



Smart Agriculture for Resource Efficiency

Focus Group Report: Best Practices and Learning Objectives for SARE Training Material

PROGRAMME: ERASMUS+

KEY ACTION: SMALL-SCALE PARTNERSHIPS IN VOCATIONAL EDUCATION AND TRAINING (KA210-VET)

REFERENCE NO: 2024-2-PL01-KA210-VET-000289700

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.



Co-funded by
the European Union



SARE
Smart Agriculture
for Resource Efficiency



Co-funded by
the European Union



SARE

Smart Agriculture
for Resource Efficiency

Project Information

Programme: Erasmus+

Key Action: Small-scale partnerships in vocational education and training (KA210-VET)

Reference No: 2024-2-PL01-KA210-VET-000289700

Project Title: Smart Agriculture for Resource Efficiency

Project acronym: SARE

Start date of project: 01 April 2025

Duration: 17 months

Publication Information

Activity: Activity 2: Focus Group with Experts: Identification of Best Practices and Learning Objectives

Publication Title: Focus Group Report: Best Practices and Learning Objectives for SARE Training Material

Publication Date: 20/07/2025

Contact Information

Fundacja Wektory Współpracy (Poland)

Email: wektorywspolpracyfundacja@gmail.com

SARE Project (grant no. 2024-2-PL01-KA210-VET-000289700) 2025 – 2026, lead contributions by Fundacja Wektory Współpracy (FWW), Strategic OMNIA Research and Technology Development Ltd, and European Institute for Emerging Technologies (EIET). CC-NC-SA 4.0 license granted.



This document is based on the work within the project ‘Smart Agriculture for Resource Efficiency’ (SARE). The creation of these resources has been co-funded by the Erasmus+ programme of the European Union under grant no. 2024-2-PL01-KA210-VET-000289700. The European Union/European Commission is not responsible for the content or liable for any losses or damage resulting of the use of these resources.



EUROPEAN INSTITUTE FOR
EMERGING TECHNOLOGIES



PROJECT BRIEF

Agriculture in Europe is facing significant challenges due to climate change, resource scarcity, and the urgent need for sustainability. Farmers and agri-stakeholders must adapt to increasingly unpredictable weather patterns, heightened water stress, and market pressures, while also complying with EU sustainability objectives. Many lack access to affordable, practical training on digital technologies and sustainable practices, leading to gaps in efficiency, resilience, and environmental performance.

The Erasmus+ SARE project addresses these issues by equipping farmers, trainers, and policy influencers with knowledge and tools for Smart Agriculture. This approach combines precision technologies, data-driven decision-making, and sustainable methods aligned with the European Green Deal, Farm to Fork Strategy, and Common Agricultural Policy (CAP) 2023-2027.

Activity 2 – Focus Group with Experts, was a pivotal step in shaping the project’s training content. Bringing together nine experts from Malta, Cyprus, and Poland, the session explored best practices, country-specific challenges, and key learning objectives for future training modules.

The main objectives of Activity 2 were to:

- Identify best practices in Smart Agriculture that are relevant, EU policy-aligned, and applicable across partner countries.
- Gather expert insights on resource efficiency, sustainable farming, and digital technology adoption in agriculture.
- Assess barriers to adoption, such as cost, digital literacy, infrastructure gaps, and policy limitations.
- Highlight national priorities for training and technology deployment in Malta, Cyprus, and Poland.
- Define learning objectives and outcomes for the training material to be developed under Activity 4.
- Promote collaboration between farmers, trainers, agri-tech providers, and policy-makers to ensure training is practical and locally relevant.

Activity 2 will produce a complete list of attendees confirming the participation of nine experts, three from each partner country, representing agriculture, technology, sustainability, and policy sectors. It will also result in a comprehensive Focus Group Report that presents the key results and conclusions from the discussions and interactive exercises. The report will detail nine EU-aligned best practices in Smart Agriculture, covering areas such as precision agriculture, integrated pest management, sustainable irrigation, agroforestry, digital advisory platforms, renewable energy integration, precision livestock farming, soil health management, and collaborative research networks. In addition, it will include national-level findings for Malta, Cyprus, and Poland, highlighting unique challenges and opportunities in each context. Finally, the report will set out the agreed learning objectives and training outcomes that will guide the development of training materials under Activity 4. An Open Educational Resource (OER) version will be prepared in English, Greek, and Maltese to ensure broad accessibility across partner countries and beyond.



