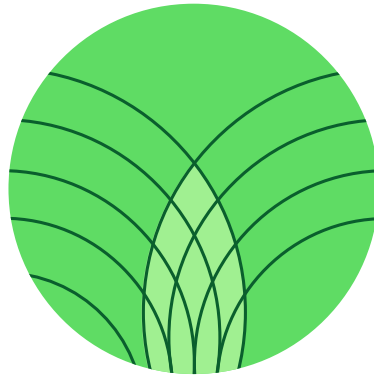




# GUARDIANS

## Technology factsheets

---



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

# Table of contents

|                                                         |    |
|---------------------------------------------------------|----|
| 1. Introduction .....                                   | 6  |
| 2. SATIVUM – CAP support tool for crop management ..... | 7  |
| 2.1. Technology description .....                       | 7  |
| 2.2. Key features and innovation.....                   | 7  |
| 2.3. Benefits .....                                     | 8  |
| 2.4. Accessibility.....                                 | 8  |
| 2.5. Description of the evaluation criteria .....       | 9  |
| 2.5.1. Usability Potential .....                        | 9  |
| 2.5.2. Expected Impact and Applicability .....          | 10 |
| 2.5.3. Capacity.....                                    | 10 |
| 3. Technology factsheet - ODOS Tech.....                | 12 |
| 3.1. Technology description .....                       | 12 |
| 3.2. Key features and innovation.....                   | 12 |
| 3.3. Benefits .....                                     | 12 |
| 3.4. Accessibility.....                                 | 12 |
| 3.5. Description of the evaluation criteria .....       | 13 |
| 3.5.1. Usability Potential .....                        | 13 |
| 3.5.2. Expected Impact and Applicability .....          | 14 |
| 3.5.3. Capacity.....                                    | 14 |
| 4. GrassGuard .....                                     | 16 |
| 4.1. Technology description .....                       | 16 |
| 4.2. Key features and innovation.....                   | 16 |
| 4.3. Benefits .....                                     | 16 |
| 4.4. Accessibility.....                                 | 16 |
| 4.5. Description of the evaluation criteria .....       | 17 |
| 4.5.1. Usability Potential .....                        | 17 |
| 4.5.2. Expected Impact and Applicability .....          | 18 |
| 4.5.3. Capacity.....                                    | 18 |
| 5. CERERE.....                                          | 20 |
| 5.1. Technology description .....                       | 20 |
| 5.2. Key features and innovation.....                   | 20 |
| 5.3. Benefits .....                                     | 20 |
| 5.4. Accessibility.....                                 | 21 |
| 5.5. Description of the evaluation criteria .....       | 21 |
| 5.5.1. Usability Potential .....                        | 21 |
| 5.5.2. Expected Impact and Applicability .....          | 22 |
| 5.5.3. Capacity.....                                    | 22 |
| 6. Swarmsense .....                                     | 24 |



|                                                           |           |
|-----------------------------------------------------------|-----------|
| <b>6.1. Technology description .....</b>                  | <b>24</b> |
| <b>6.2. Key features and innovation.....</b>              | <b>24</b> |
| <b>6.3. Benefits .....</b>                                | <b>24</b> |
| <b>6.4. Accessibility.....</b>                            | <b>24</b> |
| <b>6.5. Description of the evaluation criteria .....</b>  | <b>25</b> |
| 6.5.1. Usability Potential .....                          | 25        |
| 6.5.2. Expected Impact and Applicability .....            | 25        |
| 6.5.3. Capacity.....                                      | 26        |
| <b>7. Wildlife Herd .....</b>                             | <b>28</b> |
| <b>7.1. Technology description .....</b>                  | <b>28</b> |
| <b>7.2. Key features and innovation.....</b>              | <b>28</b> |
| <b>7.3. Benefits .....</b>                                | <b>28</b> |
| <b>7.4. Accessibility.....</b>                            | <b>29</b> |
| <b>7.5. Description of the evaluation criteria .....</b>  | <b>29</b> |
| 7.5.1. Usability Potential .....                          | 29        |
| 7.5.2. Expected Impact and Applicability .....            | 30        |
| 7.5.3. Capacity.....                                      | 30        |
| <b>8. Ecoward.....</b>                                    | <b>32</b> |
| <b>8.1. Technology description .....</b>                  | <b>32</b> |
| <b>8.2. Key features and innovation.....</b>              | <b>32</b> |
| <b>8.3. Benefits .....</b>                                | <b>32</b> |
| <b>8.4. Accessibility.....</b>                            | <b>32</b> |
| <b>8.5. Description of the evaluation criteria .....</b>  | <b>33</b> |
| 8.5.1. Usability Potential .....                          | 33        |
| 8.5.2. Expected Impact and Applicability .....            | 33        |
| 8.5.3. Capacity.....                                      | 34        |
| <b>9. Biodiversity Assessment Service.....</b>            | <b>36</b> |
| <b>9.1. Technology description .....</b>                  | <b>36</b> |
| <b>9.2. Key features and innovation.....</b>              | <b>36</b> |
| <b>9.3. Benefits .....</b>                                | <b>36</b> |
| <b>9.4. Accessibility.....</b>                            | <b>36</b> |
| <b>9.5. Description of the evaluation criteria .....</b>  | <b>36</b> |
| 9.5.1. Usability Potential .....                          | 37        |
| 9.5.2. Expected Impact and Applicability .....            | 37        |
| 9.5.3. Capacity.....                                      | 38        |
| <b>10.Chainspector.....</b>                               | <b>39</b> |
| <b>10.1. Technology description.....</b>                  | <b>39</b> |
| <b>10.2. Key features and innovation .....</b>            | <b>39</b> |
| <b>10.3. Benefits.....</b>                                | <b>39</b> |
| <b>10.4. Accessibility .....</b>                          | <b>39</b> |
| <b>10.5. Description of the evaluation criteria .....</b> | <b>40</b> |
| 10.5.1. Usability Potential .....                         | 40        |
| 10.5.2. Expected Impact and Applicability .....           | 41        |



|                                                    |           |
|----------------------------------------------------|-----------|
| 10.5.3. Capacity.....                              | 41        |
| <b>11.Fert4Olive .....</b>                         | <b>43</b> |
| 11.1. Technology description.....                  | 43        |
| 11.2. Key features and innovation .....            | 45        |
| 11.3. Benefits.....                                | 45        |
| 11.4. Accessibility .....                          | 46        |
| 11.5. Description of the evaluation criteria ..... | 46        |
| <b>12.BrocoMatuRisk .....</b>                      | <b>49</b> |
| 12.1. Technology description.....                  | 49        |
| 12.2. Key features and innovation .....            | 49        |
| 12.3. Benefits.....                                | 50        |
| 12.4. Accessibility .....                          | 50        |
| 12.5. Description of the evaluation criteria ..... | 50        |
| <b>13.VINE-CARE .....</b>                          | <b>53</b> |
| 13.1. Technology description.....                  | 53        |
| 13.2. Key features and innovation .....            | 53        |
| 13.3. Benefits.....                                | 53        |
| 13.4. Accessibility .....                          | 54        |
| 13.5. Description of the evaluation criteria ..... | 54        |
| <b>14.FarmLink.....</b>                            | <b>57</b> |
| 14.1. Technology description.....                  | 57        |
| 14.2. Key features and innovation .....            | 57        |
| 14.3. Benefits.....                                | 58        |
| 14.4. Accessibility .....                          | 58        |
| 14.5. Description of the evaluation criteria ..... | 58        |
| <b>15.AgriWing .....</b>                           | <b>61</b> |
| 15.1. Technology description.....                  | 61        |
| 15.2. Key features and innovation .....            | 61        |
| 15.3. Benefits.....                                | 61        |
| 15.4. Accessibility .....                          | 61        |
| 15.5. Description of the evaluation criteria ..... | 62        |
| <b>16.DIGIBIO .....</b>                            | <b>64</b> |
| 16.1. Technology description.....                  | 64        |
| 16.2. Key features and innovation .....            | 64        |
| 16.3. Benefits.....                                | 65        |
| 16.4. Accessibility .....                          | 66        |
| 16.5. Description of the evaluation criteria ..... | 66        |
| <b>17.SAFE BIRDS .....</b>                         | <b>69</b> |
| 17.1. Technology description.....                  | 69        |



|       |                                              |    |
|-------|----------------------------------------------|----|
| 17.2. | Key features and innovation .....            | 69 |
| 17.3. | Benefits.....                                | 69 |
| 17.4. | Accessibility .....                          | 69 |
| 17.5. | Description of the evaluation criteria ..... | 70 |
| 18.   | LIVET.....                                   | 73 |
| 18.1. | Technology description.....                  | 73 |
| 18.2. | Key features and innovation .....            | 73 |
| 18.3. | Benefits.....                                | 74 |
| 18.4. | Accessibility .....                          | 74 |
| 18.5. | Description of the evaluation criteria ..... | 76 |
| 19.   | FLOEM Plant Stem Infusion - INFRUSE .....    | 78 |
| 19.1. | Technology description.....                  | 78 |
| 19.2. | Key features and innovation .....            | 79 |
| 19.3. | Benefits.....                                | 80 |
| 19.4. | Accessibility .....                          | 80 |
| 19.5. | Description of the evaluation criteria ..... | 81 |



# 1. Introduction

---

This document provides a structured overview of the available technologies within the Test-Before-Invest Open Call. Each technology is described following the same schema, beginning with a general description, an outline of its key features and innovations, followed by an analysis of the benefits it offers and also explaining how the application is accessible to the farmer. Finally the detailed description of the evaluation criteria is provided.



## 2. SATIVUM – CAP support tool for crop management

---

### 2.1. Technology description

SATIVUM is a free web-based application developed by the Instituto Tecnológico Agrario de Castilla y León (ITACyL), a public body under the Regional Ministry of Agriculture and Livestock of the Government of Castilla y León (Spain).

SATIVUM enables users to manage multiple farms and plots, either individually or in groups, and provides extensive information on all of them. Through a user-friendly interface, it offers access to a wide range of NDVI data derived from Sentinel-2 imagery (ESA Copernicus Programme), as well as historical (available in Spain) and forecast weather data and soil property information. In addition, integrated fertilization models (based on [FertiCalc](#) algorithm), pest monitoring tools, and other modules, such as the creation of Variable Rate Application (VRA) files, support farmers in crop decision-making. It also includes farm record book features for recording field operations.

Moreover, SATIVUM is becoming a key tool for integrating CAP regulatory and environmental requirements, while also facilitating communication between farmers and the administration through its connection to the Agricultural Holdings Register and the Digital Farm Record Book (available in Spain).

SATIVUM is a tool under continuous development, with the aim of extending its use throughout Spain. It is intended to become a reference tool for the preparation of fertilization plans for a wide range of crops and for strengthening the connection between farmers and the administration.

### 2.2. Key features and innovation

The main innovation of SATIVUM lies in combining precision agriculture, agronomic models, digital record-keeping, and administrative integration within a single practical decision-support web platform. Its main features are:

- Management of multiple farms and plots; moreover, each plot has a detailed dashboard providing a wide range of information.
- Crop monitoring using NDVI satellite imagery (available every 2 – 3 days depending on cloud cover).
- Climate and soil data: access soil parameters, as well as temperature and precipitation data from weather stations, in forecast mode for each plot (and also in historical mode if the plot is located in Spain).
- Decision support system (DSS): receive support for calculating fertilization plans, Variable Rate Application (VRA), and other crop management decisions. More than



1.100 types of fertilizers and slurries, and more than 200 crops (cereals, vegetable and forage crops, orchards, etc.) are available.

- Administrative compliance: helps farmers meet CAP obligations such as maintaining Farm Digital Notebook and preparing nutrient plans. If the farm is located in Spain, it is also possible to connect the official Agricultural Holdings Register and Farm Notebook.

## 2.3. Benefits

- Free tool, developed by a public institution.
- Farm management and decision-making: better plot-level decisions, improved control of multiple farms and fields, easier access to key agronomic information, and time savings in daily technical tasks
- Agronomic performance: more accurate fertilization planning, better adjustment of nutrient applications to crop needs, improved crop monitoring through satellite imagery, early detection of within-plot variability, and better adaptation of management to local soil and weather conditions.
- Economic efficiency: reduced input costs, more efficient use of fertilizers and other resources, lower risk of unnecessary applications, better planning of field operations, and potential improvements in profitability.
- Environmental sustainability: more sustainable use of fertilizers and natural resources, reduced nutrient losses, and lower environmental impact of farm management.
- Administrative and technological support: help with CAP-related compliance, digital farm records and nutrient plans, better traceability and communication with public administration, and user-friendly access to integrated precision agriculture tools, including Variable Rate Application, across different crops and farming systems.

## 2.4. Accessibility

- A digital device (computer, smartphone or tablet) equipped with an internet browser is required (preferably Google Chrome, although it also works with others), as well as an internet connection.
- The tool can work offline in areas with poor field coverage, storing the information in cache and uploading it to the platform once the connection is restored.
- There are numerous video tutorials and FAQs on the SATIVUM website to help users get started with the tool.
- It aims to simplify decision-making based on complex algorithms through an easy-to-use interface, which inevitably involves a trade-off between precision and user understanding.



## 2.5. Description of the evaluation criteria

The evaluation criteria assess whether SATIVUM can be effectively implemented and tested on the proposed farm under real conditions. They are intended to verify whether the farm has the minimum technical, agronomic and operational conditions required to use the platform, whether the expected benefits of the tool can be meaningfully assessed, and whether the farm has the capacity to complete the pilot properly.

For each criterion, essentials refer to the minimum conditions needed to ensure a feasible and relevant implementation of SATIVUM, while added values reflect additional elements that may improve the quality of use, the relevance of the pilot results and the validation potential of the technology.

### 2.5.1. Usability Potential

This criterion assesses whether SATIVUM can be practically used on the farm in the proposed conditions. It focuses on the availability of crop compatibility and farm data needed to operate the platform and make use of its core functionalities.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Suitable crop conditions:** The farm must grow crop types compatible with SATIVUM, such as arable crops, orchards, forage crops or vegetables.
- **Greenhouse incompatibility:** The crops must not be grown under greenhouse conditions, as most of the functionalities of the tool are based on satellite imagery.
- **Plot data availability:** The applicant must provide the minimum plot and crop information needed to activate and use the platform correctly:
  - plot boundaries,
  - crop type and expected yield from current season,
  - crop type and yield from the previous season,
  - data on completed agricultural operations from previous season,
  - planned operations for the current season.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Basic digital skills:** The applicant shows confidence in using digital tools for farm management, monitoring or record-keeping.
- **Number of crops.** Provide three or more different crops for the trial.



