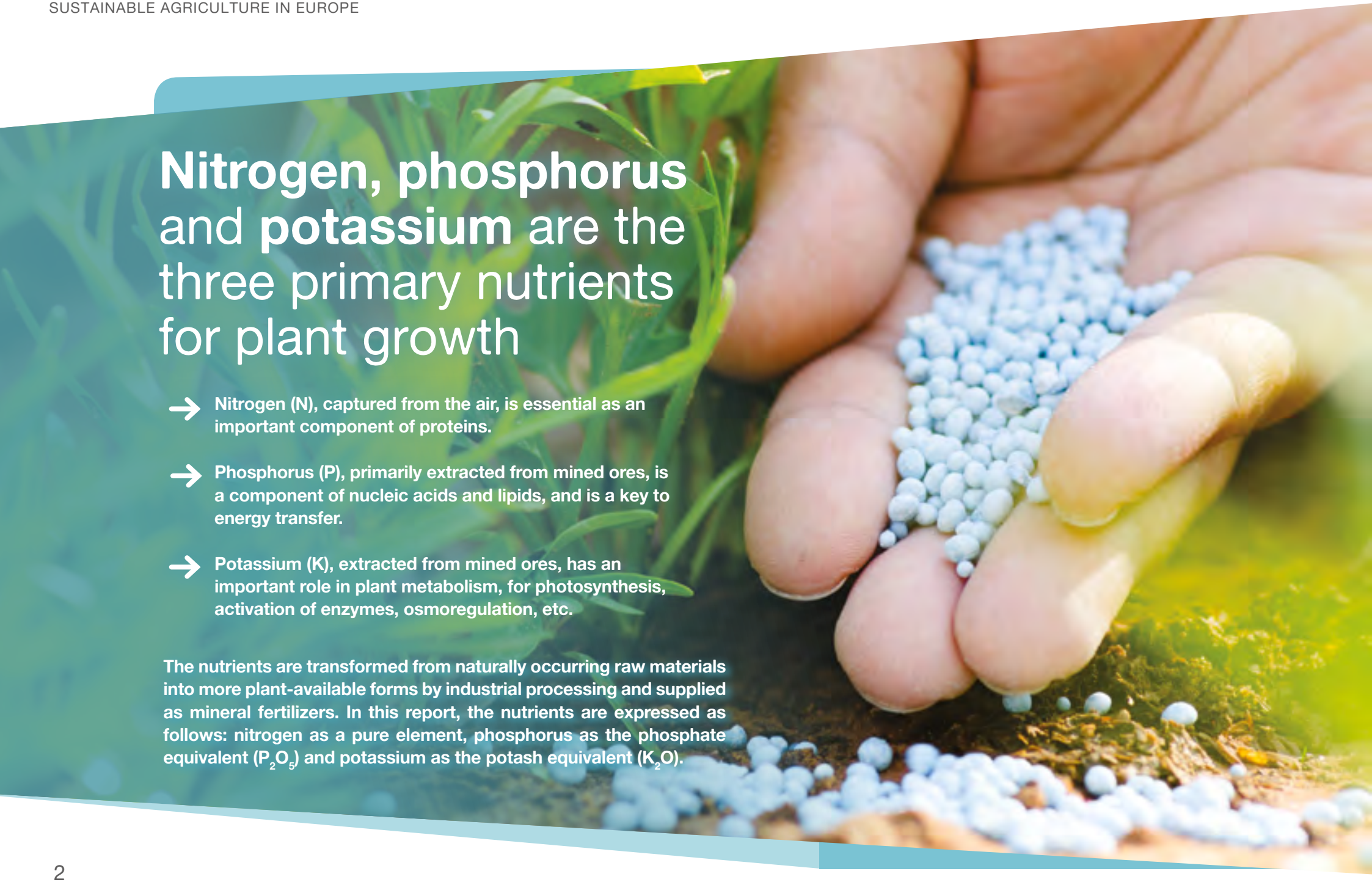
fertilizers europe

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

2019-2029

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 an 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 has been independently recognized[1] 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] *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

