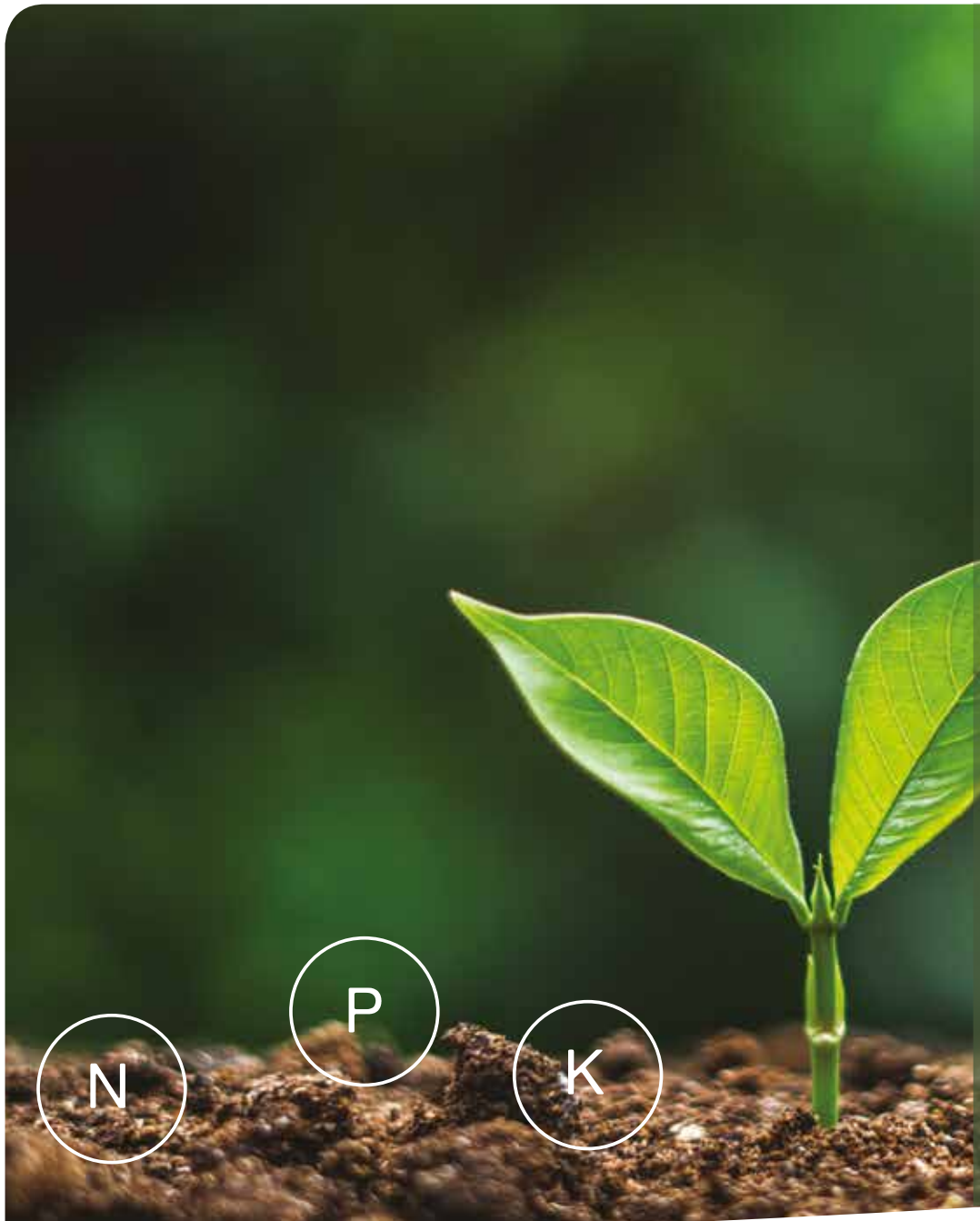
fertilizers europe

Forecast of **food, farming** and **fertilizer use** in the European Union 2020-2030

SUSTAINABLE AGRICULTURE IN EUROPE



Nitrogen, phosphorus and **potassium** are the three primary nutrients for plant growth

- **Nitrogen (N), captured from the air, is essential as a important component of proteins.**
- **Phosphorus (P), primarily extracted from mined ores, is a component of nucleic acids and lipids, and is a key to energy transfer.**
- **Potassium (K), extracted from mined ores, has an important role in plant metabolism, for photosynthesis, activation of enzymes, osmoregulation, etc.**

The nutrients are transformed from naturally occurring raw materials into more plant-available forms by industrial processing and supplied as mineral fertilizers. In this report, the nutrients are expressed as follows: nitrogen as a pure element, phosphorus as the phosphate equivalent (P_2O_5) and potassium as the potash equivalent (K_2O).

Fertilizer Europe's annual forecast of food farming and fertilizer use in the European Union[1] has been independently recognized[2] as one of the most trusted inputs into the development of agricultural policy in Europe. Its data is regularly used by many international organizations including the European Commission (DG Agriculture, DG Environment and DG Energy), the Food and Agriculture Organization (FAO), the European Environment Agency (EEA) and the International Fertilizer Producer Association (IFA).