### 2.5.2. Expected Impact and Applicability

This criterion assesses whether SATIVUM is relevant to the farm's needs and whether its effects can be meaningfully observed during the pilot. It focuses on the extent to which the proposed use case allows the tool to support real crop management decisions.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Decision authority:** The applicant must be an active farmer or farm manager with decision-making responsibility over the plots included in the proposal.
- **Minimum farm scale:** The proposed testing area must include at least 1 hectare for each crop involved in the pilot.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Practice comparison:** The applicant can explain how current management will be compared with SATIVUM-supported decisions.
- **Validation evidence:** The applicant can provide yield maps in digital format (preferably GIS format) to compare with VRA SATIVUM tool results.

### 2.5.3. Capacity

This criterion assesses whether the farm has the practical ability to implement and complete the SATIVUM pilot properly.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Digital access:** The applicant must have a digital device available (computer, tablet or smartphone) with internet access and a web browser, and an email.
- **Connectivity:** The farm must have sufficient connectivity for periodic synchronization, even if some work is carried out in the field under low-coverage conditions.
- **Operational collaboration:** The applicant must be able to share the required information, keep records updated and interact with the technology provider during the pilot.



**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Digital implementation support:** The applicant has previous experience, internal support or an identified person able to use the platform regularly.
- **Machinery:** The applicant owns Variable Rate Application machinery.
- **Structured farm records:** The applicant already keeps useful records or monitoring data from the farm that can strengthen implementation and feedback.



## 3. Technology factsheet – ODOS Tech

---

### 3.1. Technology description

ODOS Tech is a SaaS platform designed for agribusinesses to measure, manage, and reduce environmental impacts across their supply chains. It integrates farm-level data to calculate **Scope 1, 2, and 3 (including FLAG)** carbon footprints, alongside biodiversity indicators, enabling companies to move from reporting to actionable mitigation.

### 3.2. Key features and innovation

- **Farm-level data integration** from multiple sources (farm practices, feed, inputs, production)
- **Automated carbon footprinting** of agricultural supply chains aligned with GHG Protocol using own models (for e.g. Apples, Cattle, Dairy, Olives production systems)
- **Biodiversity mapping** (habitat quantity and quality assessment) using remote-sensing technologies
- **Mitigation scenario modelling** with environmental and economic impact projections to find the most effective emission reduction pathways from farm to supply chain
- **Insetting & verification tools** to track and validate on-farm actions
- **Scalable data architecture** tailored to cooperatives and complex supply chains
- **Personalized questionnaires** for data collection regarding Carbon Footprint, animal wellness and others.

### 3.3. Benefits

- Full visibility of environmental impact across the supply chain
- Reduced reporting burden and improved data accuracy
- Identification of high-impact mitigation opportunities
- Support for compliance with evolving regulations (CSRD, SBTi FLAG)
- Stronger engagement with farmers through actionable insights
- Competitive advantage through credible sustainability strategies

### 3.4. Accessibility

- Cloud-based platform accessible via web to be used by advisors on farm-visits
- Web application supports offline use/intermittent connections
- User-friendly dashboards for technical and non-technical users



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



- API and data integration capabilities
- Modular model deployment (carbon, biodiversity, mitigation)
- Multilingual support and adaptable to different geographies and sectors
- Designed for cooperatives, processors, and large agribusinesses

### 3.5. Description of the evaluation criteria

The evaluation of applications for ODOS Tech will assess the extent to which the farm can support the effective use, testing and validation of the platform under real operating conditions. As ODOS Tech is a SaaS solution focused on environmental impact assessment, carbon footprinting, biodiversity mapping and mitigation scenario modelling, the evaluation will consider both the farm's ability to provide relevant data and its suitability to generate meaningful results for the validation of the technology.

#### 3.5.1. Usability Potential

This criterion assesses whether ODOS Tech can be practically deployed and used on the farm in a way that allows reliable data collection and meaningful interaction with the platform.

##### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Production data:** The applicant must be able to provide production data during the time period to be analyzed.
- **Input information:** The applicant must be able to provide answers to questions related to farm practices and inputs into the production system (e.g. fertilizer amounts for apple orchards and feed composition for cattle farms).
- **Digital collaboration:** The applicant should be able to collaborate with advisors or technical staff during farm visits to support the use of the cloud-based platform and the completion of questionnaires.

##### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Farm boundaries:** The applicant can share the farm boundaries, as it is needed for the biodiversity assessments.
- **Energy information:** The applicant can share information regarding energy consumption from non-renewable & renewable sources.
- **Structured records:** The applicant keeps the farm production and input records in a structured and accessible way that can facilitate data submission and reduce implementation effort.



### 3.5.2. Expected Impact and Applicability

This criterion assesses whether the use of ODOS Tech is relevant for the farm and whether the expected results of the pilot can generate useful evidence on environmental performance, mitigation opportunities and practical applicability.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Relevant use case:** The applicant should present a clear and credible use case showing how ODOS Tech can support the assessment of environmental impacts and the identification of improvement opportunities in the farm production system.
- **Assessable benefits:** The applicant should be able to explain which environmental, operational or decision-making benefits are expected from the use of the technology and how these could be observed during the pilot.
- **Applicable context:** The farm's production system should be suitable for the collection of the data needed to generate carbon footprint and related environmental insights through the platform.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Manure practices:** The applicant has the following data available for the farm: manure practices, storage type, % of manure stored and spreading method.

### 3.5.3. Capacity

This criterion assesses whether the farm has the operational conditions, organisation and readiness needed to complete the testing activities within the pilot period.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Operational commitment:** The applicant should demonstrate willingness and availability to engage in the pilot activities, including data provision, clarification requests and follow-up exchanges with the technology provider.
- **Cattle data:** The applicant should provide the following data: Cattle/Herd movement/inventory and weight days in each stage (for cattle farms specifically).



**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Dedicated contact:** The applicant clearly identifies a person available to coordinate interactions with the technology provider and support timely completion of the pilot tasks.
- **Data responsiveness:** The applicant is able to respond efficiently to additional data or clarification requests during the implementation period.
- **Previous experience:** The farm has prior experience in sustainability reporting, digital tools or structured data-sharing processes that may support a smoother implementation of ODOS Tech.



## 4. GrassGuard

---

### 4.1. Technology description

Technology consists of three basic phases. Taking georeferenced images using a flying drone (1), creating an orthophoto and recognizing weed plants, including their location on the pasture (2) and then cutting weeds using a ground drone (3).

The first phase of our technology consists of taking a georeferenced image of the pasture. For this purpose, practically any flying drone, preferably a propeller-driven drone, can be used. The only condition for it to be a semi-autonomous device is that it is possible to plan the drone's flight path.

The second phase of our technology consists of processing the captured georeferenced images and combining them into an orthophoto and generating a point cloud to detect weed spots based on their height. Weed deposits are recognized on the resulting orthophoto. These locations are georeferenced. The information obtained serves as a basis for the careful planning of the route of the land drone.

The third phase of our technology is the mowing/mulching of weedy areas with the help of a land drone. The planned route is loaded into the ground drone's memory. The drone will then treat the required areas again semi-autonomously, only under the supervision of the operator.

### 4.2. Key features and innovation

Both drones used (flying and ground-based) operate in semi-automatic mode. In the case of the flying drone, it is only necessary to plan its route, while the ground-based drone is guided to the areas that need to be treated also almost automatically.

The entire technology is virtually emission-free. Both drones, both flying and ground-based, are electrically powered. The batteries are charged using solar panels.

### 4.3. Benefits

The technology will allow farmers to easily map their crops, not just pastures. Farmers will learn the basic elements of remote sensing that can be used to improve farm operations. The technologies are not demanding to be used. Based on our experience, for example, a flying drone can be controlled by an ordinary user without any previous experience practically immediately after purchasing, after training from the seller.

### 4.4. Accessibility

The first two steps of our technology are accessible after purchasing a flying drone with the possibility of flight planning. Such a solution can be purchased today for 2.5 to 4 thousand Euros, depending mainly on the type of camera. RGB cameras are cheaper, but slightly



more expensive multispectral ones expand the possibilities of using the drone. It is also necessary to own an averagely powerful PC on which it is possible to run either commercial SW, e.g. Pix4D (a license for 2 users costs about 1600 Euros with subsequent free maintenance), or the open source OpenDroneMap, which is free.

The price of a ground drone is many times higher, about 24 thousand euros. However, it is designed so that it can be transported on a cart behind a car, which is equipped with solar charging. We assume that individual farmers within a radius of about 30 km could borrow it from each other.

## 4.5. Description of the evaluation criteria

The evaluation of this technology focuses on the farm's ability to implement and test GrassGuard under real operating conditions. Since the solution combines drone-based image acquisition, digital orthophoto processing and semi-autonomous intervention on weed-affected areas, the assessment must verify that the applicant can support the required workflow in a feasible and reliable way.

### 4.5.1. Usability Potential

This criterion assesses whether the farm provides the practical conditions needed to use GrassGuard correctly during the pilot. It focuses on the ease with which the farm can operate the required tools, engage with the workflow and support the effective day-to-day use of the technology.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Flight-ready drone:** The applicant should own a flying drone with flight planning capabilities.
- **Pilot authorization:** The applicant should own a flying license to test the drone.
- **Drone legal readiness:** The applicant is willing to meet legislative requirements for the operation of drones.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Technology learning attitude:** The farmer is willing to learn modern technologies.
- **User workflow fit:** The applicant is able to use the technology workflow in a practical way during normal operations, from flight planning to image capture.



#### 4.5.2. Expected Impact and Applicability

This criterion assesses whether the technology is relevant for the farm's needs and whether its implementation is likely to generate meaningful benefits. It also considers whether the farm context allows the expected results of the pilot to be observed, assessed and potentially replicated in similar settings.

##### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Operational relevance:** The applicant should demonstrate that weed mapping and targeted treatment are relevant to its operational reality and land management needs.
- **Assessable farm benefits:** The applicant should be in a position to observe and describe the practical benefits generated by the technology during the pilot.
- **Communication skills:** The applicant has good communication skills in either Czech language or English.

##### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Ground drone co-financing:** Willingness to participate in co-financing the purchase of a ground drone, after the project ends.

#### 4.5.3. Capacity

This criterion evaluates whether the farm has the operational and organisational capacity to host and complete the pilot successfully.

##### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Image processing software:** The applicant should demonstrate availability of software for orthophoto processing (Pix4D, OpenDrone Map).
- **Suitable computer access:** The applicant should own a medium-performance computer (desktop or laptop) and have basic knowledge of working on a PC.

##### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.



- **Czech Republic location:** Location in Czech Republic is preferred, in order to test the land drone functionalities, due to the logistics for transport and possibilities of more visits with the drone.



## 5. CERERE

---

### 5.1. Technology description

CERERE is smart farming tool that helps make better decisions in the field. It combines data from weather stations and soil sensors with satellite and drone images to forecast irrigation needs, warn about crop disease risks, and show how crops are growing, all in one place.

Behind the scenes, CERERE is an AI-powered decision support system that continuously analyses data from multiple sources, including weather forecasts, soil conditions and vegetation imagery, to deliver timely, field-specific recommendations throughout the crop season.

CERERE is designed to enhance agricultural productivity and sustainability through advanced monitoring and predictive analytics. It integrates in-situ data from weather stations and soil sensors with multiple forecasting modules, including weather, irrigation, and crop disease risk, as well as vegetation vigor maps derived from satellite and drone imagery.

### 5.2. Key features and innovation

**Know exactly when and how much to irrigate:** CERERE tracks weather forecasts and soil moisture to tell exactly when crops need water and how much, enabling sustainable water management. It works both for open fields and greenhouses.

**Get ahead of crop disease:** the system monitors crop-specific disease risk to give farmers early warnings so they can treat at the right moment using less product and more effectively.

**See the full picture of your fields:** through satellite and drone images, CERERE provides maps that show which parts of the field are growing healthy and which might need attention, so farmers can focus their attention and resources where they're needed most.

### 5.3. Benefits

CERERE provides information to help save water, cut costs, and protect crops while reducing environmental footprint.

**Save water and cut irrigation costs:** CERERE provides irrigation recommendations to irrigate only when the crop needs it.

**Use fewer crop protection products:** by detecting early disease risk, the system helps farmers treat their fields at the right moment, spending less and protecting crops more effectively.

**Catch problems before they cost you:** CERERE monitors crop stress so farmers can act early before a small issue becomes a costly problem in the field.

CERERE provides farmers with actionable insights to optimize agricultural practices, improve resource efficiency, and minimize environmental impact.



## 5.4. Accessibility

The CERERE dashboard is accessible from any device (desktop, tablet, or smartphone) with internet access through a standard web browser. A CERERE chatbot will also be available via Telegram.

## 5.5. Description of the evaluation criteria

The evaluation of applications for CERERE will focus on the farm's suitability to implement, use and validate the technology in real operating conditions. As CERERE combines weather data, soil information and remote sensing outputs to support irrigation management, disease risk monitoring and crop growth assessment, the evaluation will consider both the technical compatibility of the farm and its practical ability to make effective use of the system.

### 5.5.1. Usability Potential

This criterion assesses whether CERERE can be effectively used on the farm under the proposed conditions and whether the applicant offers an appropriate environment for the technology to operate as intended. It considers the match between the farm characteristics and the technical requirements of the platform.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Supported crop type:** The farm must grow at least one of the currently supported crop types for irrigation management: maize, potatoes, strawberries, beans, blueberries, chestnuts, eggplants, zucchini, tomatoes, or wheat.
- **Suitable cultivation setup:** Crops should be grown under irrigated open field conditions, rainfed conditions, or in a greenhouse. Farms with greenhouse parcels must have soil moisture sensors (Volumetric Water Content) installed to provide in-field data needed to generate accurate recommendations.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Disease module crops:** The farm grows at least one of the crop types supported by the disease risk module: maize, potatoes, strawberries, or tomatoes.
- **Parcel sensor coverage:** The farm has soil moisture sensors installed across its parcels. The number of sensors should be proportional to the farm size, ensuring adequate spatial coverage.



