From Geospatial Data to Agricultural Decisions

Practical Case Studies and Stakeholder Engagement in AGRI-GIS

CZU - Emerging GIS Tools for Agriculture | Technical Review

ABSTRACT
How can satellite imagery, UAV data and Geographic Information Systems (GIS) support everyday agricultural decisions? The AGRI-GIS project is developing practical training modules and case studies for agricultural technicians and advisers. These resources are based on real agricultural needs, local geospatial data and workflows that can support decisions at field and farm level. This review presents the case-study framework and summarises lessons from stakeholder engagement in the Czech Republic, including the workshop “From Imagery to Decisions - Remote Sensing for Everyday Practice” held at ZD Dolní Újezd on 11 September 2026.

1. BRIDGING GIS TECHNOLOGIES AND AGRICULTURAL PRACTICE

Modern agriculture increasingly relies on digital technologies to monitor crops, manage resources and respond to changing environmental conditions. However, access to geospatial data alone is not sufficient. Agricultural professionals also need the knowledge and practical skills required to interpret this information and translate it into effective field-level decisions.

Within AGRI-GIS, new training modules and practical case studies are being developed to strengthen these competencies. The materials focus on the needs of agricultural technicians and advisers, combining GIS applications, remote sensing technologies and locally available geospatial data with real-world agricultural challenges.

Project focus. Build practical digital skills, connect geospatial information with real farm problems, and support decisions at the scale of individual fields and farms.

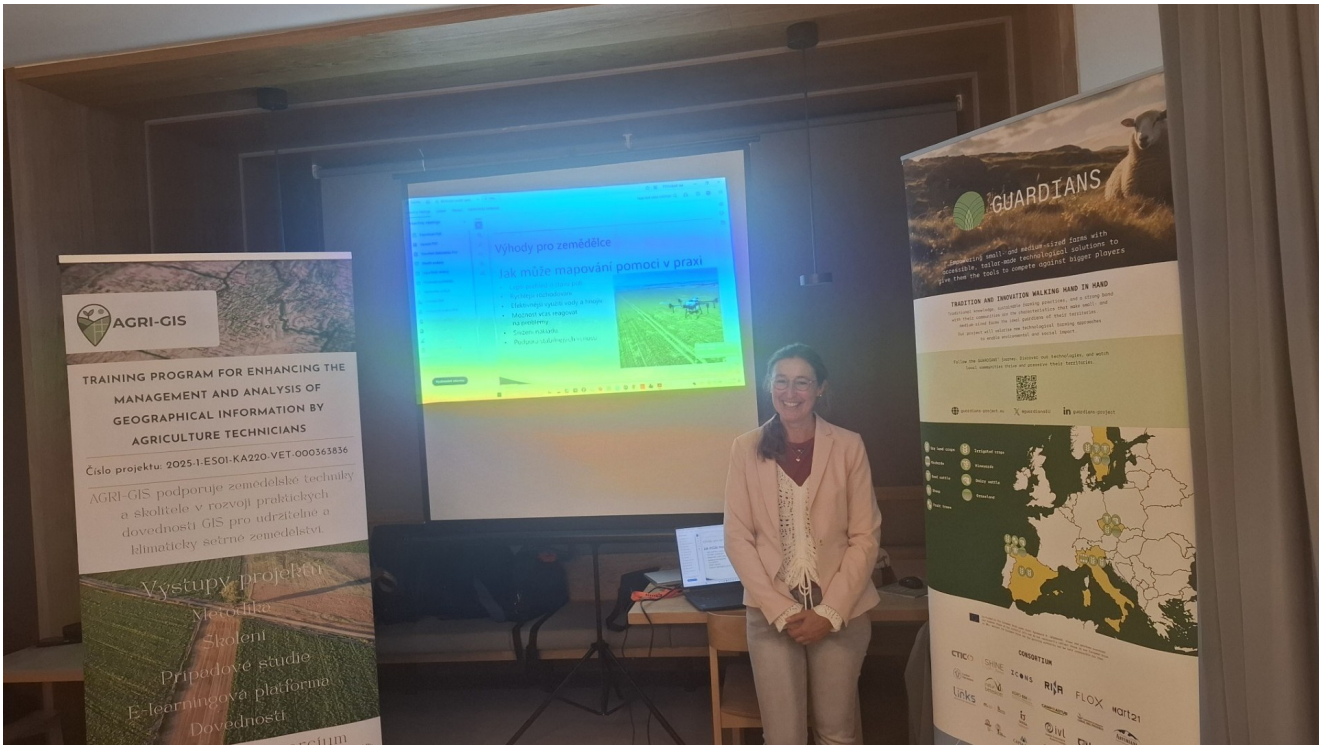


Figure 1. AGRI-GIS project presentation in the Czech Republic, illustrating the project's practice-oriented approach to geospatial training and dissemination.