Overview of the Focus Group

As part of the Erasmus+ SARE project, a virtual focus group was held to gather expert input on the development of training materials for Smart Agriculture. This activity aligned with the broader objective of equipping farmers, trainers, and agri-stakeholders with knowledge and tools to support more sustainable, resource-efficient, and digitally-enabled agriculture in Europe.

The event brought together nine invited experts, three from each partner country (Malta, Poland, and Cyprus) who are specializing in agriculture, technology, sustainability, and policy. The session included partner presentations, panel discussions, an interactive evaluation via Google Forms, and an opening icebreaker using Mentimeter.

Icebreaker Results

Five short interactive questions were used at the start of the session to warm up participants and surface initial thoughts on core project themes:

- "Give us one word that represents 'Resource Efficiency'"

Give us one word that represents "Resource Efficiency" in your experience.



Most common answers were "saving" and "economical," showing a clear emphasis on cost-effectiveness and input management.



- "What pops into your mind when you hear 'Smart Agriculture'?"

What pops into your mind when you hear "Smart Agriculture"?



"AI" and "precision" were the most frequent responses, indicating strong associations with data-driven and automated decision-making technologies.

- "What's the biggest challenge farmers face today?"

What's the biggest challenge farmers face today?

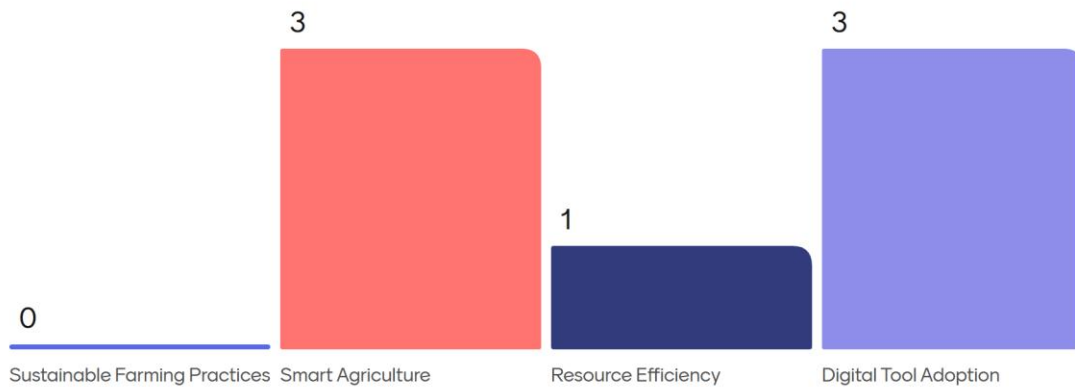


The majority mentioned "water scarcity" and "water degradation," confirming that water-related stressors are seen as the most urgent.



- **"Which of these areas is most underdeveloped in your country's agricultural training?"**

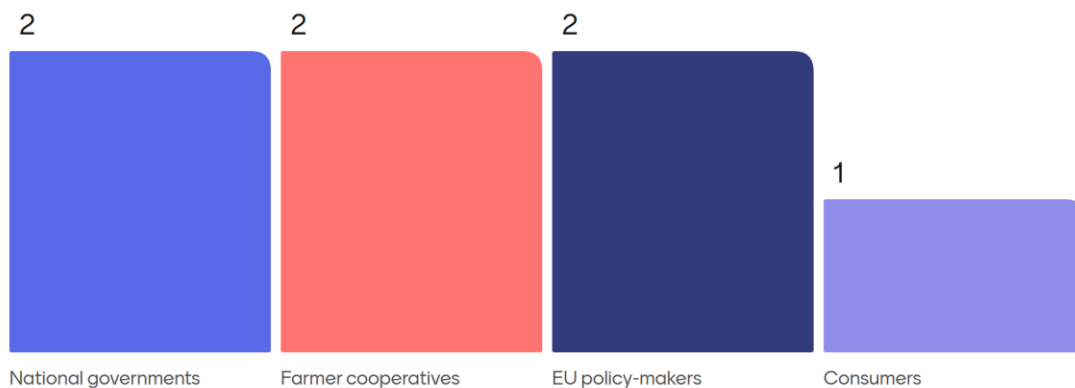
Which of these areas do you feel is most underdeveloped in your country's agricultural training?