[1] In this publication, the European Union refers to EU-28. This corresponds with the data collection process which is in line with the agriculture season 2019/2020.

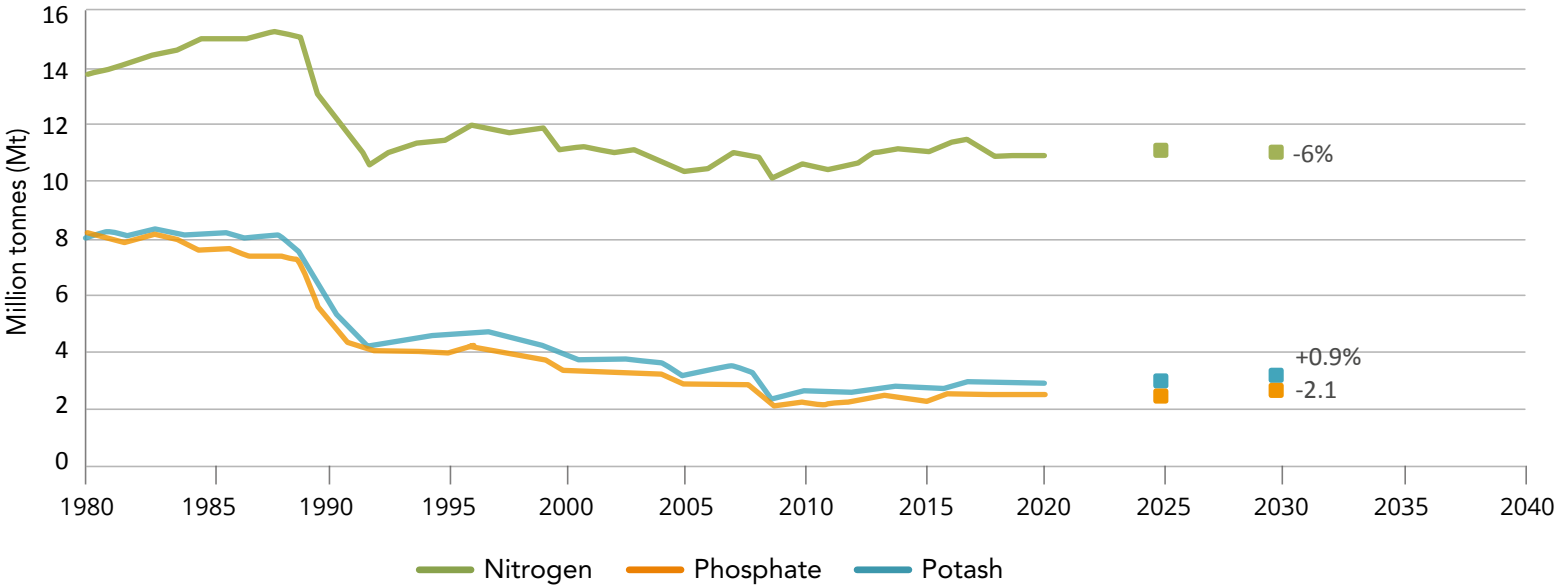
[2] Exploring land use trends in Europe: a comparison of forecasting approaches and results: H. van Delden, et al. iEMSs International Congress on Environmental Modelling and Software 2012, Leipzig, Germany.

Contents

Changes in annual fertilizer consumption in Europe by 2030:

- **N** -6% in **nitrogen consumption**, compared to -3.0% foreseen last year.
- **P** -2.1% in **phosphate consumption**, against +1.4% last year.
- **K** +0.9% in **potash consumption**, against +4.9% forecasted last year.

Fertilizer consumption
in the European Union



Over the season, fertilizers containing an average* of 11.2 million tons of nitrogen, 2.7 million tons of phosphate, and 3.1 million tons of potash were applied to 133.7 million hectares of farmland. 44.9 million cultivable hectares in the EU were not fertilized.

Consideration of the economic outlook and the anticipated evolution of Europe's cropping area has led Fertilizers Europe to expect annual nitrogen, phosphate and potash fertilizer consumption to reach 10.6, 2.7 and 3.1 million tons respectively by the 2029/2030 season, applied to 132.4 million hectares of farmland.

