Agriculture for the Future Generations

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Start Your Journey in Agriculture

A Training Course with 4 inspiring modules on agriculture for young people

Co-funded by the European Union

OBJECTIVE

The AGFG project aims to empower youth engaged or interested in agriculture by promoting inclusivity, diversity, digital empowerment, sustainability awareness, and biodiversity conservation. The goal is to enhance career prospects and contribute to rural and agricultural communities through training courses and pilot workshops, inspiring a new generation of environmentally conscious, skilled, and competitive agricultural professionals. The project is expected to have a positive impact on the agricultural sector in the participating countries by helping to create a more sustainable and competitive industry.

The course will include modules on sustainable agriculture, digital literacy, and entrepreneurship, available as Open Educational Resources.
Skill Enhancement: Participants will gain essential knowledge and skills in farming, breeding, and beekeeping.
Youth Employability: The project aims to boost the employability of young people in agriculture by equipping them with relevant skills and knowledge.
Biodiversity Conservation: The project will promote biodiversity conservation through sustainable agricultural practices.

CONTENT

MODULE 1

Introduction to Sustainable Agriculture and EU Policies

Introduction Module 1

Sustainable agriculture is a critical approach to food production that aims to meet society's present food and textile needs without compromising the ability of future generations to meet their own needs. It emphasizes the responsible use of natural resources, protection of ecosystems, and support for rural livelihoods. As global challenges such as climate change, biodiversity loss, and soil degradation intensify, sustainable agriculture has become more important than ever in ensuring long-term food security and environmental health.

Within the European Union, sustainable agriculture is a core component of broader environmental and economic strategies. Initiatives such as the European Green Deal, the Farm to Fork Strategy, and reforms to the Common Agricultural Policy (CAP) highlight the EU's commitment to transforming its food systems. This module explores the fundamental principles of sustainable agriculture, the EU's policy framework, and practical tools and practices that help farmers across Europe transition to more sustainable and resilient farming systems.

Learning Outcomes

By completing this module, learners will be able to:

1. **Define sustainable agriculture** and explain its three core dimensions: environmental, economic, and social sustainability.
2. **Identify major EU policies** and strategies supporting sustainable agriculture, including the European Green Deal, Farm to Fork Strategy, and CAP.
3. **Recognize and evaluate sustainable farming practices**, such as organic farming, agroecology, and precision agriculture.
4. **Understand current challenges** facing farmers in the EU, including climate change, policy compliance, and market demands.
5. **Apply knowledge in practical scenarios**, such as analyzing a case study or proposing a sustainable plan for a farm or agricultural project.

Topic 1.1: Principles of Sustainable Agriculture

Sustainable agriculture is a farming philosophy and set of practices that aims to produce food, fiber, and other agricultural products in a way that is environmentally sound, economically viable, and socially responsible. Unlike conventional agriculture, which often prioritizes short-term yields and profit, sustainable agriculture takes a long-term view, ensuring that farming systems remain productive and healthy for future generations. It emphasizes the interdependence between agriculture and the ecosystems it relies on—soil, water, air, biodiversity, and climate.

A key concept in sustainable agriculture is the idea of working with nature rather than trying to dominate it. This includes respecting ecological cycles, reducing external inputs such as chemical fertilizers and pesticides, and enhancing the resilience of farming systems to shocks like drought or pests. Sustainable farming also involves ethical considerations, such as animal welfare, farmer rights, and food sovereignty. Overall, it supports the idea that farming should not only feed the population but also protect the planet and sustain rural livelihoods.

Environmental Sustainability

Environmental sustainability is at the heart of sustainable agriculture. It involves practices that conserve natural resources, maintain soil fertility, protect water quality, and preserve biodiversity. Techniques such as crop rotation, agroforestry, cover cropping, and reduced tillage help maintain healthy soil and reduce erosion. Avoiding chemical overuse prevents contamination of groundwater and rivers. In addition, protecting natural habitats on and around farms helps conserve biodiversity, which is essential for pest control, pollination, and ecosystem stability.

Climate-smart agriculture is another key element, aiming to reduce greenhouse gas emissions from farming and adapt to climate change. Practices include using renewable energy sources, improving manure management, and planting resilient crop varieties. Sustainable farms also pay attention to efficient water use, employing irrigation systems that reduce waste and preserve freshwater sources. By integrating environmental principles into every stage of production, farmers contribute to a more stable and secure agricultural system.

Economic Sustainability

For agriculture to be truly sustainable, it must also be economically viable. Farmers need to make a living, invest in improvements, and remain resilient in the face of market fluctuations or climate extremes. Sustainable agriculture promotes economic resilience through diversification–growing multiple crops or combining livestock and crops to spread risk and improve income stability. Direct-to-consumer sales, value-added products, and participation in local markets can also enhance farm profitability.

Support from policy frameworks, cooperatives, and fair trade systems helps small and medium-sized farmers access markets and obtain fair prices for their products. Access to affordable credit, insurance, and training can empower farmers to adopt sustainable techniques and stay competitive. Long-term economic sustainability also depends on reducing dependence on costly external inputs by enhancing natural soil fertility and using local resources wisely.

Social Sustainability

The social dimension of sustainable agriculture focuses on equity, community well-being, and the quality of life of farmers and workers. It advocates for fair wages, safe working conditions, gender equality, and inclusive decision-making. Sustainable agriculture also supports rural communities by providing stable employment, strengthening local food systems, and encouraging the preservation of cultural traditions and agricultural knowledge.

Food security is a major goal of socially sustainable agriculture. It seeks to ensure that all people, especially in vulnerable areas, have access to sufficient, nutritious, and culturally appropriate food. Education and training are also vital, equipping farmers–especially young and new ones–with the knowledge and skills to farm sustainably. When social justice is at the core of agriculture, farming becomes a force for positive change, empowering communities and reducing inequality.

Traditional vs. Modern Sustainable Practices

Traditional farming practices, developed over generations, are inherently sustainable in many regions. These include intercropping, using compost and manure, natural pest control, and saving seeds. Such methods are rooted in local ecosystems and often use indigenous knowledge that promotes biodiversity and environmental stewardship. While these techniques may yield less in the short term, they often lead to healthier soils, stronger communities, and greater long-term productivity.

Modern sustainable practices, on the other hand, incorporate science and technology to enhance efficiency and reduce environmental impact. These include precision agriculture (using GPS and data to optimize planting and irrigation), integrated pest management (IPM), and bio-based fertilizers. Advances in biotechnology and remote sensing allow farmers to monitor soil and crop health more accurately and apply inputs more efficiently. When combined with traditional knowledge, these innovations can significantly improve the sustainability of farming systems.

Conclusion

The principles of sustainable agriculture represent a balanced and forward-thinking approach to food production. By addressing environmental, economic, and social factors, sustainable farming not only provides food but also helps combat climate change, reduce poverty, and support healthy ecosystems. Whether using time-honored traditions or cutting-edge technologies, the goal remains the same: to build a resilient and just agricultural system for present and future generations. For the European Union and its member states, aligning agriculture with sustainability goals is not just a policy priority–it is a necessity for long-term prosperity and well-being.

Topic 1.2: The Role of the European Union in Sustainable Agriculture

The European Union (EU) has long recognized the importance of sustainable agriculture as a foundation for ensuring food security, environmental protection, and rural development across its 27 member states. In response to growing environmental challenges such as climate change, biodiversity loss, soil degradation, and water scarcity, the EU has taken a leading role in guiding its agricultural sector toward sustainability. The Union's approach is not limited to setting high-level goals; it encompasses strategic policy frameworks, legislative instruments, financial incentives, and research initiatives designed to foster a resilient and environmentally responsible food production system.

At the heart of this shift is the European Green Deal, the EU’s comprehensive roadmap for achieving a climate-neutral economy by 2050. Agriculture is a central pillar of this strategy, as the sector is both a contributor to environmental problems and a key player in their solution. Through the Green Deal, the EU aims to significantly reduce greenhouse gas emissions from agriculture, promote carbon sequestration in soils and biomass, and protect natural habitats. Sustainable agriculture is thus not only an environmental necessity but also a strategic component in the EU’s climate agenda.

To translate the goals of the Green Deal into concrete actions in the food and farming sector, the Farm to Fork Strategy was launched in 2020. This strategy outlines a vision for a fair, healthy, and environmentally friendly food system. It promotes a systemic transformation of how food is produced, processed, distributed, and consumed in Europe. Key targets include reducing the overall use of chemical pesticides by 50%, cutting fertilizer use by 20%, and ensuring that at least 25% of EU farmland is managed organically by 2030. The strategy also addresses food waste, antibiotic resistance, and the sustainability of food imports, aligning EU agriculture with global sustainability commitments such as the UN Sustainable Development Goals (SDGs).

The **Common Agricultural Policy (CAP)** is the EU's primary mechanism for implementing agricultural and rural development objectives. It provides direct financial support to farmers, promotes rural development, and ensures a stable supply of safe food. In recent years, the CAP has been overhauled to place greater emphasis on environmental and climate performance. The current CAP (2023-2027) introduces a new delivery model that allows member states to develop their own **CAP Strategic Plans**. These plans must align with nine common EU objectives, including the preservation of natural resources, climate action, and the protection of biodiversity.

A major innovation in the reformed CAP is the introduction of **eco-schemes**– voluntary programs that reward farmers for adopting sustainable practices. These may include crop diversification, maintaining permanent grasslands, creating buffer zones for water protection, or using organic farming techniques. By participating in eco-schemes, farmers receive additional financial support while contributing to broader environmental goals. The CAP also strengthens **conditionality requirements**, meaning that farmers must adhere to stricter environmental and climate standards to qualify for basic payments. This reinforces the principle that public money should support public goods.

Beyond the CAP, the EU enforces several key legislative and regulatory frameworks to guide sustainable agriculture. These include the **Nitrates Directive**, which aims to reduce water pollution caused by agricultural runoff, and the **Water Framework Directive**, which promotes integrated water resource management. The **Birds and Habitats Directives** form the backbone of the EU's biodiversity conservation efforts, protecting natural habitats and species that are often impacted by agricultural expansion. Additionally, the **Sustainable Use of Pesticides Directive** promotes the adoption of integrated pest management (IPM), reduces reliance on chemical inputs, and enhances awareness of safe pesticide use among farmers.

The EU also supports sustainable agriculture through substantial investments in research, innovation, and knowledge sharing. Programs such as Horizon Europe, the EU's flagship research and innovation initiative, fund cutting-edge projects in precision agriculture, climate adaptation, soil health, and biotechnology. The European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) connects farmers, researchers, agribusinesses, and public authorities to co-develop and disseminate innovative solutions. Digital agriculture is another key area of focus, with the EU promoting smart farming technologies such as satellite monitoring, sensor-based irrigation, and data-driven decision-making tools.

Lastly, the EU's global influence extends through its external policies and trade agreements, which increasingly incorporate sustainability criteria. For example, the EU promotes environmental and social standards in its agricultural imports and provides technical assistance to developing countries to support sustainable food systems. Through partnerships with international organizations, the EU shares best practices, funds rural development projects, and contributes to global food security. This global dimension ensures that the EU's efforts in sustainable agriculture resonate beyond its borders and contribute to a more sustainable planet.

Topic 1.3: Sustainable Farming Practices and Technologies

The transition to sustainable farming is driven by a broad set of practices and technologies that reduce environmental impact, enhance farm productivity, and improve the resilience of agricultural systems. These approaches range from time-tested methods such as organic farming and agroecology to cutting-edge technologies like precision agriculture. By integrating ecological knowledge with innovation, sustainable farming practices aim to secure long-term food production while conserving the natural resources upon which agriculture depends.

Organic Farming, Agroecology, and Permaculture

One of the most recognized approaches to sustainable agriculture is organic farming, which excludes the use of synthetic fertilizers, pesticides, genetically modified organisms (GMOs), and growth hormones. Instead, it relies on natural processes such as composting, crop rotation, and biological pest control. Organic farming supports soil health, biodiversity, and animal welfare while reducing pollution and carbon emissions. It is widely supported by EU policy through certification systems and subsidies under the Common Agricultural Policy (CAP).

Closely related to organic farming is agroecology, a holistic approach that applies ecological principles to the design and management of agricultural systems. Agroecology promotes biodiversity, nutrient cycling, and the use of local knowledge and inputs. It seeks to create diversified farms that are productive, resilient, and socially equitable. Agroecological practices may include mixed cropping, the integration of livestock and crops, and the use of natural predators to manage pests.

Permaculture takes sustainability a step further by designing agricultural systems that mimic natural ecosystems. It combines principles of ecology, landscape design, and sustainable living to create self-sufficient systems. Permaculture techniques often include swales for water retention, food forests, and perennial planting systems. It emphasizes minimal disturbance of the soil and long-term productivity without reliance on external inputs.

Precision Agriculture and Smart Farming Tools

In contrast to traditional methods, modern technology has introduced a new era of sustainability through precision agriculture. This method uses data and technology to optimize field-level management with regard to crop farming. It includes GPS-guided tractors, drones, soil sensors, and remote sensing to gather real-time data about field conditions. This allows farmers to apply water, fertilizers, and pesticides only where needed, in the right amount and at the right time.

Smart farming tools, including Internet of Things (IoT) devices, AI-powered analytics, and automated machinery, improve efficiency and reduce waste. For example, smart irrigation systems can adjust water application based on soil moisture data, reducing water use by up to 30%. Similarly, AI-driven tools can detect plant diseases early and recommend targeted interventions, minimizing chemical use. These innovations not only increase yields but also reduce costs and environmental harm.

Digital platforms also facilitate farm management by integrating data on weather, crop performance, and market prices, helping farmers make better decisions. In the EU, several pilot projects and innovation hubs are promoting digital farming as part of the “smart villages” concept. This ensures that even small and remote farms can benefit from technological advancements.

Soil Health, Water Management, and Biodiversity

Sustainable farming cannot succeed without attention to soil health, which is foundational for plant growth, water filtration, and carbon storage. Practices such as cover cropping, reduced tillage, composting, and the use of organic amendments improve soil structure, increase organic matter, and enhance microbial activity. Healthy soils retain more water and nutrients, making crops more resilient to drought and pests.

Effective water management is another pillar of sustainability, especially as climate change leads to more frequent droughts and extreme weather. Techniques such as drip irrigation, mulching, rainwater harvesting, and the use of drought-tolerant crops help reduce water use and improve efficiency. The EU supports integrated water management systems that align agricultural practices with the goals of the Water Framework Directive.

Biodiversity in farming landscapes is essential for ecosystem services such as pollination, pest control, and nutrient cycling. Sustainable farms often include hedgerows, wildflower margins, agroforestry systems, and crop diversification to promote species richness. Biodiversity not only enhances resilience but also reduces the need for chemical inputs by supporting natural predators and pollinators. The EU's biodiversity strategy encourages farmers to restore natural habitats and participate in conservation efforts.

Conclusion

Together, these practices and technologies demonstrate that sustainability in agriculture is not limited to any single method or ideology. Instead, it is a flexible and dynamic process that combines ancient wisdom with modern science. By adopting a mix of organic techniques, ecological design, and smart technologies, farmers can reduce their environmental footprint, improve productivity, and build resilience to climate change. The EU's support through research, policy, and funding ensures that these approaches are accessible and scalable, paving the way for a greener future in European agriculture.

Topic 1.4: Challenges and Opportunities for EU Farmers

Farmers across the European Union (EU) are at the front line of some of the most pressing global challenges, including climate change, market volatility, and increasing regulatory demands. Yet, this period of transformation also brings new opportunities for innovation, sustainability, and growth. As agriculture adapts to meet ambitious environmental and social goals, EU farmers are being called upon to rethink traditional methods and embrace a more resilient, forward-looking approach to food production.

Climate Change, Market Pressures, and Policy Compliance

Climate change is perhaps the most urgent challenge affecting EU agriculture today. Rising temperatures, changing precipitation patterns, and more frequent extreme weather events such as droughts, floods, and storms are already impacting crop yields, livestock health, and water availability. These risks vary across Europe, with southern regions particularly vulnerable to desertification and water scarcity, while northern areas may face increased flooding or shifting growing seasons.

In parallel, market pressures–from global competition to fluctuating prices for commodities–create financial uncertainty for many farmers. The demand for low-cost food from consumers and retailers often limits profit margins, particularly for small and medium-sized farms. At the same time, public awareness around food quality, safety, and environmental impact is increasing, placing new expectations on farmers to meet sustainability criteria.

Farmers must also navigate a growing web of regulatory requirements related to environmental protection, animal welfare, and food traceability. While these standards are critical for ensuring safe and sustainable production, they can add administrative burdens and costs. Compliance with EU regulations such as the CAP's conditionality rules, the Nitrates Directive, and the Sustainable Use of Pesticides Directive requires farmers to invest time and resources in education, certification, and monitoring systems.

Funding Opportunities and EU Support Programs

Despite these challenges, the EU offers a wide range of support mechanisms to help farmers adapt and thrive. One of the most significant sources of funding is the Common Agricultural Policy (CAP), which provides direct payments to farmers and funds rural development initiatives. Under the current CAP (2023–2027), the emphasis is on environmental sustainability, innovation, and generational renewal in agriculture.

