



AGRIFOOD

4Future

D4.1

VET programmes for EQF 3-5



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Abstract

This document provides a comprehensive guide to the careful design and development of the Agrifood for Future Training Programme as part of Work Package 4. It outlines the rationale behind the curricula, the course structure, and the methodology employed to create a cohesive and impactful learning experience for students in the agrifood sector.

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List of abbreviation

AF4F	AGRIFOOD4FUTURE
WP4	Work Package 4
VET	Vocational Education and Training
ADDIE	Analyze, Design, Develop, Implement, and Evaluate Model
EQF	European Qualifications Framework
ESCO	European Skills, Competences, Qualifications and Occupations
ECVET	European Credit System for Vocational Education and Training
EQAVET	European Quality Assurance in Vocational Education and Training

1 Introduction

1.1 Scope of WP4 “Development of innovative teaching and training programmes in smart farming and sustainable food systems”

The scope of Work Package 4 (WP4) in the Agrifood4Future project centers on the creation and implementation of innovative teaching and training programs to support smart farming and sustainable food systems. WP4 aims to design, develop, and test Vocational Education and Training (VET) programs that address the skills required to foster digital and sustainable practices in the agri-food industry. These programs will cater to different educational levels and include a focus on lifelong learning, ensuring the continuous development of skills in this evolving field. Additionally, WP4 will introduce transnational models for the recognition of qualifications and ensure quality assurance across the VET sector.

The key objectives of WP4 are:

- Developing innovative educational content for various EQF levels (EQF 3-5 and EQF 6-8), including advanced master's and PhD courses on smart farming and sustainability.
- Enhancing the professional development of advisors, teachers, and trainers through blended learning, modular curricula, and practical site visits to demonstration farms.
- Creating e-learning tools and best-practice resources for teaching agri-food topics and offering practical guidance for farmers.
- Implementing capacity-building initiatives for small and medium-sized enterprises (SMEs) and farmers to promote more efficient and sustainable agricultural practices.
- Establishing a guidance service and territorial observatory to monitor labor market trends and adjust VET programs to emerging needs in the agri-food sector.

1.2 Description of the WP4

Work Package 4 (WP4) is an important pillar of the AF4F project, designed to address the digital transition, green transition, bioeconomy, and soft skills upskilling needs within the European agrifood sector. This Work Package is structured into a series of tasks and actions aimed at developing 4 different curricula for each pillar to ensure the students in the Agrifood sector are equipped with the requisite digital, green, bioeconomic, and soft skills competencies.

WP4 focuses on creating a comprehensive framework for training, assessment, and ongoing learning, specifically designed to address the emerging needs of the agrifood sector. This initiative is carefully structured to encompass everything from curriculum development to the practical application of the training material, ensuring a well-rounded approach to skills development.

The Tasks 4.1 and 4.2 are enclosed in WP4. More specifically, Task 4.1 is related to the design and development of 4 different curricula. This includes the formulation of new competence-based courses, creation of an assessment methodology, and the production of training content, all of which are leading towards fostering a learning environment that promotes the aforementioned skills in the agrifood sector.

This task is pivotal for the curricula implementation that will be prior tested in each partner country in specific pilot VET schools, delivering the training content to its practical application through the training schemes. The milestones of WP4 serve as indicators of progress toward the deliverables, highlighting the completion of the training content development. These milestones are instrumental in ensuring that WP4 stays on course, aligning with the broader objectives of the AF4F Project. Deliverable D4.1 specifically addresses the methodology for the creation of new curricula and the assessment methodology including quizzes and reflection activities.

This deliverable establishes the basis for designing the training content, providing a structured approach to skills development that is essential for the success of the upcoming tasks and actions in WP4.

The specific task under WP4 describes a structured and comprehensive approach to fostering a digitally and sustainably adept learning environment, aligning with the emerging skills that are needed. Through collaborative efforts among the consortium members, WP4 will contribute to the development of crucial skills in the agrifood sector.

1.3 Methodology guide

The structure of this document aligns with the methodology used in the design and development of the AF4F curriculum, which is based on the ADDIE model. ADDIE represents a systematic approach to instructional design, that contains five key phases: (1) Analyze, (2) Design, (3) Develop, (4) Implement, and (5) Evaluate. Each of the subsequent chapters is devoted to one of these phases:

- **Chapter 4: Analysis and rationale of curricula for the EQF level 3-5**

This chapter forms the foundation of the curriculum, with a focus on the learner's profile and the identified training needs. It captures the core elements of the curriculum, shaped by the in-depth research carried out in the previous phases of the project.

- **Chapter 5: Design Phase – Curricula structure overview**

This chapter focuses on the modular structure of the curriculum, detailing the courses, modules, and formulation of learning outcomes. It serves as a blueprint, illustrating how the AF4F Curriculum is designed to align with the project's objectives.

- **Chapter 6: Development Phase**

This section outlines the steps for implementing the AF4F training program, including the piloting of the e-learning platform and the work-based learning scheme in the participating countries. This chapter is provisional and will be finalized based on the project's progress and evolving requirements.

Through the navigation of this document, each chapter expands on the previous one, delivering a comprehensive overview of the journey from the creation of the curricula to

its potential implementation. The document aims to offer a transparent and detailed insight into the strategies and methodologies employed to ensure that the AF4F project will successfully implement the training programmes aimed at fostering the transfer of soft skills (such as entrepreneurship, communication, problem-solving, critical thinking, and creativity), and new emerging digital approaches and sustainable methods that support the upskilling of the EU agrifood sector.

2 Identification of relevant existing occupational profiles at EU level (using ESCO)

2.1 Skills Gap Analysis and Occupational Profiles

The first step for the design of the 4 different curricula was the implementation of a detailed skills gap analysis. More specifically, based on the deliverable 2.1 (D.2.1) “Report on the job and training needs analysis” 20 relevant skills have been found, that students should acquire based on the skills gaps identified in the agri-food sector.

1. Advanced data management and analysis
2. Practical skills in data interpretation and statistical analysis using tools such as Excel
3. Digital entrepreneurship
4. Online data retrieval and digital content consumption
5. Quality assurance and testing procedures for digital product management systems
6. Practical skills in supplier management
7. Farm planning and resource optimization through farm management information systems
8. Field operations management using digital tools
9. Soil nutrient monitoring and management using digital solutions
10. Hands-on experience with robotic technologies for agricultural tasks
11. Integration and implementation of sensor technologies for data collection and analysis
12. Optimization of resource use and logistics management through advanced training programs
13. Intermediate and advanced knowledge of regenerative and carbon farming practices
14. Assessment of climate risks and implementation of adaptation strategies in agriculture
15. Crop modeling, simulation techniques, and relevant software applications
16. Sustainable water and energy management practices
17. Principles of soil health management and nutrient management techniques
18. Understanding and application of national and international environmental policies in agriculture
19. Corporate social responsibility practices and sustainability reporting
20. Identification and implementation of renewable energy systems suitable for agricultural operations

The next step was to navigate through the ESCO European website in order to identify the training needs along with the ones that were mentioned in the D.2.1 report and determine the gaps.

ESCO profiles are part of a multilingual classification system developed by the European Commission to bridge the gap between the labor market and education/training systems across Europe. These profiles provide standardized descriptions of occupations, skills, and qualifications across various industries, including the agrifood sector.

Each ESCO profile offers detailed information about:

Occupations: The specific roles or jobs within a sector.

Skills and Competences: The abilities, both technical and soft skills, required for each occupation.

Qualifications: The formal education or training typically needed to perform those roles.

The use of ESCO Profiles to identify skill gaps in the agrifood sector results in:

1. **Assessment of Current Workforce Skills:** By mapping the skills of current employees in the agrifood sector to the ESCO profiles, we can identify the skills they possess and compare them to the industry's standard requirements.
2. **Comparison of Training Programs:** ESCO profiles can help assess whether existing educational and vocational programs align with the required skill sets in the agrifood sector. If certain skills or competencies outlined in ESCO profiles are missing in the curricula, this **signals a gap**.
3. **Identification of Emerging Skill Needs:** ESCO profiles are regularly updated to reflect the evolving needs of industries. In the context of smart farming and sustainability, these profiles can help identify new competencies—such as digital farming technologies or sustainable practices—that may not yet be prevalent in the workforce.
4. **Creation of Targeted Training Programs:** Once skill gaps are identified, ESCO profiles can guide the design and development of targeted training programs aimed at upskilling or reskilling workers to meet the emerging demands of the agrifood sector.

In summary, for the purpose of the task 4.1, ESCO profiles offer a structured framework to analyze the skills required in the agrifood sector and identify where there are mismatches between the current workforce's abilities and the industry's evolving needs.

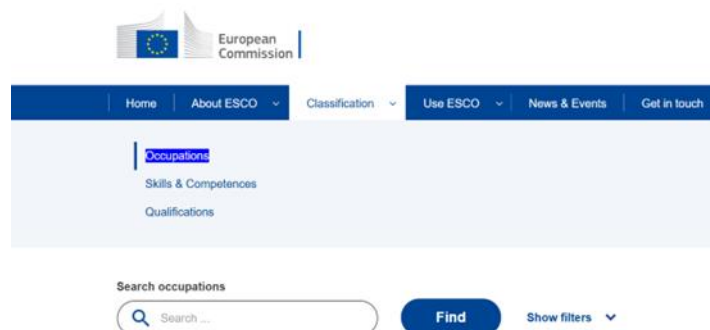


Figure 1: ESCO Website

Several key terms were used in this process, including “Agricultural Technicians,” “Farmers,” “Food Production and Processing,” “Process Control and Machine

Operators,” and “Laborers in Food and Beverage Processing.” Upon completing an in-depth and comprehensive search, the relevant occupations were identified, along with detailed descriptions of the required skills, competences, and essential knowledge. All occupational profiles related to the agrifood sector were successfully identified. For each profile, the following details were recorded: “Profile Title,” “ESCO Code,” “Profile Description,” “Required Skills and Competences,” and “Educational Requirements.” A total of 107 profiles from the agrifood sector were generated using the ESCO website. However, for a limited number of profiles (i.e., 631 - Subsistence Crop Farmers, 632 - Subsistence Livestock Farmers, 633 - Subsistence Mixed Crop and Livestock Farmers), the required skills were not described.

The categories of the missing skills that were identified for each pillar are displayed as follows:

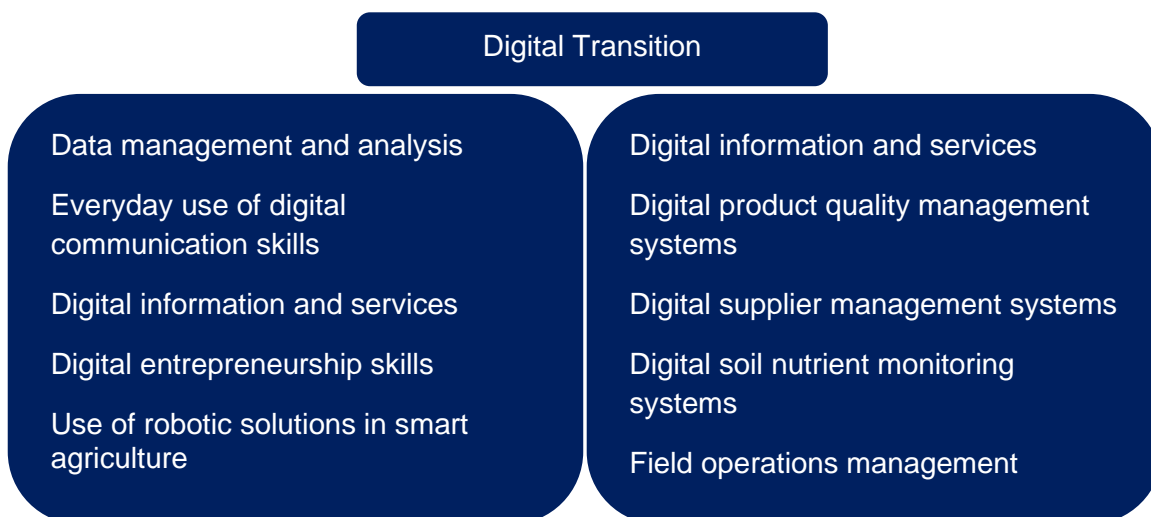


Figure 2: Skill gaps in Digital Transition

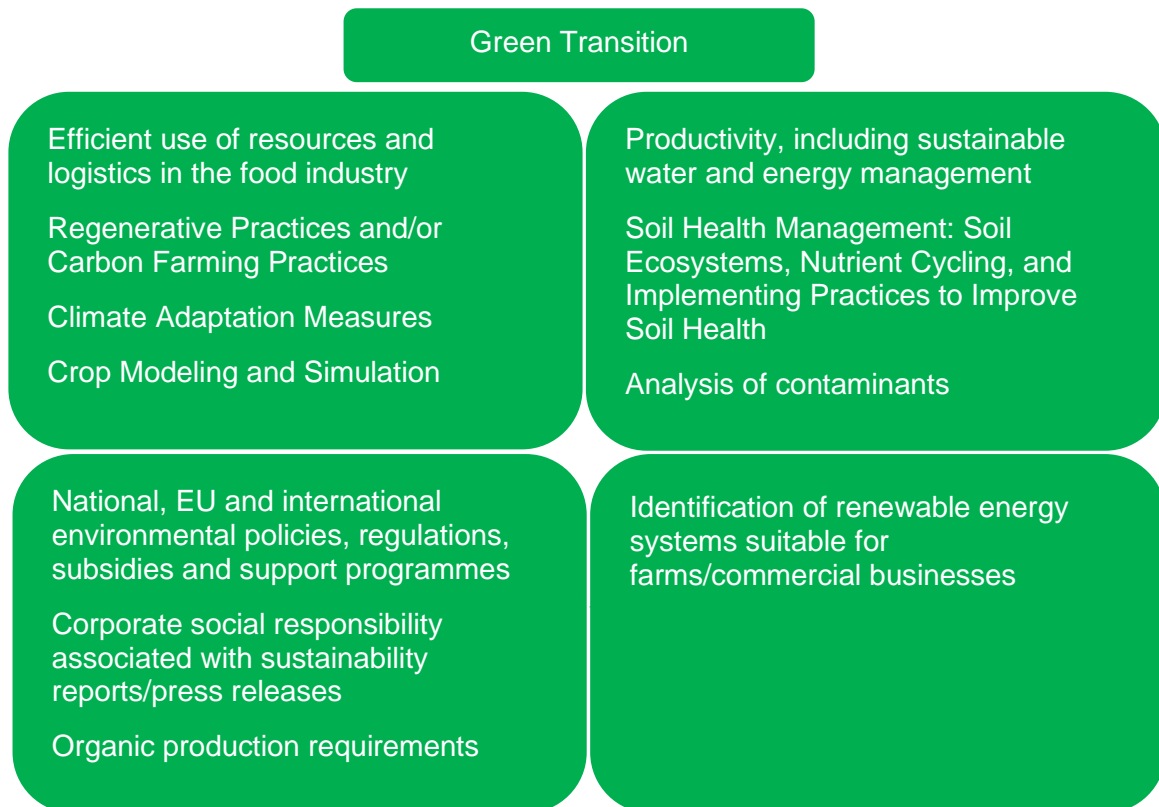


Figure 3: Skill gaps in Green Transition & Sustainability

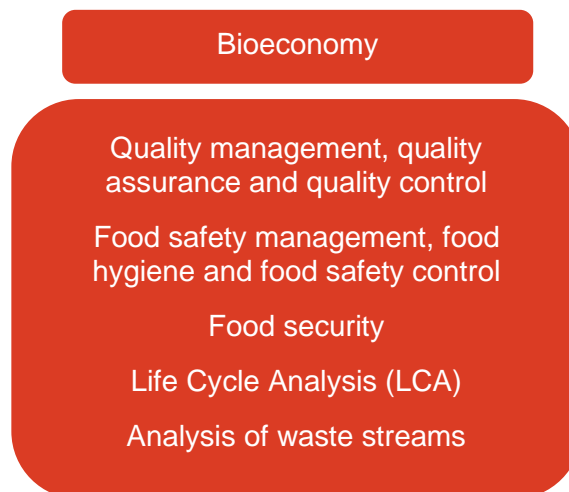


Figure 4: Skill gaps in Bioeconomy

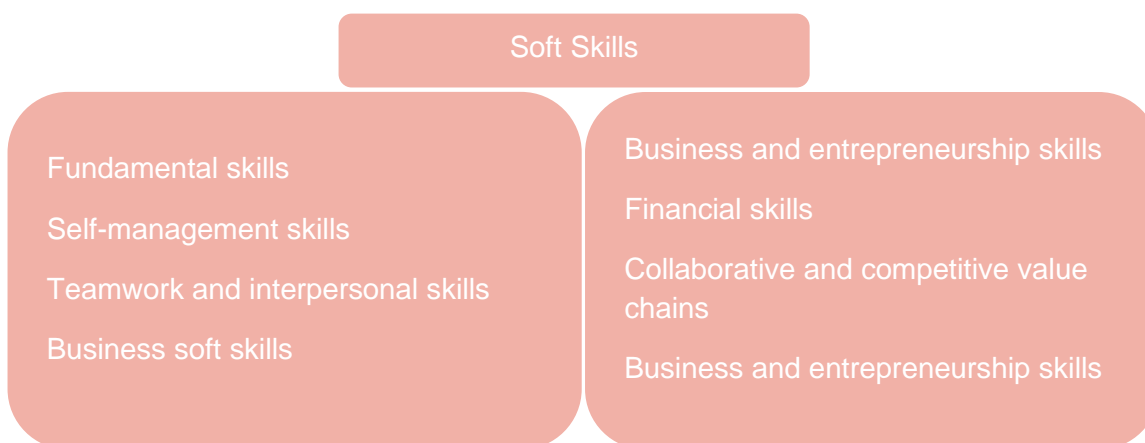


Figure 5: Skill gaps in Soft skills

2.1.1 Skills Gaps in Digital Transition in the Agrifood Sector

As the agrifood sector becomes more technologically integrated, gaps in digital competencies pose a significant barrier to growth and innovation. The workforce lacks crucial skills in managing and utilizing digital tools that are becoming increasingly necessary for modern farming and food production.

The most striking deficiency is in data management and analysis, where workers are unable to fully harness the power of data visualization techniques. The ability to analyze and interpret data is critical for optimizing production, improving resource efficiency, and making informed decisions. For example, farmers now have access to a wealth of information through precision agriculture technologies, but without the skills to analyze this data, they cannot leverage it to increase yields or reduce inputs like water and fertilizers.

The everyday use of digital communication skills is another area that needs urgent attention. Employees in the agrifood sector must be proficient in using digital communication platforms, such as email, social media, and cloud-based collaboration tools like Google Drive. These tools are becoming essential for connecting with markets, suppliers, and even consumers, as well as for participating in broader networks of knowledge sharing and innovation.

Another critical area is the lack of knowledge in digital information and services, specifically in terms of digital content consumption and the application of digital technologies in agricultural bureaucracies. As governments and institutions shift to digital platforms for reporting and compliance, agrifood workers need to be equipped to navigate these systems effectively. The bureaucratic processes in agriculture are increasingly becoming digitized, and this requires workers to develop competencies in managing these platforms to ensure regulatory compliance and operational efficiency.

The sector also suffers from a significant gap in digital product and supplier management systems. Digital quality assurance and collaboration platforms are essential for maintaining the high standards that are now expected across global supply chains. Producers need to be able to collaborate with suppliers through digital systems and

ensure that products meet regulatory and market standards before they reach the consumer.

Further, the absence of expertise in robotic solutions in smart agriculture is limiting the sector's ability to fully embrace automation. Technologies such as drones, AI-powered robotics, and Geographic Information Systems (GIS) maps are revolutionizing farming, but these advancements require specialized knowledge and skills to implement effectively. Without sufficient training in these areas, the agrifood workforce may struggle to adopt these innovations, which could hinder the sector's overall progress.

2.1.2 Skills Gaps in Green Transition in the Agrifood Sector

For the agrifood sector to fully embrace green transition and sustainability, a significant enhancement in skills related to resource efficiency and logistics is required. One critical area involves strategic management techniques—methods that are indispensable for optimizing the flow of materials and resources in a way that aligns with sustainable goals. Effective strategic management enables agrifood enterprises to refine their operational frameworks, reducing waste and enhancing resource use efficiency. Coupled with this is the need for advanced logistics expertise. Professionals in this field must be proficient in managing complex supply chains that account for sustainable practices, such as minimizing carbon footprints, employing renewable resources, and improving coordination across production stages. This leads into a broader need for supply chain management practices, emphasizing environmentally conscious methods for handling goods from production to distribution while ensuring minimal environmental impact. Additionally, the optimization of production processes is key for companies seeking to strike a balance between efficiency and sustainability, focusing on reducing energy consumption and waste while maintaining high productivity.

In the realm of regenerative practices and carbon farming, several skills are notably lacking in the sector. Biodiversity enhancement stands as a priority, with agrifood professionals needing to foster and manage ecosystems that are diverse and resilient. This involves adopting practices that not only maintain but also improve the health of agricultural environments. Alongside biodiversity, climate adaptation measures are vital for preparing the industry to withstand the increasing challenges posed by climate change. Farmers and agricultural managers must be well-versed in resilient crop varieties that can endure changing weather patterns and other environmental pressures, ensuring food security. Climate risk assessment also plays a significant role, with the need to evaluate potential environmental hazards and develop strategies to mitigate their impact. The agrifood sector would greatly benefit from enhanced skills in crop modeling and simulation, which can help predict the performance of various crops under different environmental conditions, thus allowing more informed decision-making. Advanced techniques in this area, combined with software proficiency, would enable more accurate forecasting and scenario planning.

Sustainable water and energy management is another pressing issue for the sector. Professionals need to develop expertise in water and energy efficiency techniques, particularly in technologies that allow for the careful monitoring and reduction of resource use. This includes not only adopting sustainable practices but also evaluating their

effectiveness over time, ensuring that the solutions implemented truly contribute to sustainability. Knowledge of sustainable management fundamentals is crucial, including the use of technological solutions to track and optimize the use of water and energy resources, allowing the agrifood industry to meet production demands while minimizing environmental impact. The practical application of these techniques is just as important as theoretical knowledge, making hands-on training an essential component of upskilling.

Improving soil health management is a cornerstone of sustainable agricultural practices. Agrifood professionals need a deeper understanding of soil ecosystems and nutrient cycling, alongside the implementation of best practices to enhance soil health. This is critical for both short-term productivity and long-term sustainability, as healthy soil is the foundation of a resilient food system. Further, the agrifood workforce requires an improved grasp of national, EU, and international environmental policies. Familiarity with regulations, subsidies, and support programs is essential for navigating the legal and financial landscape of sustainability initiatives. Being able to effectively comply with and leverage these policies can make a significant difference in the ability of agrifood enterprises to implement sustainable practices successfully.

In the realm of corporate social responsibility (CSR), the ability to craft transparent and impactful sustainability reports is essential. Professionals in the agrifood sector need practical skills in drafting such reports, ensuring that they are not only compliant with industry standards but also effective in communicating sustainability efforts to stakeholders. This includes incorporating elements of public relations and communication strategies into sustainability efforts, ensuring that companies not only meet their sustainability goals but also effectively convey their achievements and challenges to a wider audience.

Renewable energy systems represent another critical area where agrifood professionals require further upskilling. Identifying and implementing renewable energy solutions that are suited to the unique needs of farms and agribusinesses is essential for reducing dependency on non-renewable resources. This involves understanding various renewable energy technologies, such as solar, wind, and biomass, and applying them in practical, real-world agricultural settings. Knowledge of organic production requirements is also important for sustainability, as organic agriculture offers a pathway to reducing the environmental impact of food production. Agrifood professionals need to be familiar with the guidelines and standards governing organic farming practices, ensuring that they can meet certification requirements while maintaining productivity.

Lastly, a gap remains in the sector's ability to conduct thorough contaminant analysis. Ensuring that food production processes meet environmental and safety standards requires advanced skills in identifying and mitigating potential contaminants in both the environment and the products themselves. This is especially important as the agrifood sector works towards minimizing its environmental footprint while ensuring the safety and quality of its products.

In summary, the green transition in the agrifood sector demands a comprehensive set of new skills across various areas, from resource management and logistics to soil health,

CSR, and renewable energy integration. Addressing these skill gaps is essential for building a more sustainable and resilient food system.

2.1.3 Skills Gaps in the Bioeconomy in the Agrifood Sector

For the agrifood sector to fully adopt and integrate bioeconomic practices, addressing the missing skills in quality management, quality assurance, and quality control is essential. The industry is currently facing a gap in practical experience and real-world applications in these areas, particularly in embedding bioeconomic principles into everyday operations. Quality management in the context of bioeconomy goes beyond the traditional scope, requiring a deep understanding of how biological resources are utilized sustainably and how this impacts product quality throughout the value chain. This underscores the importance of providing hands-on training and exposure to real-world scenarios where quality assurance protocols need to adapt to the evolving demands of a sustainable bio-based economy.

Similarly, in food safety management, hygiene, and safety control, there is a critical need for practical experience in food safety protocols, specifically tailored to align with bioeconomic principles. Food safety is becoming increasingly complex as the industry transitions toward sustainable production methods, integrating more eco-friendly practices, which might introduce new risks and challenges. Thus, improved training programs are necessary to bridge the knowledge gaps, ensuring that professionals in the agrifood sector are well-equipped to implement robust food safety systems that accommodate both traditional and bioeconomic frameworks. Practical workshops, periodic audits and evaluations, and updated certification programs focused on bioeconomic practices are vital to maintaining high standards of food safety while promoting sustainability.

In the domain of food security, which is closely tied to bioeconomic sustainability, an enhanced understanding of life cycle analysis (LCA) is required. LCA offers a method to assess the environmental impacts of food production across its entire lifespan, from cultivation to consumption. However, the sector currently lacks sufficient skills in conducting thorough LCA evaluations, a gap that could hinder efforts to create more sustainable food systems. There is a strong need to develop expertise in this area, allowing agrifood professionals to evaluate how their processes contribute to or mitigate environmental harm, and to make data-driven decisions that enhance food security in a bioeconomy.

Waste stream analysis is another critical area that requires upskilling in the bioeconomic sector. The bioeconomy seeks to minimize waste and turn it into valuable resources, but this requires advanced skills in identifying, analyzing, and repurposing waste streams within food production systems. Agrifood professionals must gain deeper insights into the processes that create waste and learn how to implement circular practices that transform this waste into energy, compost, or other usable materials. A solid foundation in waste stream analysis, alongside practical applications of these techniques, is essential for fully integrating bioeconomic principles into food production and processing.

Ultimately, the bioeconomy in the agrifood sector cannot thrive without a strong focus on upskilling in quality management, food safety, life cycle analysis, and waste stream analysis. Developing these competencies will be crucial for transitioning toward more sustainable, circular models that support both environmental health and food security.

2.1.4 Soft Skills Gaps in the Agrifood Sector

Soft skills form the backbone of an adaptable and resilient workforce. In the context of the agrifood sector, these skills are not only necessary for managing day-to-day tasks but are also critical for fostering leadership, innovation, and collaboration in a rapidly changing industry.

One of the most significant areas of concern lies within fundamental skills, where there is a marked deficiency in strategic thinking, planning, and organizational abilities. Workers in this sector need to develop stronger capacities for forward-thinking and structured problem-solving. As the agrifood sector becomes increasingly dependent on new technologies and sustainable practices, the ability to anticipate challenges, organize resources efficiently, and implement strategic initiatives will be essential. Additionally, the need for adaptability and resilience is paramount. With shifting environmental, regulatory, and market conditions, employees must be able to quickly adjust to new methods of working and remain proactive in finding solutions to emerging problems.

Moreover, self-management skills appear to be underdeveloped across various levels of the workforce. This includes not only managing one's time and tasks but also demonstrating positive attitudes and behaviors, which are essential for maintaining productivity and morale in high-pressure environments. The capacity for self-reflection and continuous personal evaluation is also lacking, which hinders the ability of workers to improve their performance. A workforce that cannot self-regulate will struggle to maintain the high standards necessary for sustainability in agrifood production, where precision and responsibility are vital.

The absence of strong teamwork and interpersonal skills is another critical gap, particularly in the realm of change management. As the agrifood industry undergoes a transformation with the introduction of digital technologies and sustainable farming practices, collaboration across teams and departments is essential. The ability to communicate effectively, navigate team dynamics, and manage change are pivotal skills that must be developed to ensure a cohesive approach to the sector's evolution. Without these, efforts to modernize operations could face resistance or fail due to a lack of coordination.

In the area of business soft skills, there is a significant gap in personnel management, leadership, networking, and innovative thinking. The agrifood sector, like many others, is becoming more competitive, and businesses need leaders who can manage both human resources and innovation pipelines. Networking is also crucial, as building relationships with stakeholders—such as local communities, policymakers, and international markets—can create opportunities for growth and collaboration. Innovative thinking, meanwhile, is indispensable for developing new approaches to sustainable

agriculture and food production. These skills will be key to driving the sector forward in an increasingly digital and resource-constrained world.

