



NBS CASE

Lucerne and grass-clover pellets for fertilising winter wheat



Trials at SPNA Ebelsheerd will test the use of lucerne and grass-clover pellets (a form of bio-fertiliser) as an innovative alternative to the conventional use of mineral fertilisers and manure applications. The application will be tested at conventional and organic winter wheat. It is investigated if growing grass-clover mixtures in rotation with organic winter wheat could work as an alternative nitrogen source and reduce or eliminate the nutrient deficiency in the region.

At the farm from SPNA location Ebelsheerd the trans4num project will be testing the plant based nutrition pellets, pellets from grassclover and AlfaAlfa. This harvested product is dried and pressed into pellets. The pellets will be spread in winter wheat. Samples will be taken of the crop and soil.

The crop will be analysed on protein content, weight, and an overview of the general condition of the crop when growing. Soil samples will be taken before and after application. The trial will take place on the conventional fields of winter wheat and also at the organic fields at the location of SPNA Nieuw Beerta (Ebelsheerd).

The trial will be continued at least 3 years and will be on different fields in the winter wheat. Also an object where no fertilizer will be brought and a standard object where the fertilizer will be applied as standard agricultural practice (conventional and organic) will be done to compare with the trials off the project.



Challenges addressed by the NBS

Conventional wheat production in the Netherlands is typically very intensive, with large inputs of mineral nitrogen fertilisers which has adverse environmental effects. The pellets can be an extra or an alternative for traditional fertilisers.

The heavy clay soils at SPNA Ebelsheerd are also ideal for growing organic winter wheat. Organic winter wheat is mainly fertilized with animal manure; however, there is a shortage of manure in the region and farmers are looking for alternatives.



trans4num's main research questions and ambitions

To make the objectives off the project viable for agricultural practice it will be necessary to build up measurements off the objects. Well known questions and ambitions off the farmers will be:

- How does the pellets compares to my standard fertilizer?
- Can pellets decrease my dependency of standard fertilizer?
- Which advantages does the pellets have in my fields?
- Are the pellets giving any effects on the next crop like covercrops or the following crop?
- Is the use of plant based fertilizer causing any weed problems?
- Is soil live increasing when using grassclover fertilizer?
- How does the pellets affect the yield and quality of the wheat?

Which biophysical, agronomic, and farm management implications does the NBS have at field and farm level?

- Reduced use of chemical fertilizer in the conventional wheat.
- Reduced use of manure application in the conventional and organic wheat.
- Improved water quality at area level due to less leaching of fertilizers.
- Increase Soil Health: the biodiversity of agricultural ecosystem and soil health will be improved in NBS trials.
- Partially replacing expensive chemical fertilizers by possibly growing your own pellets could have long-term financial benefits for the cultivation of low-margin grains.

Which indicators/criteria are used to assess the success of the NBS in addressing the challenge?

The success of the NBS in addressing its challenges is assessed using the following indicators/criteria:

- The **nutritional value** of the pellets compared to mineral fertilizer. Comparison of the mineral fertilisers and bio-fertilisers will include investigation of the impact on both short and longer-term soil nutrient status and crop yield and quality.
- **Soil samples** are compared throughout the season to determine release and rate of use.
- The **yield and quality** of the wheat will be determined by harvesting the plots and analysing the grain.
- During the season the crop will be observed and reviewed if there are any differences.

These indicators provide a comprehensive assessment of the NBS's success in addressing its challenges.

What methods/tools are used for the NBS assessment?

- **Soil samples** with the chemical and textural aspects before and after the growth season off the objects.
- **Yield measurements** at the end of the season.
- After harvest the wheat will be determined on NBS case Netherlands (moister, protein amount, zeleny, HL and starch amount)
- **Yield measurements** at the start of the season behind the first season to measure effects of the plant based fertilizer still in the soil.
- **Samples** out of pellets to determine the mineral content.
- **Crop overview**, general condition score (scale 1-10, 1= bad condition, 10= good condition) (3x during growing season after application), disease presence and the general maturation-process of leaf-decoloring, starvation, 'legering' around the moment of harvest.
- The different treatments will be compared.

Contact NBS team

**STICHTING
PROEFBOERDERIJEN
NOORDELIJKE AKKERBOUW**
westerhof@spna.nl
Henk Westerhof

WAGENINGEN UNIVERSITY
coen.ritsema@wur.nl
Prof. Dr. Coen Ritsema



NBS site and scale

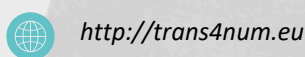
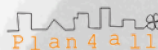
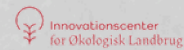
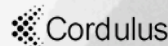
NETHERLANDS

1. Kollumerwaard
2. Ebelsheerd



trans4num is a four-year project funded under the Zero Pollution call as an EU-China international cooperation action on nature-based solutions (NBS) for nutrient management in agriculture.

trans4num ambition is to broadly enhance the NBS implementation in Europe with an integrative and tested multi-level approach, in dialogue with academic partners, practice partners and societal stakeholders.



Funded by
the European Union