



# Introduction of “AMS 2.0”: New Opportunities for Administering and Monitoring the Strategic Plan Measures

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# Why We Started the Project

## **EU Regulation (EU) 2021/2116** requires modern CAP monitoring

- Requires extensive use of AMS, with a gradual increase of monitored interventions (Art. 75(b))

## **Need to reduce manual inspections & ensure fair subsidies**

- Satellite-based checks lower administrative costs and prevent unfair claims

## **Build resilience to climate change impacts**

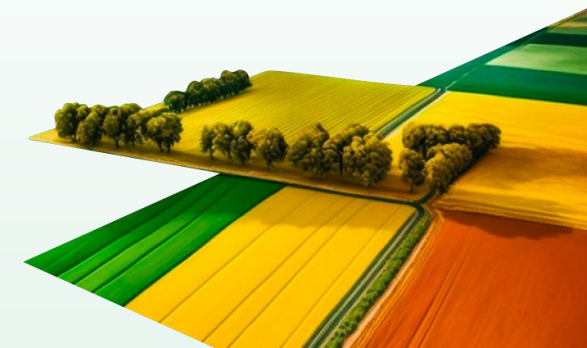
- Monitoring drought, flooding, and soil degradation supports adaptation strategies

## **Leverage Sentinel satellite expertise for reliable monitoring**

- Years of experience with Copernicus data allow advanced markers development

## **Provide farmers with new data layers for better decision-making**

- Tools like crop quality, soil moisture, and yield zones guide smarter farm practices



# Modernisation of AMS by Developing New Markers

**Start Date:** 12 January 2024

**End Date:** 31 December 2025

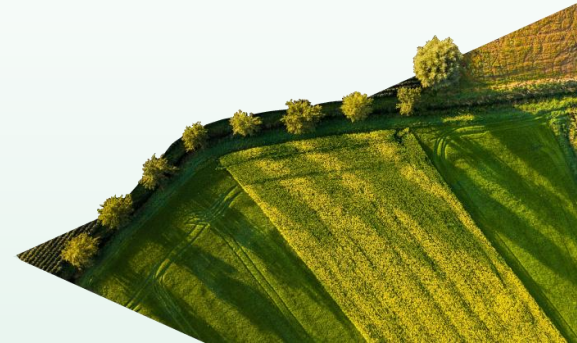
**Budget:** €2,241,024.61 (Recovery and Resilience Facility (RRF))

## Goal:

- Improve data scope, quality, and update frequency
- Expand services for farmers, institutions, and policymakers
- Increase transparency and access to agricultural monitoring data

## Massive Return on Investment

- Total creation & maintenance (10y): **~3.5M EUR**
- Total 10-year savings: **~967M EUR**
- Net benefit: **~963M EUR** ( $\approx 27x$  return)



# AMSV1 and AMSv2

## AMS v1 - 7 markers

1. Arable land
2. Grasslands
3. Permanent crops
4. Non eligible objects
5. Grasland mowing
6. Black follow land
7. 17 crops



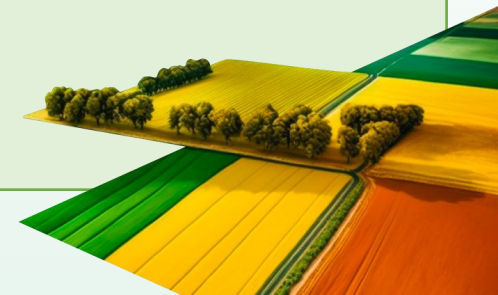
## AMS v2 - 12 markers

### Group 1 – AMS use

1. Land Cover Automatic Classification
2. Automatic Field Boundary Delineation
3. Early Crop Classification
4. Organic Farming Verification
5. Stubble Detection
6. Crop Heterogeneity Detection

### Group 2 – All users use

1. Crop Quality Assessment
2. Yield Zone Identification
3. Storm Damage
4. Soil Erosion
5. Soil Moisture
6. Soil Organic Carbon