Farmers can access targeted funding through eco-schemes, agri-environmental and climate measures, and investment subsidies. These programs support the adoption of sustainable practices such as organic farming, precision agriculture, and biodiversity conservation. Additional support is available for modernizing farm infrastructure, investing in renewable energy, and improving animal welfare.

Beyond CAP, the Horizon Europe program and the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) fund research and innovation projects aimed at making agriculture more efficient, sustainable, and competitive. Farmers can also benefit from EU advisory services, training workshops, and digital tools that enhance knowledge sharing and farm management.

Success Stories and Case Studies from EU Member States

Across the EU, many farmers and cooperatives are leading the way in demonstrating how sustainable agriculture can be both environmentally beneficial and economically viable. For instance, in Austria, the organic farming sector has seen remarkable growth, supported by strong public policies and consumer demand. Over 25% of Austrian farmland is now managed organically, making it one of the top-performing countries in the EU in terms of organic agriculture.

In **Spain**, water-scarce regions such as Andalusia have embraced **precision irrigation technologies** to cope with drought conditions while maintaining agricultural productivity. Smart irrigation systems that adjust based on weather data and soil moisture have helped reduce water usage by up to 40%, showcasing a scalable solution for climate adaptation.

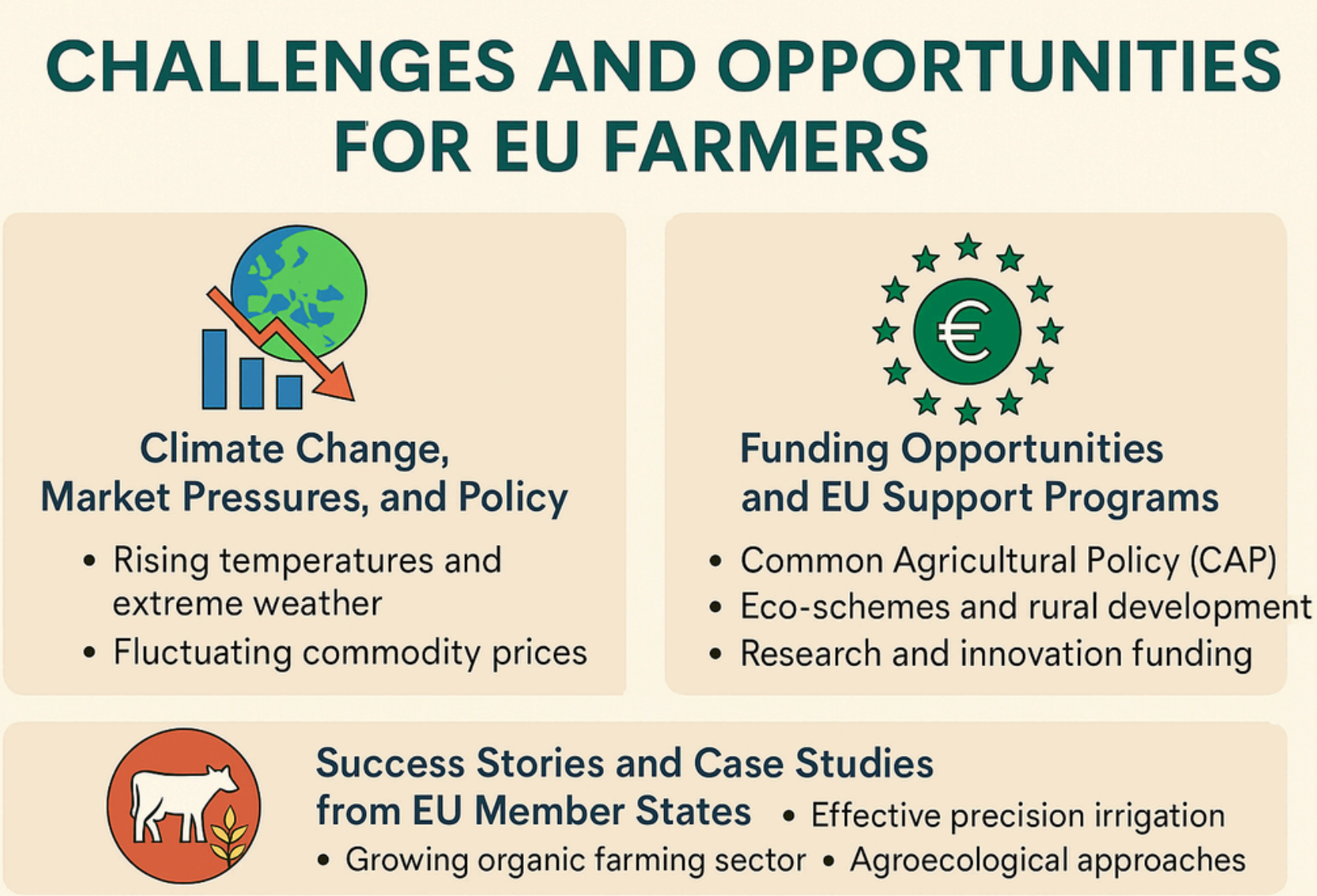
France has pioneered agroecological approaches at a national scale, integrating crop-livestock systems, cover cropping, and reduced chemical inputs. The “4 per 1000” initiative, which promotes carbon sequestration in soils, is a French-led global effort that has inspired similar soil health strategies across Europe.

In **Finland**, digital farming solutions and farm data platforms are widely used to improve nutrient management and reduce environmental impact. Government support for agricultural innovation and rural broadband has allowed even remote farms to adopt advanced technologies that increase efficiency and transparency.

These examples reflect a broader shift toward resilient, sustainable, and tech-driven agriculture. By leveraging EU funding, embracing innovation, and sharing best practices, farmers across the continent are demonstrating that sustainable transformation is not only possible but also profitable.

Conclusion

While EU farmers face significant challenges in navigating climate, economic, and regulatory pressures, they are also uniquely positioned to benefit from the tools, funding, and support available through the European Union. With the right investments and policy alignment, the agricultural sector can become a cornerstone of Europe's green transition. Empowering farmers with knowledge, technology, and financial incentives is essential to ensuring that EU agriculture remains productive, sustainable, and competitive in the years ahead.



MODULE 2

Digital Literacy and ICT skills for Agricultural Professionals

Introduction Module 2

Digital transformation is reshaping the landscape of agriculture. From managing farm operations to marketing products and engaging with consumers, digital tools and ICT (Information and Communication Technologies) are now essential for agricultural professionals. As the EU advances toward a sustainable and digitally inclusive agri-food system under the Common Agricultural Policy (CAP) and the European Green Deal, young people entering the sector need to develop strong digital literacy and ICT skills to remain competitive, efficient, and future-ready.

This module addresses the core digital competencies that young farmers, beekeepers, and agricultural entrepreneurs must acquire to thrive in this evolving environment. Through a hands-on and practice-oriented approach, learners will explore the fundamentals of digital literacy, discover relevant ICT tools for agriculture, gain insights into innovative farm management models, and learn how to use digital marketing to grow their business and engage customers.

By completing this module, young learners will be able to:

1. **Understand and apply digital literacy principles** relevant to agriculture, including data safety, digital rights, and online communication.
2. **Identify and use ICT tools** such as farm management software, sensors, and data platforms to improve efficiency and decision-making.
3. **Adopt innovative farm management models** integrating sustainability, circular economy practices, and precision farming.
4. **Develop digital marketing strategies** for promoting agricultural products and services through websites, social media, and e-commerce platforms.
5. **Critically assess online information** and navigate digital services like CAP e-portals, funding platforms, and peer knowledge networks.

This module is designed to build technical capacity and inspire young people to actively participate in the digital future of agriculture–confidently, sustainably, and creatively.

Topic 2.1: Digital Literacy Fundamentals

Digital literacy is the ability to access, manage, understand, integrate, communicate, evaluate, create and disseminate information safely and appropriately through digital technologies. It includes competencies that are variously referred to as information and media literacy, as well as computer and ICT literacy. Digital Literacy involves active and civic engagement with the digital world and promotes active citizenship (EC, 2022). It provides a path towards achieving broader goals, helping individuals of all ages, including farmers, become better critical thinkers, effective communicators, and active and empowered members of society. For agricultural professionals navigating today's digital world, increasing their digital literacy and skills is of paramount importance (Barabanova et al., 2023).

Digitalization is now a cornerstone of modern European agriculture, underpinning the sector's transformation towards greater sustainability, efficiency, effectiveness, and competitiveness. As the European Union accelerates the digitalisation of agriculture, farmers and rural professionals are increasingly expected to navigate and leverage digital tools, data-driven platforms, and online services to optimize their work (European Commission). The European Commission's strategic priorities for 2024-2029 highlight the need for investment and innovation in digital skills across the entire agri-food value chain, from farm to fork (EC, 2024). The Common Agricultural Policy (CAP) 2023-2027 targets explicitly these issues by supporting digital skills development and the uptake of advanced technologies, ensuring that all farmers, regardless of location, can benefit from the digital transition. Digital literacy in agriculture does not only mean the ability to use devices, but also understanding data privacy, navigating e-government portals, and participating in online knowledge exchange.

At its core, **digital literacy in agriculture** involves the ability to confidently use digital devices such as smartphones, tablets, and computers for everyday farm management. This includes accessing weather forecasts, market prices, and farm management software, all of which are getting increasingly significant to efficient decision-making on European farms. The increasing use of cloud-based platforms and mobile applications allows for real-time data collection and analysis, supporting more precise and timely interventions in crop and livestock management. For example, digital farm logs and nutrient management tools are now required by CAP eco-schemes, making digital skills essential for compliance and subsidy access.

Beyond device operation, digital literacy encompasses the ability to critically assess online information sources and select those that are credible and relevant. This is particularly important as the volume of agricultural data and advice available online continues to grow. The European Digital Competence Framework (DigComp 2.2) provides a structured approach for assessing and improving these skills, ensuring that farmers can distinguish between reliable data and misinformation (Vuorikari et al., 2022). Training programmes, such as those supported by the Digital Europe Programme, offer learning modules and demonstration farms to make digital education accessible and relevant to busy professionals.

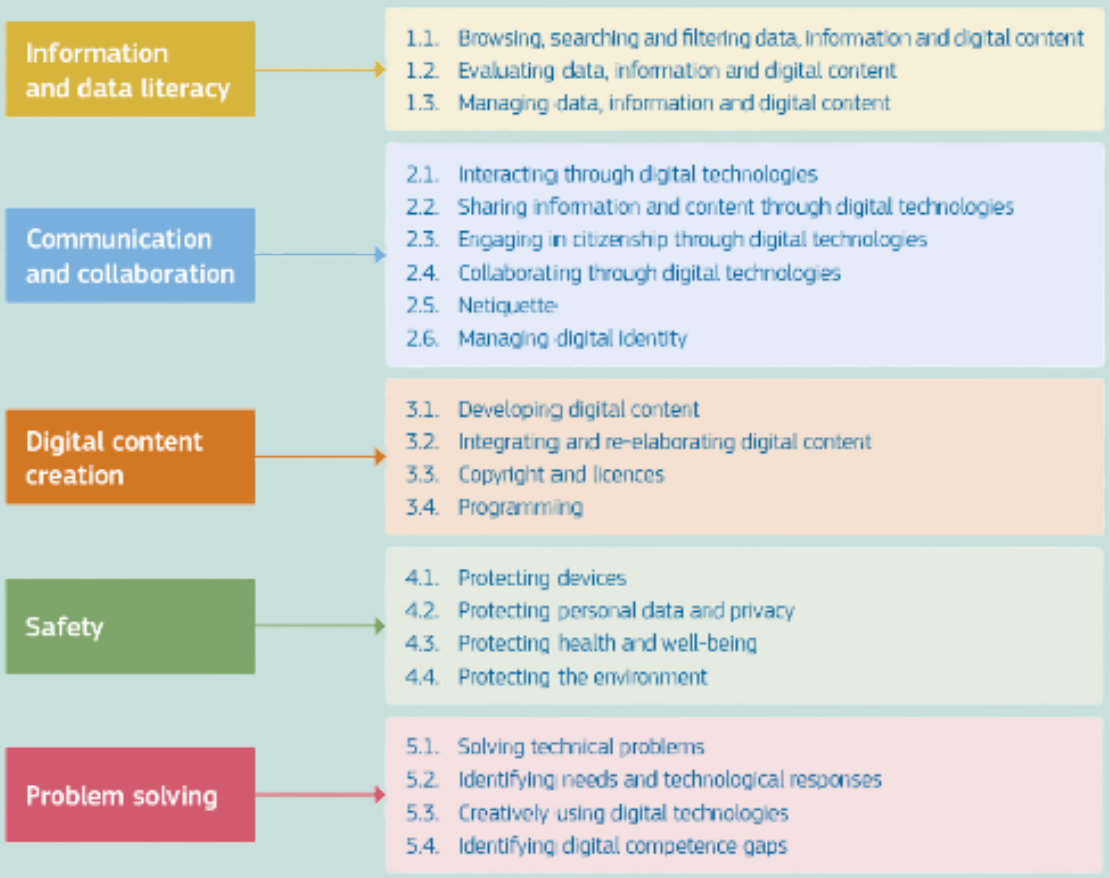


Figure 1: The DGComp conceptual reference model (Vuorikari et al., 2022)

Data security and privacy are also central to digital literacy. With the increasing use of digital records and online transactions, farmers must be vigilant about protecting sensitive information from cyber threats. The European Commission has responded by funding awareness campaigns and developing best practice guidelines for data protection in agriculture, including the safe use of cloud storage and encrypted communication tools (EC, 2023). Simulated phishing exercises and online quizzes are now common in digital skills training, helping farmers recognise and avoid potential cyber risks.

Navigating e-government services is another vital aspect of digital literacy. Many CAP-related applications, subsidy claims, and compliance checks are now processed through online portals. The ability to efficiently use these systems not only saves time but can also increase access to financial support and advisory services. For instance, the Farm Sustainability Tool for Nutrients (FaST) is now a key tool for solutions for sustainable and competitive agriculture, and its practical use depends on digital competence.

Watch on YouTube: Fast v1 Demo

Thanks to digital platforms, peer-to-peer knowledge exchange has also become more dynamic and inclusive. Farmers across the EU are forming online communities, sharing best practices and troubleshooting challenges via messaging apps and social networks (Geerling et al., 2019). These digital communities foster innovation and resilience, enabling rapid dissemination of new techniques and solutions, especially in times of crisis or rapid regulatory change. E-learning platforms are also supported by EU funding, such as SUSTAGRI4.0 e-courses, which bring digital and marketing skills to small-scale farmers and agribusiness owners towards a sustainable and community-driven future.

Skill Area	Description
Basic Computer Skills	Use of a tablet, computer, or smartphone for planning documents and tools
Web Surfing	Searching for accurate information related to farming, subsidies, or equipment
Communication Tools	Using email, messaging apps, and social media for communication and career growth
Computer Literacy	Using tools like Excel, farm management software, or mobile applications
Digital Safety	Understanding cyber risks, data protection, and privacy

Table 1: Key Digital Literacy Competencies for Young Farmers

Topic 2.2: ICT Tools for Agriculture - Agricultural Software and Applications

Adopting Information and Communication Technology (ICT) tools is revolutionising European agriculture, making farms more productive, sustainable, and resilient to change. Supported by the EU's Digital Europe Programme and the Common Agricultural Policy, ICT tools such as *Internet of Things* (IoT) sensors, data analytics platforms, and precision machinery are now central to the sector's digital transformation. These technologies enable farmers to collect, process, and act on vast amounts of data, leading to more tailored and efficient farming operations. The development of the Common European Agricultural Data Space and the establishment of *Testing and Experimentation Facilities* (TEF) for AI in agri-food (Agri-FoodTEF) are further accelerating the integration of digital tools across the value chain. AgriDataSpace project aims to pave the way for a European data space for agriculture that facilitates data sharing, processing, and analysis in a secure, trusted, transparent and responsible manner. However, the successful uptake of ICT in agriculture requires investment in technology and the development of digital skills and robust data governance frameworks. As the EU moves towards its Green Deal objectives, the role of ICT in optimising resource use, reducing environmental impact, and supporting traceability and transparency is more critical than ever.

Watch on YouTube: Agridata Space: Paving the way for the European data space for agriculture.