Smart Agriculture and Digital Tool Adoption tied with three votes each; Resource Efficiency received one vote; Sustainable Farming received zero.

- **"Who has the greatest influence on sustainable practice adoption?"**

Who do you think has the greatest influence on how farmers adopt sustainable practices?



Responses were evenly distributed among national governments, EU policymakers, and farmer cooperatives. This suggests that successful change requires multi-level coordination.

Best Practices for Smart Agriculture (EU-Aligned)

During the panel discussion and form evaluation, participants validated and expanded on nine key Smart Agriculture best practices. These were selected based on relevance to partner countries, EU policy alignment, and potential impact.

1. **Precision Farming with IoT and Sensors**

Precision farming applies GPS, IoT sensors, drones, and data analytics to manage crops and resources with high accuracy. Real-time data on soil, weather, and crop health allow farmers to target inputs only where needed, improving efficiency and sustainability. Soil sensors guide precise irrigation, while drones and satellites identify stress areas for site-specific treatment.



GPS-guided machinery reduces overlap, fuel use, and soil compaction. Together, these tools raise productivity, cut costs, and lower environmental impact. This best practice aligns with the European Green Deal and CAP 2023–2027 priorities for precision and sustainable agriculture.

2. **Integrated Pest Management (IPM) and Organic Practices**

Integrated Pest Management (IPM) combines biological control, crop rotation, and targeted use of agrochemicals based on continuous pest monitoring and threshold analysis. By emphasizing prevention and natural control mechanisms, IPM minimizes reliance on synthetic pesticides, preserving biodiversity and soil microbiota. When paired with organic farming principles, this approach reduces chemical residues in food, enhances ecosystem balance, and improves consumer trust in sustainable products. Farmers in Poland and Cyprus noted that IPM can also lower input costs while maintaining high yields, making it both economically and environmentally beneficial. This practice directly contributes to the Farm to Fork Strategy's objective of halving pesticide use by 2030 and supports the CAP's eco-scheme commitments to integrated and organic production systems.

3. **Sustainable Irrigation and Water Management**

With drought and water scarcity being major concerns across partner countries, especially Malta and Cyprus, sustainable irrigation is a critical pillar of Smart Agriculture. Advanced irrigation systems equipped with soil moisture sensors, automated valves, and weather-linked controllers ensure that crops receive the optimal amount of water without waste. These systems can adjust irrigation schedules in real time based on climatic conditions, evapotranspiration rates, and crop needs. For instance, precision drip irrigation reduces water usage by up to 30% compared to conventional methods, improving resilience in water-stressed regions. In addition to water conservation, smart irrigation helps reduce energy consumption and nutrient leaching, preserving both environmental and economic resources. This best practice reinforces the European Green Deal's sustainable water management objectives and aligns with CAP 2023–2027's environmental and climate adaptation priorities.

4. **Agroforestry and Silvopastoral Systems**

The integration of trees and shrubs into croplands or pastures strengthens farm resilience and biodiversity. Agroforestry systems enhance soil fertility, improve microclimates, and reduce erosion while offering farmers diversified income sources through timber, fruits, and other by-products. When combined with silvopastoral approaches, these systems provide shade for livestock, reduce heat stress, and promote carbon sequestration. They also serve as natural buffers that improve water infiltration and biodiversity corridors. This practice supports the European Green Deal and the CAP 2023–2027's emphasis on carbon farming and ecosystem restoration.

5. **Data-driven Decision Making with AI and Analytics**

Artificial intelligence (AI) and data analytics enable farmers to turn large volumes of field, weather, and equipment data into actionable insights. By analysing patterns in soil conditions, crop health, and climate forecasts, AI-driven systems support smarter decisions, such as adjusting irrigation, predicting pest risks, or optimizing fertilizer use. These tools improve precision, reduce waste, and enhance resilience to climate variability. This best practice aligns with the European Green Deal's digital innovation goals and the CAP 2023–2027 vision for data-informed, sustainable agriculture.



6. **Renewable Energy Integration on Farms**

Harnessing renewable energy through solar panels, wind turbines, and biogas systems allows farmers to significantly reduce dependence on fossil fuels and lower operational costs. These technologies can power irrigation pumps, lighting, and storage facilities while contributing to national energy transition goals. In Mediterranean regions such as Malta and Cyprus, solar installations are particularly effective for year-round energy generation. Biogas digesters, on the other hand, offer a sustainable solution for converting animal waste and crop residues into energy. The integration of renewables not only advances the European Green Deal's carbon neutrality objectives but also enhances farm self-sufficiency and resilience against energy price fluctuations.