# Insights: IACS PLUS & AMS v2 Alignment

## IACS PLUS – Next-Gen EU Land Monitoring

### Future Concept

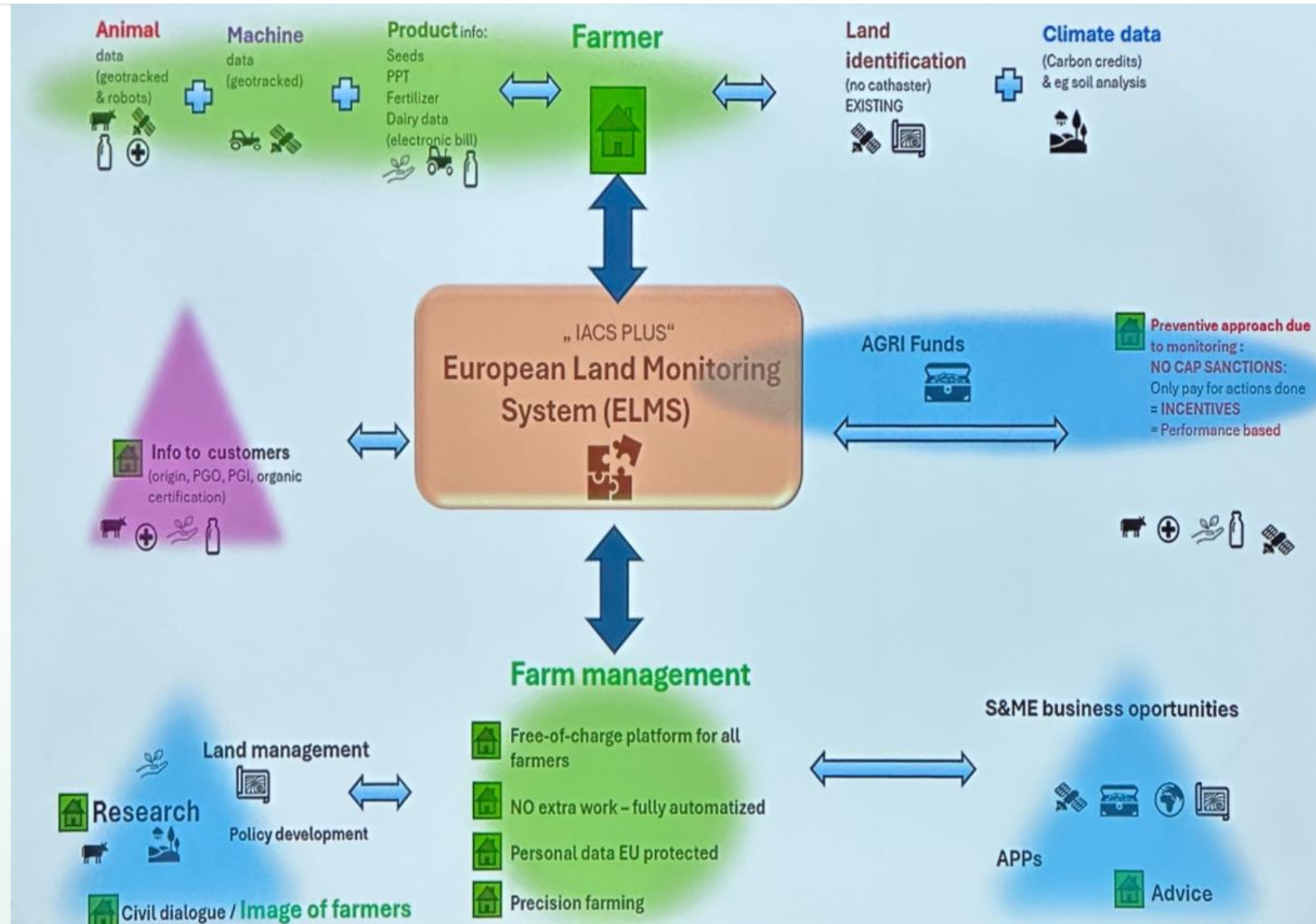
- Integrated, cross-border data
- Smarter compliance checks

### AMS v2 Link

- Shared architecture & standards
- Supports remote sensing & change detection

### Strategic Benefits

- Easy migration to IACS PLUS
- Future-proof for CAP & funding rules
- Boosts transparency & efficiency



# Early Crop Classification

## Methodology & Purpose

- Early-season classification (autumn/winter) with Sentinel data to infer land use (winter cereals, grass, fallow)
- Provides preliminary crop map before official declarations

## Practical Use

- Early detection of discrepancies
- Supports CAP campaign planning and crop-support forecasts

## Result

- Preliminary parcel-level seasonal land-use layer

## Land Use Types Determined from the Previous Autumn

During the previous autumn period, the following land use forms are identified:

-  **1 Unplowed Meadow**
-  **2 Winter Cereals Crop**
-  **3 Winter Rapeseed Crop**
-  **4 Plowed Land without Crop (Fallow)**
-  **5 Woody Plants & Permanent Crops**
-  **6 Spring Crops**  
(if ARZ can be confirmed in spring)

# Organic Farming Verification

## Methodology & Purpose

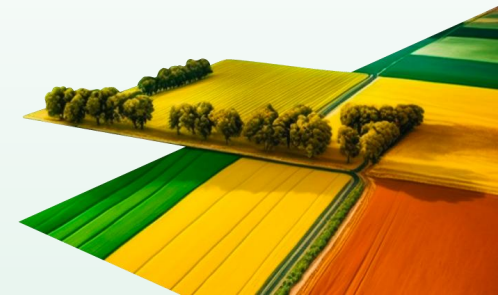
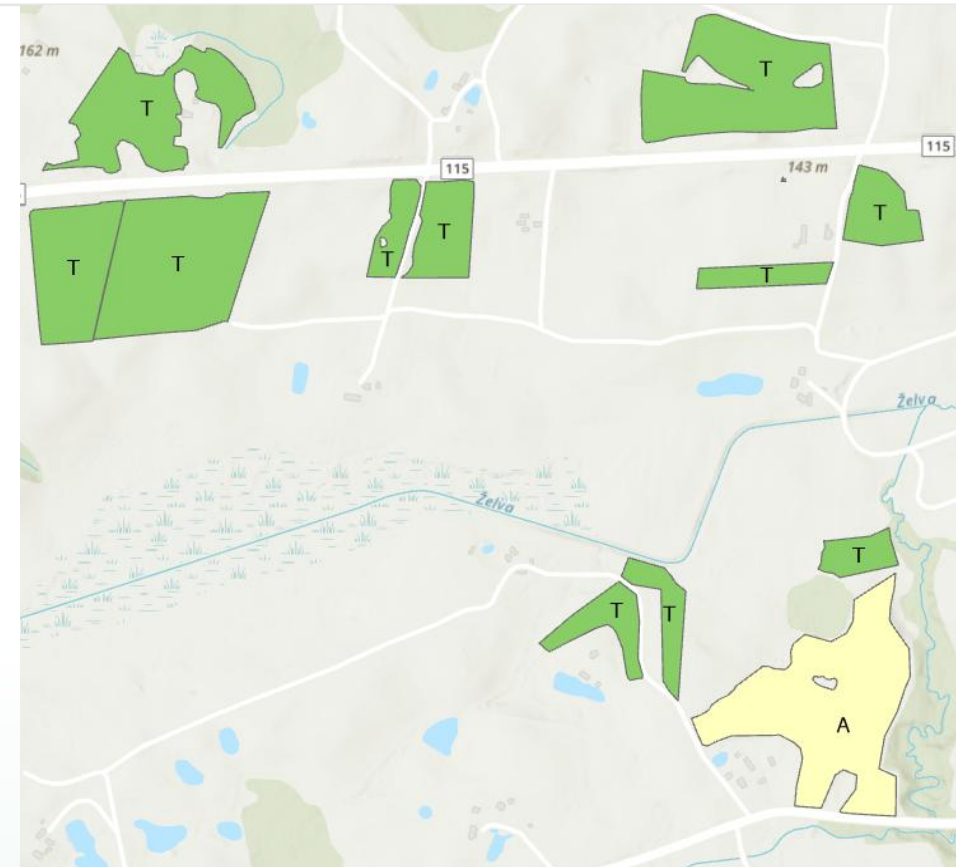
- Analyze Sentinel-1 time series to check if declared organic fields show expected vegetation patterns (slower early growth, higher biodiversity)
- Provide satellite-based validation of organic farming declarations under CAP eco-schemes