Additionally, entrepreneurial skills in the agrifood sector are notably weak. Farmers and food producers often need to engage with local marketing associations and develop new business models to remain competitive. The ability to network, form partnerships, and adapt to market trends is essential for those who want to thrive in this sector. The gap in entrepreneurial thinking not only limits individual business growth but also impedes the overall sector's ability to innovate and respond to market demands. Training programs that focus on strengthening these skills can empower small-scale producers to scale their operations, adopt sustainable practices, and access new markets.

The gaps in both soft skills and digital competencies underscore the need for comprehensive training and upskilling programs within the agrifood sector. By addressing these deficits—ranging from strategic thinking and teamwork to data analysis and robotics—stakeholders can ensure that the workforce is better prepared to navigate the challenges of modern agriculture. This upskilling will be critical for fostering innovation, improving productivity, and achieving long-term sustainability in the agrifood sector. In addition, the green transition in the agrifood sector demands a comprehensive set of new skills across various areas, from resource management and logistics to soil health, CSR, and renewable energy integration. Addressing these skill gaps is essential for building a more sustainable and resilient food system. Last, the bioeconomy in the agrifood sector cannot thrive without a strong focus on upskilling in quality management, food safety, life cycle analysis, and waste stream analysis. Developing these competencies will be crucial for transitioning toward more sustainable, circular models that support both environmental health and food security.

3 Analysis and Rationale of Curricula for the EQF Level 3-5

The methodology used in designing and developing the DigiGreenN Post curricula is based on the ADDIE model. ADDIE, an acronym, represents a structured approach to instructional design, divided into five essential phases: (1) Analyze, (2) Design, (3) Develop, (4) Implement, and (5) Evaluate.

In the Analysis phase, the focus is trained on unraveling the educational dilemma, which lays the groundwork for the ensuing phases of the ADDIE model. The pivotal inquiries shaping this phase are:

1. *Who are the learners?*
2. *What are their learning styles?*
3. *What is the knowledge problem?*
4. *What are the learning objectives?*
5. *What should be the learning content?*
6. *What is the overall goal of this training programme?*

During the Analysis phase, the training problem, which the development of four different curricula for the upskilling in the agrifood sector aims to tackle, is meticulously examined. This involves clearly defining the training's purpose, the knowledge area, the main learning goals, the essential learning objectives, the learners' profile, and the training timeline.

In more specific terms, the AF4F Curricula intends to address the necessity of bridging the identified gaps in the sector of digital and green transition as well as in the bioeconomy sector and the soft skills aiming to foster increased skills and awareness among the students in the agrifood education. This initiative is set to advance a critical set of skills in an agrifood landscape increasingly shaped by digital technologies and environmental awareness. It aligns with the broader goals of facilitating digital and green transitions, encouraging sustainable practices, and ultimately enhancing the soft skills within the sector.

In conclusion, the Analysis phase enables the identification of:

- (a) **The Profile of the Learners:** Gaining insight into the audience's prior knowledge, skills, and learning needs is essential for customizing the curriculum to address their specific requirements.
- (b) **The Outline of the Curriculum:** Defining the scope and objectives of the training sets the foundation for determining the content to be addressed.
- (c) **The Length of the Courses:** Organizing the duration to ensure thorough coverage of the curriculum while accommodating the availability and dedication of the learners.

(d) **The Special Needs for the Learning Environment (MOOC):** Determining the necessary infrastructure and resources to create a supportive learning environment.

The questions and considerations during this phase align with the best practices of the ADDIE model, emphasizing the significance of understanding the audience, pinpointing knowledge and skills gaps, establishing objectives, and defining the training scope, among other essential elements. This careful approach in the Analysis phase is crucial for laying the groundwork for a well-organized and effective curriculum design in the following stages of the ADDIE model.

3.1 Learner's Profile

The primary Target Group that is going to have access to AF4F curricula, are students in VET schools in Greece, in Spain, and in Italy. Based on the findings from the Occupational Profiles there are variations in the profiles in the agrifood sector. In total, 107 Occupational Profiles were identified through a thorough search. More specifically, in order to address the identified skills gaps and develop curricula for the green transition, digital transition, bioeconomy, and soft skills in the agrifood sector, the following ESCO occupational profiles are relevant based on the key themes of sustainability, digital transformation, bioeconomy, and human resource development:

✓ Green Transition

The green transition focuses on sustainable practices, climate adaptation, resource management, and environmental conservation within the agrifood sector. The relevant profiles here are connected to environmental management, resource optimization, and sustainable agricultural practices.

Relevant ESCO Profiles:

Sustainability manager (1213.8): Direct involvement in sustainability reporting, strategies, and improving resource efficiency, aligning with the skills gap in sustainable water and energy management, and CSR.

Environmental protection manager (1349.13): Overseeing environmental conservation efforts, which ties in with biodiversity enhancement and climate risk assessment.

Horticulture production manager (6113.2): Responsible for sustainable horticultural practices, critical for soil health management and resource-efficient production.

Farm manager (6130.1): In charge of sustainable farm operations, touching on water and energy efficiency, and the application of renewable energy systems.

Offshore renewable energy plant operator (3131.1) & Onshore wind farm technician (3131.2): Dealing with renewable energy, relevant for integration of renewable systems in agrifood businesses.

Wastewater treatment operator (3132.4): Critical for managing sustainable water resources, addressing water efficiency practices.

Forestry technician (3143.1): Focuses on managing forests sustainably, relating to ecosystem services and soil health.

The main focus on the Curriculum will be as follows:

- Climate risk management, resource conservation (water, soil, energy)
- Sustainable farming techniques (carbon farming, regenerative practices)
- Renewable energy systems in agriculture
- Practical application of environmental regulations and policies

✓ Digital Transition

This section emphasizes digital skills, technological solutions, and the application of digital tools across the agrifood sector, from logistics to precision agriculture.

Relevant ESCO Profiles:

Livestock advisor (2132.6): Provides advice on digital livestock management systems, integrating data and analytics into animal husbandry.

Agricultural policy officer (2422.12.1): Involved in shaping digital transformation policies for the agrifood sector.

Food analyst (3111.3) & Waste management supervisor (3122.5): Analyze data from digital systems to optimize production and waste management.

Food regulatory advisor (3257.2): Implements digital solutions in food safety protocols and regulatory compliance.

Import export specialist (3331.2.1): Digital supply chain and logistics are crucial for managing agricultural goods internationally.

Supply chain assistant (3343.1.7): Directly linked to digital logistics and supply chain optimization.

Fish production operator (8160.32) & Dairy processing operator (8160.24): Both integrate digital systems for efficient processing.

The main focus on the Curriculum will be as follows:

- Precision agriculture, digital monitoring of crops and livestock
- Advanced logistics and supply chain management tools
- Software proficiency for simulation and scenario planning
- Data analytics for production optimization

✓ Bioeconomy

Bioeconomy focuses on the efficient use of biological resources, promoting sustainability and reducing waste. Skills gaps here include LCA (Life Cycle Analysis), quality management, and food safety.

Relevant ESCO Profiles:

Food production manager (1321.2.1.3): Ensures food production adheres to bioeconomic principles, such as reducing waste and improving efficiency.

Food safety specialist (2263.2): Critical for managing bioeconomy-focused food safety measures.

Dairy products maker (7513.1): Implements bioeconomic strategies in dairy production, particularly in waste reduction and sustainable sourcing.

Oil mill operator (7514.2) & Oilseed presser (7514.3): Deal with sustainable production practices and waste stream management.

Food biotechnologist (2131.5): Focuses on biotechnology applications in the bioeconomy, particularly for resource-efficient food production.

Food technologist (2145.1.4): Engages in developing bioeconomic solutions in food production.

Wastewater treatment technician (3132.5): Tied to resource-efficient waste management in food production processes.

The main focus on the Curriculum will be as follows:

- Bio-based resource management (e.g., organic production, waste stream analysis)
- Quality assurance and LCA in bioeconomy
- Biotechnology applications in sustainable agriculture

✓ **Soft Skills**

Soft skills training is vital for leadership, teamwork, communication, and adaptability in an evolving agrifood sector. These skills complement the technical aspects of the curricula for the green and digital transitions and bioeconomy.

Relevant ESCO Profiles:

Agronomic crop production team leader (6111.1): Manages teams, emphasizing leadership and communication.

Mixed farmer (6130.2): Requires flexibility and adaptability in farm management, critical soft skills for evolving farming methods.

Technical sales representative in agricultural machinery (2433.6.1): Involves negotiation, communication, and customer service skills.

Agriculture, forestry and fishery vocational teacher (2320.1.1): Educates future generations, requiring strong pedagogical and communication skills.

Environmental education officer (5113.1.1): Educates the public on environmental issues, requiring strong interpersonal and communication skills.

The main focus on the Curriculum will be as follows:

- Leadership, teamwork, communication strategies

- Problem-solving, adaptability, and critical thinking
- Cross-cultural competence and negotiation skills

Up-skilling and re-skilling are essential in the agrifood sector to address the evolving demands of the green and digital transitions, the bioeconomy, and the growing importance of soft skills. As sustainability practices, climate adaptation, and renewable energy become critical, workers need to acquire new skills in regenerative agriculture, resource optimization, and renewable energy technologies. Additionally, the rise of digital tools in precision agriculture, supply chain management, and automation requires proficiency in new software and data analysis. The bioeconomy emphasizes the need for skills in life cycle analysis, waste management, and biotechnology. Moreover, soft skills such as leadership, communication, and adaptability are increasingly vital as the sector faces rapid technological, regulatory, and environmental changes. Up-skilling and re-skilling efforts are crucial to ensuring that the workforce can meet these challenges, remain competitive, and contribute to sustainable and innovative agricultural practices.

These learning needs are instrumental in aligning the agrifood sector workforce with the overarching goals of digital transformation, environmental sustainability, bioeconomy, and enhanced soft skills. By addressing these learning needs through a well-structured curriculum, the DigiGreen Post e-learning platform aims to equip the participants with the requisite knowledge and skills to navigate and excel in the upgraded agrifood sector landscape.

3.2 Curriculum Outline

3.2.1 Digital transition

Curriculum Title	Digital Transition in the Agrifood Sector
Curriculum Description (aim & objectives)	This curriculum examines the transformative impact of digital technologies on the agrifood sector, emphasizing how innovations such as precision agriculture, blockchain, IoT (Internet of Things), and big data are revolutionizing traditional farming and food production practices. Learners will investigate how digital tools and methods enhance efficiency, sustainability, and traceability throughout the agrifood value chain. Combining theoretical knowledge with practical applications, the course prepares participants to lead and manage the digital transition in agriculture, addressing both challenges and opportunities to foster growth and sustainability. Key topics include smart farming techniques, digital supply chain management, data analytics in agriculture, and the influence of policy and regulation on digital transformation.
EQF Level	3-5
Learning Objectives	
1.	To comprehend the fundamental concepts and principles of digital technologies and their application in the agrifood sector.
2.	To explore how precision agriculture, blockchain, IoT, and big data are transforming traditional farming and food production practices.
3.	To introduce students to smart farming techniques and digital supply chain management.
4.	To provide insights into the role of data analytics in enhancing efficiency, sustainability, and traceability within the agrifood value chain.
5.	To examine the impact of policy and regulation on the digital transformation in agriculture and the agrifood sector.
6.	To apply theoretical knowledge through practical case studies and real-world examples, enabling students to navigate and lead digital initiatives in agriculture.
Curriculum schedule	Course 1: Foundations of Digital Technologies in Agriculture
	Course 2: Smart Farming and Advanced Technologies
	Course 3: Field Operations and GIS Technologies
	Course 4: Supply Chain Digitalization and Traceability
Learning Parts	Blended (Online & Face to Face)

3.2.2 Green Transition & Sustainability

Curriculum Title	Green Transition and Sustainability in the Agrifood Sector
Curriculum Description (aim & objectives)	It explores essential strategies and innovations for advancing sustainability in agriculture and food systems, addressing climate change, resource depletion, and food security. Participants will learn to implement sustainable agricultural practices that enhance resource efficiency, environmental stewardship, and economic

	viability. The curriculum covers renewable energy integration, regenerative agriculture, digital technologies, and socio-economic aspects of sustainability, including job creation and economic growth. It also examines regulatory and policy frameworks supporting the green transition. By the end of this course, participants will be equipped with the tools necessary to drive the green transition in the agrifood sector, contributing to a more sustainable and resilient future for agriculture and food systems globally.
EQF Level	3-5
Learning Objectives	
	<ol style="list-style-type: none"> 1. To introduce students to the concept of the green transition and its relevance to the agrifood sector. 2. To provide an overview of sustainability principles and practices applicable to agriculture and food production. 3. To explain the environmental, economic, and social dimensions of sustainability in the agrifood sector. 4. To discuss the challenges and opportunities associated with implementing sustainable practices in agriculture and food systems. 5. To outline the policies and regulations that impact sustainability efforts in the agrifood sector. 6. To examine case studies of successful sustainability initiatives in agriculture and food production. 7. To explore the impact of climate change on agriculture and food security. 8. To identify best practices for resource management, including water, soil, and biodiversity conservation. 9. To evaluate the effectiveness of different strategies and approaches to achieving sustainability in the agrifood sector.
Curriculum schedule	Course 1: Principles and Frameworks of Sustainable Agrifood Systems
	Course 2: Sustainable Agricultural Practices and Resource Management
	Course 3: Crop Modeling, Simulation, and Soil Health Management
	Course 4: Sustainable Practices and Anticipated Developments
Learning Parts	Blended (Online & Face to Face)

3.2.3 Bioeconomy

Curriculum Title	Green Transition and Sustainability in the Agrifood Sector
Curriculum Description (aim & objectives)	It explores essential strategies and innovations for advancing sustainability in agriculture and food systems, addressing climate change, resource depletion, and food security. Participants will learn to implement sustainable agricultural practices that enhance resource efficiency, environmental stewardship, and economic viability. The curriculum covers renewable energy integration, regenerative agriculture, digital technologies, and socio-economic aspects of sustainability, including job creation and economic growth. It also examines regulatory and policy frameworks supporting the green transition. By the end of this

	course, participants will be equipped with the tools necessary to drive the green transition in the agrifood sector, contributing to a more sustainable and resilient future for agriculture and food systems globally.
EQF Level	3-5
Learning Objectives	
1.	To introduce students to the concept of the green transition and its relevance to the agrifood sector.
2.	To provide an overview of sustainability principles and practices applicable to agriculture and food production.
3.	To explain the environmental, economic, and social dimensions of sustainability in the agrifood sector.
4.	To discuss the challenges and opportunities associated with implementing sustainable practices in agriculture and food systems.
5.	To outline the policies and regulations that impact sustainability efforts in the agrifood sector.
6.	To examine case studies of successful sustainability initiatives in agriculture and food production.
7.	To explore the impact of climate change on agriculture and food security.
8.	To identify best practices for resource management, including water, soil, and biodiversity conservation.
9.	To evaluate the effectiveness of different strategies and approaches to achieving sustainability in the agrifood sector.
Curriculum schedule	Course 1: Principles and Frameworks of Sustainable Agrifood Systems
	Course 2: Sustainable Agricultural Practices and Resource Management
	Course 3: Crop Modeling, Simulation, and Soil Health Management
	Course 4: Sustainable Practices and Anticipated Developments
Learning Parts	Blended (Online & Face to Face)

3.2.4 Soft Skills

Curriculum Title	Soft Skills in the Agrifood Sector
Curriculum Description (aim & objectives)	The "Soft Skills in the Agrifood Sector" curriculum is designed to equip professionals with the essential soft skills required to excel in the dynamic and evolving agrifood industry. This comprehensive program addresses key competencies in four main areas: Fundamental Skills, Self-Management Skills, Teamwork and Interpersonal Skills, and Business and Entrepreneurship Skills. Through a blend of theoretical knowledge, practical applications, and real-world case studies, participants will develop the skills needed to effectively navigate the challenges and opportunities within the agrifood sector.
EQF Level	3-5
Learning Objectives	
1.	To provide an understanding of the key benefits of networking within the agrifood sector.