### 5.5.2. Expected Impact and Applicability

This criterion assesses the extent to which the implementation of CERERE is expected to generate useful and measurable benefits for the farm.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Weather station proximity:** The farm must be located within a reasonable distance of a weather station (below 10 km for reasonable analysis), since this data is essential for the forecasting modules.
- **Soil composition availability:** The farm must have recent information regarding the fields' soil composition, such as: sand percentage, silt percentage, clay percentage (required), plus any other optional information about the soil (average depth (m) at which the soil sample was extracted, organic carbon content (%), pH, cation exchange capacity (cmol(+) / kg), bulk density (g/cm<sup>3</sup>), calcium carbonate (CaCO<sub>3</sub>) content (%)).
- **Actionable use case:** The farm should be able to describe at least one concrete decision or practice that could be improved through CERERE recommendations or monitoring outputs.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Feedback during pilot:** The applicant is willing to provide feedback during the pilot period, helping to improve and tailor the platform to real farm needs.
- **Compatible irrigation system:** The farm uses one of the following irrigation systems: drip/hose, rosette or sprinkler. Although recommendations are valid across the three, more precise systems such as drip irrigation allow for more accurate implementation of water management advice.

### 5.5.3. Capacity

This criterion assesses whether the farm has the operational capacity to support the implementation of CERERE and complete the testing activities successfully. It considers the farmer's readiness to engage with the technology provider, use the platform consistently and contribute to the validation process with sufficient continuity and reliability.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Operational engagement:** The applicant should be able to use the CERERE dashboard or chatbot on a regular basis during the pilot period.



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



- **Digital access:** The applicant must have access to a smartphone, tablet or computer with stable internet connection to use the CERERE dashboard and chatbot.

### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Structured farm monitoring:** The farm already follows basic monitoring practices for irrigation, crop status or field observations that can support the interpretation of CERERE outputs.
- **Responsive participation:** The applicant is available to respond to questions, report observations and share implementation feedback in a timely manner during the pilot.
- **Improvement mindset:** The applicant shows interest in testing digital tools not only for immediate use, but also for contributing to the improvement and validation of the solution.



## 6. Swarmsense

---

### 6.1. Technology description

The beehive protection and monitoring system is provided as a service to beekeepers. An autonomous sensory device installed in the beehive is connected to a central server, via a data collection router, with continuously collecting data on hive conditions, including ambient and hive temperature, humidity, and acoustic signals. This data is sent to the central server for processing. Beekeepers can access all hive-related information via a web browser, allowing them to identify threats and anticipate events such as swarm formation, queen bee loss, bee colony assaults, and overall bee health. Additionally, the system sends notifications about sudden changes in temperature, humidity, or sound within specific ranges. It will reduce the cost of hive maintenance, increase production, and reduce bee mortality rate. The system can be installed by the farmers themselves.

### 6.2. Key features and innovation

- Sensors
- Router with mobile connection - HUB
- Power supply (battery, solar panel)
- Remote server as data lake, and data visualization

### 6.3. Benefits

**Accuracy:** The system delivers precise information about hive conditions, enabling better management and decision-making.

**Economy:** It enhances beekeeping efficiency by reducing colony losses and increasing production yield. The solution can decrease bee mortality by up to 20% and cut hive maintenance costs by up to 25%.

**Environmental Friendliness:** By using the information provided by the system, beekeepers can protect their colonies more effectively, reducing environmental impact and improving the quality of their products.

### 6.4. Accessibility

The technology is developed for self-installation. The beekeeper should be available for communication to check the accuracy of the predictions of the action in the beehive. Once the sensors are deployed the data will be available on the dashboard accessible remotely.



## 6.5. Description of the evaluation criteria

The evaluation of this technology focuses on the farm's suitability to host and test the Swarmsense beehive protection and monitoring system under real operating conditions. The assessment considers whether the farm can install and use the technology correctly, generate meaningful validation conditions, and collaborate effectively with the technology provider throughout the pilot.

### 6.5.1. Usability Potential

This criterion assesses whether the selected farm offers appropriate conditions for the practical use of the Swarmsense system and whether the technology can be deployed and used in a meaningful way in day-to-day beekeeping operations.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Suitable hive range:** The farm should have 3 to 10 beehives.
- **Available power access:** Availability of power supply 220v or 5v, within 50 m from the beehives must be provided. It can be battery.
- **Basic digital use:** The applicant should be able to access and consult the dashboard remotely through a web browser during the testing period.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Hive diversity:** Different sizes of beehives are available.
- **Bee diversity:** Different bee species are available.
- **Regular dashboard use:** The applicant regularly reviews hive condition data and notifications to support practical assessment of the system in routine management.

### 6.5.2. Expected Impact and Applicability

This criterion assesses whether the proposed farm can benefit meaningfully from the Swarmsense solution and whether the technology is relevant to its beekeeping activity.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



- **Relevant beekeeping need:** The applicant should demonstrate a clear need for improved monitoring of hive conditions, threats or colony health in its beekeeping activity.
- **Operational relevance:** The farm should use the monitored beehives in real production conditions so that the impact of the technology can be assessed in practice.

### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Impact awareness:** The applicant can explain how improved monitoring could contribute to reduced losses, lower maintenance effort or better production outcomes.

### 6.5.3. Capacity

This criterion assesses whether the farm has the operational readiness and commitment needed to install, support and complete the pilot successfully. It considers the farmer's willingness to follow instructions, interact with the technology provider, and carry out the basic actions required to ensure that the system can be properly tested and validated.

### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Installation commitment:** The applicant should be willing to install the sensors in the beehives, according to the explanations of the technology provider.
- **Implementation readiness:** The applicant should be able to allocate the minimum time and attention needed to install the system, monitor its functioning, visiting the beehives and respond to follow-up requests during the pilot.
- **Accessible beehives:** The beehives should be physically accessible for installation, inspection and basic maintenance actions linked to the testing process.

### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Communication support:** The applicant should have good English skills to facilitate communication and troubleshooting.
- **Self-Installation confidence:** The applicant shows confidence in carrying out self-installation tasks and following practical deployment instructions.



- **Structured farm support:** The applicant has an organized working routine that facilitates timely checks, observations and feedback during the implementation period.



## 7. Wildlife Herd

---

### 7.1. Technology description

Wildlife Herd is an autonomous drone-based wildlife deterrence system designed to reduce human–wildlife conflicts in agricultural environments. The system combines AI-powered wildlife detection, species-specific bioacoustic deterrence, and automated drone missions to detect and respond to wildlife intrusions in real time.

Using onboard sensors and machine-learning models, the system identifies wildlife such as deer, wild boar, and birds that may cause crop damage or safety risks. Once detected, the drone automatically deploys species-specific bioacoustic signals that trigger natural avoidance behavior in animals, safely guiding them away from sensitive areas without harm.

All activity is monitored through the Flox Wildlife Platform, a secure cloud-based interface that logs detections, deterrence events, and mission data, enabling farmers to review wildlife activity and evaluate deterrence effectiveness over time.

### 7.2. Key features and innovation

- Autonomous drone missions capable of detecting and deterring wildlife without manual intervention.
- AI-based wildlife detection and classification adapted to agricultural environments.
- Species-specific bioacoustic deterrence signals designed to prevent habituation.
- Integration with the Flox Wildlife Platform for monitoring, reporting, and event logging.
- Geofenced deterrence zones and automated flight routines adapted to farm layouts.
- Secure data management compliant with GDPR, including two-step authentication for users.
- Non-lethal, wildlife-friendly approach aligned with sustainable agriculture practices.

### 7.3. Benefits

- Reduces crop damage caused by wildlife such as deer, wild boar, and birds.
- Provides continuous monitoring of wildlife activity on farmland.
- Enables rapid, automated response to wildlife intrusions.
- Reduces the need for manual deterrence methods such as patrols or scare devices.
- Provides data-driven insights into wildlife patterns and farm-level risk areas.
- Supports sustainable and humane wildlife management practices.



## 7.4. Accessibility

The system is designed to be easy to deploy and operate on active farms. Farmers interact with the system through a simple digital interface that provides mission scheduling, alerts, and activity summaries. Training and onboarding support are provided to ensure safe and effective use of the technology.

The system can operate in rural environments and is designed to handle variable connectivity through local data logging and delayed synchronization with the platform.

## 7.5. Description of the evaluation criteria

The evaluation of this technology focuses on the farm's suitability to host and test the Wildlife Herd system under real agricultural conditions where wildlife pressure may affect crops, farm operations or safety. The assessment considers whether the farm can provide the minimum physical and operational conditions required for safe deployment of the autonomous drone-based deterrence system and whether the proposed context is relevant for validating its performance.

### 7.5.1. Usability Potential

This criterion assesses whether the selected farm provides the practical conditions needed to deploy and operate the Wildlife Herd system effectively.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Safe flight area:** The applicant must provide a suitable open area for safe drone take-off and landing.
- **Deterrence zone access:** The farm must allow definition of wildlife deterrence zones within fields or surrounding areas.
- **Power for deployment:** The applicant must permit installation of the drone charging station and provide basic power access.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Wildlife pressure presence:** Presence of wildlife pressure (e.g. deer, wild boar, birds) that affects crops or farm operations.
- **Stable connectivity:** Availability of stable mobile network coverage to enable real-time monitoring.



- **Suitable farm layout:** The farm layout supports efficient drone routines and clear spatial definition of areas where wildlife deterrence is needed.

### 7.5.2. Expected Impact and Applicability

This criterion assesses whether the proposed farm can benefit meaningfully from the Wildlife Herd solution and whether the technology is applicable to its specific context.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Monitoring permission:** The applicant must allow monitoring and logging of wildlife activity through the platform.
- **Relevant wildlife challenge:** The applicant should demonstrate that wildlife intrusion represents a relevant issue for crops, farm operations or field protection.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Economic management interest:** The applicant has specific interest in monitoring wildlife patterns and using digital tools to reduce crop losses, improve resource allocation, and support more cost-effective farm management.
- **Replication value:** The applicant can explain how testing this technology could generate useful knowledge for future use in similar agricultural contexts.

### 7.5.3. Capacity

This criterion assesses whether the farm has the operational readiness and commitment needed to host, support and complete the pilot successfully.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Regulatory compliance:** It is mandatory for the applicant to demonstrate that it is possible to flight drones in the context of the project and get the necessary permissions during the project. In the proposal the procedure for the authorization must be detailed.
- **Safe use conditions:** The applicant should be able to support safe day-to-day operation of the system in line with the agreed deployment conditions.



**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Testing participation:** The applicant is willing to provide feedback and participate in testing and evaluation activities.
- **Digital interface readiness:** The farm is comfortable using a simple digital interface for mission scheduling, alerts and activity summaries.
- **Collaborative attitude:** The farm demonstrates a proactive attitude towards testing innovative technologies and contributing to evaluation activities.



## 8. Ecoward

---

### 8.1. Technology description

Ecoward is a web application focused on GHG emission monitoring and management, allowing farmers to track their emissions and receive recommendations to implement strategies that reduce emissions in the simplest possible way.

Another objective of this technology is to provide farmers with a more accessible alternative to current commercial solutions.

### 8.2. Key features and innovation

Ecoward has two differentiated functionalities:

- Declarative model: By introducing annual farm data, it is possible to generate an emission forecast for that year.
- Dynamic model: Based on sniffer technology, which captures CO<sub>2</sub> and CH<sub>4</sub> measurements from animal breath, calculations can be performed to determine weekly emissions per animal during the measurement period.

### 8.3. Benefits

- Provides tools that allow annual GHG emission forecasting.
- Offers recommendations to plan strategies that help reduce GHG emissions.
- Enables real-time monitoring and visualization of animal emissions.
- Affordable and accessible technology that serves as a viable alternative to current commercial options on the market.
- Provides emission calculations and results per animal.

### 8.4. Accessibility

The application design is based on a mobile-first methodology, prioritizing development for mobile devices while ensuring multiplatform compatibility. Its main objective is to provide simplicity in both design and data access, making it easy to use even for people with limited familiarity with technology.

Additionally, the system is designed to work with one or more sniffers per farm, enabling scalability from the start and being managed through a token system that simplifies the process of adding or removing sniffers.



## 8.5. Description of the evaluation criteria

The evaluation of this technology focuses on the farm's suitability to implement and test the Ecoward solution under real livestock management conditions. The assessment considers whether the farm can provide the technical, infrastructural and operational conditions required to support greenhouse gas emission monitoring, both through annual declarative data and through the use of sniffer technology for animal-level measurements.

### 8.5.1. Usability Potential

This criterion assesses whether the selected farm provides the practical and technical conditions needed to deploy and use the Ecoward system effectively.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Individual feeding access:** The farm should have guided individual feeding zones or systems that feed animals one by one.
- **Animal identification system:** The farm should have a system available to identify animals entering and exiting.
- **Power and connectivity:** The farm should provide available and accessible power supply and mobile network coverage.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Dry environment conditions:** The farm is not located in a humid environment that could increase maintenance requirements and prevent animal access.
- **Dry feed use:** The farm uses dry feed to prevent potential obstructions or blockages.
- **Covered feeders setup:** The farm has covered feeders to improve gas capture and avoid physical modifications, ensuring accurate measurements.

### 8.5.2. Expected Impact and Applicability

This criterion assesses whether the proposed farm can benefit meaningfully from the Ecoward solution and whether the technology is applicable to its livestock management system.



### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Relevant emission context:** The farm should have a livestock production context in which monitoring greenhouse gas emissions is relevant for management, planning or sustainability improvement.
- **Previous experience:** The farm must demonstrate previous experience with GHG emissions measurement plans, so that the technology results can be better framed and used in the short period of implementation.

### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Milking robot:** The farm has already installed a milking robot, which eases the application of the technology and assures good measurements from the sniffer.
- **Sustainability positioning:** The applicant must explain how emission monitoring may support its environmental goals, farm strategy or future positioning in the market aligned with their current positioning, for which applicants have to demonstrate that they are aligned with organic or extensive production or well faire focused cattle raising.