7. **Sustainable Resource Management**

Smart agriculture technologies enable farmers to optimize the use of natural resources while reducing environmental impact. Sensor-based irrigation systems, smart controllers, and weather-linked automation ensure that water is applied precisely where and when it is needed, improving efficiency and conserving scarce resources. Similarly, nutrient monitoring and variable-rate fertilizer application help maintain soil health and prevent pollution from runoff. The integration of renewable energy sources such as solar-powered pumps and sensor networks further reduces carbon emissions and operating costs. This best practice supports the European Green Deal's sustainability objectives and the CAP 2023–2027 commitment to climate-smart, resource-efficient farming.

8. **Cover Cropping and Soil Health Management**

Cover cropping, mulching, and organic soil amendments are vital practices for restoring degraded soils and maintaining fertility. These techniques increase organic matter, enhance water retention, and improve soil structure, leading to higher resilience against drought and erosion. When integrated with precision nutrient management, cover crops can also reduce dependence on synthetic fertilizers. In regions such as Poland and Cyprus, farmers increasingly adopt legume-based cover crops to fix atmospheric nitrogen and reduce costs. This practice contributes to the Green Deal's carbon sequestration goals and supports CAP 2023–2027 eco-schemes promoting soil health and regenerative agriculture.

9. **Collaborative Research and Innovation Networks**

Collaboration among farmers, researchers, and agri-tech enterprises is essential to ensure innovation remains practical and responsive to real field conditions. Through networks such as EIP-AGRI and Horizon Europe projects, stakeholders can share knowledge, co-develop prototypes, and scale up successful pilot initiatives. These partnerships accelerate the transfer of technology from research institutions to everyday agricultural use, fostering continuous learning and adaptation. Collaborative innovation also strengthens local ecosystems of expertise, ensuring that even small-scale farmers benefit from the digital and green transitions. This best practice aligns with the CAP's commitment to knowledge exchange and the European Green Deal's drive toward innovation-led sustainability.

Google Form Questionnaire Results (by Country)

A total of nine expert participants, three each from Malta, Cyprus, and Poland, completed a detailed 40-question survey. The aim was to capture expert insights on Smart Agriculture, Resource Efficiency,



Sustainable Farming, and Digital Training. The diversity in responses reflected both shared EU-level objectives and specific national realities.

Respondent Representation

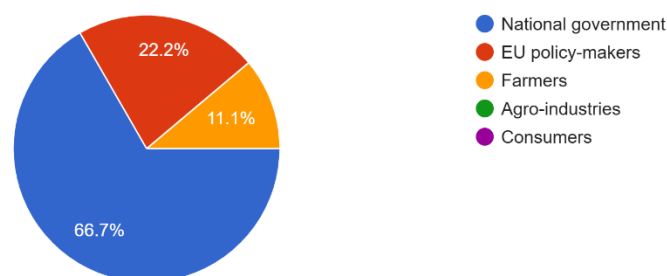
Each country contributed equally with three expert participants, ensuring that the perspectives captured reflect a balanced geographic representation.

Poland: Key Takeaways

- **Smart Agriculture as a Strategic Priority**
All Polish experts ranked Smart Agriculture as the top training focus, signalling a strategic national interest in modernizing the sector using precision technologies.
- **Technology Readiness: Moderate but Growing**
Farmers in Poland were viewed as “somewhat ready” to adopt smart tools. Experts expressed optimism but stressed that many still lack hands-on experience or digital skills.
- **Main Barriers: Skills and Support Deficit**
The most cited obstacles were low digital literacy and lack of technical support. These gaps suggest a pressing need for foundational digital education and accessible advisory systems.
- **Policy Influence: National and EU Needed**
Experts suggested a dual-level policy effort is required: CAP incentives alone are not sufficient without strong national-level digital infrastructure investment and farmer outreach programmes.

Which stakeholder group should be held most accountable for advancing sustainable farming?

