, the reality might differ considerably. To account for uncertainty about future yields and macroeconomic indicators, alternative baseline projections are produced following a partial stochastic simulation (Chapter 8). Although not all sources of uncertainty are incorporated, this approach enables us to illustrate different potential price paths around the core baseline, as demonstrated for common wheat in the graph below. The different paths can be interpreted as alternative prospects under different production and macroeconomic conditions.

Graph 2.30 Possible price paths for common wheat in the EU (EUR/t)



The smooth baseline price line (in dark blue) is situated around the average of the potential price paths. As an example, the grey lines show 10 different price paths out of almost 1 000 possible paths derived from the uncertainty analysis. These vary strongly between marketing years. Half of the simulated prices fall in the purple area.

Two additional lines are included to present the 2.5th and 97.5th percentiles. Each year, in 2.5 % of the 1 000 simulations prices are below/above the 2.5th/97.5th percentiles, but these low/high price levels are determined by some extreme macroeconomic assumptions or rather unlikely high/low yields. However, as not all sources of uncertainty are included in this assessment, one cannot exclude the possibility that under particular shocks the price will move outside this range.

Box 2.5 How could EU cereal markets be affected by agro-climatic extremes?

Numerous meteorological records were broken across the globe over the last four decades. What is more, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) leaves little room for doubt on the future occurrence of climate anomalies. For instance, heatwaves and droughts that negatively affect crop growth during flowering and grain filling will 'very likely' occur more frequently, more intensely and last longer[32].

The baseline projections presented in this report assume normal agro-climatic conditions during the growing season. As a part of a broader exploratory project, this exercise examines the potential effects of extreme events across the EU in the first simulation year (2018/2019)[33]. *Two years from the 2000s, the warmest decade on record since 1850, were selected to serve as templates. Hence, this box summarises how EU wheat, maize and barley markets could react if: (i) the extremely* unfavourable *conditions of 2003 were to recur in 2018 (scenario 1); and (ii) the extremely* favourable *conditions of 2004 were to recur in 2018 (scenario 2).*

For the purpose of simulation, the supply side of the Aglink-Cosimo model was extended using with an explicit parameterisation of crop-growing conditions through the recently developed Combined Stress Index (CSI). The CSI is a composite indicator of agro-climatic extremes. It captures a wide range of post-planting temperature and water-balance anomalies, both single (e.g. a heatwave) and combined (e.g. a heatwave and a drought, or a heatwave and excessively wet soils). Occurrence, duration, intensity, timing and the spatial coverage of such conditions are taken into account to derive region-, crop-, and year-specific values that reflect the degree of yield stress[34].

In the scenarios, the assumed meteorological configurations across Member States in 2018 'mimic' the actual spatial and temporal patterns of 2003 and 2004 (see Map 2.1). Climatic conditions in the rest of the world and the remaining projection years (2019-2030) are assumed to follow the local trends. In this case study, the CSI covers wheat, maize and barley. Growing conditions for other crops are assumed to be average. The CSI was incorporated into the model such that average agro-climatic conditions lead to the baseline projections presented in this report. Exogenously changing the CSI data beyond 2017

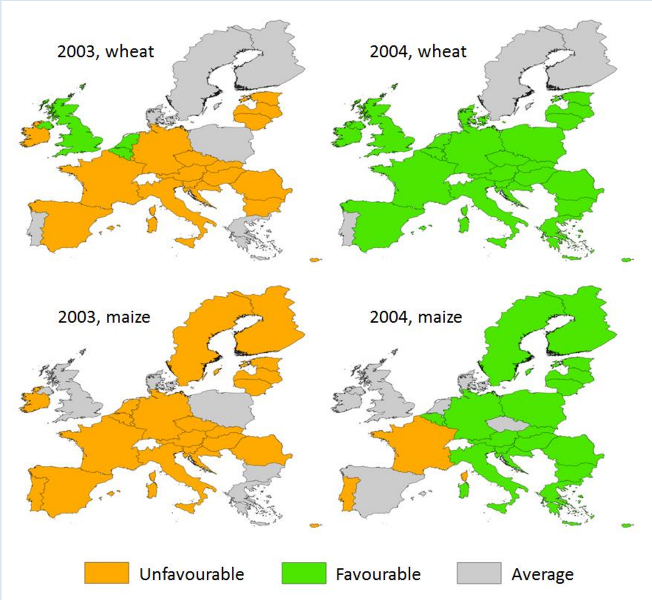
[32] IPCC (2012): Summary for Policymakers. In: Managing the risks of extreme events and disasters to advance climate change adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 1-19.

[33] The ongoing 'Concurrent Climate Extremes and Shocks on Agricultural Markets' (C^2ESAM) project was designed to explore the potential effects of meteorological extremes on domestic and global commodity markets. For details, contact JRC.D4.

[34] For details on the CSI, see: Zampieri M., Ceglar A., Dentener F., Toreti A. (2017): Wheat yield loss attributable to heat waves, drought and water excess on the global, national and subnational scales. Environmental Resource Letters 12(6): 1-11.

leads to meteorological shocks that generate endogenous yield responses and subsequent transmissions to domestic and international supply, demand, prices and trade.

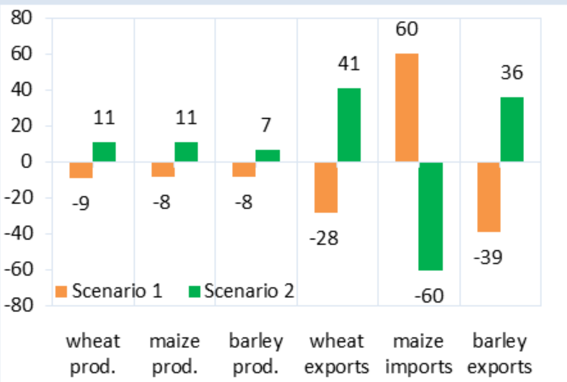
Map 2.1 Post-planting agro-climatic conditions for wheat and maize in 2003 and 2004



Source: C^{2}ESAM project.

Graphs 2.31 and 2.32 depict the potential domestic market effects based on scenario 1 (unfavourable conditions; orange bar portions) and scenario 2 (favourable conditions; green bar portions). Results are presented as percentage deviations from the baseline projections for the marketing year 2018/2019.

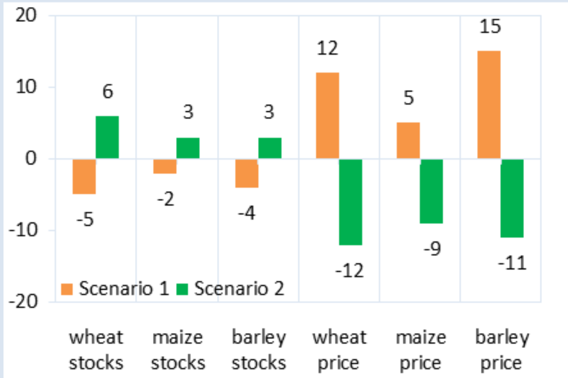
Graph 2.31 Simulation results: EU production and trade, 2018/2019 (% deviation from baseline)



Source: C^{2}ESAM project, preliminary results.

In scenario 1, production of EU wheat decreases by 9 % (to 142 million t), maize by 8 % (to 60 million t), and barley by 8 % (to 56 million t). Equivalently, yields drop to 5.3 t/ha (wheat), 6.7 t/ha (maize), and 4.5 t/ha (barley). These production losses drive a 12 % increase in the producer price of wheat (to EUR 191/t), a 5 % increase in the price of maize (to EUR 166/t) and a 15 % increase in that of barley (to EUR 164/t). An increased demand for other low-, medium-, and high-protein meals is observed, and average feed prices rise by 7 % (to EUR 192/t). Wheat and barley exports decline by about one third (to 23 and 6 million t respectively), while maize imports rise to 18.5 million t (60 %). EU wheat exports lag behind the US and Russia but recover in the subsequent 2 years. The culmination of lowered global availability of cereals leads international prices of wheat and maize to increase by 8 % (to USD 223/t) and 6 % (to USD 172/t), respectively[35]*.*

Graph 2.32 Simulation results: EU stocks and prices, 2018/2019 (% deviation from baseline)



Source: C^{2}ESAM project, preliminary results.

In scenario 2, yields rise to 6.4 t/ha (wheat), 8.2 t/ha (maize) and 5.3 t/ha (barley). Production increases to the theoretically feasible levels of 173 million t (wheat), 73 million t (maize) and 65 million t (barley). Overproduction leads to producer prices below those under the baseline (EUR 150/t for wheat, EUR 145/t for maize, and EUR 127/t for barley). Increased demand is observed, especially for low-protein feed, while average feed prices drop by 8 % (to EUR 166/t). Wheat exports reach a record high level (45 million t) roughly equal to Russian and US exports together, while maize imports fall to low levels (5 million t). Higher global availability of cereals leads international prices of wheat and maize to drop to USD 189/t (-9 %) and USD 153/t (-6 %), respectively.

The ad valorem tariff[36] *on maize imports (8 % in 2018/2019) moves accordingly: it decreases to 2 % in scenario 1 in order for domestic feed demand to be met with higher imports, while in scenario 2 it increases to 15 % to give priority to domestic maize. The effects on food demand, consumer prices and the animal sector move also according to expectations, although they are weaker in magnitude. For instance, consumer prices for meat and dairy products change by up to ±2 %.*

The key conclusion of this study is that extreme agro-climatic conditions could provoke significant impacts on EU cereal markets in either direction. Overall, the response of domestic and world prices to agro-climatic variability in the EU is in conceptual accordance with

[35] No 2, hard red winter wheat, U.S. f.o.b., Gulf; No 2, yellow maize, U.S. f.o.b., Gulf.

[36] Ad-valorem import tariffs are estimated endogenously as a function of ad-valorem and specific in- and out-of-quota tariffs, quota levels, and import and export prices.

expectations. Asymmetry can be noted in the price response regarding both the same crop across scenarios and the same scenario across crops. Differences in the magnitude of the price response can be attributed to the varying sensitivity to extremes across Member States, the uneven size of the shocks per crop and region, endogenous market adjustments and the relative importance of EU crops at international level.

In interpreting the above results three important remarks ought to be made. First, the fact that the Combined Stress Index was developed only recently renders the estimation of the likelihood of the examined scenarios difficult. However, EU crop yields generally exhibit positive trends and, despite the favourable 2017/2018 production estimates, a big yield drop in 2018/2019 could be considered more likely than a big jump. Second, EU stocks built over the last years may moderate the response of domestic prices. In principle, lower beginning stocks would have made prices more sensitive to the agro-climatic patterns examined above. Finally, the economic model does not explicitly differentiate between rain-fed and irrigated crops, and therefore explicit reactions on the input side cannot be inferred.

By factoring combined indices into a large-scale economic model, this box constitutes the first isolation of the potential impacts of climate extremes on EU agricultural markets. Furthermore, it paves the way for more advanced analyses e.g. concurrent and recurrent climatic anomalies.

2.5. Rice

Stable rice production in the EU

Again exceeding 500 million t, 2017/2018 world rice production was almost equal to the record production of the previous year. With demand slightly higher than supply in 2017/18, stocks decreased marginally.

In the EU, the rice marketing year 2017/18 came to an end with high supply due to solid production (1.8 million t, 4 % above last year) albeit with lower imports than last year (1.2 million t, down 9 % on last year's record) and higher demand (both domestic and exports).

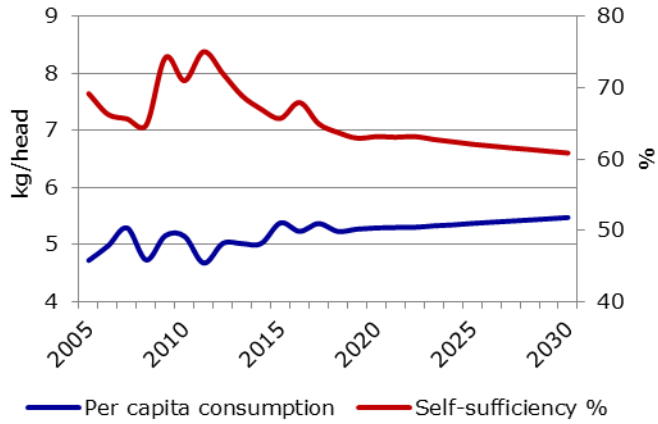
The rice market is characterised by the existence of two main types of rice: *Japonica* (short/medium grain) and *Indica* (long grain). Japonica, the traditional European rice, accounts for approximately 75 % of EU rice production. This proportion has fluctuated in recent years, depending on the respective prices of both types, with the share of Japonica increasing in the last few years.

Due to agronomic constraints, rice production is restricted to a few Member States, with Italy and Spain responsible for 80 % of EU production. The specific agronomic and environmental characteristics required for paddy fields mean that the sector has limited capacity to expand production, but also that farmers growing rice cannot easily use the same fields for other crops in delta-based production systems. The application of VCS in most producing countries (seven out of the eight rice-producing Member States: Spain, Italy, Greece, Hungary, Portugal and Romania, and France from this year onwards) should further support the stabilisation of EU rice production. As yield growth is also small, it is anticipated that EU rice production will remain stable over the next decade on a slightly decreasing area. Yields for Japonica tend to be lower than Indica, so the shift towards more Japonica offsets any yield progress on average.

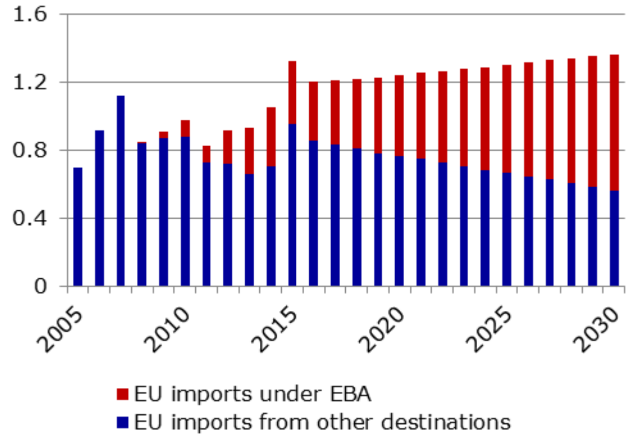
Growth in demand stimulates further imports

Consumption of rice has increased from 4.7 kg in 2005 to 5.3 kg per capita in 2017, as consumers' diets have diversified away from traditional starch components such as bread, pasta or potatoes. Towards the end of the outlook period we anticipate a further increase to around 5.5 kg per capita. Indica varieties, including Basmati, represent close to 60 % of EU consumption. Consumption of the two varieties also varies geographically, with Japonica more in demand in southern Member States (for speciality dishes such as paella and risotto) and long-grain Indica in the rest of the EU. The consumption increase has been mainly for Indica and this trend is assumed to continue.

Graph 2.33 Main indicators for the EU rice market



Graph 2.34 EU rice imports (million t)



Given the limited capacity for the EU to expand production, the expected increase in domestic demand will be met by increased Indica imports. Since 2010, duty-free imports under the 'everything but arms' (EBA) agreement have started to crowd out imports from other suppliers not benefiting from the EBA agreement. Currently about 27 % of our imports originate from EBA countries (Cambodia and Myanmar in particular), slightly declining in 2016/2017 for the first time. Traditional suppliers such as Thailand and India have shares of 18 % and 23 % respectively. This shift towards EBA imports may continue, reaching a share of around 60 % by 2030. This import increase will further decrease our self-sufficiency rate to slightly above 60 %.

2.6. Protein crops

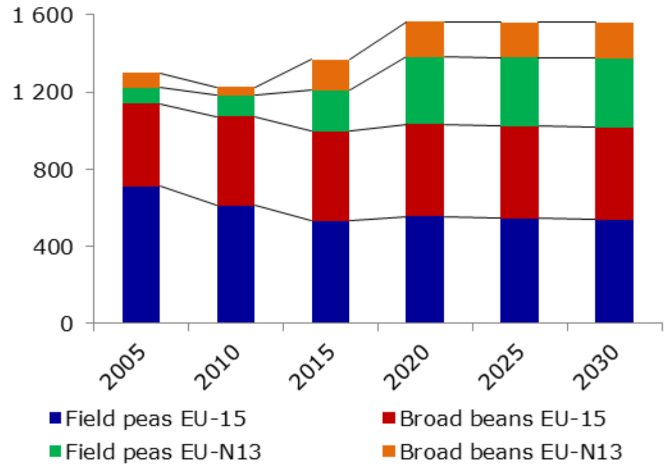
Driven by a favourable policy environment, protein crops recently experienced a strong revival, with record production in 2017/18. Over the outlook period, given the pressure on feed prices, area growth may slow down. This, together with some yield improvements, will lead to an increase in production in the EU. With a share of only 1.4 % of total crop area, the protein crop area will remain limited.

The main protein crops grown in the EU are field peas, broad and field beans, and lupines. Field peas are mainly grown in France, Spain and Germany, broad and field beans in the UK and France, and lupines in Poland. While popular in the past, protein crop production has decreased considerably in the last two decades, mainly because of economic unattractiveness and comparatively low yields, but also due to duty-free imports of protein crops and oilseeds, mandatory set-aside and other policy changes, and a lack of research and extension projects. After the specific support for protein crops was decoupled in 2009, some Member States decided to grant coupled support[37]: France, Spain and Poland in 2010, and Finland as from 2011. With the current CAP, 17 Member States opted for VCS for dry pulses, leguminous crops harvested green and/or soya bean, covering a total of 38 % of these crops' area in the EU. Meanwhile, 27 Member States consider areas planted with (one or more types of) protein crops eligible as EFA, as they are nitrogen-fixing plants. More recently, there is political demand to improve the EU's protein feed self-sufficiency, with calls for a European protein plan to be developed[38].

The protein crop area benefited from these policy changes and has shown continuous growth since 2013, thanks also to a strong protein demand from livestock production (both more intensive and organic production). Especially for the latter, strong further expansion is expected to satisfy consumer demand for non GM-fed livestock products (see chapter on dairy), offering further opportunities for the protein sector. A significant expansion occurred in 2015, especially in the EU-N13. The area increased further in 2016, but at a lower rate. In 2017, area expansion picked up again with remarkable growth, especially in the Baltic countries.

For the outlook period a further stabilisation of the protein crop area is expected given the rather low prices of competing feedstuff such as maize and soya bean meals having a bearing on protein crop profitability. There is also increased competition from EU soya beans, an area that is also expanding rapidly.

Graph 2.35 EU protein crop area (1 000 ha)



The policy change restricting the use of pesticides on EFAs might affect protein crop production in more intensive production regions such as those in France and the UK. Other restrictions on pesticide use, such as those linked to the Sustainable Use Directive, will also exert downward pressure. On the other hand, other CAP tools like VCS will continue to support protein crop production in the EU. With a share of only 1.4 % of total crop area, the protein crop area will remain limited.

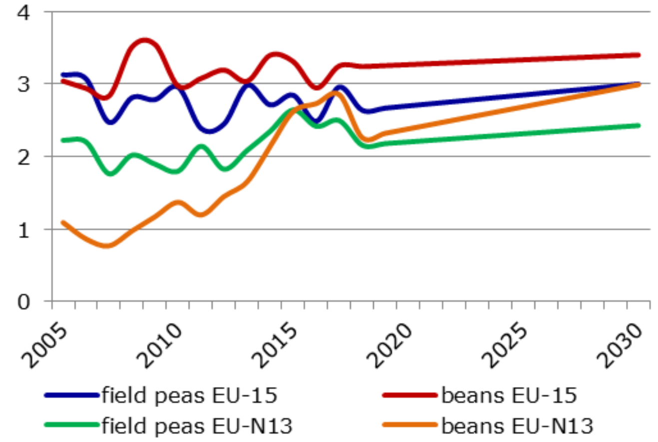
[37] Under Article 68 of Regulation (EC) No 73/2009, which allows Member States, under restrictive conditions, to grant specific support for certain agricultural products in order to maintain production.

[38] In this context a first initiative was to develop in 2017 an EU protein balance sheet to quantify the EU's supply/demand situation and its self-sufficiency in plant proteins.

Protein crops yields were higher in the past, especially in the EU-15 for field peas, but these have decreased in response to declining research activity and experience among farmers, coupled with relocation to less productive areas. Partly due to favourable cropping conditions, significant increases in the yields of field peas, and in broad and field beans, were achieved in 2014 and 2015, especially in the EU-N13. In 2016 there was a slight yield decline, which can be mainly linked to the adverse agro-climatic conditions. In 2017 yields are anticipated to be better, but no final figures are available yet. The renewed interest in protein crops is, however, also expected to have a positive impact on yield developments. With growing farming experience, especially in those areas where the crops were not grown before, higher yields should follow.

Slight yield increases on a stabilising area will result in a moderate production growth, from around 1.9 million t in 2016 to 2.5 million t in 2030 for field peas, and from around 1.9 million t in 2016 to 2.2 million t in 2030 for broad beans.

Graph 2.36 EU protein crop yield (t/ha)



2.7. Oilseeds complex

The gradual demand shift from rapeseed towards soya bean is becoming more apparent, with a decreasing rapeseed area and increasing soya bean imports and EU soya bean production. This trend, which is a reversal from the last decade, is expected to continue over the outlook period, as feed use will become the predominant driver of the oilseed complex, given uncertainty regarding first-generation biofuels.

According to the US Department of Agriculture (USDA), total world oilseed production in 2017/2018 is projected at around 580 million t. Global soya bean production is projected at around 350 million t, close to last year's record, while at 72 million t, rapeseed is also in line with last year's production, according to IGC. Despite the record high supply, a steady demand keeps oilseeds prices fairly stable.

At EU level, the 2017/2018 oilseed harvest is confirmed to be much better than last year's, with 34 million t, the second highest ever. Total areas planted were 3 % above the average of the last 5 years. Sunflower area decreased by 1 %, while rapeseed area recovered from 2 low years (+3 %). The increase in the soya bean area was further consolidated (+30 %), but total area remains relatively small (only 15 % of the oilseed area).

What about the UK?

For oilseeds, the EU-27 is a net exporter vis-à-vis the UK for meals and oils but a net importer of seeds (mainly rapeseeds, for which the UK represents 7 % of the EU-27 total rapeseed imports). The EU-27 is exporting 38 % of its meals (mainly soya meals) and 20 % of its oils to the UK (mainly sunflower oil), though this trade volume remains negligible compared to the strong EU-27 imports from the rest of the world (R.O.W.). It is acknowledged that a significant part of the traded volumes are transhipped through EU-27 ports and re-exported to the UK.

In 2017/2018, the UK had a considerable rapeseed area of 1.9 million ha, more than 8 % of the total EU area. This area reduced considerably from its peak of 2.8 million ha in 2011/2012, partly linked to problems with diseases. Yields are in line with the EU-15 average. Soya bean and sunflower production are insignificant in the UK.

The trend reversed in the mid-term: decrease in rapeseed area in the EU

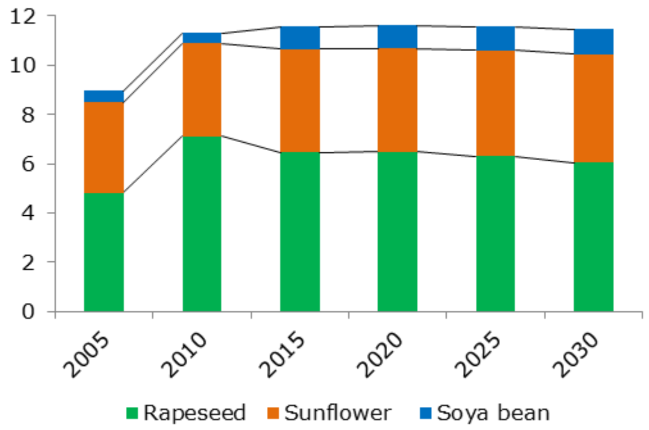
Both the surge of the policy-driven biofuel market and the intensification in animal production in the last decade have stimulated the development of rapeseed area and production. While around two thirds of domestic rapeseed is used as feedstock for biodiesel, rapeseed meal is an important component of compound feed, especially for dairy cattle and pig production.

The demand from the biofuel sector for domestically produced oilseed oils, mainly rapeseed oil, is expected to decrease towards the end of the outlook period (see Section 2.2). Increased vegetable oil food and industrial (bio-economy) consumption will only partially compensate that reduction, hence developments in the oilseed complex will be largely determined by developments in the animal and feed sector. In the feed sector, rapemeals are facing competition from sunflower meals and especially soymeals as protein-rich alternatives. Furthermore, rapeseed crops' high level of inclusion in the rotation and the potentially reduced availability of pesticides in the light of the Sustainable Use Directive will also affect the choice for rapeseed. The EU rapeseed area is expected to drop from an average 6.5 million ha in the last 5 years to around 6 million ha in 2030.

For EU soya bean production the odds look different. Both the policy and market environment are stimulating production. On the policy side, some major producers (Italy, France and Hungary) grant VCS, while areas cultivated with soya bean also counts for EFA in 15 Member States. It remains to be seen how the ban on pesticide use in EFAs will affect planting decisions.

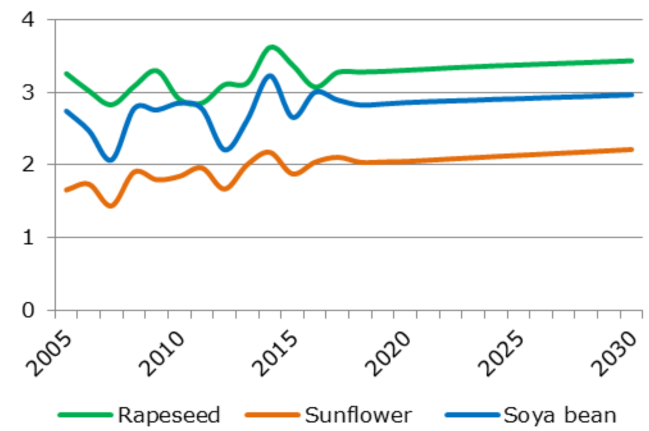
On the market side, soya bean's high protein content makes it a valuable feed alternative to rapemeal, while it can also profit from premium prices compared to imported GM soya. The area under cultivation keeps on growing, achieving a new record in 2017/2018 (922 000 ha). The area is increasing in the EU-15 but especially in the EU-N13, with Romania being the biggest grower. Over the outlook period we anticipate a further area increase of about 10 %, to a little over 1 million ha. Changes in area will depend on: (i) the relative profitability compared to maize and rapeseed, its main substitutes; (ii) the price premium for non-GM soya both for food use (in the production of meat substitutes) and feed use, with growing non-GM (e.g. organic) animal production; and (iii) further advances in breeding for this relatively new commercial crop in Europe.

Graph 2.37 EU oilseed area (million ha)



Soya bean and rapeseed yield will continue to outperform sunflower yield. Yield growth is projected to remain largely on trend, indicating only modest growth in the coming decade.

Graph 2.38 EU oilseed yield (t/ha)



Scope for increased soymeal imports and soya bean production in the EU

As explained in the following chapters, EU meat and dairy production is set to expand further. For poultry, and to a lesser extent pigmeat, livestock numbers will rise, while dairy production will mainly increase its productivity. To achieve this, a higher inclusion of protein meals in feed rations will be necessary.

While rapemeal was increasingly included in the feed mix in the last decade, at the expense of soymeal, the trend is again reversing. The first signs of higher soymeal use and import recovery were already apparent in previous years. Nutritional and economic factors hamper the inclusion of more rapemeal in the feed mix. The current inclusion of soymeal in feed rations is still relatively low, but it contains essential nutrients such as lysine and other essential proteins.

Compared to today, world soya bean production is expected to expand considerably (+28 %) by 2030, to reach nearly 434 million t. This expansion will mainly occur in Brazil (which will become the largest producer), the US and Argentina. Although the devaluation of the Brazilian and Argentinian currencies stimulates exports, some of the increased production will support the expansion of their domestic meat production. On the demand side, China currently imports about 63 % of the world's soya bean traded, and this share will increase to 67 % by 2030, according to the OECD-FAO. The Chinese do not import meals as they mainly crush domestically. China has launched a support programme for the production of domestic soya beans, but this will most probably not alter its soya bean import dependency (around 88 % currently).

The EU imports around 9 % of the soya beans traded, but also imports a large share of meals (31 % of protein meals traded, mainly soymeal). Import prices for soya beans and soymeals are projected below the recent high levels and this will stimulate imports further. The projected growth in biodiesel demand in the US and in other regions across the globe will also contribute to relatively cheap availability of soymeals.

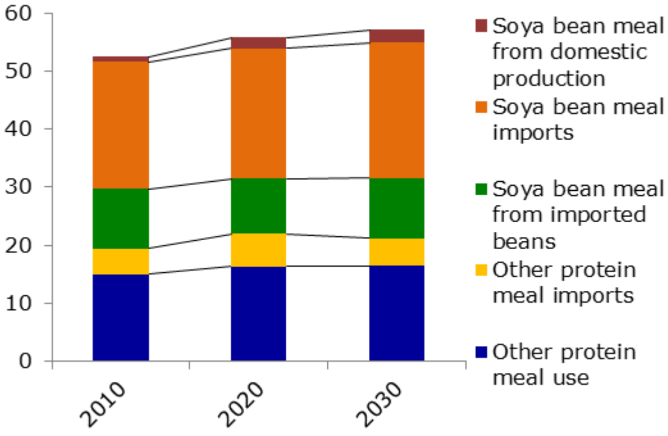
Most of the oilseeds produced in the EU are crushed domestically (mainly in the EU-15), as is the case for imported soya beans. The crushing margin[39] will remain slightly below the previous 10 years' levels, especially for rapeseed, given changes in the biofuels market (see dedicated section), low crude oil prices and generally low feed prices. This will also be the case for sunflower, as there will be more competition from other vegetable oils for food use, while the better nutritional value of soymeal weighs on sunflower meal prices. The soya bean crushing margin will remain largely stable, as it is mainly determined by developments in the feed sector, while the rapeseed's crushing margin follows more closely the developments in the biofuel sector. Still, some

[39] The crushing margin is determined by the crushing yields times prices of oils and meals divided by the oilseed price.

crushing plants are set up to easily switch between different oilseeds in response to market signals.

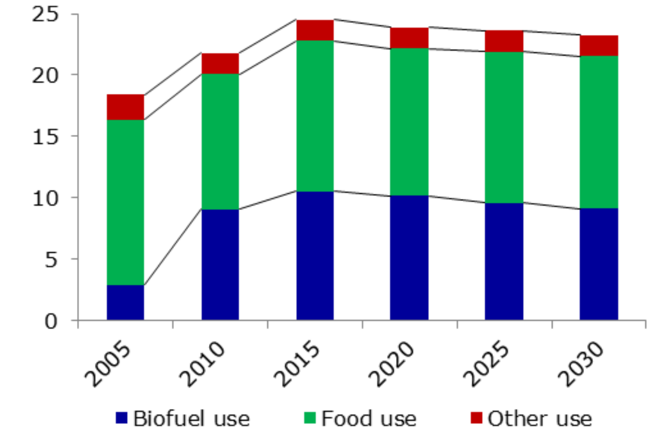
As indicated in Graph 2.39, these developments will further increase the quantity of imported soya beans and especially soymeals in the EU. Imports of other protein meals are projected to decline, partially substituted by increased soymeal production from domestic beans, but mainly due to more competitive soymeals on the world market.

Graph 2.39 EU protein meal sources (million t)



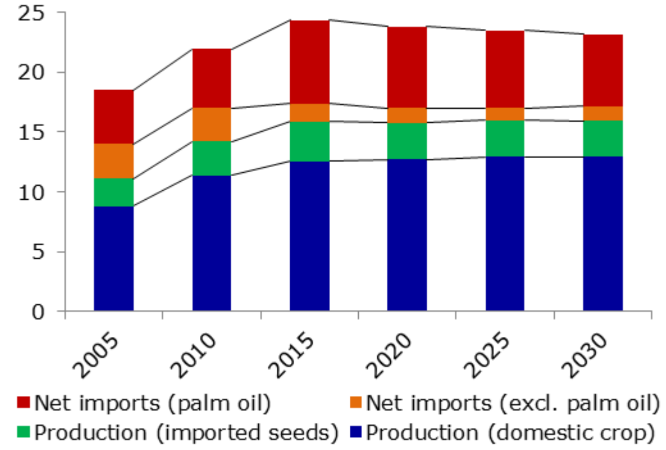
Vegetable oil food use cannot compensate for drop in biofuel use

Graph 2.40 EU vegetable oil use (million t)



Developments in the use of vegetable oil in the last decade were driven principally by the surge of the biofuels sector. However, the share of vegetable oils in the biofuels complex is projected to decrease in favour of waste oils and residues. In the EU, rapeseed oil accounts for the largest share of the vegetable oils used for biofuels (around 62 %), followed by palm oil (around 33 %). Total food use is expected to remain stable over the outlook period at around 12.4 million t.

Graph 2.41 EU vegetable oil origin (million t)

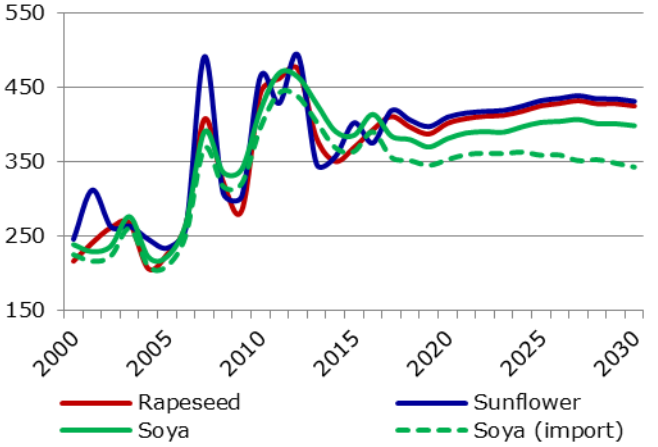


In retail and food services, sunflower oil is the most popular oil, although its total volume has decreased since the middle of the previous decade in favour of rapeseed oil, which receives a price premium in some key markets. However, sunflower oil's total food use keeps on growing, also considering industrial use for food preparation. Total palm oil food use shows a decreasing trend since 2009 after years of increases, due to increased competition from biofuel use, together with nutritional and environmental concerns. It is expected that these concerns will contribute to the further decrease in palm oil food use (from 3.4 million t in 2017 to 2.8 million t in 2030). Rapeseed and sunflower oil food use are expected to increase, supported by a shift towards high-oleic sunflower seed and rapeseed varieties, given their health benefits and associated price premiums. For rapeseed, less competition from biofuel use also stimulates food use. On the other hand there is some competition from butter, whose popularity is increasing again, with ample supply projected on the European market (see Chapter 3).

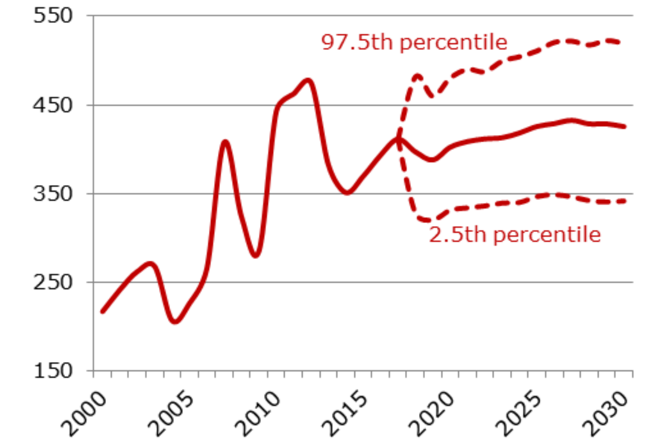
Price difference between soya bean and rapeseed

EU oilseed prices in 2016/2017 converged due to a relatively higher availability of sunflower compared to rapeseed, and a sustained world soy demand in the second part of the year. Prices of rapeseed and sunflower seeds are expected to be higher this marketing year (2017/2018) due to lower availability relative to soya beans. From 2018, prices are likely to slightly decline, in line with the general crop price projections, the assumed re-appreciation of the euro against the US dollar and low crude oil prices. Later in the outlook period, prices for rapeseed and sunflower seeds will recover again due to several factors: (i) the expected price rise of crude oil, energy and other inputs; (ii) the further appreciation of the euro; and (iii) lower availability compared with soya beans as the EU reduces its rapeseed production while production of soya beans expands globally and in the EU. The price difference between oilseed types is therefore expected to increase. An increased wedge between the EU soya bean producer price and the world price is also expected as domestic production may be driven by higher domestic demand for non-GM identity-preserved soya beans. The uncertainty analysis of the macroeconomic environment and the yield variability indicates that rapeseed prices will most probably remain above the 2005 low over the outlook period, but could exceed the 2012 high.