### 8.5.3. Capacity

This criterion assesses whether the farm has the operational readiness and commitment needed to install, support and complete the pilot successfully.

### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Maintenance availability:** Personnel to perform maintenance activities must be available.
- **Protected installation space:** A suitable space for installing the sniffer that is dry, protected from water, and covered to safeguard the hardware components must be available.
- **Data availability:** The applicant should be able to provide detailed records about the farm, with information such as number of animals, used feed, used energy resources etc. Some proof of this data availability must be shared in the proposal.



**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Stable operational routine:** The farm has a sufficiently organized daily routine to support repeated measurements and consistent use of the system in conjunction with the installed sniffer.
- **Farm location:** Farms located in northern Spain will present an easier time for regular visits from the technical team to ensure the sniffer is working properly.



## 9. Biodiversity Assessment Service

---

### 9.1. Technology description

The aim of the Biodiversity Assessment Service is to qualitatively accredit semi-natural grasslands using eDNA. This is achieved by identifying key vascular plant species indicating semi-natural grasslands by taking samples of cow dung.

### 9.2. Key features and innovation

Fieldwork - sampling kit, instructions & sample preservation.

Labwork – Protocols for DNA-extraction, amplification and sequencing.

Bioinformatics – analysing the presence of key vascular plant species indicating semi-natural grasslands.

### 9.3. Benefits

The technology will evaluate and measure biodiversity levels in semi-natural grasslands, supporting sustainable farming practices that enhance biodiversity. The method is more cost-efficient than traditional biodiversity surveys conducted by a professional botanist.

### 9.4. Accessibility

The farmer needs to practice semi-natural grazing with cattle and keep at least 10 cattle grazing in a semi-natural grazing area that should be evaluated for a week before sampling. The Farmer will then by themselves take 10 samples of fresh cow dung in the grazing-area and should have facilities to keep the samples cold before sending them to a laboratory.

### 9.5. Description of the evaluation criteria

The evaluation of this technology focuses on the farm's suitability to implement and validate the Biodiversity Assessment Service under real grazing conditions. The assessment considers whether the farm can provide the biological, operational and logistical conditions required for sampling, preservation and analysis, and whether the grazing context is relevant for evaluating biodiversity in semi-natural grasslands.



### 9.5.1. Usability Potential

This criterion assesses whether the selected farm provides the practical conditions required to apply the Biodiversity Assessment Service correctly and consistently.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Semi-natural grazing practice:** The farm must practice semi-natural grazing with beef cattle.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Long-term grazing experience:** The farm has practiced semi-natural grazing for more than 20 years.
- **High-Value grasslands:** The farm has semi-natural grasslands that are classified as high-natural value by local or national environmental agencies.

### 9.5.2. Expected Impact and Applicability

This criterion assesses whether the proposed farm can benefit meaningfully from the Biodiversity Assessment Service and whether the technology is applicable to its grazing system.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Species reference access:** The applicant must have access to a national list of key vascular plant species indicating high-value semi-natural grazing land and must share this information with the technology provider.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.



- **Formal biodiversity recognition:** The applicant is able to provide a certification or other similar formal mechanism demonstrating the biodiversity value of semi-natural grazing.
- **Premium market relevance:** The applicant is marketing semi-natural beef as a premium product.

### 9.5.3. Capacity

This criterion assesses whether the farm has the operational readiness and commitment needed to carry out the sampling process correctly and complete the pilot successfully.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Eligible grazing conditions:** The farm must keep at least 10 cows grazing in a semi-natural grazing area for a week before sampling.
- **Sampling readiness:** The applicant should be able to take 10 samples of fresh cow dung in the grazing-area and keep the samples cold before sending them to a laboratory.
- **Protocol compliance:** The applicant should be willing and able to follow the sampling instructions and preservation protocol provided for the service.

#### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Collaborative attitude:** The applicant is willing to provide follow-up information and engage with the interpretation of the assessment results.
- **Environmental awareness:** The applicant demonstrates a proactive interest in biodiversity-related practices and in understanding the ecological value of its grazing land.
- **Result use readiness:** The applicant is prepared to use the results of the assessment to reflect on management practices, environmental communication or future farm development.



## 10. Chainspector

---

### 10.1. Technology description

Chainspector is a blockchain-enabled traceability platform designed to act as a Digital Product Passport (DPP) for small- and medium-sized farms. The system records the entire journey of a product, from farm routines and livestock management to environmental impact, creating an immutable and transparent digital record. It is specifically designed to bridge the information gap between producers and consumers, allowing for the secure documentation of territorial impact and sustainability metrics.

### 10.2. Key features and innovation

- **Blockchain Traceability:** Utilizes blockchain technology and decentralized storage (IPFS) to ensure that product history remains transparent and tamper-proof.
- **Flexible Coding:** Features a modular identification system that derives unique product identifiers from daily batch IDs and individual animal records.
- **Dual QR Modes:** Supports a "direct QR" that leads straight to a product's trace page and a "generic QR" where users can manually enter batch numbers.
- **Rich Media Integration:** Allows producers to embed photos, videos, and farmer profiles directly into the trace pages to showcase farm routines and animal welfare.
- **Environmental Passport:** Integrates sustainability metrics (e.g., carbon footprint) directly into the supply-chain data to inform consumer choices.

### 10.3. Benefits

- **Consumer Trust:** Increases transparency by allowing customers to see exactly how and where their food (e.g., meat, dairy, or artisanal products) was produced.
- **Market Differentiation:** Enables small farms to stand out in competitive markets like farmers' markets or restaurants by proving their sustainability and high animal welfare standards.
- **Data Integrity:** Provides an auditable and secure environment for livestock records, reproductive cycles, and treatment histories.
- **Operational Flexibility:** Offers a way to link mutable media (like recent farm photos) to immutable blockchain records, ensuring information stays relevant while remaining secure.

### 10.4. Accessibility

- **User-Centric Design:** Developed with simple, intuitive interfaces and local language availability to ensure usability for farmers with varying digital skills.



- **Connectivity Resilience:** Includes offline-first modes and optimized media-serving behaviors to function reliably in rural environments with intermittent internet access.
- **Scalable Integration:** Designed for modular deployment, meaning it can be quickly adapted for different product sectors (from chorizo to restaurant-specific cuts) without requiring a full technical overhaul.
- **Low Entry Barrier:** Focuses on lowering the technical hurdles for farmers through training and engagement, ensuring the tool is practical for daily agricultural routines.

## 10.5. Description of the evaluation criteria

The evaluation for Chainspector focuses on the farm's ability to implement a blockchain-based traceability system that serves as a Digital Product Passport (DPP). The criteria prioritize farms capable of documenting the complete journey of their products—from farm routines to environmental impact—bridging the gap between producers and consumers through transparency and secure, immutable data.

### 10.5.1. Usability Potential

This criterion examines the technical and operational readiness of the farm to adopt a digital traceability workflow. It focuses on the farm's ability to manage product identifiers and use scannable technology (QR codes) to communicate with consumers in various environments, such as markets or restaurants.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Identification Systems:** The farm must utilize a reliable system for batch or individual animal identification (e.g., daily batch IDs or individual animal tags) to derive product identifiers.
- **Digital Interaction:** Availability of a smartphone or tablet with internet connectivity to manage the Chainspector platform and generate scannable labels for packaging.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption, and the value of the feedback collected during the pilot.

- **Direct Selling:** Direct-to-consumer sales channels (farmers markets or online selling) where QR-based transparency provides immediate value to themselves.



### 10.5.2. Expected Impact and Applicability

This criterion evaluates how the technology will enhance the farm's market position and sustainability profile. It focuses on the integration of environmental metrics and multimedia storytelling to build consumer trust and support informed purchasing decisions.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Multimedia Commitment:** Compromise to document and share farm routines through photos and videos to be included in the product's digital journey.
- **Public traceability:** To maximize the impact the applicant must accept that all the details of the products history are going to be part of the traceability of the product and publicly recorded.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Environmental Metrics:** Access to environmental impact data (e.g., carbon footprint calculations) to be integrated into the Digital Product Passport.
- **Welfare Transparency:** Interest in showcasing some kind of added value in traceability, such as organic production, extensive management or protected origin status.
- **Transformed products:** Possibility of including the traceability of transformed products from the origin (prepared meat, cheese etc.), as it will have an extended impact on consumer's perception.

### 10.5.3. Capacity

This criterion measures the farm's operational capacity to support a technical pilot involving blockchain and decentralized storage (IPFS). It ensures the farm can provide consistent data and engage in the iterative development needed to adapt the tool to different agricultural sectors.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Data Provision:** Compromise to provide accurate and timely information regarding the product's lifecycle and supply chain stages for blockchain recording.
- **Data availability:** The farm must have almost all of the information needed for the complete traceability of the product. There should not be any secondary actors



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



involved in the completion of the traceability data due to the limited scope of the project.

**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Collaborative Development:** Willingness to work closely with technical providers to test specific features like "whole-animal" QR flows or restaurant-specific deployments. The objective is that traceability is fully implemented from the farm to the consumer. The approach needed to develop this pilot, from farm to fork, should be described in the proposal.



# 11. Fert4Olive

---

## 11.1. Technology description

Fert4Olive is a cost-effective fertilization advisory service designed for smallholder olive farmers, addressing fertilization management optimisation through a user-friendly Farm Management Information System (FMIS). It targets small farms where fertilization is vital for maintaining proper nutritional status but when mismanaged can cause reduced yields, lower oil quality, degraded soil health and increased production costs.

The “Cost-effective Digital Advisor for Olive Groves Precise Fertilization” (Fert4Olive) aims to integrate the necessary software mechanisms towards a low-cost fertilisation advisory service that leveraging remote sensing technology to improve fertilization practices, while also incorporating a digital advisor to interpret satellite-derived VIs and deliver recommendations in natural language directly on a map. Fert4Olive proposes a robust Decision Support System (DSS) that will integrate satellite imagery to provide high-accuracy advice for Nitrogen (N) fertilization, by tailoring advice to the spatial and temporal variability of olive orchard needs. While several Agricultural Digital Solutions (ADSs) aim to address fertilization management, often they rely on costly in-situ sensors or deploy complex data interpretation tools that often overlook the unique barriers of small-scale farming, such as fragmented plots and limited technical expertise, making them largely inaccessible to small farmers.

Leveraging reusable technologies, our in-house Farm Management Information System (FMIS) [PRAMA Agronomy](#) ADS will be extended, adopting fine-granularity earth observation data and processing based on Generative Artificial Intelligence, aiming to address real-world challenges and fit the needs of small farms by empowering farmers with precise, map-based guidance for fertilization. Prama Agronomy will be enhanced with a Decision Support System (DSS) integrating quantitative N fertilization advice via the [FaST Navigator](#). To address spatial N variability, satellite-based monitoring will be used (3m/px resolution), employing the [Canopy Chlorophyll Content Index \(CCCI\)](#), well-suited for olive trees. Our ultimate goal is to simplify interpretation of satellite-derived VIs and integrate them into our FMIS) to streamline fertilization advisory even on farmers with limited digital adoption and significantly enhancing productivity, reducing costs and minimizing environmental impact.

Fert4Olive aims to be a generic warm-leaved orchards fertilization DSS but it will be firstly evaluated in Olive groves considering that traditionally, such cultivations, under such conditions, drive small farmers' reality.

Fert4Olive is based on our PRAMA Agronomy which provides farm digitization and advisory services, serving as a comprehensive "farm calendar", tailored to meet the data collection of farms, by enabling manual submission of key information including field inventory, farming activities and inputs (fertilization, irrigation, plant protection and harvesting) and observations (growth stages, soil analyses). Each field is recorded with georeferenced boundaries, crop and cultivar details, upon which fertilization operations, analyses and advisory recommendations are linked. The fertilization guidance will be integrated into a



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



lightweight, mobile-accessible user interface, which will be enhanced for intuitive visualization through a map-based application dedicated tab, ensuring ease of use, field-level accuracy, and immediate value for farmers.

The system calculates field-wide quantitative nitrogen (N) fertilization prescription via the FaST Navigator API, a EU Commission monograph that integrates established agronomy, soil science, IPCC GHG methodologies, and DSS models into a single operational digital tool. We use FaST Navigator that delivers a parcel-level, objective and repeatable nitrogen recommendation based on a nutrient balance fed by real operational data (weather, crop stage/BBCH, remote sensing indicators, soil analyses and recorded fertiliser applications).

Field-scale vegetation status is derived using Sentinel Hub's Statistical API, which provides aggregated polygon-level metrics (e.g., mean CCCI) calculated over each field boundary and serves as the physiological reference for baseline nutrient assessment.

The Variable-Rate Fertilization workflow uses vegetation index zonation to transform field- and pixel-level CCCI data from EO imagery directly into management zones (MZs) that represent relative crop vigor across the field. A baseline nitrogen recommendation is then adjusted for each MZ through a VI-to-rate response model, after which the zones are assigned discrete nitrogen rates.

By exploiting OpenAI API we interpret these spatial-based data into actionable location-aware advisory in natural language in order to realize a digital advisor. In this framework, structured geospatial and agronomic inputs, including GeoJSON-defined management zones, vegetation metrics, baseline prescriptions, soil attributes, and contextual field parameters, are integrated into concise, location-specific advisory statements. By combining spatial variability, relative deviations, and prescription logic within a rule-guided prompting structure, the system generates transparent natural-language explanations that justify zone-specific nitrogen rates and support consistent, operationally aligned decision-making.

The solution uses satellite-derived vegetation indices to enable farmers to adjust fertilizer inputs based on real orchard needs and in-field variability. It ingests EO data and other heterogeneous sources (remote sensing inputs, user-generated farm data, soil and crop development information) into a Decision Support System (DSS) architecture that emphasises semantic interoperability, data fusion and transparent recommendation mechanisms. The architecture supports explainable, literacy-adapted fertilization recommendations that help end users understand not only what advice is given but also why it is provided.