9 responses



- **Top Technologies: Drones and Remote Sensing**
Drones, GPS systems, and remote sensing were ranked as the most scalable smart agriculture tools. These were favoured for their proven value in larger-scale field monitoring and yield optimization.
- **Motivations: Productivity and Decision-Making**
Experts agreed that Polish farmers are primarily driven by increased productivity and data-driven planning. AI-driven solutions were seen as credible tools for improving crop cycles and input usage.



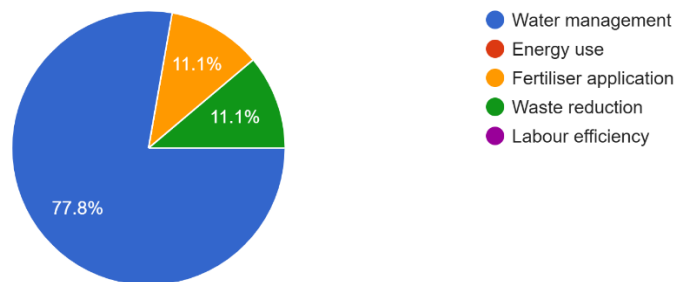
- **Resource Efficiency Needs:**
Water management and energy efficiency were pinpointed as underperforming areas. Soil moisture sensors and energy-efficient equipment were rated as highly impactful solutions.
- **Training Preferences: Interactive & Applied**
Video simulations, interactive case studies, and app-based platforms were strongly preferred. There was a clear desire to move away from static PDFs toward more engaging delivery modes.

Cyprus: Key Takeaways

- **Smart Agriculture Dominates the Agenda**
Cypriot participants unanimously selected Smart Agriculture as the most urgent area for capacity building. Their rationale focused on the dual challenges of water stress and climate volatility.
- **Connectivity as a Limiting Factor**
A unique barrier for Cyprus was poor internet infrastructure in rural farming zones. This digital divide hinders access to real-time tools and limits participation in e-learning initiatives.
- **High Costs and Incentive Gaps**
High equipment cost and lack of national incentives were repeatedly flagged. Unlike CAP-aligned grants, national programs have not yet filled this accessibility gap for smallholder farmers.
- **Resource Management is a Priority**
Experts stressed that Cyprus must urgently improve energy and water efficiency on farms. Drip irrigation and renewable integration (e.g., solar panels) were named as priority interventions.

Which area of resource efficiency needs the most improvement in your region?

9 responses



- **Top Smart Technologies: Mobile and Drip-Based**
Tools with the greatest potential included soil moisture sensors, mobile app decision tools, and drip irrigation systems, especially relevant in a water-scarce environment like Cyprus.

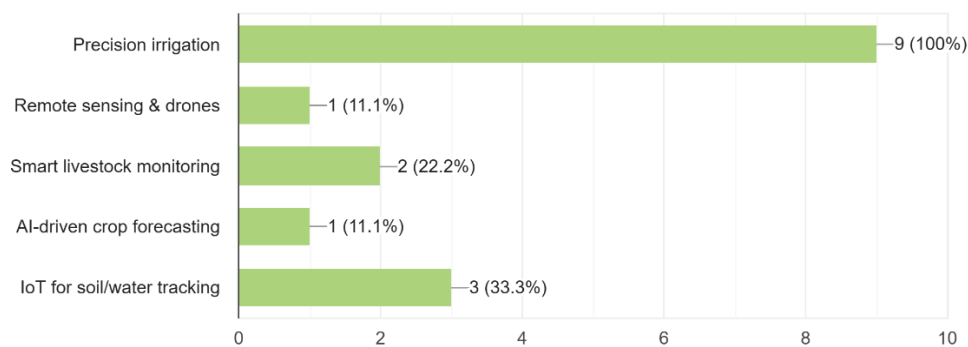


- **Farmer Readiness: Mid-Level, Cautious**
Farmers were rated as being moderately familiar with Smart Agriculture concepts but lacking hands-on experience. Interest exists, but many need support navigating the cost and technical complexity.
- **Training Design: Youth and Vocational Focus**
Participants called for more vocational-level and youth-targeted training, suggesting that early digital exposure is key to shifting long-term adoption rates across the farming population.
- **Stakeholder Responsibility: EU and Government Role**
Experts were divided on who bears the most responsibility. EU policymakers were seen as influential on structure, while national governments were expected to improve rural connectivity and incentives.

