

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

2016-2026

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).

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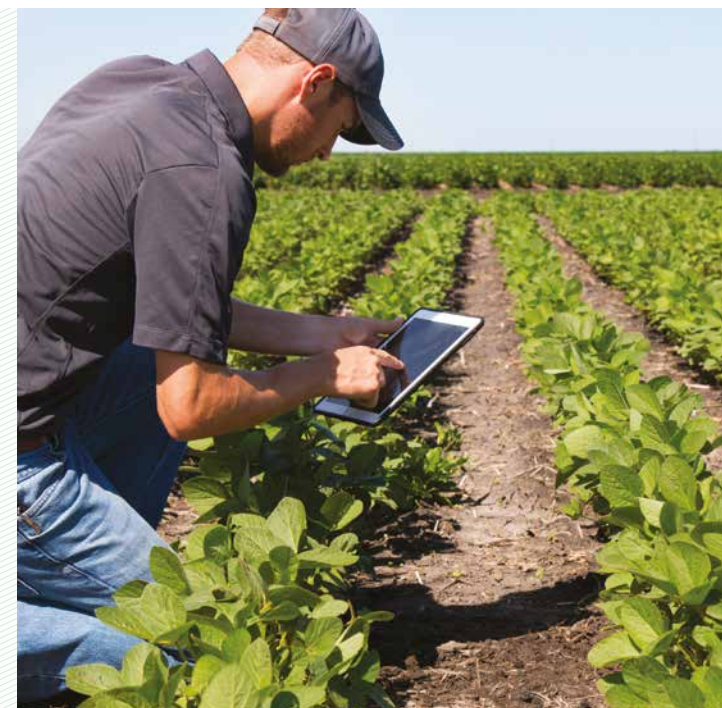
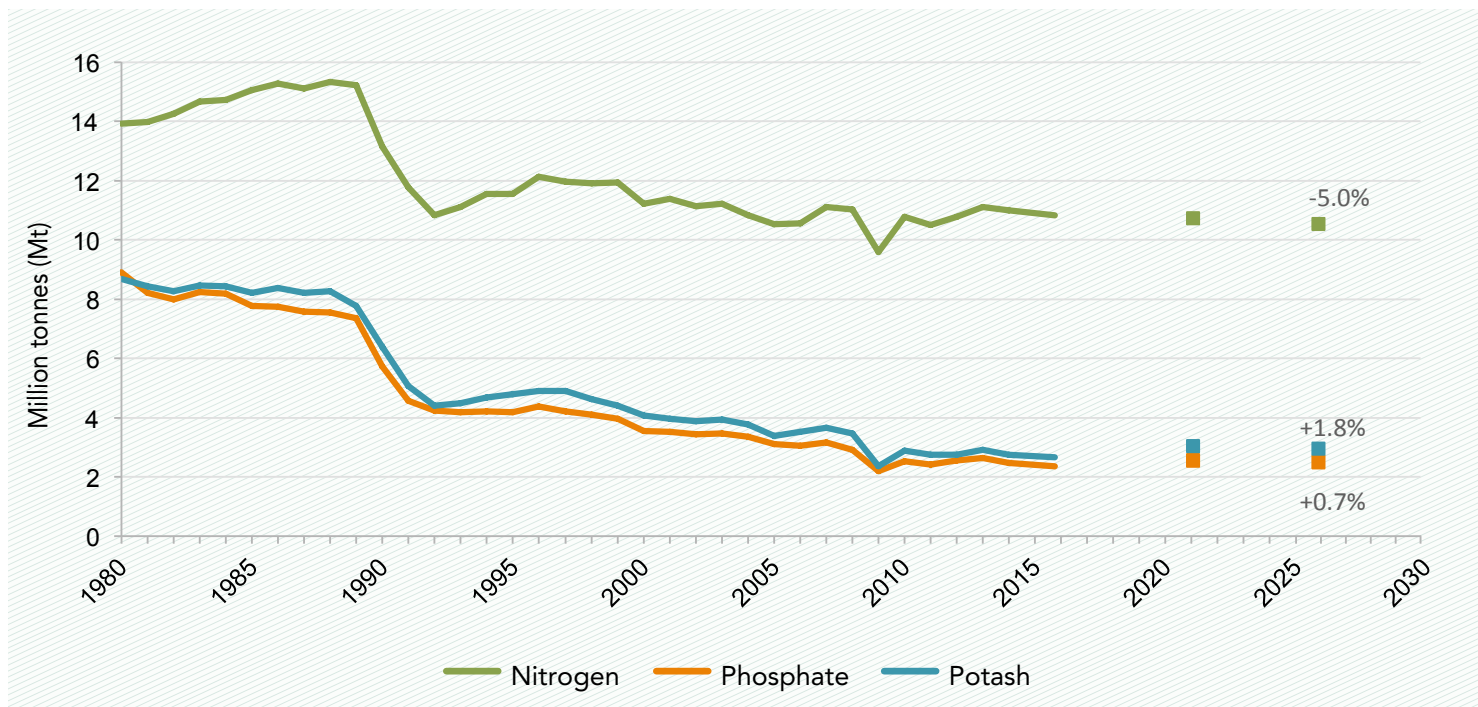
Fertilizer Europe's annual forecast of food farming and fertilizer use in the European Union has been independently recognized¹ as one of the most trusted inputs into the development of agricultural policy in Europe. Its data is regularly used by many international organizations including the European Commission (DG Agri, DG Environment and DG Energy), the 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.

