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Agrinnoovation

Digital tools and technologies for future-proof EU farming, forestry and rural areas

- Spotlight on EIP-AGRI Operational Groups and Horizon multi-actor projects testing new digital solutions
- Cultivating skills: tools and training to foster lifelong learning
- New horizons in forest pest monitoring



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Welcome

I am delighted to introduce the 2025 edition of the Agrinnovation magazine, which explores the transformative power of robotics, artificial intelligence (AI) and digital solutions in agriculture, forestry and rural areas, in the wider context of innovation and knowledge exchange.

It showcases how digital technologies are revolutionising the sector, offering farmers, foresters and rural communities smarter, more sustainable and efficient ways to produce food, manage natural resources and tackle challenges, such as climate change and labour shortages. From AI-powered decision support tools to precision farming and automation, digitalisation is helping them to increase productivity, optimise resource use and reduce environmental impact.

The EU CAP Network uses innovation, knowledge exchange and initiatives, such as the agricultural European Innovation Partnership (EIP-AGRI), to promote digital transformation, as well as connect researchers, farmers, advisors and businesses. The aim is to accelerate the development and adoption of cutting-edge solutions that address the challenges and opportunities facing rural areas and the agriculture and forestry sectors.

The Vision for Agriculture and Food, recently presented by the European Commission, identifies digitalisation as a key driver of resilience and sustainability. Smart technologies not only improve efficiency but also help reduce greenhouse gas emissions, strengthen animal welfare, and support a competitive and environmentally responsible food value chain.

As European Commissioner for Agriculture and Food, I am committed to supporting the responsible integration of these technologies and ensuring farmers have the skills, resources and policies that they need to thrive in the digital age. This includes streamlining regulatory procedures, promoting social innovation, and ensuring that digitalisation is inclusive and accessible to all.

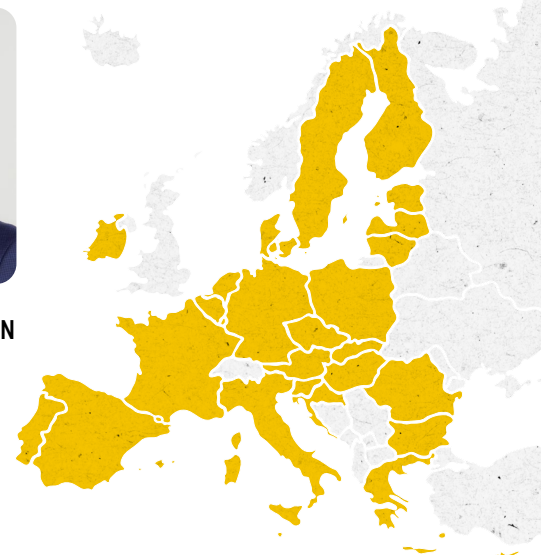
I invite you to explore this magazine and discover some of the innovative solutions that are paving the way for a more sustainable, resilient and prosperous future for Europe's agriculture, forestry and rural areas.

Sincerely,



CHRISTOPHE HANSEN

European Commissioner
for Agriculture and Food





Digital technologies for future-proof farming and forestry

Robotics, artificial intelligence (AI) and digital farming have the potential to revolutionise EU agriculture, forestry and rural areas. Digital and data technologies can help farmers and foresters work more efficiently and sustainably, cut costs, improve working conditions and increase competitiveness while reducing the sector's environmental footprint.

AI-powered digital tools can offer farmers and foresters support to increase productivity and make more efficient use of resources, for instance through precision irrigation, automated pest or weed control, yield prediction and the analysis of satellite data. Robotics can take care of precision operations while allowing farmers and foresters to focus on other tasks.

A range of innovative projects is exploring digital solutions to benefit farmers, foresters and rural communities in their everyday work. In CAP-funded EIP-AGRI Operational Groups, farmers and foresters are testing digital tools in close collaboration with ICT experts to make sure the results are relevant and more easily taken up in practice. Horizon research and innovation projects generate knowledge at the European level, supporting the EU's digital transition. In all cases, collaboration and knowledge exchange are key to making sure that digital solutions are practical, targeted and contribute to making the sector future-proof.



The EU CAP Network seminar 'Robotics and artificial intelligence in farming and forestry' (February 2025) showcased innovative projects, current technologies and successful uses of robotics and AI that could benefit EU farmers and foresters.

→ Find all results **on the event webpage**.

Predicting strawberry yields with cutting-edge technology

Traditional ways to predict strawberry yields are time-consuming and not always accurate. An Operational Group from Belgium is testing drones, sensors and artificial intelligence (AI) to develop more accurate prediction models, specifically for strawberries grown in tunnels.

Strawberry yields tend to be estimated on the basis of a manual flower count and the grower's experience. Results are not always in line with actual yields, which makes it harder for growers to set up an efficient harvesting plan or get a good view of auction prices. Operational Group coordinator Serge Remy from the Research Centre for Fruit Cultivation PCFruit explains how technology can help: "We can already predict harvests for strawberries grown in open field with more than 90% accuracy. But strawberries are increasingly cultivated on racks in protective tunnels. This requires a different approach."

Mini-drones equipped with high-resolution cameras navigate through the tunnels to capture images. Moving sensors collect real-time data on flower density. AI algorithms identify and count the flowers, after which a model predicts the yields that can be expected three weeks later.

"The system still needs to learn that images taken in tunnels have different resolutions and light circumstances. Flowers are more likely to hang and the proportion of non-visible flowers also needs to be determined," Serge says.



"Our results will be shared with farmers at dedicated training days to bring the benefits to actual farming."