## Practical Use

- Strengthens trust in subsidy distribution
- Reduces misdeclaration risk
- Supports inspectors in targeting and verification

## Result

- Compliance map with organic match status (True / No / Ambiguous)



# Stubble Detection and Monitoring

## Methodology & Purpose

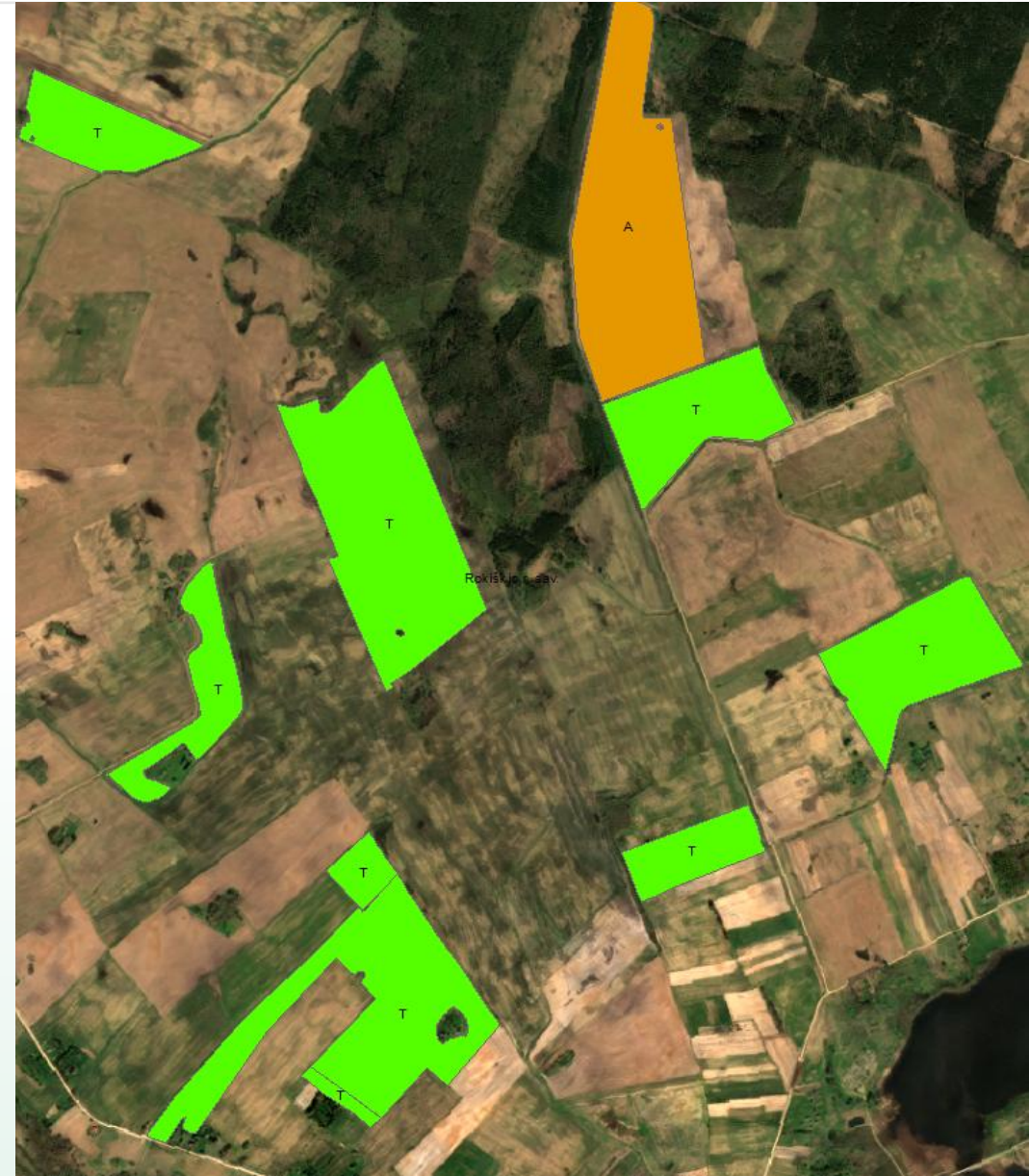
- Use **Sentinel-1 radar reflectivity** and vegetation index drop to detect stubble after harvest
- Verify no-till / low-disturbance compliance by **31 Oct** deadline