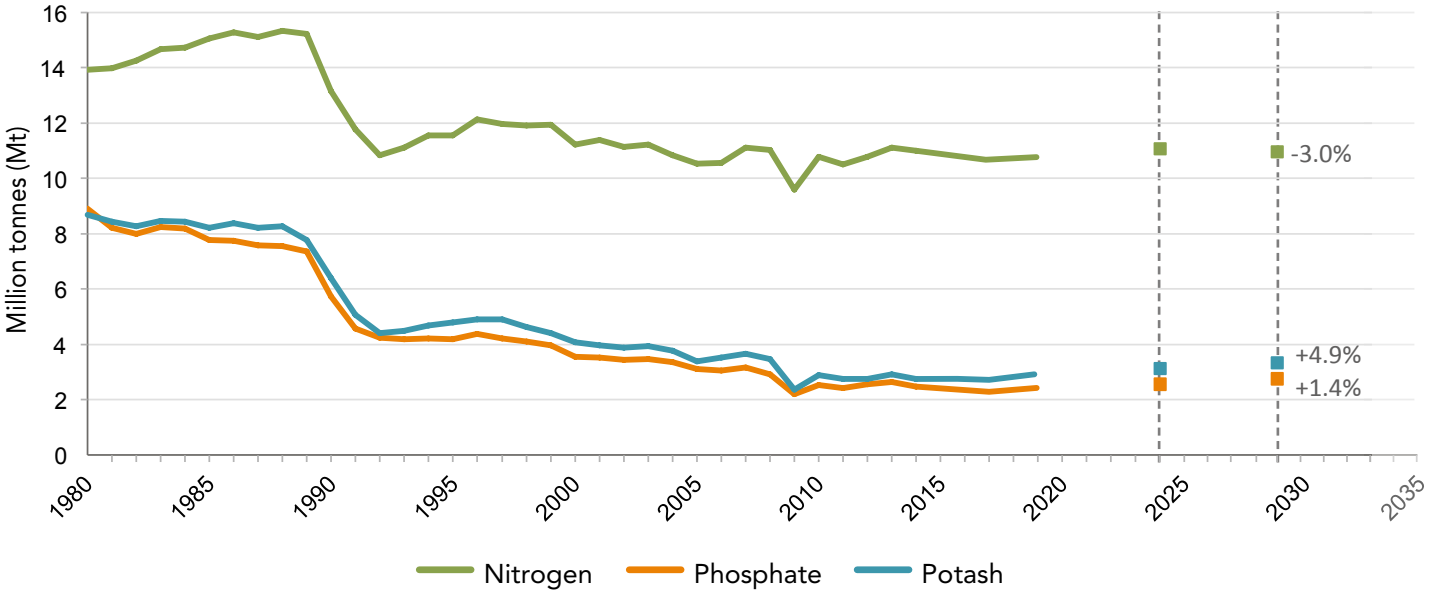
Changes in annual fertilizer consumption in Europe by 2029:

-3.0% in **nitrogen consumption**, compared to -1.6% foreseen last year.

+1.4% in **phosphate consumption**, against +6.5% last year.

+4.9% in **potash consumption**, against +4.3% forecast last year.

Fertilizer consumption in the European Union



Over the season, fertilizers containing an average* of 11.5 million tons of nitrogen, 2.7 million tons of phosphate, and 3.1 million tons of potash were applied to 133.8 million hectares of farmland. 44.6 million cultivable hectares in the EU were not fertilized.