Changes in annual fertilizer consumption in Europe by 2026:

- 5.0% in **nitrogen** consumption, compared to -0.3% foreseen last year.
 - + 0.7% in **phosphate** consumption, against +3.3% last year.
 - + 1.8% in **potash** consumption, against +7.3% forecast last year.
-

Fertilizer consumption in the European Union



Over the 2015/2016 growing season, fertilizers containing an average* of 11.1 million tonnes of nitrogen, 2.5 million tonnes of phosphate and 2.9 million tonnes of potash were applied to 133.7 million hectares of farmland in the EU. 45.2 million hectares of farmable land 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

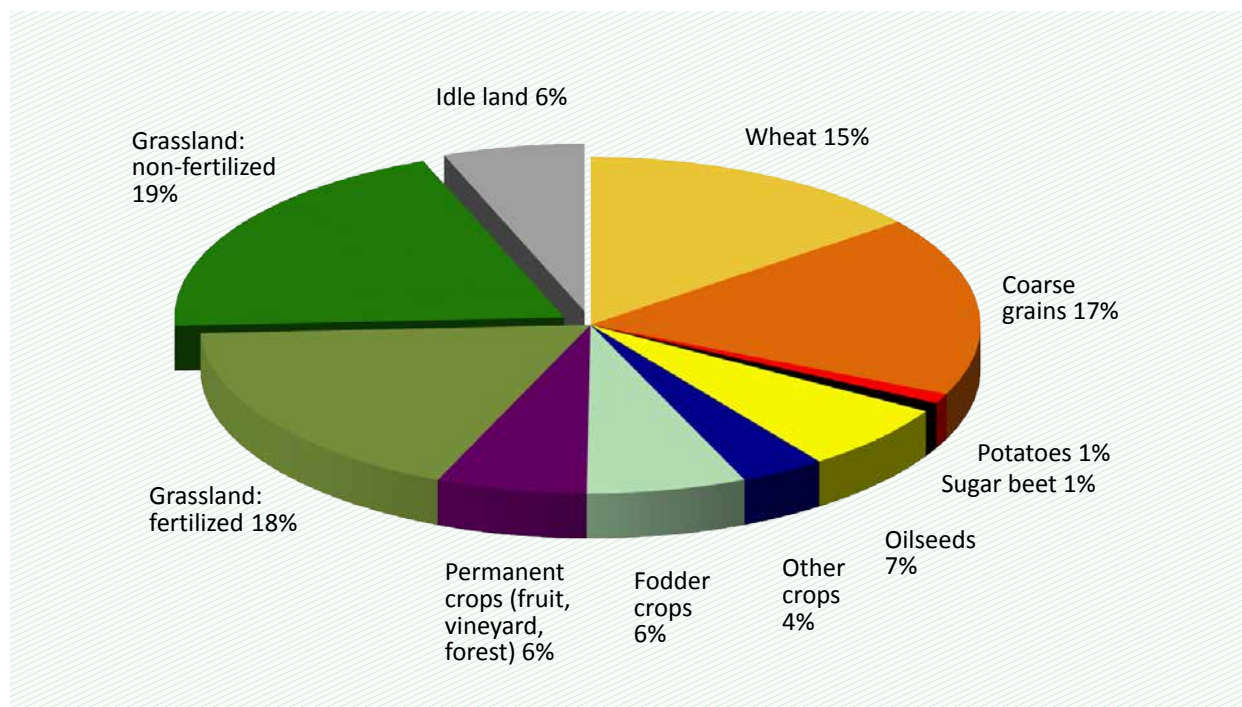
reach 10.6, 2.6 and 2.9 million tonnes respectively by the 2025/2026 season, applied to 132.6 million hectares of farmland.