SERGE REMY

Operational Group coordinator,
Research Centre for Fruit Cultivation PCFruit

→ [Learn more.](#)



Robotising the harvest

An Operational Group is developing a **fully automated robot for harvesting strawberries** grown on racks. It includes a picking robot, a logistical robot and a harvest management system. This can help growers harvest at the right time, lower labour costs and preserve quality.





Weeding out the bad seeds with AI

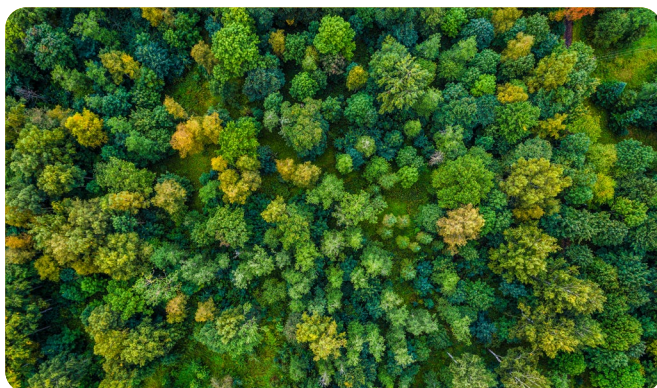
Weed control is a major challenge in organic farming, where the use of chemical herbicides is not an option, manual weeding is labour-intensive, and weed pressure affects crop quality and yields. Starting with clean, high-quality seeds can form part of the solution, but while seed production is continually refined, it remains difficult to distinguish crop and grass seeds from unwanted weed seeds.

Focusing on ryegrass, a Swedish Operational Group is using AI, machine learning and sensor technology to filter out weed seeds and invasive species. AI-powered analysis can distinguish seed characteristics that may not be visible to the naked eye, including size, shape, colour and texture. The technology supports both conventional and organic farmers to reduce weed pressure, lower labour costs, improve yields and biodiversity, and enable more sustainable farm practices.

→ More info [in the EIP-AGRI project database](#).

ICAERUS: piloting practical drone applications

Drones offer valuable solutions to help EU farmers, foresters and rural communities work more efficiently, save costs and address climate challenges. The Horizon Europe project 'ICAERUS' is mapping the opportunities, challenges, and impact of drone technology, compiling knowledge in an interactive platform. Through use cases and demonstrations, the project is showcasing real-world drone applications across Europe.



In Lithuania, ICAERUS is using drones and satellite imaging to monitor forest health, assess fire risks and track biodiversity. Satellite images can detect tree stress, while drones help monitor tree health, evaluate fire-prone areas, and track wildlife and potential disease outbreaks.

→ Discover more pilot cases [on the project website](#).

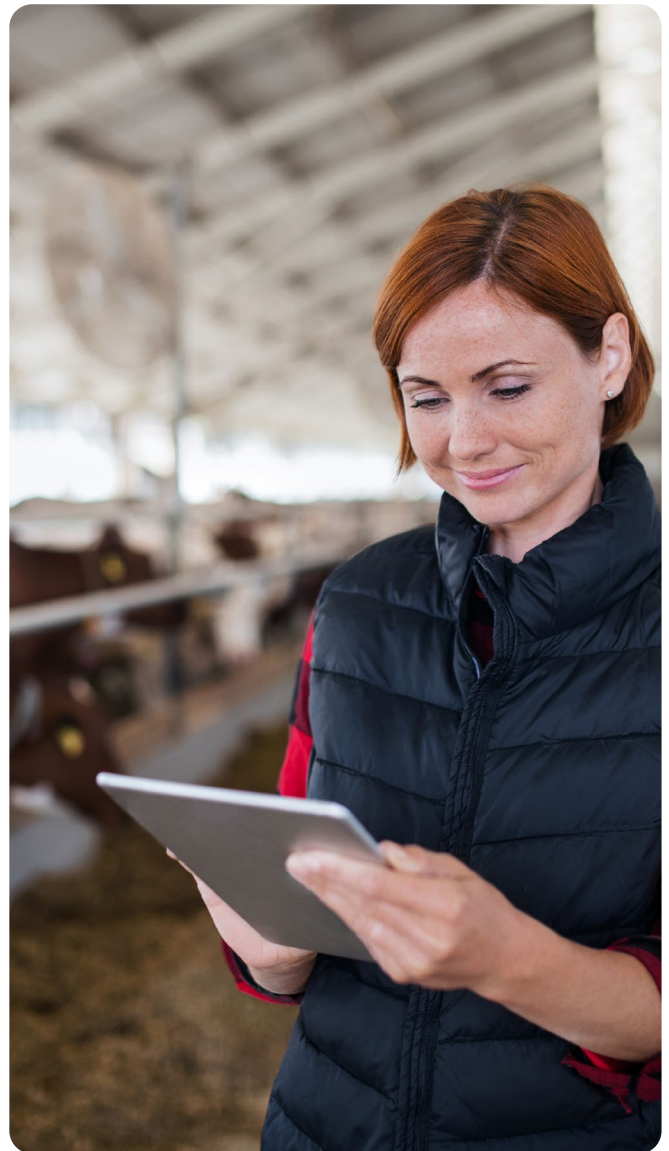
Automatic milking: tools to manage the flow of information

Automatic milking systems are increasingly finding their way to European dairy farms. To help farmers improve the efficiency and sustainability of their on-farm milking robots, a Spanish Operational Group is developing two smart decision tools to help manage the large amount of information that is generated.

A smart management application combines real-time information from the milking robot with existing details on the history of each cow in the milking parlour. This allows farmers to monitor how well the cows are adapting to the robot and detect early signs of health issues, such as lameness or mastitis.