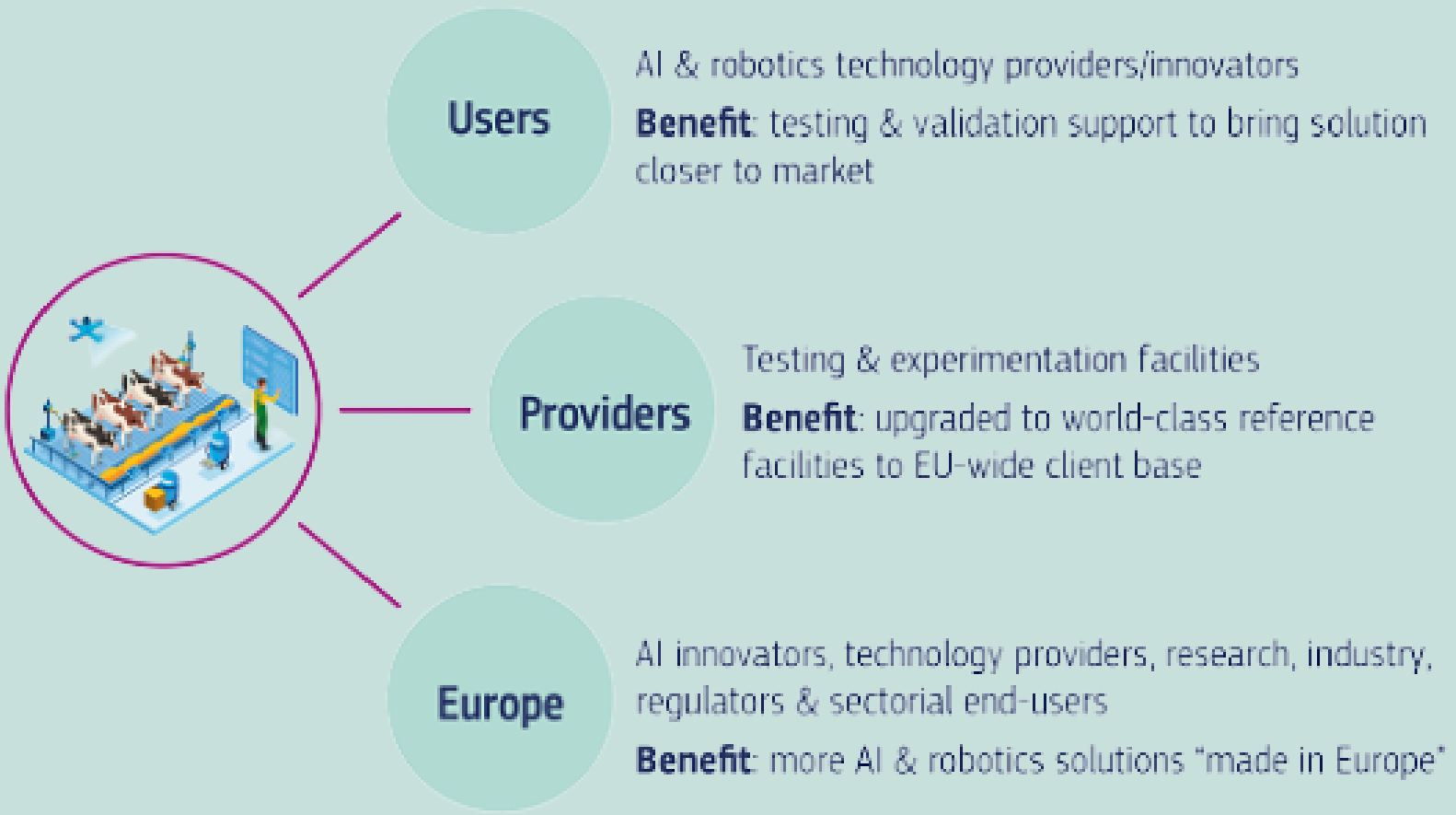


Figure 2: Testing and experimentation facilities in agri-food, https://www.agrifoodtef.eu/.

ICT tools in agriculture encompass various digital solutions, from basic farm management software to advanced AI-powered analytics and robotics. **Precision farming** technologies, such as GPS-guided tractors and drone-based crop monitoring, allow farmers to optimise input use and reduce waste, directly supporting CAP's sustainability targets. These technologies rely on accurate geospatial data and real-time feedback, enabling site-specific interventions that improve yields and reduce environmental impact. The Integrating Precision Farming into Computer Games project will encourage agricultural stakeholders to adopt precision farming techniques and technologies. This project resulted in co-creating a new precision farming module/DLC (downloadable content) for a **Farming Simulator game** in order to help users experience the multiple benefits that precision farming can have. This game has the potential to reach a wide audience of farmers, agricultural students and other interested stakeholders in an accessible way. The free DLC is available on ModHub for PC & Mac, PlayStation 4 and Xbox One.

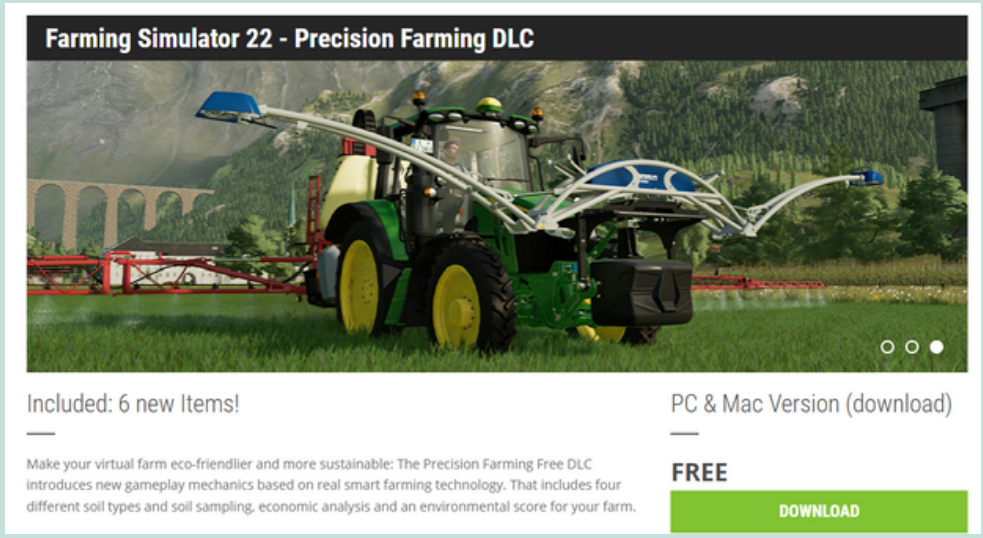


Figure 3: Farming Simulator 22 - Precision Farming DLC, EIT Food, EU co-funded

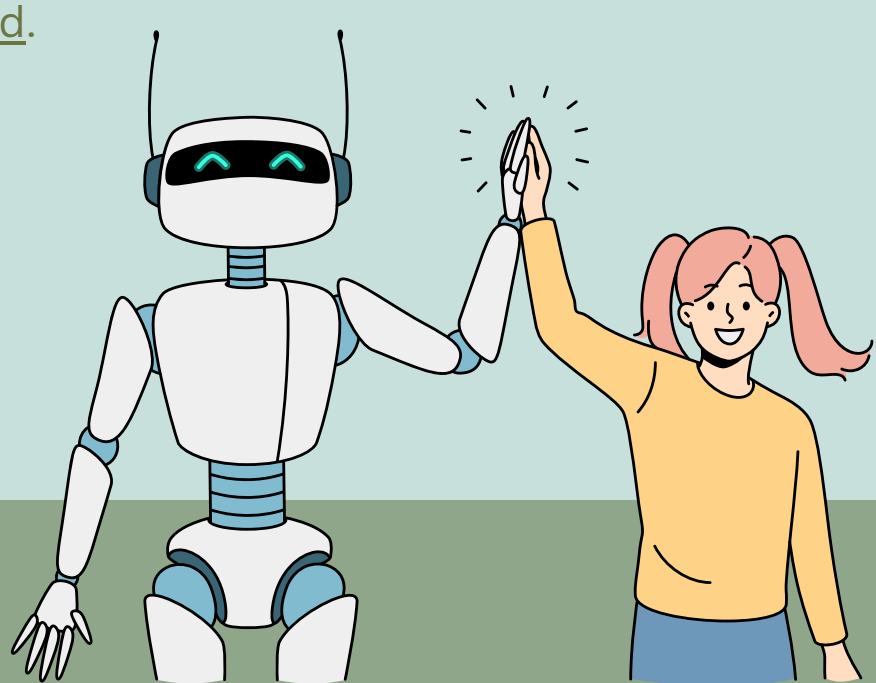
Watch on YouTube:
Precision Farming Free DLC

The **integration of IoT sensors** into fields and livestock facilities has transformed data collection, making it possible to monitor soil moisture, temperature, and nutrient levels continuously. This real-time monitoring supports more efficient irrigation and fertilisation, reducing water and chemical use while maintaining or increasing productivity. The rapid growth in IoT device adoption highlights the sector's commitment to data-driven innovation, and the EU has supported related HORIZON projects. The SWAMP project developed IoT-based methods and approaches for smart water management in the precision irrigation domain. The IoF2020 project was dedicated to accelerating the adoption of IoT for securing sufficient, safe and healthy food and to strengthening the competitiveness of farming and food chains in Europe. "The DEMETER Project was a large-scale deployment of farmer-centric interoperable smart farming-IoT-based platforms delivered through 20 pilots across 18 countries."

Data analytics platforms and artificial intelligence are unlocking new possibilities for predictive decision-making in agriculture. These tools can forecast yields, detect disease outbreaks, and recommend optimal planting and harvesting times by analysing historical and real-time data. The EU's investment in large-scale reference Testing and Experimentation Facilities for AI ensures that these solutions are validated under real-world conditions, increasing farmer confidence and accelerating adoption. The STELLA-PSS project aims to develop a holistic digital system to aid in the early warning and detection of regulated pests and a response strategy using modern sensing technology and Artificial Intelligence.

Blockchain technology is increasingly used to enhance traceability and transparency in the agri-food supply chain. By recording every transaction and movement of goods, blockchain systems help ensure food safety, prevent fraud, and build consumer trust. The Common European Agricultural Data Space further supports secure and responsible data exchange, enabling farmers to benefit from shared insights while maintaining control over their information. The EU-funded TRUSTyFOOD project aims to improve each stage of food distribution by integrating blockchain technology (BCT) into the broader context of the agrifood system. CATTLECHAIN 4.0 aims to develop innovative tools that can restore interest and activity for younger generations, assuring complete supply chain transparency, by enhancing farm productivity and guaranteeing cattle traceability with blockchain.

Despite these advances, challenges remain in terms of interoperability, infrastructure, and cost. Many farms, especially smaller holdings, face barriers to adopting the latest ICT tools due to limited broadband access or the high upfront investment required. The CAP addresses these issues by funding infrastructure upgrades and subsidising technology purchases. AgrifoodTEF programme supports the creation of European Digital Innovation Hubs (EDIHs), which will provide technological expertise and experimentation facilities to enable the digital transformation of the agri-food industry and the public sector. These EDIHs will build on the experiences and lessons learned from existing DIHs such as SmartAgriHubs and AgroRobofood.



Topic 2.3: Innovative Farm Management Models - Leveraging technology for efficient management

Innovative farm management models are important to create a more sustainable, resilient, and competitive agricultural sector. The Common Agricultural Policy and the European Green Deal are driving a paradigm shift towards practices that integrate digital technologies, sustainability principles, and data-driven decision-making. As the EU aims to have 25% of its agricultural land under organic farming by 2030, and to reduce the use of pesticides and fertilisers significantly, adopting innovative management approaches is both a necessity and an opportunity for agricultural professionals. The success of these models depends not only on technological innovation but also on knowledge exchange, collaboration, and the active participation of farmers in the digital transition (European Commission). By embracing new management paradigms, young agricultural professionals can position themselves at the forefront of Europe's sustainable food system transformation.

Circular economy models in agriculture prioritise resource recycling and reuse, turning waste into valuable inputs and closing nutrient loops. For example, biogas plants convert livestock manure into renewable energy and organic fertiliser, reducing greenhouse gas emissions and improving soil health. These systems are increasingly supported by CAP-funded investments and eco-schemes, making them accessible to a broader range of farms. EU-funded research and innovation also accelerate Europe's transition towards sustainable, resilient, circular and competitive farming systems. Several projects examine how manure can be efficiently recycled as fertiliser, including Sustainable Manure and its successor SmartNitroFarm, as well as Treat2ReUse. Others look at how to produce fertilisers from alternative sources, such as digestate NOMAD, bacteria mining BioRevolution, algae Cyanobacteria and wastewater from slaughterhouses Water2REturn and farms PSust-MOF. The need to understand and manage nutrient cycles and soil health is addressed by SENSOILS, Circular Agronomics, Nutri2Cycle and NitroFixSal, while SolACE investigates new crop varieties.

Data-driven management is another hallmark of innovative farm models. By integrating data from sensors, drones, and market platforms, farmers can make more informed decisions about planting, irrigation, and marketing. This approach not only boosts productivity but also helps farmers comply with environmental regulations and respond to market fluctuations more effectively. Precision farming has the potential to contribute to the wider goal of meeting the increasing demand for food whilst ensuring the sustainability of primary production, based on a more precise and resource-efficient approach to production management – in essence, 'producing more with less'. The 4D4F project has helped dairy farmers base management decisions on data, such as that gathered by sensing equipment, leading to best practices for more sustainable dairy farming. The IoF2020 project has developed new solutions to better integrate 'Internet of Things' (IoT) technologies into agricultural processes, whilst the RECAP project provides a repository of data that can be used to guide farmers to be compliant with CAP rules applying to their farms.

Watch on YouTube: IoF2020 "Dairy Trial", aims to unify sensor data for monitoring cattle to derive improved insights into dairy cattle fertility and welfare.

Agroecological practices, such as agroforestry and conservation agriculture, are gaining traction as part of the EU's Farm to Fork strategy. Agroecology offers a way to couple the EU's food production needs with environmental stewardship and climate ambitions. It has been identified as an approach that can be supported through the eco-schemes under the first pillar of the Common Agricultural Policy. The importance and potential of agroecology has been underscored by the food security crisis caused by the war in Ukraine, and the need for sustainable farming approaches that reduce the agricultural sector's reliance on inputs from outside the EU. Digital tools play a crucial role in monitoring ecosystem health and evaluating the impact of these practices, enabling continuous improvement and adaptation. D4AgEcol will provide knowledge for the transition to agroecological farming by identifying appropriate digital tools and technologies. To facilitate the adoption of agroecology, CONSOLE and Contracts2.0 showcase novel frameworks to promote the creation and valorisation of environmentally friendly public goods.

Watch on YouTube: D4AgEcol Teaser Video

Collaboration and knowledge exchange are essential for the success of innovative management models. EU-supported EIP-AGRI operational groups, demonstration farms, and digital advisory platforms facilitate the sharing of best practices and foster a culture of continuous learning. These networks are supported under the Common Agricultural Policy 2023-2027 National Strategic Plans. These networks empower young professionals to experiment with new approaches and scale successful innovations, including digital ones, across regions. In the context of the Agricultural Knowledge and Information System (AKIS), the EU-funded modernAKIS project will build and foster a European network of at least 1000 key AKIS actors, including AKIS coordination bodies, from all EU Member States. They will serve as linchpins in transforming the AKIS systems towards more effective governance and modernising the European agri-food sector.

Finally, adopting **renewable energy technologies**, such as solar panels and biogas digesters, further enhances the sustainability and self-sufficiency of European farms. These investments reduce carbon footprints and create new revenue streams, contributing to the economic viability of rural communities. For example, farmers in Belgium, Italy, Germany and Greece have teamed up to show that it is possible to reduce agriculture's fossil fuel dependence and move towards the adoption of renewable energy sources, in the framework of the EU-funded RES4LIVE project, which demonstrated that selected technologies, including PVT systems, PV panels, modular heat pumps, biogas upgrading to biomethane, biomethane-fuelled tractors and electrically powered on-farm machinery.

Topic 2.4: Digital Marketing for Agricultural Businesses

Digital marketing is rapidly becoming an essential component of agribusiness strategy in the European Union, enabling farmers and agri-food companies to reach new markets, build brand recognition, and engage directly with consumers (ISAM). The CAP 2023-2027 and the Digital Europe Programme invest in digital infrastructure and skills to help agricultural professionals harness the power of online marketing, social media, and e-commerce platforms. As consumers increasingly seek transparency, sustainability, and authenticity in their food choices, digital marketing offers unprecedented opportunities for differentiation and value creation. However, many agricultural businesses still face barriers to digital adoption, including a lack of digital skills, limited expertise, connectivity challenges, and the need for tailored training. Addressing these gaps is critical for ensuring that all EU farmers can compete effectively in the digital marketplace and benefit from the efficiencies and cost savings that digital marketing provides. By embracing digital marketing strategies, young agricultural professionals can future-proof their businesses and contribute to a more dynamic and sustainable European agri-food system.

Digital marketing in agriculture encompasses a broad range of activities, from building an online presence through websites and social media to leveraging SEO (Search Engine Optimisation), email campaigns, and digital advertising to attract and retain customers. These tools enable even small producers to compete on a level playing field with larger companies, reaching targeted audiences with tailored messages and offers.

Watch on YouTube: Digital Marketing Agricultural Product - Online Marketing is Important for Selling an Agri Product, Business Ideas English

E-commerce platforms and online marketplaces are transforming how agricultural products are bought and sold in the EU. Farmers can now sell directly to consumers, bypassing intermediaries and capturing a greater value chain share. This direct-to-consumer model also allows for greater transparency and traceability, which are increasingly demanded by European consumers. The Hellenic Ministry for Rural Development and Food has created the digital platform "Greek Farms" to connect traders of agricultural products and consumers from all over the world with Greek producers of quality agricultural products. "Greek Farms" digital service offers opportunities to wholesale and retail trade companies, as well as consumers, to get in touch with dynamic Greek farmers. Moreover, clients can locate the available produce based on geographical criteria to organise their purchases and logistics better. Greek agricultural holdings, which produce excellent-quality food, offer information that can facilitate the development of new trade relations and meet the needs of the international market.