## Practical Use

- Supports environmental audits & CAP greening checks
- Prevents penalties from incorrect land management

## Result

- Field classes: **Stubble Present / Absent / Uncertain (T/N/A)**
- Checked 80 fields → **17 violations, 13 OK, 4 uncertain**



# Crop Heterogeneity Detection

## Methodology & Purpose

- Analyze spatial variance of **vegetation & backscatter** to classify in-field crop uniformity
- Detect anomalies: poor sowing, weed clusters, nutrient issues

## Practical Use

- Supports precision agriculture (variable fertilization, targeted treatments)
- Validates accuracy of field declarations

## Result

- Zonal uniformity map per parcel
- 3,110 fields checked (2025 inspections)
- 2,547 positive (81.9 %) → strong marker reliability



# Crop Quality Assessment

## Methodology & Purpose

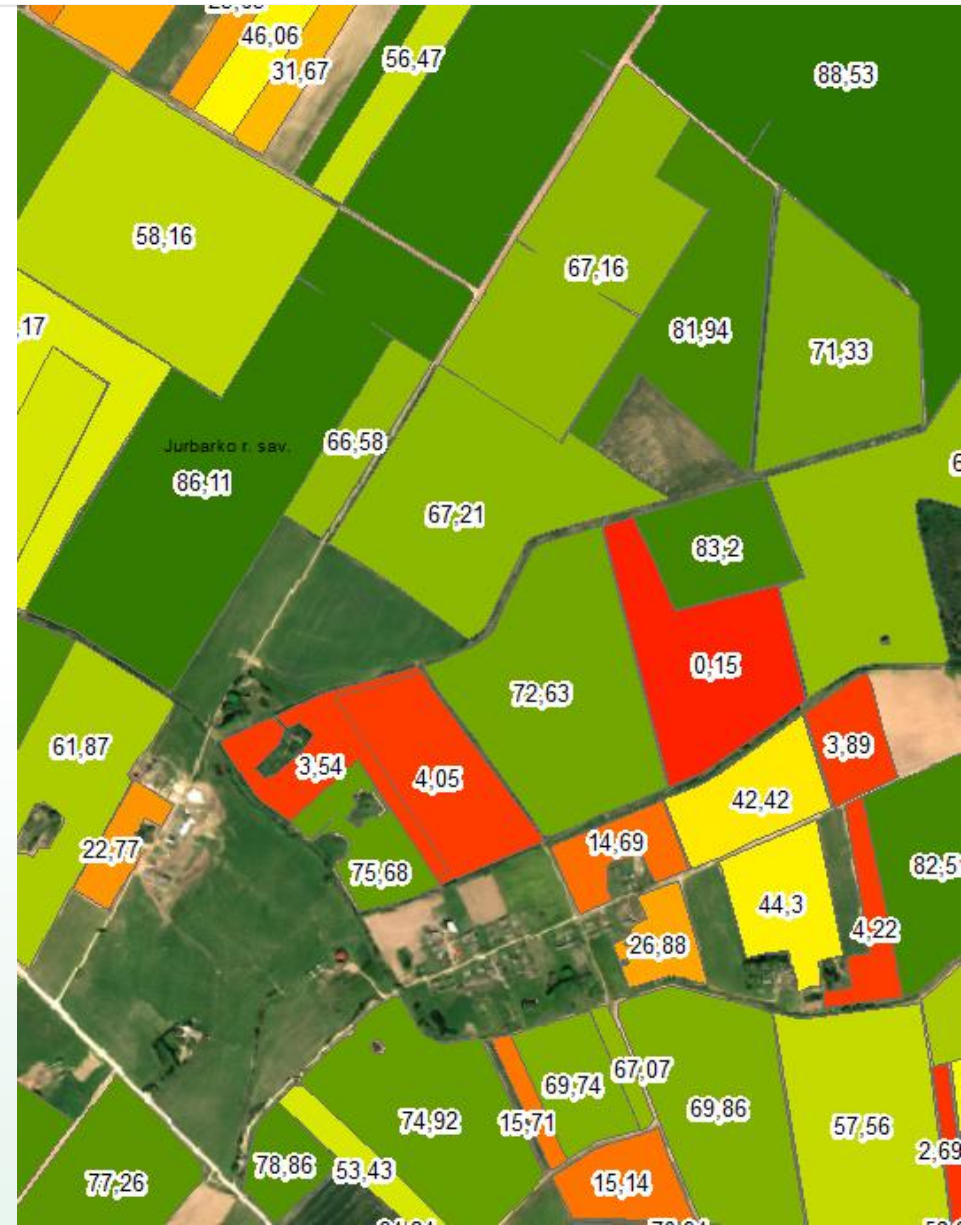
- Use **radar & spectral pixel-based classification** to map crop-condition probability zones (good / average / poor)
- Build a **Crop Quality Index (CQI)** by comparing NDVI, backscatter, and other metrics with reference years & neighboring fields

## Practical Use

- Detect underperforming zones from drought, over-fertilization, or pests
- Enable early intervention, adaptive fertilization, and targeted support
- **Supports parcel-level quality benchmarking and season-to-season comparisons**