A second tool incorporates this information into a genetic improvement programme. It adds traits that help farmers select which animals are better adapted to robot milking. These insights can be used to breed the next generation of cows with the right genomic traits for efficient milking while guaranteeing their health and welfare.

→ [More info in the EIP-AGRI project database.](#)



Milking and feeding solutions with dAlry 4.0

The Horizon project 'dAlry 4.0' explores reliable AI and data solutions to optimise automated milking systems. The goal is to improve efficiency, animal health, milk quality and feeding strategies. Through various innovations, including a laser sensor to analyse milk quality in real time, the outcomes will allow tailored milking and feeding for individual dairy cows. Results will be tested and demonstrated on six farms.

→ [Learn more.](#)



→ Discover innovative projects, inspirational ideas and up-to-date information on digitalisation in farming, forestry and rural areas [on the EU CAP Network website.](#)

OPERATIONAL GROUPS UPDATE

Digitalisation goes operational

Digitalisation, which forms a key part of the Common Agricultural Policy, is making its way to farms, forests and rural areas. EIP-AGRI Operational Groups across the EU are developing and testing digital tools and data technologies to ensure they can be used in the field. Knowledge exchange and collaboration with farmers, foresters and rural communities are essential to develop solutions that help them work in a more efficient, competitive and sustainable way.

To this day, hundreds of Operational Group projects have explored digitalisation in various forms. They have, for instance, developed the use of smartphones, tablets, in-field sensors, drones and satellites for farmers and foresters, or have tested technologies to improve water management or monitor soils, crops and livestock.

→ Find more Operational Groups working on digitalisation **in the EIP-AGRI database**.

Recap: What are Operational Groups?

→ Find out what Operational Groups do, how they are formed and who they involve in the **Operational Groups web portal**.

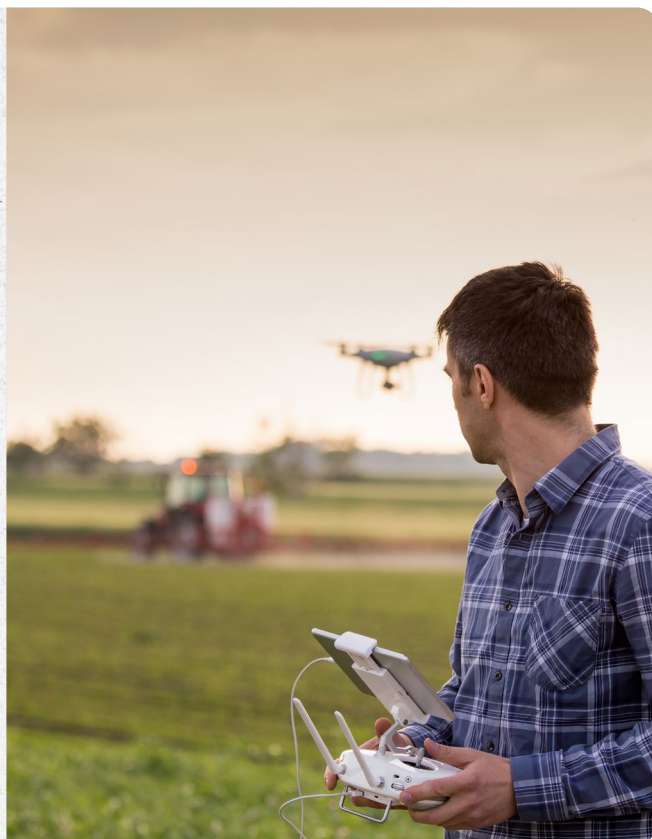


Spotlight on digitalisation

The EIP-AGRI Innovation Awards 2024 celebrated the achievements of EIP-AGRI Operational Groups. A total of 30 outstanding projects were nominated, with winners in six different categories and a public favourite. A dedicated ceremony took place during the **EU CAP Network conference 'Operational Groups: Innovation in practice'**.



Learn more about the award winner and nominees in the category 'digitalisation' **in the following pages**.



From local innovation to European impact: digital solutions for soil health

Operational Group 'Precision liming in Brandenburg' was selected as winner in the category of digitalisation at the 2024 EIP-AGRI Innovation Awards. The project works in the German region of Brandenburg, where only 26% of arable land has an optimal soil pH. This leads to yield losses and lower nutrient efficiency. Treating the soil with lime can reduce acidity and improve soil pH. The project has developed a fully digitised decision support system to help farmers calculate the optimal amount of lime they need to apply to their soils.



We spoke with representative Eric Bönecke to find out how this award has impacted the project.

Q: Has winning an EIP-AGRI Innovation Award led to new opportunities?

"Winning was a great honour for our team. We have received recognition from local farmers and policymakers, underlining the importance of sensor-based soil maps and encouraging more farmers to collaborate with us."



"The project has paved the way for two follow-up EIP-AGRI projects on nutrient management, including the **BoDi project**. While we started regionally, we know that our soil management tools are also relevant in other regions. We even raised interest in Slovenia, where a similar EIP-AGRI project is being prepared."

"We were recently contacted by Horizon project 'Soil-X-Change' – a thematic network that will help spread our results more widely across the EU, to share them with other farmers and advisors."

Q: What is your advice for other Operational Groups?

"Successful collaboration requires active communication between farmers and researchers. Allowing farmers to apply solutions on their fields and witness the benefits first-hand ensures trust and stimulates practical value. This is the key to long-term success for any project."

→ Watch the **project video** and **meet the winners**.

→ Read the **brochure 'Operational Groups - Collaboration and funding opportunities'**.