	<ol style="list-style-type: none"> 2. To introduce various networking opportunities specific to the agrifood industry. 3. To comprehend the importance of effective communication skills in networking. 4. To develop effective networking strategies. 5. To enhance the ability to utilize digital tools for networking. 6. To demonstrate the skills necessary for engaging in virtual networking activities. 7. To evaluate case studies and real-world examples of successful networking. 8. To identify key stakeholders and potential partners in the agrifood sector. 9. To improve personal networking skills through practical exercises.
Curriculum schedule	Course 1: Principles and Frameworks of Sustainable Agrifood Systems
	Course 2: Sustainable Agricultural Practices and Resource Management
	Course 3: Crop Modeling, Simulation, and Soil Health Management
	Course 4: Sustainable Practices and Anticipated Developments
Learning Parts	Blended (Online & Face to Face)

3.3 Special Needs for the Learning Environment

The educational platform (MOOC) for the AF4F project will be accessible via personal computers, smartphones, or tablets, as long as they are connected to the internet. This broadens accessibility, enabling learners from various geographical regions and with different levels of technological resources to participate. To accommodate a diverse group of learners, several key adaptations and considerations are necessary, which are outlined below:

Language Adaptations:

- **Multilingual Content:** The MOOC will provide content translated into the native languages of the participating countries, ensuring that language does not hinder learning. This includes translated texts, video subtitles, and multilingual support services.
- **Multilingual Interface:** The platform's user interface will also support multiple languages, enabling learners to navigate and interact with the platform in their preferred language.
- **Cultural Sensitivity:** The content will be culturally inclusive, featuring examples, case studies, and scenarios that are relevant and relatable to the learners' specific contexts.

Technical Requirements:

- **Mobile Accessibility:** In addition to being accessible on personal computers and tablets, the MOOC will be optimized for mobile phones, ensuring broader reach and convenience for learners.

- **Browser Compatibility:** The platform will be designed to work seamlessly across different web browsers, allowing all learners to access the course materials smoothly, regardless of their preferred browser.

Services:

- **Technical Support:** A dedicated technical support service will be available to help learners resolve any issues they may experience while navigating or using the platform.
- **Learning Support:** Academic support will be provided through tutor assistance, discussion forums, and peer interaction features, ensuring that learners have access to the help and guidance they need throughout the course.

Inclusivity:

- **Diverse Learning Materials:** The platform will offer a range of learning materials such as text, videos, audio, and interactive exercises, ensuring it accommodates various learning styles and abilities.

Assessment Adaptations:

- **Flexible Assessment:** Assessments will be tailored to different learning speeds and preferences. A combination of formative and summative assessments, quizzes, peer evaluations, and practical assignments will be available to suit diverse learner needs.

Additional Resources:

- **Resource Library:** An extensive online library with supplementary readings, case studies, and external links will be provided for learners interested in exploring topics further.

Security and Privacy:

- **Data Protection:** The platform will prioritize the safeguarding of learners' personal data, adhering strictly to GDPR and other applicable data protection regulations.

The above considerations are designed to foster a supportive, inclusive, and accessible learning environment for all participants in the AF4F MOOC. By addressing various factors such as geographical location, technical resources, and individual learning needs, these measures ensure that all learners can actively engage with the course content and succeed in their educational journey.

4 Design Phase

4.1 Modularity

Modularity is a key design principle employed in creating a well-structured training or learning environment, where the curriculum is broken down into smaller, self-contained units or modules. Each module concentrates on a specific topic or skill and is intended to be completed independently while contributing to the overall course objectives. This approach promotes a flexible, learner-centered educational experience, allowing individuals to engage with the material at their own pace and based on their unique needs. Additionally, modularity allows for straightforward updates, management, and customization of the curriculum, ensuring that the learning content remains relevant and responsive to evolving demands. Within the context of the AF4F project, this modular structure is crucial for organizing the curriculum into manageable, focused segments, thereby enriching the learning experience and enhancing outcomes for participants.

The modularity of online courses within the AF4F project offers several significant benefits:

- **Ease of Access and Navigation:** Learners can easily locate and engage with relevant materials focused on specific topics.
- **Dynamic Learning Materials:** A varied arrangement of different types of training resources keeps the learning experience lively and interesting.
- **Flexibility and Adaptability:** The course content can be easily modified, reorganized, or enhanced, allowing it to evolve in response to changing needs.
- **Structured Learning Path:** The modular approach incorporates a two-phase training process—first focusing on foundational knowledge acquisition, followed by the practical application of acquired skills. This ensures that all learners achieve a consistent level of knowledge before progressing to skill application.
- **Enhanced Retention and Understanding:** Short, focused modules facilitate improved retention and comprehension of the material.
- **Cost and Time Efficiency:** The efficient structuring of modules allows for cost-effective and time-efficient knowledge acquisition through the online platform.

In this project, the modularity is visually represented through an organizational chart (per pillar) that starts with the "AF4F Curriculum," branching out to "Courses," which further subdivides into, "Topics," and finally, "Sections" or "Subtopics". Each level of this structure encapsulates various elements of the curriculum:

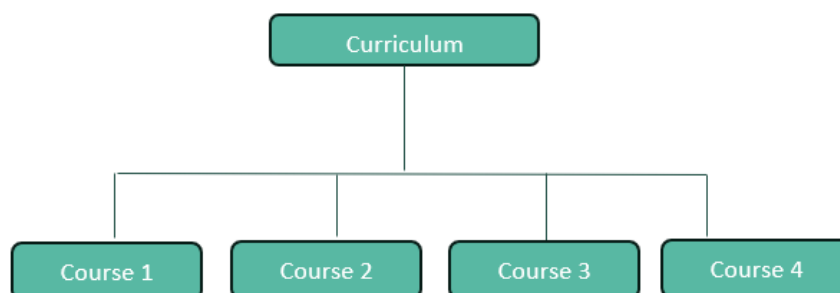


Figure 6: VET Curriculum Structure (indicative)

Curriculum: Encompasses the topics for each course.

Course: Houses the topics.

Topic: Comprises different sections and multiple training materials such as video lectures, PowerPoint presentations, manuals, extra readings, videos, etc. (The topics that comprise the course range from three to four).

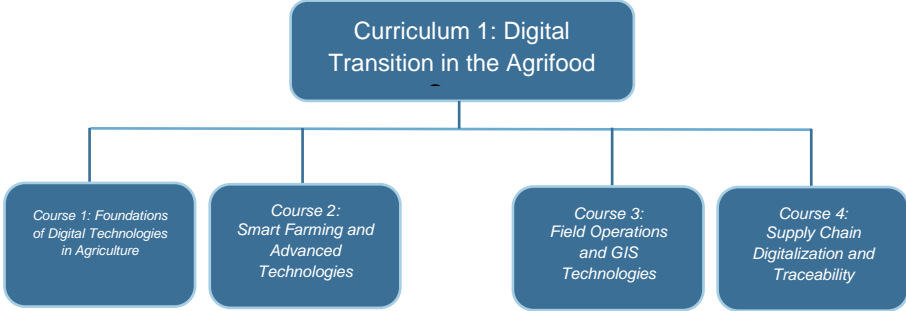
Sections or Subtopics: The sub-topics, which provide a more detailed analysis of the material.

Each level of the above hierarchy reflects a layer of modularity, which together synthesizes a structured, adaptable, and learner-focused educational environment. This modular design enables learners to progress through the curriculum, interact with the content, and reach the learning goals efficiently and effectively.

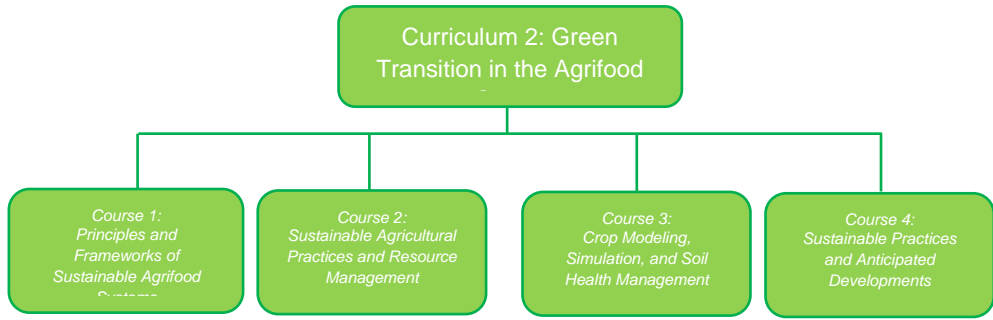
4.2 Curriculum Description

4.2.1 Digital Transition

Description of Digital Transition in the Agrifood Sector	
Curriculum Title	Digital Transition in the Agrifood Sector
Curriculum Code	DTAS-AF
Curriculum Description	This course examines the transformative impact of digital technologies on the agrifood sector, emphasizing how innovations such as precision agriculture, blockchain, IoT (Internet of Things), and big data are revolutionizing traditional farming and food production practices. Learners will investigate how digital tools and methods enhance efficiency, sustainability, and traceability throughout the agrifood value chain. Combining theoretical knowledge with practical applications, the course prepares participants to lead and manage the digital transition in agriculture, addressing both challenges and opportunities to foster growth and sustainability. Key topics include smart farming

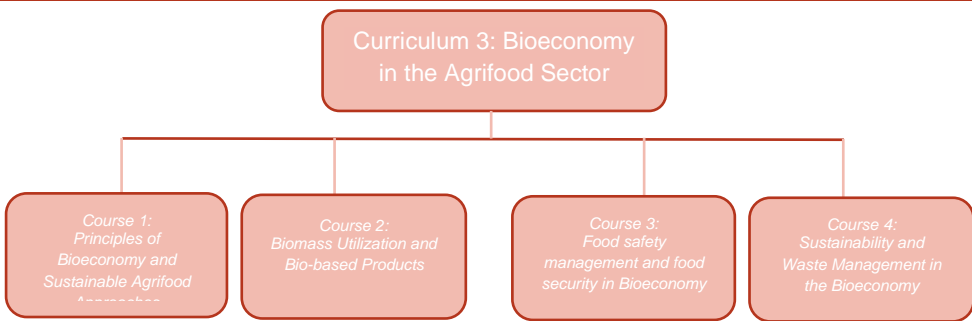
	<p>techniques, digital supply chain management, data analytics in agriculture, and the influence of policy and regulation on digital transformation.</p>
<p>Curriculum Schedule (Courses)</p>	
 <pre> graph TD A[Curriculum 1: Digital Transition in the Agrifood] --> B[Course 1: Foundations of Digital Technologies in Agriculture] A --> C[Course 2: Smart Farming and Advanced Technologies] A --> D[Course 3: Field Operations and GIS Technologies] A --> E[Course 4: Supply Chain Digitalization and Traceability] </pre>	
<p>Curriculum Knowledge Domain</p>	<p>The main subject of the curriculum is the integration and impact of digital technologies in the agrifood sector. This encompasses the study of how digital innovations, such as precision agriculture, blockchain, IoT (Internet of Things), and big data, are transforming traditional farming practices and food production processes. The course covers key areas like smart farming techniques, digital supply chain management, data analytics in agriculture, and the role of policy and regulation in supporting digital transformation.</p>
<p>Curriculum Learning Outcomes</p>	<ul style="list-style-type: none"> • Comprehend in depth digital technologies such as AI, IoT, and blockchain in the agrifood sector. • Manage and analyze agricultural data for informed decision-making. • Utilize digital communication and information systems for effective farm management. • Comprehend digital entrepreneurship and quality management systems in agriculture. • Integrate GIS, GPS, and drone technologies for precision farming and real-time soil and crop monitoring. • Address policy, regulatory, and administrative challenges in the digital transformation of agriculture.
<p>Learners Profile</p>	<p>VET Students</p>
<p>Curriculum Length</p>	<p>20 hours</p>

4.2.2 Green Transition

Description of Green Transition and Sustainability in the Agrifood Sector	
Curriculum Title	Green Transition and Sustainability in the Agrifood Sector
Curriculum Code	GTS-AF
Curriculum Description	It explores essential strategies and innovations for advancing sustainability in agriculture and food systems, addressing climate change, resource depletion, and food security. Participants will learn to implement sustainable agricultural practices that enhance resource efficiency, environmental stewardship, and economic viability. The curriculum covers renewable energy integration, regenerative agriculture, digital technologies, and socio-economic aspects of sustainability, including job creation and economic growth. It also examines regulatory and policy frameworks supporting the green transition. By the end of this course, participants will be equipped with the tools necessary to drive the green transition in the agrifood sector, contributing to a more sustainable and resilient future for agriculture and food systems globally.
Curriculum Schedule (Courses)	
 <pre> graph TD A[Curriculum 2: Green Transition in the Agrifood] --> B[Course 1: Principles and Frameworks of Sustainable Agrifood Systems] A --> C[Course 2: Sustainable Agricultural Practices and Resource Management] A --> D[Course 3: Crop Modeling, Simulation, and Soil Health Management] A --> E[Course 4: Sustainable Practices and Anticipated Developments] </pre>	
Curriculum Knowledge Domain	This curriculum focuses on the principles, practices, and innovations driving the green transition and sustainability within the agrifood sector. It examines the strategies for implementing sustainable agricultural practices, managing natural resources efficiently, and ensuring food security while addressing the impacts of climate change and resource depletion. The course aims to equip participants with the knowledge and skills necessary to promote and achieve sustainability in agrifood systems.
Curriculum Learning Outcomes	<ul style="list-style-type: none"> • Describe the the way historical agricultural practices have evolved towards sustainability and their relevance today. • Identify specific national and EU policies that support sustainable agriculture and their implications for farm practices. • Explain the importance of meeting regulatory standards and compliance requirements in sustainable agrifood production.