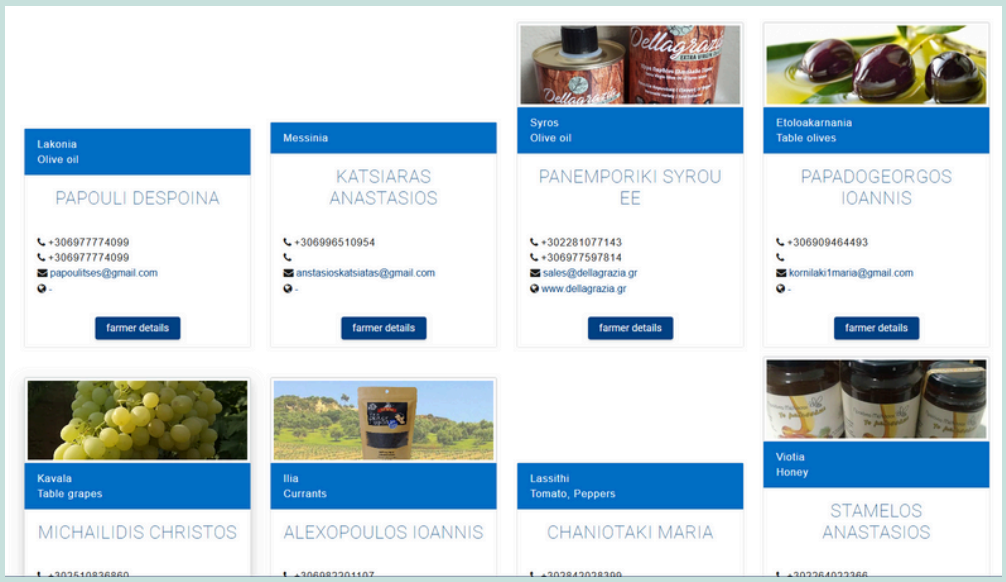


Figure 4: "Greek Farms" e-commerce platform, Ministry for Rural Development, Greece

Social media platforms such as Instagram, Facebook, and TikTok are powerful tools for storytelling and brand building. Agricultural businesses can foster stronger relationships with their audience and differentiate themselves in a crowded market by sharing behind-the-scenes content, sustainability initiatives, and customer testimonials. The ability to interact directly with customers also provides valuable feedback and insights for continuous improvement. For example, Green Land products cooperative farming is a cooperative that produces and sells extra virgin olive oil and kalamata table olives on facebook with more than 1500 followers and on instagram, promoting their products and communicating their actions.

Check the Instagram account from Green Land products cooperative farming!

Digital marketing analytics and customer relationship management (CRM) systems allow businesses to track the effectiveness of their campaigns, segment audiences, and personalise communications. This data-driven approach ensures that marketing resources are used efficiently and that strategies can be quickly adapted to changing market conditions. Training and support for digital marketing are increasingly available through EU-funded programmes, digital innovation hubs, and sector-specific advisory services. These initiatives provide practical guidance on everything from website development and SEO to online payment systems and compliance with data protection regulations.

MODULE 3

Sustainable Agriculture Practices and Biodiversity Conservation

In the face of climate change, pollution, and declining natural resources, agriculture must evolve. Sustainable agriculture offers an answer, it is a method of farming that meets present needs without compromising the ability of future generations to meet theirs. It emphasizes protecting the environment, improving farmers' livelihoods, and strengthening rural communities. At its core, sustainable agriculture promotes smarter, cleaner, and more inclusive ways of producing food.

A central part of this transformation is biodiversity conservation. Biodiversity, the variety of plants, animals, microorganisms, and ecosystems, is not just a goal, it is the engine of a resilient farm. From pollinators to soil microbes, from traditional crop varieties to natural landscapes, all components of biodiversity play a role in food production. This module introduces young people to practical and innovative ways they can become part of a new generation of environmentally conscious, skilled, and competitive agricultural professionals.

Learning Outcomes

By completing this module, learners will:

1. Understand what sustainable agriculture is and why it matters today.
2. Identify and describe farming practices that support both productivity and environmental health.
3. Recognize the critical role of biodiversity in agriculture and how it can be protected.
4. Learn practical strategies for conserving soil and water resources on farms.
5. Reflect on the connection between EU policies, rural development, and sustainability in agriculture.
6. Gain inspiration to apply these principles in real-life contexts, including their own communities.

Topic 3.1: Principles of Sustainable Agriculture

Introduction

Sustainable agriculture is more than a method of food production, it is a holistic approach to farming that balances environmental care, economic viability, and social responsibility. These three dimensions, often referred to as the "three pillars of sustainability," guide farmers to make decisions that protect the planet, support rural livelihoods, and meet society's growing food needs without harming future generations.

1. The Three Pillars of Sustainability

The core of sustainable agriculture is built on three interconnected pillars: environmental, economic, and social sustainability. Environmental sustainability means protecting natural resources like soil, water, and biodiversity. Economic sustainability ensures that farming remains a profitable activity that supports farmers' livelihoods. Social sustainability focuses on fair labor conditions, gender equality, access to education, and the well-being of local communities.

2. Working with Nature

Sustainable farming encourages cooperation with natural systems instead of trying to dominate them. This includes using ecological processes, such as composting, crop rotation, and biological pest control, instead of synthetic chemicals. For example, growing legumes improves soil nitrogen levels naturally, reducing the need for chemical fertilizers. These practices help create more balanced and resilient ecosystems on farms.

3. Diversity and Resilience

One of the main principles of sustainability is diversity, of crops, animals, and farm systems. Monocultures (growing only one crop) are more vulnerable to pests, diseases, and climate change. In contrast, diversified systems are more resilient and productive over time. Polyculture, agroforestry, and mixed livestock-crop farming are examples of diverse systems that support both productivity and ecosystem health.

4. Efficiency and Resource Recycling
Sustainable farms aim to use resources efficiently. Water, nutrients, and energy are managed carefully to avoid waste and pollution. Practices such as rainwater harvesting, mulching, and using farm waste (like manure or plant residues) for composting are common. These methods reduce dependency on external inputs and lower production costs, making farming more economically viable.

5. Community and Knowledge Sharing
Sustainability is also about people. Strong agricultural communities share knowledge, support each other, and promote inclusive practices. Local traditions and scientific innovation can work together. In the AGFG context, young farmers, NEETs, and individuals from diverse backgrounds can benefit from non-formal learning, mentorship, and collaboration, building networks that reinforce sustainable agriculture in the long term.

Example:

1.In France, the “Fermes d’Avenir” project supports small-scale, diversified farms that apply permaculture principles. These farms have shown increased soil fertility, reduced input costs, and higher community engagement.

2.In Austria, many organic farms supported by the CAP have integrated agroforestry and crop-livestock rotation to build resilience against climate change.

Topic 3.2: Key Sustainable Farming Practices

Introduction

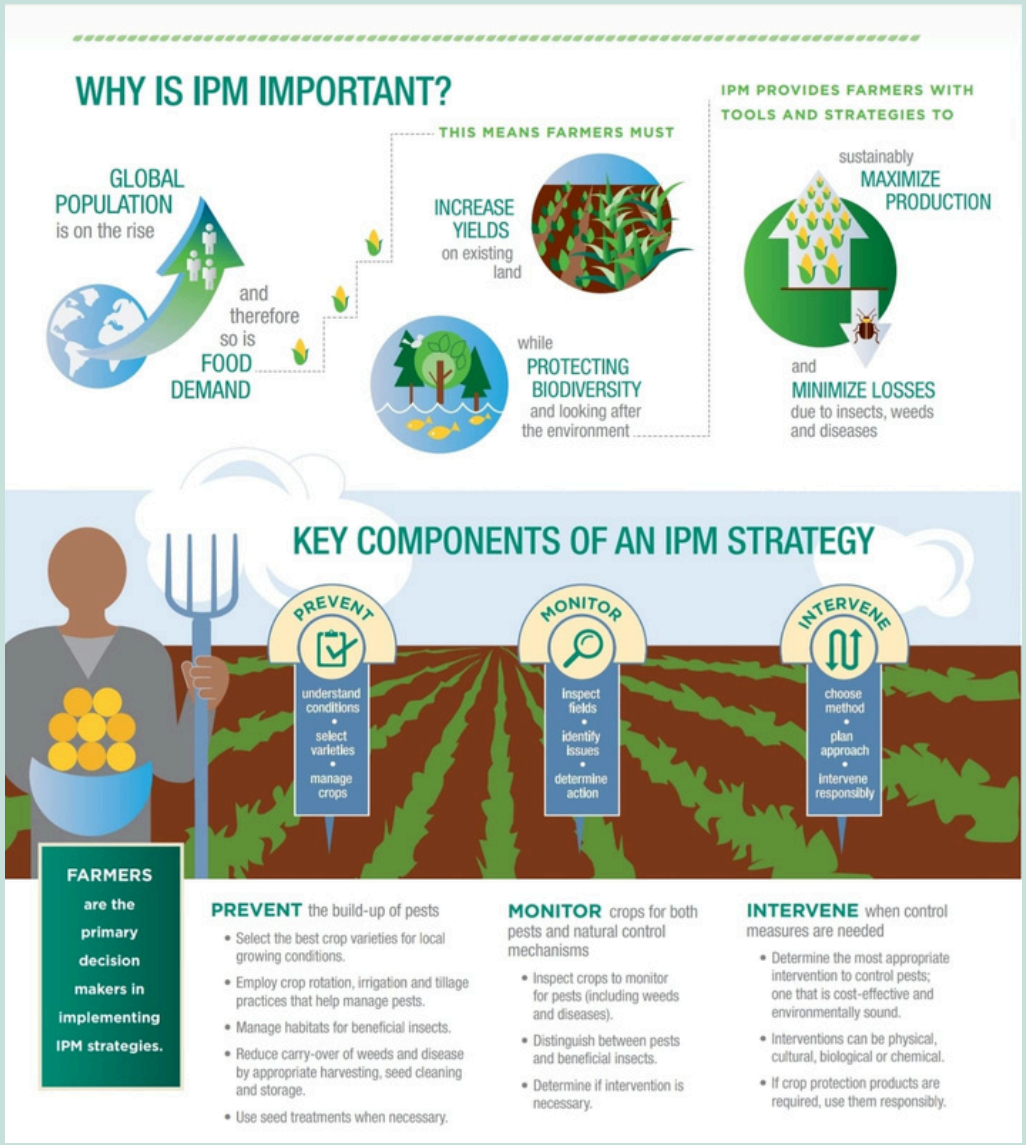
While sustainable agriculture is guided by values and principles, it is put into practice through specific daily actions on the farm. These practices aim to protect the environment, reduce costs, and increase resilience. They can be adapted to different climates, farm sizes, and levels of experience, making them especially useful for young or beginning farmers. In this topic, we will explore some of the most important sustainable farming techniques.

1. Crop Rotation and Polyculture

Instead of planting the same crop in the same place every year (monoculture), sustainable farmers rotate crops and mix different plant species. Crop rotation breaks pest and disease cycles and helps maintain soil fertility. For example, a farmer might alternate between cereals (like wheat), legumes (like beans), and root crops (like carrots). Polyculture, growing multiple crops together, further increases biodiversity and productivity by mimicking natural ecosystems.

2. Composting and Organic Fertilization

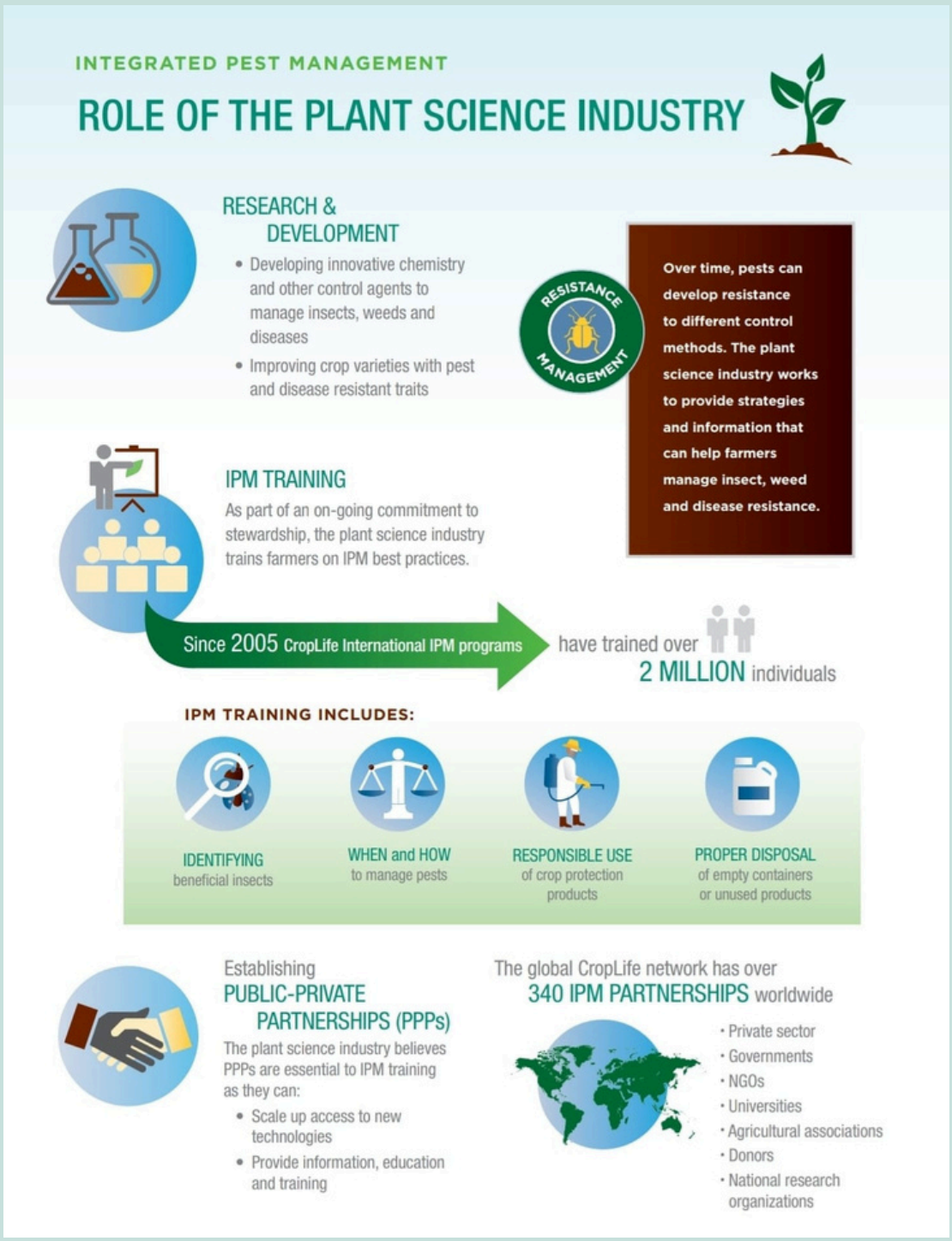
Composting turns organic waste (like kitchen scraps, manure, or plant leftovers) into a rich, dark material full of nutrients. This process improves soil structure, increases its water-holding capacity, and reduces the need for chemical fertilizers. Many farmers also use green manures, plants grown specifically to be incorporated into the soil, and animal manures, as long as they are handled safely and responsibly.



3. Integrated Pest Management (IPM)
IPM is a strategy that combines different techniques to manage pests in a safe and sustainable way. It involves:

- Observing and identifying pests before acting
- Using biological control (e.g. ladybugs to eat aphids)
- Encouraging natural predators
- Rotating crops and using pest-resistant varieties

Pesticides are used only when necessary, and in the least harmful way. This approach reduces costs, protects pollinators, and avoids harming human health or ecosystems.