Graph 2.42 EU oilseed prices (EUR/t)



Graph 2.43 Projected price and possible paths for EU rapeseed price (EUR/t)



2.8. Feed

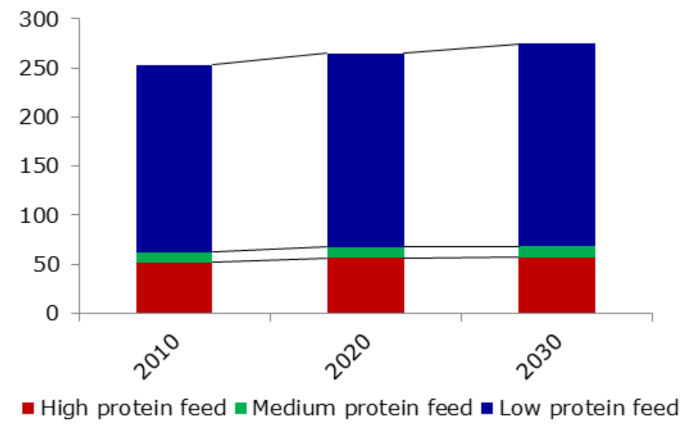
Given the expected increase of the poultry and dairy production in the outlook period, demand will drive compound feed use up to 275 million t by 2030, an increase of nearly 4 % over the period 2017-2030. Feed prices are expected to rise slightly, mainly for medium-protein feed, but not exceeding the high prices of recent years.

Depending on protein content, a distinction can be drawn between:

- low-protein feed (LPF), such as coarse grains, wheat, rice, cereal bran, molasses, roots and tubers;
- medium-protein feed (MPF), such as corn gluten feed, distiller dried grains, field peas and whey powder; and
- high-protein feed (HPF), such as protein meals, fish meal, SMP, meat and bone meal.

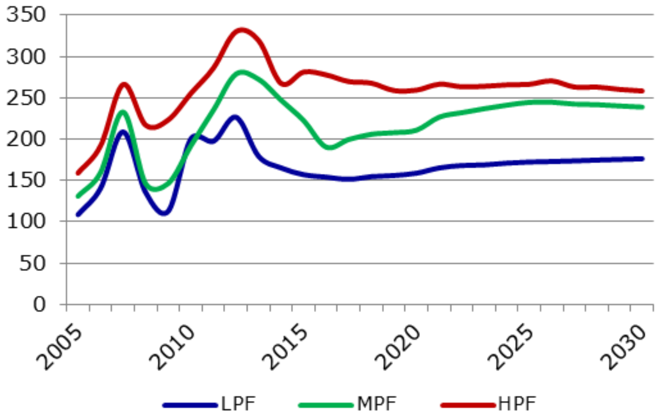
The EU-N13 uses slightly more LPF than the EU-15 (79 % vs 75 %), but a shift from LPF towards MPF and HPF is expected during the outlook period, reflecting intensification in the EU-N13. In the EU-15, the main growth area is MPF, with strong increases in distillers dried grain (DDG) use in the first years of the outlook period, while the use of field peas and broad beans is expected to increase at the beginning of the period given a favourable policy environment thanks to VCS.

Graph 2.44 EU compound feed use by protein content (million t)



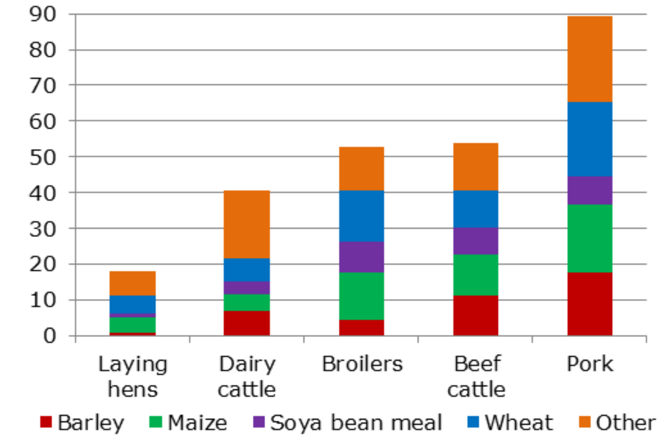
Feed prices are expected to follow the same trends as the main crops, moderately recovering over the outlook period. In the early years of the outlook period, they are expected to remain stable due to ample supplies of cereals and low energy prices. Nevertheless, prices will rise afterwards, especially for MPF, as demand is expected to increase due to the foreseen livestock intensification, as well as to higher production costs and inflation in the second half of the outlook period. Price wedges between feedstocks, especially LPF vis-à-vis MPF and HPF, will also likely affect the composition of compound feed.

Graph 2.45 EU compound feed prices (EUR/t)



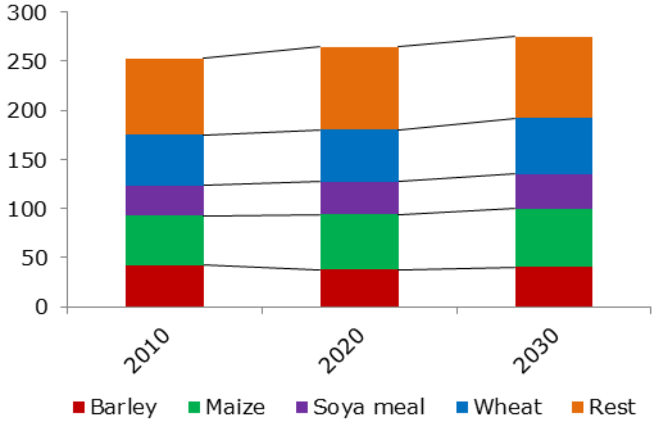
In the EU, the top feed destination is pig production, reaching 90 million t annually. The hog feed ration is mainly composed of barley, maize and wheat, which account for more than 60 % of the feed composition. Feed rations for beef cattle (54 million t annually) are also mainly composed of the three main cereals, as well as soya bean meals. Broilers are largely fed with soya bean meals, in contrast with dairy cattle (fed mostly on silage maize).

Graph 2.46 EU feed use per animal type in 2015/2016 (million t)



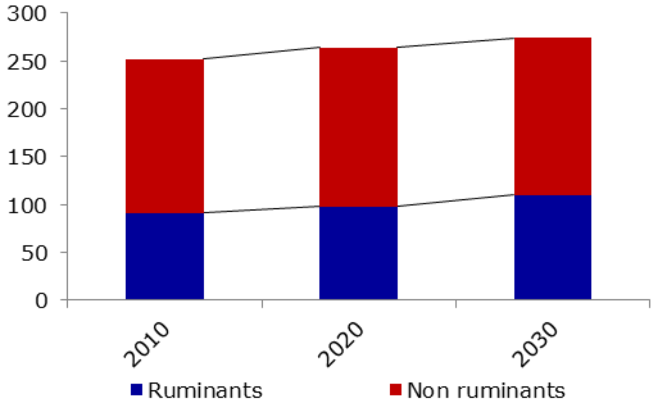
The share of barley in animal feed has increased since 2011 due to ample supplies and low prices relative to those of wheat and maize. In the early years of the projection, the price wedge is expected to shrink resulting in a lesser share of barley in the feed rations. By contrast, the share of maize has increased in recent years and is expected to continue increasing over the outlook period thanks to ample supplies and a moderate price increase. Wheat use in feed has already decreased as a result of high demand in the world market and is expected to remain stable over the next decade. The share of soya bean meals is expected to expand slightly, particularly in the first half of the period.

Graph 2.47 EU compound feed use per type of livestock (million t)



Over the outlook period, the most dynamic feed use will come from ruminants, accounting for 41 % of total feed use by 2030. This will be mainly driven by the dairy herd, which will slightly increase its feed use, while also beef production will be intensified. On the non-ruminant side, the increase will be mainly led by poultry production, which will predominantly increase in the EU-N13.

Graph 2.48 EU compound feed use per animal type (million t)



The feed conversion ratio (FCR) index, which indicates the change in the amount of feed used per kg of meat (or milk) produced, shows a steady decrease for granivores, showing feed-use efficiency gains in line with past achievements. The decrease is more pronounced in the EU-15 due to genetic improvements, productivity gains following further restructuring of the sector, and feed rationing triggered by environmental concerns. For ruminants, the FCR is projected to increase, as higher carcass weights and more specialised production systems are expected.

3. MILK AND DAIRY PRODUCTS

Although recent years have been particularly difficult, growing global and EU demand is expected to support world dairy markets in the long term. However, world market price variability will continue and market unbalances will occur. In response to this, operators involved in the supply chain will need to develop strategies to limit exposure to commodity price volatility.

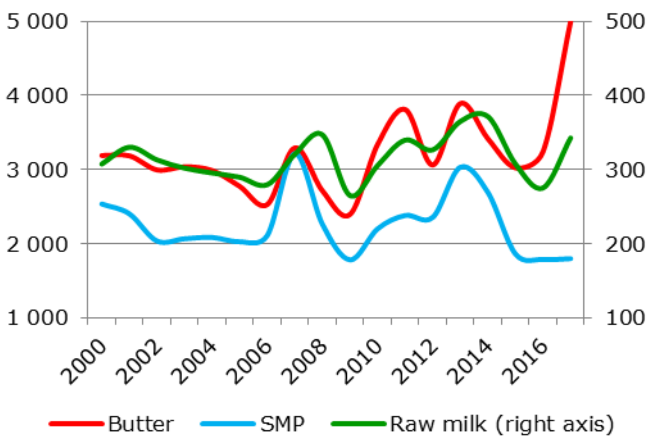
One way forward is producing more high value-added products such as cheese and infant formula. To that end, the EU has several competitive advantages, most notably the quality and reputation of its dairy products. In addition, increasing EU consumer demand for organic and quality products should enable farmers involved in these production systems to create higher value.

Recovery of milk prices in 2017 but a potentially difficult year ahead

In 2017, all dairy product prices recovered from the low levels of 2015 and 2016, except for skimmed milk powder (SMP). The price increase was driven by the reduction in production in the last quarter of 2016 and the first quarter of 2017 and strong demand, especially for dairy fats.

The EU raw milk price reached EUR 37/100 kg in September 2017, stimulating an increase in production. While droughts hit several EU regions hard, especially in the south, elsewhere good pasture and fodder conditions meant that farmers were able to store comfortable quantities of forage. Moreover, feed prices remained affordable thanks to an ample global grain harvest. As a result, in 2017, milk collection is expected to be 0.8 % above 2016 at 164 million t, while in 2018 significant growth is expected, due mainly to a recovery in production in France and Germany.

Graph 3.1 EU butter, SMP and raw milk price (EUR/t)



Cheese processing offered the best returns in 2017 and this should continue in 2018. However, with the expected increase in milk collection in 2018, prices are likely to be under pressure. In 2017, EU butter prices skyrocketed, reaching EUR 6 500/t in September. Several factors contributed to this price boom, among them the particularly strong reduction in milk production in the two main butter producing countries (France and Germany), the increase in cream production, a lower milk fat content, a drop in supply in Oceania and a very strong global demand for cream and butter. Butter prices are not expected to remain at this high level and in fact started decreasing already in the last quarter of 2017. Nevertheless, the price gap between SMP and butter prices may remain wide, at least in the next 2 years.

On the dairy protein market, demand and low prices drove record EU SMP exports close to 40 % above the previous year. This level of exports and the reduction in SMP production led to a strong decrease in private stocks. However, additional intervention buying-in took place and prices remained relatively low the whole year. With 351 000 t in stocks at the end of 2016 and 30 000 t additionally purchased in 2017, EU stocks reached very high levels. Such a high amount of stocks adds to the uncertainty on the dairy market in the short term, particularly regarding when and at what price these stocks will be released.

Developing countries are driving the increase in global milk production

In 2030, world milk production is expected to reach more than 1 billion t. This represents an annual increase of 16 million t, comparable to the average yearly growth of the last decade.

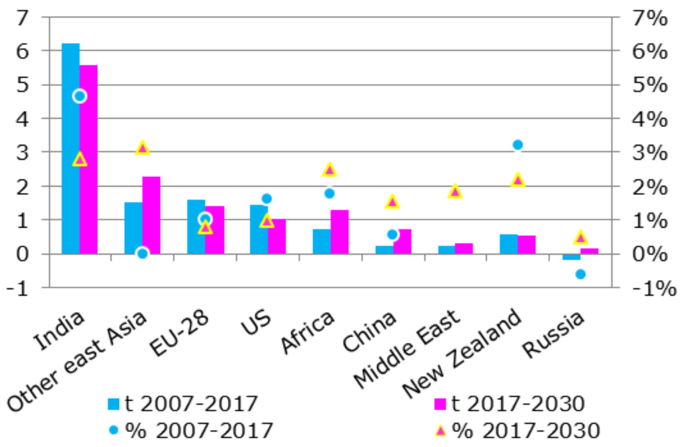
India is expected to account for 35 % of this increase, as its consumption of fresh dairy products keeps growing. However, India is not expected to trade on the world market, except occasionally if SMP prices were to spike (see Box 3.2). In **China**, the expected growth in milk production is much smaller (+700 000 t per year). Higher milk production growth is expected in **other Asian** countries, with on average 2.3 million t of milk produced additionally each year, mainly in Pakistan. In **Africa**, additional milk production (+1.3 million t per year) will mainly come from east Africa.

In developed countries, the projected rise in the **EU** (+ 1.4 million t per year on average) is larger than the expected increases in New Zealand and the US, the EU's main competitors (though not in percentage terms).

In **New Zealand**, the availability of pasture is the main factor limiting a significant increase of the dairy herd. Productivity is expected to grow, but at a slower pace than in the last decade. Out of the 23 % increase in milk production recorded between 2010 and 2014, half was due to higher cow numbers and half was linked to yield progress, mainly due to feed supplements (e.g. palm kernel meal).

In the **US**, sustained growth in milk production is expected (+1 % per year) as well as a further move of the herd from California eastwards, closer to consumption areas. The domestic market will absorb a significant share of this additional milk due to population growth (+0.7 % per year) and a continuous slight increase in per capita consumption.

Graph 3.2 Average yearly change in milk production (million t and %)

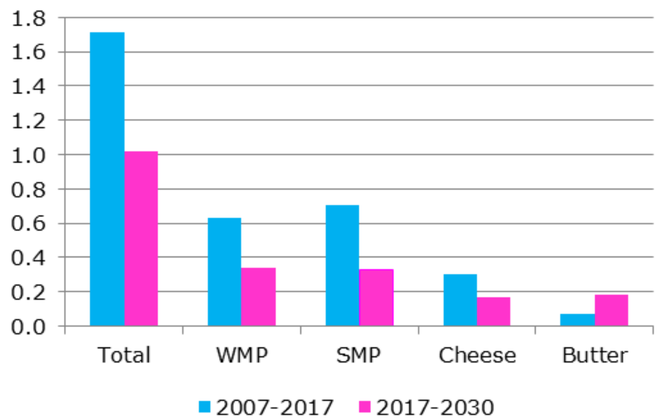


Note: Other east Asia excludes India, China and Japan
Source: DG Agriculture and Rural Development, based on OECD-FAO Agricultural Outlook

Fast-growing demand in developing countries leading to more trade

For those African and Asian countries which are not yet self-sufficient, production is expected to increase significantly. However, the increase in production will not be fast enough to satisfy the increasing demand, and this will create most of the world increase in trade.

Graph 3.3 Average annual increase of dairy product global trade (million t milk equivalent[40])



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

[40] Methodology accounting for all components of milk. Coefficients used: 3.58 for cheese, 6.57 for butter, 7.57 for SMP, 7.56 for WMP and 7.48 for whey powder.

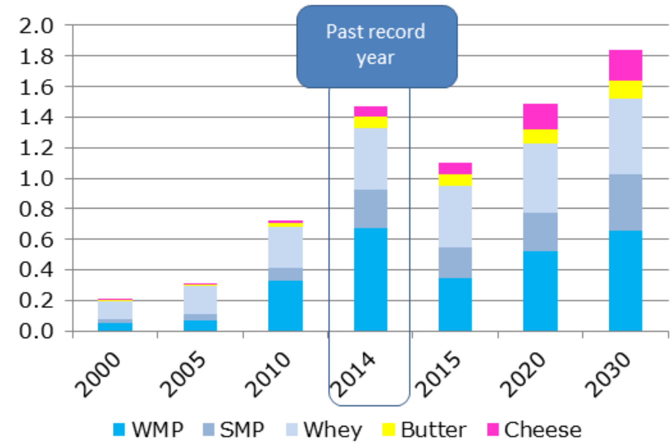
Global trade for whole milk powder (WMP), SMP, cheese and butter is expected to grow on average by 1 million t of milk equivalent per year. It is significantly (-40 %) below the last decade's average growth for all products, except for butter, for which trade will expand faster than in the last decade.

In **Africa**, shipments will rise mainly to the northern and western part of the continent. Population growth is the main driver of production and import growth, especially in Nigeria. In addition, in this country, the assumed oil price increase will lead to higher disposable income and a recovery in imports. Moreover, while sub-Saharan Africa will continue importing mainly powders (including fat-filled milk powders (FFMP)[41]), cheese and butter shipments to north Africa are expected to more than double.

China is the largest world importer of dairy products. Shipments to China are expected to increase significantly (by more than 2 % per year).

The Chinese Government has in its five-year planning acknowledged that it is impossible for China to become self-sufficient, due to a lack of sufficient natural resources and the need to rely on imports of dairy products. In addition, Chinese consumers trust the safety of foreign products, while e-commerce, widely used in Chinese megalopolises, makes buying foreign products very accessible for households. By 2030, imports are expected to supply more than 20 % of Chinese domestic consumption of dairy products.

Graph 3.4 Chinese imports of dairy products (million t product weight)



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

There are two major changes compared to the past decade: first, import growth is three times lower due to higher domestic milk production in China and lower population growth (at 0.2 % per year only). The positive effect of the 'two-child policy' (in 2016, at least 45 % of births were reported in families with already one child) is counter-balanced by the decline in the number of women of childbearing age.

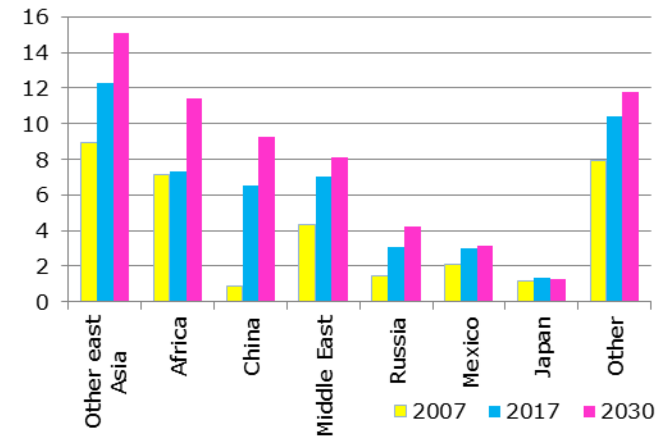
[41] FFMPs are a mix of SMP and vegetable fat. See section on SMP.

The second major development is the change in the imported product portfolio towards higher value-added products such as cheese, butter and cream, for which Chinese production capacity is small. In addition, while WMP imports are likely not to exceed the record 2014 level, more SMP will be shipped to China for further processing. By 2030, China could import almost as much cheese as the US, mainly mozzarella-type cheese and cream cheese. Moreover, butter and cream shipments are expected to continue growing, particularly for use in bakery production. UHT milk shipments to China are likely to decrease, as observed in the first 7 months of 2017, when liquid milk exports declined by 10 %, while cream exports almost doubled. The decline in UHT milk is a result of strong competition from local milk.

Infant milk formula is by far the most important product imported by China in terms of value (2.8 billion USD out of close to 6 billion USD imports of all dairy products in 2016). Chinese imports are expected to continue growing strongly despite strong competition from local production brands and increased regulation on imports.

Shipments to other **east Asia** are expected to continue growing steadily, with cheese shipments to South Korea and mainly powders to Indonesia, Malaysia, the Philippines and Vietnam. Shipments to the Middle East and Mexico are expected to increase slightly and to remain constant to Japan.

Graph 3.5 Global imports of dairy products (million t milk equivalent)



Note: cheese, butter, SMP and WMP
Source: DG Agriculture and Rural Development, based on OECD-FAO Agricultural Outlook

As regards **Russia**, if its import ban were to be removed in 2019, shipments to the country would not likely to rapidly resume to previous import levels. This is because dairy product consumption has declined due to the deterioration of the economy and the partial compensation of banned traditional suppliers, and because domestic milk production grew slightly. In addition, Russia has seen an increase in the production of analogue dairy products (i.e. produced with dairy proteins and vegetable fat, cheaper than cheese). Therefore, in 2016 cheese consumption in Russia was 16 % below its 2013 level. However, with the expected recovery of the economy and the appreciation of the rouble, cheese consumption is likely to increase should the ban be removed. However, it would take several years for Russian cheese imports to reach pre-ban levels, while butter and SMP imports (used to produce analogue) are expected to grow faster.

What about the UK?

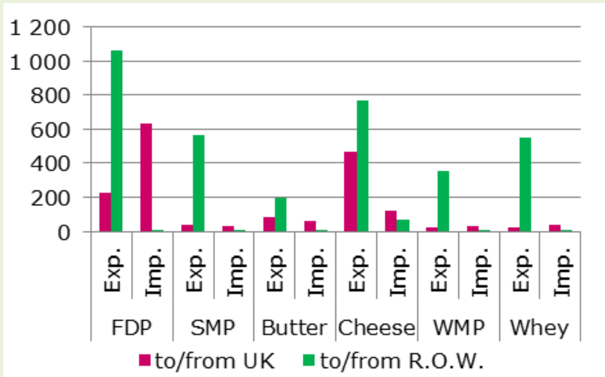
The UK represented around 9 % of milk production in the EU-28 in 2016. The average yield in the UK is well above the EU-28 average, and even higher than the EU-15 average (7 900 kg per dairy cow in the UK, 7 000 in the EU-28, 7 400 in the EU-15).

The UK is an important trade partner of the EU Member States, especially for cheese and fresh dairy products (FDP). In 2016, these products covered more than 80 % of EU-27 exports of dairy products to the UK. Interestingly, the UK exports to the EU-27 the same categories of products.

Comparing the EU-27 volume of dairy products traded with the UK and the R.O.W., the UK itself covers more than half of EU-27 cheese exports to the R.O.W. The main EU cheese exporters to the UK are Ireland, France and Germany. The main EU-27 cheese exports to the UK are fresh cheese (25 % of 2016 exports), cheddar (20 %) and fresh mozzarella (15 %). The most imported categories of cheese from the UK are cheddar (40 %) and mozzarella (14 %).

The UK holds also a strong trade position with the EU-27 for fresh dairy products, both as an importer and even more so as an exporter. More specifically, the UK supplies large quantities of liquid milk to Ireland.

Graph 3.6 EU-27 dairy trade in 2016 (1 000 t)



Generally, products traded with the UK have a lower average price than products traded with the R.O.W. This applies particularly to liquid milk. The EU-27 exports to the R.O.W. are mainly of packaged milk, whereas the exports to the UK are in bulk. The average unit value of cheese exports to the UK is also lower, mainly because of the different mix of products.

Global and EU demand driving an increase in EU supply

The EU is expected to supply close to 30 % of the global increase in import demand. Accounting for whey powder and fresh dairy products, EU exports are expected to grow on average by more than 400 000 t of milk equivalent per year, mainly in cheese and SMP.

In parallel, close to 900 000 t of milk per year would be needed to satisfy the growth in EU domestic use, mainly for cheese and for the processing of other dairy products (such as dairy desserts, fat-filled milk powders, infant milk formula, protein and whey concentrates). By contrast, liquid milk consumption is expected to continue decreasing. There are several contradicting trends playing a role on the domestic market. Changes in lifestyle, campaigns on social networks promoting lower dairy product intake for adults, and increasing lactose intolerance claims are among the factors driving lower consumption of liquid milk in particular. The rising production of processed products implies higher use of cheese (pizza and prepared meals), SMP and butter (pastry and cakes).

Less liquid milk and more cream

Consumption of **liquid milk** decreased by almost 6 kg per capita in the last 10 years in the EU and is expected to further decline by 6 kg to 52 kg per capita in 2030.

One driver of the reduction is the growth of lactose intolerance claims. Another is the partial substitution of cow milk by alternative drinks such as soya drinks. The increase in sales of alternatives to milk is estimated at below 1 kg per capita in the last 10 years. However, it only partially offsets the reduction in cow milk consumption because the main driving factor is a significant change in consumption habits, especially at breakfast. In France, where the drop in consumption is more pronounced, the number of people skipping breakfast at home is increasing. Moreover, milk is less systematically consumed at breakfast.

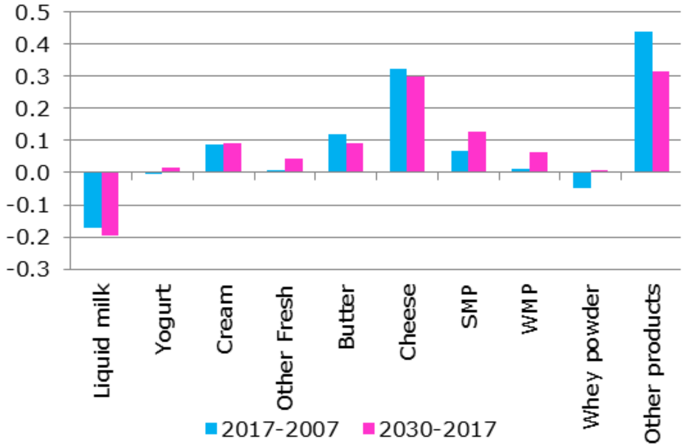
The consumption of liquid milk is holding up better in Member States where fresh milk is predominant over UHT (like in the UK). In addition, organic milk consumption is growing and market segments such as lactose-free, GM-free or 'fair' milk (for which farmers' remuneration is higher) are also developing. These trends might not relaunch the overall level of consumption but they will definitely add value to this market segment. In addition, in the EU-N13 liquid milk use is expected to continue growing to 30 kg per capita in 2030. However, this is still significantly below the consumption level in the EU-15 (57 kg per capita).

In the last decade, part of the drop in consumption was compensated by rapidly increasing exports of UHT milk (+16 % per year), especially to China. However, because of increasing competition from Chinese milk and from New Zealand's exports to China, EU exports are expected to decline, reaching 670 000 t of milk by 2030. Therefore, liquid milk production is expected to decline by 3 million t to 27.6 million t in 2030.

Similarly, the decline in consumption of **yogurt** in the EU-15 recorded in the last 10 years (-1 kg per capita) is due to changes in consumption habits linked to the financial crisis and the restriction on the use of 'health' claims. By contrast, yogurt consumption in the EU-N13 continued growing. In addition, yogurts highly concentrated in proteins are popular with people who practise sport and with young women. In the next years, per capita yogurt consumption is expected to decline slightly in the EU-15 and to continue increasing in the EU-N13, leading to a production of 8.2 million t of yogurt in 2030. Moreover, the consumption of dairy desserts should continue increasing. These contain less milk than yogurt.

The trend is completely different for **cream**, with strongly increasing retail sales and exports. As with butter, cream is seen as a natural product, with its use being promoted by cookery programmes on television. It is also an ingredient in several processed products. Therefore, cream production is expected to reach 3.3 million t by 2030 (+17 % compared to 2017). Exports are likely to increase strongly, driven particularly by Chinese demand for bakery products.

Graph 3.7 Average yearly change in milk domestic use (million t milk equivalent)

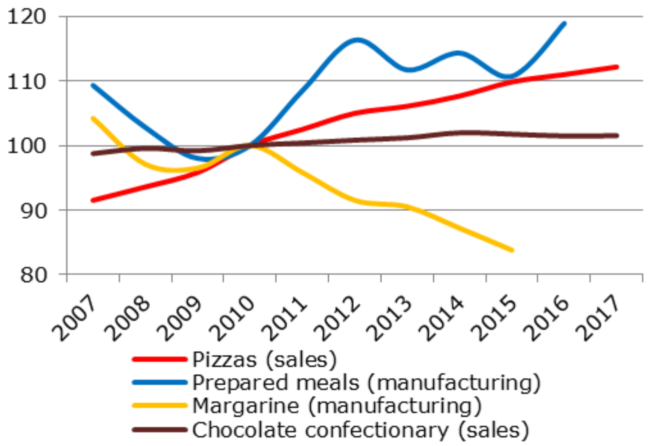


Cheese consumption driven by processing use

The main driver of cheese consumption growth is its processing use on the domestic and export markets. The volume of ready meals manufactured in the EU increased by close to 20 % between 2010 and 2016. More specifically, retail sales and the use of mozzarella in catering increased by more than 10 % over the same period, mainly for pizzas. Also for exports, mozzarella represents now more than 10 % of EU cheese exports.

Therefore, EU per capita cheese consumption is expected to further grow by 2 kg per capita to 20.4 kg by 2030. The highest increase is expected in the EU-N13, by 2030 the consumption is likely to be only 1 kg below the consumption level in the EU-15.

Graph 3.8 Production of prepared meals and retail sales and use in catering of pizzas (2010=100)



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

On the export market, besides China, other main growing markets for the EU are Japan, South Korea, the US and the Middle East. Export of cream cheeses and cheddar are growing the fastest. Cheddar exports are growing particularly strongly to Saudi Arabia and Egypt. The EU is expected to export close to 1.2 million t of cheese by 2030 and to supply close to 40 % of world import demand. The unitary value[42] of EU cheese exports is higher than the EU's main competitors (60 % higher than New Zealand and 30 % higher than the US in 2016). This difference highlights the diversity of EU cheese exports, composed of a higher share of hard cheeses and of several geographical indications (GIs).

In 2017, with an average market price of EUR 3 400/t for cheddar, cheese processing offered the best returns. This is expected to continue because of the increasing demand highlighted above, which is driving production growth of 1 % per year, to 11.7 million t in 2030.

High demand for butter will continue but prices will ease

The market situation with butter prices skyrocketing above EUR 5 000/t is not expected to last over the medium term. This is because the summer and autumn price spike cannot entirely be explained by market fundamentals. Sustained demand for dairy fats will remain, but with New Zealand resuming its regular milk production level and with the expected higher milk production in the EU, prices will ease. Over the medium term, the relationship between butter and SMP prices is expected to come closer to previous levels.

The phenomenon observed already in the EU, where the reduction in margarine manufacturing reached close to 20 % between 2010 and 2015, is now being observed more globally. On the top of higher retail sales, butter, and dairy fat more generally, is increasingly used for processing, particularly in bakery manufacturing, sometimes substituting palm oil. Therefore, global import demand is expected to increase faster than in the past, by close to 30 000 t each year. Nevertheless, less than 10 % of world butter production will be traded by 2030. This increased demand will drive higher EU butter exports, projected at 250 000 t in 2030. Given the dominant position of New Zealand producing cheaper butter, the EU should be able to supply 20 % of world demand.

On the domestic market, per capita consumption is expected to reach 4.6 kg in 2030, which is a continuation of the increasing trend but slightly slowed down. The projected level of EU production is 2.6 million t in 2030, an annual increase of 1 % per year. This growth will be supported by the anticipated small increase in milk fat content of 0.8 % in 13 years, to 4.08 %.

SMP market affected by significant stocks in the short term

The strong and fast increase in EU milk production by close to 10 million t between 2013 and 2015 coincided with the introduction of the Russian import ban and with a significant drop in Chinese purchases. Therefore, large quantities of milk were processed into storable products, namely SMP and butter. As a result, SMP prices dropped to intervention price level and public purchases in 2015-2017 led to an intervention stock of 375 000 t by the end of 2017, i.e. around 3 months of SMP production.

In 2017, after several years of strong increases, SMP production dropped by 5 % (the SMP production decrease actually began in June 2016), while exports jumped by close to 40 %, boosted by low prices. In addition, domestic use of SMP steadily increased. This is why private stocks should be very low by the end of 2017.

For the following years, one working assumption is that public stocks would be released in the next 3 years, with no additional purchases taking place. Thanks to sustained butter prices, the milk price is assumed to remain high enough not to drive purchases even though SMP prices could be low in 2018 and 2019.

In 2018, SMP demand is expected to be sustained and the production increase will be small because cheese production will remain more profitable. If exports remain stable (at the current high level) the working scenario would be a release of 140 000 t of intervention stocks. Some recovery of private stocks (which are currently very low) is expected, leading to a total stock release on the market of 100 000 t 'only'. In this scenario, SMP prices are expected to remain rather low in next 2 to 3 years.

Another working scenario may be that of no release of SMP from public stocks in 2018. The window of opportunity to sell intervention stocks is narrow.

[42] Value of export divided by quantities.

Given the increase in milk production in the first quarter of 2018, the appetite to buy from intervention stocks might be low, knowing that fresh powder will be available soon at a low price. If no intervention stocks were to be released in 2018, assuming a slightly higher production than in the previous assumption, lower availabilities would imply an export drop to 670 000 t (-15 %). At the same time, private stocks would remain very low, creating the conditions for an increase of SMP prices. In turn, this could stimulate offers to buy from intervention stocks.

Table 3.9 Scenarios considered for the SMP market next year (million t milk equivalent)

	2017	Scenario 1: 140 000 t SMP release in 2018		Scenario 2: no SMP release in 2018	
		2018	18/17	2018	18/17
Prod.	1 490	1 520	2 %	1 540	3 %
Exports	790	800	1 %	670	-15 %
Use	800	820	2 %	830	4 %
Stocks	420	310	-25 %	460	9 %
Intervention	380	230	-39 %	380	0 %
Private	30	80	167 %	80	167 %
Change in stocks	**-100**	**-100**		**40**	

High global demand for SMP will help rebalance the market in the long run

Domestic and global demand is expected to support the SMP market in the long run and lead to a recovery in the average SMP price to above EUR 2 500/t after 2020. Global SMP imports are expected to grow annually on average by 45 000 t over the outlook period, while EU domestic use should steadily increase (+1.5 % per year). EU exports are projected at 1 million t in 2030, while production should almost double. In total, the EU should supply more than 30 % of SMP world demand.

SMP is used to process various products both on the domestic market and abroad: fresh dairy products, dairy desserts, chocolate, bakery, fat-filled milk powders (FFMP) and ready meals. While chocolate confectionery in the EU remained more or less stable, other uses are increasing. The most noticeable is the increasing market of FFMPs.

Growing protein market: FFMPs

FFMPs are a mix between dairy proteins and vegetable fat (often palm oil) with around 25 % protein content. The global market for FFMPs was estimated by GIRA consultancy at around 800 000 t in 2016. Around 500 000 t are consumed in Africa, mainly originating from the EU, while 300 000 t are produced in Asia (mainly Malaysia) using imported SMP and whey. African FFMP imports grew by 8 % per year in the last 10 years. Growth should continue in the coming years, albeit at a slower pace, driven particularly by population growth. In Asia, the expected growth is smaller.

At the beginning, FFMP trade developed mainly thanks to its comparative price advantage due to the difference between butter oil and palm oil prices. However, now consumers are getting used to its taste and even in periods of lower WMP prices (as in 2016) consumers did not go back to WMP.

The EU is the main supplier of the African market: FFMPs are exported in bulk and then packed into small portions. Several EU dairy companies invested in re-packing facilities, especially in west Africa. The product is re-constituted into liquid milk mainly by households. On the Asian market, FFMP is more used in processing (e.g. bakery, ice cream, yogurt).

Other enriched powders with lower protein content are also produced in the EU. They are used, for example, to produce coffee and tea creamers. These are traded more on the Asian market.

Stable EU WMP market

The WMP market is projected to slowly grow to 900 000 t of production in 2030, half of which will be exported and half consumed domestically (to produce chocolate in particular). The EU is less competitive on the WMP market; by 2030 it is expected to supply less than 15 % of the world import demand. The EU market share was much higher in the past, standing at around 30 % 10 years ago.

Whey market driven particularly by infant nutrition

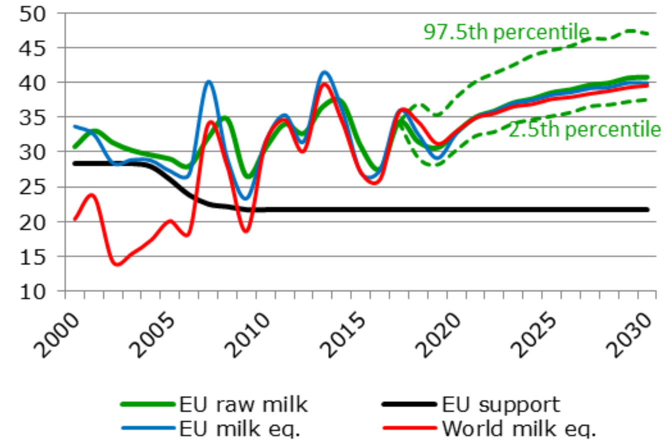
The EU is producing around half of the world dry whey production, thanks to its large cheese processing capacity. According to GIRA estimates, standard whey represents around 60 % of total whey products. Although on a decreasing trend, feed production accounts for more than 50 % of standard whey powder use.