Malta: Key Takeaways

- **Climate Adaptation is Top Priority**
All three Maltese experts emphasized the urgency of adapting agriculture to worsening climate conditions, particularly around water availability, which was the dominant issue in both the Mentimeter and Google Form results.
- **Smart Agriculture Must Be Water-Smart**
Smart irrigation systems, weather-predictive tools, and IoT-based water management were seen as essential in the Maltese context. These would not only improve yields but also ensure resilience to prolonged drought.

Which smart agriculture practice has the most potential for scale in your country?
9 responses



- **AI and Cloud Tools Lead Innovation List**
AI-driven crop forecasting, cloud-based farm planning, and mobile dashboards were highlighted as scalable due to Malta's compact geography and high digital coverage.
- **Training Needs: Practical and Integrated**
Experts called for modular training focused on applied skills, such as how to use sensors, monitor analytics, and interpret AI insights. Farmers were seen as willing learners but needed accessible content.



- **Digital Literacy Still a Challenge**

Despite Malta's overall digital maturity, respondents warned that many older or smaller farmers still struggle with basic tech use. Training should begin with digital fundamentals and scale up to more complex tools.

- **Environmental Outlook: Very Positive**

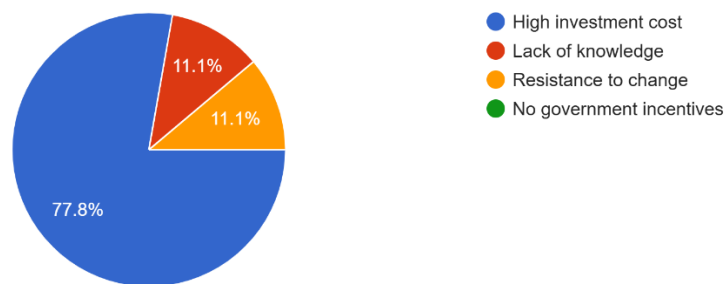
Smart Agriculture was widely viewed as having a "very positive" environmental effect in Malta, especially due to its potential to conserve water, reduce fertilizer runoff, and monitor soil health in real time.

- **Barriers: Cost and Support Services**

Maltese experts cited high upfront investment and limited technical support as key issues. Small farm sizes often mean limited economies of scale, making ROI harder to justify without grants or advisory support.

What's the most common barrier to resource efficiency improvements?

9 responses



- **Collaborative Training Development is Needed**

Maltese experts stressed the need for trainers, farmers, and agri-tech providers to co-develop learning materials. Customizing content to local needs, including language and crop types, was considered essential for long-term impact.

This breakdown offers critical insights into both shared and divergent views among the three partner countries. It reinforces the need for localized training, especially in areas such as digital readiness, water management, and climate resilience, while validating common EU-aligned priorities like precision technology and data-driven decision-making.

Learning Objectives & Training Outcomes for Activity 4

Based on the discussions and survey analysis, the following training development priorities have been identified:

Learning Objectives

- Improve farmer digital literacy through mobile-first tools and accessible interfaces.
- Promote EU-aligned sustainability practices such as IPM, agroforestry, and soil health.



- Support resource efficiency by equipping learners with water and energy-saving techniques.
- Increase farmer readiness for technology adoption via practical, low-cost innovations.
- Facilitate policy awareness of CAP eco-schemes and the European Green Deal framework.

Training Outcomes

- Training built around the 9 best practices and tailored to national needs.
- Integration of case studies from Malta, Cyprus, and Poland.
- Focus on both entry-level learners (young or smallholder farmers) and advanced users (policy professionals, trainers).
- Emphasis on ethical data use, environmental impact, and EU compliance.

Conclusion

The expert focus group successfully provided a rich, grounded foundation for the next phase of the SARE project. Experts affirmed the need to expand Smart Agriculture training using EU policy-aligned methods, digital tools, and real-world farming scenarios.

The 9 best practices identified during the session offer a structured, impactful roadmap for the training material to be developed under Activity 4. In parallel, the differentiated country insights allow for localized adaptation and targeted engagement of key stakeholders.

The next phase will focus on translating these priorities into practical, innovative learning content that can empower Europe's farmers and agricultural educators to lead in a smarter, greener future.

References

European Commission (2020). The European Green Deal. COM(2019) 640 final.

European Commission (2020). A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. COM(2020) 381 final.

European Commission (2021). The Common Agricultural Policy 2023–2027. EU Regulation 2021/2115.

