

SENTINELS FOR FLOOD AND YIELD LOSS MAPPING

Many fields ready to harvest are flooded during severe rainfall. Sentinel satellite data was used to replace field visits and to accelerate payment of compensation.

The challenge

In August 2017, Latvia experienced extremely heavy rainfall. More than twice the monthly norm poured in two days at the very beginning of the harvesting season.

Fields were flooded and it was impossible to get agricultural machinery on them. The Government declared a state of emergency in the agriculture sector. It was clear that administrative institutions would have to check flooded fields so that farmers could receive compensations for the yield loss but many roads were impossible to drive and raining continued for more than a month.

The space based solution

For the largest flooded fields, Copernicus Sentinels became very useful. Both Sentinel-1 radar and Sentinel-2 optical satellite data were used to map the flooded areas.

Sentinel-1 radar is capable of "seeing" through clouds which allowed for the use of remote sensing data for flood mapping even though the sky was still overcast and it was raining often. Furthermore, since radar backscatter on water is completely different from vegetated areas, it makes flood mapping with radar data quite unmistakable.

High revisit frequency allowed for the mapping of flooded areas every week or even more often, if necessary. The possibility of obtaining data every few days allowed fields that became flooded after a while to be caught, when water flowed down the terrain.

At the end of September Sentinel-2 was able to get some optical images. Many fields were still under water. Flood mask was also generated from optical data and merged with data from previous dates.

Flood maps from Sentinel satellite data were integrated into Land Parcel Information System and used together with farmer applications for compensation.

Benefits to Citizens

According to Sentinel data every parcel that was under water was considered to have lost yield and excluded from these fields that must be visited. Use of Sentinels reduced the amount of on-the-spot visits. Inspectors from the Rural Support Service could spend their time visiting only those fields whose yield loss was not clear from satellite data (small parcels and fields where crops emerge from water or the soil was too wet to harvest).

Use of Sentinels and drones shortened time for field visits by a third. Faster field visits saved plenty of administration costs (fewer working hours, less driving to visits). 3100 farmers with 82000 ha of damaged area received their compensation for yield loss in less than two-months after the first day of rainfall. That was an unprecedented speed for emergency administration - from field visits to payments.



Severe rain caused flood at the beginning of harvesting season in Eastern Latvia. Image: Rural Support Service

Thematic Area



AGRICULTURE,
FOOD, FORESTRY
AND FISHERIES

Region of Application



LATVIA -
LATGALE

Sentinel mission used



S1
S2

Copernicus Service used



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Usage Maturity Level



5

Farmers received compensation payments faster and could start preparing for the next season.

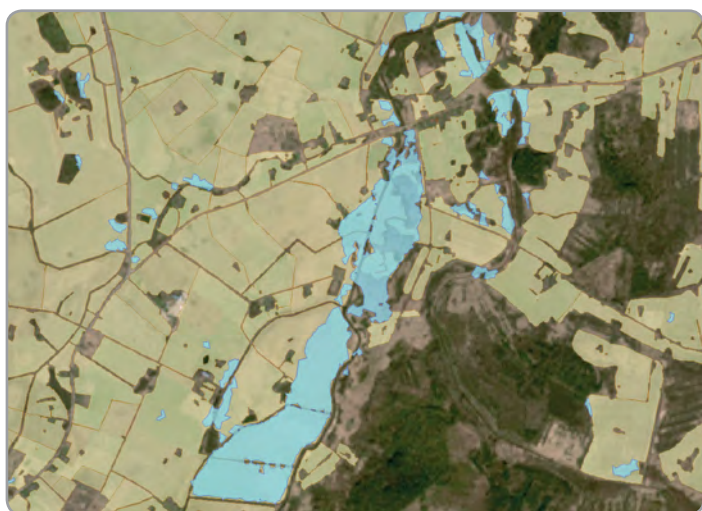
Outlook to the future

Every emergency or, in this case, loss of yield, leaves people with hope that it will not happen again or, at least, it will not happen soon. Still, emergencies happen and it is essential for government institutions to respond as soon as possible, to estimate damage rapidly, and to administer support payments in a short space of time.

The Sentinel constellation proved its worth in helping to administer compensation for flood damage. This was also the first example in Latvia of the joint use of both Sentinel-1 and 2.

If flooding strikes again, we will be experienced at mapping flooded parcels even faster. Also, we could extend flooded areas over digital terrain model, if available.

There are always things to improve with every solution. But it would not be possible without the Copernicus Sentinel satellites' data and its short revisit time.



Flooded area mapped (blue) using Sentinel-1&2. Overlap with reference parcels (yellow) show the lost yield in Eastern Latvia.

Credit: Contains modified Copernicus Sentinel data 2017

“Using Sentinels to check damaged fields lets us finish compensation payments in less than two months from the first drop of rain.”

*Indulis Abolins,
Deputy Director of Rural Support Service*

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ABOUT COPERNICUS4REGIONS

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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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