Digital tools to map biodiversity

The '**Biodiversity Regeneration In a Dairying Environment (BRIDE)**' project has worked with over 40 farms to address biodiversity loss. Farmers were encouraged to create a minimum of 10% space for nature on the farm, including hedgerows, field margins, ponds or wetlands. A web portal and an app help to map and verify improvements in biodiversity, rewarding farmers through a results-based payment system.



Knowledge network for drone technology

Drones have become an efficient tool to apply plant protection products with high precision, minimal waste and low environmental impact. **Operational Group 'GO-PHYTODRON'** has developed protocols to improve the safety and efficacy of agricultural drones. The project has created a network where farmers, foresters, agri-food industry representatives, scientists and authorities can join field demonstrations and share insights.

Smarter vineyards with precision viticulture

Vineyards with variable land conditions are hard to manage efficiently. **Operational Group 'Ripreso'** has explored the use of digital tools to tailor management strategies to the needs of the vines. With the help of sensors and precision tools, winegrowers get access to detailed growth maps that help them decide where to apply plant protection or fertiliser. Based on differences in grape composition, growers can differentiate their product range and generate more income.



AI-driven weed control

An **Operational Group from the Netherlands** has developed an AI-driven prototype robot that automatically recognises and removes weeds. Especially for organic farmers, the robot can replace manual weeding, reducing costs and labour requirements.



Learn about the nominees and winners in all categories on the **awards webpage** or **in the EU CAP Network brochure**.

New horizons in forest pest monitoring

Europe's forests face increasing threats from invasive pests, which can cause substantial ecological and economic damage. In response, digital technologies and artificial intelligence (AI) now offer solutions to tackle this worrying trend. The Horizon project 'FORSAID' is developing and improving digital tools for forest monitoring and early pest detection, using the latest innovations in robotics, machine learning and genetic technologies.

FORSAID targets nine harmful pests, including the pine wood nematode, three fungi, including chestnut blight, and five insect species, such as the spruce bark beetle and processionary moth. All of these can cause diseases or lead to tree death.

"Effective pest control relies on early detection. Digital tools allow large-scale forest monitoring without the need for frequent physical observation. This can save time, reduce labour costs and offer more accurate results."

ANDREA BATTISTI

FORSAID Project Coordinator



The project is testing remote sensing tools such as satellites and drones, which will map forest areas to identify potential tree stress or pest disturbances. This will be complemented by ground sensors and automated insect traps. AI algorithms form an important instrument in distinguishing between different types of tree stress caused by pests. Captured insects will be DNA-barcoded by robotised devices to further identify harmful species.

Andrea underlines: "By closely involving partners from forest management, and by taking into account insights from citizen science, we hope to develop an accurate, accessible and cost-effective toolkit to monitor and detect forest pests."

→ **Visit the project website.**



Precision irrigation: saving water while growing quality crops

EU agriculture and forestry face a growing demand for freshwater to ensure quality crops, healthy livestock and thriving ecosystems. At the same time, farmers are met with new climate and weather patterns and increasing water scarcity. The Common Agricultural Policy promotes innovative approaches to support more sustainable on-farm water management. Smart sensors, satellite technology, precision irrigation and decision support tools also offer farmers new ways to optimise water use, cut costs and maintain quality yields.



Intelligent irrigation for fruit farmers

Balanced irrigation is key in producing high-quality fruit. Too little or too much water can affect fruit growth and quality or lead to diseases. Operational Group 'WappFruit' has developed a smart decision support system that helps fruit farmers calculate the right amount of water needed for irrigation, which can activate a fully automated irrigation system.

The Italian Piedmont region is one of the country's most important areas for fruit production. In Operational Group 'WappFruit', local fruit growers and researchers have developed a system in which a series of sensors measure the soil's water content and the amount of water available for the fruit tree to take up. This helps to calculate the actual water volume the tree needs. A dedicated algorithm analyses the sensor data and can automatically activate an intelligent irrigation system in areas where water is lacking.

Farmers can monitor their orchards in real time. The process is fully automated, but farmers can manually and remotely turn the system on or off, which is especially valuable in Piedmont, where orchards are often located in different places.

Lorenzo Sacchetto is one of the farmers who have tested the system in their apple and kiwi orchards.

“The field trials show that this innovation can help me save up to 46% in water use. At the end of the season, we had the same fruit quantity in our yield compared to conventionally irrigated crops, and the fruits were sweeter, being irrigated with less water.”

LORENZO SACCHETTO

Fruit grower

Now that the project has ended, Lorenzo has continued the trials in his orchards, proving that the solution works for his needs. The results will form the basis for a new start-up, which will bring the system to market and make it available to more farmers.

→ **More information.**



→ The **brochure ‘Circular water solutions’** spotlights innovative projects that save, recycle and reuse water sources for on-farm use.

→ **Browse the event page** of the EU CAP Network workshop on circular water management to find more water-saving practices.

Satellite systems and soil sensing for tailored irrigation advice

Horizon Europe project ‘Meteorological Assimilation from Galileo and Drones for Agriculture’ (MAGDA) is taking irrigation advice for farmers to a higher level. The project combines information from Europe’s global navigation satellite system, Galileo, and earth observation programme, Copernicus, with data from in-field weather sensors and meteorological drones. Meteodrones in particular are a game-changer, as they can scan for air temperature, humidity, wind speed and other parameters near cultivated fields.

Via a dashboard that can be used directly on the farm, MAGDA provides farmers with accurate models that predict severe weather events and weather-driven agricultural pests. In addition, hydrological models give them tailored irrigation advice to save water and optimise production.