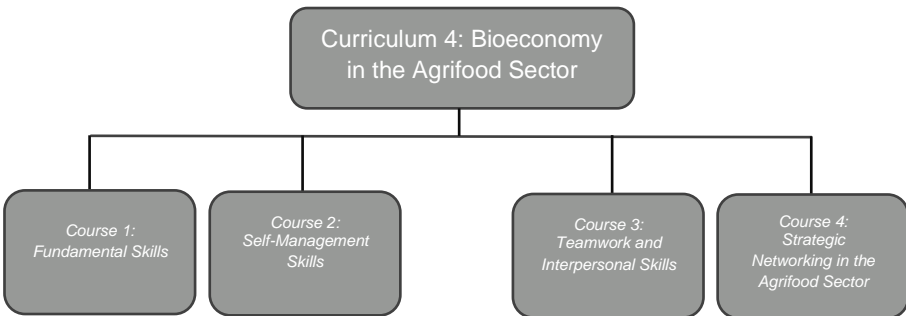
	<ul style="list-style-type: none"> Evaluate the role of government subsidies and support programs in promoting sustainable farming practices.
Learners Profile	VET Students
Curriculum Length	20 hours

4.2.3 Bioeconomy

Description of Bioeconomy in the Agrifood Sector	
Curriculum Title	Bioeconomy in the Agrifood Sector
Curriculum Code	BIO-AF
Curriculum Description	The curriculum "Bioeconomy in the Agrifood Sector" explores sustainable practices and innovations in agriculture and food systems, addressing global challenges like climate change and resource depletion. By promoting renewable biological resources and advanced technologies, the course highlights how the bioeconomy can revolutionize the agrifood sector through biomass utilization, bio-based products, and digital technologies. Students will also examine the socio-economic impacts, including job creation and economic growth.
Curriculum Schedule (Courses)	
 <pre> graph TD C3["Curriculum 3: Bioeconomy in the Agrifood Sector"] C1["Course 1: Principles of Bioeconomy and Sustainable Agrifood"] C2["Course 2: Biomass Utilization and Bio-based Products"] C3_["Course 3: Food safety management and food security in Bioeconomy"] C4["Course 4: Sustainability and Waste Management in the Bioeconomy"] C3 --- C1 C3 --- C2 C3 --- C3_ C3 --- C4 </pre>	
Curriculum Knowledge Domain	The primary focus of the "Bioeconomy in the Agrifood Sector" curriculum is to explore the intersection of biology, technology, and sustainable practices within agriculture and food systems. This course aims to provide students with a robust understanding of bioeconomy and its applications in the agrifood sector. The key subject areas include Biomass Utilization, Bio-based Products, Sustainable Agricultural Practices, and Digital Technologies in Agriculture.
Curriculum Learning Outcomes	<ul style="list-style-type: none"> Evaluate sustainable agrifood approaches and their benefits, focusing on environmental, economic, and social impacts.

	<ul style="list-style-type: none"> Identify the processes of converting biomass into bio-based products and assess their advantages and challenges. Comprehend the principles of food safety management systems and develop strategies to ensure food security within a bioeconomy framework. Analyze the socio-economic implications of the bioeconomy, including potential for job creation, economic growth, and social inclusion.
Learners Profile	VET Students
Course Length	20 hours

4.2.4 Soft Skills

Description of Digital Transition in the Agrifood Sector	
Curriculum Title	Digital Transition in the Agrifood Sector
Curriculum Code	DTAS-AF
Curriculum Description	The "Soft Skills in the Agrifood Sector" curriculum is designed to equip professionals with the essential soft skills required to excel in the dynamic and evolving agrifood industry. This comprehensive program addresses key competencies in four main areas: Fundamental Skills, Self-Management Skills, Teamwork and Interpersonal Skills, and Business and Entrepreneurship Skills. Through a blend of theoretical knowledge, practical applications, and real-world case studies, participants will develop the skills needed to effectively navigate the challenges and opportunities within the agrifood sector.
Curriculum Schedule (Courses)	
 <pre> graph TD C4[Curriculum 4: Bioeconomy in the Agrifood Sector] --> C1[Course 1: Fundamental Skills] C4 --> C2[Course 2: Self-Management Skills] C4 --> C3[Course 3: Teamwork and Interpersonal Skills] C4 --> C4[Course 4: Strategic Networking in the Agrifood Sector] </pre>	
Curriculum Knowledge Domain	The curriculum "Soft Skills in the Agrifood Sector" focuses on developing essential soft skills specifically tailored for professionals within the agrifood industry. Key areas of study include fundamental skills such as creative thinking and in-depth statistical analysis for innovative problem-solving and informed decision-making. It also

	covers self-management skills like fostering positive attitudes and behaviors, enhancing organization, planning, and strategic reflection, and building resilience, adaptability, and proactivity. Additionally, the course emphasizes equity and inclusion skills, promoting fairness, diversity, and inclusive practices to create a more equitable work environment. Through this comprehensive approach, the course aims to equip agrifood professionals with the interpersonal and cognitive skills necessary for career advancement and sector innovation.
Curriculum Learning Outcomes	<ul style="list-style-type: none"> • Demonstrate clear and impactful communication skills suitable for diverse stakeholders in the agrifood sector. • Recognize personal strengths and areas for improvement, set and achieve smart goals, manage stress, and adapt to changing conditions in a professional environment. • Comprehend team dynamics, work effectively within teams, resolve conflicts constructively, and build strong interpersonal relationships. • Develop effective networking strategies, engage with key stakeholders, stay informed about industry trends, and present oneself confidently in professional networking contexts.
Learners Profile	VET Students
Curriculum Length	20 hours

4.3 Learning Outcomes

The AF4F project endeavors to shape the four Curriculum utilizing the Learning Outcomes approach. As outlined by CEDEFOP, *“the “learning outcomes” approach shifts the emphasis from the duration of learning and the institution where it takes place, to the actual learning and the knowledge, skills and competences that have been or should be acquired through the learning process”*¹. This approach is essential for developing unified curricula across different countries, as it acts as a universal framework that integrates various vocational education and training (VET) tools, such as the European Qualifications Framework (EQF), the European Credit System for Vocational Education and Training (ECVET), and the European Quality Assurance in Vocational Education and Training (EQAVET).

The methodology implemented guarantees the establishment of appropriate assessment methods and procedures to evaluate the attainment of learning outcomes. This alignment among learning outcomes, teaching, learning, and assessment aims to create

¹ CEDEFOP (2013) USING LEARNING OUTCOMES European Qualifications Framework Series: Note 4, p.3

https://www.cedefop.europa.eu/files/Using_learning_outcomes.pdf

a more coherent, transparent, and meaningful learning experience for both learners and all stakeholders involved. Learning outcomes are closely linked to assessment, clearly outlining what and how to evaluate. This synchronization in assessing learner performance influences the teaching and learning process through the assessment itself.

The primary objectives of incorporating learning outcomes into Curriculum Design are as follows:

- To clarify the expectations associated with each learning activity.
- To assist trainers in the teaching process and their selection of methods.
- To inform learners about what they are expected to know or accomplish after completing the learning activity.

To summarize, learning outcomes clarify what learners are expected to know and be able to do upon finishing the training program. They articulate the learning process and define the expectations for assessment. By establishing well-defined learning outcomes, both educators and learners gain a clear understanding of the desired outcomes for courses or units throughout the teaching, learning, and assessment processes.

4.4 The EQAVET framework

The EQAVET² framework aims to strengthen quality assurance in vocational education and training (VET) across Europe by facilitating a continuous cycle of planning, implementing, evaluating, and refining educational practices. This systematic approach is underpinned by specific descriptors and indicators applicable at both the system and provider levels. While EQAVET is not an independent quality assurance system, it



Figure 7: EQAVET Quality Cycle
(Source: <https://www.qc-vet.eu/en/tools-en/pdca-circle>)

provides guiding principles and tools for assessing and improving VET quality, thereby promoting high standards and consistency among European countries. Its adaptability makes it a valuable resource for both public and private VET providers, aligning with the European Qualifications Framework to promote educational excellence. The EQAVET framework is built on a four-phase quality assurance cycle aimed at enhancing vocational education and training (VET) standards across Europe. The cycle begins with the "**Planning**" phase, where objectives and processes are defined in line with desired outcomes, ensuring a solid foundation for high-quality education. This is followed by the "**Implementation**" phase, where

the planned lessons and teaching methods are put into action. Next comes the "**Evaluation**" phase, where results are assessed against the set objectives, using

² <https://ec.europa.eu/social/main.jsp?catId=1546&langId=en>

various indicators and descriptors to measure effectiveness. Finally, in the "Review" phase, the evaluation results are analyzed to identify areas for improvement. This closes the loop and feeds into the next planning cycle, fostering continuous enhancement of VET quality.

The development of the curriculum will adhere to the EQAVET framework, following its four-stage process. In the planning phase, clear objectives will be established based on the current needs identified during the project's research phase (WP2). This stage focuses on setting specific, measurable, and relevant goals, detailing the procedures, actions, and tasks to be completed. During the implementation phase, innovative pedagogical methods will be integrated into the curriculum, addressing digital, green, bioeconomical, and soft skills. This ensures that the set objectives are met and the resources are effectively utilized. The evaluation phase will include a mechanism to assess the achievements, ensuring that the key performance indicators (KPIs) and overall objectives are fulfilled. In the review phase, feedback from key stakeholders will be gathered to refine the process and ensure that the intended outcomes are met. Throughout the project, EQAVET-based indicators will be employed to measure the effectiveness of the outcomes.

4.4.1 Bloom's Taxonomy

The AF4F learning outcomes are developed using Bloom's Taxonomy, which is divided into six levels of objectives (see figure 8: Bloom's Taxonomy pyramid). This framework incorporates action verbs to categorize different learning stages and aligns with the European Qualification Framework (EQF) in both structure and terminology. Each learning outcome begins with the phrase "A learner..." followed by a clear action verb, the object of that verb, and a context for its application. It's recommended to use one verb per learning outcome statement, unless a more complex outcome requires additional detail.

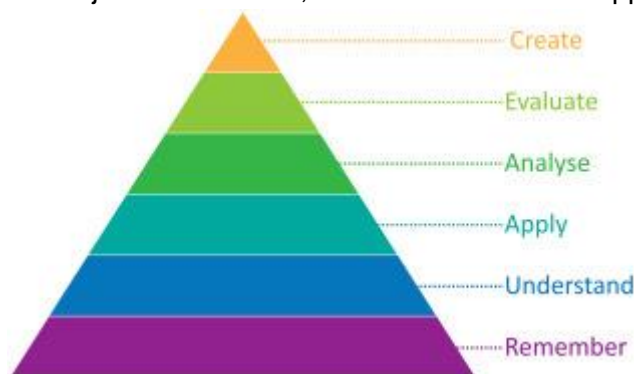


Figure 8: Bloom's Taxonomy

(Source: <https://doi.org/10.1016/j.pdisas.2022.100222>)

one verb per learning outcome statement, unless a more complex outcome requires additional detail.

i.e. *Upon completion of this course, the learner:*

will be able to Analyze the impact of digital technologies on sustainable agricultural practices within the agrifood sector.

When developing learning outcomes, key evaluation questions include:

- What knowledge has been gained?
- What skills have been developed?
- Have there been any changes in attitudes or behaviors?

For each unit, a minimum of two to three learning outcomes have been crafted, using action verbs from the provided list.

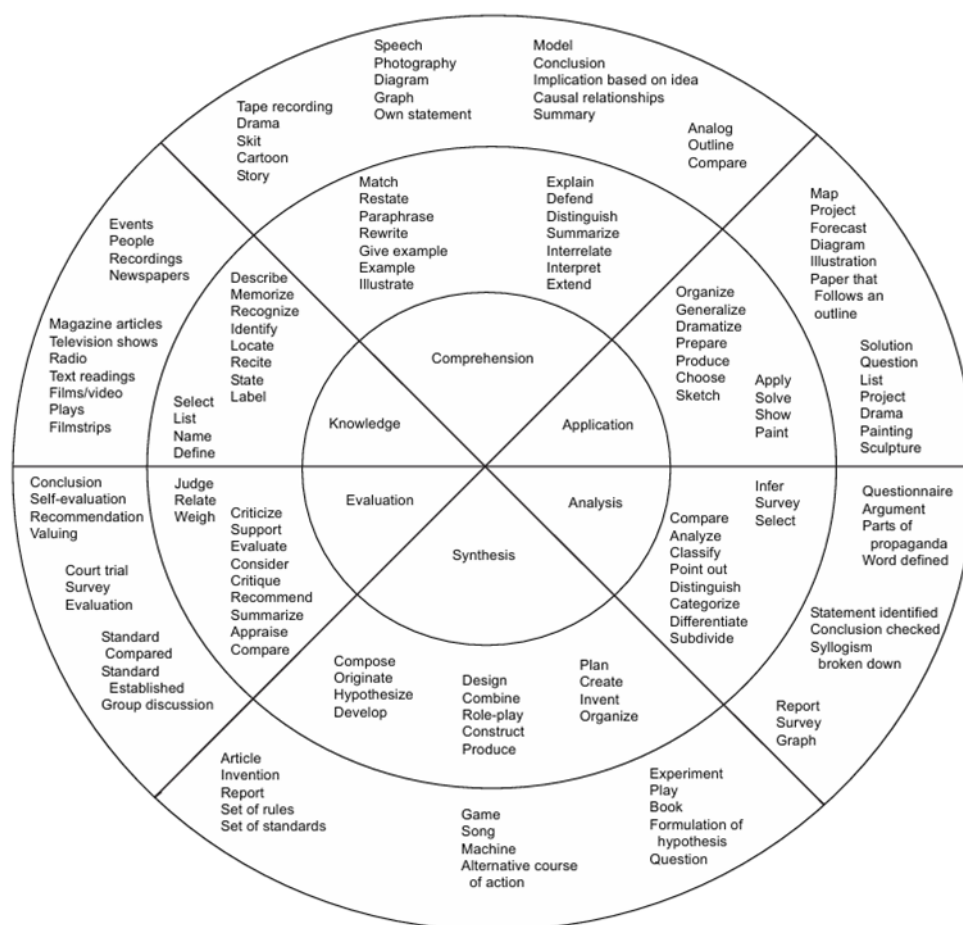


Figure 9: Bloom's Verbs And Matching Assessment Types
 (Source: The Tenth Annual Curriculum Mapping Institute: Snowbird Utah, July15-18, 2004 Adapted from Benjamin

This organized method guarantees a comprehensive grasp and development of key digital and green competencies, which are crucial for the sustainability of the postal sector as it navigates digital transformation and growing environmental awareness.