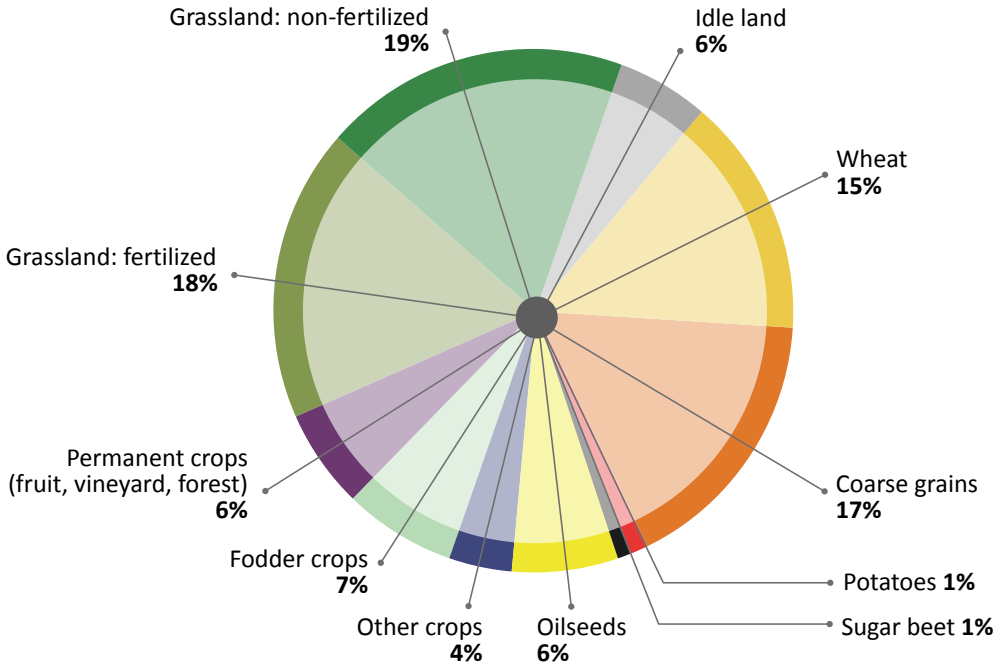
Consideration of the economic outlook and the anticipated evolution of Europe's cropping area has led Fertilizers Europe to expect annual nitrogen, phosphate and potash fertilizer consumption to reach 11.1, 2.7 and 3.2 million tons respectively by the 2028/2029 season, applied to 133.0 million hectares of farmland.

After several years of recovery, annual fertilizer consumption over the next 10 years of nitrogen is foreseen to decrease for the third consecutive year. For phosphate and potash, an increase of the consumption is forecasted but consumption will continue to remain below the levels recorded immediately prior to the 2008/2009 economic downturn. This is partly linked to a significant deterioration of the agricultural price environment and partly due to the terms of trade for global agriculture observed in the recent years. In addition, the current European regulatory context increasingly puts more emphasis on environmental issues. Being water quality, climate change, or air quality, all these political priorities of several European countries and the European Union are challenging EU's farming sector as a whole and fertilizer use by farmers as well.

** Average based on the last three growing seasons - 2016/2017, 2017/2018, 2018/2019.*

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

Agricultural land use in the European Union



The fertilized area in countries of the European Union comprises 133.8 million hectares. A further 44.6 million farmable hectares are not fertilized, of which 34.7 million are unfertilized grassland and 9.9 million idle or set-aside land.