Annual fertilizer consumption over the next 10 years will continue to remain below the more normal levels recorded immediately prior to the 2008/2009 economic downturn.

* Average based on the last three growing seasons - 2013/2014, 2014/2015, 2015/2016.

Arable crops account for
60% of the fertilized area in
western European countries and
86% of that in central and
eastern Europe.

Agricultural land use in the European Union



The fertilized area in the countries of the European Union comprises 133.7 million hectares. A further 45.2 million farmable hectares are not fertilized, of which 34.9 million are unfertilized grassland and 10.3 million idle or set-aside land.

Within the fertilized area, arable crops account for 68% (43% cereals, 9% oilseeds, 9% fodder crops). Permanent crops account for 8% 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

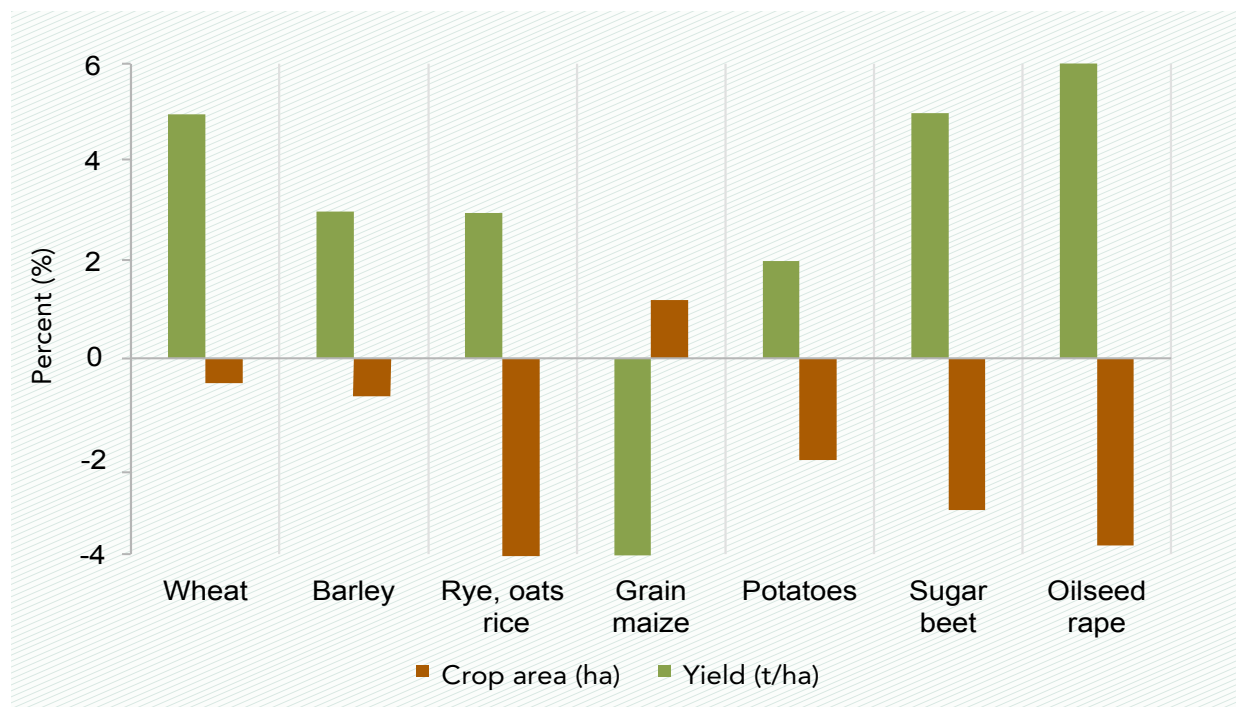
the countries of western and central and eastern Europe.