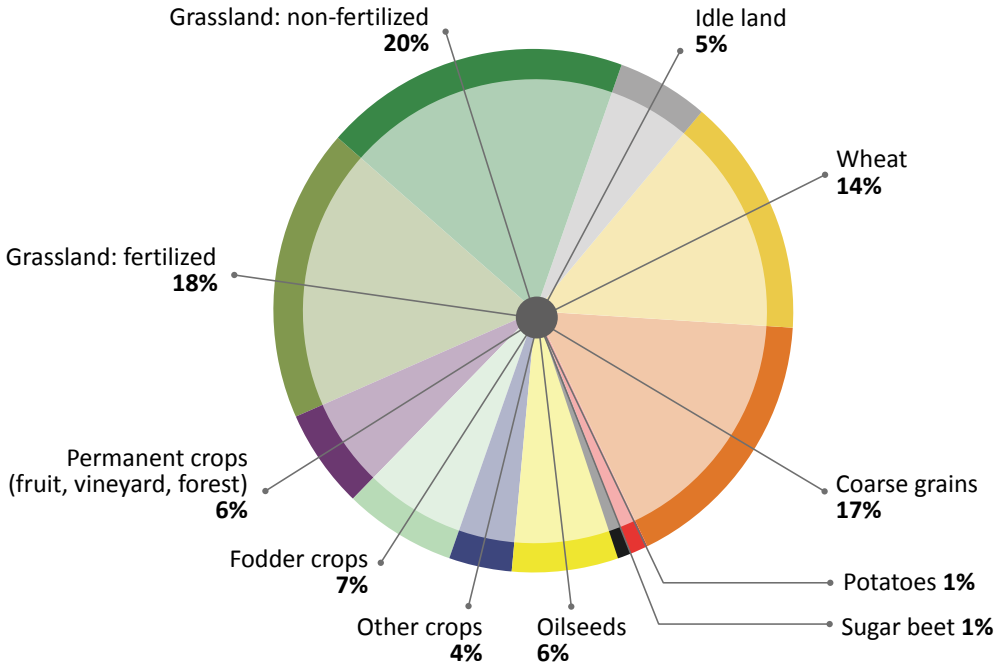
After several years of recovery, annual fertilizer consumption over the next 10 years is foreseen to decrease for the fourth consecutive year. Nitrogen suffers from the steepest downturn. For phosphate the forecast now predicts, after some years of recovery, a downturn as well, even though more moderate compared to nitrogen. For potash, a slight increase of the consumption is forecasted. Nevertheless, phosphate and potash consumption will continue to remain below the levels recorded prior to the 2008 economic downturn. This is partly linked to a deterioration of agricultural prices.

In recent years, a more challenging climate situation seems to have a growing negative influence on yield expectations. In addition, the tightening of the environmental regulatory framework limits productivity growth. The ban of one single input factors often drags down the use of the other input factors as well. The political priorities of the European Union and of several European countries are challenging EU's farming sector as a whole and fertilizer use by farmers as well.

** Average based on the last three growing seasons - 2017/2018, 2018/2019, 2019/2020.*


Arable crops account for 60% of the fertilized area in Western Europe and 87% in Central and Eastern Europe.

Agricultural land use
in the European Union



The fertilized area in countries of the European Union comprises of 133.7 million hectares. A further 44.9 million farmable hectares are not fertilized, of which 35.1 million are unfertilized grassland and 9.8 million idle or set-aside land.

Within the fertilized area, arable crops account for 62% (i.e. 42% cereals, 8% oilseeds, 9% fodder crops). Permanent crops account for 9% of the area and grassland for a further 24%.

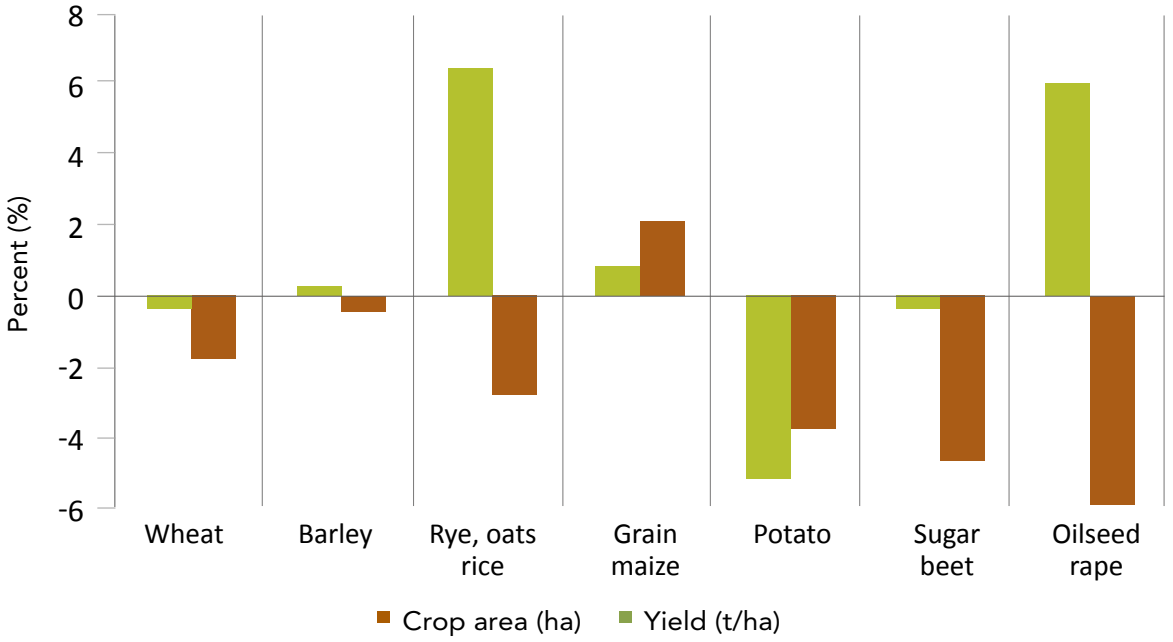
The unfertilized area is evenly spread across the countries of the European Union but there are significant differences in fertilized crop areas between the countries of Western, and Central and Eastern Europe.

