

Precision liming to improve crop nutrition

Problem

Liming is vital for optimal crop growth, as it balances soil pH and enhances both soil structure and nutrient availability. However, applying the same amount across a field can lead to over- or under-liming due to variability in soil conditions. Therefore, it is necessary to optimize lime application based on the specific needs of each area.

Solution

Precision liming can help pinpoint the specific areas of the field that need lime and determine the appropriate amounts to apply.

Outcome

The purpose of targeted lime application is to maximize crop nutrition and performance, resource efficiency, and cost-effectiveness by applying lime at variable rates based on plans created from soil sample analysis.

Practical

Precision liming is a data-driven practice within precision agriculture that uses GPS, sensors, and/ or satellite imaging to efficiently correct soil acidity by applying lime only where needed.

Precision liming can be done in different ways, but in a Danish context, the steps are typically as follows:

1. Soil samples, where GPS coordinates are noted, are taken in a grid of approximately 0.5–1 ha, analyzed, and used to create a digital soil map of the field. In connection with this, sensor measurements and satellite images can also be collected to help ensure proper sampling and to improve the accuracy of the soil maps.
2. Based on the soil map, the different pH values within the field can be evaluated, and the lime requirement can be calculated according to the target pH using programs such as CropManager.
3. An application map can then be generated and uploaded to machinery that supports GPS-based maps.
4. A GPS-controlled lime spreader, using variable rate technology (VRT), applies lime as needed, automatically adjusting the amount during operation.
5. In Denmark, new soil samples are typically taken every 3–5 years.

Precision liming can result in a more uniform soil pH, reducing acidity, improving nutrient availability, and minimizing the use of lime. Most nutrients are more available with appropriate lime use, benefiting both the farm economy and the environment.

Applicability box

Geographical coverage

Europe

Application period

All year

Required time

N/A

Period of impact

Continuous

Equipment

GPS soil samples

Application map software

GPS-controlled spreader with VRT

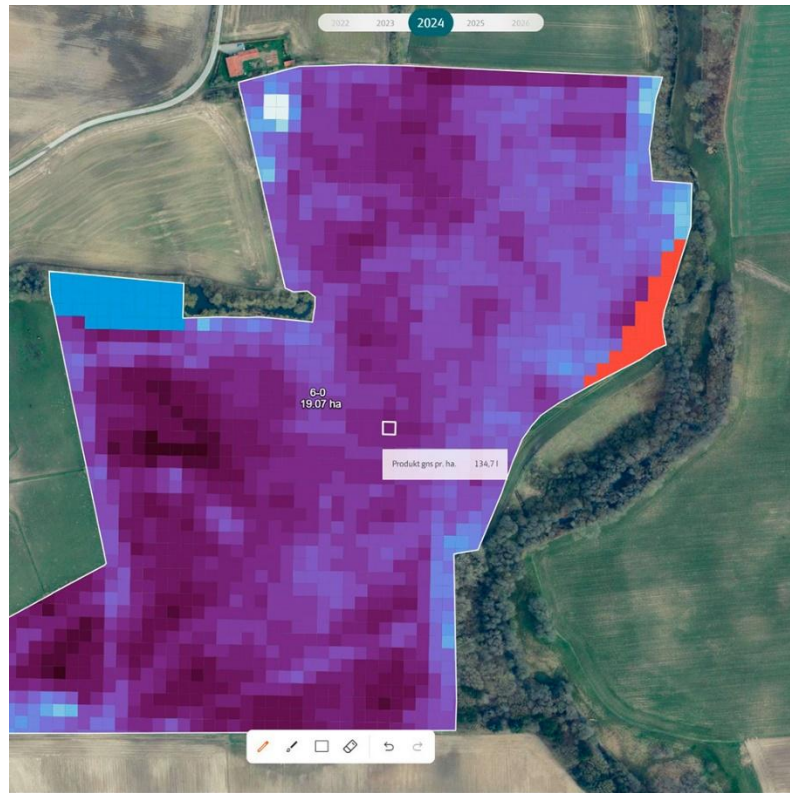


Figure 1. A picture of a graduated allocation layer in CropManager, which gives an overview of the liming needs in the different areas of the field.

The software CropManager can be used to create and apply soil maps for precision liming, along with offering other features for precision agriculture.

Further information

- CropManager webpage: [Cropmanager – til professionelt præcisionsjordbrug](#) – available in Danish, English and German
- Manual for liming (Danish):
https://www.landbrugsinfo.dk/basis/4/4/2/godskning_vejledning_anvendelse_af_kalk

About this Factsheet

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NUTRI-CHECK NET is a Horizon Europe multi-actor project establishing a self-sustaining, multi-actor, Thematic Network called “NUTRI-CHECK NET” that builds farm-level adoption of best field-specific nutrient management practices across Europe. In nine countries, farmers’ Crop Nutrition Clubs will identify and share the nature of their uncertainties about crop nutrition, their challenges and barriers to change. Decision systems and nutrition tools (including commercial products, services, and recent research outputs) will be assembled by national experts across Europe, including leading farmers, into a common online NUTRI-CHECK NET platform.

Check the project website: <https://nutri-checknet.eu>



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