



# GREEN INFRASTRUCTURE IN WINE-GROWING LANDSCAPES

Nature-based solutions and recommended  
best practices in vineyards

## Identified problem:

The **intensive use of pesticides and fertilisers** in vineyards and the **use of machinery** in modern viticulture contribute significantly to soil and groundwater contamination. These practices also create imbalances in the biodiversity of the ecosystem, increase health risks, reduce grape quality, and increase both atmospheric emissions and the carbon footprint. To ensure the environmental sustainability of the wine sector, it is essential to address all these challenges in a comprehensive manner.

## Best practice recommended by ECOSPHEREWINES:

### USE OF PRECISION AGRICULTURE (PA)

The incorporation of **technologies** that include decision support systems in agriculture indirectly optimises key aspects such as vine yield and grape composition, irrigation, soil management, as well as the detection and management of phytosanitary issues. When properly managed, AI technologies provide **diverse** environmental, social, economic, and cultural **benefits**, commonly described as **ecosystem services**.

## How can this best practice be implemented?

1. **Identify** the problems present in the vineyard (pests and damages, management issues, wine post-production issues, etc.).
2. **Select** the applied PA technology that best suits each vineyard. You can use the following technologies depending on the problem identified:
  - Use pest and disease prediction models linked to weather stations, or remote detection tools such as drones equipped with multi/hyperspectral cameras that can detect plant health problems early on, allowing you to reduce the use of plant protection products and, consequently, your carbon footprint. You can use drones to define specific vegetation indices (NDVI), creating prescription maps that, with the help of digital tools (e.g., GIS) and variable dosing, allow you to determine the appropriate application dose in different areas of your plot.
  - Use data-driven sensors and predictive models (available on various platforms) for crop management, which allow you to optimize irrigation and fertilization.
  - Use automated systems for harvesting grapes, improving work efficiency.

## What ECOSYSTEM SERVICES does the use of PRECISION AGRICULTURE provide?

- **Provision:**
  - Obtaining grapes and generating natural derivative products (e.g. cosmetics, biofuel,...).
- **Regulation:**
  - Pest and disease control through optimized monitoring and protection methods.
  - Nutrient cycle regulation, reducing leaching and groundwater contamination.
  - Protection of biodiversity in wine-growing ecosystems.
  - Reduction of the environmental footprint through reduced use of pesticides and other types of production factors.
  - Regulation of the water cycle through optimized irrigation management.
- **Cultural:**
  - Conservation and maintenance of the traditional wine-growing landscape (minimizing mechanization and reducing the use of plant protection products), reinforcing its cultural identity and value as historical heritage, highlighting the preservation of the aesthetic and heritage landscape, which is essential for sustainable wine tourism activities or education and outreach, among others.



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