Annex 3: The current implementation of AI and robotics in agriculture and forestry

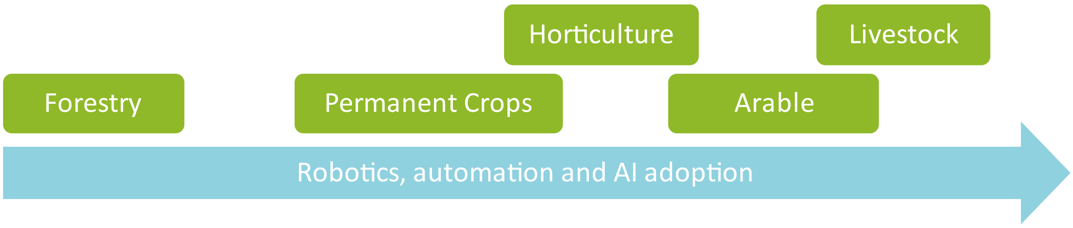

Figure 1 - The integration of AI and robotics across diverse agricultural and forestry contexts – Source: EU CAP Network

The integration of artificial intelligence (AI) and robotics in agriculture and forestry is rapidly transforming traditional practices—addressing labour shortages, improving efficiency, and enhancing sustainability. Among the key solutions showcased during the keynote presentations, successful use cases highlighted included: **ecoRobotix (Switzerland):** Autonomous weeding robots using AI to target weeds with precision herbicide application, reducing chemical use; **Robovision (Belgium):** AI-powered crop monitoring for yield forecasting, disease detection, and precision intervention; **SmartCloudFarming (Germany):** AI-driven soil carbon monitoring, optimising soil health and carbon sequestration strategies; and, **GRONOS and Artemy (Netherlands**): A fully automated indoor tomato-growing system and a robotic tomato picker demonstrating AI-driven harvesting in greenhouses. These examples illustrate the diverse roles AI and robotics play in modern agriculture and forestry, optimising efficiency, sustainability, and economic resilience.

Figure 2 - Seminar Field visits to real use cases – Source: EU CAP Network

During the seminar, participants engaged in discussions and field visits (Fig. 6) that showcased state-of-the-art applications of robotics and AI in agriculture and forestry.

These visits provided firsthand insight into real-world solutions for **livestock management, fruit production, arable farming, and sustainable forestry**. Technology demonstrations included autonomous tractors, AI-powered analytics, robotic harvesting systems, and automated livestock feeding. While **livestock farming** has seen widespread adoption of automation, particularly in milking and feeding systems, other sectors are progressing at different rates**. Arable farming** has increasingly integrated drones, autonomous tractors, and ground robots for tasks such as weeding, fertilising, and seeding, though high investment costs and system integration remain significant barriers. **Horticulture and fruit production** are adopting AI-driven imaging and autonomous equipment to optimise pruning, harvesting, and disease detection, but many solutions are still highly specialised and expensive. In contrast, **forestry** has lagged in automation due to its unstructured environments and challenging terrain. Nevertheless, promising developments in autonomous tree planting, remote sensing, and precision logging indicate growing potential for robotics and AI in the sector.

The field visits reinforced the seminar's emphasis on real-world applications, allowing participants to witness firsthand the impact of robotics and AI on livestock, fruit cultivation, arable farming, and forestry. Through these exchanges, new opportunities for collaboration emerged. Researchers, farmers, and technology providers engaged in discussions on how to **bridge the gap between innovation and on-the-ground implementation**. Many participants expressed interest in scaling up AI applications **through Robotics-as-a-Service (RaaS) models**, which could make automation more affordable for small and medium-sized farms. Others highlighted the need **for standardised data-sharing protocols**, ensuring that AI-driven analytics remain accessible and beneficial across different agricultural domains. From these visits it was reinforced that the **pace of adoption** varies significantly between agricultural and forestry sectors.

This annex is linked to the final report of the EU CAP Network seminar 'Robotics and Artificial Intelligence in farming and forestry' - Read the report on the seminar webpage