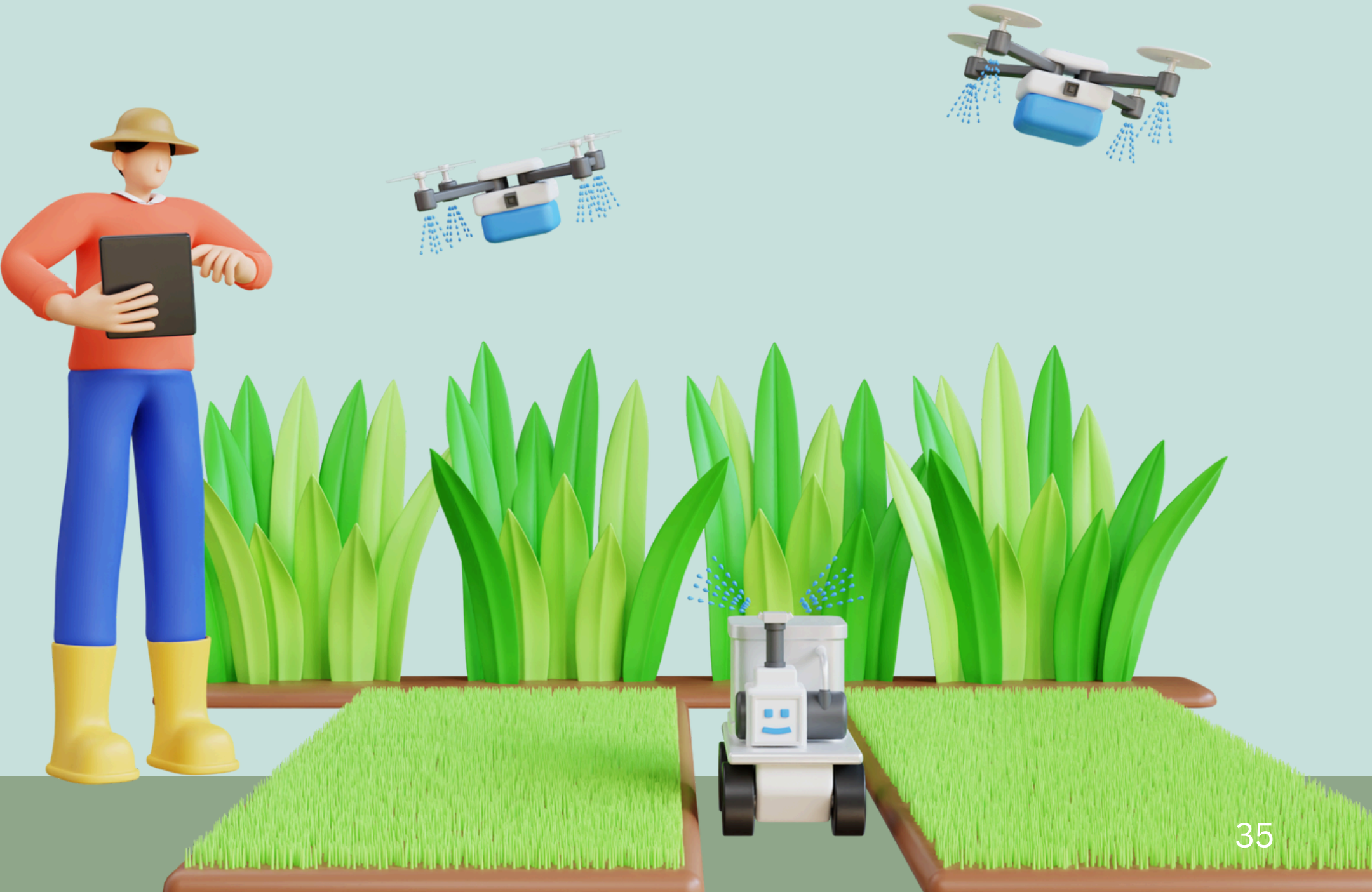


Source: Crop Life International

4. Agroforestry and Hedgerows
Agroforestry integrates trees and shrubs into farm systems. This provides shade, prevents soil erosion, improves biodiversity, and often offers new products (like fruit, nuts, or timber). Similarly, hedgerows, lines of shrubs or trees planted along field borders, serve as windbreaks, homes for beneficial insects and birds, and barriers that reduce chemical drift.

5. Water-Smart Agriculture
Efficient water use is essential in the face of drought and climate change. Techniques like drip irrigation deliver water directly to plant roots, reducing waste. Rainwater can be harvested and stored for later use. Mulching with straw or leaves helps keep moisture in the soil. These small adaptations can make a big difference in both productivity and environmental impact.

A clear 2.5-year-old FAO-published video that covers the three pillars of conservation agriculture, minimum soil disturbance, permanent soil cover, and crop rotation, with visuals and narration suitable for learners.



Topic 3.3: Biodiversity in Agriculture - Challenges and Solutions

Introduction

Biodiversity, the variety of life in all its forms, is at the heart of a healthy farming system. From soil microbes to wild bees, from traditional seed varieties to forest patches, biodiversity supports food production and builds resilience. However, many modern farming practices reduce biodiversity instead of protecting it. This topic explains why biodiversity matters in agriculture, what threatens it, and how we can protect and restore it through smarter choices.

1. Why Biodiversity Matters for Farmers

Biodiversity is not just a conservation issue, it's a practical tool. It:

- Enhances pollination, pest control, and nutrient cycling
- Increases climate resilience by buffering farms against drought, floods, and disease
- Supports healthy soils, clean water, and genetic resources
- Helps reduce dependency on chemicals and external inputs

Without biodiversity, farms become fragile, more expensive to manage, and less adaptable to change.

2. Key Types of Biodiversity in Farming

- Genetic diversity: Different varieties of crops or breeds of animals. For example, traditional tomato varieties may be more resistant to drought than commercial ones.
- Species diversity: Many types of organisms in one system, insects, birds, fungi, weeds, trees, etc.
- Ecosystem diversity: Different natural elements in the landscape, hedgerows, ponds, woodlots, grasslands.

Each type of diversity plays a role in keeping agricultural systems productive and balanced.

3. Main Threats to Agricultural Biodiversity
Modern agriculture has often favored uniformity and short-term yield. Common threats include:

- Monocultures and large-scale plantations that reduce species variety
- Chemical overuse, which kills beneficial insects, soil life, and pollinators
- Removal of natural elements like trees, ponds, and hedges
- Climate change, which stresses both crops and wildlife
- Globalized food markets, which discourage local crop and breed use

These trends can make farms more vulnerable, even as they seem more “efficient.”

4. Practices That Support Biodiversity
Sustainable farmers have many tools to protect biodiversity:

- Plant flower strips and hedgerows to provide habitat for pollinators and birds
- Use cover crops to protect soil organisms and feed microbes
- Rotate crops and include legumes to maintain soil fertility
- Encourage beneficial insects and reduce pesticide use
- Leave natural areas in and around farms, like wild field margins, wetlands, or stone piles
- Preserve and use local seed varieties adapted to regional conditions

Even small farms can make a big impact by creating a welcoming space for nature.

5. Community and Policy Support
Biodiversity cannot be protected by farmers alone. Support from governments, consumers, and NGOs is essential. The EU Biodiversity Strategy 2030 and Common Agricultural Policy (CAP) offer funding and incentives to farms that protect wildlife and restore ecosystems. Education campaigns and seed-saving networks are also growing across Europe. Young farmers, especially, can become biodiversity stewards, building farms that feed people and nurture nature at the same time.

Case Study – Romania: In Transylvania, smallholder farmers in the Apuseni Mountains maintain rich biodiversity by practicing low-input agriculture and preserving natural meadows. Through EU agri-environment schemes, they receive support to protect rare plant species and traditional hay-making methods, helping both biodiversity and local heritage thrive.

Topic 3.4: Soil and Water Conservation Strategies

Introduction
Soil and water are the foundation of every farming system, without them, no food can grow. Yet, these two vital resources are often taken for granted and mismanaged. Around the world, soil is being degraded, and freshwater is becoming scarcer. In sustainable agriculture, protecting and improving soil and water is a top priority. This topic will explore practical, low-cost strategies that help young farmers maintain healthy soils and use water efficiently.

1. Why Soil Health Matters
Soil is more than “dirt.” Healthy soil is a living system full of fungi, bacteria, worms, and organic matter that helps plants grow. It holds water, stores nutrients, and resists erosion. When soil is compacted, over-tilled, or depleted by chemicals, it becomes dry, hard, and lifeless, making farming difficult and expensive. Good soil management is essential for long-term food security.

2. Soil Conservation Practices
There are many easy-to-learn techniques that protect and rebuild soil:

- Cover cropping: Growing grasses or legumes in the off-season to prevent erosion, feed microbes, and fix nitrogen.
- Composting: Turning organic waste into rich fertilizer that improves soil structure.
- Mulching: Covering the soil with straw, leaves, or plant residue to retain moisture and reduce weeds.
- Minimal or no tillage: Reduces soil disturbance, helping maintain natural structure and life.
- Crop rotation: Prevents nutrient depletion and reduces soil-borne diseases.

These methods are especially useful on small and medium-sized farms, and many can be applied with little machinery.

3. Water Management in Sustainable Agriculture
Water is a limited and precious resource. In many parts of Europe, especially during dry summers, managing water wisely is critical. Poor irrigation and water wastage can harm both crops and local ecosystems. Sustainable water management helps farmers save money, improve yields, and build resilience against drought.

Key practices include:

- Drip irrigation: Delivers water directly to plant roots with minimal loss.
- Rainwater harvesting: Collecting water from rooftops or greenhouses for reuse.
- Swales and contour farming: Shaping land to slow runoff and help water soak into the soil.
- Organic matter in soil: Helps retain moisture, reducing the need for frequent irrigation.

4. Link Between Soil, Water, and Climate
Healthy soil is also a carbon sink, it stores carbon dioxide and helps slow climate change. Water-smart practices reduce energy use (e.g. for pumping water) and protect water sources from pollution. Together, soil and water conservation build farms that are more climate-resilient, productive, and sustainable for future generations.

5. EU and Local Support
The Common Agricultural Policy (CAP) encourages farmers to protect soil and water through “eco-schemes.” Young farmers may receive extra support to invest in tools, training, and practices that preserve these natural resources. In Romania and other EU countries, pilot programs, workshops, and subsidies promote conservation farming. Learning how to access these resources is key to long-term success for young agricultural entrepreneurs.

Economic Impact: Studies show that farms using drip irrigation and composting reduce water bills by up to 40% and fertilizer costs by 30%.
Quote from a Romanian Farmer: “Since I started composting and using mulch, I spend less on chemicals and my soil stays productive longer. It’s a win-win.” (Elena C., smallholder from Iași County)

MODULE 4

EU Career Development and Entrepreneurship in Agriculture

Introduction Module 4

The agricultural sector is undergoing a significant transformation, with young individuals becoming key players in shaping its future. The European Union (EU) offers various opportunities for career development and entrepreneurship in agriculture, aimed at fostering sustainable growth, innovation, and competitiveness within rural areas. However, the sector faces challenges, including the decline in young entrants and a lack of awareness about the diverse career paths available within agriculture. This module, "EU Career Development and Entrepreneurship in Agriculture," seeks to equip young farmers, breeders, beekeepers, and aspiring agricultural entrepreneurs with the knowledge and skills necessary to navigate the opportunities within the EU agricultural landscape, with a specific focus on career development and the principles of sustainable entrepreneurship.

By the end of this module, learners will be able to grasp the EU's role in supporting agricultural careers, understand the potential for entrepreneurial ventures in the sector, and apply best practices for building a sustainable agricultural business that aligns with EU values and policies.

Learning Outcomes

1. Upon completion of this module, participants will be able to:
2. Understand the EU’s role in career development in agriculture, including the key policies, programs, and funding opportunities that support young professionals in the sector.
3. Identify various career paths in agriculture, from traditional farming roles to more modern opportunities in agri-tech, sustainable farming, and food innovation.
4. Develop entrepreneurial skills in agriculture, with a focus on creating and managing an agricultural business that is both economically viable and environmentally sustainable.
5. Evaluate EU funding programs and career development tools available for young farmers, breeders, and beekeepers to strengthen their businesses and advance their careers.
6. Integrate sustainability and innovation into agricultural entrepreneurship, ensuring that business practices align with the European Green Deal and other EU sustainability goals.

Topic 4.1: Agricultural Career Pathways

Introduction

Agriculture is no longer limited to traditional farming activities; it is a multifaceted sector encompassing technology, science, business, and environmental management. With the growing global focus on sustainability, food security, and digital innovation, agriculture is rapidly evolving into a dynamic career field that offers a variety of professional pathways. From working with soil and crops to managing agricultural policies or developing agri-tech solutions, young people can explore a wide spectrum of opportunities. This topic aims to guide learners through the diverse career options in agriculture, the competencies required, and the tools available for mapping out a fulfilling career aligned with EU priorities and sustainability goals.

Content

Agricultural career pathways span several interconnected sectors, each offering different roles and opportunities. Primary production remains at the core, involving traditional farming, horticulture, livestock breeding, aquaculture, and apiculture. However, the rise of agri-tech has opened new routes in areas such as data analytics, drone technology, remote sensing, and precision farming. These careers require digital and technical skills, as well as a strong understanding of agricultural systems. Beyond production, agri-business careers include logistics, food processing, supply chain management, marketing, and export operations. In parallel, support services such as agricultural research, education, rural advisory work, and policymaking also offer rewarding options, particularly for those interested in development and community impact.

To navigate this diverse landscape, young people need access to career planning tools and guidance. EU initiatives such as Europass, ESCO, and EURES provide platforms for mapping skills, exploring job roles, and identifying training pathways across Member States. Learners are encouraged to conduct a self-assessment of their interests and strengths to better understand which roles suit them, and to explore educational paths accordingly. Formal education in agriculture includes vocational training, higher education degrees, and specialised agricultural schools, while informal opportunities such as internships, volunteering, and short online courses also provide valuable experience.

With the European Green Deal and the Farm to Fork strategy reshaping the sector, emerging roles in regenerative agriculture, carbon farming, and biodiversity conservation are becoming increasingly relevant. These developments reflect a shift toward green and digital jobs that will dominate the future of agriculture. Career development in this sector also requires lifelong learning, active participation in youth and professional networks, and building a strong personal profile using digital tools. Through this topic, learners will gain clarity on the range of agricultural career pathways available to them and how to make informed choices based on personal goals and societal needs.

Watch on YouTube: Career Pathways in the Agriculture Industry

Topic 4.2: Entrepreneurship in Agriculture (Principles and Business Planning)

Introduction

Entrepreneurship in agriculture is a key driver of rural innovation and economic development. As traditional farming models face pressure from climate change, global markets, and changing consumer preferences, new opportunities are emerging for individuals with innovative ideas and an entrepreneurial mindset. Agricultural entrepreneurship involves creating value by identifying problems and turning them into business opportunities—whether through developing new products, introducing sustainable practices, or creating digital solutions. This topic explores the foundational principles of entrepreneurship and provides practical guidance on how to plan and develop a business in the agricultural sector.

Content

Entrepreneurship begins with mindset. Agricultural entrepreneurs are proactive, resourceful, and solution-oriented. They recognise unmet needs in their communities or markets, such as the demand for organic produce, efficient irrigation systems, or transparent food supply chains and develop innovative solutions. These individuals embrace risk and uncertainty while also applying strategic planning and evidence-based decision-making to minimise failure. In contrast to traditional farmers who may focus solely on production, agri-entrepreneurs approach their work with a business outlook, considering customer needs, market trends, and scalability.

Developing a successful agricultural enterprise starts with identifying a viable idea. This can involve analysing gaps in local food systems, responding to sustainability challenges, or leveraging existing resources in new ways. Idea generation techniques such as brainstorming, market observation, and user feedback help refine concepts into business opportunities. Once an idea is validated, the next step is to create a comprehensive business plan that articulates the mission, vision, and value proposition. A strong business plan also includes a detailed analysis of the target market, competitors, operational model, and financial forecasts.

Financial planning is a critical component of business success. Entrepreneurs must consider start-up costs, operational expenses, revenue projections, and risk mitigation strategies. They also need to understand available funding sources, such as government subsidies, EU grants, rural development programmes, and microloans. Equally important is the ability to communicate the business idea clearly and confidently to potential investors, partners, or customers. Pitching skills, supported by visual tools like the Business Model Canvas, help clarify the business's strategic intent and secure support.

Through this topic, learners will understand how to transition from idea to action. They will gain the knowledge and confidence to start their own ventures in agriculture, guided by core entrepreneurial principles, robust planning processes, and an awareness of both the risks and opportunities present in today's agri-food systems.

Case Study: Gabriel's Sustainable Startup in Romania

Gabriel Barta, founder of Rongo Design, transformed agricultural waste into eco-friendly acoustic panels. With support from the European Agricultural Fund for Rural Development (EAFRD) Risk Sharing Loan, he accessed necessary financing to start his business, exemplifying how EU funding can facilitate innovative agricultural startups.

Read the full story here!