By contrast, other uses of whey with high value-added are developing: infant milk formula and sport and clinical nutrition. This involves a higher increase of whey protein concentrates and demineralised whey. However, domestic use of standard whey (only standard whey covered in this outlook) is projected to be stable at 1.3 million t. By contrast, exports are expected to continue growing by 3 % per year, driven by global demand.

Demand-based milk price increase over medium-term and moderate supply growth

The expected increase in milk collection next year may add pressure to milk prices in the next 2 years, which are currently close to historically high levels. In the next 13 years, despite expected ups and downs, milk prices in nominal terms are expected to follow an increasing trend, driven by demand. Given the assumed oil price and the projected affordable feed prices (on trend), the margin over feed should increase. The uncertainty analysis run by the JRC (on macroeconomic conditions, crop yields and Oceanian milk yield) highlights that prices above the trend are more likely to occur than lower prices. However, this analysis does not cover all price risks, for instance those linked particularly to market unbalances due to the time required to adapt production to milk price signals.

Graph 3.10 Milk price development and possible price paths (EUR/t)



The sustained EU and global demand is expected to support prices and drive an increase in EU milk production below 1 % per year on average, i.e. 1.4 million t. This is an average given that the weather can affect strongly milk yield and market conditions. This growth can be seen as moderate, taking into account that in 2 years, between 2014 and 2016, the EU increased deliveries by 10 million t. However, this corresponds to the potential rise in demand, knowing that the EU will compete with New Zealand and the US.

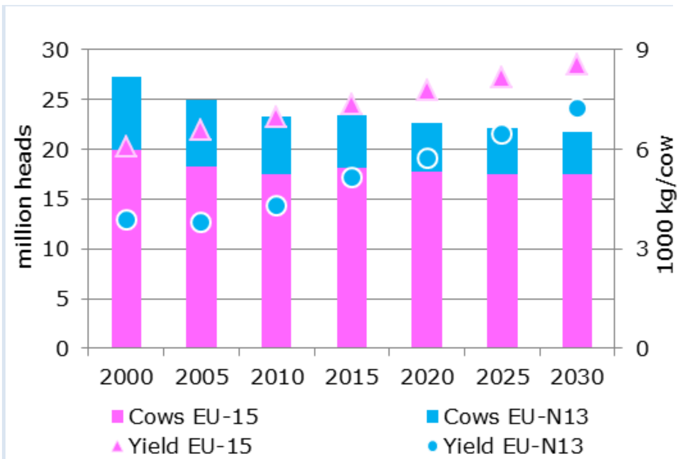
In addition, as with its main competitors, the development of EU production will be limited by the need for sustainable use of natural resources. In areas with very high livestock density in the EU, the water quality has already suffered a very strong deterioration and therefore environmental constraints are needed and imposed to reach the water quality requirements agreed by the EU. In some cases these have had a bearing on the number of animals that could be reared in those areas. For example, the Netherlands, facing a very acute water pollution problem, already had first-hand experience of this in 2017, with a drop of its dairy herd by 50 000 heads to decrease phosphate emissions (the Dutch suckler cow herd was reduced too).

Changes in citizens' and consumers' expectations will lead to changes in production systems. Besides quality schemes, which are already common for cheese, organic milk and milk from cows fed without GM feed may develop, substituting part of the conventional liquid milk. Producing organic and GM-free feed implies a higher reliance on pasture (enriched with leguminous crops), fodder, European protein crops and soya beans.

The yield of organic cows is lower (see Box 3.1). Holstein cows tend to be used less in alternative and quality production systems. In addition, other breeds offer advantages, notably in terms of fertility, fat content, rusticity and adaptation to local conditions. All these factors might lead to slower growth in the average EU milk yield than in the past decade, with on the one hand lower input systems with lower yields and on the other hand conventional systems where yield might continue increasing fast, relying more on feed purchases. The average milk yield is projected below 8 300 l/cow in 2030.

These changes in production systems will mean that the number of dairy cows in the EU-15 should remain stable after 2020 at 17.5 million cows (back to the 2012 level). By contrast, restructuring will continue in the EU-N13, albeit more slowly, with an annual decline in cow numbers of 6 000 dairy cows (-1.3 % per year). In total, the number of dairy cows is projected at 21.8 million heads in 2030.

Graph 3.11 EU dairy cow number and yield



Box 3.1 Organic milk in the EU

In 2016, around 3 % of the EU milk produced was organic. There are significant differences between Member States, with organic milk accounting for around 10 % or more in Sweden, Austria, Latvia and Denmark. By contrast, organic milk production is below 0.5 % in Ireland, Spain and Poland. In the two main dairy producing countries (Germany and France), organic production was close to 2.5 % of total milk in 2016.

In organic production systems the yield from a cow is on average more than 30 % below the yield in conventional farming. The diversity of organic production systems is wide, with yields above 7 000 kg/cow in Denmark, Sweden and the Netherlands (around 10 % below conventional systems) and yields below 5 000 kg per cow in Germany and France.

There are numerous conversions taking place. The rate of conversion increased in response to the dairy crisis, because during that period the price gap was more than 10 cents/l. This phenomenon could also be observed after the 2009 crisis. Consumers are also turning strongly to organic products

Box 3.2 Could India become a dairy net exporter in the near future?

Background

India is the largest milk-producing and consuming country in the world and has the world's largest milking herd. Milk production has been expanding at about 4 % annually since 2000, matching growth in demand as incomes increase. So far India's international trade in dairy products, both imports and exports, has been marginal relative to the size of production and consumption. But the large scope for future growth in both milk production and consumption suggests a wide range of possible outcomes for India's future trading status.

India's milking herd is comprised of indigenous cattle, crossbred cattle, water buffalo and goats. Buffalo milk accounts for about half of deliveries, cow milk 45 % and goats 4 %.

Roughly 15 % of all milk produced in India goes through organised commercial channels, via cooperatives or private companies, with the remaining milk being retained by producers or sold in local markets.

Potential to increase milk production in India lies in improving the feed supply to the dairy herd. The Indian Government estimates a shortfall in actual feed use from recommended rations for cattle and water buffalo of about 10 % for dry fodder, 33 % for concentrates and 35 % for green fodder. Feeding of dairy animals through reallocation of land resources (more fodder crops), application of technology or through feed imports is likely to be the key in expanding India's milk production in the near future. But given the small and marginal farm structure of the Indian dairy herds, it is difficult to implement improved feeding practices and apply new technology. Therefore, an increase in the scale of dairy animal operations is strategic for future growth of dairy production. This could be facilitated by the setting-up of foreign dairy processing industries, something which is already occurring in India.

India's population of more than 1.2 billion is growing by more than 1 % per year and GDP growth rates have been high in recent years. Higher growth is likely to increase demand for milk and milk products, with growing middle class consumers demanding more and better quality dairy products. About 25 % of the population are 'lacto-vegetarians' who consider milk as the only source of animal protein. In India milk products are also celebration foods and associated with luxury.

The growth in consumption of dairy products in India has been led by an increase in the consumption of fresh dairy products, which has increased from 64 kg/capita in 2010 to 81 kg/capita in 2016. This trend is expected to continue as incomes grow.

Butter/ghee is also very popular in India, with consumption increasing from 2.8 kg/capita in 2010 to

3.1 kg/capita in 2016. More than three quarters of India's consumption of dairy fats is in the form of ghee. It is used for cooking, for making sweets, as a topping on Indian breads and also for religious ceremonies. With growing income, domestic demand for ghee could increase, producing a larger amount of skimmed milk during dairy processing, which could be used in the production of skimmed milk cheese, yogurt, casein or skimmed milk powder (SMP).

Rising food prices, driven largely by rising incomes, urbanisation and demand for more diversified diets, are key concerns of policymakers. An average Indian household spends nearly 50 % of its income on food, making household welfare particularly vulnerable to higher food prices. Persistent pressures on domestic milk prices could boost government efforts to increase production and if necessary, imports. India's trade policy behaviour indicates that domestic dairy price stability is a higher priority than exports. In fact, in the past export embargoes have been imposed in an effort to curb inflation of milk prices[43].

Scenario

According to the latest OECD-FAO agricultural outlook, milk production and demand in India are projected to follow each other, with stocks not expected to change, and minimal changes in trade. But in the past India has opportunistically exported 140 000 t of SMP in 2013, when world market prices were high, only to stop exporting when world dairy prices fell.

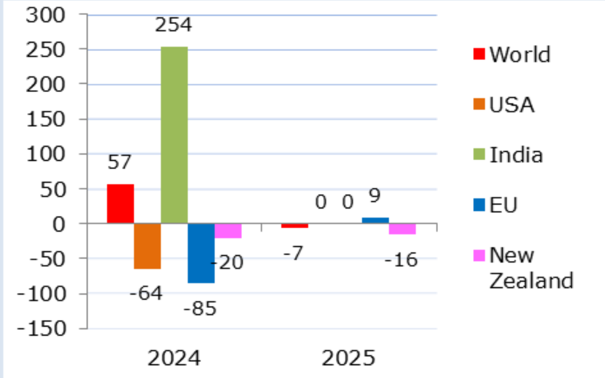
As an alternative to the outlook projections, this scenario explores the possible economic impacts of future opportunistic exports of SMP from India. The scenario focuses on India capturing 10 % of the world export market for SMP in 2024 and what impact this would have on the EU dairy markets.

This scenario simulates an opportunistic export of 256 000 t of SMP in 2024, which is not foreseen to be a permanent feature (i.e. exports from India fall back to 2 000 t in 2025).

Graph 3.12 shows the impact on the SMP market in 2024 and 2025, illustrating the changes in exports from major players in world dairy markets. Notably, the world market expands by 57 000 t as exports from India reduce the world market price of SMP by 6 %, increasing global imports.

The major players affected by India's emergence onto the SMP market are the EU, the US and New Zealand, but in the following years (2025 and 2026), markets return to the status quo.

Graph 3.12 Change in global SMP exports (1000 t)



The EU and the US experience a 12 % reduction in their exports of SMP. This reduces the domestic milk prices in these countries, stimulating domestic consumption, which accounts for over 50-60 % of dairy production in the EU and the US. In the case of New Zealand, SMP exports are reduced by only 6 %.

In the EU, the net impact of India engaging more actively in the world SMP market in 2024 results in the reallocation of milk use. Particularly, instead of SMP and butter production, milk will be processed more into cheese, WMP and fresh dairy products as world market prices change.

Table 3.13 Changes in EU dairy production, 2024

	Change	
	1000 t	%
SMP	-75	-4.3
Butter	-14	-0.6
Cheese	28	0.2
WMP	3	0.4
Fresh dairy products	304	0.7

The net effect of India's SMP exports in 2024 translates into a reduction of EU farmers' milk price by 0.7 % in 2024, with no reduction in milk production.

Conclusion

India is mainly focused on its domestic market. However, SMP can be produced and traded when prices are attractive on the world markets. As a result, India can rapidly increase its exports, as already observed in the past. The results of this scenario show that in that case a substantial decrease in EU exports of SMP could be expected, but with a fairly small impact on EU farmers' milk prices.

[43] For a more detailed overview of the Indian dairy sector read: USDA (2017). India's Dairy Sector: Structure, Performance, and Prospects, LDPM-272-01 Economic Research Service USA.

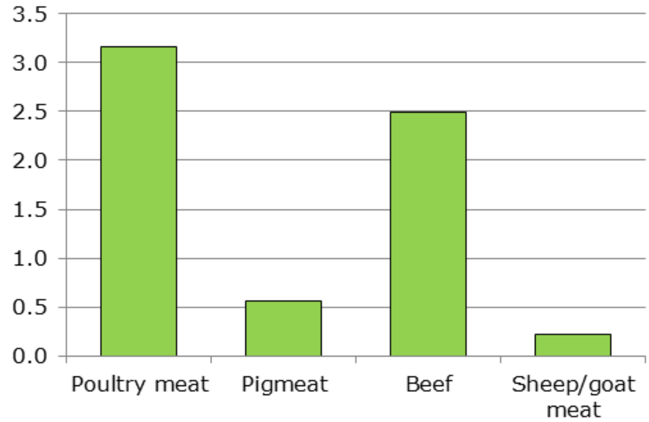
4. MEAT PRODUCTS

By 2030, EU meat production is expected to reach 47.5 million t, driven by sustained demand in the EU and worldwide. Production of poultry is expanding, pushed by a favourable domestic market. Pigmeat production is expected to increase slightly in the next few years, despite environmental concerns, but decline by 2030 to today's level. After the restructuring of the milk sector, beef production is expected to return to its downward trend. By contrast, production of sheep and goat meat is likely to grow by 4 % by 2030 after years of decline. Where EU consumption does not absorb the changes in production, the EU will depend to a greater extent on increased exports to a challenging international market. Livestock farmers might face lower prices in the first years of the outlook due to increased competition but also relatively low feed prices. Prices are then expected to stabilise in nominal terms, due to ample supply covering growing global demand.

Increasing world import demand for meat opens opportunities for EU exports

Population and economic growth in developing countries, albeit slower than in the previous decade, are expected to support higher meat demand and contribute to the growth of EU meat exports. World meat consumption is expected to increase by 1 % per year on average between 2017 and 2030, slower than between 2007 and 2017 (+1.8 % per year), reaching almost 365 million t or 34.7 kg per capita, a modest 300 g increase between 2017 and 2030.

Graph 4.1 Changes in world imports of meat and live animals, 2030 v 2017 (million t)



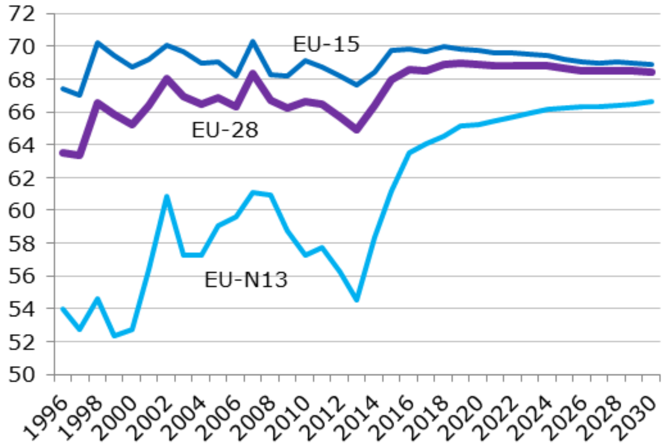
Source: DG Agriculture and Rural Development, based on the OECD-FAO Agricultural Outlook.

World import demand for poultry meat is expected to increase by almost 3.2 million t compared to 2017, reaching 15.5 million t by 2030. This almost equals the combined increases for the other types of meat (beef, pigmeat, and sheep and goat meat). Important growing markets are located in Asia, sub-Saharan Africa and the Middle East (mainly for poultry). Although the pigmeat import demand from China is expected to decline by 2030, after the restructuring of its domestic sector, China will continue to represent the largest market and small changes can have important consequences on international trade.

Per capita[44] meat consumption in the EU-N13 is catching up, while consumption in the EU-15 is slowly decreasing

After the contraction of meat consumption during the economic crisis, EU per capita meat consumption recovered strongly between 2014 and 2016 (+2.2 kg per capita) thanks to the improved economic situation and ample supplies of all meat categories, and despite the increased exports.

Graph 4.2 EU total meat consumption (kg per capita, retail weight)



By 2030, EU-28 per capita consumption of meat products is expected to stabilise or decline slightly. Meat consumption in the EU-N13 would continue its upward trend and catch up with the EU-15 (+2.6 kg) but still not reaching the same level. In the EU-15, per capita meat consumption followed a declining trend the last 15 years before quickly recovering after the economic crisis. It is now expected to decrease due to growing social concerns (animal welfare and carbon footprints), health concerns and an ageing European population (eating less meat per capita), before stabilising around 0.8 kg below the 2017 level by the end of the outlook period.

Despite changing dietary patterns in the consumption of fresh meat, especially among younger consumers, a clear downward trend in overall meat consumption is not yet visible in the available supply and balance statistics.

We are now seeing the emergence of other trends such as a shift towards more processed meat and meat use in ready-to-eat meals and other food/feed products, and the increasing importance consumers attach to the origin of meat and its production method. However, quantifying the impact of these trends at EU level and for the future is not easy.

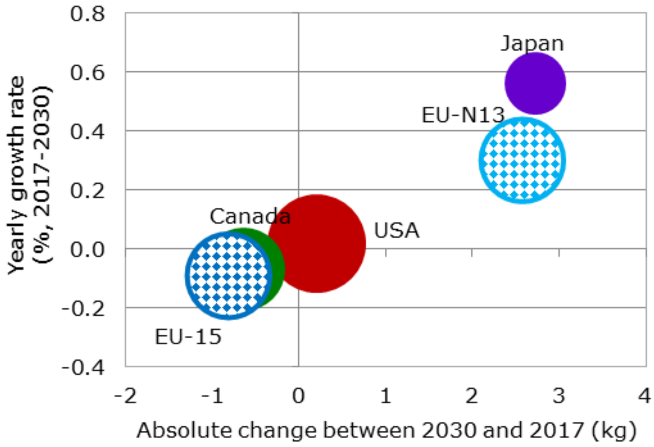
[44] Consumption per capita is measured in retail weight. Coefficients to convert carcass weight into retail weight are 0.7 for beef and veal, 0.78 for pigmeat and 0.88 for poultry and sheep meat.

Diverging trends between Member States make an overall view even more difficult. Panel and retail sales data at national level suggest a decline in beef consumption in certain Member States such as France, but an increase in Germany. The decrease in total meat consumption observed between 2008 and 2013 could have been seen as a turning point, but is difficult to disentangle this from the impact of the economic crisis and of the higher meat supply on consumption, as demonstrated by the strong increase in 2014-2016. A stabilisation of consumption in 2017 could be a first indication that the trend will switch to a more pronounced decline, while the exact turning point at EU level may happen in the longer run. Therefore, by the end of the outlook period, per capita consumption in the EU is expected to reach 68.9 kg per year (in retail weight) on average.

When looking at global level, the EU-15 declining trend in meat consumption is the most pronounced compared to the other countries represented: Canada, the US and Japan. The pattern in the EU-N13, on the other hand, is still characterised by a potentially higher level of per capita meat consumption. Therefore, the EU-N13's yearly growth rate is expected to be closer to Japan's, which is gradually taking over western diets based on more meat instead of fish.

However, as population growth also determines total meat consumption (not only per capita), the picture of meat consumption is reversed. The population in the EU-N13 has been declining and is projected to decline in the next years at such a rate that the per capita increase in meat consumption is completely offset, resulting in a decrease of 60 000 t of meat consumed by 2030. In the EU-15, by contrast, the population is still increasing and even with declining per capita consumption, total meat consumption goes up, adding 250 000 t to current meat demand by 2030.

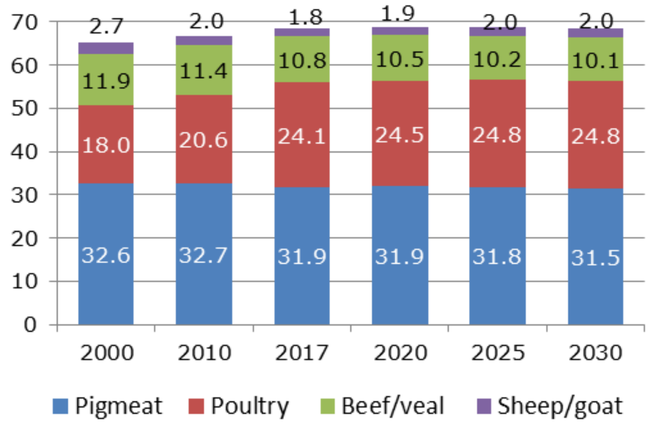
Graph 4.3 Changes in per capita meat consumption (retail weight)



Note: The size of the bubble represents the absolute quantity of per capita meat consumption (kg/capita/year)

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

Graph 4.4 EU per capita consumption by meat type (kg)



The evolution of per capita meat consumption hides a shift in the consumer basket for meats. Pigmeat and beef continue to follow the declining trend of the last ten years, giving way to increased poultry consumption. Sheep and goat meat is expected to increase its share slightly, contrary to the trend in the previous decade.

The immigration of non-EU citizens to the EU, estimated at 2.4 million people in 2015, might influence the evolution of certain consumption trends at regional or national level, but only slightly.

4.1. Beef and veal

After the recapitalisation of the dairy herd in 2012-2014, resulting in decreased beef supply, EU production recovered in 2014-2016. EU production is expected to stagnate in 2017, before returning to a downward trend mainly dictated by the declining size of the cow herd and lower demand.

Restructuring of milk sector determines beef production potential

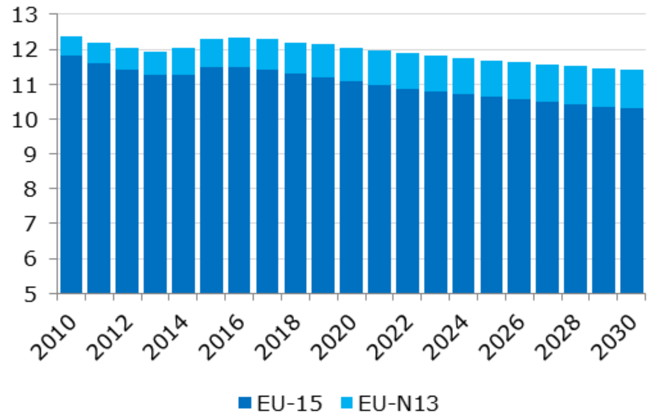
Given that almost two thirds of the EU cow herd is of the dairy type, changes in the dairy herd have a major impact on beef supply. After 3 years of increasing EU dairy cow numbers, the low milk price in 2016 led to a restructuring of the sector and the culling of cows or a partial reconversion to beef production. As a result, the number of dairy cows in the EU-15 decreased in 2016 and this is expected to continue as milk yields benefit from productivity gains. The dairy cow herd in the EU-N13 has been declining for more than a decade and is likely to continue this downward trend, albeit at a lower rate (as described in the previous chapter).

Another important driver of developments in the cow herd is the implementation of voluntary coupled support (VCS). Many Member States opted for VCS in the beef sector, mainly in the form of suckler cow payments, in order to maintain a specialised beef herd. However, some Member States with a large suckler cow herd, like the UK (excluding Scotland) and Germany did not implement VCS in the beef sector. Ireland did not use the possibility to grant VCS either, but made provision for a specific beef scheme in its rural development programme.

The ceiling (maximum number of head of cattle for which a payment can be granted) and the exact implementation of the VCS payments in the Member States have a significant impact on changes in herd size. At the same time, Member States can revise their schemes (in terms of ceiling, reference period, etc.). Competition in economic and environmental terms with other agricultural activities such as dairy production is likely to reduce suckler cow herds further in certain EU regions.

Overall, the suckler cow herd in the EU-15 is expected to fall to around 10.3 million head by 2030 (-10 % or 1.1 million head less than in 2017). However, contrary to the prospects for the dairy herd, the EU-N13 suckler cow herd is likely to record an increase from 880 000 head to 1.1 million, especially in Poland, Hungary and Bulgaria, in line with trends observed in the last 5 years. As a result, the share of EU-N13 suckler cows in the EU total will increase slightly from 7 % to 10 % in 2030.

Graph 4.5 EU suckler cow herd (million head)



Productivity gains in milk sector limit beef production potential

Beef production is expected to remain stable in 2017, mainly as a result of the increased number of heifers that are slaughtered, before starting to gradually decline again in the next coming years. By the end of the outlook period, beef production is expected to fall to 7.5 million t, mainly driven by lower consumer demand and developments in the dairy and suckler cow herd, but at a slower rate than in 2005-2013. The average carcass weight is expected to increase in the EU, mainly because of technological progress in production systems (use of sexed semen, more calves of beef or mixed types), against a background of relatively low feed prices.

EU exports of live animals increased by 5.5 % in the first 7 months of 2017 compared to the already high 2016 figures, as demand from Turkey, Lebanon and Israel continued. Over the outlook period, a gradual decline in exports of live animals to Turkey is foreseen due to increasing competition from other players such as Uruguay and Brazil, which represented 31 % and 18 % respectively of Turkish live imports in 2016. Sanitary issues or ethical and animal welfare concerns could also act as a downward factor for live exports.

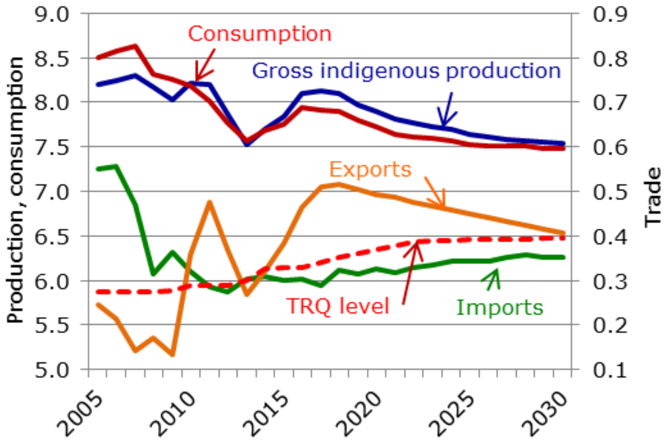
The downturn of Australian beef exports and high domestic demand in the US left opportunities to other players, including EU exporters. As a result, EU exports increased by 25 % in the first 7 months of 2017 compared to the already high numbers of 2016, in particular to Hong Kong, but they are expected to drop over the outlook period to a level close to 200 000 t (-17 %) due to competition from Brazil, Argentina, Australia and the US.

Russia is expected to import much less from the EU (even after removal of the import ban, assumed for the end of 2018) due to lower demand and sourcing from other countries, while demand from Asian countries and the Middle East could offer new opportunities. The removal of certain SPS (sanitary and phytosanitary) barriers could present new trade opportunities to the US and other countries.

As regards the EU's beef imports, its tariff-rate quotas (TRQs) for fresh and frozen beef (especially for high-quality produce) are expected to be almost filled, while total preferential access will increase gradually over the outlook period up to a lower level than the current trade agreements (up to 395 000 t in c.w.e.). This outlook takes into account an increase in beef imports resulting from the FTA with Canada (additional TRQ of 46 000 t of fresh beef)[45], but assumes that the quota will be only filled by less than half. By contrast, the beef TRQ for Ukraine is not expected to be used for SPS reasons.

Although the economic recession in Brazil had an impact on the development of its beef sector, Brazil is expected to continue playing a major role on the world beef market for three reasons: a competitive Brazilian real over the whole outlook period, low production costs and direct access to the main importing countries.

Graph 4.6 EU beef market developments (million t)



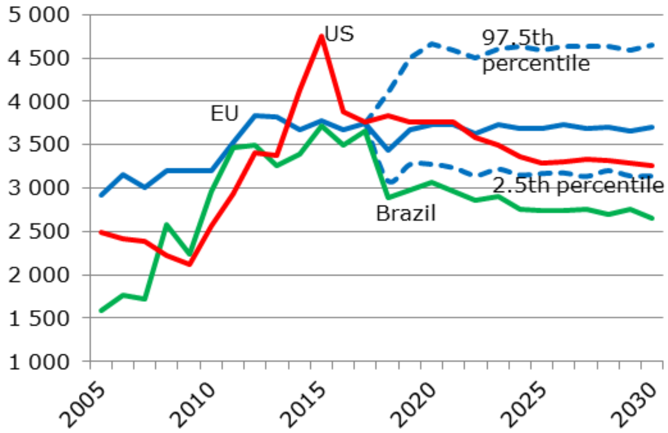
Note: trade includes live animals

Consumption back to its downward trend after recovery in the short run

EU per capita beef consumption continued to go up slightly in 2016, especially in the EU-N13, thanks to the improved economic climate and a favourable price development driven by increased availabilities. Nevertheless, consumption started to resume its downward trend already in 2017. By the end of the outlook period, beef consumption in the EU is expected to decline gradually from 10.8 kg to 10.1 kg per capita (retail weight) in 2030. This figure masks a significant gap between the EU-15 (11.7 kg) and the EU-N13 (3.6 kg).

[45] The TRQs under the CETA were split into 35 000 t of fresh and 15 000 t of frozen beef, but this includes Canada's 4 160 t under the existing hormone-free *erga omnes* TRQ. The additional TRQ is therefore 46 000 t and was opened in September 2017.

Graph 4.7 Beef prices and possible price paths (EUR/t)



Note: The US reference is the price of choice steers, 1 100-1 300 lb lw, Nebraska — lw to dw conversion factor 0.63; The Brazil reference is the price of frozen beef, export unit value, product weight

The EU beef price remained quite firm in the second half of 2016 and 2017, despite the inflow of dairy cow and heifer slaughterings. Increased exports of live animals and beef meat certainly favoured the price's firmness. The herd recapitalisation observed in the US and the expected high supplies, mainly from Brazil, in a context of moderate feed prices, are expected to push the world price down in 2018 and put further pressure on EU beef prices. The scale of the price decrease will depend greatly on the medium-term impact of the economic recession on the sector and on local consumption in Brazil. This will determine how much beef will be available for exports and to meet the demand for beef in the US. The restructuring of the dairy sector in the EU will limit beef production potential and a new equilibrium between supply and demand might push prices slightly upwards in 2019 before subsequently stabilising. This is contrary to developments in the world market price, where a small decrease is expected.

The price path presented is an average projection and developments may not be as smooth as indicated, given the uncertainties over yields (feed costs and forage availability) and the macroeconomic environment. The 2.5th and 97.5th percentiles shown in Graph 4.7 (blue dotted lines) give an indication of the price variation that could be expected given this uncertainty.

Box 4.1 Insights on developments in EU Member States

Beef production is strongly linked to the dairy sector and concentrated in beef exports

The EU beef and veal market is complex due to the close interrelationship between dairy and beef production. In many Member States producers are eligible for voluntary coupled payments (VCS) on dairy cows and/or suckler cows. In most Member States milk production is the dominant driver of beef production: changes in milk production have bigger effects on beef production than developments in suckler cow herds and specialised beef production. In addition, different market segments and distinct qualities also play an important role.

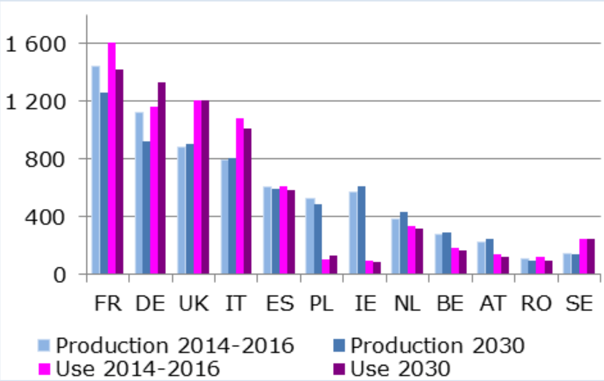
Immediately after the abolition of the milk quota system, the beef market in many Member States experienced a shortage in calves for fattening due to the reallocation of females from fattening to breeding use as the dairy cow herd expanded. After the re-stocking of dairy cow herds and in response to declining milk prices, the availability of calves for fattening recovered. The selected Member States whose production and use of beef are presented in Graph 4.8 accounted for more than 90 % of EU beef supply from 2014 to 2016. The big four producing countries (France, Germany, the UK and Italy), which together are projected to account for 50 % of production in 2030, will remain significant net importers. The group of medium-sized beef producing countries made up of Poland, Ireland, the Netherlands, Belgium/Luxembourg[46] and Austria, which are projected to account for about 26 % of EU production (2 million t), are notable net exporters of beef (1.2 million t).

Apparent use[47] shows a declining trend

Apparent use is expected to decline for nearly all selected countries. Therefore apparent use of beef in 2030 is projected to be 182 000 t lower than in 2014-2016. Apparent domestic use is calculated as production minus net trade. Domestic use as presented in Graph 4.8 thus reflects all types of market disappearances, ranging from consumed quantities in households and restaurants, different types of wastes, as well as changes in stocks. As a consequence, the figures presented here, when re-calculated in apparent use per head, may not correspond with data from consumer panel outcomes covering information on quantities purchased or consumed by private households only.

Between 2014-2016 and 2030, some significant changes are projected in the beef net trade potential of some Member States. In Germany domestic use will increase due to a slight increase in per capita use and because of projected growth in the country's population due to migration. This will trigger an increase in German import demand for beef. In contrast, for France a reduction in use is projected due to a decline in per capita consumption that is expected to outpace the rate of decline in beef production. These developments are reflected in a decline in the projected level of French beef imports. These divergent developments in Germany and France are also partly as a result of differences in the perception of current animal welfare discussions. These are more intense for pigmeat and poultry production in Germany, while in France the discussion focuses on beef production.

Graph 4.8 2014-2016 to 2030 change in beef production and use for selected Member States (1000 t)



Remark: BE covers Belgium and Luxembourg
Source: AGMEMOD simulation

Overall EU beef production is expected to decline

Beef production (net indigenous production; see Graph 4.8) in the EU is characterised by expected increases in the Netherlands (11 %), Austria (10 %), Ireland (6.5 %), and Belgium/Luxembourg (6.4 %), while reductions are projected for Germany (-17 %), France (-12 %), Romania (-11 %), and Poland (-8.2 %) between 2014-2016 and 2030. These projected developments are based primarily on the following three factors: changes to dairy cow herds, suckler cow herds and trade in live animals.

Dairy cow numbers decline in most Member States

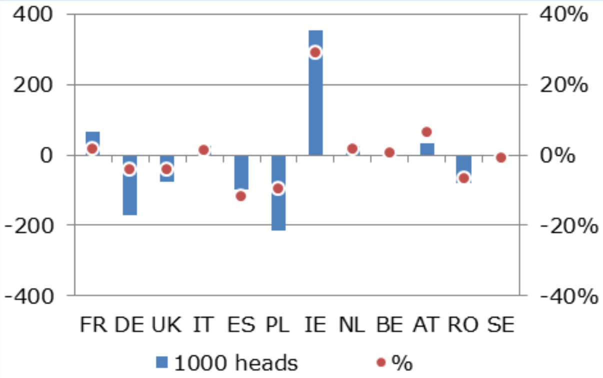
After the growth following the abolition of the EU milk quota system, a resumption of the long-term decline of dairy cow herds is expected for most Member States. Changes in national herds are influenced by the speed of gains in milk yields, structural change and probable expansions in milk production.

Growth in milk production will be driven by changes in average farm herd size, price and cost developments, environmental obligations and animal welfare regulations. Over the period to 2030, a significant expansion in the dairy cow herd is projected for Ireland (29 %) and minor increases in Austria (6 %), France (2 %) and the Netherlands (2 %). In other selected Member States, the number of dairy cows is projected to decline or remain stable.

[46] Belgium and Luxembourg are treated as one region in AGMEMOD

[47] Apparent use refers to the balance between production and net trade and includes human consumption but also waste, pet food and other uses

Graph 4.9 2014-2016 to 2030 change in the dairy cow herds for selected Member States

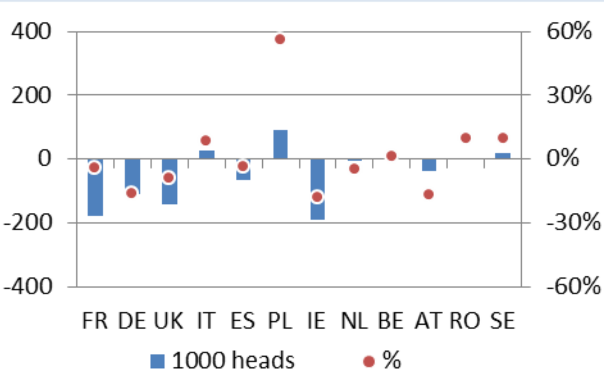


Source: AGMEMOD simulation
Remark: BE covers Belgium and Luxembourg

Suckler cow herds continue growing in a few new Member States

In the EU the share of suckler cow herds compared to total (dairy and beef) cows is about 34 %. This share is expected to remain stable over the medium term. In the last few years some signs of a recovery in suckler cow herds from very low levels have occurred and will probably continue in Poland and Romania, but also in Hungary and Bulgaria. Increases are projected for Italy (8 %), Sweden (9 %) and Belgium/Luxembourg (1 %). In the other selected Member States beef cow herds are projected to decline over the period to 2030. The competitiveness of the suckler cow sector is often quite low and direct payments play a significant role for specialised and mixed farms, often accounting for up to 100 % of farm income on some specialised beef farms.