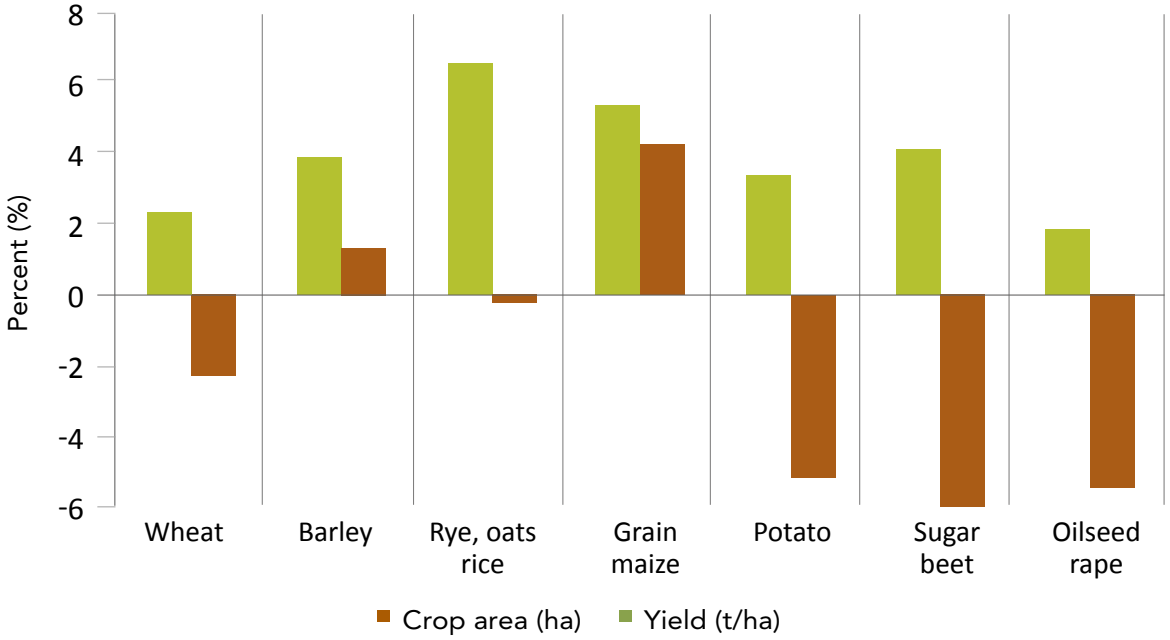
Within the fertilized area, arable crops account for 78% (a.o. 51% cereals, 10% oilseeds, 6% fodder crops). Permanent crops account for 6% of the area and grassland for a further 16%.

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

In Western Europe (EU-15), the fertilized area comprises 60% arable crops (a.o. 36% cereals, 6% oilseeds, 9% 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 (a.o. 57% cereals, 14% oilseeds, 8% fodder crops), with permanent crops and fertilized grassland only comprising 3% and 10% of the fertilized area respectively.

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 European farming and food crops 2019-2029