In Western Europe (EU-15), the fertilized area comprises 59% arable crops (i.e. 36% cereals, 6% oilseeds, 10% fodder crops), 11% permanent crops (vineyards, orchards, forests) and 30% fertilized grassland. Agriculture in Central and Eastern Europe (EU-13), however, is far more directed towards arable production, which accounts for 87% of the fertilized area (i.e. 57% cereals, 14% oilseeds, 8% fodder crops), with permanent crops and fertilized grassland only comprising 3% and 10% of the fertilized area respectively.

Note: Due to rounding, figures may not add up to 100%

The grain sector (wheat, coarse grains and oilseeds) accounts for 61% of total nutrient consumption, with wheat alone accounting for 26%. **Fodder crops and grassland** account for a further 22%.

Changes in farming food crops 2020-2030

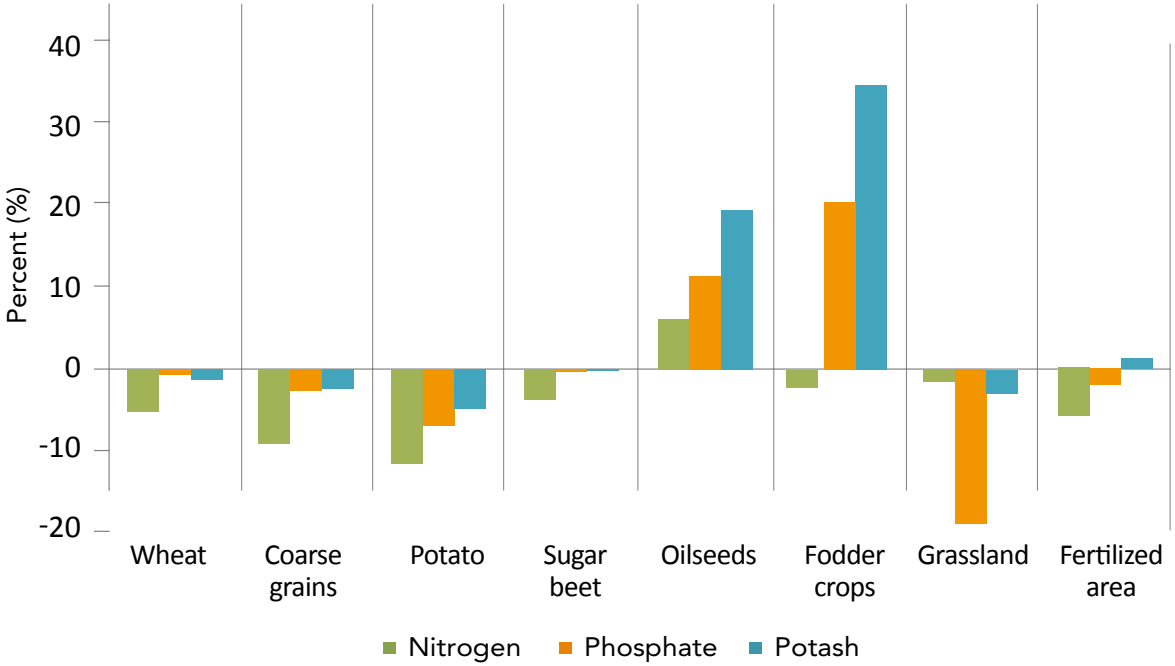


The anticipated cropping pattern in the European Union over the next 10 years sees a decrease (-2%) in the agricultural area dedicated to cereals. This decrease, however, is partially compensated by an overall increase in crop yield of 1%.

Compared to last year, the two trends remain similar. The decreases in area for oilseed rape (-7%) and cereals (-2%) are compensated by increases in yield (+6%, and +1% respectively). The area for sugarbeet is again foreseen to drop (-5%) with stability in yield (0%). The biggest drop is foreseen for potato where the area is forecasted to decrease by -4%, with an expected smaller yield of -6%.

Over the next ten years, **nutrient consumption** (N+P+K) for agriculture is forecasted to decrease by -4.1%.

