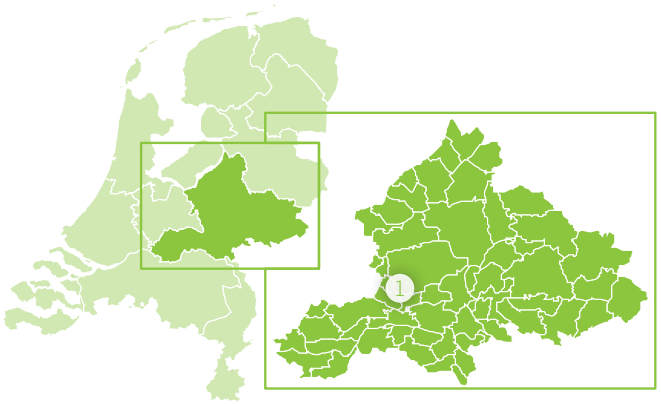
Challenge



1. Wageningen, Gelderland

DESCRIPTION

- Atlantic climate
- Alluvial soils, sandy with relatively low organic matter content
- Shallow groundwater tables

CHARACTERISTICS

Half of the agricultural land of the country is intensively managed grassland to sustain a very intensive livestock farming. Most of these grasslands are monocultures of ryegrass.

CHALLENGES

In the future, conventional phosphate rock-based fertilisers will not be available anymore. Strategies are needed to maintain both forage production and soil fertility.

The intensive agriculture on sandy soils make agricultural systems prone to losses of nitrogen through emissions of nitrous oxide.

SELECTED PRACTICES

- Increased diversity above- and belowground: working with grasses and clover, as well as earthworms from all ecological categories
- Novel fertilisers: struvite and products from biogas production

Participating partners

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Circular solutions for carbon and nutrient management

Case study

Gelderland, the Netherlands



Case study
Gelderland, the Netherlands

What ? Close further N and P cycle in intensively managed grasslands

How ? Make use of novel fertilisers and above- and belowground biodiversity

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Mitigate greenhouse gas emissions

With novel fertilisers and plant diversity

Agriculture is one of the main emitters of nitrous oxide (N_2O), a greenhouse gas partly responsible of climate change.

We aim to find combinations of plant and fertilisers that mitigate N_2O emissions. We will use fertilisers from the biogas industry as well as a diversity of grassland species, including grasses and legumes commonly used in Dutch pastures.



Produce with less phosphorus

Thanks to grass diversity

Conventional phosphorus (P) fertilisers come from phosphate rock. This resource will be depleted in the coming centuries. P will likely become a limiting nutrient in the Dutch agricultural system.

We want to understand and benefit from the different strategies that grasses use to access less available P in the soil. These include: different root morphology, association with beneficial microorganisms such as mycorrhiza, production of enzymes, etc.



Find alternative phosphorus sources

Through earthworm activity and novel fertiliser use

Since phosphate rocks will be depleted in the coming centuries, we need to find new sources of P. Struvite is a slow release fertiliser produced from a wide variety of residual products.

The slow release property of struvite makes it a challenge to satisfy plant needs in a timely fashion.

However, earthworms might be able to increase the solubility of struvite for plant uptake through their activity as they locally modify soil chemical conditions.