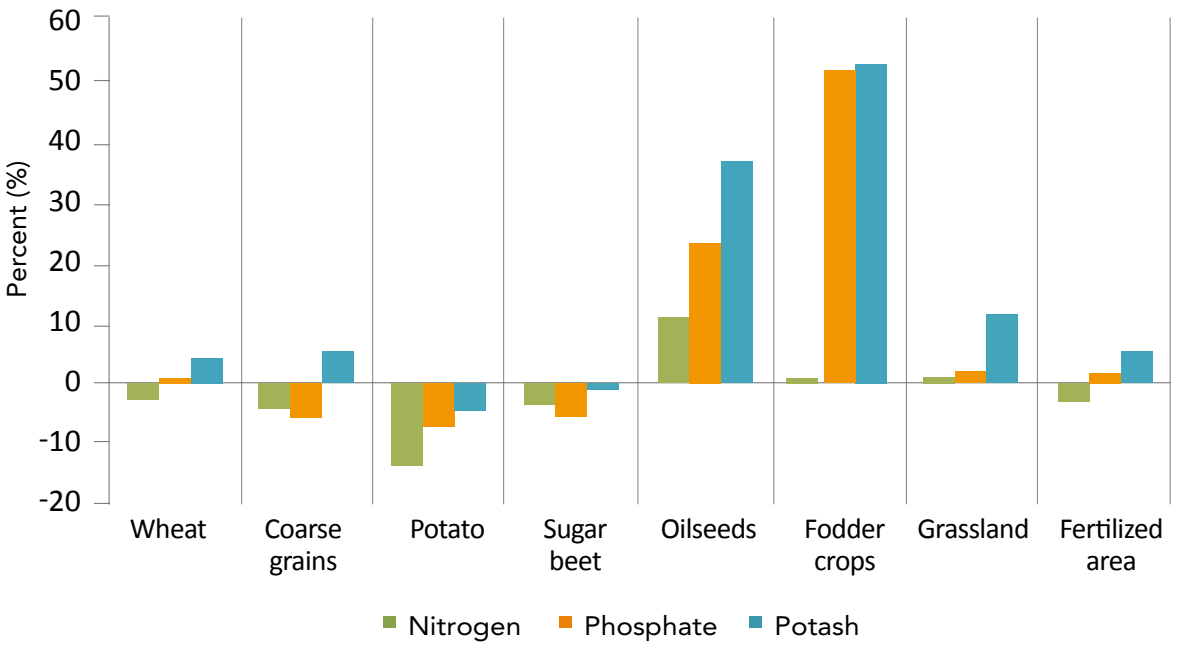


The anticipated cropping pattern in the European Union over the next 10 years sees a decrease (-1%) in the agricultural area devoted to cereals. This decrease, however, is compensated by an overall increase in crop yield of 4%.

Compared to last year, all trends remain similar. The decreases in area for oilseed rape (-6%), potato (-5%) and cereals (-1%) are compensated by increases in yield (+2%, +3% and +4% respectively). The biggest change is again foreseen for sugar beet where the area is forecasted to decrease by 6%, with an expected 4% increases in yield.

Over the next ten years, **nutrient consumption** (N+P+K) for agriculture will increase by 0.9%.

Changes in fertilizer use by crop 2019-2029



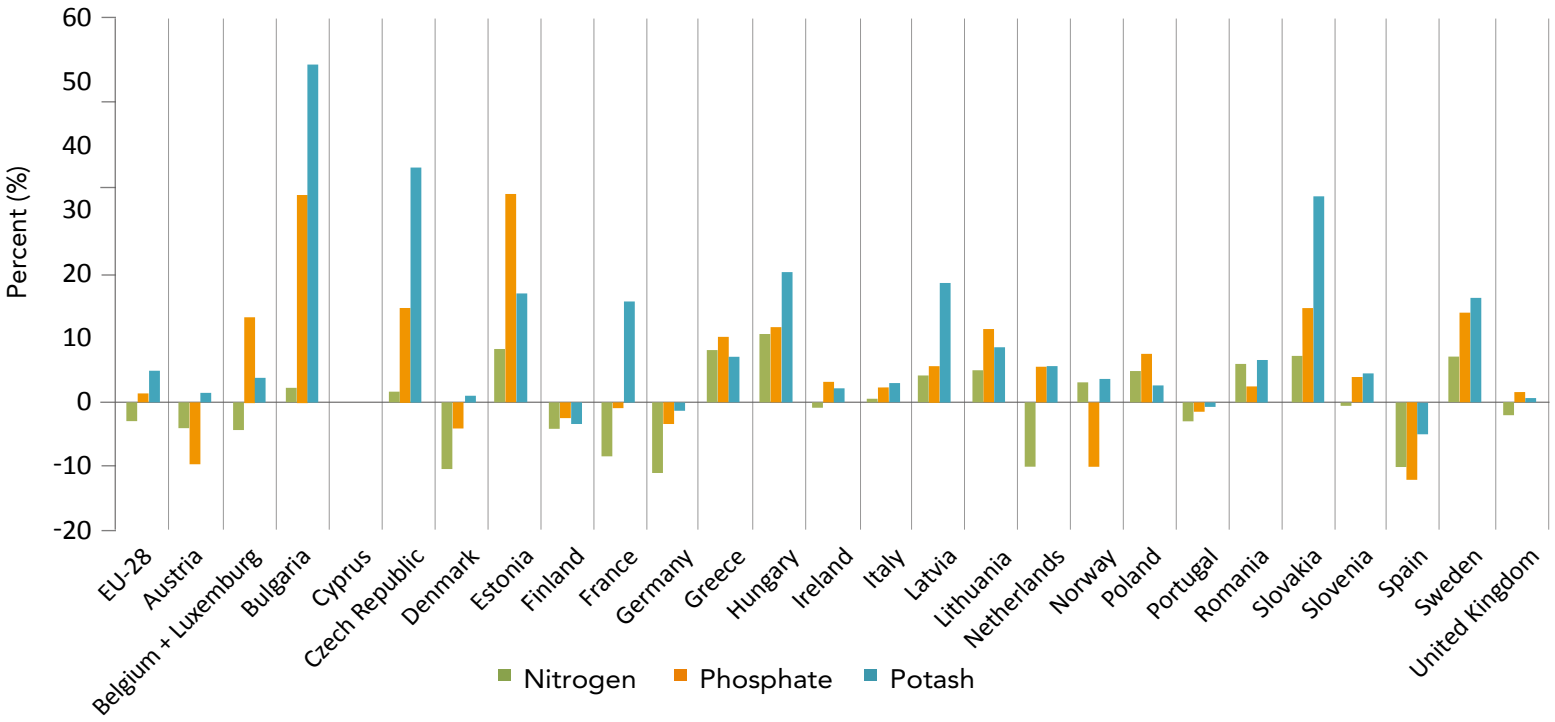
Despite the forecasted yield increases on a positive trend for all major crops (+7% for coarse cereals to values between +4% and +2% for other crops), the nutrient consumption (N+P+K) is expected to slightly decrease (-0.9%).