Changes in fertilizer use by crop 2020-2030



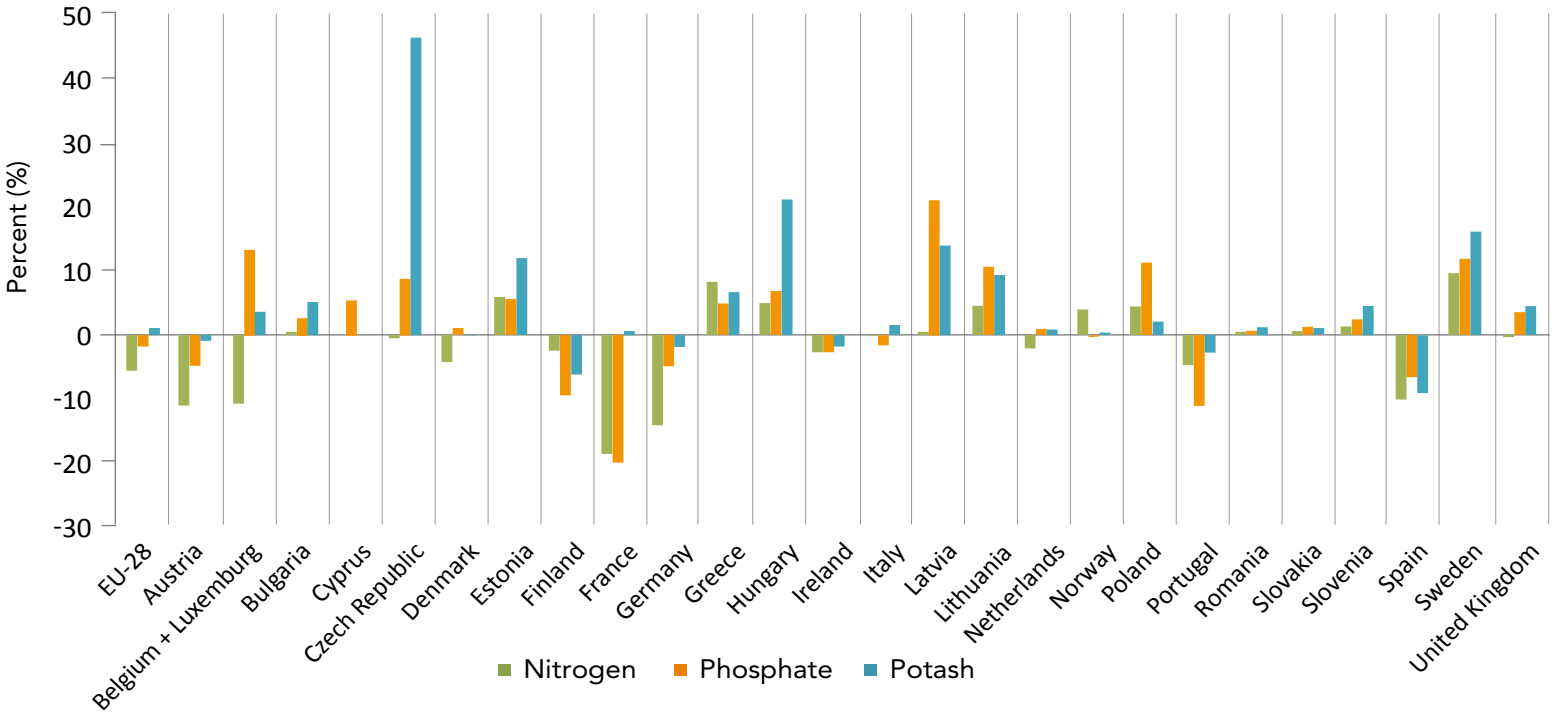
As the forecasted yield increase for the average of the major crops is slowing down (1% for total cereals; -5% for potato; 6% for oilseed), the nutrient consumption (N+P+K) is expected to decrease significantly (-4.1%).

With the exception of oilseed and fodder crops where increases of respectively 10% and 8% are forecasted, nutrient consumption will decrease in all major crops. Sugar beet will see a decrease of nutrient consumption of -2%, potato of -9% and cereals of -4%. The tightening of the environmental rules is foreseen to especially affect nitrogen consumption, with most of the crops except oilseed showing a downturn in nitrogen use (-6%). The aforementioned general decrease of nutrient consumption can only be attenuated by some smaller decrease of phosphate (-2.1%) and potash application (-1%).

The forecast predicts that France will be facing the highest decrease in nutrient consumption, due to tightening of the rules for the use of fertilizers.

For the period 2020-2030, this trend is also impacting other EU-15 countries. Still **most Central and Eastern European countries (EU-13) demonstrate a higher nutrients consumption trend.**

Changes in regional fertilizer use 2020-2030



Increased consumption of nitrogen is foreseen in most Central and Eastern Europe countries (EU-13) though lower than last year, while significant decreases are foreseen in the Western European countries, with the highest decreases in France, Germany and Spain. Finland and Portugal are now also foreseeing a stronger decrease of nutrient consumption compared to last years.

For nitrogen, the average growth in consumption in Central and Eastern European countries remains still positive at 2.3% (compared to 5.1% last year). For Western countries, the expected decrease of -9.6% is again exacerbating compared to last year (-6.1%).

For potash, growth is reported in most European countries, except for Austria, Finland, Portugal and Spain still contributing slightly to the recovery (+1%). For phosphate instead, the average growth foreseen over the next 10 years turns into decrease (-2.1%) with quite diverse trends among the member states of the European Union.

The relatively solid growth of nutrient consumption that could be observed since 2010 until today is now forecasted to turn into a clear drop of the EU fertilizer market, especially for nitrogen due to a combination of environmental and market pressure both on farmers and producers.

The EU Commission's Green Deal 'Farm-to-Fork' and 'Biodiversity' strategies put forward the ambition for 2030 to reduce nutrient losses to the environment from both organic and mineral fertilizers by at least 50%, while ensuring no deterioration in soil fertility.

