

SENTINELS VERIFY AGRICULTURAL SUBSIDIES

Estonia uses Copernicus Sentinel-1 and -2 time series in a country wide system to verify the mowing requirement of the agricultural subsidies under Common Agricultural Policy.

The challenge

The Estonian Agricultural Registers and Information Board (ARIB), like other European paying agencies (PAs), is responsible for the honest sharing of the subsidies to farmers and the verification of the subsidy claims.

The European Common Agricultural Policy (CAP) sets the rules for the farmers to keep the land in good condition in order to qualify for the subsidy payments. Although the fraction of non-compliances is tiny, the total economic impact on an EU level is huge given the €50 billion annual budget of CAP.

In the verification of the subsidy checks PAs have so far mainly relied on inspectors' field visits. Given the rising labour costs in Europe it gets more and more expensive every year.

The space based solution

ARIB, in cooperation with Tartu Observatory and CGI Estonia, has built an automated satellite based infosystem SATIKAS.

SATIKAS uses Sentinel-1 (S1) radar and Sentinel-2 (S2) optical satellite imagery to check whether the farmers follow the mowing requirement, which is one of the most common under CAP and is often violated on lands which are not in intens agricultural use. The system operates from May to October every year to cover the entire growing season and detects all mowing on agricultural grasslands in Estonia.

Sentinel satellite images are pre-processed and dense time series are formed. In each season more than 100 S1 radar images and more than 50 S2 optical images are used. For each parcel its characteristic S1 and S2 parameters' signatures are built, where

the mowing events are detected using state of the art deep learning technology.

Benefits to Citizens

The results are published in virtual real time throughout the season in an open web map for the general public and in detailed reports for the ARIB specialists. It helps to reduce the need for expensive field visits, saves the time of inspectors – sending them directly to the right fields without wasting time on areas which are OK anyway. It also has a significant prophylactic effect – publishing the results on the web map works as a reminder for the farmers who have not yet fulfilled the mowing requirements.

By detecting more episodes of non-compliance, SATIKAS helps to reduce false payments – the economic impact in Estonia alone is estimated at close to € 500,000 every year. The total economic



Mowing detection results are presented on a public web map of Lääne-Viru County. Green represents mowed area, red not mowed area and orange late mowed area.

Thematic Area



AGRICULTURE,
FOOD, FORESTRY
AND FISHERIES

Region of Application



ESTONIA

Sentinel mission used



S2

Copernicus Service used



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Usage Maturity Level

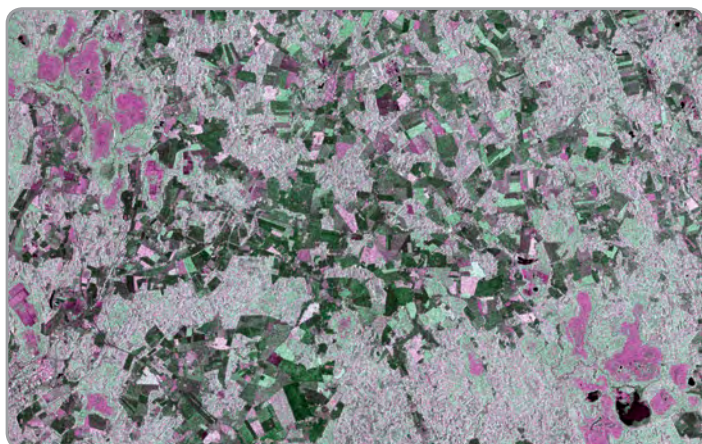


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impact of similar systems at EU level is at least two orders of magnitude greater.

As the system is new the accuracy is still improving every year. As of 2018 it is already used as the risk analysis tool with gradual movement to the ultimate goal of totally replacing field visits and making the payment decisions based on SATIKAS satellite based results.

Ultimately, SATIKAS helps to reduce the spending of the European Union and to direct the freed resources for future developments through technological progress.



Lääne-Viru County on a false colour composite. SATIKAS uses dense time series of Sentinel-1 radar images as its main data source. Red represents vv-polarization, green vh-polarization, blue vv+vh-polarization.

“We are gradually increasing satellite based monitoring and reducing field visits. Building the satellite based mowing detection system is the first step in this development.”

Ahti Bleive, Estonian Agricultural Registers and Information Board

Outlook to the future

Mowing checks using Sentinel-1 and -2 data is the first step for ARIB in its future path towards automated satellite based monitoring and reducing the need for inspectors' field visits. It is planned to further extend the functionality of SATIKAS with grazing detection, harvesting detection, crop classification and flooded fields mapping. The accuracy of SATIKAS will be developed to the level such that it is possible to make payment decisions without field visits. Next generation Sentinels and other high resolution sensors will be used to improve the accuracy and precision of the subsidy checks and to support the farmers with satellite derived information in their work.

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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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