In western Europe (EU-15), the fertilized area comprises 60% arable crops (37% cereals, 7% oilseeds, 9% fodder crops), 10% permanent crops (vineyards, orchards, forests) and 29% grassland. Agriculture in central and eastern Europe (EU-12), however, is far more directed towards arable production, which accounts for 86% of the fertilized area (56% cereals, 14% oilseeds, 8% fodder crops), with permanent crops and grassland only comprising 3% and 11% of the fertilized area respectively.



The grain sector (wheat, coarse grains and oilseeds) accounts for **62%** of total nutrient consumption, with wheat accounting for **26%**. **Fodder crops and grassland** account for a further **22%**.

Changes in farming and food crops 2016-2026



The anticipated cropping pattern in the European Union over the next 10 years sees a 1.1% decrease in the agricultural area devoted to cereals. This decrease, however, is compensated by an overall increase in crop yield of 3%.

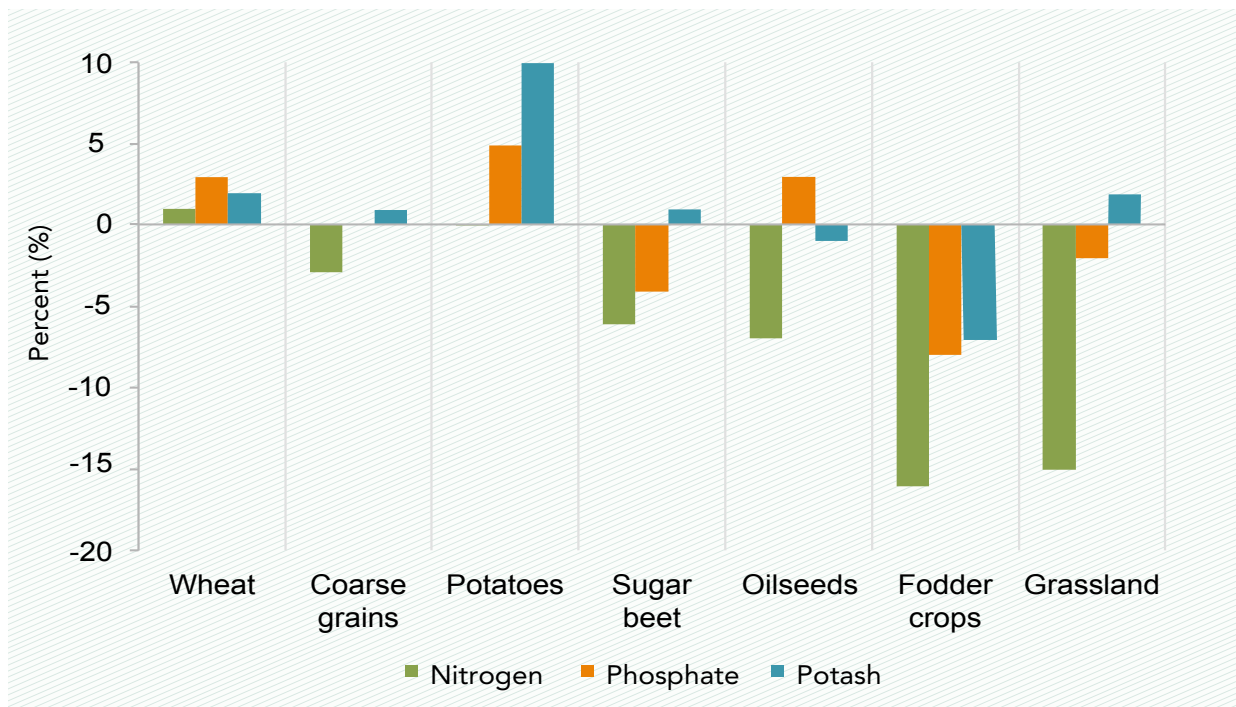
Compared to last year, the decrease of cropping area for potatoes is smaller (-2.1%) and still compensated by a slight

increase in yield (+2%). The sugar beet area is forecast to decrease by 3.1%, with an expected 5% increase in yield.

The cropping area for oilseed rape is expected to decrease by 3.8%, but with a forecast growth in yield of 6%.

