



AGRI-GIS
TRAINING PROGRAM FOR ENHANCING THE MANAGEMENT AND
ANALYSIS OF GEOGRAPHICAL INFORMATION BY AGRICULTURE
TECHNICIANS

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Erasmus+

KA220-VET - Cooperation partnerships in vocational education and training

WP2: Training Methodology and Guide for VET Trainers

Activity A2.1 (WP2) Participatory Sessions with Agricultural Technicians

Developed by

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JUSTIFICATION OF THE AGRI-GIS TRAINING PROGRAM

1. Context and scientific justification

The European agricultural sector is undergoing a profound transformation driven by 3 main factors:

1. climate change
2. the digitalization of agriculture
3. the growing need to optimize natural resources

In this context, geospatial technologies, especially Geographic Information Systems (GIS), have become fundamental tools for modern agricultural management.

GIS allow:

- integrating multiple sources of spatial data
- analyzing territorial patterns
- supporting decision-making in agronomic management

These tools make it possible to address complex problems such as:

- crop damage assessment
- pest monitoring
- water management
- adaptation to climate change

Platforms such as QGIS, ArcGIS, or Earth observation services such as Copernicus Programme and the Sentinel-2 satellite have greatly expanded the availability of geospatial data applicable to the agricultural sector.

However, the analysis carried out within WP2 of the AGRI-GIS project has shown that there is a significant gap between the availability of these technologies and their actual use by agricultural technicians.

The results obtained in the 4 participating countries show that:

1. technicians recognize the potential of GIS
2. but lack practical training to use them
3. which limits their adoption in everyday agricultural management.

This situation creates the need for specific training programs that facilitate the transfer of these technologies to the agricultural sector.

2. Technical justification

2.1 Identified technological gap

The comparative analysis carried out among partners shows that the level of GIS knowledge among agricultural professionals is mainly between basic and intermediate.

Most participants use cartographic tools only to:

- visualize maps
- identify plots
- consult orthophotos.

The use of GIS for advanced agronomic analysis such as the integration of climate, satellite or soil data is still very limited.

The main barriers identified include technical complexity of the software, fragmentation of data sources, lack of applied training and difficulty in interpreting results.

2.2 Potential of GIS in agriculture

GIS technologies have enormous potential to improve agricultural management in different areas.

Crop damage assessment

Through the analysis of satellite imagery and geospatial data it is possible to detect damage caused by extreme weather events, estimate production losses and identify particularly vulnerable areas.

Pest and disease management

GIS make it possible to analyze the spatial distribution of pests and diseases, facilitating the identification of infestation hotspots, the analysis of propagation patterns and the planning of control strategies.

In addition, spatial analysis can be combined with climate variables to develop predictive phytosanitary risk models.

Water management and water stress

Geospatial analysis makes it possible to identify areas with a higher risk of water stress through the integration of climate data, soil moisture, topography and crop information.

This information can be used to improve irrigation efficiency and optimize the use of water resources.

Precision agriculture

GIS are a key tool for the development of precision agriculture, allowing the creation of yield maps, the identification of intra-plot variability and among others optimizing the application of fertilizers and plant protection products.

3. Pedagogical justification

The needs analysis carried out in WP2 has also provided key information on how the training program should be designed to be effective. Participants agreed on several fundamental aspects:

3.1 Need for practical training

One of the clearest conclusions of the analysis is that training must focus on practical applications and real cases.

Many technicians indicated that traditional GIS training is often too theoretical and difficult to apply in daily work.

Therefore, the AGRI-GIS program will be based on:

- practical exercises
- agricultural case studies
- use of real data

3.2 Problem-based learning

The pedagogical approach of the program is based on problem-based learning (Problem-Based Learning).

This approach will teach tools and concepts through real problems in the agricultural sector, such as:

- drought damage
- pest outbreaks
- irrigation management
- crop variability.

3.3 Progressive learning approach

The training program will follow a progressive structure that allows participants to gradually move from basic concepts to more complex applications.

The learning process will include three levels:

Level 1. GIS literacy

Understanding of basic concepts:

- geospatial data
- cartographic layers
- coordinate systems
- map visualization.

Level 2. Applied spatial analysis

Use of GIS tools to:

- integrate agricultural data
- create thematic maps
- analyze spatial patterns.

Level 3. Agronomic applications

Application of GIS to specific agricultural problems, such as:

- crop damage assessment
- pest management
- water stress analysis.

4. Justification of the structure of the training program

Based on the needs analysis carried out in the four participating countries, four main thematic units were defined for the AGRI-GIS program.

Unit 1

Introduction and GIS fundamentals applied to agriculture.

This unit responds to the need to provide a solid conceptual basis for the use of GIS tools.

Unit 2

Crop damage assessment.

This unit addresses one of the most relevant problems identified by participants: the assessment of damage caused by extreme weather events.

Unit 3

Pest and disease management.

The objective of this unit is to use GIS tools to analyze the spatial distribution of pests and improve control strategies.

Unit 4

Water stress, smart irrigation and climate.

This unit responds to the growing need to improve water management in agriculture, especially in regions affected by drought.

5. Expected contribution of the AGRI-GIS program

The training program developed within the AGRI-GIS project will contribute to improving the digital competencies of agricultural technicians, facilitating the adoption of geospatial technologies in agriculture and improving the sustainable management of agricultural resources.

In the long term, the project will contribute to strengthening the capacity of the European agricultural sector to face challenges such as climate change, water scarcity and the sustainability of agricultural systems.

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