Graph 4.10 2014-2016 to 2030 change in suckler cow herds for selected Member States



Source: AGMEMOD simulation
Remark: BE covers Belgium and Luxembourg

Trade in bovine animals affects beef production

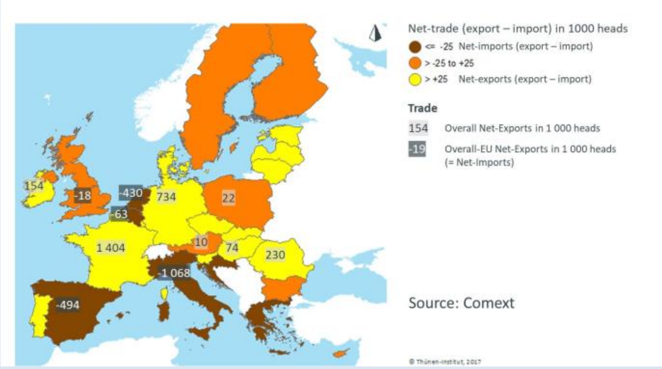
The domestic market is characterised by some specialisation among different Member States with respect to trade in live cattle for fattening and slaughtering. Countries tend either to export cattle (France, Germany, Ireland and Romania) or import cattle (Italy, Spain, the Netherlands and Belgium/Luxembourg) (see Map 4.1). More than 60 % of EU bovine trade is made up of trade in calves. Member States with a strong focus on dairy production and limited options for fattening calves due to the low competitiveness of cattle fattening compared to alternative farming businesses (Ireland, France and Germany) export calves to countries with significant numbers of specialised veal producers with integrated systems (the Netherlands and Belgium/Luxembourg), or for fattening in Italy and Spain (see Map 4.1).

Trade in bovine animals facilitates further specialisation of Member States

Intra-EU trade flows are often very targeted, with Germany and Poland delivering calves to the Netherlands and Belgium/Luxembourg, France providing animals to Spain and Italy, Ireland to the Netherlands, Spain and the UK, and Romania to Italy and neighbouring countries.

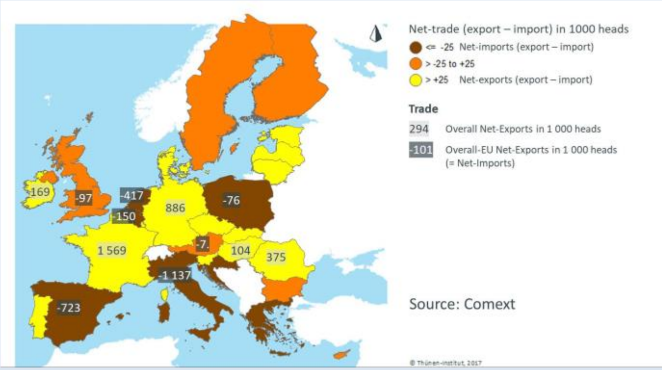
The projections indicate a further increase in trade of live animals, reflecting a further trend in existing Member State specialisation. The surplus in bovines is expected to grow in France, Germany, Ireland, Romania and Hungary, while Spain, Italy, Belgium/Luxembourg and Poland are expected to import more cattle. In the Netherlands and other Member States, environmental obligations and transport regulation for animal welfare may restrict further growth in live cattle imports (see Map 4.2).

Map 4.1 Regional trade bovine animals in selected Member States 2014-2016



Source: AGMEMOD simulation, based on Eurostat

Map 4.2 Regional trade in bovine animals in selected Member States 2030



Source: AGMEMOD simulation, based on Eurostat

4.2. Sheep and goat meat

After several years of continuous decline, sheep and goat production and consumption are expected to increase marginally thanks to improved profitability and the implementation of voluntary coupled support. However, EU prices might face a drop in the next few years due to world price developments, followed by a stabilisation in nominal terms.

EU sheep and goat herd increasing in the first half of the outlook period, followed by a slight decline towards 2030

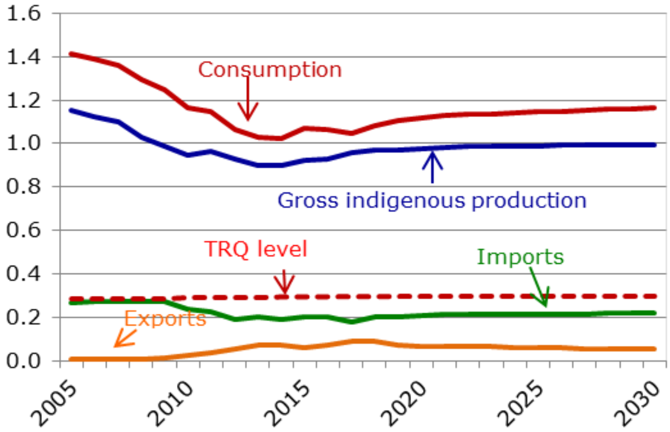
The EU sheep and goat flock has shrunk steadily over the years, but the trend reversed in 2015, even if significant differences exist between Member States. According to the Eurostat December 2016 livestock survey, the EU-15 sheep flock increased for a second year in a row, by another 1 million head, after adding 950 000 head in 2015. This increase came almost solely from Spain and the UK. The EU-N13 flock recorded an increase of only 36 000 head (+0.2 %, a stabilisation after the increasing trend of the last 4 years). The goat flock in the EU-15 showed a downward trend in recent years but recorded again a net increase of 250 000 head in 2016. Spain, Italy and the Netherlands showed the largest increases, by 287 000, 65 000 and 36 000 head respectively, while Greece continued decreasing its flock by almost 130 000 head. The EU-N13 recorded a slight increase of around 50 000 head in 2016 to reach 2.3 million head, mainly coming from Cyprus and Romania. Although widely diverging developments are expected across Member States, the EU sheep and goat flock as a whole is expected to increase in the coming years but decline in the second half of the outlook period to around 102 million head.

Production levels expected to increase marginally over the coming decade

The historically declining trend in the production of sheep and goat meat[48] seems to have reversed in 2015, thanks to the increased profitability of sheep farms and demand for live animals. In addition, a majority of the main sheep-producing Member States decided to implement VCS for sheep farming. Nevertheless, generation renewal remains an issue in some EU regions. In the first half of 2017, sheep and goat meat production increased by 4.3 %, partly due to sheep slaughterings in the UK being carried forward. However, taking into account the price pressure at world level from New Zealand and Australia in the coming years and the slight increase in domestic demand, EU production is expected to stabilise at around 1 million t (+40 000 t or average yearly growth of 0.3 %), masking significant variation between Member States.

In the first 7 months of 2017, EU sheep imports dropped by 18 % year-on-year. Over the outlook period, imports are expected to remain within TRQ levels, albeit increasing over time. Both Australia's and New Zealand's sheep herds suffered from droughts, which had an impact on export potential in the short term. Production potential and exports should recover over the medium term in Australia. By contrast, sheep production in New Zealand is expected to stabilise, limited by competition for pasture from the dairy sector. In addition, due to growing opportunities in other markets, especially Asia and the Middle East, the EU import quota allocated to New Zealand is not expected to be filled.

Graph 4.11 EU sheep and goat meat market developments (million t)



EU exports of both meat and live animals continued to rise in 2017, although exported quantities remain relatively low. Meat exports (predominantly frozen meat) went mainly to Hong Kong, while live animals were exported to Libya, Jordan, Israel and Lebanon. Tough competition from Australia and New Zealand, representing 85 % of international trade, limits export potential despite slightly increased world import demand. In view of the above, EU total exports are expected to go down slightly over the outlook period to around 50 000 t (c.w.e) by 2030, limited to existing destinations in the Mediterranean region. Exports to Hong Kong fell significantly in 2015-2016 but seem to have revived thanks to the weaker pound sterling.

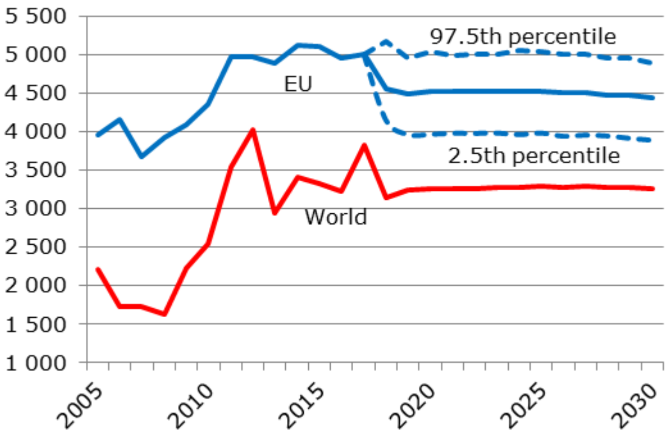
The EU sheep meat price[49] follows the world price path, which is expected to show a drop in 2018 and stabilise in the following years. There continues to be a relatively significant gap between the EU and world price level as a result of EU border protection.

Sheep meat is the meat consumed least in the EU, accounting for only 2.9 % of total meat consumption or 2.0 kg per capita (retail weight) in 2030. Total consumption is expected to increase slowly to around 1.2 million t by 2030 (consumption of this type of meat is assumed to stay relatively stable regardless of price developments). Growing consumption for religious reasons and specific promotion programmes targeting consumers unfamiliar with sheep meat may push consumption upwards.

[48] This refers to 'gross indigenous production', i.e. including trade in live animals.

[49] The EU price relates to the price of 'heavy lamb'.

Graph 4.12 Projected sheep prices and possible price paths (EUR/t)



Note: The reference for the world price is New Zealand

4.3. Pigmeat

Thanks to booming exports to China, pigmeat prices recovered in 2016. Pigmeat production took advantage of this short-term opportunity but is expected to expand only marginally by 2030. This is because of stabilising EU consumption and competition on the world market despite favourable feed prices.

Production set to expand marginally following recovery in recent years

The increased production capacity in certain parts of the EU and the continuous low feed prices resulted in an increase in pigmeat production in 2016, despite the Russian import ban[50]. Fortunately, the price pressure was offset by a boost in Chinese pigmeat demand on the world market. Slaughtering still increased in 2016 albeit at a lower rate, due to the time lag before pig production adjusts to the price developments and short-term economic behaviour to at least partly cover the investment costs. The slowdown in slaughtering followed the reduction in the reproductive herd, as shown in the December 2016 livestock survey. Nevertheless, the May-June 2017 livestock survey announced a new expansion of the sow herd, mainly in Spain, the Netherlands and Poland, reversing the declining trend of the last 2 years.

Environmental[51] and social concerns, which have led, among other things, to national and subnational legislation on various aspects of manure management, will probably limit expansion of production in the current hotspots without bringing it to a halt. Decisions on new investments will be strongly influenced by trade-offs between higher production and logistical costs, on the one hand, and the opportunity costs of delocalising, on the other hand, including the feed and processing chain. Another way to cope with decreasing margins or to increase competitiveness is vertical integration, as observed in Spain and northern Italy. Against a background of stabilising or even declining domestic demand, additional production will need to be exported on a competitive and relatively stable world market. Taking into account these elements, EU pigmeat production is expected to decrease by less than 1 % in the EU-15 while increasing in the EU-N13 by almost 235 000 t (7 %) by 2030.

EU exports increase, but under fierce competition

Due to a surge in Chinese pigmeat demand in 2016, EU exports hit a record level, slowing down the foreseen readjustment of EU production and even resulting in an erosion of EU consumption. World import demand for pigmeat is expected to grow but more slowly than in the previous decade (+560 000 t), reaching 8.4 million t by 2030, mostly from existing EU trade partners in Asia and sub-Saharan Africa. The level of Chinese demand after the restructuring of its domestic sector is a factor of uncertainty that can heavily impact the world pigmeat market.

Russia's ambitious self-sufficiency targets and its decreased purchasing power will lead in any case to lower imports from the EU, import ban or not. In addition, Russia has been looking for alternative suppliers, some of whose exports it had previously restricted. Moreover, EU volumes that under normal

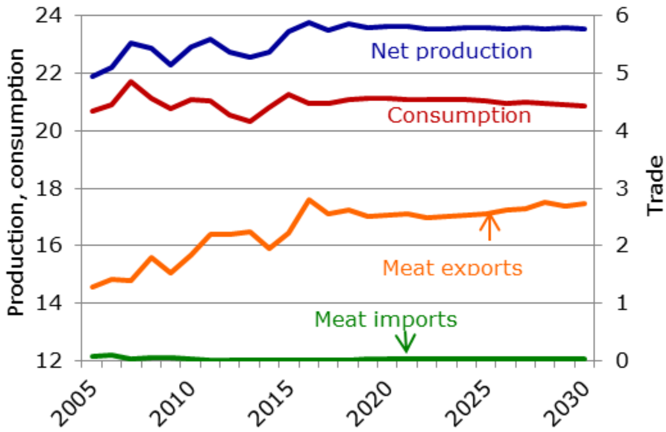
[50] Russia imposed a sanitary ban on imports of EU pigmeat in February 2014, following the outbreak of African swine fever (ASF) in Poland, Estonia and Latvia. In August 2014, it imposed a second (economic) ban on most pork products. This ban was prolonged until the end of 2018.

[51] In response to the Nitrates Directive, some Member States (e.g. Denmark, France and the Netherlands) have introduced regulations limiting the expansion of pigmeat production. GHG emissions from enteric fermentation and manure management in the sector totalled 25.4 million t, or around 5.3 % of total agricultural emissions in 2012 (EEA, 2015).

market conditions would have gone to Russia have found their way to other destinations, mainly Japan, South Korea and the Philippines.

After the end of the 2013 outbreak of porcine epidemic diarrhoea virus (PEDv), US pigmeat exports are likely to return to growth over the outlook period and at competitive prices, encouraged by an assumed weaker US dollar. This price level is expected to increase the US's market share slightly, while the EU's share would remain stable. The production increase in Brazil will mainly feed its domestic market, although its participation in international trade will continue to put pressure on the world market. In view of the above, EU exports are expected to reach almost 2.8 million t at the end of the outlook period, representing around 34 % of world pigmeat trade (compared to 37 % in 2016). This also reflects the EU pork market's increasing dependency on exports, which are expected to rise from less than 9 % to 12 % of total production by 2030.

Graph 4.13 EU pigmeat market developments (million t)

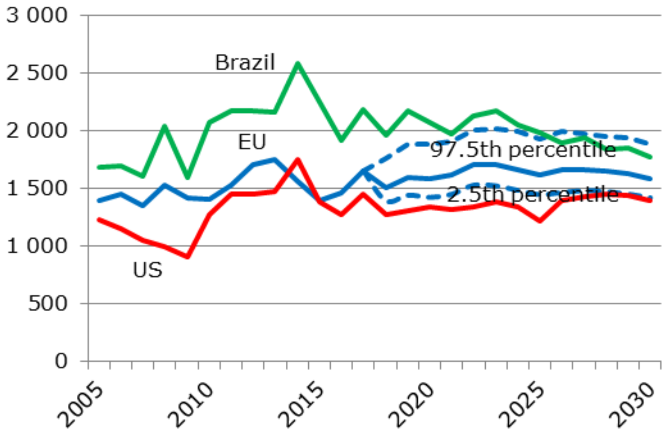


EU consumption levels going in opposite directions

After the enormous boost in 2014 and 2015, per capita pigmeat consumption experienced a stabilisation in 2016-2017, mainly due to lower availability of pigmeat on the domestic market. In the longer run, per capita consumption in the EU-15 will slowly start to fall again, to 30.3 kg by 2030, as pigmeat loses out to poultry meat, while total consumption in the EU-15 will stay steady, compensated by population growth. Per capita consumption in the EU-N13, on the other hand, is expected to increase steadily, to reach a record high of 36.5 kg by 2030.

Thanks to the strong import demand from China in 2016 and an improved balance between EU supply and demand in 2017, pigmeat prices rose again after 2 years of lower prices. EU prices are expected to stay firm over the outlook period, closely following the changes in the world market. Sustained price competition with the Americas (the US, Brazil) will keep pressure on EU prices, which are expected to reach an average of EUR 1 580/t in 2030.

Graph 4.14 Projected pigmeat prices and possible price paths (EUR/t)



Note: The US reference is the price of barrows and gilts, No 1-3, 230-250 lb lw, Iowa/South Minnesota — lw to dw version factor 0.74; The Brazil reference is the price of frozen pigmeat, export unit value, product weight

4.5. Poultry meat

Poultry meat is the only meat for which both production and consumption are expected to expand between 2017 and 2030, by 4.6 % and 4.2 % respectively. Supported by continued expanding global demand, the EU will increase its exports thanks to the sales of different cuts of poultry meat and offal and a wide portfolio of destinations.

Growth of poultry production slows down

Poultry meat enjoys several comparative advantages over other meats. These include affordability, convenience, absence of religious guidelines limiting consumption, a healthy image, lower GHG emissions than other meat types, lower production costs, a short rearing time and lower required investments. As a result, production and consumption have increased steadily for many years in several parts of the world.

Production of poultry meat is expected to continue to grow over the outlook period, but the growth rate is likely to slow down to 0.3 % per year, after having averaged 2.7 % over the past 10 years. The strongest increase in production (+1.1 % a year) is expected in the EU-N13, due largely to sustained productivity gains and investments in Hungary, Poland and Romania. In a context of relatively low feed prices throughout the outlook period, strong domestic and world demand will together contribute to an expected growth in total EU production up to 15.3 million t by 2030.

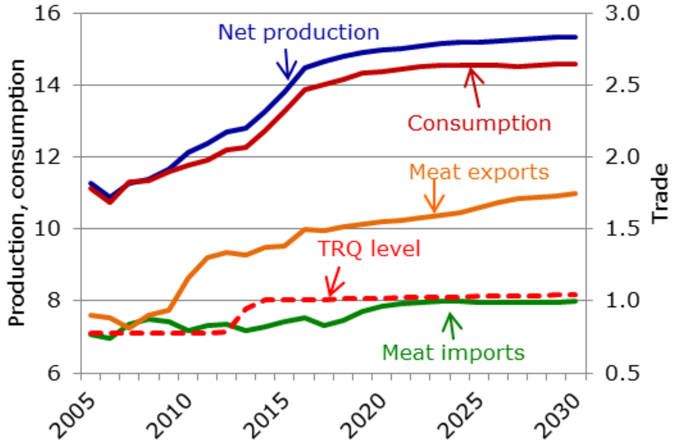
EU exports follow demand on the world market

World import demand for poultry meat is expected to remain very strong over the outlook period, although growing at a lower rate than during the previous 10 years (1.8 % per year versus 3.4 %), reaching 15.5 million t in 2030. The additional demand is shared almost equally by the Middle East (Saudi Arabia), sub-Saharan Africa (South Africa, Ghana, Benin, DR Congo) and Asia (Vietnam, the Philippines).

Due to sanitary bans on imports from the EU in many key destinations, exports have stabilised in 2017. Although it is assumed that the Russian import ban will be in place until the end of 2018, Russia's policy aim of self-sufficiency will lead to lower imports from the EU (and from other parts of the world), even when the import ban is lifted. Increased competition is expected in certain markets (e.g. whole chicken), mainly from Brazil, which is able to export at lower prices, also thanks to its currency devaluation. In view of the above, EU exports will continue to rise, but only moderately, by an average of 1.3 % a year until 2030, reaching almost 1.8 million t (see also Box 4.2).

Although the new TRQs introduced since 2013 are not yet fully used, imports are expected to grow gradually from the 2013-2014 lows to fairly close to the quota level (around 1 million t) by 2030, supported by increased production in Thailand and Brazil, two of the EU's main supplier countries. In the context of the trade agreement with Ukraine, the EU opened two TRQs, amounting to a total of 40 000 t net weight from 2020 onwards. The TRQ for the imports of fresh and frozen poultry cuts is used at 100 % while the second one for frozen chicken carcasses is only partially used, a situation which is assumed to continue over time.

Graph 4.15 EU poultry meat market developments (million t)

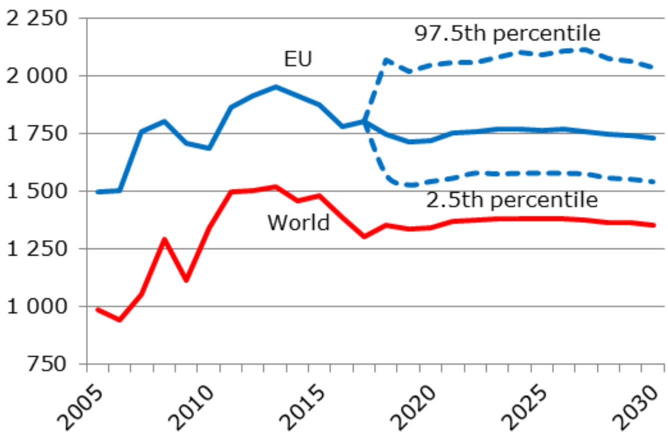


Poultry meat consumption reaching maturity

Poultry meat is the only meat for which consumption is expected to increase in both the EU-15 and the EU-N13, with an annual growth of 0.2 %, reaching almost 25 kg per capita by 2030. The growth rate in the EU-N13 will be lower than in previous years as their markets reach maturity, similar to the EU-15.

After a drop of EU poultry meat prices in the first years of the outlook period, reflecting lower input prices, higher domestic production and increased competition (mainly from Brazil and the USA), prices are expected to stabilise around EUR 1 730/t by the end of the outlook period.

Graph 4.16 Projected price and possible paths for poultry meat (EUR/t)



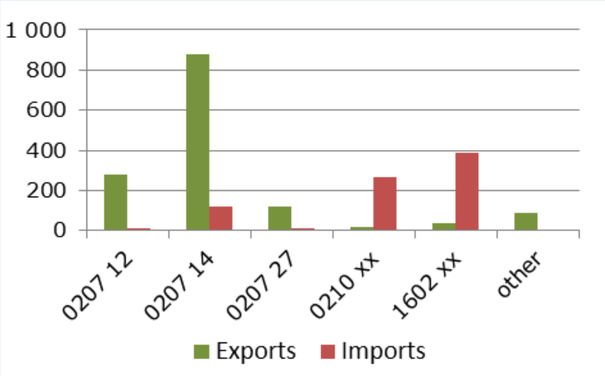
Note: The reference for the world price is Brazil.

Box 4.2 EU poultry trade characteristics

EU poultry trade (meat and offal) is characterised by high-value imports and low-value exports. Although the EU is a net exporter of poultry by volume, it is a net importer in value terms. In 2016, the volume of EU exports of poultry meat and offal represented 1.4 million t and EUR 1.5 billion respectively, while imports represented around 0.88 million t and EUR 2.2 billion.

When looking in more detail, EU exports fall mainly under HS-6[52] *codes 020712, 020714 and 020727, which represent 19 %, 62 % and 8 % respectively of total volumes (averages over the period 2014-2016). The unit value within these three categories ranged from EUR 0.45/kg to EUR 1.5/kg in the same period. The first category (020712) is dominated by frozen whole chicken, mainly exported to the Middle East. The second category (020714) is a mix of frozen boneless and other cuts, with a minor part being offal. The third category (020727) refers to frozen cuts of turkey (boneless and with bone in*).

Graph 4.17 EU poultry exports and imports by HS-code (average 2014-2016, 1 000 t)



EU poultry imports mainly fall under HS-codes 0210 and 1602, covering different kinds of prepared and preserved poultry meat and offal, including edible flours and meals. All trade under code 0210 is imported as 'salted chicken' (tariff line 0210 9939), representing 268 000 t or 33 % of the total volume (average 2014-2016). Code 1602 covers mainly preparations containing more than 25 % poultry meat or offal but also 10 % preparations of uncooked turkey meat, making up a total of 390 000 t or 48 % share. As for code 020714, it represents 120 000 t or 15 % share of the total volume. In contrast to exports, the unit value of imports is higher, ranging between EUR 2.10/kg and EUR 2.44/kg for 0210 xxx and 0207 14, while ranging between EUR 1.90/kg and EUR 3.87/kg for tariff lines 1602 xx.

Box 4.3 Effects of a total ban on EU poultry meat due to avian influenza

Background

Avian influenza (bird flu) is a highly infectious disease that can affect many bird species. Even though the risks for humans are restricted to the people who are more in contact with live birds, the outbreaks are very carefully monitored and very strict preventive measures against the spread of the disease are adopted. The different forms of avian influenza present in the world are divided into highly pathogenic and low pathogenic. This scenario concentrates on the highly pathogenic strains, which provoke rapid death in affected animals.

In October 2016, a case of the highly pathogenic H5N8 strain in a wild swan was reported in Hungary. After this occurrence, a series of cases have been observed in various EU Member States. In outbreaks in domestic holdings, affected animals are culled and protective measures are taken to preserve the health of the workers exposed. The virus is sensitive to heat and is killed by thorough cooking of infected meat. To date, no human cases of H5N8 virus have been detected in the EU.

The EU produces approximately 4 % more poultry meat than what is consumed. In 2016, the EU was the third largest exporter (1.5 million t c.w.e.) and the third largest importer (880 000 t c.w.e.) of poultry meat in the world (see box 4.2). EU poultry meat imports have been quite stable in the last years. The EU is a net exporter of poultry meat, but half of its exports go to only seven countries. As an example, and due to its territorial proximity, we concentrate here on the EU's poultry trade with Ukraine.

EU imports from Ukraine are the third largest after Brazil and Thailand. However, while Brazil's and Thailand's exports to the EU decreased in the first 8 months of 2017, Ukraine's exports to the EU increased by around 70 % (i.e. an increase of 21 000 t c.w.e.). EU exports to Ukraine are approximately twice as much as imports and also increased in the first 8 months of 2017 by 41 % compared to the previous year (i.e. +27 000 t c.w.e.).

Even though the EU has increasingly opened its market by signing bilateral free-trade agreements (e.g. with Ukraine), the occurrence of bird flu cases may trigger unilateral trade bans. The probability of unilateral bans on poultry meats originating from the EU rises with increases of widespread avian influenza outbreaks in the EU.

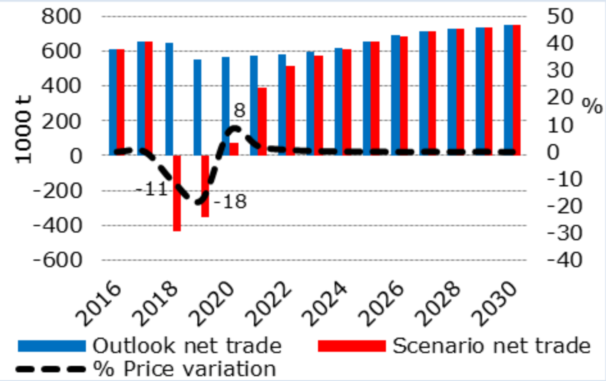
Scenario

The scenario presented here is rather exploratory and illustrates the potential impact on poultry production and consumption of unilateral bans on poultry meat originating from the EU due to an avian influenza

[52] HS-6 refers to the 'Harmonised System', an international nomenclature for the classification of products; up to the HS-6 digit level, all countries classify products in the same way.

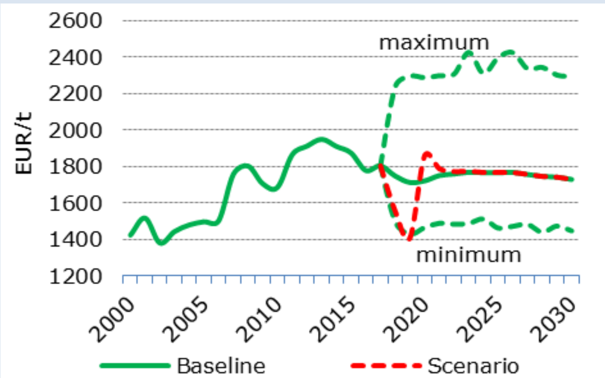
pandemic on EU territory[53]. The scenario assumes that non-EU countries totally ban poultry meat imports from the EU in 2018 and 2019. Moreover, it simulates the effects of widespread culling of poultry across the EU in 2018, assuming the loss of one poultry production cycle, which lasts for 45 days on average, and thus corresponds to a production shock of 12.5 %. Finally, it incorporates the effects of a loss of consumer trust across the EU (e.g. due to fears of human infection), reducing poultry consumption by 10 % in both 2018 and 2019.

Graph 4.18 EU poultry net trade and price variation, over outlook period and under the ban



Since production would not be exported out of the EU in the first 2 years of the outlook period, overabundance of poultry meat, together with a drop in consumption, would exert pressure on prices. However, the massive culling in the first year of the ban would prevent prices from dropping as much as in the second year (see Graph 4.18). As a result, poultry production would fall by 15 % (-2.2 million t) and 13 % (-1.9 million t), respectively, in the 2 years of the ban, with a slow realignment in the following years until 2021 (-5 % in 2020 and -2 % in 2021). The EU producer price would decrease by approximately 11 % in the first year of the ban and by 18 % in the second year. However, this price variation is measured on a yearly basis. Intra-year price fluctuations are not included and may potentially be larger.

Graph 4.19 EU poultry price and minimum and maximum of stochastic simulations



When taking uncertainty into account, the EU producer price (the dotted line in red in Graph 4.19) is expected to reach in the second year of the ban the minimum of the stochastic simulations[54] performed around the baseline. However, the probability of such a price drop is lower than 1 %. In Graph 4.19, the minimum and maximum of the stochastic simulations are represented together with the baseline price (in green).

In the scenario, the poultry consumer price in the EU decreases with respect to the baseline by 5 % and 8 % respectively in the 2 years of the ban, before rebounding by 3 % in the first year after the ban. The drop in EU poultry consumption would reduce EU poultry imports by 50 % in the first year of the ban. However, as production begins to increase during the second year of the ban, EU poultry imports would decrease even more (-64 % with respect to the baseline). EU poultry net trade would be largely negative during both years of the ban (-430 000 t and -350 000 t, respectively). This trade loss decreases slowly by 2025.

As for prices of other meats, they would follow the behaviour of the poultry price but would decrease only slightly in the years of the ban (pigmeat by 1 % and 2 %, and beef and veal by 2 % and 3 %, respectively), before stabilising around the baseline in subsequent years. A higher responsiveness of beef and veal would be expected, as pork quantities produced are approximately three times higher than those of beef and veal. Consumption effects on other meats are relatively small.

On the international side, Ukrainian poultry imports would decrease by 3.5 % and 2.5 % respectively in the first and second year of the ban, while the Ukrainian internal producer price would increase by 2 % and 1 %. South African imports would decrease by 2 % and 1.5 % in the years of the ban. At the same time, imports of the Philippines would decrease by 4 % and 2.4 % during the ban.

In the scenario, Ukrainian poultry exports increase by 3.5 % and 2.5 % respectively in the 2 years of the ban, while Brazil's exports increase by 8.4 % and 6.7 %. Proportionally, Thailand would be less affected by the ban (only plus 1.2 % and 0.9 % during the ban).

Conclusion

Poultry markets are expected to adjust moderately well to a ban on EU poultry meat exports. However, poultry prices would be heavily distorted in the years of the ban and it would take up to 5 years for exports to recover. The loss in net trade would be large and would only slowly recover. At this point, it is important to note that this analysis cannot control for the different poultry meat qualities imported and exported. Moreover, bilateral trade is not directly represented.

[53] Due to model constraints, in this scenario we consider the effects on poultry meat but not on egg production. This means that effects may be even larger for the sector.

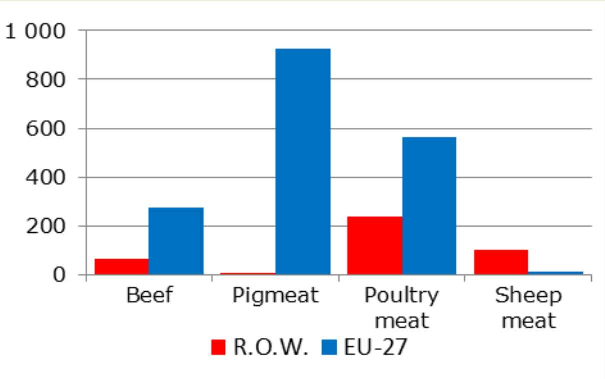
[54] A brief introduction to the methods used is done in Chapter 8.

What about the UK?

The UK is an important meat producer in the EU. It is the largest sheep producer in the EU and is in second and third place for poultry meat and beef production respectively (2016 data).

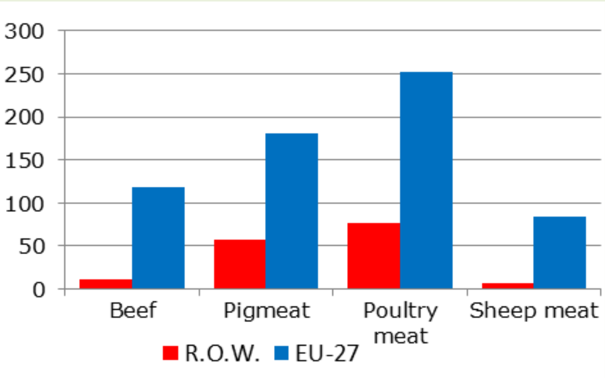
The EU-27 is the biggest trade partner for the UK in terms of imports and exports, except for imports of sheep meat. In 2016, 30 % of EU-27 meat exports were shipped to the UK. Pigmeat takes the largest share of meat imports from the EU, representing around 900 000 t. Poultry meat trade with the R.O.W. is more developed than other meats.

Graph 4.20 UK imports by meat type (average 2014-2016, 1 000 t)



The UK is also an important trade partner of the EU-27 for live animals. More than 500 000 pigs (piglets and fattened pigs) are exported yearly to the UK. Trade in live poultry is also very significant in both directions.

Graph 4.21 UK exports by meat type (average 2014-2016, 1 000 t)



5. OLIVE OIL, WINE AND FRUIT AND VEGETABLES

Three sectors, not covered by the modelling tool used to derive projections, represent around 20 % of EU agricultural output: these are the wine, olive oil and fruit and vegetable sectors. This chapter provides supply and demand projections for these sectors based mostly on expert judgement. Price developments are not explicitly taken into account. At this stage, the large degree of differentiation and segmentation of these markets is not fully accounted for. For fruit and vegetables in particular, given the diversity of production and supply chains involved in the sector, the projections were limited to apples and tomatoes. Other sectors that are also important to EU agriculture, such as flowers and ornamental plants, were left out of the projections.

5.1. Olive oil

The EU olive oil sector foresees further structural improvements over the outlook period such as the conversion of production into more productive production systems, in particular: (i) the increase of irrigated areas; and (ii) the extension of production areas replacing other crops in traditional producing regions. Production growth will serve both growing world demand and increasing EU consumption outside the main producing Member States.

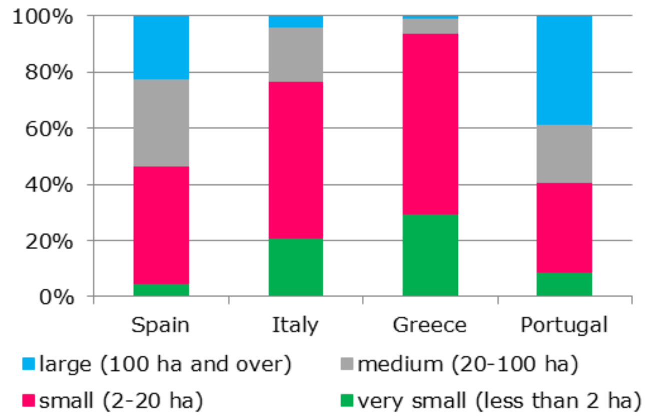
In recent years, EU **olive oil** production has been characterised by high fluctuations despite significant investments in irrigated production systems. For example, in 2016/2017 production dropped by 25 % due to unfavourable climatic conditions and damage in olive groves caused by *Xyllela fastidiosa*. Some production recovery is expected for the current campaign but the expected production level is still below the average level of the 2015/2016 campaign[55].

The EU production is dominated by four main producing countries: Spain, Italy, Greece and Portugal. These Member States represent together 99 % of EU production and more than two thirds of world production. On top of the economic benefits that olive farming generates, it also brings social and environmental benefits (particularly soil erosion prevention) to often remote or marginal territories.

Structural differences are noticeable in the main producing countries. Most the area is cultivated by small farmers in Italy and Greece, in contrast to a higher share of medium-sized and large farms in Spain and Portugal, with a stronger supply and commercial concentration in cooperative structures in Spain. In the last decade, the faster restructuring of production systems in the Iberian Peninsula played a crucial role in the development of production.

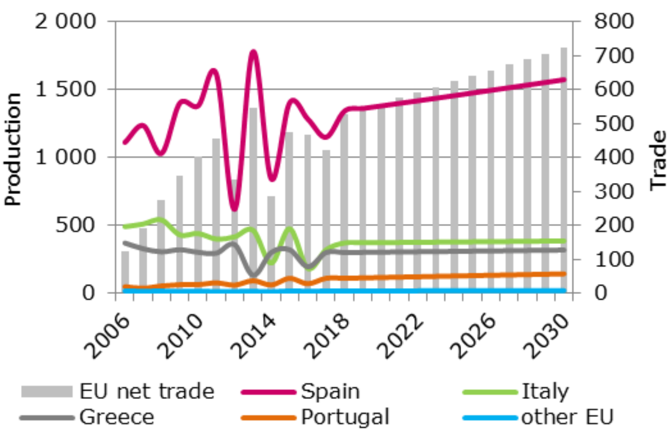
[55] Given the high variability of production, projections are compared to the 2014-2016 average.