Nutrient use (N+P+K) in EU agriculture will decrease by **3%** over the next ten years.

Changes in fertilizer use by crop 2016-2026



As the overall increase in yield in cereals is forecast to slow down over the next 10 years (+3% compared to +7% forecast last year), cereals NPK nutrient consumption is expected to stabilize at -0.3%.

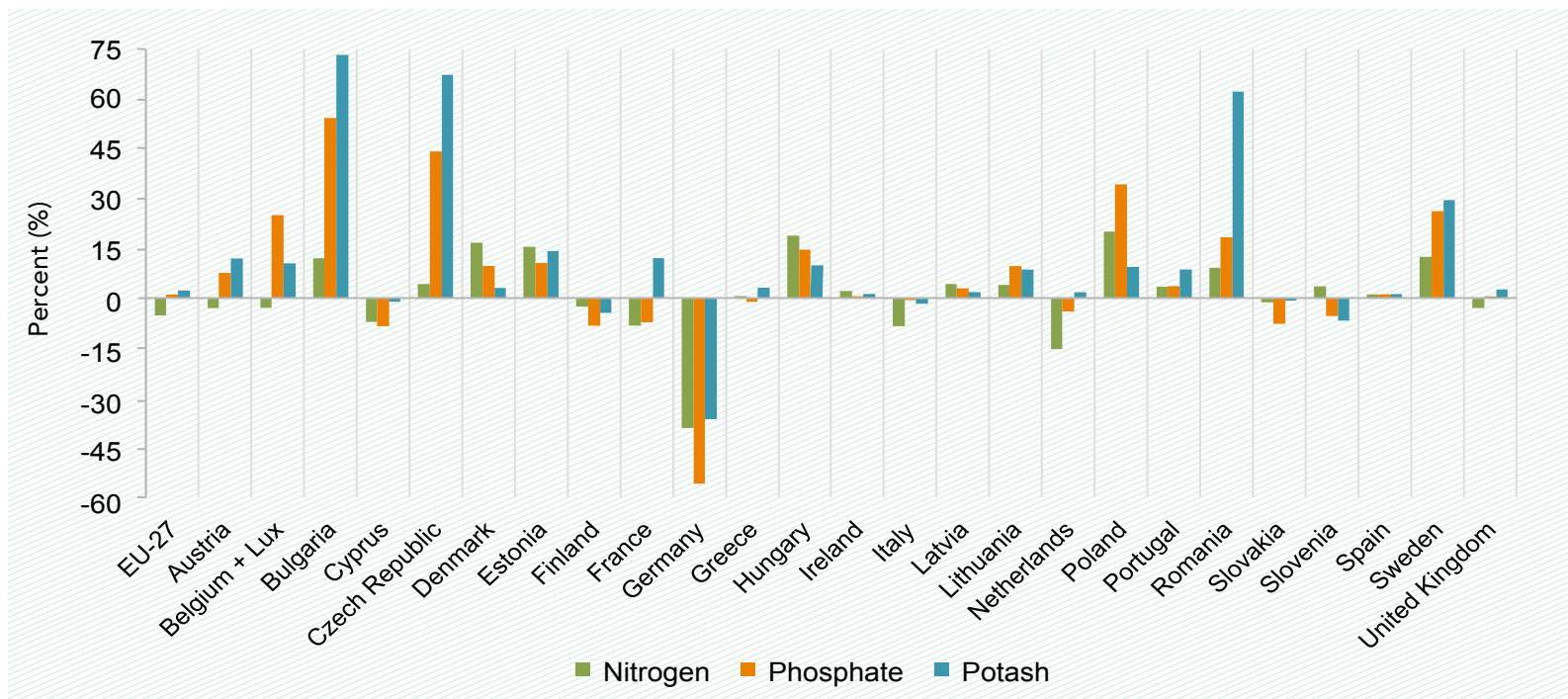
Except for potatoes, where an overall increase of 5% is forecast, NPK nutrient consumption is forecast to decrease in all crops (for

instance -3% for sugar beet and -5% for oilseed rape). In fodder crops, a decrease of 12% is foreseen as the impact of the abolition of milk quotas should induce a trend towards greater productivity. At the same time, the decrease in nutrient consumption for grassland is now foreseen at around 11%.