Watch on YouTube: A New Vision for Europe's Agriculture

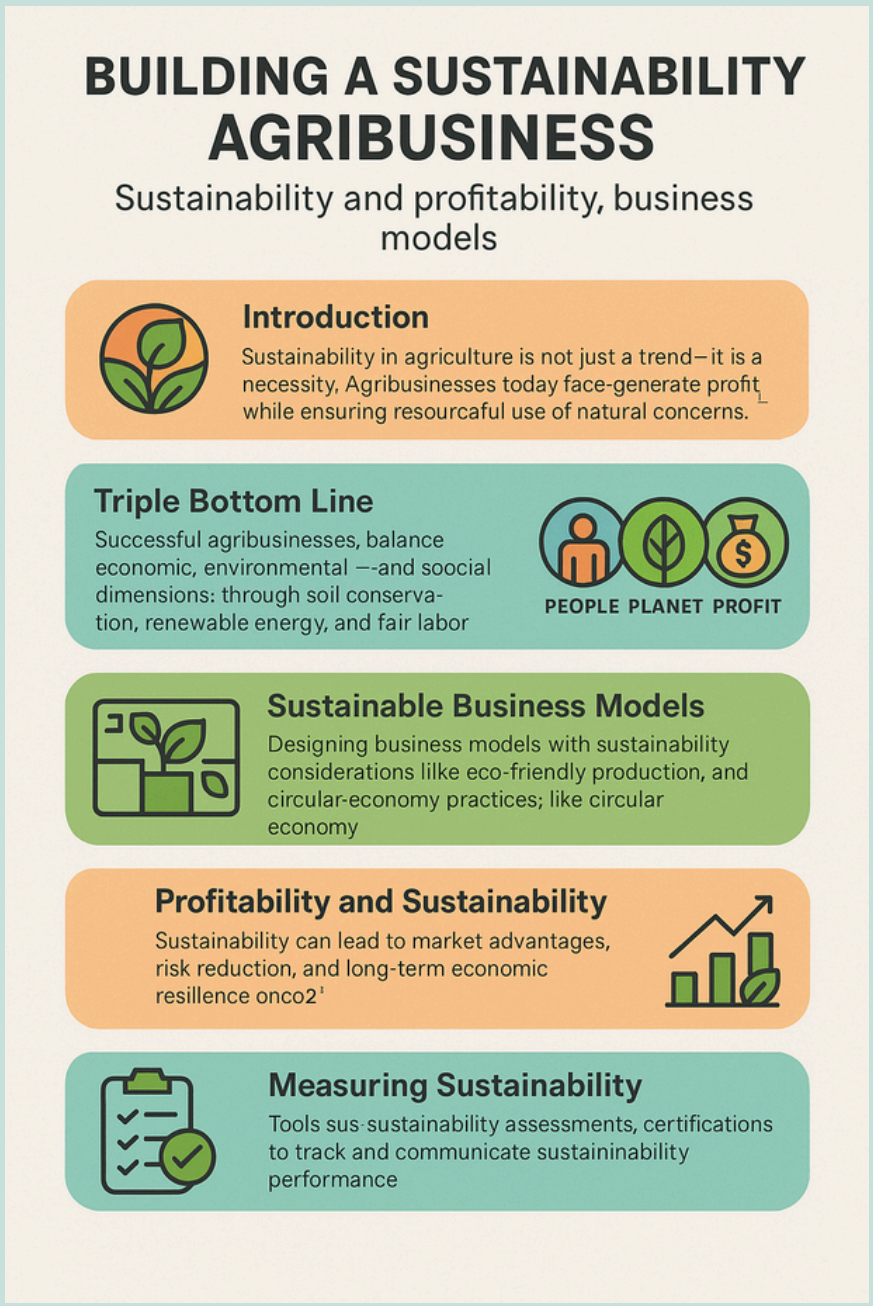
Topic 4.3: Building a Sustainable Agribusiness (Sustainability and Profitability, Business Models)

Introduction

Sustainability in agriculture is not just a trend—it is a necessity. Agribusinesses today face the dual challenge of generating profit while ensuring responsible use of natural resources and contributing to social wellbeing. A sustainable agribusiness creates value across environmental, social, and economic dimensions, supporting long-term resilience and ethical growth. This topic focuses on how agripreneurs can integrate sustainability into their business models while maintaining profitability. It introduces sustainability frameworks, explores real-world applications, and guides learners in developing balanced strategies for sustainable enterprise development.

Content

At the core of sustainable agribusiness lies the concept of the triple bottom line: people, planet, and profit. Successful agribusinesses aim to balance economic success with environmental protection and social responsibility. For example, implementing soil conservation practices, reducing chemical inputs, and adopting renewable energy technologies can significantly reduce environmental impact while lowering operational costs in the long run. Similarly, engaging with local communities and ensuring fair labour practices can enhance brand trust and customer loyalty.



Designing a business model that prioritises sustainability requires thoughtful planning. Entrepreneurs must consider the entire value chain, from input sourcing to waste management, and seek opportunities to reduce ecological footprints at every stage. The Business Model Canvas can be adapted to include sustainability considerations such as eco-friendly production, responsible sourcing, or green logistics. Circular economy principles are particularly relevant, encouraging practices like composting, reusing materials, or converting waste into energy or new products.

Contrary to common perception, profitability and sustainability are not mutually exclusive. Many businesses achieve economic success precisely because of their sustainable approach. Consumers increasingly value ethical and sustainable products, and this trend translates into market advantages. Furthermore, sustainability reduces long-term risks associated with resource scarcity, regulation, or climate change, contributing to the resilience of the enterprise.

Measuring sustainability performance is essential to track progress and identify areas for improvement. Tools such as environmental impact assessments, life cycle analysis, and sustainability scorecards enable businesses to quantify their efforts and report outcomes transparently. Certifications like Organic, EMAS, or ISO 14001 also help communicate sustainability credentials to consumers and partners. In addition, EU and national funding schemes increasingly prioritise green business models, offering support for those who align with environmental objectives.

By exploring these concepts, learners will be equipped to design agribusinesses that are not only economically viable but also responsible stewards of the land and community.

Watch on YouTube: Secrets to Building a Sustainable Farm Business

Case Study 1 : First Milk's Regenerative Dairy Farming in the UK

First Milk, a British dairy cooperative, implemented regenerative farming practices across its member farms, focusing on soil health and biodiversity. This approach not only enhanced environmental sustainability but also improved economic resilience, demonstrating effective strategies for scaling sustainable agricultural businesses.

Case Study 2 : InSoil's Green Loans for Regenerative Agriculture

InSoil, a Lithuanian fintech company, offers green loans to small and medium-sized farms across the EU, supporting the transition to regenerative agriculture. By providing accessible financing, InSoil enables farmers to adopt sustainable practices, contributing to long-term business growth and environmental benefits.

Topic 4.4: Innovative Agricultural Businesses (Case Studies of Successful Agricultural Startups and Enterprises)

Introduction

Innovation is transforming agriculture, offering bold new solutions to longstanding challenges in food production, resource management, and rural development. Across Europe and the world, agricultural startups are applying cutting-edge technologies and pioneering new business models to increase efficiency, improve sustainability, and create added value. This topic presents case studies of successful agricultural enterprises to inspire learners, demonstrate key success factors, and showcase the potential of innovation in the sector. By analysing real-world examples, learners will gain practical insights and learn how to apply creative thinking in their own entrepreneurial journeys.

Content

Innovation in agriculture can take many forms. It may involve technological advances such as precision farming, satellite monitoring, or AI-powered irrigation systems. Organisational innovations, such as cooperatives or contract farming models, enable smallholders to compete in global markets. Market innovations, including direct-to-consumer platforms or local food networks, respond to shifting consumer preferences. Successful agri-startups often combine these approaches to address specific problems—such as improving soil health, reducing food waste, or ensuring product traceability.

To facilitate learning, this topic introduces a selection of case studies that reflect a diversity of approaches and contexts. For instance, learners will explore a vertical farming enterprise using hydroponic systems and smart sensors to grow crops in urban areas with minimal water use. Another example focuses on a mobile app that provides small-scale farmers with market information, weather updates, and crop advice in real time, empowering them to make better decisions. A third case study looks at a regenerative agriculture initiative that combines traditional knowledge with scientific practices to restore soil fertility and create a strong community-supported agriculture (CSA) network. Finally, a tech startup using blockchain technology to improve supply chain transparency and consumer trust will be analysed to highlight the role of digital innovation in food systems.

Each case study is accompanied by a structured analysis of the challenges faced, solutions developed, and the results achieved. Learners will examine what enabled the success of these ventures—be it strong leadership, effective stakeholder collaboration, or a deep understanding of market needs. These lessons will help learners understand the process of innovation, including how to identify problems worth solving, prototype ideas, and scale sustainable solutions.

Ultimately, this topic encourages learners to draw inspiration from these examples and reflect on how similar strategies could be applied or adapted to their local contexts. It aims to cultivate a mindset of possibility, resilience, and innovation within the agricultural sector.

Watch on YouTube: Agriculture, Food, and Natural Resources Careers

Empirical examples

Greece: Youth-Led Smart Irrigation in Greek Strawberry Greenhouses

In Greece, a team of young researchers and engineers developed a smart irrigation system tailored for strawberry greenhouses. This innovative solution integrates Internet of Things (IoT) devices and edge computing to optimize water usage and improve crop yields. By deploying sensors and automated controls, the system monitors soil moisture levels in real-time, ensuring precise irrigation and reducing water waste. The implementation of this technology not only enhances sustainability but also demonstrates the potential of youth-driven innovation in agriculture. The project serves as a practical example of how modern technology can be applied to traditional farming practices to achieve efficiency and environmental benefits.

Cyprus: Youth-Led Organic Farming and Climate Action

In Cyprus, young farmers are at the forefront of sustainable agriculture through initiatives like the ORGANIKO project. This EU-funded project focuses on promoting organic farming practices and developing a national plan to mitigate climate change impacts in the agricultural sector. By integrating organic methods, these young agripreneurs aim to enhance environmental sustainability and contribute to the country's climate goals. The ORGANIKO project exemplifies how youth engagement in agriculture can lead to innovative solutions addressing both food production and environmental challenges.

Romania: Empowering Youth through Agripreneurship

In Romania, the AGRISchool PLUS project by Junior Achievement Romania prepares agricultural high school students for business success by providing practical entrepreneurship education. The program includes activities like the Mini Enterprise annual international entrepreneurship education program, Innovation Days, and JA Agribusiness Entrepreneurship Workshops. These initiatives equip students with entrepreneurial skills and connect them with the local business environment, fostering youth-led innovation in agriculture.

Entrepreneurial Mindset Self-Check

Before or after designing your agribusiness plan, take a moment to reflect on your entrepreneurial mindset. This self-check helps you identify the personal strengths and areas for growth that are vital in agricultural entrepreneurship.

✓Resilience: Do I bounce back from setbacks and keep going when challenges arise?

✓ Creativity: Do I enjoy finding new ways to solve problems or create something original?

✓ Collaboration: Am I open to working with others, sharing ideas, and co-creating solutions?

✓ Initiative: Do I take action without needing to be told or prompted?

✓ Adaptability: Can I adjust my plans when things don’t go as expected?

✓ Vision: Do I have a clear idea of what I want to achieve and why?

✓ Responsibility: Do I take ownership of my decisions and learn from my experiences?

Instructions: Reflect on each statement and rate yourself on a scale from 1 (Not at all) to 5 (Very much). Use your responses to guide your approach in developing your agribusiness idea and identify traits you'd like to strengthen.

ACTIVITIES:

Activity Module 1:

To deepen understanding and encourage practical application of the concepts covered in this module, the following activities are designed to be interactive, reflective, and solution-oriented. Learners will analyze real-life examples, collaborate through guided discussions, and apply their knowledge to design sustainable farming systems.

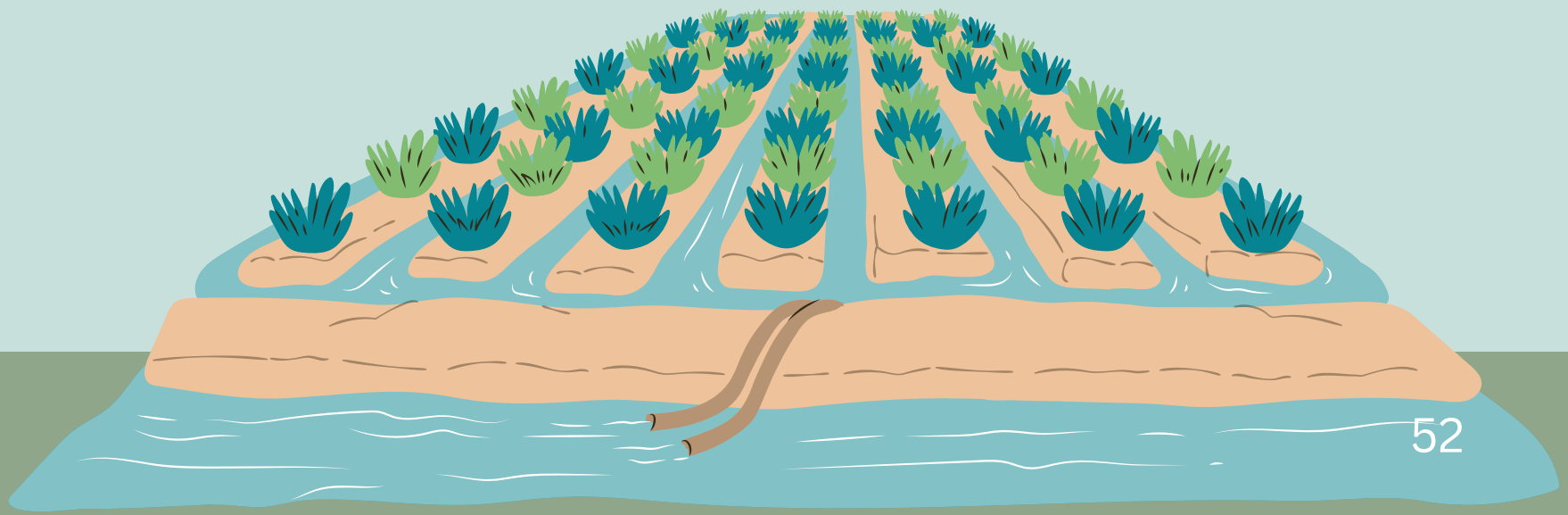
Case Study Analysis

Title: Adapting to Drought with Precision Farming in Southern Spain

Overview:
A farming cooperative in Andalusia, Spain faced recurring droughts and rising irrigation costs. With EU funding through the CAP's rural development program, the cooperative invested in precision irrigation systems and soil moisture sensors. Over two years, water use decreased by 35%, crop yield remained stable, and the farm reduced its carbon footprint.

Tasks for Learners:

- Identify the key sustainability challenges the cooperative faced.
- Explain how technology and funding were used to address these challenges.
- Assess the environmental, economic, and social benefits of the intervention.
- Suggest one additional practice the cooperative could adopt to further improve sustainability.



Group Discussion Prompts

Divide learners into small groups and assign one topic per group. Each group presents their conclusions to the class or workshop.

1. **“Can high-tech solutions replace traditional farming practices?”**
2. Debate the balance between modern precision tools and low-tech ecological practices in achieving sustainable farming goals.
3. **“What role should consumers play in driving sustainable agriculture?”**
4. Discuss how food choices, certification schemes (e.g., organic, fair trade), and public awareness impact farming practices.
5. **“Is it possible for all EU farmers to go organic?”**
6. Explore economic, environmental, and practical constraints of transitioning to fully organic agriculture at a national or EU-wide scale.
7. **“How should subsidies be distributed to promote sustainability?”**
8. Reflect on how CAP payments should be designed to reward truly sustainable efforts versus conventional practices.

Practical Application Tasks

Task 1: Design a Sustainable Farm Plan

Requirements:

- Choose a location and describe the local environmental conditions.
- Select crops and/or livestock appropriate for the region.
- Outline at least three sustainable practices (e.g., crop rotation, renewable energy use, natural pest control).
- Include a brief economic plan—how will the farm remain profitable?
- Suggest how the farm could benefit from EU policies or programs.

Task 2: Sustainability Audit of a Local Farm (Optional for advanced learners)

If feasible, learners can visit or virtually study a nearby farm and conduct a simple sustainability audit.

Checklist includes:

- Soil and water management practices
- Energy sources and usage
- Waste and input management
- Biodiversity and land use
- Social and labor considerations

Sustainable Agriculture Module: Activity Templates

1. Case Study Analysis Template

Title of Case Study: _____
Location: _____
Summary of the Case:

1.What were the main sustainability challenges?

2. What solutions were implemented and how effective were they?

3. What benefits were observed (environmental, economic, social)?

4.Suggest additional sustainable practices that could be adopted:

2. Group Discussion Prompts Template

Discussion Topic: _____
Group Members: _____
Key Points Discussed:
Summary of Group Conclusion:

3. Sustainable Farm Plan Template

Name of Learner/Group: _____
Farm Location and Environmental Conditions:
Crops and/or Livestock Chosen:
Three Sustainable Practices (describe each briefly):
1.
2.
3.
Economic Plan (How will the farm remain profitable?):

Sustainable Farm Economic Plan Template

1. Farm Information
Farm Name: _____
Location: _____
Size of Farm (in hectares): _____
Type of Farming (e.g., crops, livestock, mixed): _____

2. Income Sources
List all sources of income and their expected annual revenue.
Example:
- Crop sales (e.g., wheat, vegetables): €_____
- Livestock sales (e.g., milk, meat): €_____
- Direct sales/farm shop: €_____
- Agritourism or additional services: €_____
Total Expected Revenue: €_____

3. Expenses
List all annual expenses.
Example:
- Seeds and planting materials: €_____
- Animal feed and care: €_____
- Equipment and maintenance: €_____
- Labor costs: €_____
- Water and irrigation: €_____
- Certification and compliance costs: €_____
Total Estimated Expenses: €_____

4. Profitability and Financial Planning
Net Profit Estimate (Revenue - Expenses): €_____
Break-even Analysis:
How much production/sales are needed to cover expenses
Strategies to Increase Profitability:
- _____
- _____

5. EU Funding and Support
Describe potential EU programs or subsidies that the farm may benefit from:

Activity Module 2:

Name of the activity: “Design Your Smart Digital Farm”

Description of the activity:
In this creative and research-based activity, you will design **your own smart digital farm** using the knowledge gained in this module. You will identify key digital tools (software, platforms, and apps), describe how you will manage your farm using innovative practices, and create a basic digital marketing plan. This activity helps you apply your digital literacy, ICT, farm management, and marketing skills personally and practically.