Graph 5.1 Share of utilised agricultural area by size category of specialised olive farms in the main producing countries (2013)



By 2030, EU production is expected to rise by a third compared to the 2014-2016 average which was affected by two low production years (2014 and 2016). However, in 2030 the expected production is 5% above the 2015 production level. It is expected to increase strongly in the Iberian Peninsula (by 2.3 % per year), driven by the expansion of irrigated and newly planted groves that generate higher yields. In Italy, growth could reach 2.0 % per year, whereas in Greece production is set to increase at a slower pace (+1.1 % per year). In Italy and Greece, growth will be based on yield improvements, while area is not expected to increase. However, this evolution might be affected by both climate conditions, rising concerns over water availability, and the possible outbreak of *Xyllela fastidiosa*.

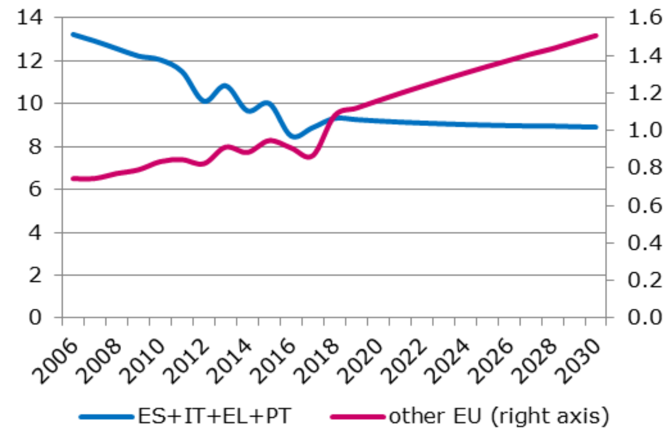
Graph 5.2 EU olive oil production and net trade development (1 000 t)



The further development of irrigated and intensive olive plantations could reduce production variability. However, the economic viability of traditional groves will struggle in good production years, when prices will drop. This is due to traditional groves' lower productivity and higher production costs. Therefore the need for these systems to create value, particularly by using quality labels such as geographical indication (GI) and organic will become more prevalent. In addition, to maintain production, olive growers can benefit from rural development measures (e.g. for their contribution to landscape protection), or from VCS, currently implemented only in Italy. Furthermore, recognised producers' organisations may implement measures under three-year work programmes in areas such as marketing, traceability and improvement of environmental impact, competitiveness and production quality in the sector.

The expected production increase will serve both EU and world demand. In the last decade, the evolution of EU consumption was characterised by a regular decrease in the four main producing Member States, with a steeper drop during the financial crisis and more recently because of very high prices, down to 8.5 kg per capita in 2016. A further decrease of total consumption in these countries is projected by 2030 but at a slower pace than in recent years, (-6.5 % compared to the 2014-2016 average). The increasing consumption in the rest of the EU would compensate this decrease, however, with per capita consumption remaining at a low level (around 1.5 kg per capita in 2030).

Graph 5.3 EU olive oil per capita consumption (kg)



Given the strong global demand and increasing EU production, EU exports should continue increasing, albeit more slowly than in the past decade (+4.7 % per year over the period 2006-2016, +3.0 % per year on average by 2030). EU imports are expected to remain stable over the outlook period. Therefore, the net export position of the EU will be strengthened further.

5.2. Wine

EU total wine consumption is expected to stabilise after a long period of decline. Total domestic use will, however, decrease due to a reduction of the other uses of vinified production such as distillation or production of vinegar and vermouth. The EU is expected to maintain a steady growth in wine exports, thanks to strong demand for GI wines and sparkling wines. Overall these developments will lead to a small decrease of EU production

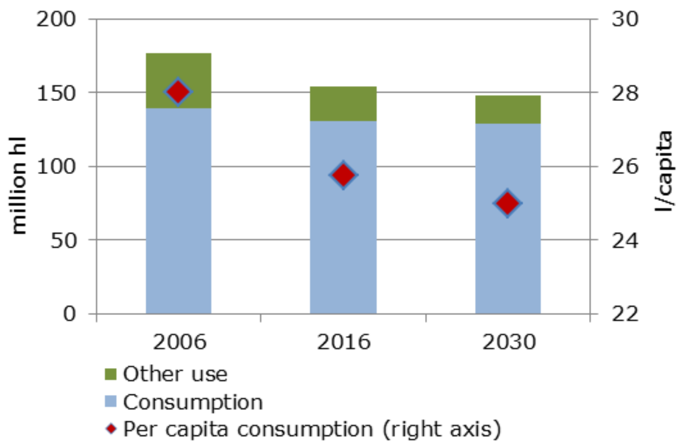
At 160 million hl, the EU is the world's leading producer of wine, representing over 60 % of world production in 2016. Three Member States (Italy, France and Spain) account for more than 80 % of this production. The EU is the largest consumer of EU wines (130 million hl), with five Member States accounting for more than 70 % of this EU consumption (France, Italy, Spain, Germany and the UK).

The harvest in 2017 is exceptionally low due to climatic conditions and does not represent a 'normal' wine year. Therefore, it was not used to derive future trends and is not depicted in the graphs.

Diverging trends in* per capita *consumption

In the EU, per capita consumption decreased by almost 3 litres over the last decade, with diverging consumption trends in the EU-15 and the EU-N13. In the EU-15, per capita consumption decreased by 4 litres to 27 litres per capita over the same period. While the historically declining trend recently changed in Italy, Spain and the UK, mainly thanks to the increased popularity of sparkling and light wines, per capita consumption in France and Germany continues to decline. By contrast, wine consumption in the EU-N13 has significantly increased over the last decade (+2 litres per capita, up to 14 litres) thanks to economic growth and some substitution of beer by wine.

Graph 5.4 EU wine domestic use



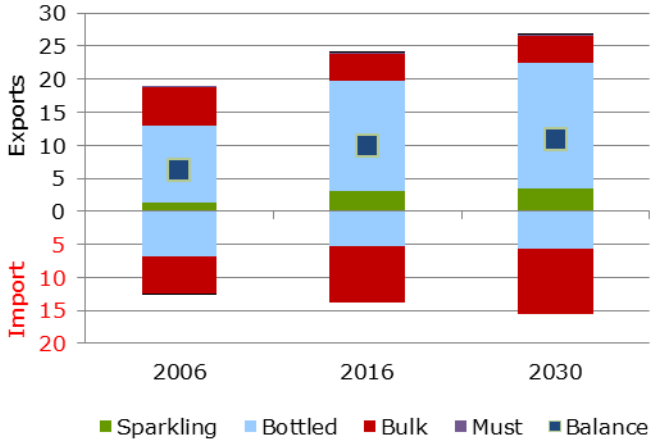
It is expected that these trends will continue. However, they will not completely offset the declining trend in some large consuming countries, resulting in a slightly declining consumption overall (-0.1 % per year), down to 25 litres per capita by 2030. Thanks to the expected population growth, total wine consumption in the EU will remain stable. However, total domestic use will decline due to further decreases in the use of vinified production for 'other uses' such as distillation, or the production of 'processed/elaborated products' such as vinegar and vermouth.

Steady growth in EU exports thanks to strong demand for wines with a geographical indication (GI wines) and sparkling wines.

Despite strong competition from other wine producing countries on the export market, sustained growth in

EU exports is expected (+1.7 % per year), reaching close to 27 million hl in 2030. The increasing exports are driven by strong demand for bottled still wines (+4 % per year over the last 10 years) and for EU sparkling wines (+9 % per year over the last 10 years). It is expected that these wines will account for 71 % and 13 % respectively of total EU wine exports by 2030 (compared to 70 % and 12 % in 2016). The share of bulk wine in exports is expected to decrease from 17 % to 15 %, whereas the share of bulk wine in EU wine imports is expected to increase from 63 % to 70 %, making it the main contributor to the slight increase of imports by 2030 (+0.8 %).

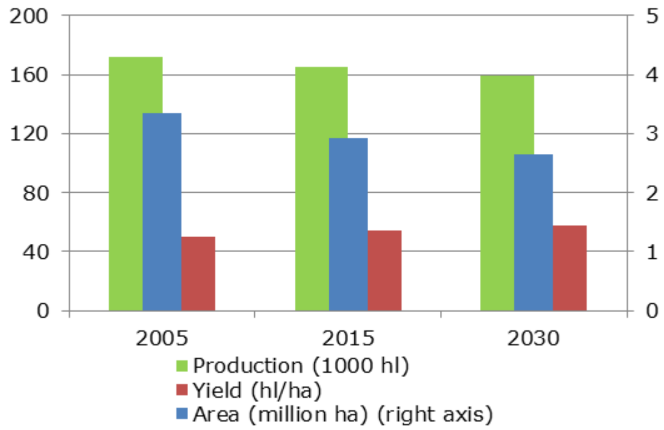
Graph 5.5 *EU wine trade balance (million hl)*



Restructuring of vineyards will lead to an increase of average yields

The EU vineyards area declined by more than 1 % per year between 2005 and 2015, particularly due to the grubbing up of old vineyards. The decline is expected to continue over the outlook period, though at a slower pace (-0.7 % per year). It is anticipated that vineyards will only be partially replanted, mostly with GI wines where allowed. This process has contrasting impacts on the average yield, with a higher concentration of production in more productive areas (pushing average yield up) and a limitation of maximum yield in GI wine areas. The removal of older vineyards has so far the strongest effect. Therefore, the average yield is expected to increase by 0.5 % a year to 57.6 hl/ha by 2030. The increase in average yield is not expected to offset the impact of the decline in area on production. As a result, production is projected to continue slightly declining by 0.2 % per year (compared to a decline of 0.5 % per year over the period 2005-2015), although with annual variability due to climate conditions.

Graph 5.6 Vineyard production area and yields



5.3. Apples

Increasing yields combined with a reduction in production area are expected to lead to a stabilisation of apple production in the EU. The consumption of fresh apples is expected to stabilise, while the consumption of processed apples is likely to decline slightly.

The EU produced more than 12 million t of apples in 2016/2017. Four Member States accounted for more than 70 % of this production (Poland, Italy, France and Germany).

EU production is expected to stabilise at around 12.5 million t of apples per year by 2030. Although the average yield is expected to be 17 % higher in 2030 compared to the average yield in the last decade, the impact on production will be offset to a large extent by a decrease in area (-0.7 % per year up to 2030).

Modernisation of the apple sector is the main driver of yield increase, in particular in Poland. The main thrust of modernisation is the grubbing up of old orchards. These will be partially replaced by new planting of varieties that correspond to new consumer preferences and new production methods, including methods to adapt to climate change. Improved disease resistance and pest management will also contribute to the yield increase.

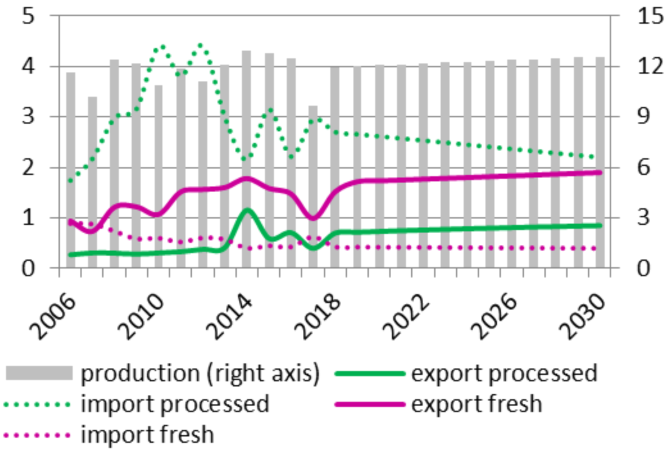
There are signs in the fruit and vegetable sector that promotion campaigns and the EU school fruit scheme are starting to have an effect, leading to a halt in the declining consumption trend. However, this is not confirmed for apple consumption. With the increased EU standards of living, consumers seem to favour more trendy products such as tropical fruit or berries, which are regularly offered in supermarket shelves next to the more common and relatively cheap apples.

The domestic per capita consumption of fresh apples has shown a decline of 0.7 % per year in the period 2006-2016. The declining trend is expected to continue but at a slower pace (-0.3 % per year to 2030).

The export market of fresh apples grew by close to 5 % in the period 2006-2016 despite the Russian import ban. The sector has been successful in finding alternative markets after the introduction of the ban in 2014, partially compensating for the loss of the Russian market. EU exports of fresh apples are expected to further grow (+1.8 % per year up to 2030), while imports will continue to decline at a slow pace (-0.5 % per year up to 2030).

The recent decline in consumption of processed apples in the EU is expected to continue (-0.4 % per year up to 2030), in particular for juices, which take up most of the EU's processed apples. This decline in demand is expected to create a surplus of processed apples on the EU market, leading to increasing exports[56] (+1.3 % per year over the same period). The lower domestic demand is expected to lead to a lower level of EU imports (-0.1 % per year up to 2030).

Graph 5.7 EU production and trade of fresh and processed apples (in million t)



5.4. Tomatoes

EU production of fresh tomatoes is expected to remain relatively stable despite increasing yields driven by longer production seasons. However, the value of production is likely to continue to rise as greater product segmentation adds value. Consumption of fresh tomatoes is expected to go down slightly. By contrast, consumption of processed tomatoes is expected to marginally grow, driven by higher demand as an ingredient and for food products that evoke a Mediterranean lifestyle.

The EU produced more than 18 million t of tomatoes in 2016/2017, out of which approximately 40 % is consumed fresh and 60 % is used in the processing industry. These are separate production streams. Five Member States (Spain, Italy, the Netherlands, Poland and France) accounted for almost 75 % of production for fresh consumption, while three Member States (Spain, Italy and Portugal) accounted for 94 % of production for processing.

EU production of **fresh tomatoes** is expected to remain relatively stable compared to the average for 2014-2016[57] (-1.4 % by 2030), though with an increasing share of varieties with higher value added such as cocktail tomatoes, cherry tomatoes and other miniature tomatoes. Similarly, in the last decade the stability of production volumes has been accompanied by a growing value of production: close to +20 % in France, Germany, Italy and Spain in the period 2006-2016 (figures based on Euromonitor). Fresh tomatoes can be produced in greenhouses or in open air, the latter method being mainly used in the southern countries.

While the production area is expected to decrease, the average yields of fresh tomatoes are increasing, driven by an extension of production seasons in all regions of production. The traditional summer campaign in the northern producing countries is being extended to winter and the traditional winter campaign in the southern countries is being extended to summer. The increasing share of high added value varieties, e.g. miniature tomatoes, in total fresh tomato production is pushing down the average yield. However, the impact of longer production seasons on average yield is expected to be stronger.

The extension of the seasons might have an impact on sustainability challenges in the sector, such as increased energy demand in the northern countries and increased use of water in the southern countries.

Domestic per capita consumption of fresh tomatoes remained stable at 15 kg per capita in the last decade (between 2006 and the 2014-2016 average). By 2030 it is expected to decline slightly to 14.4 kg (-0.3 % per year compared to 2014-2016).

In contrast to the declining exports in the last decade (-0.3 % per year in volume between 2006 and 2014-2016), mainly due to the Russian import ban introduced in 2014, exports are expected to increase up to 2030 (+2.4 % compared to the 2014-2016 average). With stable imports, in particular from Morocco and Turkey (72 % and 18 % respectively in 2016), the EU will remain a net importer of fresh tomatoes.

As for **processed tomatoes**, production is expected to increase slightly during the outlook period (+0.4 % per year until 2030). Growth will mainly be driven by increasing yields, in particular in the main producing countries. Their strong market position will be sustained by their high level of specialisation and competitiveness.

The EU consumption of processed tomatoes is expected to increase from 20.5 kg per capita in 2014-2016 to above 21 kg in 2030 (in fresh tomato equivalent). This growth is mainly driven by increasing demand for convenience foods such as prepared meals (see Graph 3.8) and products that are evocative of a Mediterranean lifestyle.

The trade flows of processed tomatoes are much higher than those of fresh tomatoes, the latter being

[56] Market surplus at times of bumper harvests pushes prices down, making EU processed apples competitive on the world market. This already happened in 2014, resulting in an increase in exports.

[57] Given the high variability of production, projections are compared to the 2014-2016 average.

more perishable than the former. Exports are expected to continue increasing up to 2030 both in volume (+0.4 % per year compared to 2014-2016) and in value (+0.7 % per year). By contrast, EU imports of tomatoes are expected to fall by 1.3 % from 2014-2016 to 2030, in particular due to the decrease in domestic demand for tomato concentrate, which is being replaced by domestic tomato pulp. In this context, the EU is expected to become a net exporter of processed tomatoes by 2030. Nevertheless, the EU will remain a net importer of total tomatoes (fresh and processed).

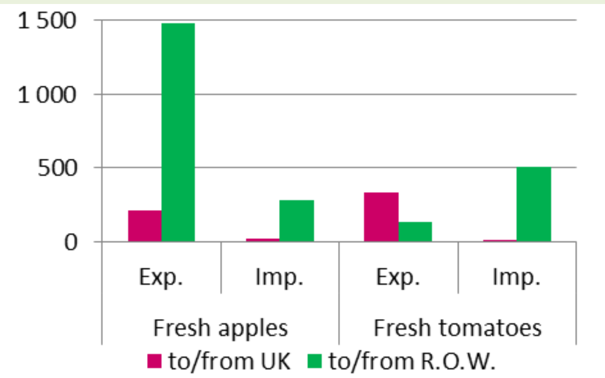
Graph 5.8 EU trade of fresh and processed tomatoes (in million t)

What about the UK?

*The UK accounted for around 3 % and 1 % of total EU-28 production of **fresh apples** and **fresh tomatoes** respectively in 2016/2017. The UK is a net importer of these products from the EU-27.*

*The EU-27 exports more than 200 000 t of **fresh apples** to the UK, mainly from France (56 %) and Italy (18 %). The UK accounts for 13 % of total EU-27 exports. The small UK exports to the EU-27 (20 000 t) are mainly destined for Ireland.*

Graph 5.9 EU-27 trade of fresh apples and tomatoes in 2016 (1 000 t)

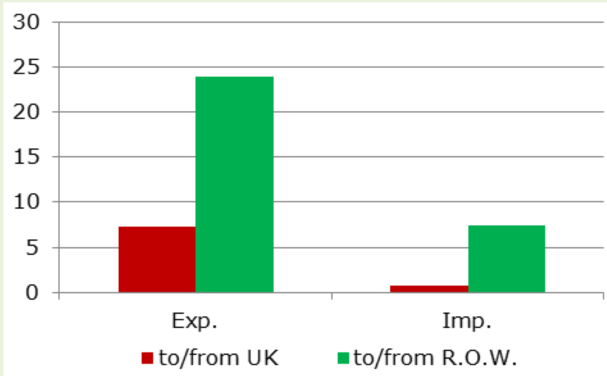


*The UK is an important market for EU-27 exports of **fresh tomatoes**, as it purchases 72 % of total EU-27 exports. The UK's main trading partners are the Netherlands and Spain, accounting together for roughly 85 % of EU-27 exports to the UK in 2016/2017. Exports from the UK to the EU-27 are very small (2 % of total EU-27 imports) and go mainly to Ireland (73 %).*

*With low production and a large consumption market, the UK is a significant importer of **EU wines**. In 2016/2017, 23 % of EU-27 wine exports were shipped to the UK. These came mainly from Italy (44 %), France (23 %) and Spain (18 %), representing more than 7 million litres in total. In terms of value, exports to the UK accounted for 19 % of EU-27 exports, corresponding to EUR 2.5 billion.*

Exports from the EU-27 to the UK are mainly still and sparkling bottled wine. These accounted for 69 % and 22 % respectively of volumes shipped to the UK in 2016/2017. In terms of value, these products account for 61 % and 36 % respectively of EU-27 wine exports to the UK.

Graph 5.10 EU-27 trade of wine in 2016 (in million hl)



6. AGRICULTURAL INCOME

The market outlook presented in this report, together with ad hoc assumptions on sectors not explicitly covered by the analysis, result in an expected increase in agricultural income per annual working unit (AWU) at the beginning of the outlook period. The income will stabilise afterwards, with an overall 1.1 % increase in real terms in the EU in the outlook period compared to the 2015-2017 average. The agricultural income per AWU is expected to increase at a higher rate (+0.8 percentage point per year) in the EU-N13 compared to the EU-15, resulting in a further closing of the income gap by 2 %.

The growth in EU agricultural income comes from the significant gain in agricultural output (almost +20 % over the period). This is partially outweighed by a strong increase of intermediate costs (+30 % over the period). It is also significantly affected by subsidies, for which the current situation applies throughout the outlook period. The continued labour outflow from agriculture due to structural changes at EU level is also playing a significant role.

What about the UK?

The total value of the agricultural output from the UK is EUR 26 billion, corresponding to 7 % of the EU total. UK agricultural income per AWU slightly decreased (-2 %) in real terms from 2010 to 2015. In terms of labour, the outflow was relatively slow between 2000 and 2009. The trend reversed after the financial crisis and since then a small inflow of workers has been recorded.

6.1. Per capita income increase over the past decade

From 2006 to 2016, EU agricultural income per AWU increased in both nominal and real terms, albeit with ups and downs due to certain volatility in commodity prices. The overall increase in income has been mainly driven by higher value of production, especially from 2009 to 2013 (+26 %) following the big drop in 2009. For the entire period 2005-2016 significant growth took place in the EU-N13, showing a certain convergence with the EU-15[58].

However, intermediate costs increased by 22 % from 2009 to 2013, mainly driven by the high cost of energy and fertilisers. The oil price peaked in 2011/2012 and remained at a high level up to 2014, having a major impact on production costs.

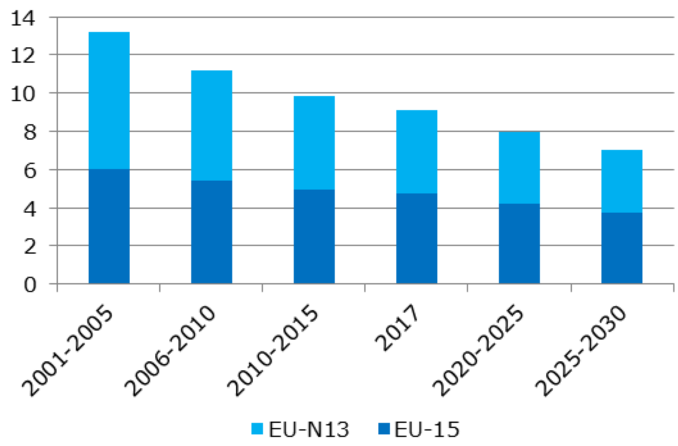
Costs of investments (or depreciation) have overall increased in the past decade, but at a slow pace in the past 5 years due to reduced investments and low economic growth in the EU-28. Indeed, from 2006 to 2016, also the consumer price index, which also affects investment costs, has increased slowly in the EU-15 (1.6 % per year) and only slightly more in the EU-N13 (2.4 % per year).

The agricultural workforce has decreased strongly since 2007: about 2.5 million people have left the sector, reaching a total of 9 million workers in the EU-28 in 2017. This has mainly happened in the EU-N13, which experienced a loss of 1.7 million workers (-29 %). This trend is correlated with significant structural changes across the sector (fewer farms, economies of scale, investments in machinery, etc.). At the bottom of the economic crisis the outflow slowed down, mainly in the EU-N13.

6.2. Continuous structural changes but labour force outflow at a slower pace

Total EU agricultural employment declined by 8 % from 2012 to 2016. The labour outflow will continue in the future, although at a slower pace. During the period 2017-2030 the agricultural workforce is expected to shrink by 28 % to reach 6.6 million people in agriculture by 2030 (-3.2 % per year).

Graph 6.1 Agricultural workforce across the EU (million AWU)



Structural changes in the EU are expected to continue, with higher investments in technology. Precision farming and digital agriculture are examples of such investments. However, they are costly because farmers have to invest in software, data sensors, appropriate machinery, etc. More targets for agricultural systems (production of by-products, environmental benefits, use of more efficient irrigation systems, etc.) could also accelerate in the outlook period and would require further investments. Moreover, a period of relatively low oil prices and the recovery of the economy (an annual increase of between 2.2 % and 4.1 % is expected in the GDPI[59] in the EU) are expected to boost agricultural investments.

In the EU-N13, continuous changes to farm structures will be a significant driver of the labour outflow, both

[58] Source: Agricultural Context Indicators, C26, DG Agriculture and Rural Development.

[59] Measurement of GDP by income generated.

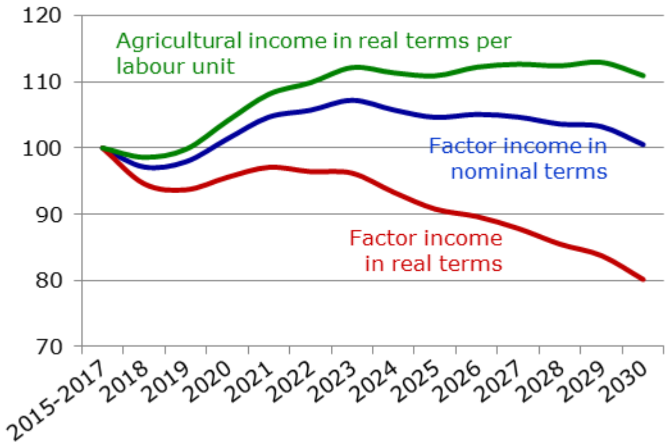
due to technical change, as previously stated, as well as ongoing but as yet incomplete consolidation (see the dedicated section below on this subject). Still, technical change can also happen on small and medium-sized farms (characterized as farms below 100 European size units).

The labour outflow from agriculture is driven by structural changes (technical and scale changes) but also because other sectors offer better opportunities to the workforce. Still, rural areas face difficulties in creating attractive jobs outside the agricultural sector resulting in ongoing migration towards urban centres. This is often due to sub-optimal infrastructures in rural areas and limited access to public transport. The expected development of these regions and their attractiveness could impact the labour outflow from agriculture and thus, the income per AWU.

6.3. Decreasing factor income in real terms

Factor income in real terms is expected to decrease, mainly due to a stronger increase in intermediate costs compared to the value of production.

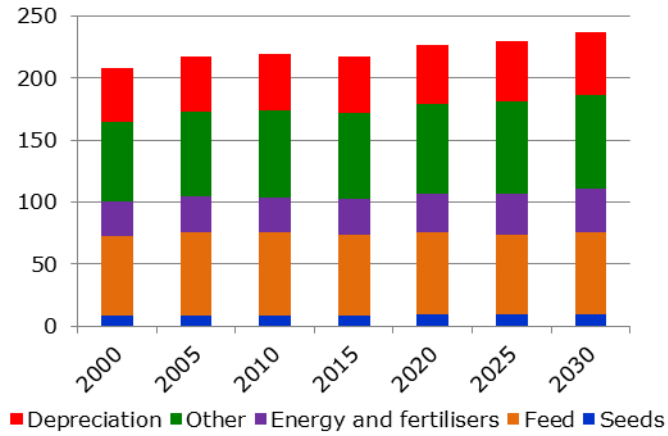
Graph 6.2 Change in EU agricultural income (2015-2017 average=100)



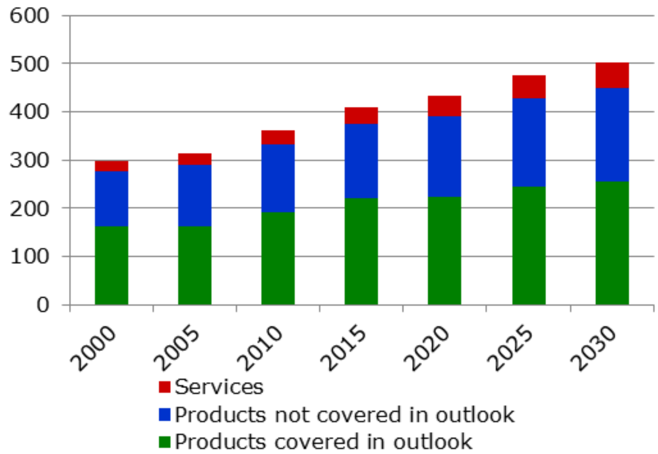
On the costs side, intermediate costs are expected to rise significantly in the outlook period (by 2.5 % per year). This is mainly due to a recovery of energy prices after the very low in prices in 2015-2016. The share of energy and fertilisers in total intermediate costs will slightly rise by 3 % up to 2030 (compared to the 2015-2017 average). On feed, the low cereal prices that are currently keeping feed costs relatively low are expected to increase in the following years. Feed, as a share of the overall intermediate costs, will decline by 4 %.

Other intermediate costs such as agricultural services (agricultural and accounting advice, veterinary expenses, training) as well as depreciation are also expected to increase during the outlook period, as agriculture becomes more capital- and service-intensive.

Graph 6.3 EU intermediate costs and depreciation (billion EUR)



Graph 6.4 EU value of production (billion EUR)

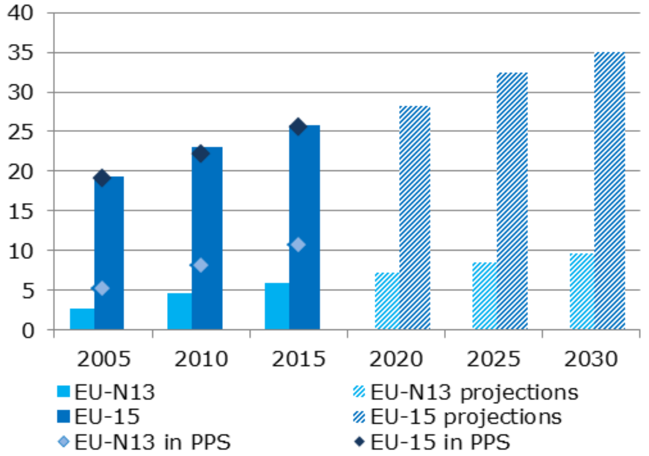


On the revenue side, the total value of production[60] is expected to increase by 2 % per year on average. Growth will be stronger in the EU-N13 (+2.9 % annually) than in the EU-15 (+1.8 % annually). Given the difference in total revenue, the increase in absolute numbers is three times higher in the EU-15 than in the EU-N13. Across the EU, the value of the production of common wheat and maize is expected to increase substantially (between 2.4 % and 2.8 % per year). For oilseeds, sunflower seeds' value of production is expected to record a strong increase (by 3 % per year). As for animal products, the value of milk production will increase by almost 4 % annually, while the value of sheep and bovine production will slightly decrease over the outlook period.

Since 2005, agricultural income in the EU-N13 increased faster than in the EU-15. The factor income in nominal terms per AWU increased by 8 % per year in the EU-N13 compared to a 3 % growth in the EU-15, though at a slower pace since 2012. Furthermore, the gap between the factor income expressed in purchasing power standard (PPS) is currently closing more rapidly, which might indicate that a small deterioration in real terms does not indicate necessarily a deterioration in purchasing power.

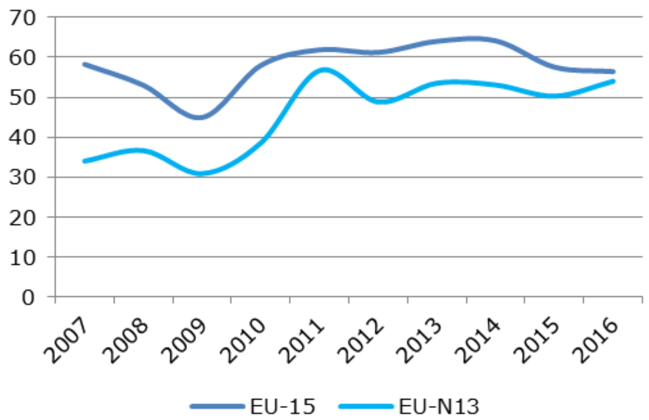
[60] In nominal terms.

Graph 6.5 EU-15 and EU-N13 factor income in nominal terms per AWU (thousands EUR/year)



In the EU, the gap between the agricultural income and the wages in the whole economy has closed somewhat in the last years. Indeed, the ratio between the agricultural entrepreneurial income and the wages in the economy increased by 10 % from 2007 to 2016. This is mainly due to the high prices in 2013 and 2014 that pushed agricultural incomes up while the economy was still recovering from the hit of the crisis the years before. In the EU-N13, the gap has closed by 20 % while it remained stable in the EU-15. This is linked to the accession to the EU market for the EU-N13, which has become a net exporter of primary and secondary processed goods on the world market. The progressive implementation of CAP payments also played a role in closing the gap.

Graph 6.6 Income per family worker compared to wages in the whole economy (%)



6.4. Low income growth puts pressure on factor remuneration

The factor income is the income received from the production factors, mainly land, capital and labour. Farmers expect to receive a return on their investments in these fixed productions factors. In the past years, land prices increased, and reached an average of EUR 10 000 per hectare in 2013 (based on FADN data[61]), and so did the formation of capital on farms. Indeed, the gross fixed capital formation increased by more than 30 % since 2005[62]. This was driven by further needs for investments in machinery and buildings in the farming sector. Labour costs in the EU increased since 2005, although at a slower pace in the recent years. The labour productivity increased significantly in the same period, mainly coming from the workforce outflow.

In the outlook period, arable land prices are expected to keep an upward trend due the continuous pressure on agricultural land developments as well as environmental constraints (see section 2.1). Moreover, it is expected that farming will be more technology-intensive in the outlook period and that further investments will accompany the take-off of new technologies (as digital innovation, remote sensors, etc.). On labour, it is expected that structural changes towards use of advanced technology and large-scale farming will also reduce the total amount of labour. Nevertheless, the change in the skills mix in agriculture towards more technology-oriented knowledge could affect the overall labour costs upwards. Indeed, agricultural training for farm managers is becoming more needed and widespread; around 20 % of young farm managers (less than 35 years old) have received a training compared to less than 5 % of older farmers (more than 55 years)[63]. With this expected increase of fixed production factors costs, it is thus a challenge that factor income will continue to remunerate farmers at an appropriate level vis-à-vis their investments to be made in these productions factors.

[61] Facts and figures on EU agriculture and the CAP. Link: https://ec.europa.eu/agriculture/sites/agriculture/files/statistics/facts-figures/agricultural-capital-land-value.pdf

[62] Productivity in EU agriculture, EU Agricultural Markets Briefs, December 2016

[63] CAP context indicators – C24: Agricultural training of farm managers

Table 6.1 Outlook for agricultural income in the EU, 2017-2030 (2015-2017 average=100)

	2015-17	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Factor income in nominal terms														
EU-28	**100**	**97.1**	**97.9**	**101.4**	**104.7**	**105.7**	**107.2**	**105.7**	**104.6**	**105.1**	**104.6**	**103.6**	**103.2**	**100.5**
EU-15	100	96.6	97.3	101.1	104.5	105.5	107.2	105.4	104.1	104.5	103.9	102.8	102.3	99.3
EU-N13	100	99.3	100.7	102.3	105.1	106.5	107.2	107.3	107.0	107.7	107.8	107.3	107.1	105.7
Factor income in real terms														
EU-28	**100**	**94.6**	**93.7**	**95.6**	**97.1**	**96.4**	**96.2**	**93.3**	**90.8**	**89.6**	**87.8**	**85.5**	**83.7**	**80.1**
EU-15	100	94.2	93.3	95.4	97.0	96.2	96.2	93.0	90.3	89.2	87.3	84.9	83.1	79.3
EU-N13	100	96.4	95.4	96.1	97.4	97.2	96.3	94.6	92.6	91.6	90.2	88.0	86.3	83.6
Labour input														
EU-28	**100**	**95.9**	**93.8**	**91.7**	**89.7**	**87.7**	**85.7**	**83.7**	**81.8**	**79.8**	**77.9**	**76.0**	**74.1**	**72.2**
EU-15	100	96.6	94.6	92.6	90.6	88.6	86.7	84.7	82.8	80.9	78.9	77.0	75.1	73.2
EU-N13	100	95.1	93.0	90.9	88.8	86.7	84.7	82.7	80.7	78.7	76.8	74.8	72.9	71.0
Agricultural income in real terms per labour unit														
EU-28	**100**	**98.6**	**99.8**	**104.1**	**108.1**	**109.8**	**112.1**	**111.3**	**110.9**	**112.2**	**112.6**	**112.4**	**112.9**	**110.9**
EU-15	100	97.5	98.6	103.0	107.0	108.5	110.9	109.7	109.1	110.2	110.5	110.1	110.6	108.3
EU-N13	100	101.1	102.4	105.6	109.5	111.9	113.5	114.2	114.5	116.1	117.2	117.4	118.1	117.4

Source: DG AGRI calculations, based on the Economic Accounts for Agriculture (Eurostat)

7. ENVIRONMENTAL ASPECTS

This chapter presents an environmental analysis of the medium-term market developments of EU agricultural markets based on a set of environmental and climate indicators. These indicators include non-CO_2 greenhouse gas (GHG) emissions, ammonia (NH_3) emissions and the change in the nitrogen balance (N surplus). Although some environmental restrictions in place at EU and national level are implicitly taken into account (e.g. in the number of animals, change in production), this modelling analysis does not take into account environmental constraints in an explicit way. This may lead to an overestimation of the negative environmental and climate impact in the regions in question.