→ **Learn more.**





Bridging the divide: unlocking digital opportunities for rural areas

While rural areas are home to almost one third of the EU population, only 60% of all rural households have access to high-speed internet. Improving their access to digital connectivity can unlock new socioeconomic opportunities for farmers, foresters and rural communities, helping to bridge the digital divide between rural and urban areas.

XGAIN: Digital connectivity for rural communities

Digital connectivity in rural and remote areas depends on good internet infrastructure and effective data solutions to guarantee high-speed, secure and reliable internet. This allows farmers, foresters, rural communities and municipalities to access online solutions from their own devices, in their own areas and tailored to their needs.

Better connectivity enables the use of digital tools, for instance, to monitor livestock or forest health, predict floods or wildfires, apply precision farming, create new supply chains or set up educational and healthcare services.

To help users find their way in a range of connectivity solutions, the Horizon Europe project 'XGAIN' has integrated them into a single knowledge facilitation tool. This software platform helps users decide which smart technology, network solution or business model fits their needs. The tool also calculates the socioeconomic and environmental impact of each suggestion.



Because not all sectors of agriculture, forestry and rural life have the same needs, XGAIN is testing its innovations in six living lab innovation hubs in Belgium, Spain, Lithuania, Croatia, Greece and the UK. In these real-life environments, XGAIN focuses on collaboration and mutual learning to ensure that all solutions are inclusive, innovative and tailored to practical needs.

→ Get access to **newsletters**, **podcasts** and XGAIN insights **on the project website**.

Broadband benefits for EU citizens

The **Broadband Competence Offices (BCO) Network** fosters knowledge exchange between national, regional and European authorities and other experts to give all EU citizens access to high-speed internet and the opportunities it brings.

With the EU-funded Ro-NET project, the Romanian national BCO has brought broadband coverage to about 200 000 rural households, 8 000 public and private institutions, and up to 400 000 citizens. This has allowed local communities to set up several e-learning, e-health, and e-commerce services.

→ [Watch the video.](#)



A digital platform for winegrowers

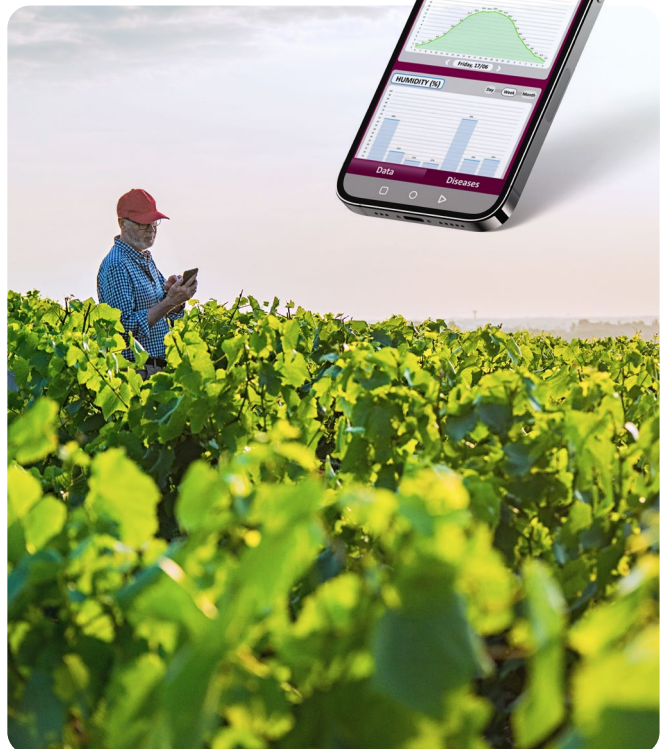
Operational Group 'Smart Agro Grape' has introduced 'smart vineyards' to Slovenian winegrowers to help them work in a more sustainable and cost-efficient way. The project has developed a cloud-based digital platform that processes data from in-field sensor stations. Details on soil temperature, water content and environmental data, such as rainfall or air temperature, are translated into accurate prediction models that farmers can access via a mobile app. The results help them calculate how much water, fertiliser and vine protection products they actually need to apply.

Knowledge exchange is a key part of the project's success. Participating farmers receive training to learn how to use new digital solutions on their farms. Among several knowledge exchange events, the Operational Group has shared its results with Interreg Europe projects **ERUDITE**, **Carpe Digem** and **Digital Rural**, and with Horizon projects **SMART ERA** and **CODECS** – all focusing on the digital transformation of rural areas.

→ [More info.](#)

"The project has given us better methods to predict and monitor diseases in our vineyards. We enjoyed the positive exchange of experiences and ideas with other winegrowers participating in the project."

KATJA AND GREGOR LEBER VRAČKO
Winegrowers



Cultivating skills: tools and training to foster lifelong learning

While digitalisation offers many opportunities to make the European farming and forestry sector more efficient, profitable and sustainable, new technologies are not always easily taken up in daily practice. Farmers, foresters and the advisors who work with them have to keep building and updating their knowledge of fast-changing practices and technologies. They therefore need access to professional training and learning opportunities to develop the right knowledge, skills and competencies.



Via their CAP Strategic Plans, EU countries can set up training schemes or promote networking activities that foster knowledge exchange and collaboration for farmers and advisors. In addition, several EU-wide programmes, including **Erasmus+**, **Erasmus for Young Entrepreneurs** and **Horizon thematic networks** foster learning for farmers, foresters and advisors, some specifically focusing on students, young or aspiring farmers. Informal learning opportunities, exchange visits between innovative projects and on-farm demonstrations form excellent settings to boost peer-to-peer learning and stimulate the uptake of innovation in the field.