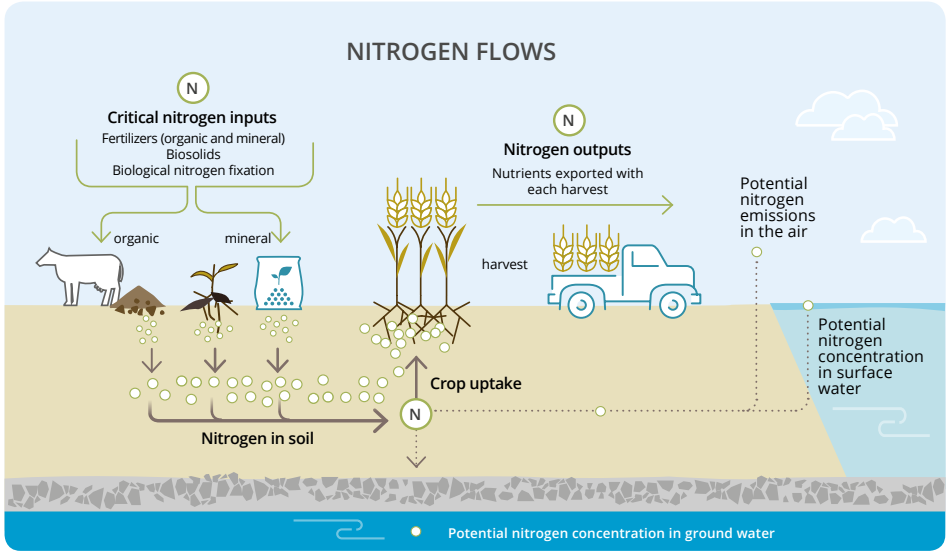
This ambitious target together with other EU objectives such as achieving 25% of organic farming are expected to result in a reduction of fertilizers use, which is also reflected in the downward trend of the nutrient use figures reported in Fertilizers Europe 10-year forecast. However, an adequate supply of nutrients must be guaranteed to ensure optimal crop growth and healthy soil.

The role of the Nitrogen Use Efficiency Indicator
in moving towards sustainable EU food system

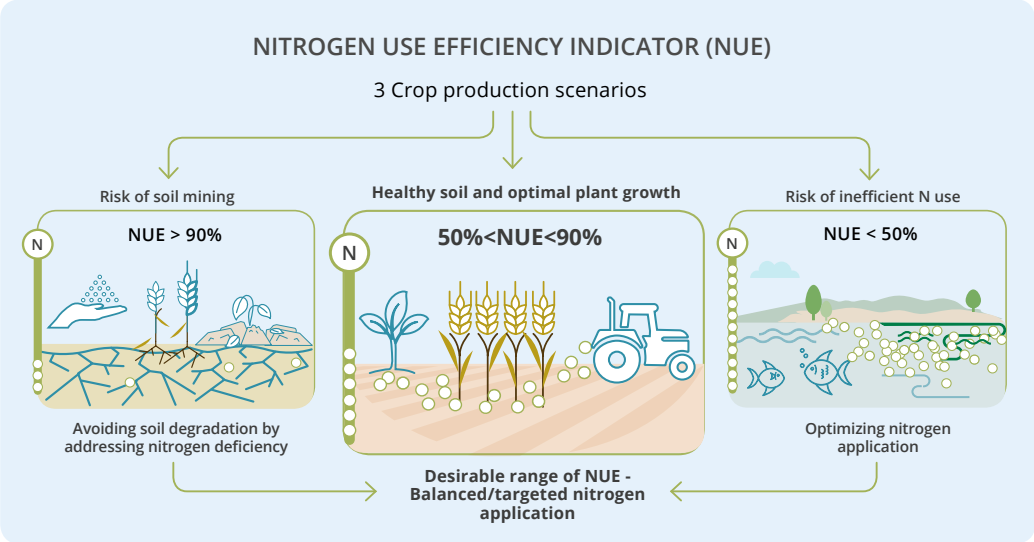
Nitrogen (N) is essential for life, a main nutrient for crops and the most important crop yield limiting factor in the world. However, nitrogen losses to the environment affect air and water quality and can have a negative impact on biodiversity. Increasing nitrogen use efficiency means that nitrogen is effectively taken up by plants, while losses to the environment are decreased and crop and animal productivity are maintained or even increased.

Supporting farmers to increase nutrient use efficiency helps European agriculture to become more sustainable while maintaining a productive and competitive agricultural sector in Europe.

To achieve a better management of nitrogen in agriculture, the use of this NUE indicator is increasingly becoming relevant to guide on farm decisions as it ensures more efficient nitrogen use in food production, allowing to minimise environmental impacts and achieve better crop yields.



Nitrogen Use Efficiency (NUE) can be calculated as the ratio between N applied to soil and N reoved by harvested crops. The Nitrogen Use Efficiency (NUE) indicator provides information on resource use efficiency, the economy of food production (nitrogen in harvested yield), and the pressure on the environment (coming from nitrogen losses).