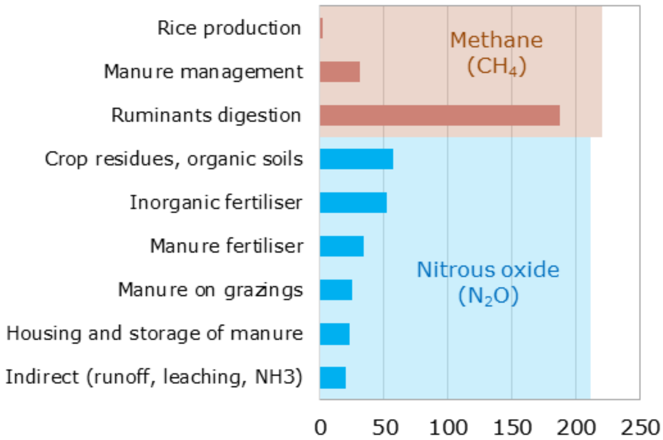
The environmental analysis is based on the 2016 CAPRI[64] baseline, which provides a medium-term outlook for the EU and global agricultural commodity markets. In the EU, the baseline provides harmonised projections for the main agricultural commodities, land use and herd sizes, at Member State and regional level. The baseline covers current CAP policies, assuming the continuation until 2030 of CAP post-2013 Member State policy options. This reflects the impact on regional agricultural output development, including livestock herd size, with a direct impact on environmental aspects.

7.1. Greenhouse gas emissions

Agriculture[65] accounts for slightly more than 10 % of total EU-28 GHG emissions[66]. According to the CAPRI projection, total non-CO_2 (CH_4 and N_2O) GHG emissions from agriculture are expected to decrease by 2030 (-1.5 % to 433 million t CO_2 equivalent) compared to the reference year 2008. In 2030, livestock will continue to be responsible for 99 % of all methane (CH_4) emissions from agriculture, the biggest share (85 %) coming from ruminants digestion (see Graph 7.1).

The main sources of nitrous oxide emissions (N_2O) are related to crop and grassland production, mainly inorganic (mineral) fertiliser application, crop residues and cultivation of organic soils (e.g. histosols). These will account in 2030 for 51 % of N_2O emissions. The remainder is associated with manure housing and storage 11 %, manure on grazing land 12 %, manure fertilisation of fields 16 % and indirect emissions 10 %.

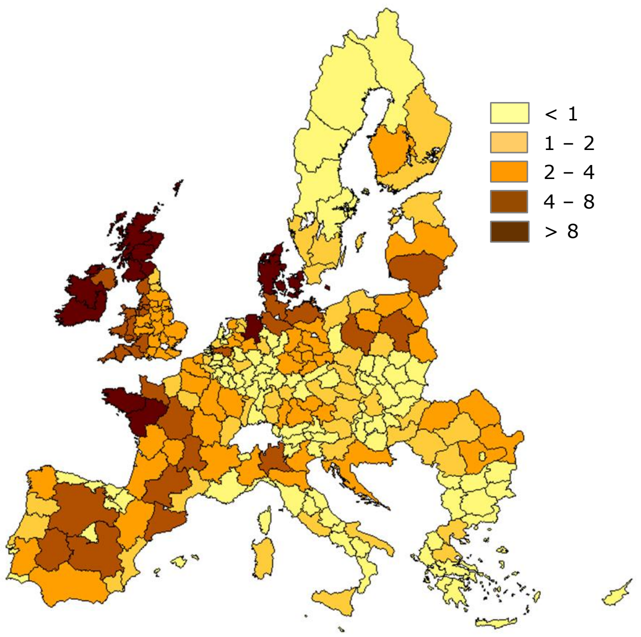
Graph 7.1 non-CO_2 GHG gas emissions sources in the EU-28 in 2030 (million t CO_2 equivalent)[67]



Source: DG JRC, based on the 2016 CAPRI baseline.

Overall, the livestock sector will contribute directly to 72 % of the non-CO_2 GHG emissions of agriculture in 2030, if emissions from manure on the field are allocated to the livestock sector. Crop and fodder areas generate the remaining 28 % of non-CO_2 GHG emissions and part of these emissions is linked to the production of animal feed.

Map 7.1 non-CO_2 GHG emissions in 2030 (million t CO_2 equivalent)



Source: DG JRC, based on the 2016 CAPRI baseline.

Map 7.1 shows the projected geographical distribution of non-CO_2 GHG emissions in 2030. High global warming potential is expected in Ireland, Denmark, Brittany and Pays de la Loire (France),

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64 www.capri-model.org. CAPRI is a comparative static partial equilibrium model for the agricultural sector. The 2016 CAPRI baseline is calibrated to the mid-term outlook of the European Commission published in 2015. It provides projections for the agricultural sector for 2030.

65 Land use, land use change and forestry (LULUCF) net removals are not included in total greenhouse gas emissions. Emissions from agricultural transport and energy use are excluded as they are not part of the agriculture sector as defined by the current IPCC reporting guidelines.

66 EEA (2017): 'National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism'. http://www.eea.europa.eu/data-and-maps/data/national-emissions-reported-to-the-unfccc-and-to-the-eu-greenhouse-gas-monitoring-mechanism-13.

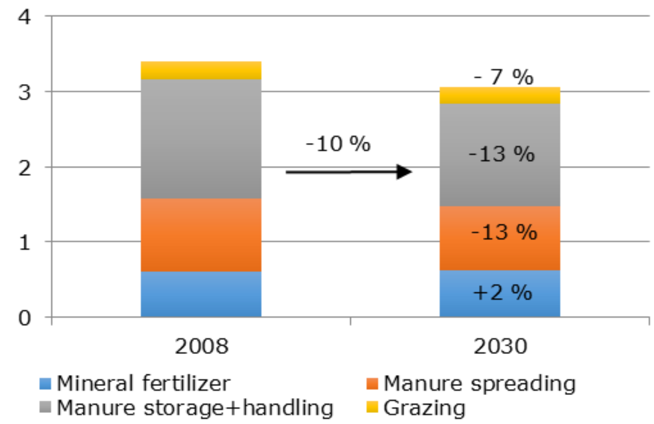
67 AR4 (IPCC Fourth Assessment Report: Climate Change 2007) conversion factors have been used for CH_4 and N_2O into CO_2 equivalent (respectively 25 and 298).

western Lower Saxony (Germany), and Scotland[68]. Compared to 2008, increases above 25 % are projected for Crete (Greece), central Poland and northern Bulgaria, north-western Germany, Alentejo (Portugal) and Aragon (Spain). Decreases of more than 25 % have been projected in a significant number of regions in Germany, the UK, northern France, Italy, southern Spain, etc.

7.2. Ammonia emissions

Animal and crop production processes release NH_3[69] into the atmosphere. More than 90 % of the EU-28 NH_3 emissions (93 % in 2015[70]) is associated with agriculture, especially with manure management (approx. 80 %) and mineral fertiliser use (approx. 20 %). In the atmosphere NH_3 can combine with other forms of air polluters such as nitrogen oxides released by transport, industrial and household activities and sulphur dioxide from industry, and contribute to the formation of airborne particulate matter (also called PM2.5), with strong negative impacts on human health)[71,72,].

Graph 7.2 Projected ammonia emissions change by sources in the EU-28 (million t of NH_3)[73]



Source: DG JRC, based on the 2016 CAPRI baseline

The CAPRI model projects a decrease in EU-28 NH_3 emissions for 2030, both in total and per ha. The CAPRI environmental module tracks all nitrogen flows associated with feed, animal products, manure management and spreading, and mineral fertiliser, as well as NH_3 and other losses. It assumes the implementation of a limited set of NH_3 emission abatement measures[74]. The module does not include national obligations that may be enacted by Member States to comply with the National Emission Ceilings (NEC) Directive. The CAPRI calculations show that EU-28 agricultural NH_3 emissions are expected to decline by approximately 10 % between 2008 and 2030, with the largest emission reductions resulting from manure storage, handling and spreading, and with nearly constant emissions from fertilisers (see Graph 7.2). These reductions will occur despite an 8 % increase in meat production and a 23 % increase in milk and dairy, i.e. 12 % in animal N-protein[75], while animal numbers (in livestock units (LSU)) will decline by 9 % and nitrogen contained in manure (N-manure) by 5 %. Thus, increasing efficiency of meat, milk and dairy production is an important factor that also leads to better utilisation of nitrogen and lower losses of NH_3. Further driving factors are specific changes in herd composition (e.g. more poultry and less dairy), evolving manure management systems and additional NH_3 emission abatement techniques.

Two contrasting exemplary situations in Germany and Poland are described below. In Germany, the CAPRI projections show an increase in production of animal proteins by more than 20 % between 2008 and 2030, while animal numbers are expected to decline by 13 % and N-manure production by 2 %. In this period, total agricultural NH_3 emissions (see Graph 7.3) are projected to decline by 14 %. The strongest emission reductions (-23 %) are found for manure spreading, mainly due to abatement measures[76], while a fall of 18 % is observed in grazing animal emissions.

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[68] The significant difference in size of the administrative regions affects the total emissions per region.

[69] Ammonia (NH_3) is a gas produced by the decay of organic vegetable matter and from the excrement of humans and animals. When released into the atmosphere, ammonia increases the level of air pollution. Once deposited in water and soils, it can potentially damage sensitive vegetation systems, biodiversity and water quality through acidification and eutrophication.

[70] EEA web (2017): 'NECD directive data viewer'. https://www.eea.europa.eu/data-and-maps/dashboards/necd-directive-data-viewer.

[71] EEA Report No 13/2017; Air quality in Europe, Downloaded 11 October; https://www.eea.europa.eu/publications/air-quality-in-europe-2017, Luxembourg: Publications Office of the European Union, 2017, ISBN 978-92-9213-921-6 doi:10.2800/850018.

[72] Maas R., P. Grennfelt (eds) (2016). 'Towards Cleaner Air. Scientific Assessment Report 2016'. EMEP Steering Body and Working Group on Effects of the Convention on Long-Range Transboundary Air Pollution, Oslo. xx+50pp.

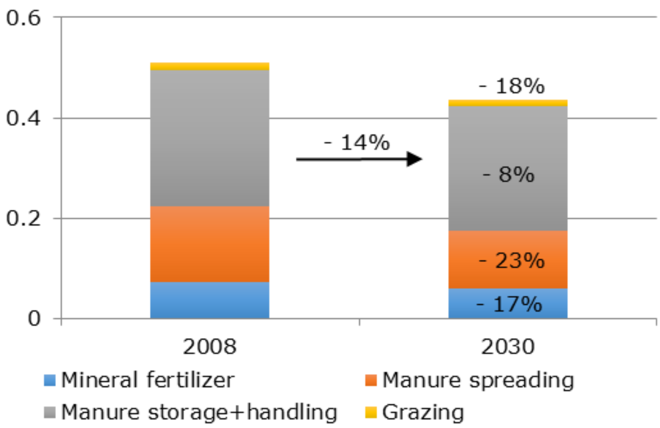
[73] Ammonia values in the previous outlook report (2016) were expressed in tonnes of NH_3-N. This report uses tonnes of NH_3 for comparison with other reports on NH_3 emissions. For the conversion to tonnes of NH_3, a factor of 17/14 applies.

[74] CAPRI's abatement measures for ammonia have been assumed to change over time. Scenarios and coefficients have been taken from the MITERRA project and GAINS/RAINS model (IIASA). Further details can be found in:
Velthof, G.L. et al., 2007. Development and application of the integrated nitrogen model MITERRA-EUROPE. Alterra Report. Alterra, Wageningen. 102.
Velthof, G.L. et al. (2009). 'Integrated assessment of nitrogen losses from agriculture in EU-27 using MITERRA-EUROPE'. Journal of environmental quality 38, 402-17.
Oenema, O. et al. (2009): 'Integrated assessment of promising measures to decrease nitrogen losses from agriculture in EU-27'. Agriculture, Ecosystems and Environment 133, 280-288.

[75] Nitrogen in animal proteins (meat, milk and dairy).

[76] In the case of manure spreading, implementation of 'low ammonia application' measures has been assumed to change over time. 'Low ammonia application' measures include different methods of distributing manure to agricultural fields so as to minimise surface exposure, by placing it under a cover of soil or vegetation. This is sufficient to reduce emissions compared to the reference technology (broadcasting). Low efficiency methods include slit injection, trailing shoe, slurry dilution, band spreading for liquid slurry and incorporation of solid manure by ploughing into the soil the day after application. High efficiency methods involve the immediate incorporation by ploughing within 4 hours after application, deep

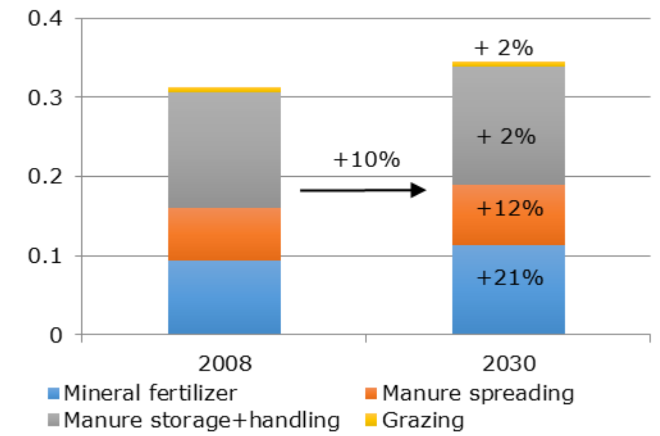
Graph 7.3 Projected ammonia emissions change by sources in Germany (million t of NH_3)



Source: DG JRC, based on the 2016 CAPRI baseline.

Emissions from manure handling and storage fall by 8 %, driven by declining dairy numbers and partially offset by increasing poultry numbers. A slightly increasing cereal crop production requires 17 % less inputs of mineral fertiliser. Animal and crop production efficiency gains in Germany are larger than the EU average and drive much of the diminishing emissions, in addition to specific NH_3 emission abatement strategies. However, these decreases are lower than those imposed by the NEC Directive for 2030. This is because the model does not account for possible national obligations enacted to meet the limits in the Directive.

Graph 7.4 Projected ammonia emissions change by sources in Poland (million t of NH_3)

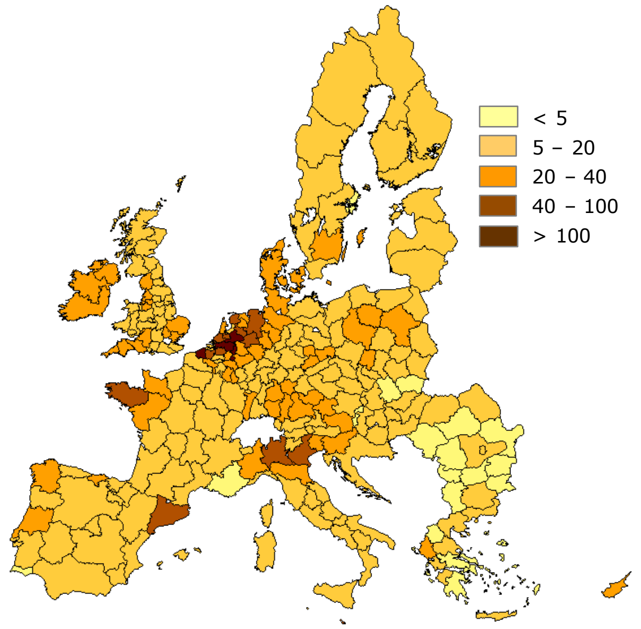


Source: DG JRC, based on the 2016 CAPRI baseline.

For Poland, large increases of close to 40 % are projected for protein production, while the associated N-manure output will go up by 12 %. NH_3 emissions are expected to increase by 10 % between 2008 and 2030. The main drivers of these increases are manure spreading (+12 % — no abatement assumed) and fertiliser emissions (+21 %). Relative projected increases in crop and animal production in Poland are significantly above the EU average and despite the efficiency gains will cause growing NH_3 emissions by 2030 if no additional effort is undertaken by the Member State.

Map 7.2 shows the projected regional distribution of NH_3 emissions in 2030, while Map 7.3 shows the projected absolute changes from 2008. Emissions are declining in most German regions, while large increases in some regions in Poland are not compensated by smaller decreases elsewhere. Higher ammonia pressure is projected in specific regions in northern Italy, France, the Netherlands, Austria, Ireland, Spain, etc.

Map 7.2 Ammonia emissions in 2030 (kg NH_3 / UAA ha)



Source: DG JRC, based on the 2016 CAPRI baseline.

Ammonia emissions and the NEC Directive

Since air pollution can travel over hundreds to thousands of kilometres, European countries have multilaterally agreed to reduce their national ammonia emissions as part of a larger package to reduce air pollution, the National Emission Ceilings (NEC) Directive[77]. For the EU-28, NH_3 emissions need to be reduced by 6 % in 2020 and by 19 % in 2030, compared to the base year of 2005. Although the Directive does not set specific ammonia reduction targets for agriculture, we assume that the emissions from agriculture need to decrease proportionally to all emissions to reach the national and EU targets[78]. NH_3 emissions reported by Member States fell by

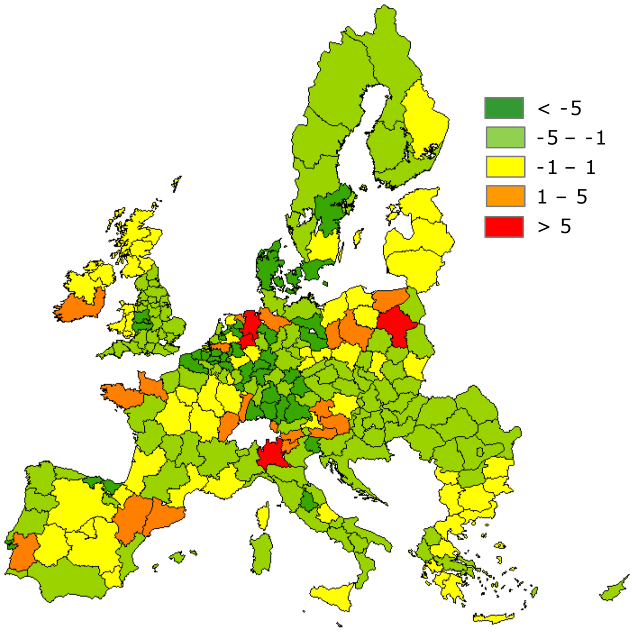
and shallow injection of liquid manure and immediate incorporation by ploughing (within 12 hours after application) of solid manure' (Klimont and Winiwarter, 2011. Integrated ammonia abatement — Modelling of emission control potentials and costs in GAINS. In http://pure.iiasa.ac.at/9809/1/IR-11-027.pdf).

[77] NEC Directive (2016/2284/EU), 2016.

[78] Ammonia emissions from agriculture constitute more than 90 % of total ammonia emissions.

3 % in 2015 compared to 2005 while the objective for 2020 would be a 6 % decrease.

Map 7.3 Ammonia emissions change 2030-2008 (kg NH_3/UAA ha)



Source: DG JRC, based on the 2016 CAPRI baseline.

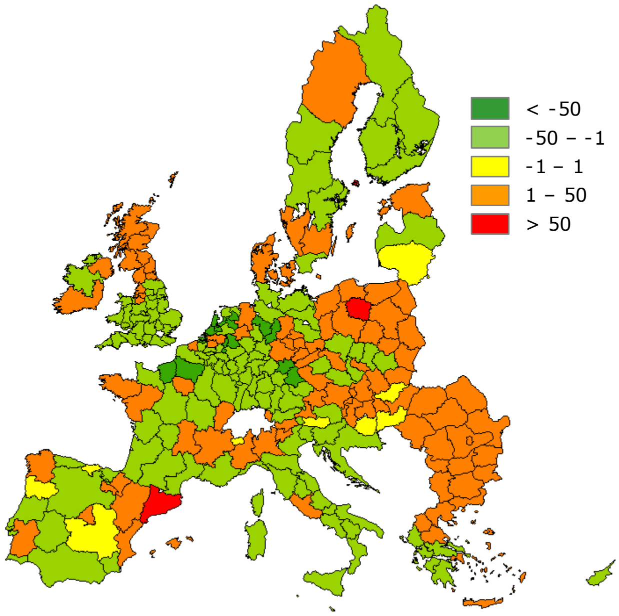
7.3. Nitrogen surplus

The nitrogen (N) surplus of a farm is the balance between inputs and outputs of N to and from the farm. High levels of N surplus indicate higher losses of nitrogen to the atmosphere (NH_3 and N_2O emissions) and nitrate leaching to surface and underground water, leading to eutrophication.

In 2030, the projected average N surplus in the EU-28 is close to 63 kg N/ha, 2.6 % lower than in 2008. This is due to a general increase in N-use efficiency, as average N inputs per ha increase less than N in crop production, while the amount of manure for fertilisation even decreases. However, differences between regions can be observed in Map 7.4. The largest falls in N surplus are projected in regions where a reduction in herd size is expected.

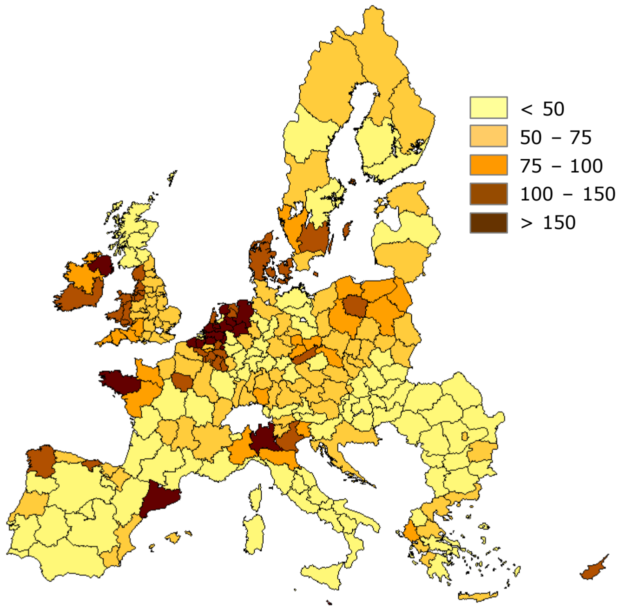
The average N surplus per ha increases specially in regions where animal numbers (mainly pigs) increase, together with a decrease in UAA (e.g. Catalonia). These increases may be particularly problematic in sensitive regions ('nitrate vulnerable zones'), when the increase in N surplus adds to pre-existing high levels. Map 7.5 illustrates the regions with a projected high average N surplus for 2030: several regions in the Netherlands, Belgium, Malta, Lombardy, north-western Germany, Catalonia, Brittany and Northern Ireland. However, legislative environmental restrictions (stemming from the Nitrate Directive, the NEC Directive, or other EU or national rules) have not been explicitly taken into account in this modelling exercise. Such restrictions may lead to further reduction of the extent of the N surplus by changing production methods, additional mitigation measures and/or cost-driven reallocation of production to other regions.

Map 7.4 N surplus change 2030-2008 (kg N / UAA ha)



Source: DG JRC, based on the 2016 CAPRI baseline.

Map 7.5 N surplus in 2030 (kg N / UAA ha)



Source: DG JRC, based on the 2016 CAPRI Baseline.

8. GENERAL CONSEQUENCE OF MACROECONOMIC AND YIELD UNCERTAINTIES

The baseline is a projection of agricultural market developments based on a set of plausible assumptions that are the result of broad consultation with market experts. Those assumptions are, however, only one of the possible future paths. The partial stochastic analysis described in this chapter addresses uncertainties regarding key market drivers and their potential impacts on the projections. This kind of probabilistic analysis quantifies the range of possible outcomes around the central baseline value, by reproducing in the future a portion of the past uncertainty observed for key factors.

Particular consideration is given to the uncertainty surrounding selected macroeconomic variables (GDP, GDP deflator, consumer price index, exchange rate and oil price) as well as uncertainty in crop and milk yields. The analysis is partial as it does not capture variability possibly stemming from factors other than those selected.

8.1. Exogenous sources of uncertainty

The selection of stochastic variables aims to identify the major sources of uncertainty for EU agricultural markets. In total, 39 country-specific macroeconomic variables, the crude oil price and 85 country- and product-specific yields, shown in Tables 8.1 and 8.2, are treated as uncertain within this partial stochastic framework.

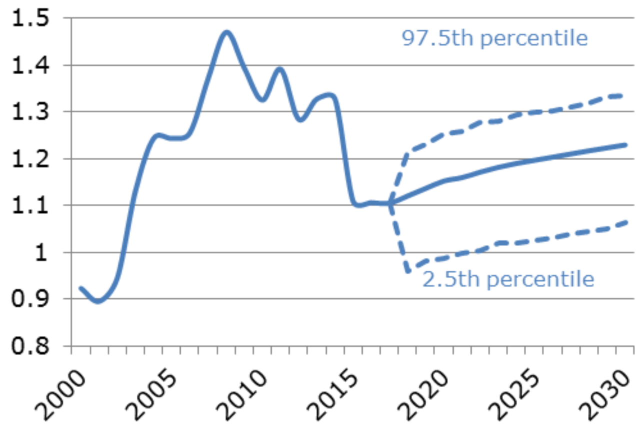
The procedure followed consists of three steps: (i) the quantification of the past uncertainty for each variable concerned; (ii) the generation of 1 000 sets of possible values for the stochastic variables; and (iii) the execution of the Aglink-Cosimo model for each of these 1 000 alternative scenarios. These three steps are explained in more detail below[79].

Step (i): Past variability around the trend is quantified for each macroeconomic and yield variable separately

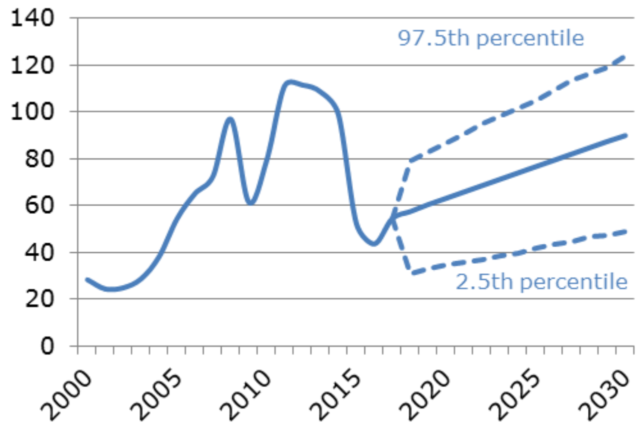
For macroeconomic variables, the estimation is based on econometric estimation of vector autoregressive systems of equations for the period 2000-2016. The unexplained portion of uncertainty *in each year* for the different variables is considered. The empirical cumulative distributions of the error terms are correlated in the next step by use of hierarchical Archimedean copulas. By using copulas, the correlation between empirical distributions of the errors is used to replicate the correlation between macroeconomic variables. No particular assumption is needed on the shape of the marginal distributions of macroeconomic variables' uncertainty.

Table 8.1**Error! Reference source not found.** summarises the simulated variability of macroeconomic variables in 2030. The accumulated variability of each outcome is measured with the coefficient of variation in the year 2030 (CV_{2030}), defined as the ratio of the standard deviation of the variable relative to its mean, and calculated using the 2030 simulated values. These coefficients are only a relative measure and do not provide information about the actual level of the variables themselves. It is therefore also useful to look at the 2.5th and 97.5th percentiles of the two most important variables treated stochastically (see Graphs 8.1 and 8.2).

Graph 8.1 Exchange rate USD/EUR



Graph 8.2 Oil price (USD/bbl)



[79] Further details on the methodology on which this chapter is based can be found in Araujo Enciso, S., Pieralli, S. and Perez Dominguez, I., 'Partial Stochastic Analysis with the Aglink-Cosimo Model: A Methodological Overview', EUR 28863 EN, Publications Office of the European Union, Luxembourg, 2017, doi: 10.2760/680976, JRC108837 http://publications.jrc.ec.europa.eu/repository/handle/JRC108837.

Table 8.1 Coefficients of variation for macroeconomic variables in 2030 (%)

	CPI (consumer price index)	GDP deflator	GDP index	Exchange rate (national currency/USD)	Oil price
Australia	1	2	1	6	
Brazil	1	1	1	7	
Canada	1	1	1	3	
China	1	1	1	1	
EU[80]	1	1	1	6	
India	1	1	1	4	
Japan	1	1	1	6	
New Zealand	1	1	1	4	
Russia	1	3	2	6	
USA	1	1	1		
World					22

Table 8.2 Coefficients of variation for yields in 2030 (%)

CV2026	Europe		Black Sea area			South America				North America			South-East Asia				Australia	China	India	New Zealand
	EU-15	EU-N13	Kazakhstan	Ukraine	Russia	Argentina	Brazil	Paraguay	Uruguay	Canada	Mexico	US	Indonesia	Malaysia	Thailand	Vietnam				
Common wheat	5	8	17	15	11	11	12	13	18	9	4	5					20	2	3	
Durum wheat	6	16																		
Barley	3	7				13				3							20			
Maize	5	15		11		8	8	16	19	5	3	6						2		
Milk																	2			3
Other Coarse grains				14				20	10											
Oats	4	6								6										
Rye	9	7																		
Other cereals	4	6																		
Rice	14											2			3	22		1	3	
Other Oilseeds			18	8				10												
Soya bean	7	16	6	9		6	6	16		9		5								
Rapeseed	6	9								9							18			
Sunflower seed	5	8			10	8														
Palm oil													3	3						
Sugar beet	4	5			8							6						6		
Sugar cane						8	3					4			7		4	2	3	

80 The exchange rate is the euro against the US dollar.

For yields, the uncertainty is based on the deviation between historical yields and a fitted[81] cubic time trend for the period 2000-2016. Correlation between empirical distributions of yield errors for a given commodity is calculated by regional block, but is assumed to be zero among regional blocks. Similarly to the macroeconomic variables, the empirical distributions of the errors are used as input into hierarchical Archimedean copulas without further assumptions on the shape of the marginal distributions of errors in each regional block. Regional blocks correspond to the columns in the shaded areas shown in Table 8.2, together with the coefficient of variation for yields in the year 2030.

Step (ii): 1 000 sets of possible values are generated for the stochastic variables

The second step involves generating 1 000 sets of possible values for the stochastic variables, thus reproducing the variability determined in step (i) for each year of the outlook period 2018-2030. Macroeconomic and yield errors are separately included in a hierarchical Archimedean copula framework to flexibly simulate the correlation of the variables inside countries and regional blocks, respectively.

Step (iii): the Aglink-Cosimo model is run for each of the 1 000 alternative 'uncertainty' scenarios

The third step involves running the Aglink-Cosimo model for each of the 1 000 alternative 'uncertainty' scenarios generated in step (ii). In order to discern the effect of each source of uncertainty, this step is performed three times (only with yield uncertainty, only with macroeconomic uncertainty, and finally combining both macroeconomic and yield uncertainty). This procedure yielded 998, 999 and 988 successful simulations respectively. In the remaining cases, the model did not solve. This can occur as the model is a complex system of equations and policies that may lead to infeasibilities when exposed to extreme shocks in one or several stochastic variables.

8.2. Main impacts of macroeconomic and yield uncertainty

This section presents briefly the global results of the uncertainty (partial stochastic) analysis. Most of the results were already presented in the previous chapters (e.g. uncertainty around milk price in Chapter 3).

Yield uncertainty overall affects the crop and milk market balances. It directly alters production, with demand, imports, exports and stocks adjusting accordingly in response to the impact on prices and forming a new equilibrium. This effect is transferred to other commodities such as animal production (other dairy and meat products), mainly through feed, but the effect is diluted because of substitution effects.

Livestock production is affected similarly by both macroeconomic and yield uncertainties; important factors in these markets include the world crude oil price and the price of protein meals. For biofuels production, the main driver is the crude oil price, which has a direct impact on the consumption of biofuels as both are linked through policies such as the blending mandate. Imports and exports are mainly affected by macroeconomic uncertainty, specifically exchange rates, which affect the competitiveness of the EU-28 on world markets through relative prices. This mainly affects livestock sectors that are well integrated in world trade, such as dairy.

For crop prices in the EU-28, a stronger reaction comes from yield uncertainty than from macroeconomic variation. The effect of both sources of uncertainty simultaneously is the largest, although the effects are not additive. Similarly, in some of the world's markets, yield uncertainty plays a major role in the price variation. The effect of the uncertainties comes together at the level of the EU farm income. The CV_{2030} income per AWU (annual working unit) due to macroeconomic uncertainty is 10.1 % (in nominal terms 10 %). For yield uncertainty the figure is 8.6 % (similarly, in nominal terms 8.6 %). For combined uncertainties, the figure is 13.4 % (in nominal terms 13.3 %).

[81] Ordinary least squares regression.