Advisory support to build agricultural skills

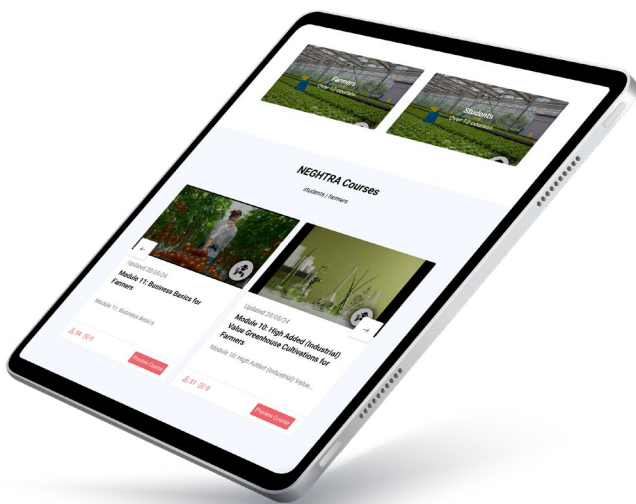
- Advisors play an increasingly important role in capturing farmers' knowledge needs, connecting them with innovative projects, and offering expert advice. The EU CAP Network seminar on skills and lifelong learning (February 2024) discussed tools to help advisors and training providers build agricultural skills. **Find all results on the event page.**
- Learn more about Agricultural Knowledge and Innovation Systems, new roles of advisors, **EU-wide advisory networks**, and more **on the EU CAP Network website.**





Next-generation training for greenhouse growers

With the global demand for sustainable agriculture on the rise, greenhouse businesses are increasingly adopting more sustainable production methods. Digital technologies prove to be powerful tools to help growers optimise resource use, improve irrigation and fertigation strategies, save energy and reduce costs. The Erasmus+ programme 'Next generation training on intelligent greenhouses' (NEGHTRA) has set up an interactive platform that helps young farmers build the right skills to use innovative technologies and grow resilient businesses.



The NEGHTRA website gives access to a free online platform with specialised training material and online courses. This covers smart greenhouse technologies, including automation, energy management and more.

The e-learning platform targets agricultural students, young farmers and new entrants, providing them with knowledge and skills to adopt new technologies in their businesses. Innovations and in-field results from three pilot greenhouses in Spain, Italy and Greece are fed into the online training material.

All information is available in seven languages. The courses are supported by instructional videos, demonstrations of innovative practices and virtual reality tools. Such e-learning techniques support active learning and can make the learning process more engaging. Online training modules also help make learning more accessible. They are open to farmers and students of all socioeconomic backgrounds, who can take the courses in their available time. NEGHTRA's approach can help pave the way for a new generation of digitally skilled and environmentally conscious farmers.

→ [Learn more.](#)



Farm demonstration for climate innovation

On-farm demonstrations are an efficient tool to showcase innovative solutions to farmers, foresters, advisors and others who can benefit from them. The Horizon network 'Climate Farm Demo' connects 1 500 demo farms across Europe to promote the use and uptake of climate-smart farming solutions.

At the heart of the project are its 1 500 pilot demo farms. All farmers are connected to dedicated 'climate farm advisors' and to researchers, teachers and policymakers in an innovation ecosystem that stimulates regular knowledge exchange at national and EU level. Farmers and advisors receive continuous support to ensure that they learn about climate-smart techniques and gain confidence to apply them effectively.

The farms will host 4 500 demonstration events, offering a platform for peer-to-peer learning and collaboration. "By giving priority to farmer-led innovation, we want to ensure that climate-smart solutions are co-created with those who understand the realities of farming best," says Christine Berger, project coordinator. "This approach fosters ownership and makes it more likely that sustainable practices will be adopted and maintained in the long run. We hope to reach 250 000 members of the farming community, including 150 000 farmers, by the end of the project in 2029."

All demonstration farms and events are listed on the project website. It also features a library of climate-smart tools and a training kit to organise better on-farm or virtual demonstrations.

→ [Browse the project website.](#)



"Trust is key. If you give farmers the chance to share their challenges in an atmosphere of trust, they will be open for discussion."

ANDRÁS VÉR

Climate Farm Advisor, Hungary



The seminar 'On-farm demonstrations for peer-to-peer learning and innovation' (June 2025) highlights the benefits of demo farms, lighthouses and other tools to boost peer-to-peer learning.

→ [Find all results on the event page.](#)

Focus Groups update

With over 55 themes covered, EU CAP Network and former EIP-AGRI Focus Groups have proven to be a fruitful platform for knowledge exchange and innovation. Each year, three new Focus Groups bring together 20 experts with complementary knowledge, each group zooming in on a specific issue faced by EU farmers, foresters and rural communities. The result is a dedicated group effort buzzing with expertise that takes stock of challenges and opportunities for further innovation, research and collaboration.



What's new?

Focus Groups have discussed topics ranging from soil salinisation and bee health to forest biomass and circular horticulture.

Three EU CAP Network Focus Groups have started their work in autumn 2024:

- > **Production of protein crops under climate change**
- > **Local perennial plant genetic resources in view of climate change and biodiversity loss**
- > **Alternative solutions for livestock product differentiation**

- **Browse all Focus Group topics and results.**
- **Subscribe to the newsletter on innovation and knowledge exchange | EIP-AGRI** to stay updated on new calls for Focus Group experts.

Latest videos

Watch EIP-AGRI challenge videos, in which farmers talk about their solutions to challenges raised by EU CAP Network Focus Groups.