4.5 Curriculum Overview and Description

4.5.1 CURRICULUM 1. Courses Overview & Description

COURSE DESCRIPTION	
Course Title	Foundations of Digital Technologies in Agriculture
Course Code	DTAS 1-AF (Course 1)
Course Description	This course aims to introduce participants to the fundamental concepts and tools of digital technologies that are transforming the agrifood sector. By the end of this module, participants will have a foundational understanding of how data management, digital communication, and information systems are used to enhance agricultural practices and productivity.

Learning Outcomes	<p><u>By the end of this course, the learner will be able to:</u></p> <p>LOut1: Describe the key processes of data management in agriculture, including methods of data collection, storage solutions, and organizational techniques.</p> <p>LOut2: Apply statistical methods and utilize software tools (e.g., spreadsheets, specialized agricultural data analysis software, Spss) to conduct data analysis.</p> <p>LOut3: Use digital tools (e.g., Excel) to create visual representations of agricultural data.</p> <p>LOut4: Demonstrate the ability to compose, send, and manage professional emails, including the use of attachments and organizational features.</p> <p>LOut5: Effectively use social media platforms (e.g., Facebook, Twitter, LinkedIn) to publish and share relevant agricultural content and engage with peers and stakeholders.</p> <p>LOut6: Utilize Google Drive for managing agricultural projects, sharing data, and conducting collaborative research, ensuring efficient and organized communication.</p> <p>LOut7: Compose the benefits derived from the use of digital information tools in agriculture.</p> <p>LOut8: Develop proficiency in navigating and using online portals and digital platforms to retrieve agricultural information (i.e., FAO portal).</p> <p>LOut9: Interpret digital data and content to inform and support decision-making processes in agricultural administration.</p> <p>LOut10: Explain the importance and application of business intelligence tools in digital agricultural entrepreneurship.</p> <p>LOut11: Develop social media marketing strategies to promote agricultural businesses.</p> <p>LOut12: Discuss the principles of digital marketing in the agrifood sector.</p>
Contents	<p>Contents (Topics)</p> <p>T1.1. Data Management and Analysis</p> <p>T1.2. Everyday Use of Digital Communication Skills</p> <p>T1.3. Digital Information and Services</p> <p>T1.4. Digital Entrepreneurship Skills</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Managing and analyzing agricultural data, using digital communication tools for effective collaboration, and accessing digital information systems to streamline operations. Digital entrepreneurship skills enabling them to create and manage innovative agricultural enterprises.
Keywords	<i>Data Management, Digital Tools, Agricultural Communication, Social Media Marketing, Business Intelligence, Online Portals, Data Interpretation, Decision-Making, Digital Marketing, Social Media Strategies, Agrifood Entrepreneurship</i>

COURSE DESCRIPTION	
Course Title	Smart Farming and Advanced Technologies
Course Code	DTAS 2-AF (Course 2)
Course Description	This course aims to equip participants with knowledge and skills in advanced digital technologies and their practical applications in smart farming. By the end of this module, participants will be able to implement and manage digital systems and tools to enhance agricultural efficiency, sustainability, and productivity.
Learning Outcomes	<p><u>By the end of this course, the learner will be able to:</u></p> <p>LOut1: Recognize “digital quality management systems” and their importance in ensuring product quality in agriculture.</p> <p>LOut2: Illustrate the elements of an effective digital quality management system.</p> <p>LOut3: Recognize key digital tools and platforms (e.g., farm management and precision agriculture systems, software tools collecting data from farms using sensors, satellite image processing tools) used for supplier management in agriculture.</p> <p>LOut4: Illustrate the importance of supply chain transparency and its impact on agricultural businesses and stakeholders.</p> <p>LOut5: Identify the components and benefits of digital soil nutrient monitoring systems.</p> <p>LOut6: Demonstrate the ability to analyze soil nutrient data.</p> <p>LOut7: Locate various robotic technologies used in smart agriculture and their functionalities.</p> <p>LOut8: Consider the role of AI in enhancing the capabilities of robotic agricultural technologies.</p> <p>LOut9: Outline data collected from drones (e.g., aerial imagery, NDVI maps) with GIS maps to enhance precision farming practices.</p>
Contents	<p>Contents (Topics)</p> <p>T2.1. Digital Product Quality Management Systems</p> <p>T2.2. Digital Supplier Management Systems</p> <p>T2.3. Digital Soil Nutrient Monitoring Systems</p> <p>T2.4. Use of Robotic Solutions in Smart Agriculture</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Implementing digital product quality management systems to ensure food safety, utilizing digital tools for efficient supplier management, and employing digital soil nutrient monitoring systems for precision agriculture.
Keywords	<i>Digital Quality Management, Product Traceability, Quality Control Tools, Smart Farming, Digital Supplier Management, Precision Agriculture, Supply Chain Transparency, Farm Management Tools, Digital Soil Monitoring, Nutrient Analysis, Precision Agriculture, Smart Farming Technologies</i>

COURSE DESCRIPTION	
Course Title	Field Operations and GIS Technologies
Course Code	DTAS 3-AF (Course 3)
Module Description	This course aims to equip participants with skills in crop modeling and simulation techniques, along with soil health management practices. It covers the use of advanced tools to predict crop performance and implement strategies to maintain and improve soil health, enhancing overall agricultural productivity and sustainability.
Learning Outcomes	<p><i>By the end of this course, the learner will be able to:</i></p> <p>LOut1: Accurately describe the key components and functionalities of real-time data tracking systems, such as GPS devices, sensors, and mobile applications.</p> <p>LOut2: Infer the types of data collected (e.g., equipment location, crop health, weather conditions) and their significance for effective field management.</p> <p>LOut3: Use GIS tools to create and analyze maps, incorporating layers such as soil types, crop conditions, and topography.</p> <p>LOut4: Describe the basic principles of AI in the agrifood sector, including machine learning and data analytics.</p> <p>LOut5: Classify different applications of AI in agriculture, such as predictive analytics, autonomous machinery, and precision farming.</p> <p>LOut6: Demonstrate the ability to use AI tools and software for applications such as crop monitoring, disease detection, and yield prediction.</p> <p>LOut7: Explain the components and functionalities of agricultural drones.</p> <p>LOut8: Describe the types of data a drone can collect.</p> <p>LOut9: Discuss the benefits of drone data for agriculture businesses.</p>
Contents	<p>Contents (Topics)</p> <p>T3.1. Field Operations Management Systems</p> <p>T3.2. Artificial Intelligence (AI) in Agriculture</p> <p>T3.3. Drone Technology and Applications</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Managing field operations using digital systems for real-time data optimization. Using GIS technologies for precision farming and agricultural planning.
Keywords	<i>Real-Time Data Tracking, GIS Mapping, Field Management, Sensor Technology, Artificial Intelligence, Machine Learning, Precision Farming, Predictive Analytics, Agricultural Drones, Aerial Data Collection, Precision Farming, Remote Sensing</i>

COURSE DESCRIPTION	
Course Title	Supply Chain Digitalization and Traceability
Course Code	DTAS 4-AF (Course 4)
Course Description	This course aims to provide participants with the understanding of how digitalization enhances supply chain efficiency, transparency, and sustainability. It covers ways of optimizing operations, managing inventory, logistics, and supplier coordination. It covers the importance of traceability for food safety.
Learning Outcomes	<p><i>By the end of this course, the learner will be able to:</i></p> <p>LOut1: Illustrate the fundamental concepts and importance of digital supply chains in the agrifood sector, including their impact on efficiency and transparency.</p> <p>LOut2: Recognize the pivotal digital technologies driving the evolution of agrifood supply chains, such as blockchain, IoT, and data analytics.</p> <p>LOut3: List the advantages and challenges associated with the adoption of digital supply chains by analyzing case studies of successful digital transformations in the agrifood industry.</p> <p>LOut4: Explore the principles and functionalities of blockchain technology as applied to enhancing traceability in food supply chains.</p> <p>LOut5: Evaluate the benefits of blockchain in improving transparency, security, and efficiency throughout the food supply chain.</p> <p>LOut6: Explore the role and significance of IoT (Internet of Things) technologies in enabling real-time monitoring within agrifood supply chains.</p> <p>LOut7: Assess the benefits of IoT devices and sensors for enhancing visibility, traceability, and decision-making in agrifood logistics.</p> <p>LOut8: Examine case studies to investigate the practical applications and outcomes of real-time monitoring in improving efficiency and reducing waste in agrifood supply chains.</p> <p>LOut9: Assess the effectiveness of digital solutions in improving food safety practices and maintaining product quality assurance.</p> <p>LOut10: Give examples of case studies that explore the impact of digital technologies on reducing foodborne illnesses and enhancing consumer confidence in food products.</p>
Contents	<p>Contents (Topics)</p> <p>T4.1. Introduction to Digital Supply Chains in Agrifood</p> <p>T4.2. Blockchain and Traceability in Food Supply Chains</p> <p>T4.3. IoT and Real-Time Monitoring in Agrifood Supply Chains</p> <p>T4.4. Enhancing Food Safety and Quality through Digital Technologies</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions

Competences	Enhancing food safety and quality through advanced digital technologies, ensuring efficient and secure supply chain management.
Keywords	<i>Digital Supply Chains, Blockchain, IoT (Internet of Things), Data Analytics, Blockchain, Traceability, Transparency, Food Supply Chain, Internet of Things (IoT), Real-Time Monitoring, Supply Chain Visibility, Agrifood Logistics, Food Safety, Quality Assurance, Digital Solutions, Consumer Confidence</i>

4.5.1 CURRICULUM 2. Modules Overview & Description

COURSE DESCRIPTION	
Course Title	Principles and Frameworks of Sustainable Agrifood Systems
Course Code	GTS1-AF (Course 1)
Course Description	This course aims to offer a thorough understanding of the core principles and policy frameworks crucial for sustainable agrifood systems. Participants will acquire a thorough understanding through essential concepts, theories, and regulations that drive sustainability in agriculture and food production.
Learning Outcomes	<p><u>By the end of this course, the learner will be able to:</u></p> <p>LOut1: Define sustainability and its three pillars: environmental, economic, and social sustainability</p> <p>LOut2: Explain the principles of the green transition, including reducing carbon footprints, enhancing biodiversity, and promoting renewable energy.</p> <p>LOut3: Identify and describe specific key policies and regulations at local, national, and international levels (i.e., Paris Agreement, the United Nations Sustainable Development Goals (SDGs), and the EU Green Deal) that promote sustainability in the agrifood sector.</p> <p>LOut4: Describe the national environmental policies affecting the agrifood sector, such as agricultural subsidies, land use regulations, and water management policies.</p> <p>LOut5: Assess the mechanisms for implementing national environmental policies, such as regulatory agencies, monitoring systems, and incentive programs.</p> <p>LOut6: Define challenges such as financial costs, administrative burdens, and technological barriers that agrifood businesses may face in complying with national environmental policies.</p> <p>LOut7: State key EU environmental policies such as the Common Agricultural Policy (CAP), the Green Deal, and the Farm to Fork Strategy.</p> <p>LOut8: Recognize the objectives, components, and mechanisms of these policies, including targets for reducing greenhouse gas emissions, promoting biodiversity, and improving resource efficiency.</p> <p>LOut9: Point out the mechanisms for implementing national environmental policies, such as regulatory agencies, monitoring systems, and incentive programs.</p>

Contents	Contents (Topics) T1.1. Introduction to Sustainability and Green Transition T1.2. National Environmental Policies and Regulations T1.3. EU Environmental Policies, Subsidies, and Support Programs T1.4: International Environmental Policies and Corporate Social Responsibility (CSR)
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Implementing sustainability and green transition concepts, interpreting national and EU environmental policies and regulations, leveraging EU subsidies and support programs, and navigating international environmental policies. Integrating corporate social responsibility (CSR) practices within the agrifood sector to promote sustainable development.
Keywords	<i>Digital Supply Chains, Blockchain, IoT (Internet of Things), Data Analytics, Blockchain, Traceability, Transparency, Food Supply Chain, Internet of Things (IoT), Real-Time Monitoring, Supply Chain Visibility, Agrifood Logistics, Food Safety, Quality Assurance, Digital Solutions, Consumer Confidence</i>

COURSE DESCRIPTION	
Course Title	Sustainable Agricultural Practices and Resource Management
Course Code	GTS2-AF (Course 2)
Course Description	This course aims to equip participants with the knowledge and skills needed for sustainable agricultural practices and efficient resource management. It provides insights into environmentally friendly farming techniques and the optimization of natural resource use to improve agricultural productivity and sustainability.
Learning Outcomes	<p><u>By the end of this course, the learner will be able to:</u></p> <p>LOut1: Illustrate regenerative agriculture and its core principles, including soil health, biodiversity enhancement, and ecosystem services.</p> <p>LOut2: Point out the ecological benefits, such as improved soil fertility, increased biodiversity, and enhanced water retention, along with economic and social benefits like long-term profitability, resilience to climate change, and community well-being.</p> <p>LOut3: List techniques for implementing these practices, including selecting appropriate cover crops, designing crop rotation plans, minimizing soil disturbance, and managing livestock to enhance soil health.</p> <p>LOut4: Identify key standards and regulations such as the EU Organic Regulation, USDA Organic Standards, or other relevant national and international standards.</p> <p>LOut5: Describe essential practices for organic crop production, such as the use of organic seeds, crop rotations, green manures, and composting,</p>

	<p>as well as organic livestock production practices like organic feed, pasture management, and humane treatment of animals.</p> <p>LOut6: Assess the economic factors influencing the profitability of organic farming, including market demand, price premiums for organic products, input costs, and potential financial support and subsidies for organic farmers.</p> <p>LOut7: State resource efficiency and explain its relevance to the food industry, including reducing waste, optimizing resource use, and minimizing environmental impact.</p> <p>LOut8: Consider key resources used in the food industry, such as water, energy, raw materials, and packaging.</p> <p>LOut9: Point out techniques for reducing water and energy consumption in food processing, such as using energy-efficient equipment and optimizing process parameters.</p> <p>LOut10: Explain the principles of water conservation, including techniques such as efficient irrigation, rainwater harvesting, and the use of drought-resistant crops.</p> <p>LOut11: Identify efficient irrigation techniques such as drip irrigation, sprinkler systems, and soil moisture monitoring to optimize water use.</p> <p>LOut12: Evaluate the overall impact on agricultural sustainability and productivity, considering factors like resource conservation, resilience to climate variability, and long-term viability of water resources for farming operations (i.e., water reuse).</p>
Contents	<p>Contents (Topics)</p> <p>T2.1. Regenerative Practices and Carbon Farming</p> <p>T2.2. Organic Production Requirements</p> <p>T2.3. Efficient Use of Resources in the Food Industry</p> <p>T2.4. Sustainable Water Management</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Implementing sustainability and green transition concepts, interpreting national and EU environmental policies and regulations, leveraging EU subsidies and support programs, and navigating international environmental policies. Integrating corporate social responsibility (CSR) practices within the agrifood sector to promote sustainable development.
Keywords	<i>Regenerative Agriculture, Carbon Farming, Soil Health, Ecosystem Services, Organic Standards, Organic Crop Production, Organic Livestock Production, Profitability in Organic Farming, Resource Efficiency, Waste Reduction, Water and Energy Conservation, Sustainable Food Processing, Water Conservation, Efficient Irrigation, Water Reuse, Climate Resilience</i>