Fert4Olive is integrated into the existing [PRAMA](#) Farm Management Information System (FMIS), rather than being a standalone prototype, so that system requirements are mapped onto concrete architectural components and existing farm records. Historical fertilization practices, weather conditions and BBCH growth stages are digitised and stored in PRAMA FMIS, providing an evidence-based baseline for configuration and evaluation. Within this environment, the ADS supports map-based management zones, fertilization planning and logging of operations, ensuring traceability and alignment with real farm workflows.



The solution is co-designed with the farmer and his agronomist, translating practical decision-making needs (when, where and how much to fertilize) into system functionality such as mobile access, spatial visualisation and plain-language advisory outputs. It is specifically designed for users with limited digital literacy and access to technology, offering natural-language recommendations displayed on an intuitive map interface. Through this configuration, Fert4Olive aims to optimise fertilizer inputs based on actual orchard needs, enable cost-effective digital advisory at an improved granular level and provide a user-friendly ADS suitable for broad adoption by small farmers.

## 11.2. Key features and innovation

**Optimization of Fertilizer Inputs According to the Actual Needs of Orchards:** Fert4Olive is conceived as a co-created and economically viable digital advisory system that provides low-cost support for fertilization management in Mediterranean orchards. Its core innovation lies in optimizing both the timing and quantity of nitrogen applications according to actual crop needs, thereby reducing the inefficiencies and agronomic risks associated with nitrogen over- and under-application.

**Cost-Effective Natural-Language Advisory at a Finer Granularity:** Fert4Olive addresses the challenges of limited digital literacy among smallholder farmers by translating complex Earth Observation data into clear, accessible natural-language recommendations. This approach narrows the knowledge gap, strengthens trust through transparent explanations, and enables more precise and informed interventions, while also improving the practical value and uptake of satellite-based advisory services.

**User-Friendly Advisory Decision Support for Widespread Adoption:** Fert4Olive is designed to reduce both input and advisory costs, improve productivity, and minimize resource wastage in ways that directly respond to farmers' practical needs. By demonstrating seamless integration with existing fertilization practices under real farm conditions, the system supports a gradual transition toward data-driven decision-making and highlights the tangible benefits of digital agriculture for broad adoption among small farmers.

## 11.3. Benefits

By streamline data-driven fertilization advisory that is considering the actual needs, our solution can **reduce N fertilizer usage by 20%** per season compared to traditional fertilization planning. This focus aligns with the EU's broader commitment to addressing soil degradation and promoting sustainable nutrient management as critical components of agricultural and environmental policy, including [Common Agricultural Policy](#), [Sustainable Development Goals](#) and [European Green Deal](#). It is estimated that land degradation costs the EU €50 billion annually, with [€1.25 billion lost to reduced agricultural productivity](#), as it makes farmers contend with declining soil quality and productivity leading to declining profitability. This is particularly challenging for small farmers, like AMS, who struggle to manage [rising fertilizer costs](#) driven by unpredictable market dynamics and economic pressures. In regions like Crete, where agriculture is dominated by small family-run olive farms managing fragmented plots, the adoption of our ADS is expected to **reduce**



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



**production costs by 40%.** By matching N supply with crop-specific needs to maintain high yields, reducing costs associated with leaf and soil laboratory analyses, and lowering fertilization advisory expenses, Fert4Olive directly addresses the **economic challenges** faced by small farmers and therefore supports rural economies and regional growth. Also, Fert4Olive is expected to enhance **social sustainability** through digital advisory and interventions tracking, **reducing the time and effort required from farmers for fertilization decision making and planning by 80%, freeing up valuable time for farmers**, which they can spend on other productive activities.

- Reduced nitrogen fertilizer use by approximately 20% per season
- Decreased production costs by up to 40%, including savings on fertilizer inputs, lab analyses and advisory expenses
- Reduced fertilization planning time by up to 80%
- Improved yield stability by aligning nitrogen supply with real needs
- Enhanced environmental performance through reduced losses and improved soil health
- Increased competitiveness and resilience of small farms
- Greater access to advanced precision agriculture tools without upfront capital investment

#### 11.4. Accessibility

Fert4Olive is specifically designed for users with limited digital literacy and access to technology, offering a cost-effective and user-friendly fertilization advisory service through natural-language recommendations displayed on an intuitive map interface. Its accessibility is further strengthened by a mobile-first design, simple visualization of fertilization zones, and clear, plain-language guidance that helps farmers confidently adjust inputs according to real orchard needs and in-field variability. Built through co-design with farmers, the system also emphasizes transparency, explainability, and agronomist validation, ensuring that it remains practical, trustworthy, and closely aligned with everyday farming realities.

#### 11.5. Description of the evaluation criteria

The evaluation for Fert4Olive focuses on the farm's digital readiness and the physical suitability of its plots for satellite-based monitoring. The criteria assess whether the farm can effectively utilize a Farm Management Information System (FMIS) and if the existing crop management history allows for a precise, data-driven optimization of nitrogen fertilization.

##### 11.5.1. Usability Potential

This criterion evaluates the compatibility of the farm's physical layout and the farmer's digital skills with the Fert4Olive platform. It ensures that the satellite data can be accurately processed for the specific plots and that the mobile interface will be a practical tool for daily operations.



## Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Crop Suitability:** The farm must cultivate a tree crop supported by the FaST Navigator, such as Olive, Almond, Apple, Citrus, or Stone fruits.
- **Plot Geometry:** Individual plots must have a minimum width of 20 meters and a total area greater than 0.1 hectare to ensure reliable satellite-based zonation.
- **Software Commitment:** The farmer must commit to actively using the PRAMA FMIS for logging activities and validating recommendations during the pilot.

## Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Digital Literacy:** Farmers who are already familiar with smartphone use, specifically map navigation and geolocation features.
- **Terrain Profile:** Plots with a field slope not exceeding 20%, which minimizes distortion in Earth Observation vegetation indices.
- **Communication Skills:** Basic English communication skills to facilitate technical interaction and troubleshooting with the technology provider.

### 11.5.2. Expected Impact and Applicability

This criterion assesses the potential for the technology to deliver significant economic and environmental benefits, such as reducing fertilizer waste and production costs. It prioritizes farms where the transition to precision fertilization will have the highest measurable impact on sustainability and profit.

## Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Data Baseline:** The farm must provide access to historical fertilization and crop management records to enable system calibration and baseline comparison.

## Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Climate Context:** A preference for warm-climate, rain-fed Mediterranean tree crops where timing optimization is critical under extreme conditions.
- **Economic Opportunity:** Farms currently facing high fertilizer costs or declining soil health that could benefit from the estimated 40% reduction in production costs.



### 11.5.3. Capacity

This criterion measures the farm's operational ability to interpret and implement technical agronomic advice. It emphasizes the collaboration between the farmer and professional experts to ensure that the AI-generated recommendations are applied safely and effectively.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Agronomic Support:** The farm must collaborate with a qualified agronomist to assist in the validation and interpretation of the digital recommendations during the pilot.

#### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Planning Efficiency:** Farms seeking to reduce the time and effort required for fertilization planning, targeting the system's potential 80% reduction in administrative workload.



## 12. BrocoMatuRisk

---

### 12.1. Technology description

The proposed technology is an **AI-based crop monitoring and Decision Support System** designed to support optimal harvest timing for Brassicaceae crops such as broccoli, and cauliflower.

The system integrates **UAV (drone) RGB imagery**, computer vision, weather data, and local market price analytics to provide a comprehensive, data-driven approach to harvest decision-making.

Using high-resolution aerial imagery, the system detects individual crop heads and classifies their **maturity stage** across the field. This information is combined with weather forecasts to quantify the **early blooming risk**. In parallel, the system incorporates **local market price** monitoring and price prediction models, allowing farmers to evaluate whether harvesting immediately or delaying harvest (when agronomically safe) is more economically beneficial. The system also generates harvest prioritization maps and yield estimates, enabling farmers to identify which field zones should be harvested first and to better plan labor and logistics.

By combining crop status, risk quantification, and market intelligence, the platform provides actionable recommendations through a tablet-based interface, **supporting both agronomic and economic optimization of harvest timing**.

### 12.2. Key features and innovation

- AI-based maturity estimation using UAV imagery
- Field-level spatial mapping of crop maturity status
- Quantification of early blooming risk, integrating crop status and weather forecasts
- Local market price prediction, based on historical and real-time data
- Combined agronomic–economic decision support, linking crop readiness and agronomic risks with expected market conditions
- Threshold-based alerts for both risk and optimal harvest windows
- Harvest prioritization maps and detailed yield estimation, guiding operational decisions
- User-friendly mobile interface for in-field use

The key innovation is the integration of three decision layers:

1. What is ready? (maturity maps)
2. What is at risk? (early blooming risk)
3. What is economically optimal? (local market price prediction)



### 12.3. Benefits

- Reduced losses due to early blooming and over-maturity
- Optimized harvest timing based on crop condition, weather and market dynamics
- Increased profitability, by aligning harvest with favorable market conditions
- Better labor and logistics planning, based on detailed yield estimation and harvest prioritization maps
- Reduced reliance on manual scouting
- Improved resilience to climate and market variability

### 12.4. Accessibility

The system is designed for **small and medium-sized farms** and ensures easy adoption:

- Compatible with **commercial UAVs**
- Requires only **standard RGB imagery** (no specialized sensors)
- Accessible via **tablet devices in the field**
- **Cloud-based processing**, reducing technical complexity
- **Simple visual outputs** (maps, alerts, recommendations)

The platform is built to function under real farm constraints, including limited time, variable connectivity, and low digital complexity.

### 12.5. Description of the evaluation criteria

The evaluation for BrocoMatuRisk centers on the farm's ability to implement a data-driven harvest strategy that balances crop maturity with market fluctuations. The process assesses the technical readiness for high-resolution aerial monitoring, the suitability of the fields for drone operations, and the alignment with economic prediction models to maximize farm profitability.

#### 12.5.1. Usability Potential

This criterion examines the farm's technical infrastructure and the ease with which operators can interact with the AI maturity models. It focuses on the availability of mobile hardware and the farm's layout, ensuring the platform can be used effectively for real-time field navigation and prioritization.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Aerial Monitoring Hardware:** UAV flight (owned or as a service) and acquisition/creation of RGB orthomosaics at 10-15m altitude, GSD=0.2-0.3cm. This is required to generate high-resolution imagery necessary for accurate crop detection and maturity classification.



- **Device with Connectivity:** Availability of a tablet device with internet connectivity (e.g., 4G/5G mobile network or broadband internet) to access the BrocoMatuRisk user interface during farm operations. This is required to enable real-time access to the platform directly in the field.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Spatial Complexity:** Management of multiple spatially fragmented fields, enabling the evaluation of the platform's performance across diverse locations.

#### 12.5.2. Expected Impact and Applicability

This criterion evaluates the relevance of the decision-support system to the farm's economic and agronomic goals. It prioritizes farms that can provide the necessary crop and market data to validate the system's ability to optimize harvest timing and labor logistics.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Target Crop:** Farm cultivates Brassicaceae species (min. 0.5 ha) during the replication period. Eligible crops include, broccoli and cauliflower. This is required to ensure the system can be validated on the same or relevant crops with similar maturity and harvest dynamics.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Crop Expansion:** Farm cultivates cauliflower during the project's period. This requirement is prioritized to expand the solution beyond broccoli-focused applications.

#### 12.5.3. Capacity

This criterion measures the farm's operational capacity to host a specialized technical pilot. It ensures that the physical environment and the farm's logistical planning are sufficient to support frequent, reliable data collection throughout the growing cycle.



**Essentials:**

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Farm Location:** Located in Greece, ensures alignment with the economic decision-support module, which is calibrated using Greek wholesale price data retrieved from compatible local market price APIs. Being in the same country as the pilot farm also reduces recalibration needs due to broadly similar growing conditions and crop varieties.
- **Flight Environment:** Field conditions that ensure unobstructed UAV flights and reliable image acquisition for the computer vision models.

**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Identified market API:** Identify a market price API or digital platform, providing historical and current market price information in near-daily granularity to support evaluation of the platform's economic decision-support functionalities.
- **Operational Readiness:** Availability of at least one responsible operator to be trained in system operation and monitoring.



## 13. VINE-CARE

---

### 13.1. Technology description

VINE-CARE is an AI-driven vineyard monitoring system that combines multispectral drone imaging, environmental data, and machine learning models to detect early signs of vine diseases and plant stress. The system collects aerial multispectral imagery using a drone (e.g., DJI Mavic 3 Multispectral), processes the data through AI models, and generates vineyard health maps highlighting areas with potential disease (e.g., Downy Mildew, Oidium), hydric stress, or nutrient deficiencies.

The technology supports precision agriculture by enabling vineyard managers to monitor crop health at parcel level and apply targeted treatments only where needed. This helps reduce fungicide use, optimise vineyard management, and improve sustainability in viticulture.

The system is designed for small and medium vineyards and supports agro-ecological farming practices by providing actionable insights through visual maps and decision-support recommendations.

### 13.2. Key features and innovation

Key features:

- **Drone-based multispectral monitoring** enabling high-resolution vineyard health assessment.
- **AI-powered disease detection models** trained to identify early symptoms of mildew and oidium.
- **Stress detection** including hydric stress and potential nutrient deficiencies.
- **Vineyard health maps** highlighting risk zones for targeted intervention.
- **Decision-support system** recommending sustainable treatment actions aligned with organic farming practices.
- **Cloud-based data processing and visualisation** accessible to farmers and agronomists.

The innovation lies in combining affordable drone technology, multispectral analysis, and artificial intelligence to provide early crop health insights that were previously difficult to obtain without costly monitoring systems.

### 13.3. Benefits

- **Early detection of vine diseases** such as Downy Mildew and Powdery Mildew (Oidium).
- **Reduced fungicide usage (20–25%)** through targeted treatments.
- **Improved vineyard management decisions** based on objective crop health data.



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



- **Monitoring of hydric stress and plant vitality** to optimise irrigation and nutrition strategies.
- **Support for sustainable and agro-ecological farming practices.**
- **Cost-efficient monitoring of vineyards** compared to manual scouting.

### 13.4. Accessibility

The VINE-CARE system is designed with a **human-centric approach** to ensure accessibility for farmers and vineyard managers with limited technical expertise.