Still, the nutrient consumption (N, P, K) is expected to significantly increase in oilseed crops and, from a comparably low absolute level, also in fodder crops. Nevertheless, the increase on these two crops will not compensate general decrease observed in other crop families.

The tightening of the environmental rules at EU and national level is foreseen to affect the nitrogen consumption negatively in all crops. Nevertheless, nitrogen consumption decrease will be partly compensated by an increase of phosphate and potash application (on oilseeds and particularly on fodder maize for biogas production).

The last 2 years, **Germany was forecasted as facing the highest decrease in consumption of all three nutrients**. For the period 2019-2029, it appears that this trend is also impacting other EU-15 countries. Still most Central and Eastern European countries (EU-13) demonstrate a trend for higher nutrients consumption, mainly phosphate and potash.

Changes in regional fertilizer use 2019-2029



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 The Netherlands, France, Germany, Denmark and Spain.

For nitrogen, the average growth in consumption in Central and Eastern European countries reached +5.1 % (compared to +9.7% last year). For Western countries, the expected decrease of -6.4% is similar to last year (-6.1%).

For phosphate and potash, growth is reported in most European countries, except Spain, Austria, Denmark, Finland, France, and Germany. It is contributing to the recovery (+1.4% and +4.9%) foreseen for these nutrients in the European Union over the next 10 years.

Since 2010, a relatively solid growth of nutrients (+5.5% for the total of N, P, and K) has been observed. However, it looks as if the fertilizer market is now slowing down, especially for nitrogen due to a combination of environmental and market pressures both on farmers' and producers' sides.

Balanced plant nutrition is a vital element of sustainable crop and soil management.

1. There are **17 most important** nutrients for plants, all different pieces of the very same puzzle. Plants must obtain these nutrients from their environment and different sources to grow optimally.

2. One nutrient alone cannot deliver sufficient yield and crop quality. It is the **balanced nutrition** between the different nutrients that ensures reaching yields according to the genetic potential of the crops.

3. The rate and ratio at which **each nutrient** is needed by a plant changes over its growth cycle. A deficiency in one nutrient cannot be compensated by a surplus of another nutrient.

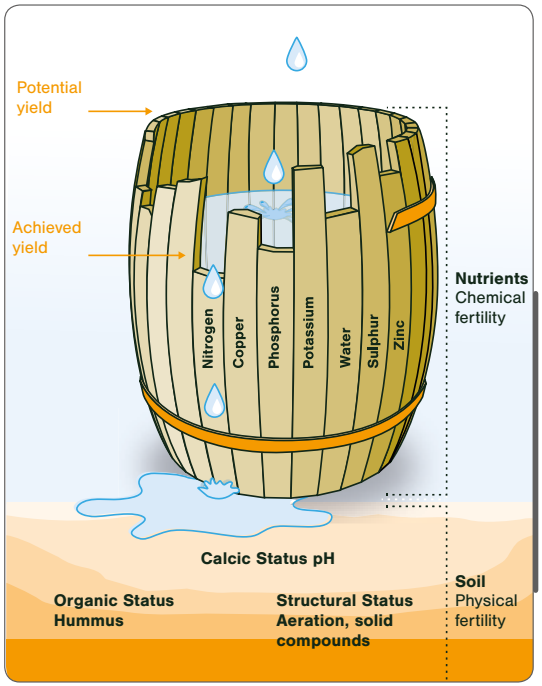
4. Healthy and **fertile soils** need adequate supply of nutrients. Enriching European soils is a prerequisite for sustaining agriculture and European farmers.

