vinetur

French and Italian Vineyards Harness AI and IoT to Combat Climate Risks and Boost Wine Quality

Real-time data from sensors and machine learning models help growers optimize yields, reduce water use, and improve traceability

Thursday, January 22, 2026



Vineyards in France and Italy are testing new digital tools to improve grape growing and wine production as part of the AgriDataValue project, funded by the European Union’s Horizon program. The project includes 23 pilot initiatives across nine European

countries, covering a range of crops and farming systems. In the case of vineyards, pilot activities in France and Italy are using smart agriculture technologies to monitor environmental conditions and support more efficient, sustainable wine production.

The core of these pilots is the use of Internet of Things (IoT) devices, which collect real-time data on temperature, soil moisture, and humidity. These sensors are installed directly in the vineyards and feed information into the SynField system, developed by Synelixis. The data is then integrated into the AgriDataValue platform, where it can be analyzed using artificial intelligence (AI) and machine learning (ML) models.

This technology allows vineyard managers to make informed decisions about irrigation, fertilization, and disease prevention. For example, by monitoring soil moisture and leaf wetness, growers can optimize watering schedules and reduce water use. The system also helps identify early signs of plant diseases such as downy mildew and powdery mildew. Machine learning models analyze weather patterns and historical disease data to provide early warnings, allowing for targeted interventions that minimize crop loss.

In France, one pilot is located in Saint-Émilion, a region known for its high-quality Merlot wines. Here, multiple SynField devices—including main nodes and peripheral sensors—track a wide range of environmental factors. Weather stations record temperature, humidity, wind speed and direction, and rainfall. Soil sensors measure moisture and temperature at different depths. A pyranometer tracks solar radiation. This detailed monitoring supports strict requirements for traceability and regulatory compliance in the region.

In Italy, another pilot operates in Tebano, Emilia-Romagna. The seven-hectare vineyard grows Sangiovese and Trebbiano grapes using integrated management practices that combine sustainability with productivity. The SynField system here includes a main node, weather station, and soil sensors. The vineyard was planted in 2021 with Guyot training systems and specific spacing between vines to optimize growth. Real-time data collection helps managers adjust their practices to local conditions.

A key focus of AgriDataValue is managing climate risks such as spring frosts, which can destroy buds and inflorescences—critical parts of the grapevine that determine yield. By combining ground-based sensor data with satellite observations, the project

provides high-resolution assessments of environmental variability. This approach improves early warning for frost events and other weather-related threats.

The integration of IoT devices with AI-driven analysis creates a more transparent supply chain for wine producers. Data collected from the field is securely shared through the AgriDataValue platform, supporting advanced analytics and decision-making tools for farm managers. This not only improves vineyard performance but also enhances grape quality and long-term sustainability.

For producers participating in AgriDataValue, these digital tools represent a significant step toward resilient farming practices and transparent business models. The project demonstrates how real-time field data, advanced analytics, and secure data sharing can help growers better understand their vineyards, manage climate risks, optimize yields, reduce environmental impact, and build consumer trust through greater traceability.

By connecting on-farm decision support with data-driven innovation across the value chain, AgriDataValue is laying the groundwork for a more competitive and sustainable future in viticulture. The lessons learned from these pilots may also have broader applications for other sectors in agriculture as digital transformation continues to reshape food production across Europe.