## Result

- **CQI-coded vector layer for every declared field**



# Yield Zone Identification & Forecasting

## Methodology & Purpose

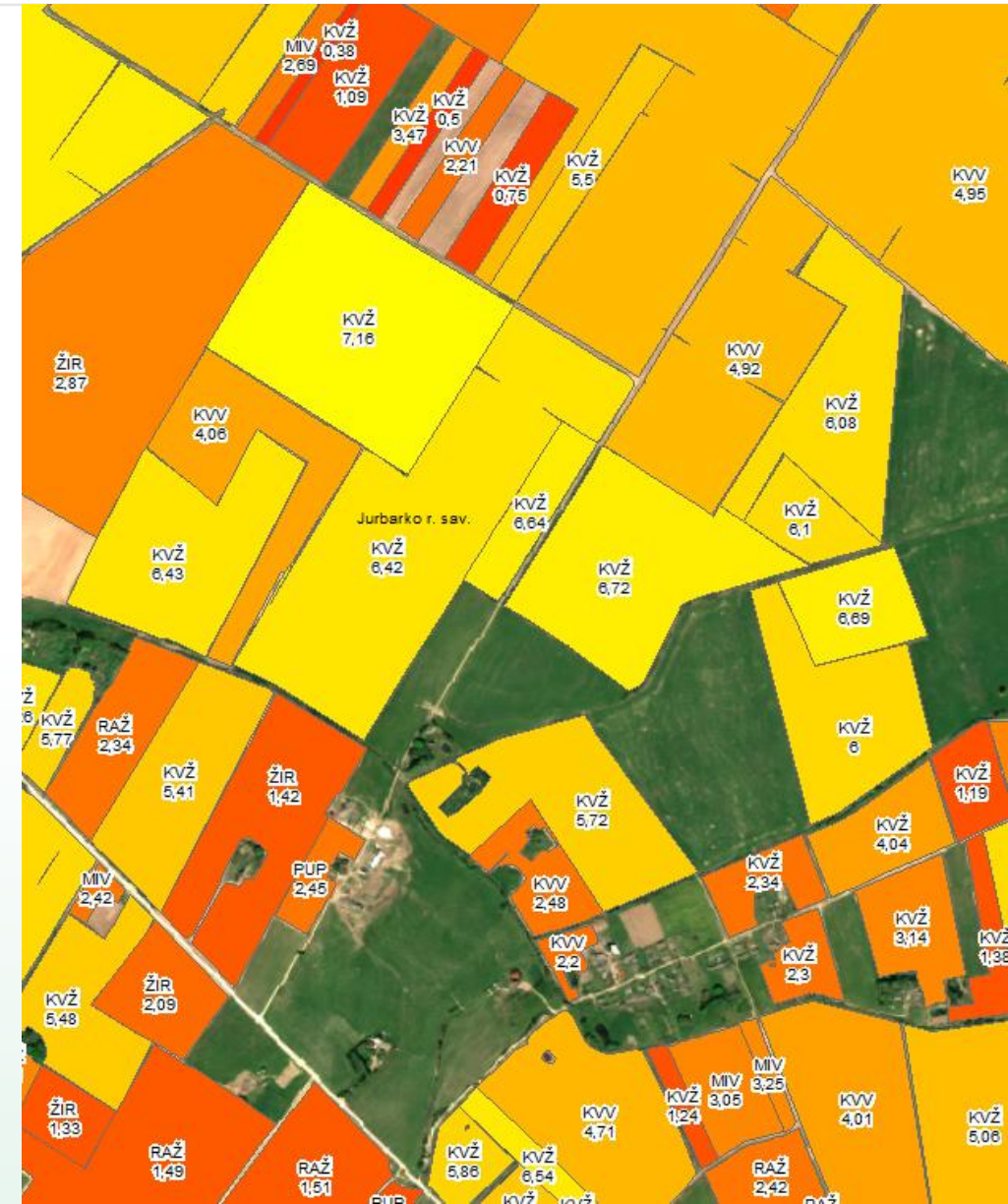
- Use radar & spectral pixel-based classification plus statistical yield data per crop type
- Analyze vegetation dynamics & growth trends to forecast yield and identify productivity zones
- Model spatial and temporal crop yield potential, highlighting intra-field variability and harvest volume

## Practical Use

- Supports logistic planning (harvest equipment, scheduling)
- Informs pricing strategies
- Ensures environmental compliance tied to yield efficiency

## Result

- Zonal yield maps with expected productivity ratings
- Provide parcel-level forecasts for harvest and resource allocation