- Clear **colour-coded vineyard health maps** showing areas of potential risk.
- Easy access to results via **web and/or mobile interface**.
- Minimal technical input required from farmers once drone data collection is completed.
- Simple alerts and recommendations highlighting areas requiring inspection or treatment.

This system design ensures that the system can be easily adopted by **small farms participating in the GUARDIANS open call**.

### 13.5. Description of the evaluation criteria

The evaluation for VINE-CARE focuses on the vineyard's technical readiness for drone-based multispectral monitoring and its commitment to organic or sustainable viticulture. The criteria assess the availability of high-resolution aerial data, the farm's capacity to maintain a rigorous imaging schedule throughout the growing season, and the alignment of the farm's disease management history with the system's AI diagnostic capabilities.

#### 13.5.1. Usability Potential

This criterion assesses whether the farm can practically use the VINE-CARE system, including enabling drone operations and providing the minimum information required to generate usable outputs.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Hardware Specifications:** Availability of a smartphone or tablet to run the edge application.
- **Staff Readiness:** An agronomist or technically competent staff member willing to undergo a system training session.
- **Vineyard Zoning:** The presence of at least three distinct vineyard blocks or zones to allow comparative health analysis.



**Added values:**

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Varietal Diversity:** Vineyards with multiple grape varieties, which allows for more complex phenology-specific validation of the AI models.
- **Network Resilience:** Testing in environments with limited internet connectivity to validate the application's offline-first capabilities.
- **User Feedback:** Willingness to provide structured feedback on the technology's interface and performance.

**13.5.2. Expected Impact and Applicability**

This criterion evaluates the potential for VINE-CARE to significantly reduce fungicide use and improve sustainability. It prioritizes organic vineyards or those in transition, where precision monitoring of diseases like Downy Mildew and Oidium can have the greatest environmental and economic impact.

**Essentials:**

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Vineyard Profile:** A vineyard with at least 2 hectares under organic or transitioning-to-organic certification.
- **Baseline Transparency:** Commitment to providing data on current fungicide use, spray frequency, and monitoring costs for impact comparison.

**Added values:**

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Disease Vulnerability:** A documented history of fungal disease pressure (e.g., powdery/downy mildew, Botrytis) to ensure the AI models are tested against real-world threats.
- **Strategic Alignment:** Existing sustainability goals or pursuit of organic certification that strengthens the internal motivation for technology adoption.

**13.5.3. Capacity**

This criterion measures the farm's operational capacity to host a multi-month research pilot. It focuses on the logistical ability to perform frequent drone flights and the willingness to collaborate with academic partners for ground-truth validation.

**Essentials:**

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.



- **Greek farm:** The farm must cultivate vineyards in Greece, where drone monitoring can be applied, and the farm must provide access for ground truth observations to validate disease detection when required (this is due to budget limitations for the drone operation since the drone operator and the drone would need to be allocated outside where the current pilot inside the project is located, Greece, and would cost more than the budget allowance for the open call).
- **Validation Access:** Willingness to grant UCD (University College Dublin) access to the vineyard for ground-truth validation and system refinement.

### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Environmental Context:** Ability to provide basic environmental or weather data from local stations to support the AI model's accuracy.
- **Dissemination Support:** Willingness to participate in project dissemination activities, such as roadshows or case studies, to help replicate the solution.



## 14. FarmLink

---

### 14.1. Technology description

FarmLink is a digital technology designed to support small and medium-sized farms that operate in remote or weakly connected areas and need reliable field-to-platform data transmission. The solution combines a resilient communications layer, field devices, wearable safety equipment and farm management software to digitalise operations that are still frequently coordinated manually or with delayed reporting. Its purpose is to make agricultural work in disconnected environments visible, traceable and actionable in near real time. Through FarmLink, farms can capture operational events from the field, transmit alerts and selected telemetry, and consolidate the information in a management environment where supervisors can monitor activity, improve coordination, document incidents and make better decisions. The technology is especially relevant for labour-intensive fruit farms with dispersed plots, high mobility of workers and limited access to conventional internet coverage.

### 14.2. Key features and innovation

FarmLink combines a robust field connectivity layer, worker-oriented devices and a digital farm management environment into one modular solution specifically adapted to small and medium-sized farms. Its innovation lies not only in the individual technologies used, but in the way they are integrated into an affordable, easy-to-deploy and scalable system for remote agricultural contexts.

The key features of FarmLink are:

- **LoRaWAN gateway infrastructure** for reliable long-range communication across plots with poor or no conventional coverage.
- **Wearable safety devices for workers**, designed to support traceability of field activity and rapid emergency notification.
- **IoT-ready architecture** that allows the future integration of field sensors and other connected devices relevant to farm operations.
- **Cloud-based data ingestion and processing**, enabling secure storage, event management and operational traceability.
- **Web dashboards and management interfaces** that transform field data into actionable information for planning, supervision and decision-making.
- **SOS and alert functionalities** that strengthen worker protection and improve response capacity in isolated environments.
- **Modular deployment logic**, allowing farms to start with a basic setup and progressively scale the system according to size, budget and operational needs.

From an innovation perspective, FarmLink addresses a gap that many conventional farm management tools do not solve: they assume that connectivity already exists. FarmLink



starts by solving the connectivity and field-data capture challenge, and then links that capability to management, safety and efficiency services in a single operational framework.

### 14.3. Benefits

FarmLink delivers benefits in three dimensions.

- First, it improves operational efficiency by reducing blind spots in field work and allowing managers to know what is happening, where it is happening and when critical events occur. This supports better allocation of labour, faster response to incidents, improved task verification and more structured reporting.
- Second, it strengthens worker safety through immediate SOS notifications and faster escalation when workers are isolated or far from direct supervision.
- Third, it creates the basis for more sustainable and data-driven agriculture, because the same connectivity layer can later support monitoring devices and better planning of resources and interventions. For small farms, this means lower coordination losses, safer working conditions and a realistic route towards digital transformation.

### 14.4. Accessibility

FarmLink has been conceived for practical adoption by small and medium-sized farms with limited technical capacity and investment room. Its deployment model is modular, so each farm can start with the minimum viable configuration and extend the system progressively as needs evolve. The solution is intended to be easy to install, easy to understand and manageable in daily use without advanced digital skills. Because it is designed for remote agricultural settings, FarmLink is suitable for farms where mainstream software tools fail due to lack of reliable coverage. This accessibility is economic and operational: the system reduces complexity for the farmer, simplifies field adoption and makes benefits visible from the first stages of implementation.

### 14.5. Description of the evaluation criteria

The evaluation focuses on identifying farms that suffer from connectivity gaps and operational blind spots in remote agricultural environments, ensuring they have the capacity to collaborate in digitalizing field workflows, safety protocols, and long-range data transmission.

#### 14.5.1. Usability Potential

This criterion evaluates the technical/digital readiness of the farm and the suitability of its environment for the deployment of alternative connectivity layers.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



- **Connectivity Needs:** The farm operates in a rural or agricultural area with limited, unstable or absent conventional internet/mobile coverage, where an alternative field connectivity solution is necessary.

### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **IoT Integration:** The farm plans to incorporate, now or later, additional IoT devices or monitoring points that can use the deployed connectivity layer.

### 14.5.2. Expected Impact and Applicability

This criterion evaluates strategic alignment with the technology's goals, focusing on the potential for improved operational coordination, worker safety, and future scalability.

### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Operational Visibility:** The farm carries out labor-intensive field operations, uses dispersed plots or faces coordination challenges that justify real-time or near real-time visibility of activity in the field.

### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Worker Safety:** The farm has a clear need to improve worker safety, emergency response capacity or supervision in isolated field conditions.
- **Scalability Interest:** The farm is interested in scaling the solution after the pilot to more plots, more workers, new crops or other environments.

### 14.5.3. Capacity

This criterion evaluates the farm's operational commitment to the pilot, including its willingness to provide field access for installation and its compliance with data-sharing regulations.

### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.



- **Active Participation:** The farm is willing to participate actively in installation, configuration, validation and co-creation activities, including operational testing with workers and managers during the pilot.
- **Data Compliance:** The farm accepts the controlled use of operational data and, where applicable, worker-related project data under informed participation procedures and compliance with GDPR and applicable legal requirements.

### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Demonstration Capacity:** The farm is willing to act as a demonstrator or replication site for workshops, peer-learning activities or future dissemination.



## 15. AgriWing

---

### 15.1. Technology description

AgriWing is an AI-powered decision-support system for precision plant protection in olive orchards. It integrates multispectral drone imagery, in-field environmental sensing, and pest monitoring into a single operational workflow.

The system is designed to translate complex agronomic data into clear, actionable decisions for farmers. Instead of providing raw data or requiring interpretation, AgriWing delivers direct guidance on when intervention is needed, what treatment should be applied, and how to execute it using UAV-based spraying systems.

The platform operates as a cloud-based Software-as-a-Service (SaaS) solution, combined with a dedicated field sensor that captures tree-level environmental conditions.

### 15.2. Key features and innovation

- Integration of heterogeneous data sources: multispectral imagery, pest monitoring (olive fruit fly), and in-field sensor data
- AI-driven analysis of crop health, pest pressure, and environmental conditions
- Translation of complex datasets into clear operational recommendations
- Generation of shapefile-based prescription maps for UAV spraying systems
- End-to-end workflow from monitoring to execution (data → decision → action)
- Focus on olive orchards and real-world agricultural conditions
- Modular architecture enabling future integration with additional systems

### 15.3. Benefits

- Reduction of pesticide use through targeted and timely interventions
- Improved decision-making based on real field conditions
- Elimination of manual data interpretation
- Increased efficiency of UAV spraying operations
- Direct connection between analysis and field execution
- Support for sustainable and precision agriculture practices

### 15.4. Accessibility

AgriWing is designed for farms that already use or have access to drone technologies. The system is delivered as a SaaS platform, requiring minimal technical expertise from the farmer.



The solution requires the installation of a dedicated AgriWing field sensor, which provides tree-level environmental data essential for accurate analysis. The sensor is designed for simple deployment and low maintenance.

The interface focuses on simplicity and operational clarity, allowing farmers to receive and execute recommendations without needing advanced knowledge in data analysis or agronomy.

### 15.5. Description of the evaluation criteria

The evaluation for the AgriWing technology focuses on the farm's ability to implement an integrated AI-driven workflow for precision plant protection. Criteria are centered on the availability of advanced drone hardware, the physical installation of tree-level sensors, and the farm's commitment to sustainable practices that can be enhanced through targeted, data-backed interventions.

#### 15.5.1. Usability Potential

This criterion assesses whether the farm possesses the necessary hardware and operational experience to utilize the AgriWing decision-support system. It focuses on the compatibility of the farm's existing drone fleet with the platform's multispectral and spraying requirements.

##### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Monitoring Capability:** Access to a multispectral drone specifically for crop monitoring to feed the AI analysis system.
- **Precision Execution:** Access to a UAV spraying system capable of shapefile-based application, such as the DJI Agras series.

##### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Operational Experience:** Applicants with previous experience in UAV-based crop monitoring or spraying operations to ensure a faster adoption curve.

#### 15.5.2. Expected Impact and Applicability

This criterion evaluates the relevance of the AgriWing solution to the farm's specific agricultural context. It ensures the technology is applied to its intended crop —orchards— and seeks to leverage historical data to validate the impact of precision spraying on yields and chemical use.



**Essentials:**

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Crop Specificity:** The farm must cultivate orchards, as the AgriWing system is specifically designed for this crop and associated pests like the olive fruit fly.

**Added values:**

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Analytical Baseline:** Availability of historical farm data, including pest incidence, historical treatments, and previous yields, to support the validation of the AI model.
- **Strategic Alignment:** Active participation in organic or sustainable farming practices, where targeted intervention offers the highest value.

**15.5.3. Capacity**

This criterion measures the farm's operational capacity to support the technical deployment of the pilot. It focuses on the physical installation of monitoring hardware and the commitment of the farm staff to collaborate on system testing and feedback.

**Essentials:**

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Hardware Installation:** Commitment and to the installation and maintenance of the AgriWing field sensor for tree-level environmental data collection.
- **Installation adequacy:** the farm must demonstrate that their farm is adequate in terms of conditions for the installation of the software (power, connectivity etc.).

**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Collaborative Engagement:** Strong willingness to participate in testing, validation, and feedback activities to help refine the technology.



## 16. DIGIBIO

---

### 16.1. Technology description

DIGIBIO (Digital Intelligence for Biodiversity and Ecosystem Optimisation) is a modular, open-source digital decision-support platform designed to help small and medium-sized farms assess, visualise and enhance biodiversity and ecosystem services at the farm scale. Developed by Alberami — the Italian climate-tech company behind AgroEcology\_Italy, the country's first ICROA-endorsed soil carbon removal project — DIGIBIO translates complex ecological and spatial data into actionable, farm-level insights. The platform integrates open geospatial data (Sentinel-2, land-cover layers, climate variables), ecological models and user-defined scenarios to deliver maps, indicators and recommendations on pollination potential, habitat quality, landscape connectivity and regenerative practice suitability. DIGIBIO runs on a lightweight web architecture (Python, R) that requires no proprietary hardware and is optimised for low-spec devices. To address rural connectivity gaps, the platform supports offline functionality — preloaded maps and local data that synchronise automatically once an internet connection is available — making it usable in low-bandwidth or intermittent conditions.

### 16.2. Key features and innovation

DIGIBIO combines geospatial intelligence, ecological modelling and farmer-oriented decision-support tools into a modular digital system specifically designed for small and medium-sized farms. Its innovation lies not only in the individual analytical components, but in the way they are integrated into an accessible, open-source and scalable platform that turns complex biodiversity and ecosystem data into practical, farm-level actions — and, critically, into eligibility for eco-schemes and high-integrity carbon finance.

The key features of DIGIBIO are:

- **Integration of open geospatial datasets** — Sentinel-2 imagery, land-use maps and climate variables, enabling consistent and low-cost environmental analysis without proprietary data sources.
- **Pollination service modelling** — combining habitat suitability, climatic conditions and crop-specific dependencies to estimate pollinator occurrence and pollination deficits across the farm.
- **Landscape biodiversity assessment** — diversity indices, fragmentation metrics and spatial heterogeneity indicators to evaluate the ecological quality of the farm and its surroundings.
- **Connectivity and corridor analysis** — identification of ecological barriers and opportunities for habitat linkage through least-cost path modelling and spatial clustering.
- **Scenario simulation functionality** — allowing farmers to test agroecological interventions (hedgerows, floral strips, cover crops, habitat restoration) and visualise their potential ecological and economic impacts before implementation.