- **Spain**: a local project has converted **abandoned agricultural land** into pastures for a local type of sheep breed.
- **Romania**: how can **mountain areas** remain resilient and competitive? Farmer Dan Neag highlights a local initiative which helps unite communities and preserve local customs.
- **France**: organic farmers Emilie and Martin are testing **crop associations** in collaboration with the Horizon project 'IntercropValuES'.



Do you have an idea for a Focus Group topic that could be tackled in 2026?

- **Share your proposal.**



What's the buzz? Smart tools to support pollinator health

Around 80% of all crops depend on insect pollination. That makes bees and other pollinators essential in maintaining healthy ecosystems. Smart monitoring tools, artificial intelligence (AI) technology and even mini-robots are now being used in increasingly precise ways to help farmers monitor diseases, support pollinator health and boost production.

Disease monitoring for beekeeping communities

A changing climate makes bees more vulnerable to pests and diseases. Romanian Operational Group 'Bee smart, bee healthy' has tested a smart monitoring system that alerts beekeepers when there is a health hazard in their hives, enabling them to take action.

"The Varroa mite poses one of the biggest problems in beekeeping today," says Iulia Fatu, project coordinator. "We are testing smart hives that film the bees as they enter. AI algorithms detect bees that are carrying the Varroa parasite. If any infected bees are identified, an alert with the location of the hive is sent to the beekeeper."

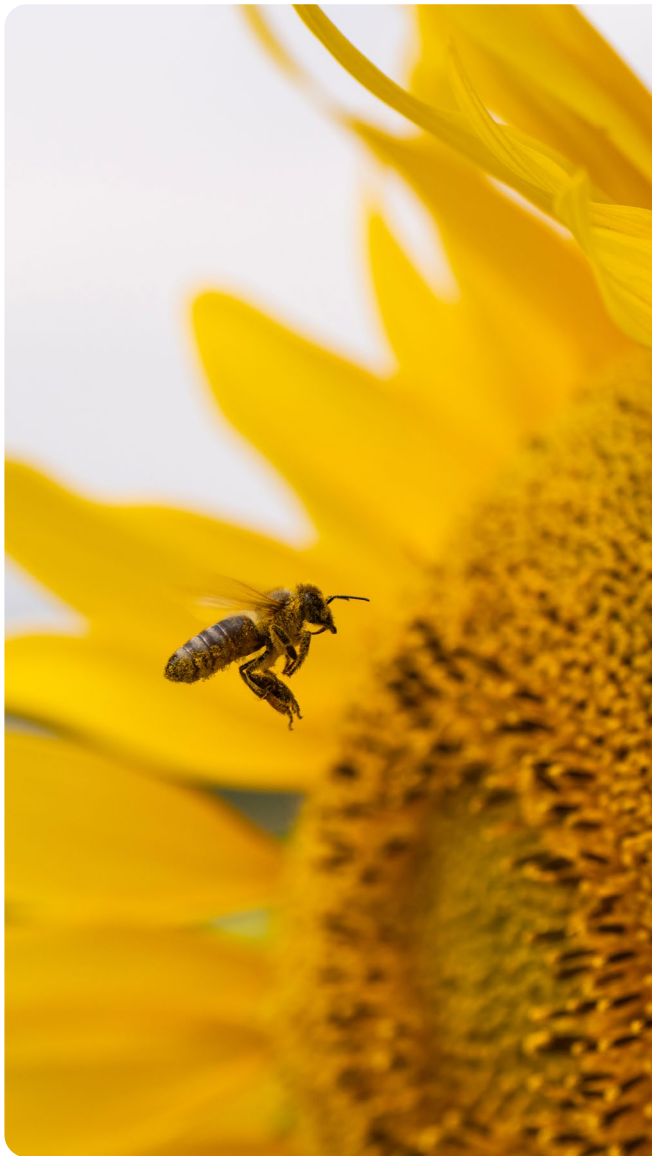
The smart hives are connected through an intelligent sensory network, allowing beekeepers in a larger area to receive predictions about potential disease risks.



Thanks to a 'living lab' in which researchers and beekeepers work closely together, the project has been developing natural solutions to prevent or treat diseases. These strengthen the bees' immune systems and prevent their honey from containing chemicals, helping beekeepers to safeguard their bees and increase the quality of their products.

→ This project was nominated for the EIP-AGRI Innovation Awards 2024 in the category 'animal welfare and husbandry'. **Watch the video.**

→ Learn more **in the EIP-AGRI project database.**



Climate-proof sunflowers for pollinators

Sunflowers are naturally tolerant to drought and heat. The Horizon Europe project 'HelEx' is building knowledge to provide farmers with sunflower varieties that are even more resilient to the impact of climate change. To find out which varieties are most attractive to pollinators, HelEx is documenting insect biodiversity in sunflower fields.

The project captures images of beneficial insects via remote cameras and collects insect DNA from environmental samples. Honey bees, hoverflies or bumblebees are identified through AI. These monitoring methods are becoming increasingly precise, with the advantage that they do not harm any plants or animals. Research further zooms in on plant traits that are especially attractive, such as UV reflection or pollen and nectar quality.

→ More info [on the project website](#).

→ This project was featured at the [EU CAP Network workshop 'Promoting pollinator-friendly farming'](#).



Micro-robots in the court of the honeybee queen

The queen bee is the heart of the honeybee hive. EU-funded project 'RoboRoyale' focuses on the queen's well-being to optimise the health, brood production and efficiency of the entire colony.