Table 8.3 Impact in 2030 of macroeconomic and yield uncertainties on production, consumption and trade of agricultural commodities, CV_{2030} (%)

CV_{2030} (%)	Production			Consumption			Exports			Imports		
	Macro	Yield	Combined	Macro	Yield	Combined	Macro	Yield	Combined	Macro	Yield	Combined
Cereals	0.3	4.5	4.5	0.2	0.8	0.8	1.3	16.6	16.7	1.8	28.6	29.1
Wheat	0.4	4.2	4.2	0.4	2.1	2.2	1.2	17.5	17.6	0.6	9.5	9.5
Coarse grains	0.3	5.0	5.0	0.2	1.4	1.4	2.0	16.4	16.6	2.5	36.5	37.3
Barley	0.3	3.2	3.2	0.3	1.0	1.0	2.0	18.7	18.7	0.3	2.3	2.4
Maize	0.4	7.8	7.8	0.4	2.7	2.7	3.5	17.3	18.5	2.7	38.0	38.9
Oilseeds	0.3	5.5	5.5	0.2	2.2	2.2	10.2	38.7	40.4	0.5	7.1	7.2
Sunflower	0.4	6.4	6.5	0.9	2.7	2.8	9.6	37.5	38.5	10.5	43.7	45.0
Rapeseed	0.4	5.3	5.3	0.6	2.3	2.3	14.8	56.3	59.4	6.6	20.3	21.3
Soya bean	0.4	7.9	7.9	0.9	7.2	7.3				1.1	8.6	8.7
Protein meal	0.3	2.2	2.2	0.3	2.0	2.0	0.8	3.7	3.8	0.9	2.7	2.9
Veg. oils	0.6	1.5	1.6	0.3	0.6	0.7	1.9	5.5	5.8	1.0	2.3	2.5
Sugar	0.5	4.4	4.4	0.6	0.7	0.9	3.5	22.0	22.3	1.5	9.6	9.8
Ethanol	0.8	1.1	1.4	0.1	0.1	0.1	2.3	2.4	3.3	8.7	9.4	12.5
Biodiesel	0.9	0.2	1.0	0.4	0.1	0.5	5.1	1.5	5.2	13.0	3.8	13.3
Meat	0.2	0.5	0.5	0.2	0.2	0.3	2.3	3.6	4.2	2.2	4.6	4.9
Beef	0.3	1.0	1.0	0.3	0.4	0.5	0.8	5.0	5.2	5.8	18.7	18.9
Sheep meat	0.3	0.2	0.3	0.2	0.3	0.4	0.1	0.1	0.1	1.8	2.1	2.8
Pigmeat	0.4	0.7	0.8	0.3	0.3	0.4	2.7	5.6	6.1	1.7	2.4	3.4
Poultry meat	0.3	0.7	0.8	0.3	0.6	0.7	3.5	4.3	5.8	2.5	2.7	3.3
Milk	0.2	0.6	0.6									
Butter	0.3	0.8	0.9	0.3	0.4	0.5	4.5	6.1	7.7	2.7	8.2	8.6
Cheese	0.4	0.2	0.4	0.3	0.2	0.3	2.4	2.7	3.7	1.9	2.9	3.5
SMP	1.7	1.4	2.2	0.2	1.4	1.4	3.3	3.6	4.9			
WMP	1.8	2.3	2.9	0.3	0.2	0.4	3.9	4.4	5.9			

Table 8.4 Impact in 2030 of macroeconomic and yield uncertainties on consumption by type of use of agricultural commodities, CV_{2030} (%)

CV_{2030} (%)	Consumption			Food use			Feed use			Biofuel use		
	Macro	Yield	Combined	Macro	Yield	Combined	Macro	Yield	Combined	Macro	Yield	Combined
Cereals	0.2	0.8	0.8	0.1	0.6	0.6	0.2	0.8	0.9	1.0	1.4	1.8
Wheat	0.4	2.1	2.2	0.1	0.6	0.7	0.6	4.2	4.3	1.0	2.2	2.4
Coarse grains	0.2	1.4	1.4	0.2	0.6	0.7	0.3	1.7	1.8	1.0	1.4	1.7
Oilseeds	0.2	2.2	2.2									
Protein meal	0.3	2.0	2.0				0.3	2.0	2.0			
Vegetable oils	0.3	0.6	0.7	0.6	1.1	1.2				1.2	0.3	1.2
Sugar Sugar beet	0.6	0.7	0.7	0.3	0.7	0.9				1.2	1.8	2.1
Meat	0.2	0.2	0.3	0.2	0.2	0.3						
Beef and veal	0.3	0.4	0.5	0.3	0.4	0.5						
Sheep meat	0.2	0.3	0.4	0.2	0.3	0.4						
Pigmeat	0.3	0.3	0.4	0.3	0.3	0.4						
Poultry meat	0.3	0.6	0.7	0.3	0.6	0.7						
Butter	0.3	0.4	0.5	0.3	0.4	0.5						
Cheese	0.3	0.2	0.3	0.3	0.2	0.3						
SMP	0.2	1.4	1.4	0.1	0.1	0.2	1.9	15.5	15.6			
WMP	0.3	0.2	0.4	0.3	0.2	0.4						

Table 8.5 Impact in 2030 of macroeconomic and yield uncertainties on EU domestic and world prices of agricultural commodities, CV_{2030} (%)

CV_{2030} (%)	EU-28 domestic price			World price		
	Macro	Yield	Combined	Macro	Yield	Combined
Cereals	5.4	11.1	12.0	1.3	11.0	11.2
Wheat	5.6	11.8	13.0	1.1	11.8	11.9
Coarse grains	5.2	10.7	11.5	1.3	11.2	11.4
Barley	5.4	10.8	11.9	1.2	10.0	10.1
Maize	5.2	11.1	11.8	1.7	14.3	14.5
Oilseeds	4.3	13.9	14.4	1.7	17.6	17.7
Sunflower	2.0	7.8	8.0			
Rapeseed	3.2	10.2	10.6			
Soya bean	5.9	22.7	23.2	1.9	23.5	23.5
Protein meal	5.0	12.2	13.0	1.4	14.4	14.5
Vegetable oils	5.2	6.6	8.3	1.6	7.7	7.9
Sugar (white)	5.4	5.3	7.4	1.9	4.6	5.0
Ethanol	7.2	6.0	9.7	5.1	6.4	8.6
Biodiesel	9.2	2.9	9.7	9.2	2.5	9.6
Meats	5.8	4.5	7.3	1.3	4.0	4.3
Beef and veal	6.4	7.6	10.0			
Sheep meat	5.6	2.1	6.0	0.9	1.9	2.1
Pigmeat	5.9	4.6	7.4			
Poultry meat	5.2	5.5	7.4	1.3	5.8	6.0
Milk	4.3	4.2	5.9			
Butter	4.9	5.9	7.5	2.2	5.6	6.1
Cheese	4.5	4.2	6.0	1.3	3.5	3.8
SMP	4.3	2.9	5.1	1.3	2.4	2.8
WMP	4.7	3.3	5.6	1.4	2.8	3.2

9. Market Outlook Data

Table 9.1 Baseline assumptions on key macroeconomic variables

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Population growth (EU-28)	**0.24%**	**0.09%**	**0.07%**	**0.3%**	**0.3%**	**0.3%**	**0.3%**	**0.3%**	**0.1%**	**0.0%**	**0.0%**
EU-15	0.37%	0.17%	0.14%	0.4%	0.5%	0.5%	0.5%	0.5%	0.2%	0.1%	0.1%
EU-N13	-0.27%	-0.22%	-0.20%	-0.2%	-0.2%	-0.2%	-0.3%	-0.3%	-0.3%	-0.4%	-0.4%
Real GDP growth (EU-28)	**2.1%**	**1.7%**	**-0.4%**	**0.3%**	**1.8%**	**2.3%**	**1.9%**	**2.3%**	**1.7%**	**1.6%**	**1.5%**
EU-15	2.1%	1.6%	-0.5%	0.2%	1.6%	2.2%	1.8%	2.1%	1.6%	1.5%	1.4%
EU-N13	1.9%	3.0%	0.5%	1.2%	2.9%	3.7%	3.0%	4.2%	2.9%	2.7%	2.5%
World	4.3%	3.1%	2.6%	2.6%	2.9%	2.9%	2.5%	3.1%	3.1%	3.0%	2.9%
Inflation (Consumer Price Index) (EU-28)	**1.9%**	**3.0%**	**2.6%**	**1.5%**	**0.6%**	**0.0%**	**0.3%**	**1.7%**	**1.8%**	**1.8%**	**1.8%**
EU-15	1.8%	2.9%	2.5%	1.5%	0.6%	0.1%	0.3%	1.7%	1.8%	1.8%	1.8%
EU-N13	2.7%	3.7%	3.7%	1.4%	0.3%	-0.4%	-0.2%	1.8%	2.3%	2.0%	2.0%
Exchange rate (USD/EUR)	**1.33**	**1.39**	**1.28**	**1.33**	**1.33**	**1.11**	**1.11**	**1.11**	**1.15**	**1.20**	**1.23**
Crude oil price (USD per barrel Brent)	**79**	**111**	**112**	**109**	**99**	**52**	**44**	**55**	**63**	**77**	**90**

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

Table 9.2 Area under arable crops in the EU (million ha)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Cereals	**56.0**	**56.7**	**57.7**	**57.6**	**57.9**	**57.3**	**56.7**	**56.0**	**57.1**	**57.0**	**57.0**
of which EU-15	34.3	34.5	34.9	34.9	35.2	34.7	34.3	34.0	34.6	34.4	34.4
of which EU-N13	21.6	22.2	22.8	22.7	22.8	22.6	22.4	22.0	22.6	22.6	22.6
Common wheat	23.1	23.7	23.3	23.4	24.4	24.3	24.2	23.6	24.3	24.5	24.8
Durum wheat	2.9	2.5	2.6	2.4	2.3	2.4	2.7	2.7	2.5	2.4	2.3
Barley	12.2	11.9	12.5	12.4	12.4	12.2	12.3	12.2	12.3	12.3	12.3
Maize	8.3	9.3	9.8	9.8	9.6	9.3	8.6	8.5	9.0	8.9	8.9
Rye	2.3	2.2	2.4	2.7	2.2	2.0	1.9	2.0	2.2	2.1	2.0
Other cereals	7.1	7.1	7.1	7.0	7.0	7.1	7.0	7.1	6.9	6.8	6.7
Rice	**0.5**	**0.5**	**0.5**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
Oilseeds	**11.3**	**11.6**	**11.0**	**11.8**	**11.5**	**11.6**	**11.5**	**12.1**	**11.6**	**11.6**	**11.5**
of which EU-15	6.0	6.2	6.0	6.3	6.1	6.1	6.0	5.9	5.9	5.7	5.5
of which EU-N13	5.3	5.4	4.9	5.5	5.5	5.5	5.6	6.2	5.7	5.8	6.0
Rapeseed	7.1	6.7	6.2	6.7	6.7	6.5	6.5	6.8	6.5	6.3	6.0
Sunseed	3.8	4.4	4.3	4.6	4.3	4.2	4.2	4.3	4.2	4.3	4.4
Soya beans	0.4	0.4	0.4	0.5	0.6	0.9	0.8	0.9	0.9	1.0	1.0
Sugar beet	1.6	1.6	1.7	1.6	1.6	1.4	1.5	1.7	1.6	1.5	1.5
Roots and tubers	1.9	1.9	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.4	1.3
Protein crops	1.2	1.1	0.9	0.8	0.9	1.4	1.6	1.7	1.6	1.6	1.6
other arable crops	5.9	3.9	4.0	4.0	4.7	4.8	5.0	4.7	3.6	3.9	3.9
Fodder (green maize, temp. grassland etc.)	21.0	22.2	22.6	23.2	21.7	21.7	21.7	21.7	22.0	21.7	21.5
Utilised arable area	**99.4**	**99.5**	**100.0**	**101.1**	**100.6**	**100.2**	**100.0**	**99.9**	**99.5**	**99.1**	**98.5**
set-aside and fallow land	8.5	7.9	7.8	7.0	6.8	6.7	6.6	6.6	6.4	5.9	5.5
Share of fallow land	*8.6%*	*7.9%*	*7.8%*	*6.9%*	*6.8%*	*6.7%*	*4.3%*	*6.6%*	*6.4%*	*6.0%*	*5.6%*
Total arable area	**107.9**	**107.4**	**107.8**	**108.1**	**107.4**	**106.9**	**106.7**	**106.5**	**105.9**	**105.0**	**104.1**
Permanent grassland	59.4	58.8	58.4	58.1	58.3	58.5	58.3	58.2	57.8	57.3	56.9
Share of perm. grassland in UAA	*33.1%*	*32.8%*	*32.7%*	*32.6%*	*32.9%*	*33.0%*	*33.0%*	*33.0%*	*33.0%*	*33.0%*	*33.0%*
Orchards and others	12.2	13.1	12.5	12.1	11.7	11.7	11.6	11.6	11.5	11.3	11.2
Total utilised agricultural area	**179.5**	**179.3**	**178.7**	**178.3**	**177.5**	**177.1**	**176.6**	**176.2**	**175.2**	**173.6**	**172.1**

Table 9.3 EU cereals market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**281.2**	**292.4**	**281.6**	**307.6**	**331.0**	**314.4**	**296.8**	**301.2**	**317.2**	**328.9**	**340.8**
of which EU-15	199.7	202.8	202.3	212.3	225.2	218.4	195.6	203.4	213.9	218.0	222.4
of which EU-N13	81.5	89.6	79.4	95.3	105.8	96.0	101.3	97.7	103.3	110.9	118.4
Consumption	**280.7**	**279.0**	**275.3**	**276.0**	**283.9**	**287.6**	**287.4**	**283.5**	**288.3**	**298.4**	**308.5**
of which EU-15	223.4	222.6	217.8	218.6	225.6	229.2	227.8	225.0	227.7	236.2	244.4
of which EU-N13	57.3	56.5	57.5	57.4	58.3	58.3	59.6	58.5	60.5	62.3	64.1
of which food and industrial	104.1	103.0	102.6	100.5	100.9	102.0	102.5	99.0	104.4	110.2	115.9
of which feed	167.5	167.0	163.2	164.9	172.0	174.4	172.8	171.9	171.8	176.5	181.3
of which bioenergy	9.1	9.1	9.5	10.7	11.0	11.2	12.2	12.6	12.0	11.6	11.2
Imports	13.3	14.4	16.9	19.2	15.6	20.5	19.3	20.8	17.6	19.4	20.8
Exports	31.5	25.2	31.6	43.5	51.7	50.8	38.1	38.0	45.8	49.7	52.8
Beginning stocks	56.4	38.7	41.2	32.8	40.2	51.2	47.8	38.5	43.1	45.9	47.5
Ending stocks	38.7	41.2	32.8	40.2	51.2	47.8	38.5	38.9	43.9	46.0	47.8
of which intervention	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stock-to-use ratio	*14%*	*15%*	*12%*	*15%*	*18%*	*17%*	*13%*	*14%*	*15%*	*15%*	*16%*

Note: the cereals marketing year is July/June

Table 9.4 EU wheat market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**137.3**	**139.7**	**134.4**	**144.3**	**157.4**	**160.9**	**144.1**	**150.8**	**157.4**	**163.2**	**169.2**
of which EU-15	105.0	104.0	101.0	104.7	113.9	115.9	98.3	107.3	111.4	113.9	116.4
of which EU-N13	32.3	35.7	33.4	39.6	43.5	45.0	45.8	43.5	46.0	49.3	52.7
Consumption	**125.3**	**129.6**	**119.1**	**116.2**	**126.1**	**129.6**	**128.1**	**127.0**	**129.5**	**132.6**	**135.6**
of which EU-15	103.6	107.6	98.5	95.5	104.2	107.1	106.0	104.9	107.1	109.4	111.7
of which EU-N13	21.7	21.9	20.7	20.7	21.9	22.4	22.1	22.1	22.4	23.2	23.9
of which food and industrial	70.1	69.6	69.7	68.8	69.3	69.0	70.6	69.8	72.1	73.7	75.1
of which feed	51.1	55.4	45.2	43.0	52.5	56.1	53.1	52.5	52.9	54.5	56.4
of which bioenergy	4.1	4.6	4.3	4.4	4.4	4.5	4.5	4.7	4.5	4.3	4.1
Imports	4.5	7.1	5.3	3.7	5.7	6.6	5.0	4.8	5.4	5.1	5.0
Exports	22.2	15.7	21.7	31.1	34.6	33.9	26.5	28.4	32.8	35.7	38.4
Beginning stocks	16.3	10.6	12.1	10.9	11.6	14.0	18.1	12.6	13.9	15.2	16.1
Ending stocks	10.6	12.1	10.9	11.6	14.0	18.1	12.6	12.9	14.4	15.3	16.3
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 9.5 EU coarse grains market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**143.9**	**152.7**	**147.3**	**163.3**	**173.6**	**153.5**	**152.7**	**150.3**	**159.8**	**165.7**	**171.6**
of which EU-15	94.8	98.8	101.3	107.6	111.3	102.5	97.2	96.2	102.5	104.2	106.0
of which EU-N13	49.2	53.9	46.0	55.7	62.3	51.0	55.5	54.2	57.4	61.6	65.7
Consumption	**155.5**	**149.5**	**156.2**	**159.8**	**157.8**	**158.0**	**159.3**	**156.5**	**158.7**	**165.8**	**172.8**
of which EU-15	119.8	114.9	119.4	123.1	121.4	122.1	121.8	120.1	120.6	126.7	132.7
of which EU-N13	35.6	34.5	36.8	36.7	36.3	35.9	37.5	36.5	38.2	39.1	40.2
of which food and industrial	34.1	33.4	33.0	31.6	31.6	33.0	31.9	29.2	32.3	36.5	40.8
of which feed	116.4	111.6	118.0	121.9	119.5	118.3	119.7	119.4	118.9	122.0	124.9
of which bioenergy	5.0	4.5	5.2	6.3	6.7	6.7	7.7	7.9	7.6	7.3	7.1
Imports	8.8	7.2	11.6	15.5	9.9	13.9	14.4	16.0	12.3	14.2	15.8
Exports	9.3	9.5	9.9	12.4	17.1	16.8	11.6	9.6	13.0	14.0	14.4
Beginning stocks	40.1	28.2	29.1	21.9	28.5	37.2	29.7	25.8	29.2	30.6	31.4
Ending stocks	28.2	29.1	21.9	28.5	37.2	29.7	25.8	26.0	29.4	30.8	31.6
of which intervention	0.5	0.1	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 9.6 EU common wheat market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**127.8**	**131.1**	**126.0**	**136.2**	**149.7**	**152.5**	**134.8**	**141.5**	**148.9**	**154.7**	**160.7**
of which EU-15	95.8	95.7	92.7	96.8	106.4	107.8	89.5	98.3	103.2	105.7	108.3
of which EU-N13	32.0	35.4	33.2	39.4	43.3	44.7	45.3	43.2	45.7	49.0	52.4
Consumption	**115.3**	**120.6**	**110.3**	**107.5**	**117.4**	**120.8**	**119.0**	**117.4**	**120.4**	**123.5**	**126.6**
of which EU-15	95.7	100.5	91.5	88.7	97.4	100.3	98.8	97.3	100.0	102.4	104.8
of which EU-N13	19.6	20.0	18.8	18.8	20.0	20.5	20.2	20.1	20.4	21.1	21.8
of which food and industrial	60.4	60.8	61.0	60.2	60.6	60.5	62.2	60.9	63.2	64.9	66.2
of which feed	50.8	55.2	45.0	42.9	52.4	55.8	52.4	51.8	52.7	54.3	56.2
of which bioenergy	4.1	4.6	4.3	4.4	4.4	4.5	4.5	4.7	4.5	4.3	4.1
Imports	2.4	5.4	3.8	1.8	2.9	4.1	3.3	3.3	3.2	2.9	2.8
Exports	20.1	14.3	20.3	30.0	33.3	32.7	25.1	27.0	31.2	34.1	36.8
Beginning stocks	14.9	9.8	11.4	10.6	11.1	13.0	16.1	10.1	11.9	13.2	14.0
Ending stocks	9.8	11.4	10.6	11.1	13.0	16.1	10.1	10.5	12.4	13.3	14.2
of which intervention	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yield	**5.5**	**5.5**	**5.4**	**5.8**	**6.1**	**6.3**	**5.6**	**6.0**	**6.1**	**6.3**	**6.5**
of which EU-15	6.6	6.4	6.4	6.8	7.1	7.2	6.1	6.8	6.9	7.1	7.2
of which EU-N13	3.7	4.1	3.8	4.3	4.6	4.7	4.7	4.8	4.9	5.1	5.4
EU price in EUR/t	230	204	251	197	179	160	166	166	171	188	194
World price in EUR/t	227	219	231	240	205	194	176	184	190	209	215
World price in USD/t	301	305	297	318	272	215	195	203	219	250	265
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 9.7 EU durum wheat market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**9.4**	**8.6**	**8.4**	**8.1**	**7.7**	**8.4**	**9.3**	**9.3**	**8.5**	**8.5**	**8.4**
of which EU-15	9.1	8.3	8.2	7.9	7.5	8.1	8.8	8.9	8.2	8.2	8.1
of which EU-N13	0.3	0.3	0.2	0.2	0.2	0.3	0.5	0.4	0.2	0.3	0.3
Consumption	**9.9**	**9.0**	**8.9**	**8.7**	**8.7**	**8.8**	**9.1**	**9.6**	**9.1**	**9.1**	**9.0**
of which EU-15	7.9	7.1	7.0	6.8	6.8	6.9	7.2	7.6	7.1	7.0	6.9
of which EU-N13	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1
of which food and industrial	9.6	8.8	8.7	8.6	8.7	8.5	8.4	8.9	8.9	8.9	8.8
of which feed	0.3	0.2	0.2	0.1	0.1	0.3	0.7	0.7	0.2	0.2	0.2
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	2.0	1.7	1.5	1.9	2.8	2.5	1.7	1.5	2.1	2.2	2.2
Exports	2.1	1.4	1.4	1.1	1.2	1.2	1.4	1.4	1.5	1.6	1.6
Beginning stocks	1.3	0.8	0.7	0.3	0.5	1.1	2.0	2.5	2.0	2.0	2.0
Ending stocks	0.8	0.7	0.3	0.5	1.1	2.0	2.5	2.4	2.0	2.0	2.0
Yield	**3.3**	**3.4**	**3.2**	**3.4**	**3.4**	**3.4**	**3.4**	**3.5**	**3.5**	**3.6**	**3.7**
of which EU-15	3.3	3.4	3.2	3.4	3.3	3.4	3.4	3.5	3.4	3.6	3.7
of which EU-N13	3.1	4.0	2.9	3.7	4.1	4.4	4.7	4.4	3.7	3.8	3.9

Note: the durum wheat marketing year is July/June

Table 9.8 EU barley market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**53.1**	**51.9**	**55.0**	**61.1**	**60.7**	**61.9**	**60.1**	**58.6**	**61.0**	**62.8**	**64.8**
of which EU-15	43.3	41.6	44.4	49.9	48.8	50.5	48.5	47.4	49.1	50.2	51.3
of which EU-N13	9.8	10.3	10.6	11.2	11.9	11.5	11.7	11.2	11.9	12.7	13.5
Consumption	**54.6**	**48.8**	**50.3**	**49.4**	**48.7**	**49.8**	**50.9**	**50.4**	**51.4**	**52.4**	**54.0**
of which EU-15	42.8	38.4	39.7	39.1	38.1	39.4	39.8	39.6	40.3	41.2	42.7
of which EU-N13	11.9	10.4	10.6	10.2	10.6	10.3	11.1	10.8	11.0	11.1	11.3
of which food and industrial	12.0	12.0	12.2	12.1	12.1	12.8	9.3	10.8	12.9	12.8	13.3
of which feed	42.1	36.1	37.2	36.6	35.9	36.3	41.2	39.2	38.0	39.1	40.1
of which bioenergy	0.5	0.7	0.9	0.7	0.7	0.7	0.4	0.4	0.5	0.5	0.5
Imports	0.2	0.4	0.1	0.0	0.1	0.3	0.4	0.6	0.1	0.2	0.3
Exports	7.6	5.7	7.8	8.8	12.7	14.2	8.8	7.0	9.8	10.8	11.1
Beginning stocks	18.4	9.4	7.2	4.2	7.2	6.6	4.9	5.8	8.1	8.0	7.7
Ending stocks	9.4	7.2	4.2	7.2	6.6	4.9	5.8	7.6	8.0	7.9	7.6
of which intervention	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yield	**4.3**	**4.4**	**4.4**	**4.9**	**4.9**	**5.1**	**4.9**	**4.8**	**5.0**	**5.1**	**5.3**
of which EU-15	4.7	4.6	4.7	5.2	5.1	5.4	5.1	5.0	5.2	5.3	5.4
of which EU-N13	3.2	3.5	3.4	4.1	4.1	4.1	4.1	4.1	4.3	4.6	4.9
EU price in EUR/t	190	199	224	175	168	153	140	138	150	164	169
World price in EUR/t	191	195	231	185	156	159	140	143	150	164	169
World price in USD/t	253	272	297	246	207	176	155	158	173	196	208

Note: the barley marketing year is July/June

Table 9.9 EU maize market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**59.9**	**70.7**	**59.8**	**67.0**	**77.9**	**59.3**	**61.1**	**59.4**	**65.6**	**69.4**	**73.2**
of which EU-15	35.8	41.8	39.6	38.2	43.8	34.3	31.9	32.1	35.5	36.1	36.8
of which EU-N13	24.1	29.0	20.2	28.9	34.1	24.9	29.2	27.3	30.1	33.3	36.4
Consumption	**67.2**	**70.0**	**72.9**	**76.5**	**76.2**	**75.6**	**74.0**	**72.5**	**74.5**	**79.6**	**85.0**
of which EU-15	51.8	53.4	54.8	58.4	58.4	58.0	56.3	55.1	56.5	60.5	64.7
of which EU-N13	15.4	16.6	18.1	18.1	17.7	17.7	17.6	17.4	18.1	19.1	20.3
of which food and industrial	13.7	13.3	12.7	11.5	11.5	12.4	15.2	11.0	12.9	16.0	19.5
of which feed	50.3	54.0	57.2	60.8	60.0	58.5	52.8	55.3	55.7	57.9	60.0
of which bioenergy	3.2	2.7	3.0	4.3	4.7	4.7	6.0	6.2	5.9	5.7	5.5
Imports	7.6	6.3	11.0	15.0	9.4	13.3	13.6	15.0	11.6	13.4	15.1
Exports	1.4	3.5	1.8	3.1	4.0	2.2	2.6	2.2	2.8	3.0	3.1
Beginning stocks	14.7	13.6	17.1	13.2	15.6	22.8	17.5	15.6	16.6	17.2	18.2
Ending stocks	13.6	17.1	13.2	15.6	22.8	17.5	15.6	15.3	16.4	17.4	18.4
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
Yield	**7.2**	**7.6**	**6.1**	**6.9**	**8.1**	**6.4**	**7.1**	**7.0**	**7.3**	**7.8**	**8.3**
of which EU-15	9.2	10.3	9.4	8.9	10.4	9.2	9.4	9.5	9.9	10.2	10.5
of which EU-N13	5.4	5.5	3.6	5.3	6.3	4.5	5.7	5.4	5.6	6.2	6.8
EU price in EUR/t	214	206	236	177	154	158	166	155	160	172	176
World price in EUR/t	208	205	233	153	129	148	142	143	146	159	163
World price in USD/t	275	285	299	203	172	164	157	158	168	190	200

Note: the maize marketing year is July/June

Table 9.10 EU other cereals* market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**30.9**	**30.1**	**32.5**	**35.2**	**35.0**	**32.3**	**31.5**	**32.3**	**33.2**	**33.5**	**33.7**
of which EU-15	15.6	15.5	17.3	19.6	18.7	17.7	16.9	16.7	17.8	17.9	17.9
of which EU-N13	15.3	14.6	15.2	15.6	16.3	14.6	14.6	15.7	15.4	15.6	15.7
Consumption	**33.6**	**30.7**	**33.0**	**33.9**	**33.0**	**32.6**	**34.4**	**33.6**	**32.8**	**33.9**	**33.9**
of which EU-15	25.2	23.2	24.9	25.6	24.9	24.7	25.7	25.4	23.8	25.1	25.2
of which EU-N13	8.4	7.5	8.1	8.3	8.0	7.9	8.7	8.3	9.1	8.8	8.6
of which food and industrial	8.3	8.1	8.1	8.1	8.1	7.8	7.3	7.4	6.6	7.8	8.0
of which feed	24.0	21.5	23.6	24.5	23.6	23.5	25.8	24.9	25.1	25.0	24.8
of which bioenergy	1.3	1.1	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.1	1.1
Imports	1.1	0.5	0.6	0.4	0.4	0.3	0.4	0.4	0.6	0.7	0.4
Exports	0.2	0.2	0.2	0.5	0.4	0.4	0.2	0.4	0.4	0.2	0.2
Yield	**3.3**	**3.2**	**3.4**	**3.6**	**3.8**	**3.6**	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**
Beginning stocks	7.0	5.1	4.8	4.6	5.7	7.7	7.3	4.5	4.4	5.4	5.5
Ending stocks	5.1	4.8	4.6	5.7	7.7	7.3	4.5	3.2	5.0	5.5	5.5

* Rye, oats and other cereals

Note: the other cereals marketing year is July/June

Table 9.11 EU rice market balance (million t milled equivalent)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**1.8**	**1.8**	**1.8**	**1.7**	**1.7**	**1.8**	**1.8**	**1.8**	**1.7**	**1.7**	**1.7**
of which EU-15	1.8	1.7	1.8	1.7	1.6	1.7	1.7	1.7	1.7	1.6	1.6
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
Consumption	**2.6**	**2.4**	**2.5**	**2.5**	**2.5**	**2.7**	**2.7**	**2.8**	**2.7**	**2.8**	**2.8**
of which EU-15	2.1	1.9	2.0	2.0	2.0	2.2	2.1	2.2	2.1	2.2	2.2
of which EU-N13	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
Imports	1.0	0.8	0.9	0.9	1.1	1.3	1.2	1.2	1.2	1.3	1.4
Exports	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3
Beginning stocks	0.5	0.5	0.5	0.5	0.5	0.4	0.6	0.6	0.6	0.6	0.6
Ending stocks	0.5	0.5	0.5	0.5	0.4	0.6	0.6	0.6	0.6	0.6	0.6
Yield	**3.9**	**3.7**	**4.0**	**4.0**	**3.9**	**4.1**	**4.0**	**4.0**	**4.0**	**4.1**	**4.1**
EU price in EUR/t *	608	618	593	511	578	596	609	588	604	665	705
World price in EUR/t	391	406	458	402	327	356	365	353	348	369	381
World price in USD/t	518	565	588	534	435	395	405	390	401	441	468

* in milled equivalent
Note: the rice marketing year is September/August

Table 9.12 EU oilseed* (grains and beans) market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**28.8**	**29.0**	**27.4**	**31.5**	**35.4**	**32.1**	**31.0**	**34.1**	**32.7**	**33.3**	**33.5**
of which EU-15	17.9	17.7	17.5	18.0	20.2	18.7	16.5	18.0	18.3	18.0	17.3
of which EU-N13	10.9	11.3	9.9	13.5	15.2	13.4	14.5	16.1	14.4	15.3	16.2
Rapeseed	20.6	19.2	19.3	21.0	24.3	21.8	20.1	22.3	21.4	21.2	20.7
Sunseed	7.0	8.6	7.2	9.3	9.3	7.9	8.5	9.2	8.6	9.2	9.7
Soya beans	1.2	1.2	1.0	1.2	1.8	2.4	2.5	2.7	2.7	2.8	3.0
Consumption	**44.8**	**44.5**	**44.8**	**48.3**	**49.9**	**50.7**	**50.4**	**51.3**	**49.9**	**50.8**	**51.8**
of which EU-15	38.2	37.5	37.7	39.8	40.5	41.9	41.6	42.1	41.0	41.6	42.5
of which EU-N13	6.6	7.0	7.0	8.5	9.4	8.8	8.8	9.2	8.9	9.2	9.4
of which crushing	41.2	40.6	40.9	44.7	45.4	46.1	45.6	46.8	45.7	46.5	46.8
Imports	16.7	16.6	16.7	18.1	16.4	19.4	20.2	17.7	17.9	18.3	19.2
Exports	0.8	0.9	0.6	1.1	1.3	0.9	0.9	0.7	0.7	0.7	0.8
Beginning stocks	3.6	3.5	3.7	2.4	2.6	3.2	3.1	2.9	2.7	2.5	2.4
Ending stocks	3.5	3.7	2.4	2.6	3.2	3.1	2.9	2.8	2.7	2.5	2.4
EU price in EUR/t (rapeseed)	443	462	475	382	351	370	393	411	402	426	425
World price in EUR/t (soya bean)	397	443	438	404	369	364	391	356	353	359	343
World price in USD/t (soya bean)	549	562	551	521	407	396	403	394	407	430	422

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

Table 9.13 EU oilseed yields (t/ha)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Rapeseed	**2.9**	**2.8**	**3.1**	**3.1**	**3.6**	**3.4**	**3.1**	**3.3**	**3.3**	**3.4**	**3.4**
of which EU-15	3.4	3.3	3.4	3.4	3.9	3.7	3.2	3.6	3.6	3.7	3.7
of which EU-N13	2.2	2.2	2.4	2.8	3.2	2.9	2.9	2.9	2.8	2.9	3.0
Sunflower seed	**1.8**	**2.0**	**1.7**	**2.0**	**2.2**	**1.9**	**2.0**	**2.1**	**2.0**	**2.1**	**2.2**
of which EU-15	1.8	1.9	1.6	1.7	1.8	1.6	1.6	1.7	1.7	1.7	1.7
of which EU-N13	1.9	2.0	1.7	2.2	2.4	2.1	2.3	2.3	2.2	2.4	2.5
Soya beans	**2.8**	**2.8**	**2.2**	**2.6**	**3.2**	**2.7**	**3.0**	**2.9**	**2.9**	**2.9**	**3.0**
of which EU-15	3.2	3.2	2.8	3.0	3.6	3.2	3.3	3.3	3.3	3.3	3.3
of which EU-N13	2.4	2.2	1.6	2.0	2.6	1.9	2.5	2.4	2.4	2.4	2.5

Table 9.14 EU oilseed meal* market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**25.7**	**25.2**	**25.7**	**28.0**	**28.0**	**29.0**	**28.5**	**29.1**	**28.6**	**29.2**	**29.6**
of which EU-15	22.3	21.6	22.0	23.6	23.1	24.3	23.8	24.3	23.9	24.4	24.7
of which EU-N13	3.5	3.6	3.7	4.4	4.9	4.7	4.7	4.9	4.7	4.8	4.9
Consumption	**49.2**	**48.9**	**45.8**	**49.4**	**49.3**	**51.8**	**49.7**	**53.5**	**53.3**	**54.5**	**54.6**
of which EU-15	40.6	40.3	37.2	40.8	40.7	43.0	40.7	44.4	44.1	44.8	44.8
of which EU-N13	8.6	8.6	8.6	8.6	8.6	8.8	9.0	9.1	9.2	9.7	9.9
Imports	24.4	24.9	21.1	22.1	22.3	23.8	22.2	25.5	25.8	26.2	25.8
Exports	0.9	1.2	1.1	0.9	1.0	1.0	1.1	1.1	1.1	0.9	0.8
Beginning stocks	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Ending stocks	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
EU price in EUR/t (soya bean meal)	323	390	428	424	380	355	360	352	334	343	331
World price in EUR/t	291	304	386	365	282	295	287	272	258	265	256
World price in USD/t	386	423	496	484	375	328	318	301	298	317	314

* Rapeseed- soya bean-, sunflower seed- and groundnut-based protein meals. Note: the oilseed meal marketing year is July/June;

Table 9.15 EU oilseed oil* market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**14.2**	**14.3**	**14.3**	**15.7**	**16.2**	**15.9**	**15.8**	**16.3**	**15.8**	**16.0**	**15.9**
of which EU-15	11.7	11.7	11.6	12.4	12.6	12.5	12.5	12.8	12.4	12.5	12.4
of which EU-N13	2.5	2.6	2.6	3.2	3.6	3.3	3.4	3.5	3.4	3.5	3.5
Consumption	**15.6**	**15.4**	**14.1**	**15.4**	**16.1**	**16.2**	**16.3**	**16.4**	**15.8**	**15.7**	**15.8**
of which EU-15	13.0	12.9	11.7	12.7	13.2	13.4	13.5	13.6	13.0	12.9	13.0
of which EU-N13	2.6	2.5	2.4	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Imports	2.3	2.1	1.6	1.6	1.6	2.0	2.1	1.7	1.6	1.5	1.4
Exports	0.8	1.0	1.7	1.5	1.7	1.7	1.7	1.7	1.6	1.7	1.4
Beginning stocks	0.7	0.8	0.8	0.8	1.1	1.1	1.0	0.9	0.7	0.8	0.7
Ending stocks	0.8	0.8	0.8	1.1	1.1	1.0	0.9	0.8	0.7	0.8	0.7
EU price in EUR/t (rapeseed oil)	934	962	918	731	669	710	786	785	750	787	782
World price in EUR/t (vegetable oil)	954	842	782	689	555	667	748	755	722	746	743
World price in USD/t (vegetable oil)	1265	1172	1005	915	737	740	828	834	833	893	914

* Rapeseed-, soya bean-, sunflower seed- and groundnut-based oils. Note: the oilseed oil marketing year is July/June;

Table 9.16 EU vegetable oil* market balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**14.3**	**14.4**	**14.4**	**15.8**	**16.2**	**15.9**	**15.9**	**16.4**	**15.9**	**16.1**	**16.0**
of which EU-15	11.8	11.7	11.8	12.5	12.7	12.6	12.5	12.9	12.5	12.6	12.5
of which EU-N13	2.5	2.6	2.6	3.2	3.6	3.3	3.4	3.5	3.4	3.5	3.5
Consumption	**21.8**	**21.8**	**21.5**	**23.6**	**24.1**	**24.5**	**24.2**	**24.8**	**23.9**	**23.5**	**23.1**
of which EU-15	18.8	18.9	18.7	20.4	20.9	21.3	21.1	21.6	20.8	20.4	20.0
of which EU-N13	2.9	2.9	2.8	3.2	3.2	3.2	3.1	3.2	3.1	3.1	3.1
of which food and other use	12.7	13.0	12.7	14.0	13.2	14.0	13.9	14.3	13.8	13.9	14.0
of which bioenergy	9.1	8.8	8.8	9.5	11.0	10.5	10.3	10.5	10.2	9.6	9.1
Imports	8.7	8.7	9.0	9.8	9.8	10.3	10.0	10.1	9.8	9.3	8.8
Exports	1.0	1.3	1.9	1.6	1.9	1.8	1.9	1.8	1.8	1.8	1.6
Beginning stocks	1.0	1.2	1.2	1.2	1.6	1.6	1.5	1.3	1.1	1.2	1.1
Ending stocks	1.2	1.2	1.2	1.6	1.6	1.5	1.3	1.2	1.1	1.2	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 9.17 EU sugar market balance (million t white sugar equivalent)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Sugar beet production (million tonnes)	**105.2**	**125.1**	**114.8**	**109.0**	**131.0**	**101.9**	**111.8**	**130.6**	**126.0**	**121.9**	**118.4**
of which EU-15	87.6	104.8	94.2	88.8	106.7	84.5	88.6	106.9	103.3	100.0	97.1
of which EU-N13	17.6	20.3	20.6	20.2	24.3	17.3	23.2	23.6	22.7	21.9	21.3
of which for ethanol	13.0	12.7	12.3	12.6	12.7	12.7	14.1	11.8	14.5	14.9	14.7
of which processed for sugar	92.2	112.4	102.5	96.4	118.4	89.2	97.7	118.7	111.5	107.0	103.7
Sugar production*	***16.1***	***18.5***	***17.1***	***16.7***	***19.6***	***14.9***	***16.8***	***20.5***	***19.5***	***19.1***	***18.9***
Sugar quota	13.5	13.5	13.5	13.5	13.5	13.5	13.5	0.0	0.0	0.0	0.0
of which EU-15	13.6	15.7	14.2	13.6	16.2	12.3	13.2	16.9	16.0	15.6	15.3
of which EU-N13	2.5	2.9	2.9	3.1	3.5	2.6	3.6	3.6	3.5	3.5	3.6
Consumption	**18.9**	**18.6**	**18.6**	**19.1**	**19.6**	**18.5**	**18.4**	**18.5**	**18.3**	**17.9**	**17.5**
Imports	3.4	3.3	3.6	3.1	2.7	2.9	2.3	1.3	1.4	1.4	1.3
Exports	1.0	2.0	1.3	1.4	1.4	1.3	1.3	3.0	2.6	2.7	2.6
Beginning stocks**	1.6	1.2	2.4	3.2	2.6	4.0	1.9	1.3	1.6	1.5	1.5
Ending stocks**	1.2	2.4	3.2	2.6	4.0	1.9	1.3	1.6	1.6	1.5	1.6
EU price in EUR/t	515	679	723	600	425	428	443	359	403	403	394
World price in EUR/t	543	440	392	355	351	388	445	344	363	362	354
World price in USD/t	720	612	504	457	376	390	493	380	418	434	435