Learning objectives of the activity:

- Reinforce understanding of digital literacy and online safety in agriculture.
- Identify and apply relevant ICT tools and farm management models.
- Explore sustainable and data-driven farm practices.
- Create a simple digital marketing plan using real-world tools.
- Reflect on your digital readiness and future training needs.

Duration: 60–90 minutes

Number of people that can participate:
Individual or small group (2–4 people)

Materials:

- Digital worksheet (template provided in the Annexe)
- Internet access for research
- Computer, tablet, or smartphone
- Optional: Canva or PowerPoint for a visual farm plan

Instructions step by step:

1.Reflect (10 min)

List the digital tools and apps you currently use or know about in agriculture. Are there any areas (marketing, management, etc.) you feel less confident in?

2.Explore & Research (15–20 min)

Visit the following suggested links and choose tools for your smart farm:

- farmOS – farm management software
- Apiary Book – beekeeping app
- Greek Farms e-commerce platform
- Precision Farming DLC – Farming Simulator
- Digital Skills and Jobs EU Portal

3.Design Your Smart Farm (30 min)

Use the template to outline your farm. Include:

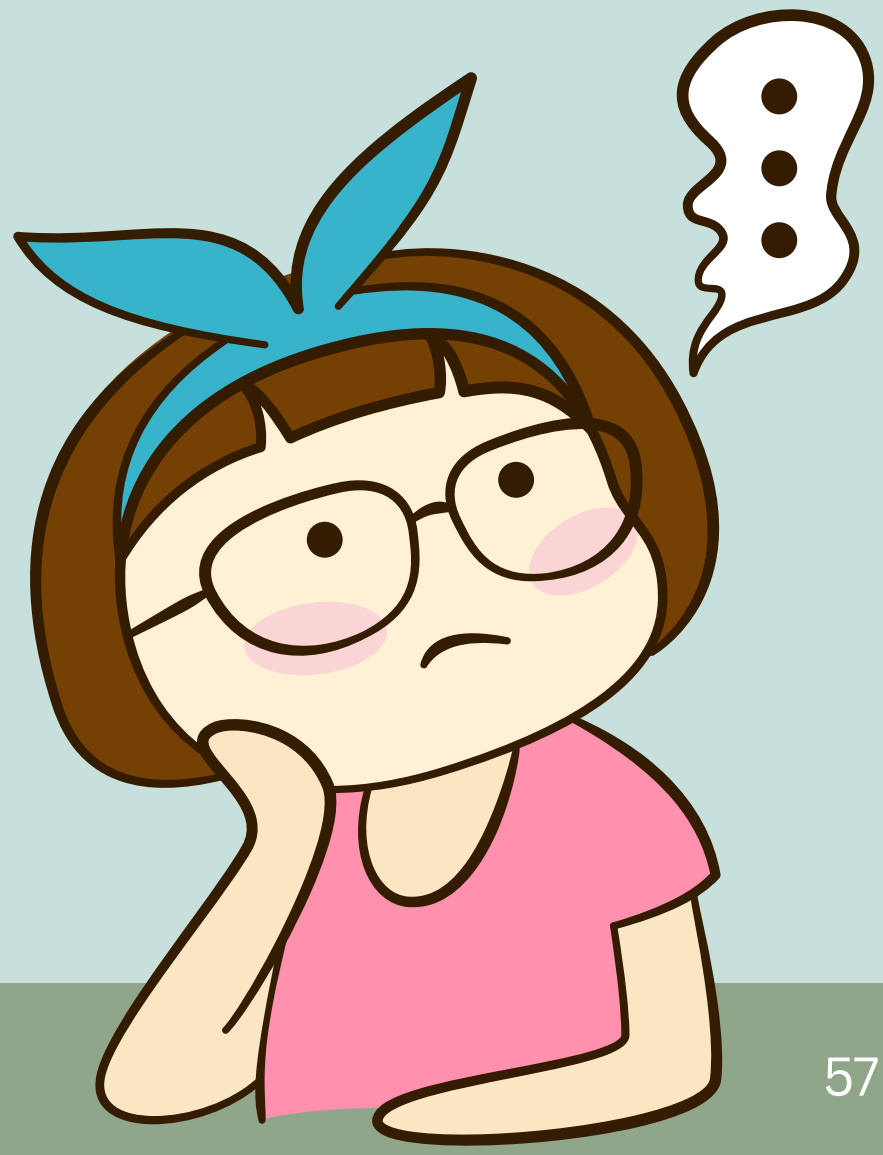
- **Digital Tools Used:** ICT tools and apps you'll use for crop/livestock management.
- **Farm Management Model:** How you'll integrate precision farming, sustainability, or agroecology.
- **Marketing Plan:** How you'll sell your products using digital tools (e.g., Instagram, e-commerce, newsletters).
- **Cyber Safety Plan:** How you'll protect your data and digital identity.

4.Create (15–20 min)

Optionally, create a one-slide visual of your smart farm using Canva or PowerPoint. Include icons or images of your tools and practices.

5.Share & Reflect (optional – 10 min)

If working in a group or class, present your farm and explain your digital choices. Get feedback and inspiration from others.



Smart Digital Farm Template

Use this template to plan your own Smart Digital Farm. Based on what you've learned in this module, fill in the sections below to define your digital tools, farm management approach, marketing plan, and cybersecurity strategy.

Suggestion

1. Digital Tools Used
List at least 3 digital tools (apps, software, platforms) you will use on your farm. Explain how each tool will support your farm operations.

_____

_____

2. Farm Management Model
Describe how you will manage your farm using innovative and sustainable practices. Will you use precision agriculture, agroecology, circular economy principles? Explain.

_____

_____

3. Digital Marketing Plan
Define how you will promote and sell your products using digital tools. Which platforms will you use (social media, website, e-commerce)? How will you engage with customers online?

_____

_____

4. Cybersecurity and Digital Safety
What steps will you take to protect your farm's digital systems and personal data? Mention things like passwords, backups, and secure platforms.

_____

_____

5. Reflection
After completing this template, reflect on what you learned. What skills do you feel confident in? What do you want to learn more about?

_____

_____

Activity Module 3:

Name of the activity: Design Your Own Sustainable Micro-Farm
Description of the activity: In this creative and practical activity, young participants will design a small-scale farm (real or imaginary) using the principles and practices learned in the module. They will integrate sustainable techniques such as crop rotation, biodiversity support, water conservation, and composting. The activity encourages critical thinking, environmental awareness, and systems thinking.

Learning objectives of the activity:

- Apply sustainable agriculture principles in a real-life simulation
- Understand how to integrate biodiversity-friendly features into farm planning
- Visualize how soil and water conservation methods function in a practical layout
- Stimulate entrepreneurial and ecological thinking

Duration: 30-60 min
Number of people that can participate (if necessary): Individual or small group (2–4 people)

Materials:

- A4 or A3 blank paper / flipchart paper
- Colored pens or markers
- Internet access or handbook for reference

Instructions step by step:

- Choose the setting for your micro-farm (e.g., rural area, hillside, small village plot).
- Sketch the layout of your farm on paper (approx. 1–2 hectares in size).
- Decide which crops and/or animals you want to include (consider diversity and rotation).
- Add sustainable features: <Water-saving system (e.g., rainwater collection, drip irrigation), Soil protection methods (e.g., composting area, cover crops), Biodiversity zones (e.g., hedgerows, flower strips, bee hotels, wild corners), Trees or agroforestry elements (optional).>
- Label each component and write 1–2 sentences explaining how it supports sustainability.
- Share your design with the group or submit a short written description explaining your choices and what you learned.

Activity Module 4:

Name of the activity:
Design Your Future Agribusiness – From Vision to Innovation

Description of the activity:
This activity invites young learners to explore agricultural career pathways and develop their own innovative agribusiness concept that is sustainable, entrepreneurial, and inspired by real-world case studies. Through guided steps, learners will map their interests, define a business idea, develop a simple business model using a visual canvas, and pitch it as a career or entrepreneurial goal. The activity can be done individually or in small groups and encourages critical thinking, creativity, and application of the course content.

Learning objectives of the activity:

- Understand different career paths and roles in agriculture
- Apply the principles of entrepreneurship and sustainability in a business context
- Identify innovative approaches in agri-food systems
- Use a simplified Business Model Canvas to design a sustainable agribusiness
- Reflect on personal career goals and future opportunities in the agricultural sector

Duration:
2–3 hours (can be split into two sessions)

Number of people that can participate (if necessary):
1–4 people (individual or group work)

Materials:

- Printed or digital version of a **Mini Business Model Template**
- Internet access for research
- Optional: Printer, poster board (if presenting physically)

Instructions Step by Step:

1.Warm-up (15 minutes): Reflect on your personal strengths, interests, and values using this question prompt:
“What would you like to improve or solve in your community through agriculture?”
Write down 3 ideas.

2.Explore Career & Innovation (30 minutes): Visit https://www.eurodesk.eu and explore 2–3 agricultural job roles or green entrepreneurship opportunities. Then, choose one real innovative agribusiness from EIT Food Startups or AgFunder News. Write what inspires you about it.

3.Develop Your Business Concept (45–60 minutes): Using the Mini Business Model Canvas, describe your idea:

- What problem does it solve?
- Who are your customers?
- What is your product or service?
- What makes it sustainable?
- How will you generate income?
- What resources or partners do you need?

4.Pitch Your Vision (30 minutes): Prepare a short 3–5 minute pitch of your concept using either:

- A simple poster (draw or use Canva: [www.canva.com])
- A short video (record with your phone)
- A slideshow presentation

5.Reflect & Share (15 minutes): #AgriFutureEU. Reflect on what you learned about agriculture, sustainability, and entrepreneurship. If in a group, give feedback to each other. Post your idea online or in class using the hashtag

GLOSSARY

MODULE 1

Agroecology: An approach to farming that applies ecological principles to agricultural systems, emphasizing biodiversity, sustainability, and local knowledge. It seeks to create resilient, self-sufficient systems that work in harmony with nature.

Agri-environmental Measures (AEMs): Practices funded by the EU under the Common Agricultural Policy to encourage farmers to protect and enhance the environment on their land. These include preserving biodiversity, improving soil and water quality, and maintaining landscapes.

Biodiversity: The variety of life in all its forms, levels, and combinations, including ecosystem diversity, species diversity, and genetic diversity. Biodiversity is essential for ecosystem services like pollination and pest control.

CAP (Common Agricultural Policy): The EU's main agricultural policy, which provides funding and regulations for farming in member states. It aims to support farmers, ensure food security, and promote environmental sustainability.

Carbon Sequestration: The process of capturing and storing atmospheric carbon dioxide in plants, soils, forests, or oceans to mitigate climate change. Sustainable farming practices like cover cropping and agroforestry can enhance carbon sequestration.

Conditionality: A set of mandatory requirements farmers must meet to receive full CAP payments. These include rules on environmental protection, public health, animal welfare, and climate action.

Eco-schemes: Voluntary schemes under the CAP that offer additional payments to farmers who go beyond mandatory environmental standards. Practices can include organic farming, agroforestry, and conservation efforts.

Farm to Fork Strategy: An EU initiative under the European Green Deal that aims to create a fair, healthy, and environmentally friendly food system. It includes targets for reducing pesticides, increasing organic farming, and cutting food waste.

Integrated Pest Management (IPM): An environmentally sensitive approach to pest control that uses a combination of techniques including biological control, habitat manipulation, and the use of resistant varieties, minimizing chemical input.

Organic Farming: A farming system that avoids synthetic chemicals and GMOs. It promotes ecological balance, biodiversity, and soil health through natural practices such as composting, crop rotation, and natural pest control.

Permaculture: A design philosophy for sustainable land use that imitates natural ecosystems. Permaculture integrates agriculture, housing, and community planning to create self-sustaining and resilient systems.

Precision Agriculture: A modern farming technique that uses data, sensors, GPS, and AI to manage crops and soil more efficiently. It aims to optimize resource use, reduce waste, and improve yields.

Rural Development: An EU policy area under the CAP that supports economic, social, and environmental improvements in rural areas. It includes funding for sustainable farming, innovation, infrastructure, and community-led initiatives.

Sustainable Agriculture: A farming approach that meets current food needs without compromising the ability of future generations to meet theirs. It balances environmental health, economic profitability, and social equity.

Water Framework Directive (WFD): An EU directive aimed at protecting and improving water quality across member states. It includes agricultural measures to reduce water pollution from fertilizers and pesticides.

MODULE 2

Digital Literacy: The ability to use digital tools confidently, understand digital content, and navigate online platforms in a safe and informed way.

ICT (Information and Communication Technology): A broad set of tools and systems used to handle digital communication, data, and technologies in agriculture.

Farm Management Software: Applications that help farmers plan, track, and analyse farm operations, including crops, livestock, budgets, and data.

Smart Farming: An approach to agriculture that uses modern technology like GPS, sensors, and data analytics to increase efficiency and precision.

Precision Agriculture: Farming technique that optimises inputs (water, fertilisers, etc.) using GPS, satellite imagery, and IoT.

Agroecology: Integrating ecological principles into agricultural practices to enhance biodiversity, sustainability, and productivity.

E-commerce: The act of selling and buying agricultural products or services via online platforms and digital marketplaces.

Market Access Platforms: Online services that help farmers promote and sell their products directly to customers or businesses (e.g., e-Agri, AgriMarketplace).

Livestock Monitoring Tools: ICT systems like RFID tags and digital trackers monitor animal health, breeding cycles, and feeding schedules.

Beekeeping Apps: Digital tools such as Apiary Book or HiveTracks are used to track hive inspections, production, and disease management.

Climate Control Systems: Technological greenhouse setups automatically regulate temperature, humidity, and lighting for optimised plant growth.

Decision Support Systems (DSS): AI-powered platforms that help farmers make data-informed choices in crop planning, resource use, and logistics.

Digital Marketing: Digital channels and tools are used to promote agricultural products and services to a broader audience.

Social Media Marketing: Using social platforms like Instagram, TikTok, and Facebook to share content, connect with customers, and build a farming brand.

Website/Blog: A personalised online space to showcase farm products, updates, and the farm's story or values.

Email Marketing: Sending newsletters and promotional emails to engage with customers and partners regularly.

Google My Business: A free tool that helps agricultural businesses appear on local Google search and map results, with business hours, reviews, and contact info.

Newsletter: A digital publication sent regularly via email to keep subscribers updated on farm news, products, and initiatives.

Cybersecurity: The practice of protecting computers, devices, and digital information from unauthorised access or damage.

Digital Safety: Awareness and practices that help prevent online risks, such as scams, hacking, or data breaches in farm systems.

GDPR Compliance: Adhering to EU data protection regulations that ensure the privacy and protection of personal and farm-related data.

Digital Footprint: The trail of data a person leaves behind online, including browsing history, social media activity, and shared content.

Online Marketplaces: E-commerce platforms where farmers can sell directly to consumers or retailers, often with low cost and broad reach

Mapping & GPS Tools: Digital tools like Google Earth allow farmers to visualise, plan, and analyse their land digitally.

Weather and Climate Tools: Platforms that offer real-time forecasts and alerts to help farmers plan operations.

Infographic: A visual tool combining images, icons, and text to communicate data or concepts simply and clearly.

MODULE 3

Agroforestry: A land-use system where trees or shrubs are grown around or among crops or pastureland to enhance biodiversity, soil health, and productivity.

Biodiversity: The variety of life in the world or in a particular ecosystem, including plants, animals, fungi, and microorganisms. In agriculture, it supports resilience, productivity, and sustainability.

Composting: A natural process that turns organic waste like food scraps and plant material into a nutrient-rich soil amendment that improves soil health.

Cover Crop: A crop (such as clover or rye) planted to protect and enrich the soil between harvests, rather than for commercial sale.

Crop Rotation: The practice of growing different types of crops in the same area in sequential seasons to maintain soil fertility and reduce pests and diseases.

Drip Irrigation: A water-saving technique where water drips slowly to the roots of plants through a system of pipes or tubes, minimizing evaporation and waste.

Ecosystem Services: The benefits people get from nature, such as pollination, pest control, water purification, and soil formation, which are essential for sustainable agriculture.

Integrated Pest Management (IPM): A strategy that combines different methods to control pests with minimal impact on the environment, using chemicals only when absolutely necessary.

Monoculture: The cultivation of a single crop over a large area, often leading to soil depletion and vulnerability to pests.

Sustainable Agriculture: Farming that meets current needs without harming the environment or future generations. It balances productivity with care for natural resources and communities.

MODULE 4

Agribusiness: A business involved in the production, processing, and distribution of agricultural products. It includes farms, food processors, wholesalers, and retailers.

Business Model Canvas (BMC):A visual tool used to describe, design, and analyse a business model. It outlines key elements such as value proposition, customers, resources, revenue streams, and sustainability strategies.

Carbon Farming: An agricultural method aimed at capturing and storing atmospheric carbon dioxide in soil and vegetation, helping to mitigate climate change.