2. PRACTICAL CASE STUDIES: FROM OBSERVATION TO ACTION

The forthcoming AGRI-GIS case studies are designed as applied learning workflows. Their purpose is to show how a concrete agricultural problem can be connected with suitable spatial information, an understandable analytical process and a practical decision.

Agricultural challenge	Geospatial evidence	Analysis and interpretation	Practical decision
A field or farm problem that requires attention.	GIS layers, satellite imagery, UAV data or other spatial information.	Processing and interpretation of relevant spatial indicators.	A targeted response or better-informed management assessment.

3. KEY THEMATIC AREAS FOR THE CASE-STUDY PORTFOLIO

The case-study portfolio is intended to reflect diverse European agricultural conditions while remaining focused on practical applications. The thematic areas identified in the source material cover the main points where geospatial information can support production, sustainability and climate-related decision-making.

Theme	Practical orientation
Crop monitoring	Observe crop development and field conditions using geospatial information.
Climate-related impacts	Assess agricultural damage and changes associated with extreme weather events.
Satellite and UAV imagery	Compare remote-sensing technologies and their contribution to agricultural assessment.
Water management	Use spatial information to understand water-related challenges in agricultural production.
Crop stress and damage detection	Identify potential problems affecting plant health and productivity.
Spatial yield variability	Understand differences in agricultural performance within individual fields.
Targeted crop management	Use geospatial evidence to support more precise agricultural interventions.

> Core idea. Case studies should not begin with a software function. They should begin with an agricultural question and then guide the learner through the data, analysis and interpretation needed to address it.

4. STAKEHOLDER ENGAGEMENT: LESSONS FROM THE CZECH REPUBLIC

An important example of the connection between geospatial technologies and agricultural practice was the workshop “From Imagery to Decisions - Remote Sensing for Everyday Practice”, held on 11 September 2026 at ZD Dolní Újezd in the Czech Republic. The host agricultural cooperative has extensive experience in precision farming.

The event was supported by the Agricultural Association and the Ministry of Agriculture of the Czech Republic. Participants included representatives of government and public institutions, agricultural enterprises, advisory organisations and other stakeholders in the agricultural sector.



Figure 2. Participants at the workshop held at ZD Dolní Újezd, bringing together agricultural practitioners, advisers and institutional stakeholders.

The strong interest in the event and the questions raised by participants confirmed the relevance of practical, accessible training on remote sensing and geospatial information.

5. FROM IMAGERY TO DECISIONS: REMOTE SENSING IN PRACTICE

Workshop discussions highlighted three recurring needs: knowing where useful geospatial and remote-sensing data can be obtained, understanding how satellite and UAV imagery can be processed and interpreted, and identifying realistic opportunities to integrate this information into everyday agricultural practice.



Figure 3. Workshop session on safe and legal drone use, connecting UAV operation with practical agricultural applications.

- Available sources of geospatial and remote-sensing data.
- Methods for processing and interpreting satellite and UAV imagery.
- Opportunities to integrate geospatial information into routine agricultural work.

> Interpretation matters. Practical training needs to explain not only how to generate a geospatial output, but also how to understand what it means, where its limitations lie and how it can inform a management decision.



Figure 4. Field-based activity illustrating the operational context in which UAV and geospatial data are collected and connected with agricultural decision-making.

6. DEVELOPING PRACTICAL DIGITAL COMPETENCIES

The experience gained through stakeholder engagement reinforces one of the central principles of AGRI-GIS: geospatial technologies should be understandable, accessible and applicable to real agricultural situations. By combining training modules with practical case studies, the project aims to help agricultural technicians and advisers strengthen their capacity to use GIS and remote-sensing information in professional practice.

The objective is not simply to provide access to digital tools. It is to develop the practical competencies needed to transform geospatial information into meaningful agricultural decisions.

Training principle	What it means in AGRI-GIS
Practice-oriented design	Start from recognisable agricultural challenges rather than from software functions.
Accessible data	Use geospatial information that technicians can realistically obtain and work with.
Interpretation skills	Build confidence in reading outputs and understanding their limitations.
Field-level relevance	Connect results to decisions at the scale of individual fields and farms.
Transferability	Develop workflows that can be adapted to different European agricultural contexts.

7. KEY TAKEAWAYS AND NEXT STEPS

The AGRI-GIS case-study development process is creating a practical bridge between geospatial technologies and the everyday needs of agriculture. The Czech workshop demonstrates that agricultural stakeholders are interested not only in advanced data sources, but in clear guidance that helps them decide when, why and how those sources can be useful.

- Geospatial data become valuable when they support a specific agricultural question.
- Satellite and UAV imagery need clear processing and interpretation workflows.
- Training should be rooted in real farm conditions and the needs of technicians and advisers.
- Practical case studies can strengthen confidence with GIS and remote sensing across different European contexts.

The forthcoming educational resources will continue to translate these principles into concrete training modules and case studies, supporting more informed decisions at field and farm level.

ABOUT AGRI-GIS

AGRI-GIS - Erasmus+
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