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



- **Integration with Alberami's ICROA-endorsed carbon framework** — DIGIBIO connects ecological insights with 13 regenerative practices under an ICROA-endorsed protocol, enabling farmers to estimate carbon revenues and prepare for the generation of high-integrity carbon credits, with blockchain-based traceability to prevent double counting.
- **Offline-first, low-spec operation** — preloaded maps, local processing and automatic sync make the platform usable on modest devices and in areas with poor connectivity.
- **User-friendly dashboards** — intuitive maps, indicators and plain-language recommendations for day-to-day farm management.
- **Open-source and modular architecture** — ensuring transparency, adaptability and replication across different regions, crops and production systems.

From an innovation perspective, DIGIBIO addresses a critical gap in current agricultural digital tools: while many platforms focus on productivity or input optimisation, very few provide integrated, spatially explicit insights into biodiversity and ecosystem services at the farm scale, and fewer still connect those insights to eco-schemes and carbon finance. DIGIBIO bridges that gap by linking ecological modelling with practical decision-making and with real income streams for small farms.

### 16.3. Benefits

DIGIBIO delivers benefits across three dimensions, combining ecological intelligence, practical decision-making and long-term economic sustainability for small and medium-sized farms.

- **First, it improves ecological decision-making** by providing clear, spatially explicit insights into biodiversity and ecosystem services. Farmers can identify where ecological limitations exist (e.g. pollination deficits, fragmented habitats, degraded corridors) and prioritise targeted interventions, leading to more efficient and informed land management.
- **Second, it strengthens environmental performance and resilience** by supporting the implementation of nature-based solutions such as ecological corridors, floral strips, cover crops and habitat restoration. This enhances pollination, increases biodiversity, reduces landscape fragmentation, improves soil health and supports adaptation to climate and biotic pressures — including *Xylella* and other emerging threats in Mediterranean agriculture.
- **Third, it unlocks new revenue streams and enables accessible digital transformation** by translating ecological data into eligibility for eco-schemes, PSR measures and ICROA-endorsed carbon credits. For small farms, this means greater autonomy in managing sustainability, improved access to premium markets, and a practical, low-cost pathway towards data-driven agroecological transition.



## 16.4. Accessibility

DIGIBIO is designed for practical adoption by small and medium-sized farms with limited technical capacity and limited investment room. Its architecture is modular, so each farm can start with a minimum data setup and progressively expand functionalities as needs evolve. The interface is built to be easy to access, easy to interpret and manageable in daily use, without requiring advanced ecological or digital expertise.

Because it is web-based and optimised for low-spec devices, DIGIBIO is suitable for farms where complex or high-cost digital tools are not viable. Its offline functionality removes connectivity as a barrier in rural Mediterranean contexts. Participating farms receive guidance and technical support from Alberami for on-boarding, configuration and interpretation of outputs, and benefit from access to the broader Alberami network — over 600 SME farms already engaged in regenerative and carbon-farming activities.

This accessibility is both economic and operational: the system reduces technical barriers, simplifies ecological assessment and makes benefits visible from the first stages of implementation, including a concrete line of sight to eco-schemes and voluntary carbon markets.

## 16.5. Description of the evaluation criteria

The evaluation focuses on identifying farms where biodiversity and ecosystem services can be effectively assessed and enhanced through DIGIBIO, and where the farm has the capacity to collaborate in the adoption, validation and potential replication of a digital, ecology-based decision-support system.

### 16.5.1. Usability Potential

This criterion evaluates the technical and data readiness of the farm and the suitability of its context for the deployment of a biodiversity-oriented digital decision-support system.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Basic digital infrastructure:** The farm (or a designated operator) has access to a web-capable device (PC, laptop or tablet) and to an internet connection — at least intermittently — sufficient to log into the platform and synchronise data.
- **Farm geospatial data:** The farm can provide, or identify, basic geospatial information on its operations (field boundaries, main crops and land-use types), so that DIGIBIO can compute farm-specific biodiversity and ecosystem service indicators.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.



- **Digital readiness:** The farm shows familiarity and prior experience with digital tools and is comfortable working with maps, dashboards or spatial indicators as part of farm management.
- **Complementary environmental data:** Availability of additional local data (soil analyses, climate records, biodiversity observations, historical land-use information) that can be integrated to enrich DIGIBIO's outputs and validation.

#### 16.5.2. Expected Impact and Applicability

This criterion evaluates the strategic alignment between the farm's context and DIGIBIO's goals, focusing on the potential to generate meaningful improvements in biodiversity, ecosystem services, regenerative practice adoption and eligibility for eco-schemes and carbon markets.

##### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Ecological relevance:** The farm operates in a landscape where pollination, habitat quality or landscape connectivity play a relevant role in agricultural productivity or environmental performance — typically mixed-cropping, perennial (olive, vine, fruit) or silvopastoral systems in Mediterranean or similar biodiversity-rich contexts.
- **Plot allocation:** The farm is able to commit at least one plot (indicatively from 1 ha up to full-farm coverage) to the pilot.

##### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Agroecological orientation:** The farm has already implemented, or is interested in implementing, biodiversity-enhancing and regenerative practices (cover crops, floral strips, hedgerows, habitat restoration, reduced tillage).
- **Eco-scheme and carbon-market interest:** The farm is interested in accessing CAP eco-schemes, PSR measures or voluntary carbon markets — in particular, ICROA-endorsed carbon credits generated through Alberami's regenerative framework.

#### 16.5.3. Capacity

This criterion evaluates the farm's operational commitment to the pilot, including its willingness to collaborate in co-design, data provision and validation activities with the technology provider.

##### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.



- **Active participation:** The farm is willing to participate actively in testing, validation and feedback activities throughout the pilot, including online workshops, field walks and structured feedback sessions.
- **Data sharing:** The farm agrees to provide relevant environmental and management data under appropriate data-sharing conditions, in full compliance with GDPR and other applicable regulations.

### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Demonstration capacity:** The farm is willing to act as a demonstrator or replication site for workshops, training activities or future dissemination events — including peer-learning with other Mediterranean farms.
- **Mediterranean context:** The farm operates in a Mediterranean landscape and/or in areas affected by emerging biotic pressures such as *Xylella fastidiosa*, where biodiversity buffers and regenerative practices are particularly relevant.



## 17. SAFE BIRDS

---

### 17.1. Technology description

SAFE BIRDS is an AI-enabled biosecurity support system for free-range poultry farms that helps detect wild-bird intrusion risk early and respond quickly with controlled, neighbour-safe deterrence. It combines camera-based monitoring, on-farm risk scoring, real-time alerts, and rules-based sound deterrence, while supporting both new 4G cameras and existing legacy camera infrastructure. The system uses a dual-logic architecture, with core functions running locally on the farm for fast response and continuity, and optional server-side services for monitoring, analytics, and configuration. It is designed for practical replication in small farms, with a simple risk-first dashboard, external speaker integration where needed, and local data handling with limited retention and human oversight.

### 17.2. Key features and innovation

SAFE BIRDS offers a smart, farm-ready combination of AI detection, rapid risk alerts, and controlled deterrence for outdoor poultry systems. The innovation lies in making advanced biosecurity practical for small farms through modular deployment, mixed new-and-legacy camera integration, low-training operation, and built-in safeguards for neighbours, animal welfare, and privacy. Its replication value is especially strong, because it is designed to work with existing farm infrastructure and can be adapted to different farm layouts and risk zones without requiring full equipment replacement.

### 17.3. Benefits

SAFE BIRDS strengthens biosecurity in free-range poultry farming by enabling earlier detection of intrusion risks and faster, more consistent response than manual chasing. It improves day-to-day decision-making through real-time alerts, event history, and hotspot identification, helping farmers react quickly and address recurring weak points. The system also lowers adoption costs through modular deployment and reuse of legacy cameras, while supporting neighbour-safe and welfare-safe operation through controlled deterrence. More broadly, it is designed to improve poultry health and farm productivity, reduce environmental impact, and provide a scalable, replication-ready solution for other small farms.

### 17.4. Accessibility

SAFE BIRDS is designed to be accessible for small and medium free-range poultry farms through a modular, low-training, farmer-friendly approach. The system supports simple daily operation with a risk-first dashboard, clear real-time alerts, hotspot visibility, and manual override controls, so farmers can use it without specialist technical skills. It also improves accessibility of adoption by reusing existing farm infrastructure where possible, including



legacy camera feeds, while adding external Bluetooth speakers only where needed, reducing upgrade costs and avoiding full hardware replacement. In addition, the system supports online availability with offline fallback/local continuity, making it practical for rural environments with variable connectivity, and it is intended to be replication-ready with installation guidance for similar farms.

## 17.5. Description of the evaluation criteria

The evaluation for the SAFE BIRDS system centers on the farm's ability to implement a technology-driven biosecurity perimeter. We assess the physical layout for camera and sound deployment, the presence of specific wild-bird intrusion risks, and the farm's commitment to balancing automated deterrence with animal welfare and local community standards.

### 17.5.1. Usability Potential

This criterion examines the technical and physical readiness of the farm to integrate AI-enabled monitoring and sound-based deterrence. It focuses on whether the infrastructure can support the hardware and if the staff is prepared to engage with the digital dashboard.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Infrastructure and Visibility:** The farm must provide suitable mounting points with clear lines of sight to risk zones for camera and deterrence unit installation.
- **Power Supply:** Provision of a feasible power supply for all installed equipment, using grid power or an agreed-upon alternative.
- **Connectivity:** Availability of at least intermittent mobile or internet connectivity for alerts, or an agreement to operate in a local-only mode for data access.
- **Staff Digital Readiness:** At least one designated staff member must be available to access the dashboard via smartphone or basic IT setup for routine operation.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Infrastructure Synergy:** Presence of existing mounting infrastructure (poles, fences, buildings) or an existing CCTV system to speed up adoption.
- **Connectivity Quality:** Stable internet coverage across target zones to support live viewing and faster remote support.
- **Environmental Clarity:** Minimal vegetation obstructions along the perimeter, ensuring optimal AI detection performance.
- **Operational Readiness:** Daily availability of staff to acknowledge real-time alerts and record the outcomes of deterrence actions.



### 17.5.2. Expected Impact and Applicability

This criterion evaluates the relevance of the wild-bird intrusion risk to the farm's specific livestock and layout. It ensures that the pilot will result in measurable improvements in biosecurity and provides a clear baseline for validating the system's effectiveness.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Target Livestock:** The farm must operate poultry, cattle, sheep, or other livestock with outdoor access where wild-bird intrusion is a measurable risk.
- **Zonal Definition:** The farm must have clearly defined perimeter areas or "hotspots" where monitoring and deterrence can be evaluated.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Mapping Precision:** Ability to provide a farm layout map with marked risk zones to accelerate hotspot mapping and system configuration.
- **Knowledge Sharing:** Willingness to share anonymized pilot metrics and feedback to support future replication guidance.
- **Demonstration Potential:** Interest in hosting short peer-learning visits or demonstrations for other farmers after the validation phase.

### 17.5.3. Capacity

This criterion measures the farm's operational capacity to host the pilot safely and legally. This includes adherence to noise regulations, animal welfare standards, and the logistical ability to support the technology provider during installation.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Operational Commitment:** Mandatory participation of the owner or staff in setup, training, and routine daily operation during the pilot.
- **Community Standards:** Agreement to follow "neighbor-safe" rules, including sound limits and time-of-day constraints to prevent local nuisance.
- **Welfare Safeguards:** Commitment to welfare-safe operation, including monitoring animals for stress and using manual overrides when necessary.
- **Data and Access Safety:** Agreement to local data-handling rules (limited retention/purges) and ensuring safe working conditions for installation teams.



**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Acoustic Environment:** Low background noise levels that allow the deterrence sounds to be more effective at lower, neighbor-safe volumes.
- **Baseline Data:** Provision of baseline information, including current mitigation practices and any incident history, to allow for performance comparison.
- **Documentation Support:** Permission for the technology provider to use photo documentation of the installation for technical and validation purposes.



## 18. LIVET

---

### 18.1. Technology description

LIVET is a modular digital decision-support platform designed specifically for extensive cattle farming. It integrates a secure backend infrastructure with a web-based management platform and an offline-first mobile application, enabling both supervisory and field-level operations.

The system centralises livestock records, reproductive cycles, treatments, batch-level traceability and economic indicators into a single auditable environment. It is built on a shared backend and PostgreSQL database, exposing APIs consumed by both applications. Where available and authorised, LIVET can integrate selected IoT devices (such as GPS collars and calving sensors), but these integrations are optional and modular, ensuring the system remains fully functional without mandatory hardware dependencies.

The architecture prioritises:

- Offline-first mobile operation
- Secure authentication and role-based access control
- Full traceability of user actions
- Regulatory alignment (GDPR and livestock compliance)
- Scalability from TRL 4–5 to TRL 7

The platform is designed to function reliably in rural and mountainous environments with intermittent connectivity.

### 18.2. Key features and innovation

LIVET introduces a farmer-centric innovation approach grounded in co-design and real operational constraints.

**Key features include:**

- Animal and batch-level traceability with full historical records
- Reproductive cycle monitoring with configurable alerts
- Economic visibility at batch and supplier level
- SIGPAC parcel integration for spatial livestock context
- Mobile ear-tag barcode scanning to eliminate manual ID entry
- Offline-first mobile functionality with automatic synchronisation
- Optional IoT integration (GPS collars and calving sensors)
- Role-based multi-farm management with action traceability
- Integrated compliance-by-design framework ensuring structured regulatory recordkeeping and audit-ready traceability for inspections and certification bodies.



**Innovation aspects:**

- Focus on simplicity over feature overload
- Modular IoT integration to avoid unnecessary recurring costs
- Economic analytics prioritised over opaque AI automation
- Designed specifically for extensive cattle systems (organic, breeding, fattening)
- Co-created with farmers to ensure practical usability
- Cybersecure-by-design architecture
- Unlike highly automated industrial livestock systems, LIVET preserves human decision making authority while providing structured, reliable decision-support tools.

