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EU soil health strategy –

Position paper of the German Agricultural Lime Producer Association

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The German Agricultural Lime Producer Association welcomes the new initiative of the EU Commission to develop a new soil strategy at EU level to protect soil fertility and to fight against soil degradation in Europe. All soil functions should be in a healthy condition.
We would like to point out that **soil acidification is also an important threat to many soils and should be considered in the new EU soil strategy**.

In the long term, soil acidification leads to various soil problems and affects several soil functions. Balanced soil pH is the basis of soil fertility. It is known that neutralization of acids in soils has a direct positive effect on physical, chemical and biological soil properties.

Optimal pH has positive effects in and on the soil:

- better utilization of nutrients (nitrogen, phosphorus, potassium)
- better infiltration and storage of water in the soil
- lower solubility of heavy metals
- lower risk of erosion
- positive impact on soil biology (earthworms, bacteria) and soil biodiversity
- positive effect on humus quality and quantity; improved carbon sequestration
- better soil fertility in general; higher and more stable yields

Problem:

Studies in several European countries have shown that many agricultural and forestry soils do not show optimal properties and have a strong acidity level significantly affecting soil fertility and sustainability of the soil. This proves that speaking for soil protection, as well as for ecological and economic reasons, there is a need to work on the management of optimal pH-value in soils. Therefore, pH management should be included in the new EU soil strategy.

Proposed objectives of German Agricultural Lime Producer Association:

- Recognition of soil acidification as a threat to the soil
- Reduction of further soil acidification
- Proposing sustainable soil management practices to improve the acid/alkaline balance in the soil depending on land use, crop and soil type
- Offer advice and information to farmers on how to deal with soil acidity and how to manage agricultural land for optimal pH-values

The German Agricultural Lime Producer Association would like to express the need to officially **recognize soil acidification as a threat to European soils**. The new soil strategy should increase awareness of the problem of soil acidification and provide incentives to farmers. Sustainable soil management methods, such as liming, already exist and are widely available.

Additional information:

Worldwide, around 50% of all arable soils have inadequate pH values of below 6.0-6.5. In Germany, around 40% of soils used as arable land in agriculture are not in the optimum range and thus inhibit the growth of crops.

Social classification

The vitality of our soils affects not only agriculture and forestry, but the entire ecosystem, which also includes raw materials, energy, water storage and quality, and carbon storage. Topics that are both socio-politically relevant and affect our raw material and food production.

Fig. 1 shows the relationship of soil acidification to societal demands and functions of soil.

Societal need	Soil service	Impact
Biomass	Wood and fibre production	-
	Growth of crops	-
Water	Filtering of contaminants	-
	Water storage	-
Climate	Carbon storage	+/-
Biodiversity	Habitat for plants, insects, microbes, fungi	-
Infrastructure	Platform for infrastructure	Indifferent
	Storage of geological material	Indifferent

Source: EEA Report, 08/2022

Also to be taken into account are the soil structure and the water storage capacity in the soil. The filtering capacity of soils prevent eutrophication and acidification, for example.

Influence of acidification on agricultural soil fertility and forest vitality

Soil acidification occurs when the soil's ability to neutralize acids decreases, resulting in a drop in pH value. On the one hand, this can be caused by naturally "acidic precipitation" but also by natural, chemical and biological conversion processes in the soil. On the other hand, on agriculturally used land, the balance of the nutrient products used must be taken into account; for example, through the use of mineral and organic fertilizers (e.g. ammonium-based or urea-based), which lower the pH value due to physiological conversion processes. At extremely low pH values (<4.5), the availability of elements such as aluminum and manganese increases, sometimes even to toxic levels. As a result, the yield capacity on such land also decreases. Soil acidification can be counteracted by liming.

In agricultural soils, pH and base saturation are the indicators used to assess soil acidity and the need for liming. Overall, pH value is the most important indicator for agricultural soils because it correlates best with the availability of nutrients and crop yields.

Soil acidification in forests is less related to tree growth than to a decline in tree vigor, impaired tree nutrition, increased tree mortality, and reduced plant species diversity in forest undergrowth (De Vries et al., 2014a; Schmitz et al.,2019).
Historically, therefore, protective liming has been applied to forest soils, which – in combination with the decrease in acid inputs – has significantly increased soil pH. Exceedances of critical sulfur levels have decreased, but are still observed in forests (Forsius et al., 2021).
(EEA Report, 08/2022)

Professional lime fertilization is and will therefore remain an important basic tool in the toolbox for crop production – especially with focus on climate change. New scientific studies show that lime application has an almost balanced greenhouse gas balance and supports carbon

storage under suitable conditions. Soil structure and water storage capacity are also improved, leading to better water availability and rootability for plants.

Further information on the sustainable use of lime in agriculture and forestry:
https://naturkalk.de/2023/05/24/duengekalk-nachhaltig-wirtschaften-in-zeiten-des-klimawandels-pressekonferenz-der-duengekalk-hauptgemeinschaft/

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The Düngekalk-Hauptgemeinschaft (DHG) is an independent department within the Bundesverband der Deutschen Kalkindustrie e.V. (German Lime Industry Association).
The Düngekalk-Hauptgemeinschaft is responsible for all questions of lime application in the field of agriculture and forestry including animal feed lime as well as pond management.
It is supported by the member companies that produce agricultural lime and animal feed lime and/or supply them to agriculture and forestry.

Sources:

Soil monitoring in Europe – Indicators and thresholds for soil health assessments, EEA Report (European Environment Agency), 08/2022

De Vries, W. et al. 2014a, Impacts of acid deposition, ozone exposure and weather conditions on forest ecosystems in Europe: an overview, Plant and Soil 380, 99. 1-45.

Forsius, M. M. et al. 2021, Assessing critical load exceedances and ecosystem impacts of anthropogenic nitrogen and sulphur deposition at unmanaged forested catchments in Europe, Science of the Total Environment 753, 141791.

Schmitz, A. et al. 2019, Responses of forest ecosystems in Europe to decreasing nitrogen deposition, Environmental Pollution 244, pp. 980-994.