BALANCED PLANT NUTRITION

Every plant nutrient has a specific role to play

From Liebig"s barrel ...

According to "Liebig's barrel" principle, plant growth is dictated by the scarcest resource (limiting factor) and not by the total resources available. A deficiency in one nutrient cannot be compensated by a surplus of any of the others. So one nutrient alone cannot ensure the yield, and the balance between the nutrients is essential to ensure reaching yields according to the genetic potential of the crops. The principle of the Liebig's barrel highlights the key importance of a good soil management as a basis of agriculture practices.

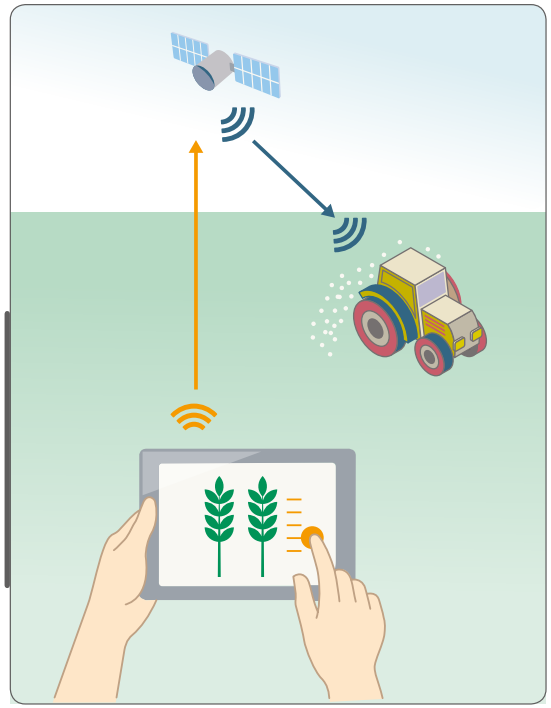


Liebig's barrel - a principle developed in agricultural science by Carl Sprengel and later popularized by Justus von Liebig in the 19th century,a German chemist who made major contributions to agricultural and biological chemistry.

... To targeted crop nutrition

The fertilizer industry today focuses on developing practical tools, including GSM-based mobile applications, to help farmers assessing plant nutrient needs and improving nutrient management. The best indicator of the nutrient supply comes from the crop itself and is used to guide fertilizer application rates later in the growth cycle.

The tools range from simple portable devices such as hand-held metering devices all the way to farm machinery equipped with satellite-produced biomass field maps.