# Crop Lodging Detection (Storm Damage)

## Methodology & Purpose

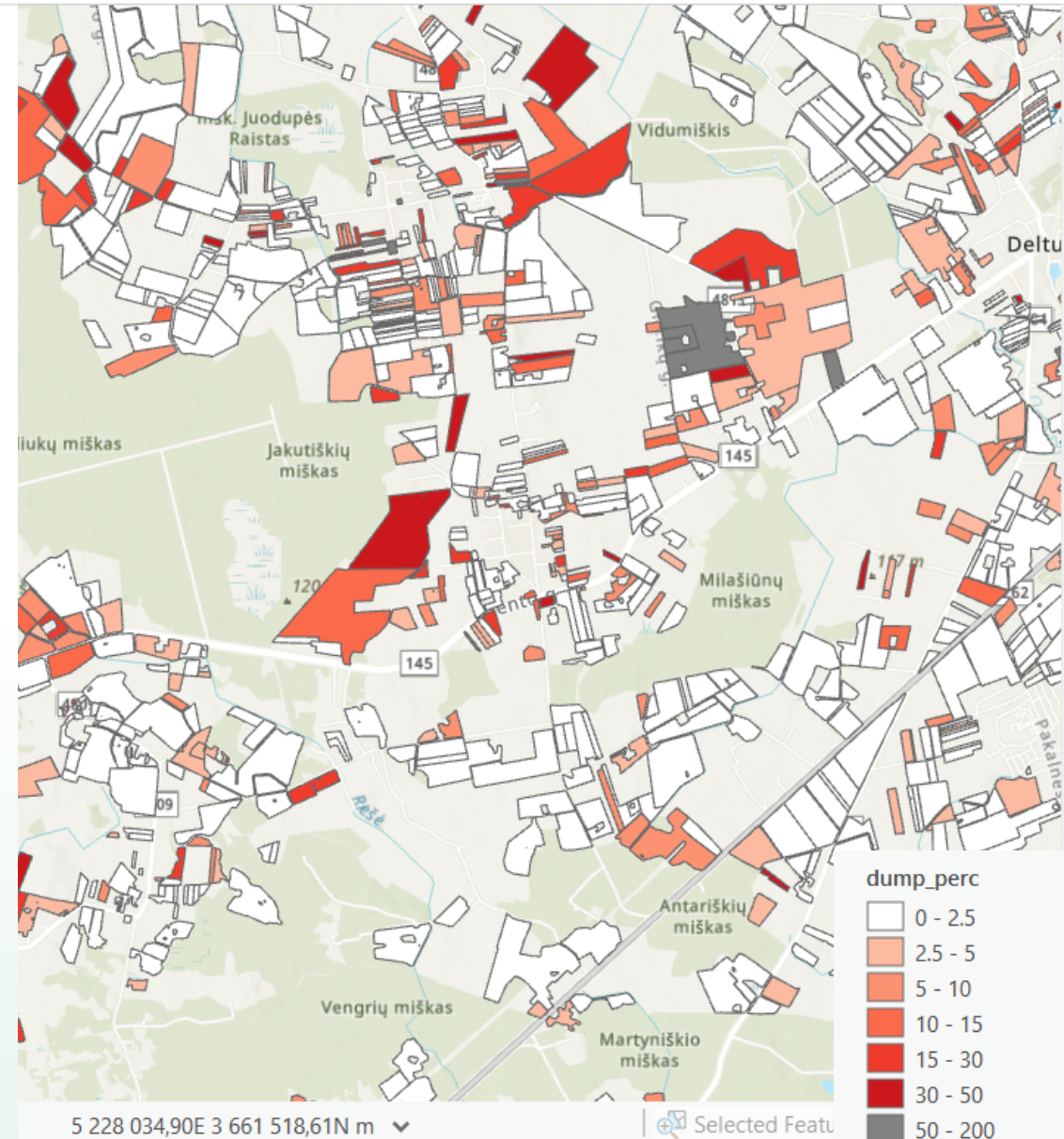
- Use **Sentinel-1 radar polarimetry** to detect physical crop flattening from wind or excess nitrogen
- Automatically map and quantify crop lodging events for rapid response and loss estimation

## Practical Use

- Enables objective storm-damage reporting for insurance
- Reduces need for manual field inspections
- Supports CAP emergency-aid assessments

## Result

- **Vector dataset of lodged zones per field with estimated impact**
- **Reliability: ~70 %**



# Soil Erosion Risk Mapping

## Methodology & Purpose

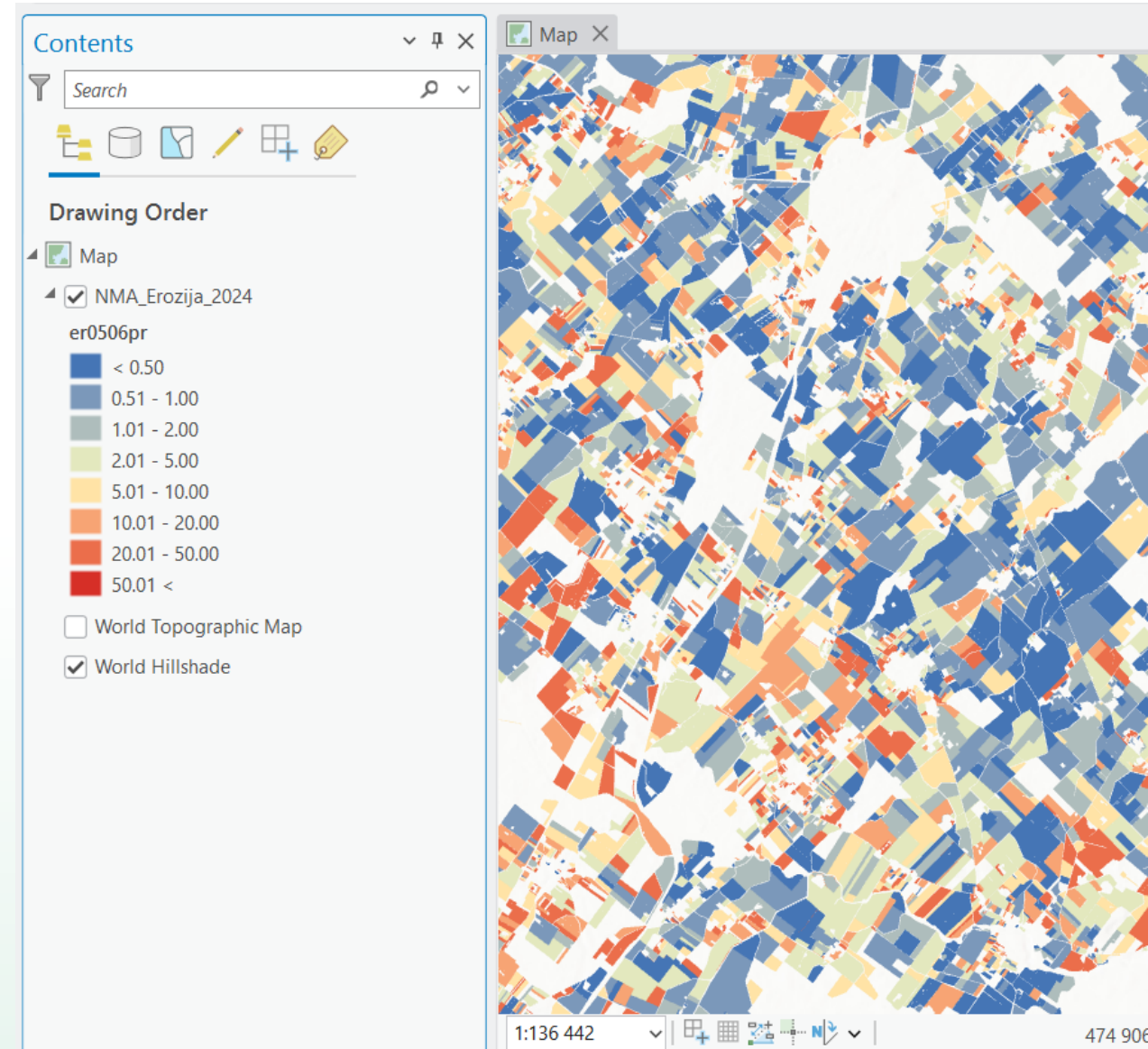
- Use Sentinel 1 **time-series analysis** to detect recurring bare soil or weak vegetation
- Map erosion-prone areas and long-term soil-loss risk