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

Note: the sugar marketing year is October/September;

Table 9.18 EU isoglucose balance (million t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Isoglucose production	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.8**	**1.1**	**1.5**	**1.9**
of which EU-15	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.6
of which EU-N13	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	1.0	1.3
Isoglucose quota	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.0**	**0.0**	**0.0**	**0.0**
Isoglucose consumption	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.8*	*1.0*	*1.4*	*1.8*
share in Sweetener use (%)	3.7	3.7	3.6	3.5	3.3	3.4	3.6	3.9	5.2	7.3	9.3
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	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.1

Table 9.19 EU biofuels market balance (million t oil equivalent)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**11.6**	**11.7**	**12.2**	**13.1**	**14.3**	**14.2**	**14.1**	**14.3**	**14.1**	**13.6**	**13.1**
Ethanol	3.0	3.2	3.3	3.5	3.5	3.6	3.6	3.7	3.6	3.5	3.5
...based on wheat	1.0	1.0	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.0	1.0
...based on other cereals	1.2	1.3	1.5	1.7	1.6	1.6	1.6	1.6	1.5	1.4	1.4
...based on sugar beet and molasses	0.9	0.8	0.8	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.9
... 2nd gen.	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Biodiesel	8.5	8.5	8.9	9.6	10.8	10.6	10.5	10.6	10.6	10.1	9.7
...based on vegetable oils	7.7	7.5	7.4	8.1	9.2	8.9	8.7	8.8	8.6	8.1	7.7
...based on waste oils	0.9	1.0	1.4	1.5	1.6	1.7	1.7	1.8	1.9	1.9	1.8
...other 2nd gen.	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Consumption	**13.7**	**15.0**	**15.4**	**14.6**	**15.2**	**15.2**	**15.1**	**15.1**	**14.9**	**14.3**	**13.5**
Ethanol for fuel	2.7	2.8	2.7	2.7	2.9	2.9	2.9	2.8	2.8	2.6	2.5
non fuel use of ethanol	*1.2*	*1.3*	*1.4*	*1.4*	*1.3*	*1.3*	*1.3*	*1.3*	*1.3*	*1.3*	*1.3*
Biodiesel	9.9	10.9	11.3	10.4	10.9	11.0	11.0	11.0	10.9	10.4	9.8
Net trade	**-2.1**	**-3.6**	**-2.9**	**-1.4**	**-1.0**	**-1.1**	**-0.8**	**-0.8**	**-0.9**	**-0.6**	**-0.4**
Ethanol imports	0.9	1.0	0.8	0.7	0.6	0.6	0.6	0.5	0.6	0.5	0.4
Ethanol exports	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Biodiesel imports	1.3	2.7	2.5	1.1	0.6	0.8	0.6	0.8	0.8	0.6	0.6
Biodiesel exports	0.1	0.1	0.3	0.4	0.2	0.2	0.4	0.4	0.4	0.4	0.4
Petrol consumption	94.0	92.9	89.8	89.3	89.8	90.7	90.0	89.7	86.3	82.4	78.5
Diesel consumption	206.3	203.0	196.3	193.9	194.8	197.6	196.6	196.6	189.5	183.2	175.7
Biofuels energy share (% RED counting)	**4.5**	**5.1**	**5.5**	**5.3**	**5.5**	**5.5**	**5.5**	**5.6**	**5.8**	**5.7**	**5.7**
Energy share: 1st-generation	3.9	4.3	4.4	4.1	4.3	4.2	4.2	4.2	4.2	4.1	4.0
Energy share: based on waste oils	0.3	0.4	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8
Energy share: other 2nd-generation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy share: Ethanol in Petrol	4.3	4.6	4.6	4.6	4.8	4.8	4.8	4.8	4.8	4.8	4.7
Energy share: Biodiesel in Diesel	5.2	5.8	6.2	5.8	6.1	6.1	6.1	6.1	6.3	6.2	6.1
Ethanol producer price in EUR/hl	59	58	60	58	50	47	39	43	43	47	49
Biodiesel producer price in EUR/hl	71	96	91	85	83	67	79	79	80	78	78

Table 9.20 EU milk market balance

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Dairy cows (million heads)	**23.3**	**23.1**	**23.0**	**23.3**	**23.3**	**23.4**	**23.3**	**23.0**	**22.6**	**22.1**	**21.8**
of which EU-15	17.6	17.4	17.6	17.8	17.9	18.1	18.1	17.9	17.7	17.5	17.5
of which EU-N13	5.8	5.6	5.5	5.4	5.4	5.2	5.2	5.1	4.9	4.6	4.3
Milk yield (kg/cow)	**6 300**	**6 464**	**6 496**	**6 489**	**6 737**	**6 861**	**6 904**	**7 019**	**7 337**	**7 804**	**8 285**
of which EU-15	6 961	7 137	7 082	7 040	7 272	7 358	7 386	7 497	7 780	8 158	8 539
of which EU-N13	4 288	4 388	4 621	4 684	4 951	5 134	5 210	5 345	5 739	6 456	7 253
Dairy cow milk production (million t)	**146.9**	**149.0**	**149.7**	**150.9**	**157.1**	**160.3**	**160.7**	**161.6**	**165.9**	**172.7**	**180.5**
of which EU-15	122.2	124.2	124.3	125.4	130.4	133.5	133.8	134.3	137.7	143.0	149.2
of which EU-N13	24.7	24.8	25.4	25.5	26.6	26.8	26.9	27.3	28.1	29.6	31.2
Total cow milk production (million t)	**150.4**	**152.4**	**152.7**	**153.9**	**159.7**	**162.9**	**163.0**	**164.0**	**168.0**	**174.3**	**181.7**
of which EU-15	122.4	124.5	124.5	125.7	130.7	133.8	134.0	134.5	138.0	143.3	149.5
of which EU-N13	28.0	27.9	28.2	28.3	29.0	29.2	29.0	29.4	30.0	31.1	32.3
Delivered to dairies (million t)	**137.4**	**140.6**	**141.0**	**141.9**	**148.9**	**152.8**	**153.4**	**154.6**	**159.3**	**166.7**	**175.2**
of which EU-15	118.6	121.4	121.0	122.0	127.4	130.9	131.2	131.8	135.4	140.9	147.3
of which EU-N13	18.8	19.2	20.0	19.9	21.5	21.9	22.2	22.8	23.8	25.8	27.8
On-farm use and direct sales (million t)	13.1	11.8	11.7	12.0	10.8	10.1	9.7	9.4	8.7	7.6	6.6
of which EU-15	3.8	3.1	3.6	3.6	3.3	2.9	2.8	2.7	2.6	2.3	2.1
of which EU-N13	9.3	8.7	8.2	8.4	7.5	7.3	6.8	6.7	6.2	5.3	4.4
Delivery ratio (%)	91.3	92.3	92.3	92.2	93.2	93.8	94.1	94.3	94.8	95.6	96.4
of which EU-15	96.9	97.5	97.1	97.1	97.5	97.9	97.9	98.0	98.1	98.4	98.6
of which EU-N13	67.0	68.8	71.0	70.2	74.1	75.1	76.5	77.3	79.4	82.9	86.3
Fat content of milk (%)	4.0	4.0	4.0	4.0	4.0	4.0	4.1	4.0	4.1	4.1	4.1
Non-fat solid content of milk (%)	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.4	9.4	9.4
EU Milk producer price in EUR/t (real fat content)	306	340	327	365	372	308	275	343	328	385	407

Table 9.21 EU fresh dairy product balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**46 998**	**46 811**	**46 717**	**46 784**	**46 502**	**46 883**	**46 321**	**46 076**	**45 373**	**44 918**	**44 249**
of which EU-15	40 684	40 571	40 439	40 396	40 082	40 267	39 737	39 458	38 807	38 035	37 218
of which EU-N13	6 314	6 240	6 279	6 388	6 420	6 616	6 584	6 617	6 566	6 883	7 032
of which fresh milk	31 890	31 853	31 751	31 767	31 404	31 348	30 850	30 613	30 310	28 935	27 570
of which cream	2 432	2 419	2 508	2 575	2 633	2 745	2 764	2 817	2 939	3 120	3 298
of which yogurt	8 230	8 201	8 130	8 076	7 969	8 040	7 988	7 994	8 044	8 128	8 190
Net trade	**320**	**388**	**534**	**602**	**754**	**896**	**1 106**	**1 045**	**1 142**	**1 138**	**1 082**
Consumption	**46 678**	**46 423**	**46 184**	**46 182**	**45 748**	**45 987**	**45 215**	**45 030**	**44 232**	**43 779**	**43 168**
of which fresh milk	31 766	31 708	31 408	31 407	30 867	30 677	30 018	29 876	29 510	28 168	26 904
of which cream	2 358	2 315	2 420	2 474	2 514	2 629	2 619	2 640	2 738	2 876	3 011
of which yogurt	8 195	8 172	8 066	7 998	7 909	7 984	7 933	7 952	7 999	8 080	8 142
per capita consumption (kg)	***92.6***	***92.1***	***91.5***	***91.3***	***90.1***	***90.3***	***88.5***	***87.8***	***85.8***	***84.7***	***83.5***
of which EU-15	104.0	103.5	102.9	102.1	101.0	101.1	98.6	97.7	94.6	92.5	90.2
of which EU-N13	49.8	48.7	48.3	50.0	48.2	48.4	49.0	49.1	50.4	52.7	55.2
of which fresh milk	63.0	62.9	62.2	62.1	60.8	60.2	58.7	58.3	57.7	55.0	52.5
of which cream	4.7	4.6	4.8	4.9	5.0	5.2	5.1	5.1	5.3	5.5	5.6
of which yogurt	16.3	16.2	16.0	15.8	15.6	15.7	15.5	15.5	15.5	15.6	15.7

Table 9.22 EU cheese market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**9 341**	**9 391**	**9 605**	**9 367**	**9 559**	**9 888**	**10 028**	**10 256**	**10 764**	**11 265**	**11 701**
of which EU-15	8 061	8 105	8 234	7 972	8 150	8 421	8 495	8 636	9 065	9 421	9 715
of which EU-N13	1 280	1 286	1 371	1 395	1 409	1 467	1 533	1 620	1 699	1 844	1 986
Consumption	**8 754**	**8 793**	**8 914**	**8 655**	**8 870**	**9 201**	**9 359**	**9 472**	**9 853**	**10 254**	**10 562**
of which EU-15	7 506	7 532	7 615	7 338	7 513	7 749	7 827	7 897	8 143	8 390	8 625
of which EU-N13	1 249	1 260	1 299	1 317	1 357	1 452	1 532	1 575	1 710	1 864	1 937
per capita consumption (kg)	***17.4***	***17.4***	***17.7***	***17.1***	***17.5***	***18.1***	***18.3***	***18.5***	***19.1***	***19.8***	***20.4***
of which EU-15	18.9	18.9	19.1	18.3	18.6	19.1	19.2	19.3	19.7	20.2	20.7
of which EU-N13	11.8	12.0	12.3	12.5	12.9	13.9	14.7	15.2	16.6	18.4	19.5
Imports	80	74	77	75	77	61	71	50	60	60	59
Exports	666	672	768	786	721	719	800	848	971	1 071	1 198
EU market price in EUR/t (Cheddar)	2 887	3 180	3 399	3 661	3 765	3 096	2 860	3 400	3 222	3 649	3 749
World market price in EUR/t	3 022	3 103	2 976	3 299	3 368	3 007	2 791	3 527	3 186	3 437	3 519
World market price in USD/t	4 007	4 319	3 823	4 381	4 474	3 336	3 090	3 900	3 673	4 115	4 328

Table 9.23 EU butter market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**2 072**	**2 102**	**2 167**	**2 127**	**2 234**	**2 334**	**2 380**	**2 317**	**2 433**	**2 521**	**2 623**
of which EU-15	1 846	1 875	1 918	1 877	1 973	2 053	2 081	2 018	2 108	2 161	2 224
of which EU-N13	227	227	250	250	261	281	299	299	325	360	399
Consumption	**2 023**	**2 007**	**2 079**	**2 044**	**2 117**	**2 134**	**2187**	**2 201**	**2 247**	**2 313**	**2 384**
of which EU-15	1 772	1 762	1 804	1 760	1 823	1 809	1 856	1 873	1 899	1 929	1 964
of which EU-N13	251	245	275	284	295	325	331	328	348	384	421
per capita consumption (kg)	***4.0***	***4.0***	***4.1***	***4.0***	***4.2***	***4.2***	***8.6***	***4.3***	***4.4***	***4.5***	***4.6***
of which EU-15	4.5	4.4	4.5	4.4	4.5	4.5	4.6	4.6	4.6	4.6	4.7
of which EU-N13	2.4	2.3	2.6	2.7	2.8	3.1	3.2	3.2	3.4	3.8	4.2
Imports	32	32	33	21	25	3	3	6	12	14	15
Exports	157	124	124	116	135	172	206	182	198	222	254
Ending Stocks	50	80	100	95	125	135	125	65	85	85	85
of which private	49	80	100	95	125	135	125	65	85	85	85
of which intervention	2	0	0	0	0	0	0	0	0	0	0
EU market price in EUR/t (EU-15)	3 339	3 811	3 064	3 892	3 417	3 023	3 244	5 000	3 567	3 769	3 638
World market price in EUR/t	3 051	3 222	2 583	3 023	2 825	2 869	2 937	4 884	3 373	3 461	3 404
World market price in USD/t	4 045	4 485	3 318	4 015	3 753	3 183	3 251	5 400	3 889	4 144	4 187
EU intervention price in EUR/t	2 218	2 218	2 218	2 218	2 218	2 218	2 218	2 218	2 218	2 218	2 218

Table 9.24 EU SMP market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**965**	**1 096**	**1 109**	**1 108**	**1 457**	**1 538**	**1 561**	**1 492**	**1 555**	**1 754**	**1 959**
of which EU-15	844	954	953	958	1 235	1 325	1 342	1 289	1 350	1 493	1 648
of which EU-N13	121	142	156	150	222	213	218	203	205	261	311
Consumption	**686**	**689**	**677**	**697**	**721**	**741**	**768**	**797**	**870**	**912**	**1 013**
of which EU-15	624	602	590	575	614	628	645	665	717	727	787
of which EU-N13	62	87	88	122	107	113	122	132	153	185	226
Imports	4	0	2	5	2	3	4	2	2	2	2
Exports	376	515	520	407	648	692	575	793	787	844	949
Ending Stocks	265	157	70	80	170	279	501	405	80	80	80
of which private	70	107	70	80	170	250	150	30	80	80	80
of which intervention	195	50	0	0	0	29	351	375	0	0	0
EU market price in EUR/t (EU-15)	2 202	2 383	2 358	3 032	2 693	1 862	1 789	1 800	2 213	2 739	3 003
World market price in EUR/t	2 351	2 629	2 461	3 312	2 825	1 951	1 802	1 845	2 353	2 837	3 089
World market price in USD/t	3 117	3 660	3 163	4 399	3 753	2 165	1 994	2 040	2 713	3 397	3 799

Table 9.25 EU WMP market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**698**	**682**	**651**	**723**	**756**	**717**	**730**	**721**	**772**	**832**	**903**
of which EU-15	645	630	595	666	694	665	680	674	721	771	832
of which EU-N13	53	52	55	57	61	52	49	47	51	61	71
Consumption	**255**	**296**	**267**	**352**	**367**	**321**	**354**	**360**	**400**	**435**	**470**
of which EU-15	222	261	233	311	330	286	316	317	353	382	412
of which EU-N13	33	35	34	41	37	35	38	43	48	52	57
Imports	2	2	3	3	1	4	6	2	4	4	4
Exports	445	388	386	374	390	400	381	362	375	401	437
EU market price in EUR/t (EU-15)	2 694	2 997	2 733	3 548	3 029	2 395	2 365	2 975	2 889	3 271	3 397
World market price in EUR/t	2 610	2 786	2 517	3 537	2 836	2 229	2 190	2 804	2 792	3 135	3 240
World market price in USD/t	3 460	3 878	3 234	4 698	3 768	2 474	2 424	3 100	3 219	3 753	3 985

Table 9.26 EU whey market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**1 767**	**1 746**	**1 865**	**1 919**	**1 855**	**1 905**	**1 804**	**1 867**	**1 953**	**2 042**	**2 120**
of which EU-15	1 565	1 539	1 622	1 654	1 605	1 637	1 559	1 606	1 678	1 744	1 798
of which EU-N13	202	207	243	265	250	269	245	262	275	298	321
Consumption	**1 371**	**1 287**	**1 376**	**1 406**	**1 353**	**1 372**	**1 257**	**1 306**	**1 348**	**1 349**	**1 318**
Imports	2	2	3	3	1	4	6	2	4	4	4
Exports	398	461	492	516	504	538	553	564	609	698	806
EU market price in EUR/t	720	896	962	1 017	964	755	708	900	920	1 140	1 236
World market price in EUR/t	732	928	988	1 035	988	791	681	852	918	1 071	1 151
World market price in USD/t	970	1 292	1 269	1 375	1 312	877	754	942	1 058	1 283	1 416

Table 9.27 EU beef and veal meat market balance (1 000 t c.w.e.)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Total number of cows (million heads)	**35.7**	**35.2**	**35.1**	**35.2**	**35.4**	**35.7**	**35.6**	**35.3**	**34.7**	**33.8**	**33.2**
of which dairy cows	23.3	23.1	23.0	23.3	23.3	23.4	23.3	23.0	22.6	22.1	21.8
of which suckler cows	12.4	12.4	12.2	12.0	11.9	12.0	12.3	12.3	12.1	11.7	11.5
Gross Indigenous Production	**8 218**	**8 200**	**7 868**	**7 530**	**7 695**	**7 846**	**8 100**	**8 133**	**7 892**	**7 638**	**7 534**
of which EU-15	7 298	7 284	6 988	6 696	6 797	6 881	7 050	7 068	6 953	6 788	6 708
of which EU-N13	920	916	880	834	899	965	1 050	1 064	939	849	826
Imports of live animals	0	0	0	0	0	0	0	0	0	0	0
Exports of live animals	104	147	159	109	114	178	219	241	238	219	200
Net Production	**8 115**	**8 052**	**7 710**	**7 421**	**7 581**	**7 668**	**7 881**	**7 892**	**7 653**	**7 419**	**7 334**
Consumption	**8 183**	**8 012**	**7 774**	**7 564**	**7 683**	**7 759**	**7 941**	**7 914**	**7 725**	**7 530**	**7 484**
of which EU-15	7 630	7 458	7 281	7 131	7 181	7 251	7 366	7 331	7 135	6 983	6 976
of which EU-N13	553	554	493	434	502	508	575	583	590	547	508
per capita consumption (kg r.w.e.)*	***11.4***	***11.1***	***10.8***	***10.5***	***10.6***	***10.7***	***10.9***	***10.8***	***10.5***	***10.2***	***10.1***
of which EU-15	13.4	13.1	12.8	12.4	12.5	12.5	12.7	12.6	12.1	11.8	11.7
of which EU-N13	3.7	3.7	3.3	2.9	3.4	3.4	3.9	3.9	4.0	3.8	3.6
Imports (meat)	321	286	275	304	308	300	304	289	325	343	353
Exports (meat)	253	327	210	160	206	207	244	268	255	230	206
Net trade (meat)	-68	41	-64	-143	-102	-93	-60	-21	-70	-112	-147
EU market price in EUR/t	3 197	3 521	3 838	3 816	3 676	3 772	3 675	3 750	3 733	3 694	3 704
World market price in EUR/t (Brazil)	2 956	3 460	3 496	3 257	3 399	3 722	3 488	3 654	3 068	2 748	2 657
World market price in USD/t (Brazil)	3 919	4 816	4 492	4 326	4 515	4 130	3 861	4 040	3 537	3 290	3 268

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

Table 9.28 EU sheep and goat meat market balance (1 000 t c.w.e.)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Gross Indigenous Production	**949**	**963**	**928**	**902**	**901**	**925**	**932**	**957**	**979**	**990**	**997**
of which EU-15	832	841	809	784	778	808	804	826	840	843	844
of which EU-N13	117	122	119	118	123	117	128	131	139	148	153
Imports of live animals	0	0	0	0	0	0	0	0	0	0	0
Exports of live animals	10	22	27	34	36	38	52	55	44	35	25
Net Production	**939**	**941**	**902**	**868**	**864**	**887**	**879**	**902**	**935**	**956**	**972**
Consumption	**1 167**	**1 149**	**1 067**	**1 031**	**1 021**	**1 070**	**1 064**	**1 048**	**1 121**	**1 145**	**1 163**
of which EU-15	1 077	1 057	979	949	937	991	980	965	1 035	1 057	1 074
of which EU-N13	90	92	89	83	84	79	84	84	86	88	89
per capita consumption (kg r.w.e.)*	***2.0***	***2.0***	***1.9***	***1.8***	***1.8***	***1.8***	***1.8***	***1.8***	***1.9***	***1.9***	***2.0***
of which EU-15	2.4	2.3	2.2	2.1	2.0	2.2	2.1	2.1	2.2	2.2	2.3
of which EU-N13	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8
Imports (meat)	240	222	190	200	189	202	203	179	209	214	218
Exports (meat)	12	15	25	36	32	20	19	33	22	25	26
Net trade (meat)	-228	-207	-166	-164	-157	-183	-184	-146	-186	-189	-192
EU market price in EUR/t	4 360	4 978	4 980	4 889	5 129	5 097	4 953	5 000	4 521	4 528	4 442
World market price in EUR/t	2 540	3 534	4 017	2 940	3 406	3 317	3 225	3 818	3 252	3 287	3 252
World market price in USD/t	3 368	4 920	5 161	3 905	4 526	3 680	3 570	4 222	3 749	3 935	3 999

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

Table 9.29 EU pigmeat market balance (1 000 t c.w.e.)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Gross Indigenous Production	**22 974**	**23 275**	**22 769**	**22 595**	**22 782**	**23 491**	**23 762**	**23 497**	**23 640**	**23 600**	**23 590**
of which EU-15	19 529	19 829	19 552	19 493	19 499	20 122	20 281	20 086	20 068	20 044	19 946
of which EU-N13	3 446	3 446	3 217	3 102	3 283	3 369	3 480	3 411	3 572	3 556	3 645
Imports of live animals	0	0	0	0	0	0	0	0	0	0	0
Exports of live animals	67	62	36	26	35	21	10	6	20	20	20
Net Production	**22 908**	**23 213**	**22 734**	**22 569**	**22 747**	**23 470**	**23 752**	**23 491**	**23 620**	**23 580**	**23 570**
Consumption	**21 093**	**21 042**	**20 562**	**20 346**	**20 814**	**21 264**	**20 952**	**20 945**	**21 119**	**21 048**	**20 869**
of which EU-15	16 581	16 484	16 268	16 249	16 361	16 591	16 216	16 219	16 333	16 324	16 218
of which EU-N13	4 511	4 558	4 294	4 097	4 453	4 673	4 735	4 727	4 785	4 724	4 650
per capita consumption (kg r.w.e.)*	***32.7***	***32.5***	***31.8***	***31.4***	***32.0***	***32.6***	***32.0***	***31.9***	***31.9***	***31.8***	***31.5***
of which EU-15	32.5	32.2	31.8	31.6	31.7	32.0	31.1	31.0	30.9	30.6	30.3
of which EU-N13	33.3	33.7	31.8	30.4	33.1	34.9	35.4	35.5	36.2	36.3	36.5
Imports (meat)	29	18	19	15	14	11	12	13	24	31	42
Exports (meat)	1 844	2 189	2 191	2 238	1 947	2 217	2 812	2 559	2 526	2 564	2 744
Net trade (meat)	1 815	2 171	2 172	2 223	1 933	2 206	2 800	2 546	2 501	2 533	2 702
EU market price in EUR/t	1 402	1 532	1 705	1 753	1 564	1 396	1 460	1 653	1 580	1 616	1 579
World 'Atlantic' market price in EUR/t (Brazil)	2 072	2 172	2 167	2 162	2 585	2 252	1 917	2 182	2 072	1 977	1 770
World 'Atlantic' market price in USD/t	2 747	3 023	2 784	2 872	3 434	2 499	2 122	2 413	2 388	2 367	2 177
World 'Pacific' market price in EUR/t (US)	1 272	1 454	1 451	1 477	1 752	1 386	1 277	1 452	1 343	1 214	1 260
World 'Pacific' market price in USD/t	1 686	2 024	1 864	1 961	2 328	1 538	1 413	1 606	1 548	1 454	1 550

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

Table 9.30 EU poultry meat market balance (1 000 t c.w.e.)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Gross Indigenous Production	**12 134**	**12 371**	**12 706**	**12 793**	**13 271**	**13 790**	**14 477**	**14 669**	**14 975**	**15 204**	**15 349**
of which EU-15	9 524	9 710	9 844	9 840	10 093	10 313	10 682	10 797	10 868	10 882	10 887
of which EU-N13	2 610	2 661	2 862	2 954	3 178	3 477	3 795	3 871	4 107	4 322	4 462
Consumption	**11 771**	**11 904**	**12 214**	**12 264**	**12 721**	**13 266**	**13 866**	**14 013**	**14 380**	**14 547**	**14 597**
of which EU-15	9 421	9 555	9 776	9 819	10 203	10 619	11 077	11 187	11 527	11 611	11 684
of which EU-N13	2 350	2 349	2 438	2 445	2 518	2 647	2 788	2 826	2 853	2 936	2 913
per capita consumption (kg r.w.e.)*	***20.6***	***20.8***	***21.3***	***21.3***	***22.0***	***22.9***	***23.9***	***24.1***	***24.5***	***24.8***	***24.8***
of which EU-15	20.8	21.1	21.5	21.5	22.3	23.1	24.0	24.1	24.6	24.6	24.6
of which EU-N13	19.6	19.6	20.4	20.5	21.2	22.3	23.5	23.9	24.3	25.5	25.8
Imports (meat)	797	832	842	793	823	856	884	831	960	994	995
Exports (meat)	1 159	1 299	1 334	1 322	1 372	1 381	1 495	1 486	1 555	1 651	1 747
Net trade (meat)	362	467	492	529	550	525	611	655	596	657	752
EU market price in EUR/t	1 686	1 865	1 912	1 950	1 910	1 875	1 779	1 804	1 721	1 765	1 728
World market price in EUR/t	1 343	1 496	1 503	1 516	1 460	1 480	1 385	1 304	1 343	1 381	1 352
World market price in USD/t	1 781	2 083	1 931	2 014	1 940	1 642	1 533	1 442	1 549	1 653	1 663

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

Table 9.31 Aggregate EU meat market balance (1 000 t c.w.e.)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Gross Indigenous Production	**44 275**	**44 809**	**44 272**	**43 820**	**44 649**	**46 052**	**47 270**	**47 255**	**47 485**	**47 433**	**47 470**
of which EU-15	37 182	37 665	37 194	36 812	37 167	38 124	38 816	38 778	38 728	38 558	38 384
of which EU-N13	7 093	7 144	7 078	7 008	7 483	7 928	8 454	8 477	8 757	8 875	9 086
Imports of live animals	0	0	0	0	0	0	1	1	0	0	0
Exports of live animals	181	231	221	169	186	236	281	302	302	274	245
Net Production	**44 095**	**44 578**	**44 051**	**43 651**	**44 464**	**45 816**	**46 989**	**46 954**	**47 183**	**47 159**	**47 226**
Consumption	**42 213**	**42 106**	**41 617**	**41 206**	**42 240**	**43 358**	**43 822**	**43 921**	**44 344**	**44 270**	**44 113**
of which EU-15	34 708	34 554	34 304	34 147	34 682	35 452	35 639	35 701	36 030	35 975	35 952
of which EU-N13	7 505	7 553	7 314	7 058	7 557	7 906	8 183	8 219	8 314	8 294	8 160
per capita consumption (kg r.w.e.)*	**66.6**	**66.4**	**65.7**	**64.9**	**66.4**	**68.0**	**68.6**	**68.5**	**68.9**	**68.7**	**68.4**
of which EU-15	69.1	68.7	68.2	67.7	68.5	69.7	69.9	69.7	69.8	69.2	68.9
of which EU-N13	57.3	57.8	56.2	54.5	58.4	61.2	63.5	64.0	65.2	66.3	66.6
of which Beef and Veal meat	11.4	11.1	10.8	10.5	10.6	10.7	10.9	10.8	10.5	10.2	10.1
of which Sheep and Goat meat	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0
of which Pigmeat	32.7	32.5	31.8	31.4	32.0	32.6	32.0	31.9	31.9	31.8	31.5
of which Poultry meat	20.6	20.8	21.3	21.3	22.0	22.9	23.9	24.1	24.5	24.8	24.8
Imports (meat)	1 386	1 358	1 327	1 312	1 333	1 370	1 403	1 312	1 518	1 582	1 608
Exports (meat)	3 268	3 830	3 760	3 757	3 557	3 825	4 570	4 346	4 359	4 470	4 723
Net trade (meat)	1 882	2 472	2 433	2 446	2 224	2 455	3 167	3 034	2 841	2 889	3 116

* 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 9.32 EU eggs market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production*	**7 297**	**7 333**	**7 256**	**7 321**	**7 376**	**7 574**	**7 742**	**7 704**	**7 802**	**8 028**	**8 287**
of which EU-15	5 424	5 498	5 399	5 660	5 740	5 884	5 970	5 923	5 977	6 067	6 194
of which EU-N13	1 873	1 835	1 857	1 661	1 636	1 689	1 772	1 782	1 825	1 961	2 092
Total use	**7 148**	**7 139**	**7 110**	**7 121**	**7 157**	**7 312**	**7 512**	**7 487**	**7 568**	**7 765**	**7 993**
of which EU-15	5 788	5 793	5 780	5 737	5 757	5 898	6 105	6 079	6 153	6 346	6 590
of which EU-N13	1 360	1 346	1 330	1 384	1 399	1 414	1 407	1 408	1 414	1 419	1 403
per capita consumption (kg) **	***13.2***	***12.8***	***12.6***	***12.5***	***12.4***	***12.7***	***12.9***	***12.6***	***12.9***	***13.2***	***13.5***
of which EU-15	13.5	13.2	13.0	12.6	12.5	12.8	13.1	12.7	13.1	13.5	14.0
of which EU-N13	11.9	11.4	11.4	12.0	12.1	12.2	12.2	12.2	12.3	11.9	11.6
Imports	33	23	40	20	14	19	17	16	19	23	26
Exports	182	217	186	220	233	281	247	233	253	286	320

* includes eggs for consumption and hatching eggs
** includes only eggs for consumption

Table 9.33 EU olive oil market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**2 200**	**2 396**	**1 463**	**2 483**	**1 435**	**2 324**	**1 743**	**1 896**	**2 187**	**2 311**	**2 438**
of which ES+PT	1 444	1 691	677	1 873	903	1 512	1 353	1 260	1 496	1 605	1 717
of which IT+EL	741	694	773	596	522	795	377	620	675	688	702
Consumption	**1 838**	**1 780**	**1 601**	**1 731**	**1 572**	**1 646**	**1 440**	**1 474**	**1 628**	**1 670**	**1 715**
of which ES-IT-EL-PT	1 524	1 462	1 291	1 386	1 236	1 285	1 093	1 141	1 179	1 147	1 126
of which other EU	314	318	310	345	335	361	348	333	449	523	588
per capita ES-IT-EL-PT (kg)	12	11	10	11	10	10	9	9	9	9	9
per capita other EU (kg)	1	1	1	1	1	1	1	1	1	1	2
Imports	82	97	153	53	225	98	104	136	134	136	138
Exports	483	553	489	601	508	574	571	557	694	777	862

Note: the olive oil marketing year is October/September

Table 9.34 EU wine market balance (million hl)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Vinified production	**159**	**158**	**140**	**170**	**163**	**165**	**162**	**138**	**162**	**159**	**159**
of which 5 main producer MS	145	141	126	153	149	150	147	122	148	146	146
other EU MS	14	17	14	17	14	15	14	16	14	13	13
Domestic use	**154**	**157**	**131**	**149**	**161**	**156**	**154**	**143**	**150**	**150**	**148**
Direct consumption	128	133	112	126	137	131	131	125	130	130	129
per capita (l)	**25.5**	**26.4**	**22.2**	**24.9**	**26.9**	**25.7**	**25.7**	**24.5**	**25.3**	**25.1**	**25.0**
Other uses	25	24	18	23	24	25	23	18	21	20	19
Imports	14	14	15	14	14	14	14	15	14	15	16
Exports	22	23	21	21	22	22	23	21	23	25	27
Total Ending Stocks	**159**	**150**	**153**	**167**	**162**	**163**	**161**	**149**	**158**	**161**	**161**

Note: the wine marketing year is August/July

Table 9.35 EU apples market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**10 895**	**11 844**	**11 098**	**12 076**	**12 894**	**12 758**	**12 448**	**9 693**	**12 062**	**12 332**	**12 554**
Other uses	795	859	739	814	835	830	793	618	765	785	799
EU Supply	**10 099**	**10 985**	**10 359**	**11 262**	**12 059**	**11 927**	**11 655**	**9 075**	**11 297**	**11 547**	**11 755**
EU supply for processing	**2 973**	**3 281**	**3 273**	**3 562**	**4 128**	**3 696**	**3 820**	**2 423**	**3 364**	**3 526**	**3 663**
Exports (processing)	309	333	380	415	1 154	595	710	400	734	799	849
Imports (processing)	4 404	3 808	4 402	2 994	2 153	3 147	2 216	2 950	2 617	2 408	2 200
Consumption (processing)	7 068	6 755	7 294	6 141	5 127	6 248	5 326	4 973	5 247	5 135	5 013
per capita (kg)	14	13	14	12	10	12	10	10	10	10	10
EU supply for fresh consumption	**7 127**	**7 705**	**7 086**	**7 700**	**7 931**	**8 231**	**7 835**	**6 652**	**7 933**	**8 021**	**8 092**
Exports (fresh)	1 072	1 516	1 564	1 605	1 782	1 585	1 476	991	1 736	1 818	1 900
Imports (fresh)	602	525	608	576	401	451	428	626	422	411	400
Consumption (fresh)	6 656	6 713	6 130	6 671	6 550	7 097	6 787	6 287	6 619	6 614	6 592
per capita (kg)	13	13	12	13	13	14	13	12	13	13	13

Note: the apples marketing year is August/July

Table 9.36 EU tomatoes market balance (1 000 t)

	2010	2011	2012	2013	2014	2015	2016	2017	2020	2025	2030
Production	**16 299**	**15 626**	**15 185**	**14 544**	**16 679**	**17 662**	**18 575**	**18 233**	**18 017**	**18 096**	**18 148**
EU supply for processing	**9 433**	**8 812**	**8 637**	**7 639**	**9 883**	**10 401**	**10 727**	**10 779**	**10 749**	**10 876**	**10 966**
Exports (processing)	2 113	2 295	2 438	2 281	2 429	2 535	2 616	2 628	2 621	2 652	2 674
Imports (processing)	2 475	2 981	2 293	2 113	2 557	2 814	2 505	2 511	2 618	2 609	2 600
Consumption (processing)	9 794	9 497	8 492	7 471	10 010	10 680	10 616	10 662	10 746	10 833	10 892
per capita (kg)	19	19	17	15	20	21	21	21	21	21	21
EU supply for fresh consumption	**6 867**	**6 814**	**6 549**	**6 905**	**6 796**	**7 261**	**7 848**	**7 454**	**7 268**	**7 220**	**7 182**
Exports (fresh)	195	261	321	359	204	172	131	126	215	227	236
Imports (fresh)	478	454	434	477	459	526	549	499	503	509	513
Consumption (fresh)	7 149	7 006	6 662	7 023	7 051	7 614	8 266	7 827	7 556	7 502	7 459
per capita (kg)	14	14	13	14	14	15	16	15	15	15	14

Note: the tomatoes marketing year is October/September