Most central and eastern European countries (EU-12) show a trend towards higher nutrient consumption. In western Europe, however, Germany is foreseen to have the largest decrease in nutrient consumption mainly because of a tightening of national rules for the use of fertilizers.

Changes in regional fertilizer use 2016-2026



The evolution in nitrogen use by country is similar to last year. Increased consumption is foreseen in most of central and eastern Europe (EU-12), while significant decreases are foreseen in the western European countries, with the highest decreases in France, Germany, Italy and The Netherlands.

For nitrogen, the average growth in consumption in central and eastern European countries remained at 12.4%, as in the last forecast. For western countries, the expected decrease jumped from -4.9% last year to -11.3% in the current forecast, mainly because of expected increased pressure on the use of fertilizers in Germany.

For phosphate and potash, significant growth is reported in almost all countries in central and eastern Europe, as well as in Austria, Belgium/Luxembourg, Denmark, Portugal, and Sweden. However, the decreases foreseen in other countries reduce the forecast increases in phosphate and potash consumption in Europe to 0.7% and 1.8%.

After several years of relatively solid growth, it looks as if the fertilizer market is now slowing down. With lower commodity prices and the Russian embargo, European farmers are feeling the pressure. Consequently, they have become more cautious in their spending, even on essential inputs such as fertilizers.

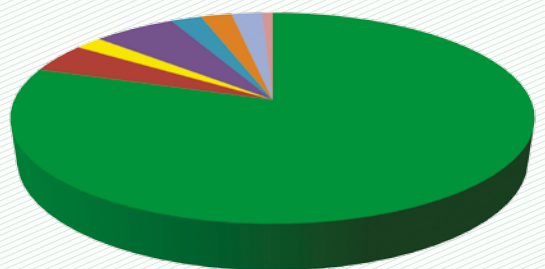
The European Commission's proposed Regulation for fertilizing products on the EU market and its Circular Economy Package will increase choices for farmers and so become a significant driver of fertilizer consumption in the EU over the next ten years.

EU policy framework

It is crucial that European farmers have access to the fullest range of fertilizers. The aim of the European Commission's amended fertilizer Regulation is to make this possible by harmonizing definitions and quality standards for all types of fertilizing products that can be traded across the EU.

For the first time, the amended Regulation covers materials including organic and organo-mineral products, liming materials, soil improvers, growing media, agronomic additives, and plant bio-stimulants, as well as the possibility of a combination of these products. They were not included in the current Fertilizer Regulation 2003/2003. Their access to the EU market depends on mutual recognition between Member States, which often poses difficulties because of diverging national rules on their definition and make-up.

MARKET VALUE OF FERTILIZING PRODUCTS (%)



- Mineral fertilizers
- Organic fertilizers
- Organo-mineral fertilizers
- Growing media
- Soil improvers
- Liming material
- Plant biostimulants
- Agronomic additives

Source: European Commission

PRIORITIES FOR MINERAL FERTILIZERS

For Fertilizers Europe, three key aspects for mineral fertilizers need to be secured during the on-going legislative debate:

1) Defining mineral fertilizers

Mineral fertilizers need to be clearly defined to ensure that they meet farmers' expectations, guarantee a high level of quality and open the door to secondary-based component materials. A way of doing this is to clearly state in Annex I to the new Regulation that a mineral fertilizer should be a fertilizer containing nutrients in a mineral form or processed into a mineral form. The definition should support a sufficient level of nutrients and limit carbon content.

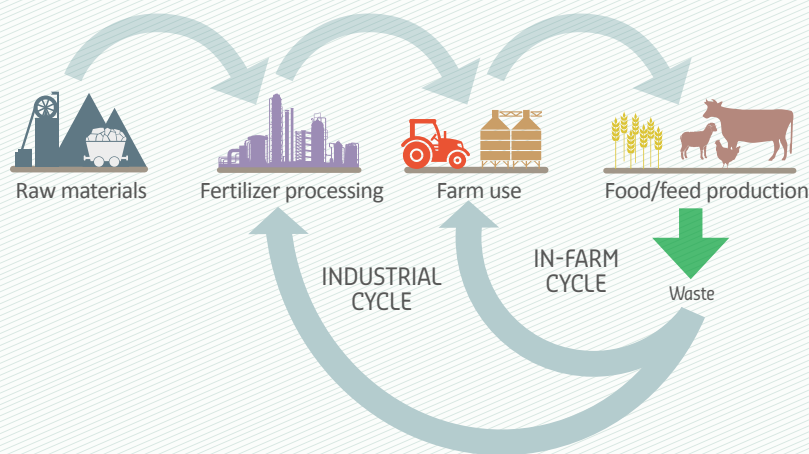
2) Ensuring high quality fertilization in Europe

