

## FREE INTERNET PROGRAMME FOR FARMERS

*CropSAT enables the farmer to monitor the biomass on his field every time Sentinel-2 passes by. Furthermore, it can allow variable rate application maps for plant protection.*

### The challenge

The challenge is to apply the right amount of fertiliser and pesticides based on crop density and vigour, which determines the crops ability to utilise the fertiliser and pesticides. This will secure a higher yield for the farmer and less nitrogen leaching to the environment. It will also help bring down pesticide consumption, as we only have to apply pesticides to the areas where it is needed.

### The space based solution

CropSAT is a user-friendly internet programme for farmers. It is free of charge and has no log-in requirements.

In CropSAT the farmer can see the changes in biomass on his fields every time the Sentinel-2 satellite passes Denmark.

He can use it for monitoring his fields and to learn from his previous crop management, and he can create variable rate application maps for fertiliser and plant protection.

The biomass map is based on data from Sentinel-2 where the NDVI vegetation index is calculated.

All the Danish fields (600,000 field polygons 2.6 mill hectares) are shown in CropSAT. The farmer only needs to type in his farm-ID and all his fields will appear. He can then select one field and request data from a particular day with no clouds where Sentinel-2 was passing by.

The farmer will see his fields in yellow and green colours. Yellow means lower biomass and very green means high biomass – see picture 1.

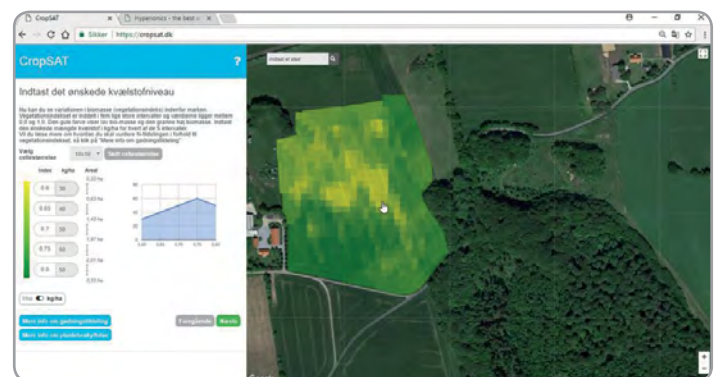
Afterwards, the farmer can type in kilo nitrogen per hectare in the five levels – see left side in picture 1. The next step in the programme will show the variable rate application map for the field according to the fertiliser input.

If the farmer is satisfied with the application map he can export the application file (shape file), download it to a USB stick and transfer it to the tractor terminal. The fertiliser will be spread according to the application map. The same procedure is used for pesticides.

### Benefits to Citizens

CropSAT provides benefits for better crop quality and for the environment.

In Europe, we place a high focus on nitrogen loss from fields to the aquatic environment. CropSAT enables a significantly higher degree of precision minimising local leaching. More precise fertiliser and pesticide application will also improve food quality and safety to the benefit of the consumers. CropSAT contributes to better quality crops, especially a higher protein content. In Denmark, we strive to produce as much protein as possible rather than importing soya from America.



Field in CropSAT. The yellow colour shows areas with low biomass and the dark green areas with the highest biomass.  
Credit: Contains modified Copernicus Sentinel data

Thematic Area



AGRICULTURE,  
FOOD, FORESTRY  
AND FISHERIES

Region of Application



DENMARK,  
NORWAY,  
SWEDEN

Sentinel mission used



S2

Copernicus Service used



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Usage Maturity Level



5

In addition to this, CropSAT helps bring down pesticide consumption, as pesticides and growth regulation will only be applied to the areas where it is needed.

## Outlook to the future

The use of CropSAT is growing rapidly. In 2017 the programme had 7,300 unique users in Denmark and 4,100 in Sweden. The number of users is expected to increase rapidly since CropSAT has now been translated into English. A new feature in 2018 is an automatic nitrogen model for winter wheat and winter rape. In the long term, the use of satellites in crop production will increase and only the "sky" is the limit as to their future use.



Tractor spreading fertiliser according to a variable rate application map made in CropSAT.

“I started using CropSAT in 2017. My crops are now more uniform. It is good for the environment and the protein percentage in the grain seems to rise.”

*Lars Bonde, farmer*

## Acknowledgements

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## ABOUT COPERNICUS4REGIONS

This Copernicus User Story is extracted from the publication “**The Ever Growing use of Copernicus across Europe's Regions: a selection of 99 user stories by local and regional authorities**”, 2018, Edited by NEREUS, the European Space Agency and the European Commission.

The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains. The views expressed in the Copernicus User Stories are those of the Authors and can in no way be taken to reflect the official opinion of the European Space Agency or of the European Commission.

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