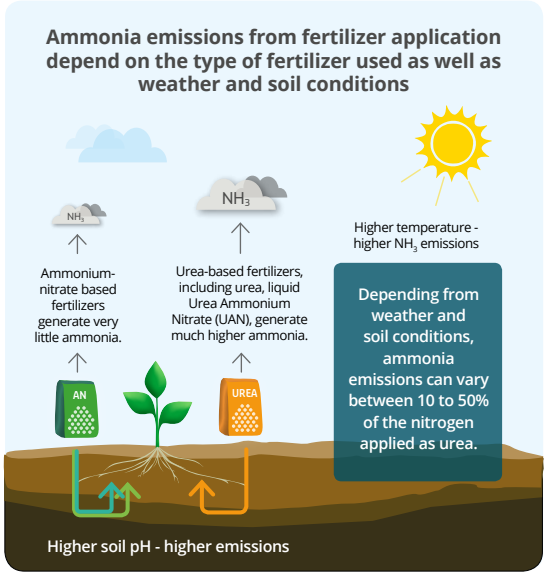
The indicator can be broken down to three simplified production scenarios:

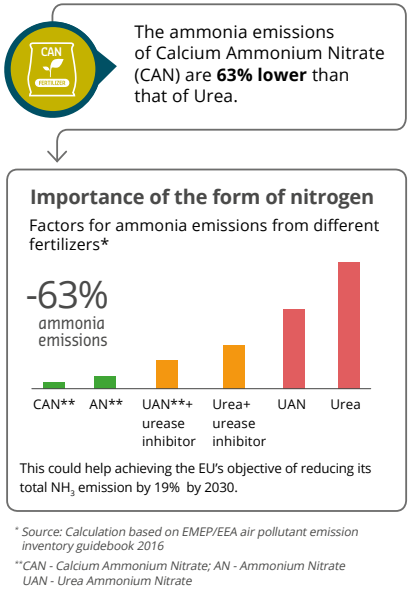
- NUE > 90% Risk of deterioration of soil fertility
- 50% <NUE< 90% Healthy soil, optimal plant growth, no losses to the environment
- NUE<50% Risk of inefficient nitrogen use

In each of these scenarios the NUE indicator can provide advice on farm practices on how to optimise the use of nitrogen by either addressing nitrogen deficiency or optimising its use.

Nitrogen Use Efficiency and the right form of nitrogen

Losses from the application of nitrogen fertilizers to the environment depend on the type of fertilizer used as well as weather and soil conditions.





* *Source: Calculation based on EMEP/EEA air pollutant emission inventory guidebook 2016*

***CAN - Calcium Ammonium Nitrate; AN - Ammonium Nitrate UAN - Urea Ammonium Nitrate*

Nitrogen Use Efficiency and balanced plant nutrition

Optimum yield and high NUE can only be achieved simultaneously thanks to a balanced supply of all plant nutrients. Balanced nutrition is essential to help crops using efficiently each and all nutrients and reaching yield potentials and quality in each environment.

Smart and precision farming - an enabler of Nitrogen Use Efficiency

The best indicator of the needed nutrient supply comes from the crop itself. The fertilizers industry continuously develops practical tools that help farmers assess plant nutrient needs and improve their nutrient management and thus enhance their nitrogen use efficiency. The tools range from simple portable devices such as hand-held metering devices and GSM-based mobile applications, all the way to arm machinery equipped with satellite-produced biomass field maps.

Benefits for policy makers - supporting policy development and monitoring of progress

- **Allows site-specific benchmarking** of production systems
- **Can serve as a tool/indicator to improve performance** of on-farm activities
- **Allows to monitor progress** towards established targets
- **Provides a solid scientific and analytical basis** and an established protocol for N data collection, processing and reporting
- **Can be used to monitor progress of sustainable development goals** in relation to food production and environmental challenges

NUE Indicator

Benefits for farmers - guiding on-farm decision to achieve a better performance

- **Provides farmers with crop and field specific guidance** on how to improve nitrogen uptake while reducing nitrogen losses in the environment
- **Helps farmers to improve practices and reach environmental compliance**
- **Approach can be used to financially reward farmers** taking part in voluntary schemes
- **Helps farmers to improve farm economic performance**

How the forecast is made

Fertilizers Europe's forecast is an annual exercise that uses the following procedure:

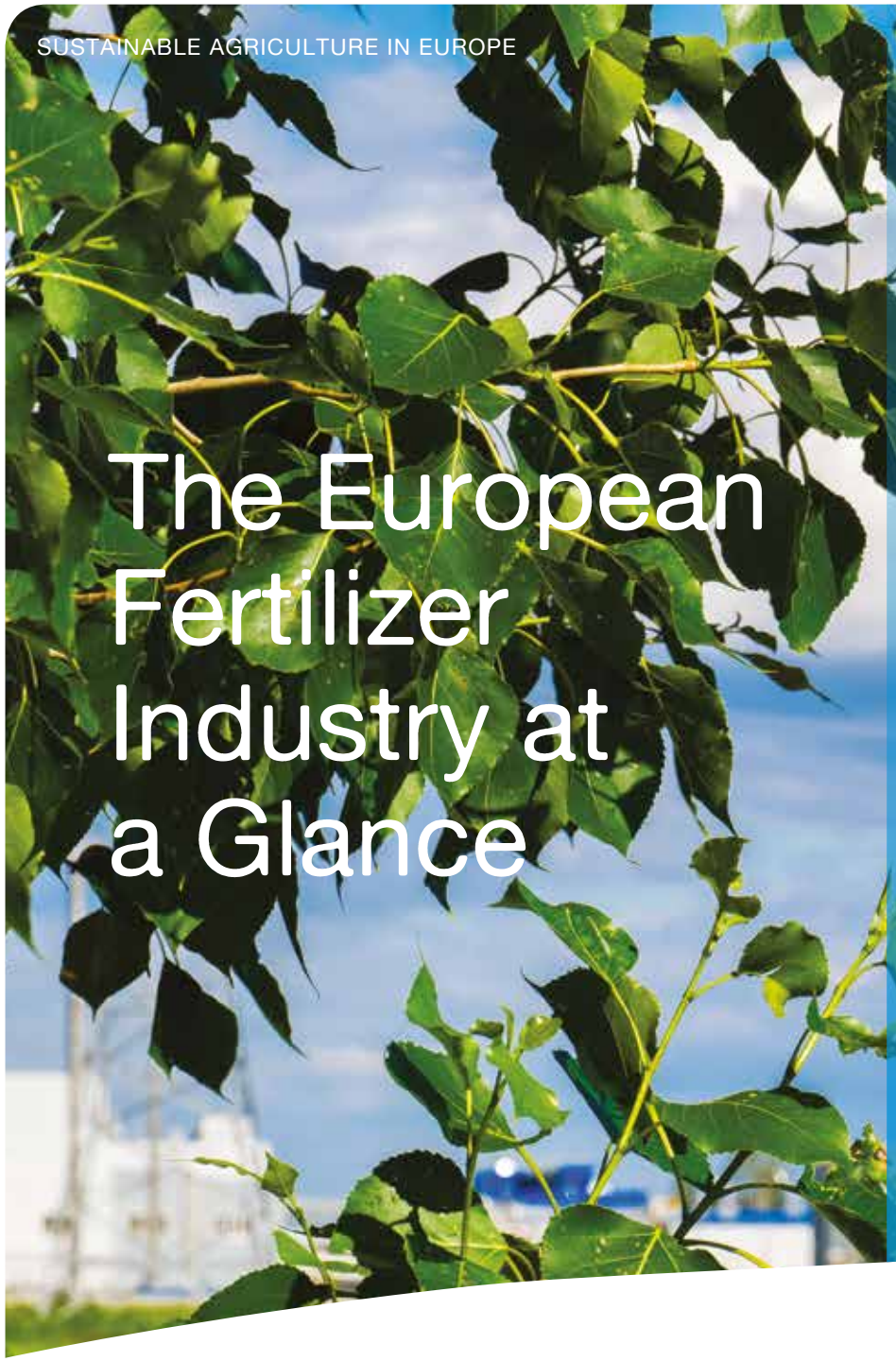
- at the end of each growing season, a general European scenario is established, based on quantitative information (from the FAO-OECD, USDA, FAPRI and the European Commission) and a qualitative analysis made by Fertilizers Europe experts;
- the general scenario is then adapted to the specificities of each country and national forecasts made;
- the national forecasts are then analysed and discussed by all the experts;
- when the market and economic situation require it, the forecasters carry out a last update of the current situation before integration and publication.

The forecast is an upward crop-based procedure where fertilizer consumption is evaluated by assessing the evolution of the cropping area and the nutrient application rates for each crop. However, two different methodologies are used to achieve this crop-based procedure:

- In the majority of European Union countries, representing 98.4% of its agricultural area and fertilizer consumption, the forecast is an expert-based approach constructed from national forecasts generated by Fertilizer Europe's members.
- In Croatia, Cyprus, Latvia and Slovakia, evaluation of the crop area and production as well as application rates used for N, P and K nutrients on each crop is based on a combination of data taken out of the IFA-FAO database, European Commission,...; when precise figures are not available, the evaluation is based on an agronomic model developed by the group of forecasters, for both the current value and the 10 years forecasted value.
- Malta is currently not covered in the forecast.

REFERENCE VOLUMES

The reference volumes used to calculate the percentage changes in fertilizer demand are based on the average value of the last three growing seasons (for the current exercise: 2017/2018, 2018/2019 and 2019/2020). This mitigates the extent to which exceptional years (positive or negative) may impact the calculated evolution of demand.



The European Fertilizer Industry at a Glance

turnover
€ 9.8 BN*

€ 1.4 BN*
investment

75.000 employees**

120+
production sites

€ 66.2 M***
research & development

* EU-28

** total including supply chain (average last 5 years)

*** in 2015 (members only)

fertilizers europe

Fertilizers Europe represents the majority of fertilizer producers in Europe and is recognised as the dedicated industry source of information on mineral fertilizers. The association communicates with a wide variety of institutions, legislators, stakeholders and members of the public who seek information on fertilizer technology and topics relating to today's agricultural, environmental and economic challenges. The Fertilizers Europe website provides information on subjects of relevance to all those interested in fertilizers contribution to global food security.

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