The project is developing a system of micro-robots that replace the court bees responsible for feeding and grooming the queen. They feed the queen protein-rich food at the right time and guide her to areas for egg laying. Insights from AI and machine learning will teach this system how to regulate the queen's egg-laying behaviour and pheromone flow, which influences the behaviour of the worker bees. This approach can boost reproduction and stimulate pollination by active, healthy colonies.

→ Read more [on the project website](#).



Open-source robotics to assist organic microfarms

Microfarms are small-scale market garden farms that grow various vegetables on a maximum of five hectares. They have become increasingly popular in urban and peri-urban areas across Europe. Horizon 2020 project 'RObotics for Microfarms' (ROMI) tailors to the needs of these sustainable, high-yielding enterprises by developing practical robotic tools that help save time and efforts.

Microfarms can play an important role in producing sustainable food for nearby cities, providing organic produce at fair prices through short supply chains. While they tailor to local markets with a diverse range of crops, all planting, weeding and harvesting is usually done manually.

"Microfarms manage a large number of labour-intensive crops with limited space and resources. ROMI has developed three affordable, light-weight and open-licence tools that can be adapted to each farm."

JONATHAN MINCHIN
ROMI Project Coordinator



The ROMI Rover is an autonomous weeding robot that helps prevent small weeds from taking root, reducing manual labour. The 'Cablebot' is a robotic camera system that moves over the crops, continuously monitoring them. Both are linked to a dashboard that generates insights on plant growth, weeds and crop planning. Looking ahead, ROMI is developing a scanner that can create an accurate 3D image of a single plant, to help farmers and plant development biologists understand plant health and growth, or traits for selective breeding.

"Our tools are developed and tested directly in the field with the expertise of professional farmers," Jonathan continues. "We are now looking into ways of training the tools to deal with new plants or complex field situations."

→ [Learn more.](#)

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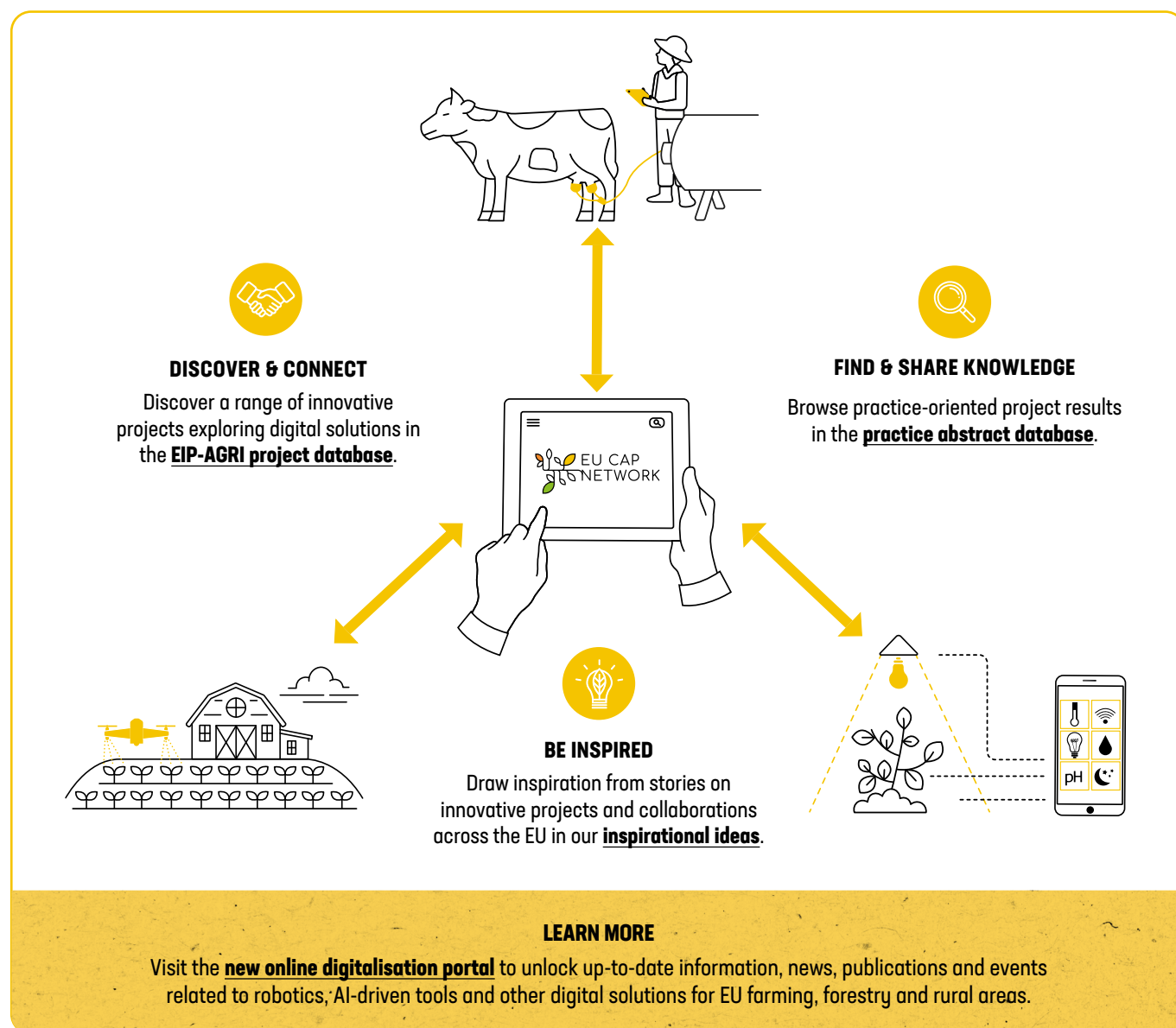
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