## Practical Use

- Supports CAP soil-conservation measures
- Guides cover-crop and management decisions
- Informs regional land-use planning

## Result

- **Erosion-risk maps with intensity levels per plot**
- **Reliability: ~68 %**



# Soil Moisture Intensity Mapping

## Methodology & Purpose

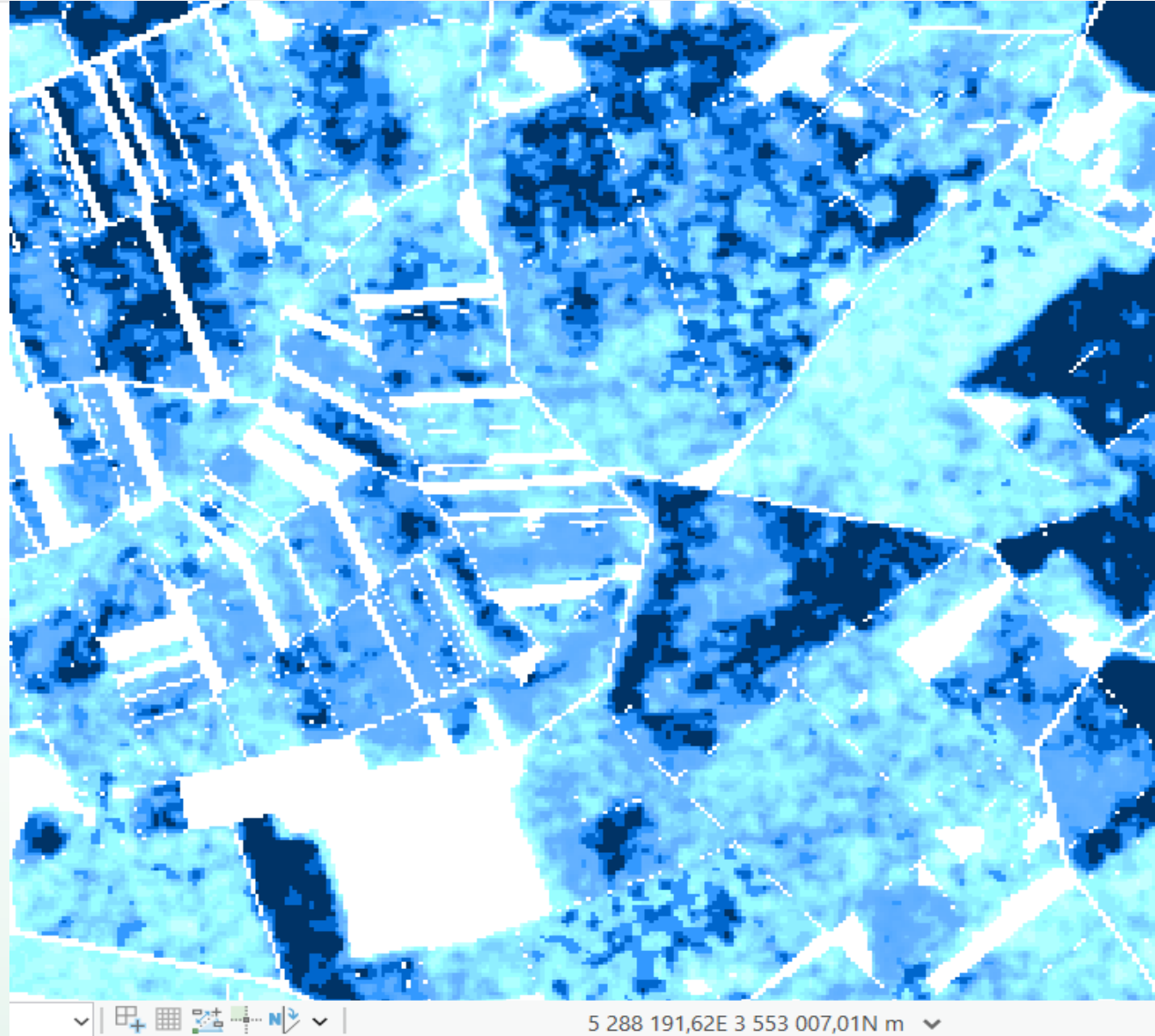
- Use **Sentinel-1 radar** to classify fields into **dry / medium / wet zones** based on dielectric soil-moisture response
- Monitor temporal and spatial changes in soil water content during the growing season

