

Master thesis proposal - Barley calibration for Yara N-Sensor®

About Yara

Yara is a fertilizer company that delivers products and solutions to farmers across the world. As a compliment to the fertilizers, Yara also develop and provide tools and services that enables farmers to optimize their use of fertilizer.

Yara N-Sensor

Yara N-Sensor is a tractor-mounted spectral sensor for variable rate application of nitrogen fertilizer. Based on specific wavelengths, N-Sensor measures the greenness and density of the crop canopy. By combining spectral reflectance information with crop specific details, the system calculates the N-uptake and the corresponding nitrogen demand of the crop. The correct fertilizer rate is subsequently applied by a fertilizer spreader.

Yara N-Sensor operates with several calibration options. In the Nordic region, users can utilize a locally developed calibration for malting barley. The calibration is developed to target the preferred protein content of the grain. This is a key parameter since it determines the grain price of malting barley and is also an important qualifier for feed barley.

The current malting barley calibration has been in use for about a decade. However, new data sources now exist and there is a need to update the existing calibration with the new data sources.

Description of thesis

The suggested assignment is to develop a new calibration for barley using data that has been collected during previous years. Hence, the work does not include field work, and is primarily a statistical task. The calibration is intended to be used in practice by farmers in the Nordics.

Similar as the previous calibration, the new calibration is also intended to be targeting the protein content of the harvested grain. Furthermore, several parameters should to be investigated for their influence on the calibration model. This include sowing date, variety and geographical region.

The available data collection consists of measurements on plot basis, including weekly N-Sensor measurements at growth stages 32-55, yield and quality parameters as well as metadata such as variety, field site, soil type, pre-crop etc. In total, the data includes 32 field sites ranging over five years.

Preferred student background

- Agricultural education
- Interest in precision fertilization
- Experience or interest in statistics and modelling
- Experience with agricultural field research is advantageous

Supervision and working with Yara

By engaging in the described project, you would be working closely with highly skilled agronomists and researchers. For students about to start their job career, this is an excellent opportunity to establish a network and to learn from experts in research, agronomy and precision agriculture. You will be working with people in our R&D department Hanninghof in Dülmen, Germany, as well with agronomists in the Nordics, primarily in Sweden.

For further questions or interest in the project, please contact Jörg Jasper (jorg.jasper@yara.com) and/or Tove Sundgren (tove.sundgren@yara.com).