The Commission proposal, despite covering a new range of fertilizing products, should not unravel the progress made within the 2003 Regulation. It is vital that the new Regulation maintains the quality of mineral fertilizers so that farmers can continue to supplement their crops with highly targeted fertilizing products. It must also secure a future for finished phosphate fertilizers manufactured in Europe and for Controlled Release Fertilizers used in 90% of outdoor nurseries in the EU.

3) Limiting administrative barriers

Manufacturers should have an effective and non-bureaucratic path to receive a CE-mark for their products. This is particularly important for producers that deliver a large number of formulas tailored to specific crop use in order to meet the needs of the farmer and the environment in an optimal way.

FOSTERING NUTRIENT RECYCLING



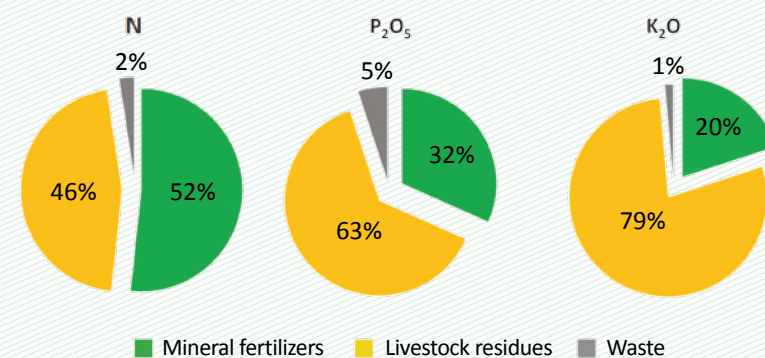
Generating value from secondary raw materials that are currently disposed of as waste is one of the key principles of the European Commission's Circular Economy Package. Research, innovation and investment by companies producing organic-based fertilizers from waste materials are developing rapidly and the Commission believes that there are significant new market opportunities for these new products.

Although only 5% of bio-wastes are recycled today, estimates indicate that the EU could replace, for example, up to 20-30% of the five million tons of phosphates it imports each year with products using phosphorus extracted from sources such as sewage sludge, biodegradable waste, meat and bone meal, or manure. However, creating a new category of recycled fertilizing materials in European legislation will not necessarily create a business case.

The new Regulation sets out common rules on converting bio-waste into the raw materials that can be used to manufacture fertilizers. Producers will have to demonstrate that their products meet these requirements, as well as limits for organic and microbial contaminants and physical impurities, before they can be traded across Europe.

The draft Regulation is currently being discussed within the European Parliament and the Council of Ministers for approval and adoption. When adopted, following a transition period allowing companies and public authorities to prepare for the new rules, it will be directly applicable without needing to be transposed into national law. The new Regulation is currently expected to be possibly adopted by the end of 2017 and come into effect in 2020.

NUTRIENT SOURCES IN EUROPE



Sources: Mineral fertilizers from Fertilizers Europe Forecast; livestock manures calculated from estimation on the basis of animal numbers from Fertilizers Europe Forecast; waste sources from Eurostat.

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 99.4% 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 Cyprus and Latvia, evaluation of the production and crop area is based on the economic model used by the European Commission. Application rates used for nitrogen, phosphorus and potassium nutrients on each crop are based on an agronomic model developed by a small group of forecasters.
- Croatia and Malta are 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: 2013/2014, 2014/2015 and 2015/2016). This mitigates the extent to which exceptional years (positive or negative) may impact the calculated evolution of demand.



Fertilizers are integral to modern agriculture - they provide farmers with the means to meet increasing global food and energy needs. The European fertilizer industry is committed to the development and production of innovative products, application and recycling techniques to maximize the productivity and the

sustainability of European agriculture. Following the fertilizer loop, it combines active product stewardship and close collaboration with the farming community with increasing interaction along the entire food chain to maximize nutrient-use efficiency and reduce the environmental footprint of food production.



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