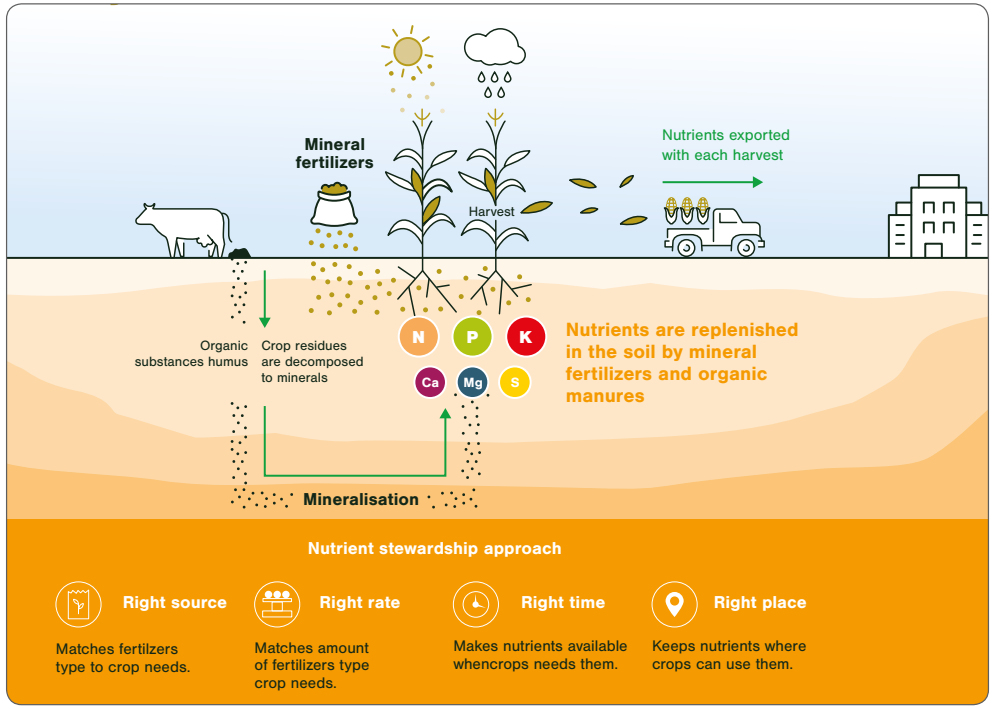
How does a crop actually grow?

Crop growth requires sunlight, carbon dioxide (CO_2), water and a balanced supply of the 17 essential plant nutrients. These nutrients support a plant's essential metabolic functions and are primarily absorbed from water in the soil via the plant's root system. A certain proportion of nutrients are naturally present in the soil as a result of natural microbial processes that break down decaying plant and organic matter, but usually these need to be supplemented by nutrients from other organic and mineral sources such as mineral fertilizers to ensure optimal plant growth. When a plant is harvested, the nutrients it has absorbed are exported from the soil and the nutrient supply is depleted. This is why it is essential to feed the crops, and consequently the soil, after every harvest in order to avoid soil depletion.

Balancing crop nutrition for healthy crops and fertile soils

A good crop feeding strategy at farm level can be achieved with a balanced supply of the main nutrients needed. Balanced nutrition is essential to help crops reaching high yields and quality, moving towards a crop's maximum genetic potential. The challenge for farmers and growers is that the rate and the ratio at which each nutrient is needed by a plant changes over its growth cycle. The objective of balanced fertilization is, therefore, to ensure that the plant has access to an adequate supply of each nutrient at every growth stage in order to avoid any over or under-supply and to optimize plant yield.

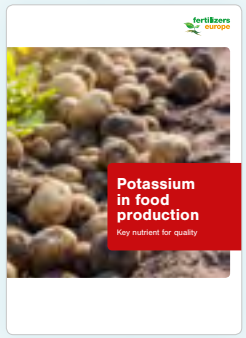
Fertilisers maintain soil fertility

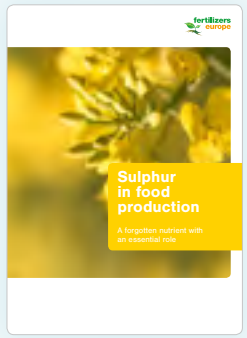


This publication is part of the series highlighting respective contribution of the main nutrients used by farmers and growers in Europe.

To obtain a print copy of the Forecast and/or our other publications, please contact: **communications@fertilizerseurope.com**

Find out more about Fertilizers Europe Publications at: **www.fertilizerseurope.com/publications/**





contents

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: 2016/2017, 2017/2018 and 2018/2019). 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
€ 10.2 BN*

€ 1.3 BN*
investment

75.800 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.

Fertilizers Europe asbl
9-31 Avenue des Nerviens
B-1040 Brussels
Tel. +32 2 675 35 50
agriculture@fertilizerseurope.com

Group Fertilizers Europe
@FertilizersEuro
www.fertilizerseurope.com