## Practical Use

- Guide irrigation planning and sowing schedules
- Inform drainage management and machinery access in wet/dry periods

## Result

- **Moisture-classification layers with in-field gradients**
- **Reliability: ~74 %**



# Soil Organic Carbon Classification

## Methodology & Purpose

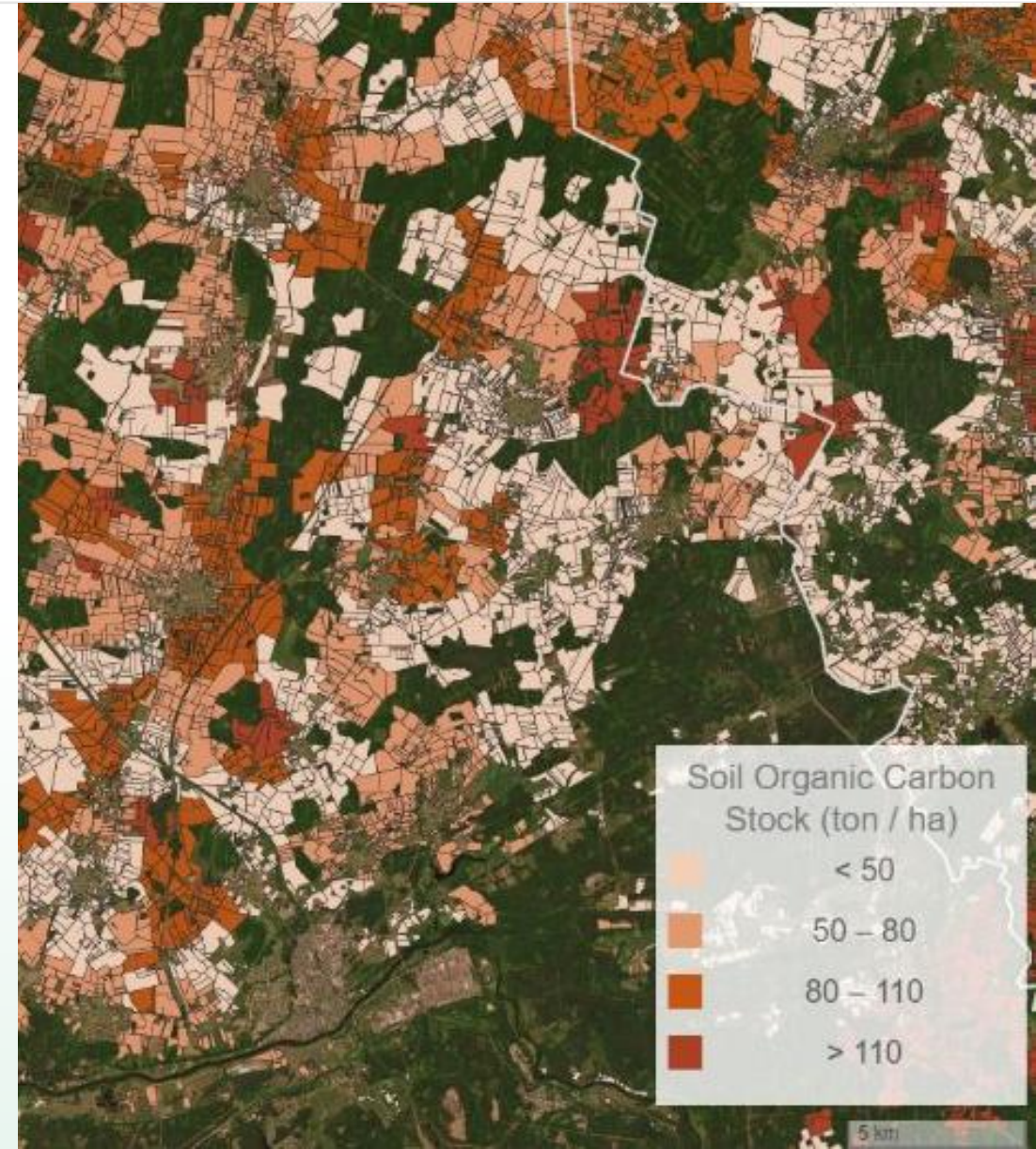
- Estimate and classify **soil organic carbon (SOC, 0–30 cm)** using **Sentinel-2 imagery** combined with **LUCAS soil samples**
- Assess carbon storage potential and locate areas for carbon farming and sequestration programs

## Practical Use

- Supports carbon-credit schemes and national CO<sub>2</sub> inventories
- Promotes sustainable soil management for long-term fertility

## Result

- **SOC-classified vector layers for farmland**



# Next Steps


- Complete validation of project outputs
- Publish results as open data
  - NPA portal
  - NMA agro mobile geotag app
  - LT open data portal
- Large AMS 2.0 dissemination campaign
  - External PR company for dissemination strategy
  - Present findings at conferences and stakeholder workshops
  - Publish articles, newsletters, and social media updates
- Prepare for five years of post-project support
  - Ensure maintenance, updates, and stakeholder engagement





**Thank you for Your attention**

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