LOCATION

Serbia, Montenegro, Georgia and Slovenia

PARTNERS

5.1
Disease prediction and supply chain transparency for orchards/vineyards

CHALLENGE

Pest and disease appearance as well as their spread is one of the main problems in fruit and grape production. Disease control is usually based on experience instead of hard facts, although prediction models are available. However, these models often provide only general instructions instead of precise advice for each user. Additionally, there is a lack of easily accessible traceability data for consumers who would like to know which pesticides and other products their food has been treated with.

AIM

This pilot focuses on complete farm management in vineyards and orchards, providing pest and disease management tools to optimise pesticide usage and increase crop quality. Furthermore, pesticide usage data is collected and stored to enable a transparent supply chain.

HOW

The DNET agroNET platform is used to provide decision support in pest and disease management to farmers, as well as collecting data through the whole supply chain and providing the relevant information to each stakeholder. agroNET gathers information about pesticide usage from Pulverizadores Fede cloud-connected smart sprayers, thus being able to provide the data to be incorporated into the product passport.

IoT devices are deployed and information from Pulverizadores Fede sprayers is integrated to collect knowledge about the environment, spraying cycles, and data directly from field and machines. Throughout the pilot, data are collected, processed and insights generated, providing instructions for farmers in real-time. A blockchain-based data exchange protocol (OriginTrail) is used to ensure trust and transparency between actors and the integrity of the data exchanged in the value chain. The service provides pest and disease control in orchards and vineyards in different regions by using digitised prediction models and cloud connected sprayers.

BENEFIT

The pilot will result in pesticide usage optimisation, leading to a decrease in costs and an increase in the quality of the various fruits and grapes. It will also deliver a trustworthy supply chain based on collected information from all stakeholders.

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DEMETER Integration

A range of IoT devices were used to collect relevant parameters providing inputs in expert modules resulting in decision support to farmers in irrigation, pest and disease management. agroNET platform developed by DNET was used as a main decision support system across all deployments in vineyards and orchards, providing data visualization and easy to use instructions to the farmers. Integration with FEDE sprayer enabled automation in pesticide application. Also, integration with additional proprietary platforms (Product Passport, fleetNET, DKG) through DEMETER AIM as the main information model, provided a basis for supply chain transparency. APIs facilitated interaction between the platforms, while the AIM and Semantic Mappings played a crucial role in remodeling information from IoT sensors.

Feedback From Farmers

Farmers participating in Pilot 5.1 shared their satisfaction by using digital solution in everyday practice. They highlighted the benefits of having real-time insight into environmental parameters and decision support for irrigation optimization and pesticide usage resulting in costs decreasing, better farm management and less environmental footprint. Furthermore, farmers expressed their willingness to share relevant information with end-users, thereby fostering supply chain transparency. This feedback showcases the tangible benefits and value that the digital solution brings to farmers, empowering them to enhance their agricultural practices and sustainability.

Outcomes

By utilizing expert modules for pest and disease prediction, pesticide usage has been reduced. The irrigation expert module has optimized water usage, conserving this valuable resource. Furthermore, the pilot has improved supply chain transparency by introducing QR codes on wine bottle labels.
The main outcomes after successful use of the solutions are:
- Fully validated current digitized prediction models in grape/apple production,
- Established new partnerships,
- Increased awareness of the end-users' communities,
- Developed a basis for establishing new business models based on the data sharing between different stakeholders.