



Think Big (Data) in agriculture

Computer technology has changed the way businesses operate, and it has an increasingly profound impact on farming. In a project with a budget of DKK 100 million, researchers and companies innovate to improve competitiveness in future Danish agricultural crop production using big data.

Danish environmental regulations for the supply of nutrients to plants mean that the emission of nutrients from agriculture to the aquatic environment has fallen. However, this has come at a cost. The suboptimal fertilisation in relation to crop need has led to stagnating yields and quality in the past 20 years. Future Cropping is a new innovative project that intends to remedy this problem by getting the best of both worlds – protecting the environment while maintaining high-yielding and efficient crop production.

This is to be achieved by integrating a range of data, decision support systems and technological solutions that enable farmers to tailor their management according to the local and actual conditions in the field.

"Until recently, the desired impact from state-of-the-art data analytics capabilities has not been achieved. However, current technological advances in areas like data management and communication technology in agriculture enable us to collect, combine and analyse different layers of information that can contribute to even more efficient production than we have today," says Professor Thomas S. Toftegaard, Head of the Department of Engineering, Aarhus University.

Differentiated treatment of fields

Not all fields are identical and we would do the environment, agriculture and the economy a favour if they were not treated equally.

The comprehensive innovation project will provide research-based knowledge developed and tested in practice in cooperation with the industry and give agriculture the opportunity to treat the fields on the basis of their individual characteristics and conditions.

The project therefore aims to develop and commercialise more efficient and sustainable solutions for crop production, which will increase the yield per hectare by about two per cent per year.

"In the near future, big data will enable farmers to make improved and differentiated decisions in the production and operation chain," says Dr Toftegaard.

The increased efficiency coupled with the sustainability principle will benefit Denmark's environment, agriculture, employment and export market.

Computer intelligence in plant production

What is new and special about the project is that it will develop a data platform to enable the collection and integration of large amounts of information across all the main phases of the crop production annual cycle, ranging from soil preparation and growth monitoring to harvest activities.

The amount of data also forms the basis for developing intelligent, efficient and sustain-

able technologies, solutions and cultivation techniques for site-specific and high-yielding crop production with a low environmental impact.

"Today, almost any modern agricultural machine can be built or modified to be operated remotely and to generate and wirelessly transmit data. These technological advances will make it possible to utilise data to a degree we wouldn't have dreamed about only a few years ago," says Dr Toftegaard.

The researchers and the industry involved expect that big data can significantly increase the efficiency of all the major operations in crop production.

In addition to developing an advanced data platform, they are going to design, test and demonstrate technologies for intelligent tillage and crop establishment, intelligent and sustainable fertilisation, intelligent harvesting, and differentiated nitrogen regulation and drainage.