### 18.3. Benefits

LIVET delivers tangible operational, regulatory and economic benefits:

**Operational Benefits**

- Reduced manual data entry and administrative workload
- Lower error rates through barcode scanning
- Improved visibility of livestock status and reproductive cycles
- Reliable use in low-connectivity environment

**Regulatory Benefits**

- Improved compliance with livestock traceability regulations
- Structured treatment documentation
- Audit-ready data export for inspections
- Alignment with organic certification requirements (e.g., COPAE context)

**Economic Benefits**

- Batch-level profitability analysis
- Supplier comparison and purchasing optimisation
- Feed cost sensitivity support
- Better-informed investment decisions

**Strategic Benefits**

- Affordable and accessible for SMEs
- Reduced dependency on costly IoT licensing models
- Scalable and adaptable to similar extensive farming contexts

### 18.4. Accessibility

Accessibility has been a core design principle of LIVET, not only in terms of technical compatibility, but also in how farmers interact with the system in their daily work.



Funded by the European Union under the Horizon Europe Framework Programme, Grant Agreement No. 101084468.



In practice, farmers will use LIVET through two complementary interfaces:

### **Mobile application (field-oriented use):**

The mobile app is designed for day-to-day operations in the field. Farmers can:

- Register events directly from pasture or stable (births, treatments, movements, status changes).
- Scan official ear tags using the smartphone camera to avoid manual entry errors.
- Receive and consult alerts (e.g., reproductive events, treatment deadlines).
- Continue working even without connectivity, with automatic synchronisation once the connection is restored.

The interface prioritises large buttons, simplified views and minimal data entry to match real working conditions (outdoors, gloves, time pressure).

### **Web platform (management and analysis use):**

The web interface is intended for more structured management tasks, typically from home or office. Farmers can:

- Review livestock records and traceability history.
- Manage inventories (medication, feed, agricultural inputs).
- Register purchases and sales.
- Access economic summaries and analytical dashboards.
- Prepare documentation for inspections and regulatory compliance.

The platform ensures:

- Intuitive user interfaces requiring minimal training.
- Smartphone compatibility (Android and iOS)
- Offline-first mobile operation for field environments
- Modular architecture adaptable to different digital maturity levels
- Affordable cost structure suitable for small and medium farms
- Multi-user support with controlled permissions

The system is designed for progressive digital adoption. Farms with low initial digitalisation levels can start by replacing basic manual records and gradually incorporate additional functionalities such as IoT integration or advanced analytics.

Additionally, by focusing exclusively on extensive cattle farming models, LIVET avoids unnecessary complexity and ensures the solution remains proportionate, usable and economically viable.



## 18.5. Description of the evaluation criteria

The evaluation of the LIVET platform focuses on assessing the digital readiness of extensive cattle farms and the alignment of their production models with the system's decision-support tools. The criteria ensure that participating farms can effectively transition from manual records to a digital environment while providing the operational support necessary to validate the platform's impact on traceability and economic planning.

### 18.5.1. Usability Potential

This criterion evaluates the technical and operational feasibility of adopting the LIVET web and mobile applications within the farm's daily routine. It focuses on the digital literacy of the operators and the physical requirements for accurate livestock data entry and tracking.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Digital Readiness:** The farm must have access to a smartphone (Android or iOS) and the staff must possess basic digital literacy to operate the platform.
- **Software Implementation:** Commitment to allow the installation and active use of both the LIVET web and mobile applications during the replication phase.
- **Traceability Infrastructure:** The farm must manage livestock using official identification methods (ear tags) to enable the system's mobile scanning features.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Multi-User Collaboration:** Farms with multiple users involved in daily operations who can benefit from role-based access and action traceability.
- **Digital Growth Mindset:** An openness to progressive digital adoption, particularly for farms currently operating with low levels of digitalization.

### 18.5.2. Expected Impact and Applicability

This criterion assesses how well the LIVET platform addresses the specific operational and economic challenges of the applicant's farm. It prioritizes scenarios where the integration of spatial data and batch-level analysis will yield the most significant improvements in regulatory compliance and profitability.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Sector Alignment:** Eligibility is restricted to extensive cattle livestock models, specifically those focused on organic, breeding, or fattening production.



- **Spatial Management:** The farm should operate across multiple parcels, making the use of spatial information (e.g., SIGPAC in Spain) relevant for management.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **IoT Integration:** Farms that already use or plan to use calving sensors and GPS collars compatible with the project's integrated models. For this reason, the specific models have to be declared in the proposal.
- **Economic Analysis Interest:** A demonstrated interest in utilizing decision-support tools to improve batch-level profitability and investment planning.

#### 18.5.3. Capacity

This criterion measures the farm's logistical and legal capacity to support the testing process and handle data securely. It ensures that the farm is fully committed to the collaborative nature of the pilot and meets the necessary regulatory standards for data processing.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Validation Commitment:** The farm must be willing to actively participate in validation activities, including usage monitoring and providing feedback.

#### Added values:

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Geographic Proximity:** Location within the Asturias region is desirable to facilitate efficient on-site visits, field validation, and technical follow-up specially due to the involvement of sensors integration.
- **Operational Maturity:** Farms that have structured records of treatments and reproductive cycles, which can be easily migrated into the LIVET environment.



## 19. FLOEM Plant Stem Infusion – INFRUSE

---

### 19.1. Technology description

**FLOEM Plant Stem Infusion (PSI)** is an innovative precision delivery technology that enables **direct infusion of liquid solutions into the vascular system** of plants. Instead of relying on soil-mediated fertilisation or foliar spraying, FLOEM delivers nutrients and other compatible liquid formulations directly into the plant's internal transport system, where they can be distributed efficiently throughout the plant without losses caused by soil leaching.

The technology has been successfully demonstrated across multiple plant types, including perennial crops such as fruit trees and vines, as well as smaller and non-perennial plants. This makes the system largely **crop-agnostic** and adaptable to a wide range of agricultural applications.

By bypassing soil-related limitations such as nutrient immobilisation, leaching, and uneven uptake, FLOEM enables **precise and controlled delivery of compounds** directly where plants can use them most effectively. Potential applications include improving **nutrient-use efficiency**, stabilising or **increasing yields**, and **delivering plant treatments** such as biostimulants, medications, or pest-control agents directly into plant vascular tissue. In controlled research trials, the technology has already demonstrated yield increases of up to 34% in certain crops.

Within the **INFRUSE** project, FLOEM is being adapted specifically for **orchard** environments, with a prototype system designed for trunk infusion in fruit trees such as apples. The system uses a modular tree infusion interface, tubing, a control hub, and a pressure delivery mechanism that allows farmers to administer measurable amounts of liquid solutions directly into the tree.

The technology is currently being validated under real production conditions at the Fruit Farm Trstenjak ecological orchard, a leading Slovenian producer of organic juices and vinegars.



## 19.2. Key features and innovation

FLOEM introduces a fundamentally different approach to delivering compounds to plants by enabling **direct vascular infusion of liquid solutions**. Instead of relying on soil transport processes or foliar absorption, the system delivers compounds directly into the plant's internal transport network, allowing for highly efficient and targeted distribution throughout the plant.

The patented technology is built around a **modular** infusion architecture, consisting of a tree interface adapter, fluidic tubing, a controlled pressure delivery system, and a central control hub that regulates infusion parameters. This design allows precise adjustment of pressure, flow rate, and total infused volume, ensuring controlled and measurable delivery.

Key innovative aspects include:

- **Direct plant vascular delivery:** nutrients or compatible treatments are infused directly into the plant's transport system, bypassing soil-related losses.
- **High nutrient-use efficiency:** reduced fertiliser waste and improved uptake compared to conventional soil fertilisation methods.
- **Crop-agnostic platform:** applicable to perennial crops such as fruit trees and vines, as well as smaller plants and greenhouse crops.
- **Precision control of delivery parameters:** adjustable infusion pressure, flow rate, and total delivered volume.
- **Modular and scalable design:** components can be deployed per tree and scaled gradually across an orchard.
- **Potential for versatile applications:** the same delivery platform can be used for delivery of nutrients, fertilizers, biostimulants, plant health treatments, or pest management solutions.

The system is designed to operate in real farm environments with minimal infrastructure requirements and can function without continuous internet connectivity, making it suitable for a wide range of agricultural settings.



### 19.3. Benefits

FLOEM Plant Stem Infusion offers farmers a **new tool** for improving the efficiency and precision of compound delivery while reducing losses associated with conventional soil-based fertilization.

By delivering **nutrients, treatments, pesticides or biostimulants** directly into the plant's vascular system, the technology can significantly improve compound uptake efficiency and reduce losses caused by leaching, immobilisation in soil, or uneven uptake. This can translate into more stable plant nutrition, production, health, and improved crop performance.

In research trials, FLOEM has demonstrated yield increases of up to 34%, highlighting its potential to improve productivity while maintaining efficient input use.

Key benefits for farms include:

- Improved yield potential through more efficient nutrient delivery
- Reduced fertilizer waste by bypassing soil-related losses
- Precise and measurable input application directly to the plant
- New possibilities for targeted plant treatments, including delivery of biostimulants, medications, or pest-control compounds
- Compatibility with ecological or low-input production and regulatory environment
- Gradual and scalable adoption, allowing farms to start with a small number of trees or plants

Because the system operates directly at the plant level, it provides farmers with a new level of control over how and when inputs are delivered, improving both productivity and resource efficiency in modern agriculture.

### 19.4. Accessibility

The FLOEM system is designed to be accessible and practical for real farm environments, requiring only **minimal infrastructure and technical expertise**. The technology can be deployed on individual plants or small groups of trees, allowing farms to start with a limited pilot and gradually scale adoption if the results are positive.

Installation and operation are designed to be straightforward. The system consists of modular components that can be installed directly on selected trees, with infusion parameters controlled through a simple control hub. Farms participating in the pilot will receive **guidance and technical support from the technology provider** (Plan Z) for installation, operation, and monitoring of the system.

The system can operate in standalone mode and does not require continuous internet connectivity, making it suitable for farms with varying levels of digital infrastructure. Basic operational data and performance indicators can be monitored locally during the pilot phase.



Participation in the replication phase of the GUARDIANS Test-Before-Invest Open Call allows farms to evaluate the technology **under their own crop, climatic, and operational conditions** while contributing valuable feedback to the development of next-generation agricultural technologies.

The modular nature of the system allows farms to test the technology on a small number of plants before considering wider deployment, ensuring a low-risk pathway for experimentation and adoption.

## 19.5. Description of the evaluation criteria

The evaluation of the FLOEM Plant Stem Infusion (PSI) technology focuses on the farm's ability to integrate a direct vascular delivery system into their existing orchard management. The process assesses the technical suitability of the crops, the potential for measurable improvements in nutrient efficiency, and the farm's readiness to provide the necessary operational support for the pilot.

### 19.5.1. Usability Potential

This criterion assesses how effectively the modular FLOEM system can be installed and operated within the specific environment of the applicant's farm. It focuses on the physical compatibility of the technology with the existing crop structures and the ease with which the farm staff can adopt the infusion process.

#### Essentials:

The following set of essentials represents the minimum requirements needed to ensure that the technology can be used and tested in practice:

- **Crop Compatibility:** The farm must cultivate orchard crops or perennial plants (e.g., apple, pear, plum, vine, olive) with established trunk or stem structures suitable for vascular infusion.
- **Tree Health:** Selected trees must be in standard production condition and free of terminal disease or structural damage that would prevent successful infusion.
- **Infrastructure Access:** The farm must provide safe physical access to trees and, if necessary, access to electricity for the delivery system.

#### Added values:

The following set of added values represents additional elements that may improve the quality of the user experience, the ease of adoption and the value of the feedback collected during the pilot.

- **Feedback Engagement:** Applicants who demonstrate an openness to iterative testing and providing detailed, structured feedback on the system's user interface.
- **Data Correlation Tools:** Availability of existing environmental sensors (e.g., soil moisture, temperature) to help correlate infusion data with external conditions.



### 19.5.2. Expected Impact and Applicability

This criterion evaluates the potential benefits the farm may gain from bypassing soil-related nutrient losses. It looks for scenarios where direct infusion can significantly improve yield or plant health, especially in resource-constrained or ecologically sensitive environments.

#### Essentials:

The following set of essentials represents the minimum elements needed to ensure that the technology is applicable and that its effects can be meaningfully assessed.

- **Pilot Scale:** A commitment of a minimum of 3 to 10 production trees for the duration of the pilot to ensure a meaningful assessment of results.
- **Validation Agreement:** Participation in structured data collection and performance evaluation sessions to validate the technology's impact.

#### Added values:

The following set of added values represents additional aspects that may increase the expected benefits of the pilot, the relevance of the results and their potential value for wider replication.

- **Production Regime:** Farms operating under ecological or reduced-input regimes where the impact of nutrient efficiency is expected to be more pronounced.
- **Economic Relevance:** Small- to medium-sized farms (up to 50,000 trees) where per-tree modular deployment provides a clear economic advantage.
- **Future interest:** Farms interested in exploring future systemic applications (e.g., therapeutic or anti-pest delivery), outside the initial TRL 7 scope. Farms facing pest infestations or disease spread (e.g. Flavescence dorée) might be very relevant.

### 19.5.3. Capacity

This criterion measures the farm's operational and logistical ability to host the technology provider and maintain the system. It ensures that the farm has the necessary commitment and proximity to successfully execute the pilot's lifecycle.

#### Essentials:

The following set of essentials represents the minimum requirements needed to host, support and complete the testing activities.

- **Operational Access:** The farm must provide orchard access for installation and monitoring or demonstrate the ability to follow remote installation instructions.
- **Staff Commitment:** Allocation of staff time for the training and maintenance required by the technology provider.



**Added values:**

The following set of added values represents additional elements that may strengthen the implementation of the pilot, facilitate collaboration with the technology provider and improve the overall quality of the testing process.

- **Geographic Proximity:** Farms located in central, eastern, or southeastern Europe to facilitate easier on-site support from the provider (Slovenia).
- **Collaborative Readiness:** Experience in participating in innovation projects or research trials, suggesting a high capacity for professional collaboration.