Circular Economy: An economic system based on minimising waste and making the most of resources by reusing, repairing, refurbishing, and recycling existing materials and products.

Entrepreneurial Mindset: A set of attitudes and skills, such as creativity, initiative, problem-solving, and risk-taking, that enable individuals to create value and pursue business opportunities.

EURES: The European Job Mobility Portal providing information on job vacancies, CV posting, and advice for working across EU countries.

ESCO (European Skills, Competences, Qualifications and Occupations): A multilingual classification system that links skills, qualifications, and occupations, helping individuals explore jobs and training opportunities in the EU.

European Green Deal: An EU strategy aiming to make the EU climate-neutral by 2050. It includes agricultural reforms promoting sustainability, biodiversity, and reduced emissions.

EU Funding for Agriculture: Financial support from the EU through programmes like the Common Agricultural Policy (CAP), Young Farmers Scheme, and EAFRD to promote rural development and innovation.

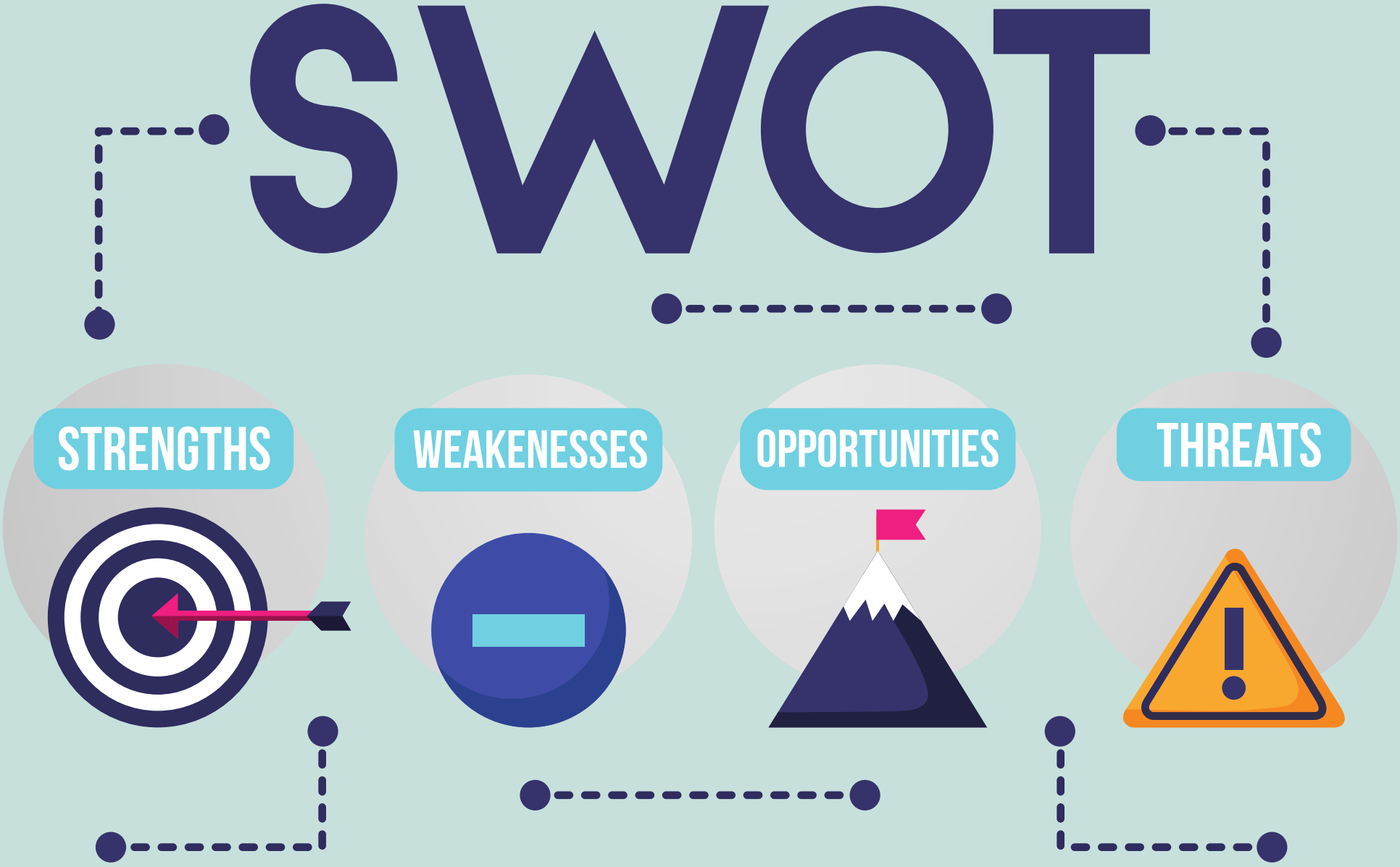
Innovation in Agriculture: The use of new ideas, technologies, and practices to solve problems, increase productivity, and make agriculture more sustainable.

Pitching: The act of presenting a business idea clearly and persuasively to potential investors, partners, or stakeholders.

Regenerative Agriculture: A system of farming principles and practices that seeks to rehabilitate and enhance the entire ecosystem of the farm, focusing on soil health, biodiversity, and carbon sequestration.

Sustainability: Practices that meet current agricultural needs without compromising the ability of future generations to meet theirs. It involves environmental, economic, and social responsibility.

SWOT Analysis: A strategic planning tool used to identify a business's Strengths, Weaknesses, Opportunities, and Threats.



EVALUATION QUIZZES

Quiz 1

Section A: Multiple Choice (Choose the correct answer)

1. Which of the following is not a pillar of sustainable agriculture?
a) Environmental sustainability
b) Economic sustainability
c) Technological advancement
d) Social sustainability

2. The EU's "Farm to Fork" Strategy aims to:
a) Increase the use of synthetic fertilizers
b) Reduce pesticide use by 50%
c) Privatize agricultural subsidies
d) Eliminate organic farming by 2030

3. What does precision agriculture primarily rely on?
a) Manual labor
b) Traditional methods
c) Digital technologies and data
d) Increasing livestock density

4. Eco-schemes under the CAP are designed to:
a) Support fossil fuel use in farming
b) Encourage environmentally friendly practices
c) Replace all direct payments
d) Discourage organic certification

5. Which of these is an example of an agroecological practice?
a) Monoculture farming
b) Artificial growth hormones
c) Intercropping
d) Chemical pest eradication

Section B: True/False

1. ___ The Common Agricultural Policy (CAP) only funds large industrial farms.
2. ___ Organic farming allows the use of genetically modified organisms (GMOs).
3. ___ Agroecology combines scientific knowledge with traditional farming practices.
4. ___ The EU's Green Deal includes agricultural reforms for climate neutrality.
5. ___ Precision agriculture reduces waste by targeting resources precisely where needed.

Section C: Short Answer

1. Briefly explain what is meant by "conditionality" in the context of EU agricultural payments.
2. Name two sustainable water management practices used in EU agriculture.
3. Describe one way in which climate change is affecting farming in Europe.
4. What role does biodiversity play in a sustainable farming system?
5. Suggest one way the EU supports small-scale farmers in adopting sustainable practices.

Answers Section A:
1-c, 2-b, 3-c, 4-b, 5-c

Answers Section B:
1 - false, 2 - false, 3 - true, 4 - true, 5 - true

Quiz 2

1. What does digital literacy mean for agricultural professionals?
a. Reading printed agricultural manuals
b. Using digital tools and platforms safely and effectively
c. Posting content on social media
d. Avoiding technology on the farm

2. What is the primary purpose of the FaST (Farm Sustainability Tool) platform?
a. To sell farm machinery online
b. To connect farmers with social media influencers
c. To help farmers use solutions for sustainable and competitive agriculture based on space data (Copernicus and Galileo) and other public and private datasets.
d. To calculate tax returns for agricultural businesses

3. How do ICT tools like IoT sensors help farmers?
a. By replacing all farm workers
b. By allowing remote entertainment
c. By providing real-time data for better decision-making
d. By eliminating the need for fertilisers

4. What is the purpose of the Common European Agricultural Data Space?
a. To reduce crop diversity
b. To send EU food to space
c. To store personal photos online
d. To support secure agricultural data sharing and innovation

5. What is precision farming primarily based on?
a. GPS, sensors, and data analytics
b. Manual seeding
c. Random fertilisation
d. Traditional farming calendars

6. What is one benefit of using digital marketing in agriculture?

a. Higher pesticide use
b. Reduced product visibility
c. Increased paper documentation
d. Direct engagement with consumers and improved brand presence

7. Which of the following best describes agroecology?

a. Farming that relies entirely on imported chemical inputs
b. Using GPS tractors without considering environmental impacts
c. Integrating ecological principles into agriculture to promote sustainability and biodiversity
d. Prioritising maximum yield through monoculture practices

8. What should you do before using a new digital tool?

a. Ask your neighbour for permission
b. Ensure it is aligned with your needs, and data is secure
c. Avoid reading the instructions
d. Use only if others do

9. What should farmers do to ensure digital safety?

a. Share passwords with all workers
b. Use unsecured Wi-Fi networks
c. Use strong passwords, backups, and secure platforms
d. Store all data on paper

10. Which digital competence is essential for accessing CAP e-services?

a. Navigating e-government portals
b. Online gaming
c. Driving skills
d. Cooking skills

Answers:

1-b, 2-c, 3-c, 4-d, 5-a, 6-d, 7-c, 8-b, 9-c, 10-a

Quiz 3

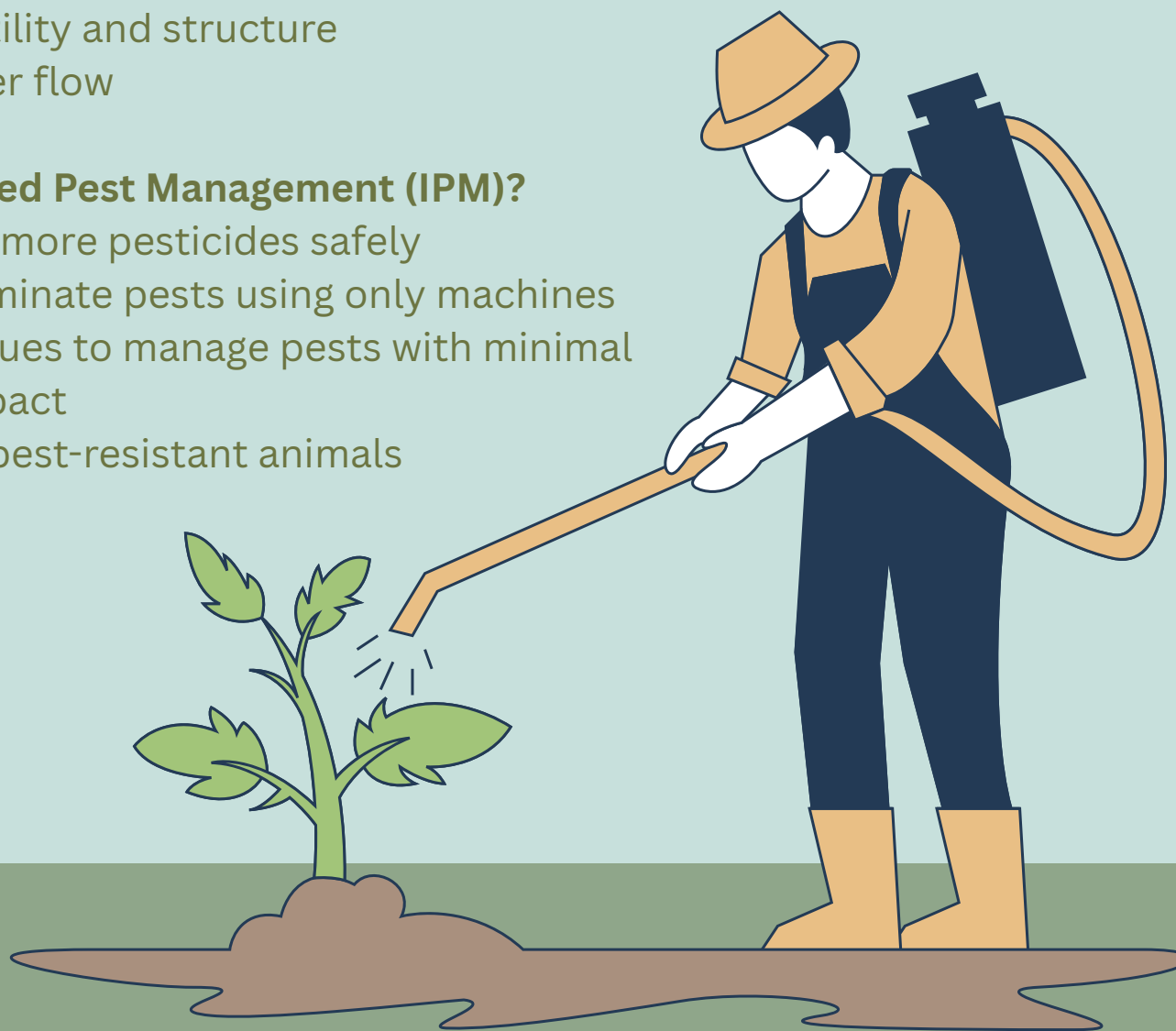
1. What are the three main pillars of sustainable agriculture?
a. Price, Profit, Productivity
b. Economy, Environment, Equality
c. Environmental, Economic, and Social Sustainability
d. Fertility, Farming, and Finance

2. Why is crop rotation considered a sustainable practice?
a. It reduces farm labor
b. It prevents weeds from growing
c. It improves soil health and breaks pest cycles
d. It increases monoculture efficiency

3. Which of the following is an example of biodiversity on a farm?
a. Growing one crop for many years
b. Planting flower strips to attract pollinators
c. Spraying pesticides regularly
d. Using only one type of fertilizer

4. What does composting primarily help with?
a. Pest control
b. Increasing crop prices
c. Building soil fertility and structure
d. Controlling water flow

5. What is Integrated Pest Management (IPM)?
a. A system to use more pesticides safely
b. A method to eliminate pests using only machines
c. A mix of techniques to manage pests with minimal environmental impact
d. A way to breed pest-resistant animals



6. Which practice is most effective for conserving water on a farm?
a. Tilling soil daily
b. Drip irrigation
c. Sprinkler systems in mid-day
d. Covering fields with plastic

7. What is one benefit of agroforestry?
a. Encourages monocultures
b. Drains nutrients from crops
c. Requires no maintenance
d. Provides shade, reduces erosion, and improves biodiversity

8. Which of the following is a threat to agricultural biodiversity?
a. Monoculture farming
b. Hedgerows
c. Cover cropping
d. Intercropping

9. Which EU policy supports biodiversity and sustainable farming?
a. Erasmus+
b. Farm to Fork Strategy
c. Digital Europe
d. Creative Europe

10. Why should young farmers care about soil health?
a. Healthy soil increases fuel use
b. It helps reduce market competition
c. It makes land easier to sell
d. It supports plant growth, retains water, and stores carbon

Answers:
1-c, 2-c, 3-b, 4-c, 5-c, 6-b, 7-d, 8-a, 9-b, 10-d

Quiz 4

1. What does the term "agri-tech" refer to?
a. Traditional farming methods
b. Policies regulating land ownership
c. The application of technology to enhance agricultural practices
d. A type of livestock insurance scheme

2. Which EU strategy aims to make agriculture more sustainable and climate-resilient?
a. Erasmus+ Youth Strategy
b. Common Market Organisation
c. European Green Deal
d. Digital Innovation Pact

3. What is a key characteristic of agricultural entrepreneurship?
a. Avoiding innovation to reduce risk
b. Following traditional production methods only
c. Solving problems by creating new business opportunities
d. Ignoring consumer trends in farming

4. What is the primary purpose of the Business Model Canvas?
a. Tracking pesticide usage
b. Applying for land subsidies
c. Analysing the sustainability of farming tools
d. Structuring and visualising a business plan

5. Which of the following tools supports job exploration and training pathways across EU countries?
a. Eurostat
b. ESCO
c. EFSA
d. LIFE+

6. What is "carbon farming"?
a. Farming using carbon-based fertilisers
b. Importing carbon-rich crops
c. A technique to sequester carbon through agricultural practices
d. A type of intensive monoculture

7. What are the three pillars of the "triple bottom line" in sustainable agribusiness?
a. Production, trade, and logistics
b. People, planet, and profit
c. Fertiliser, finance, and food
d. Soil, seeds, and subsidies

8. Why is financial planning essential in agricultural entrepreneurship?
a. To avoid hiring skilled workers
b. To limit innovation and reduce creativity
c. To manage resources, plan budgets, and attract funding
d. To focus only on exporting produce

9. Which platform offers opportunities for mobility and learning in the EU, including agricultural sectors?
a. Horizon Europe
b. CORDIS
c. EIT Digital
d. Erasmus+

10. What is one benefit of studying successful agricultural startups?
a. To avoid collaboration with other farmers
b. To discourage experimentation
c. To analyse strategies and apply innovative practices
d. To copy business models without adaptation

Answers:
1-c, 2-c, 3-c, 4-d, 5-b, 6-c, 7-b, 8-c, 9-d, 10-c

ANNEXES

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