COURSE DESCRIPTION	
Course Title	Crop Modeling, Simulation, and Soil Health Management
Course Code	GTS3-AF (Course 3)
Course Description	This course aims to equip participants with skills in crop modeling and simulation techniques, along with soil health management practices. It covers the use of advanced tools to predict crop performance and implement strategies to maintain and improve soil health, enhancing overall agricultural productivity and sustainability.
Learning Outcomes	<p><i>By the end of this course, the learner will be able to:</i></p> <p>LOut1: Define crop modeling and simulation and explain their relevance to sustainable agriculture, including their role in predicting crop performance, optimizing resource use, and supporting decision-making.</p> <p>LOut2: Illustrate the key components of crop models, such as input parameters (climate, soil, crop data), processes (growth, development, yield), and output variables (biomass, yield, resource use efficiency).</p> <p>LOut3: Point out the basic principles behind the development and use of crop models, including data collection, parameterization, calibration, validation, and scenario analysis.</p> <p>LOut4: Identify the inputs required for basic crop modeling, including climate data (temperature, rainfall), soil characteristics (texture, fertility), and crop information (variety, planting date).</p> <p>LOut5: Use simple crop models, such as DSSAT (Decision Support System for Agrotechnology Transfer) or APSIM (Agricultural Production Systems Simulator- General Use), to simulate crop growth and development under various conditions like different planting dates, irrigation levels, or fertilization regimes.</p> <p>LOut6: Define nutrient cycling and its relevance to soil health and agricultural sustainability, emphasizing the recycling of nutrients within the ecosystem to maintain soil fertility.</p> <p>LOut7: List the key components and processes involved in nutrient cycling, including nutrient inputs (fertilizers, organic matter), transformations (mineralization, immobilization), and outputs (crop uptake, leaching).</p> <p>LOut8: Analyze the effectiveness of different nutrient management practices by monitoring soil fertility indicators (e.g., nutrient levels, soil organic matter), crop growth parameters, and yield performance.</p> <p>LOut9: Define soil health and its components such as soil structure, fertility, biological activity, and its importance for sustainable crop production and environmental quality.</p> <p>LOut10: Identify key practices that contribute to improving soil health, including crop rotation, cover cropping, reduced tillage, organic amendments, and integrated pest management.</p> <p>LOut11: Evaluate the environmental impacts of soil health practices, examining how practices like reduced tillage, cover cropping, and organic</p>

	amendments contribute to soil conservation, reduced erosion, improved water retention, and lower greenhouse gas emissions.
Contents	Contents (Topics) T3.1. Introduction to Crop Modeling and Simulation T3.2. Tools for implementing Soil Health Management T3.3. Nutrient Cycling and Soil Fertility T3.4: Implementing Practices to Improve Soil Health
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Utilizing crop modeling and simulation techniques to forecast crop performance, employing tools and strategies for effective soil health management, comprehending nutrient cycling and ways of maintaining soil fertility, that both enhance soil health.
Keywords	<i>Crop Modeling, Simulation, Resource Optimization, Scenario Analysis, Soil Health Management, Crop Modeling, DSSAT, APSIM, Nutrient Cycling, Soil Fertility Mineralization, Organic Matter, Soil Health, Crop Rotation, Organic Amendments Reduced Tillage</i>

COURSE DESCRIPTION	
Course Title	Sustainable Practices and Anticipated Developments
Course Code	GTS4-AF (Course 4)
Course Description	This course will provide insights into current sustainable practices and explore future trends in the agrifood sector. It aims to prepare participants for emerging developments by examining innovative techniques and technologies that promote long-term sustainability in agriculture.
Learning Outcomes	<p><u>By the end of this course, the learner will be able to:</u></p> <p>LOut1: Define regenerative agriculture, explaining its focus on restoring and enhancing soil health, biodiversity, and ecosystem services.</p> <p>LOut2: Identify advanced techniques used in regenerative agriculture, such as agroforestry, holistic grazing, and minimal soil disturbance.</p> <p>LOut3: Point out the concept of carbon farming, including practices that increase soil carbon storage and reduce greenhouse gas emissions, such as cover cropping, crop rotation, and organic amendments.</p> <p>LOut4: Explain the concept of climate adaptation in agriculture, emphasizing its importance for maintaining productivity and sustainability in the face of climate change.</p> <p>LOut5: Describe key factors influencing agricultural resilience, such as temperature extremes, precipitation variability, pest and disease pressures, and soil health.</p>

	<p>LOut6: Identify characteristics of resilient crop varieties, such as drought tolerance, heat resistance, pest and disease resistance, and shorter growing seasons.</p> <p>LOut7: Explain the diverse types of renewable energy systems such as solar, wind, biomass, and geothermal energy, and their relevance to farms and commercial businesses.</p> <p>LOut8: Identify the benefits (e.g., cost savings, sustainability, energy independence) and challenges (e.g., initial investment, maintenance, resource availability) of implementing renewable energy systems in agricultural settings.</p> <p>LOut9: Recommend suitable renewable energy solutions, considering factors like energy demand, resource availability, economic feasibility, and environmental impact.</p> <p>LOut10: Define social responsibility, including concepts such as ethical practices, community engagement, and environmental stewardship, and explain its relevance to the agrifood sector.</p> <p>LOut11: Utilize tools and frameworks, such as social audits, sustainability reporting, and certifications (e.g., Fair Trade, Rainforest Alliance).</p>
Contents	<p>Contents (Topics)</p> <p>T4.1. Advanced Regenerative Practices and Carbon Farming</p> <p>T4.2. Climate Adaptation Measures</p> <p>T4.3. Identification of renewable energy systems suitable for farms/commercial businesses</p> <p>T4.4: Social responsibility in the agrifood sector</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Advanced regenerative practices and carbon farming techniques, implementing climate adaptation measures to enhance resilience, identifying suitable renewable energy systems for farms and commercial businesses, and comprehending social responsibility within the agrifood sector.
Keywords	<i>Regenerative Agriculture, Agroforestry, Holistic Grazing, Carbon Farming, Climate Adaptation, Agricultural Resilience, Resilient Crop Varieties, Sustainable Farming, Renewable Energy Systems, Solar Energy, Wind Power, Biomass Energy, Social Responsibility, Ethical Practices, Sustainability Reporting, Certifications</i>

4.5.1 CURRICULUM 3. Modules Overview & Description

COURSE DESCRIPTION	
Course Title	Principles of Bioeconomy and Sustainable Agrifood Approaches
Course Code	BIO1-AF (Course 1)
Course Description	This course aims to introduce the core concepts of bioeconomy and their application in the agrifood sector, focusing on sustainable practices, renewable resources, and circular economy principles. Students will learn how these approaches enhance environmental sustainability, economic viability, and social equity in agrifood systems.
Learning Outcomes	<p><i>By the end of this course, the learner will be able to:</i></p> <p>LOut1: Correctly define “bioeconomy” and describe its scope including the core principles, that is, sustainability, resource efficiency, and innovation.</p> <p>LOut2: Adequately provide detailed descriptions of at least three key sectors within the bioeconomy.</p> <p>LOut3: Clearly describe examples of innovations and technological advancements that enhance the bioeconomy.</p> <p>LOut4: Identify key components of quality management systems (QMS) used in bioeconomy sectors.</p> <p>LOut5: Describe in detail the benefits of implementing effective quality management practices (enhanced product consistency, regulatory compliance, and customer satisfaction) in bio-based industries.</p> <p>LOut6: Identify common methodologies and tools used in QA and QC processes relevant to bio-based industries.</p> <p>LOut7: Identify three different types of biomass resources, including plant, animal, and waste-derived biomass.</p> <p>LOut8: Recognize the environmental and economic benefits of utilizing biomass resources in the agrifood sector, with specific examples.</p>
Contents	<p>Contents (Topics)</p> <p>T1.1. Core Principles of Bioeconomy</p> <p>T1.2. Quality Management, Quality Assurance, Quality Control in the context of bioeconomy</p> <p>T1.3. Introduction to Biomass Resources</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Comprehending the core principles of the bioeconomy, including the use of renewable resources and sustainable practices. Skills in quality management, quality assurance, and quality control specifically within the bioeconomy context.
Keywords	<i>Bioeconomy, Sustainability, Resource Efficiency, Innovation, Quality Management Systems (QMS), Quality Assurance (QA), Quality Control (QC), Bio-based Industries, Biomass Resources, Plant Biomass, Animal Biomass, Waste-Derived Biomass</i>

COURSE DESCRIPTION	
Course Title	Biomass Utilization and Bio-based Products
Course Code	BIO2-AF (Course 2)
Course Description	This course aims to explore the processes and benefits of converting biomass into bio-based products, focusing on various types of biomass, their utilization, and the advantages and challenges of bio-based alternatives compared to conventional products.
Learning Outcomes	<p><i>By the end of this course, the learner will be able to:</i></p> <p>LOut1: Identify key components of quality management systems (QMS) used in bioeconomy sectors.</p> <p>LOut2: Describe in detail the benefits of implementing effective quality management practices (enhanced product consistency, regulatory compliance, and customer satisfaction) in bio-based industries.</p> <p>LOut3: Identify the most basic methodologies and tools used in QA and QC processes relevant to bio-based industries.</p> <p>LOut4: Identify and describe the main technologies used for biomass conversion, such as biochemical, thermochemical, and mechanical processes.</p> <p>LOut5: Provide three examples of applications and end-products from these technologies, such as biofuels, biogas, and bio-based chemicals.</p> <p>LOut6: Identify different types of biomass resources that can be valorized using conversion technologies.</p> <p>LOut7: Describe various types of bio-based products derived from biomass resources.</p> <p>LOut8: Explain the principles of green financing and its relevance to bio-based product development.</p> <p>LOut9: Discuss the impact of green financing on promoting sustainability and innovation in the agrifood sector, providing specific examples of successful projects</p>
Contents	Contents (Topics) T2.1. Quality Management and Assurance in Bio-Based Industries T2.2. Conversion Technologies for Biomass T2.3. Bio-based Products and Applications
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Managing and assuring quality within bio-based industries, understanding and applying various conversion technologies for biomass, and exploring the development and applications of bio-based products. Ensuring product quality, utilizing technologies to convert biomass into valuable products, and evaluating the practical uses and benefits of these bio-based alternatives.
Keywords	<i>Quality Management Systems (QMS), Regulatory Compliance, Quality Assurance (QA), Quality Control (QC), Biomass Conversion, Biofuels, Biochemical Processes</i>

	<i>Thermochemical Processes, Bio-based Products, Green Financing, Sustainability, Innovation</i>
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COURSE DESCRIPTION	
Course Title	Food safety management and food security in Bioeconomy
Course Code	BIO3-AF (Course 3)
Course Description	This course aims to examine the principles and practices of food safety management within the bioeconomy, while also addressing strategies for ensuring food security. It focuses on understanding risk assessment, safety systems, and methods to safeguard food quality and availability in a bioeconomy context.
Learning Outcomes	<p><u>By the end of this course, the learner will be able to:</u></p> <p>LOut1: Explain how IoT, blockchain, and data analytics contribute to food safety management in terms of traceability, real-time monitoring, and regulatory compliance.</p> <p>LOut2: Identify a set of digital tools and systems used for food safety control, such as HACCP software, sensor technologies, and automated inspection systems.</p> <p>LOut3: Summarize the key components of a food safety management system.</p> <p>LOut4: Map the steps of a food safety management system.</p> <p>LOut5: Recognize the purpose of a food safety management system and the reasons it is necessary.</p> <p>LOut6: Explain how precision agriculture and sustainable farming practices contribute to improved food security.</p> <p>LOut7: List a number of strategies and policies designed to enhance food security, such as sustainable agriculture, food waste reduction, and investment in agricultural technology.</p> <p>LOut8: Analyze the steps and strategies involved in implementing these techniques, highlighting any challenges and how they were addressed.</p> <p>LOut9: List and describe the innovative food security techniques and strategies showcased in the case studies.</p>
Contents	<p>Contents (Topics)</p> <p>T3.1. Digital Technologies in Food Safety Management and Security</p> <p>T3.2. Food Safety Management Systems</p> <p>T3.3. Food Security in Bioeconomy</p> <p>T3.4. Case studies on successful application of techniques in the food system</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions

Competences	Integrating digital technologies for enhanced food safety and security, implementing and managing food safety systems, and addressing food security challenges within the bioeconomy framework.
Keywords	<i>Food Safety Management, IoT (Internet of Things), Blockchain, Digital Tools, Food Safety Management System (FSMS), Hazard Analysis Critical Control Point (HACCP), Risk Assessment, Continuous Improvement, Precision Agriculture, Sustainable Farming, Food Security Strategies, Agricultural Technology, Food Security Techniques, Innovation in Agrifood Systems, Case Study Analysis, Sustainable Practices</i>

COURSE DESCRIPTION	
Course Title	Sustainability and Waste Management in the Bioeconomy
Course Code	BIO4-AF (Course 4)
Course Description	This course aims to explore sustainable practices and waste management strategies within the bioeconomy, focusing on enhancing resource efficiency, reducing environmental impact, and promoting circular economy principles.
Learning Outcomes	<p><u>By the end of this course, the learner will be able to:</u></p> <p>LOut1: Accurately define “Life Cycle Analysis (LCA)” and explain its purpose.</p> <p>LOut2: Describe the four main stages of LCA (Goal and scope definition, Inventory analysis, Impact assessment, Interpretation) and their significance.</p> <p>LOut3: Explain the role of Life Cycle Inventory (LCI) in evaluating the environmental impact of agrifood products, and describe the types of data required for conducting an effective LCI.</p> <p>LOut4: Identify and analyze the key challenges associated with data collection in LCI for bioeconomy applications, and propose strategies to address these challenges to ensure data accuracy and reliability.</p> <p>LOut5: Provide two examples of LCIA methods and one example (per method) of the impact categories.</p> <p>LOut6: Describe how the LCA results are calculated.</p> <p>LOut7: Check assumptions with sensitivity analysis</p> <p>LOut8: Create a plan for a comprehensive LCA background report that effectively communicates LCA findings, including methodologies, results, and recommendations.</p>
Contents	Contents (Topics) T4.1. Introduction to Life Cycle Analysis (LCA) T4.2. Life Cycle Inventory T4.3. Impact Assessment T4.4. Interpretation
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions

Competences	Coprehending the role of life cycle analysis (LCA) to assess environmental impacts. Creating life cycle inventories, evaluating the impacts of processes and products, and interpreting the results to make informed decisions for enhancing sustainability and managing waste within the bioeconomy.
Keywords	<i>Life Cycle Analysis (LCA), Sustainability, Environmental Impact, Resource Efficiency, Life Cycle Inventory (LCI), Data Collection, Environmental Impact, Bioeconomy Applications, Life Cycle Impact Assessment (LCIA), Impact Categories</i> <i>Calculation Methods, Bioeconomy, Sensitivity Analysis, LCA Reporting, Methodologies, Data Interpretation</i>

4.5.1 CURRICULUM 4. Modules Overview & Description

COURSE DESCRIPTION	
Course Title	Fundamental Skills
Course Code	DTAS1-AF (Course 1)
Course Description	This course aims to equip students with essential soft skills necessary for success in the agrifood sector. It focuses on developing effective communication abilities, enhancing active listening, applying problem-solving techniques, and managing time efficiently. Students will gain foundational skills that are crucial for personal and professional growth within the industry.
Learning Outcomes	<p><u>By the end of this course, the learner will be able to:</u></p> <p>LOut1: Apply various creative thinking techniques such as brainstorming, mind mapping, and lateral thinking to generate innovative ideas and solutions in agrifood contexts.</p> <p>LOut2: Analyze Case Studies of successful creative innovations in the agrifood sector, identifying key factors that contributed to their success and applying these insights to propose innovative solutions to current agrifood challenges.</p> <p>LOut3: Apply structured problem-solving techniques, such as the PDCA (Plan-Do-Check-Act) cycle and root cause analysis, to identify, analyze, and resolve challenges within the agrifood sector effectively.</p> <p>LOut4: Use decision-making frameworks, including SWOT analysis, to evaluate different solutions and make informed decisions that enhance operational efficiency and innovation.</p> <p>LOut5: Develop actionable solutions, for real-world agrifood scenarios, that demonstrate their ability to address complex problems through critical thinking, creativity, and data-driven analysis.</p> <p>LOut6: Apply decision-making models, such as the Rational Decision-Making Model, to make informed and effective decisions in agrifood sector scenarios.</p>

	LOut7: Evaluate multiple options using criteria such as feasibility, cost-effectiveness, sustainability, and impact, prioritizing the best solutions to address specific challenges in the agrifood industry.
Contents	Contents (Topics) T1.1. Creative Thinking T1.2. Problem-solving T1.3. Decision-making
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Generate innovative ideas and approaches through creative thinking, effectively address challenges and obstacles by applying systematic problem-solving techniques, and make informed, strategic decisions that enhance their performance and outcomes in the agrifood sector.
Keywords	<i>Creative Thinking, Innovation, Agrifood Challenges, Problem-Solving, Problem-Solving, Decision-Making, Root Cause Analysis, Operational Efficiency, Decision-Making, Rational Decision-Making Model, Feasibility, Cost-Effectiveness</i>

COURSE DESCRIPTION	
Course Title	Self-Management Skills
Course Code	DTAS2-AF (Course 2)
Course Description	This course aims to enhance students' ability to manage themselves effectively in the agrifood sector. It focuses on increasing self-awareness, setting and achieving smart goals, managing stress, and adapting to changes. By developing these self-management skills, students will improve their personal and professional resilience and performance.
Learning Outcomes	<p><i>By the end of this course, the learner will be able to:</i></p> <p>LOut1: Demonstrate the ability to foster a positive work environment in the agrifood sector by maintaining a positive attitude, encouraging teamwork, and supporting colleagues.</p> <p>LOut2: Roleplaying techniques that encompass positive attitudes and behaviors that enhance personal and professional performance.</p> <p>LOut3: Develop and implement SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals to guide their personal and professional growth in the agri-food industry.</p> <p>LOut3: Implement strategic reflection techniques to evaluate past experiences, identify strengths and areas for improvement, and adjust strategies to enhance effectiveness in agrifood sector roles.</p> <p>LOut4: Explain the principles of resilience, adaptability, and proactivity in problem solving.</p> <p>LOut5: Present case studies where resilience, adaptability, and proactive problem-solving strategies led to successful outcomes in the agrifood sector.</p>

	<p>LOut6: Participate in simulated scenarios to practice adaptability and proactive responses to changing agrifood industry conditions.</p> <p>LOut7: Demonstrate an understanding of the importance of inclusivity and diversity in the agrifood sector, fostering a supportive and respectful work environment.</p> <p>LOut8: Critically evaluate policies and practices within agrifood organizations related to equality and diversity, advocating for improvements that contribute to a more inclusive workplace culture.</p>
Contents	<p>Contents (Topics)</p> <p>T2.1. Demonstrating Positive Attitudes and Behaviors</p> <p>T2.2. Organization, Planning, and Strategic Reflection</p> <p>T2.3. Resilience, Adaptability, and Proactivity</p> <p>T2.4. Diversity, Equality, and Inclusion related skills</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Demonstrating positive attitudes and behaviors, organizing and planning effectively, and engaging in strategic reflection. Resilience and adaptability to navigate challenges proactively, and develop skills related to diversity, equality, and inclusion.
Keywords	<i>Positive Attitude, Teamwork, Workplace Environment, Professional Behavior, SMART Goals, Strategic Reflection, Planning, Professional Development, Resilience, Adaptability, Proactivity, Problem-Solving, Inclusivity, Diversity, Equality, Inclusive Workplace</i>

COURSE DESCRIPTION	
Course Title	Teamwork and Interpersonal Skills
Course Code	DTAS3-AF (Course 3)
Course Description	This course aims to develop students' ability to work effectively within teams and build strong interpersonal relationships in the agrifood sector. It focuses on comprehending team dynamics, resolving conflicts constructively, enhancing interpersonal communication, and collaborating to achieve shared goals. These skills are essential for fostering productive and positive team environments.
Learning Outcomes	<p><i>By the end of this course, the learner will be able to:</i></p> <p>LOut1: Define essential characteristics that contribute to effective teamwork within the agrifood sector, such as clear roles and responsibilities, effective communication, and collaboration.</p> <p>LOut2: Apply teamwork principles to agrifood sector scenarios, demonstrating the ability to work collaboratively, resolve conflicts, and achieve common goals as part of a team.</p> <p>LOut3: Demonstrate how organizational change impacts teams within the agrifood sector, including decrease of resistance to change and increase in morale, and productivity.</p>

	<p>LOut4: Explain 20 change management methodologies.</p> <p>LOut5: Develop and demonstrate effective interpersonal communication skills, including active listening, clarity in conveying information, and empathy, to enhance collaboration and resolve conflicts in agrifood teams.</p> <p>LOut6: Apply various communication techniques, both verbal and non-verbal, to different agrifood sector scenarios, fostering constructive dialogue, and pro-moting mutual understanding among team members</p> <p>LOut7: Define different leadership styles (e.g., transformational, situational) and their application in agrifood team environments, recognizing how each style impacts team dynamics and performance.</p> <p>LOut8: Identify the steps for a leadership development plan outlining personal leadership strength, areas for growth, and action steps to enhance leadership capabilities within agrifood teams.</p>
Contents	<p>Contents (Topics)</p> <p>T3.1. Characteristics of Effective Teamwork</p> <p>T3.2. Change Management</p> <p>T3.3. Interpersonal Communication</p> <p>T3.4. Leadership in Team Environments</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Effective teamwork, change management, interpersonal communication, and leadership. Identify and foster the characteristics of successful teams, manage and adapt to change, communicate effectively with team members, and demonstrate leadership qualities that enhance team performance and cohesion in the agrifood sector.
Keywords	<i>Teamwork, Communication, Collaboration, Conflict Resolution, Change Management, Resistance to Change, Team Dynamics, Productivity, Interpersonal Communication, Active Listening, Non-Verbal Communication, Conflict Resolution, Leadership Styles, Team Dynamics, Transformational Leadership, Leadership Development</i>

COURSE DESCRIPTION	
Course Title	Strategic Networking in the Agrifood Sector
Course Code	DTAS4-AF (Course 4)
Course Description	This course aims to refine students' networking skills to build and leverage professional relationships within the agrifood sector. It focuses on identifying and engaging key stakeholders, using networking opportunities for collaboration and innovation, and presenting oneself effectively in professional settings. The goal is to enhance students' ability to create meaningful connections and drive sector-specific advancements.
Learning Outcomes	<u>By the end of this course, the learner will be able to:</u>

	<p>LOut1: Demonstrate the key benefits of networking within the agrifood sector, including professional growth, business development, and access to industry insights.</p> <p>LOut2: Identify various networking opportunities specific to the agrifood industry, such as conferences, trade shows, and online platforms.</p> <p>LOut3: Analyze case studies and real-world examples to recognize successful networking practices that have led to significant business opportunities or collaborations in the agrifood sector.</p> <p>LOut4: Develop effective communication skills essential for networking, including active listening, clear articulation of ideas within the agrifood sector.</p> <p>LOut5: List a set of specific networking strategies..</p> <p>LOut6: Demonstrate the ability to effectively utilize digital networking platforms such as LinkedIn and industry-specific forums to build and expand their professional network within the agrifood sector.</p> <p>LOut7: Engage in virtual networking activities, such as webinars, online conferences, and virtual meetups, demonstrating the ability to connect with industry professionals, participate in discussions, and follow up on connections made through digital platforms.</p> <p>LOut8: Conduct a stakeholder mapping exercise to identify and categorize key stakeholders and potential partners.</p> <p>LOut9: Participate in workshops focused on peer collaboration, where students can practice building and leveraging networks to brainstorm and develop innovative solutions to agrifood sector challenges.</p>
Contents	<p>Contents (Topics)</p> <p>T4.1. Importance of Networking in Agrifood</p> <p>T4.2. Building Effective Networking Skills</p> <p>T4.3. Leveraging Digital Tools for Networking</p> <p>T4.4. Stakeholder Mapping and Collaborative Innovation</p>
Duration	5 hours
Assessment Method	Self reflection activities, quizzes, multiple choice questions
Competences	Understanding the role of networking within the industry, building effective networking skills, leveraging digital tools for enhanced connectivity, and strategically using networks to foster collaboration and innovation.
Keywords	<i>Networkin, Professional Growth, Industry Insights, Collaboration Opportunities, Active Listening, Communication Skills, Networking Strategies, Agrifood Sector, Digital Networking, Virtual Meetups, Professional Connections, Agrifood Platforms, Stakeholder Mapping, Collaborative Innovation, Network Building, Agrifood Partnerships</i>

5 Development Phase

This chapter outlines the Development Phase of the AF4F Curriculum Programme, representing a crucial step where the conceptual framework established in the Design Phase is transformed into practical learning experiences. During this phase, comprehensive educational content is produced, combining the knowledge of subject matter experts with the skills of multimedia professionals to craft engaging and impactful learning materials. A key focus is the careful preparation of the MOOC platform to host this content, ensuring that participants have an intuitive and accessible learning experience.

The main deliverables of this phase include: (a) the creation of learning materials, featuring a selection of core and supplementary Learning Objects/Activities, along with collaborative and assessment tools, (b) the development of a comprehensive Quiz Bank for evaluations, (c) a set of reflection activities, (d) multiple choice questions, which serve as user manuals for the MOOC platform.

5.1 Educational Material

In line with the design principles outlined, the AF4F Curriculum Programme focuses on addressing the digital, green, bioeconomical, and soft skills gap identified within the agrifood sector. The four different curriculum draw on insights from the agrifood workforce across Europe, recognizing the growing importance of eco-friendly and technological competencies.

At the heart of AF4F's educational approach is a customized Curriculum, aimed at equipping the VET students with the necessary skills to thrive in an ever-evolving agrifood sector. This curriculum is reinforced by well-designed templates, which guide content developers in creating structured and cohesive training materials. These templates ensure consistency in the quality and delivery of all learning resources, whether through presentations, and readings.

Our standards for educational content prioritize the following key elements:

- Compliance with Open Educational Resources (OER) guidelines, ensuring content is accessible and freely available under designated licenses.
- Easy-to-navigate design that enhances user experience.
- Content that is engaging, relevant, and valuable to retain learners' interest.
- Incorporation of learners' prior experiences and knowledge into the material.
- Appropriateness of content for the targeted age group and social demographics.
- Up-to-date and accurate information.
- Alignment with sound pedagogical practices based on modern educational theory.
- Use of credible and recognized sources.
- Adequate and thorough information
- An attractive and well-organized design and layout

For our presentations (in pptx format), we adopt a systematic approach that includes:

- Clearly displaying the title along with the aims and objectives of each module
- Focusing on 3-5 key terms for emphasis
- Dividing each unit into multiple sections to simplify information
- Presenting the main content in an engaging visual format, enhanced by URLs and resources embedded within the slides
- Including audiovisual elements such as relevant images, graphs, and videos
- Incorporating assessment activities for self-evaluation
- Offering a comprehensive list of references for further exploration
- Adding self-reflection tasks to promote personal growth
- Maintaining a slide count of 25-30 to ensure depth and engagement
- Utilizing creative and high-quality graphics and visual elements

All external media sources will be properly credited and positioned thoughtfully to keep the emphasis on the educational content. Additionally, all materials specific to AF4F project will include the project's logo, a suitable disclaimer, in accordance with the licensing choice agreed upon by the consortium.

The AF4F project will produce diverse types of educational content: Video Lectures, PowerPoint Presentations, Manuals, Case studies/Scenarios, Experiential learning exercises & Activities, Animated Videos, Goal setting activities, quizzes, Extra readings, Interviews, Experts from other EU related projects.

Learning objects and activities will be created as flexible and adaptable components to accommodate diverse learning styles and goals. They will include various formats, such as text and multimedia presentations, to ensure that each learning objective is successfully achieved.

To maintain engagement and offer a dynamic learning environment, our learning objects typology includes:

1. Readings: To provide foundational knowledge.
2. Exercises/Activities: To reinforce learning through practice.
3. Videos: To present concepts in an engaging format.
5. Presentations: To visually summarize key information.
6. Projects: To apply knowledge in practical settings.
7. Tests/Quizzes: To assess understanding and retention.

Through these materials, the AF4F Project aims to provide a transformative educational experience that equips agrifood sector for the digital and green transition, the bioeconomy and the soft skills enhancement.

6 Implementation & Evaluation Phase

In this chapter, we outline the Implementation and Evaluation Phase, which will take place when the four different curricula will be tested in each partner country, with involvement of at least >300 students in our pilot VET schools (AKMI in Greece, CESUR in Spain, Phorma Mentis in Italy). This phase is essential as it signifies the shift from theoretical preparation to practical execution.

The AF4F curricula will begin with an online theoretical training segment accessible through the partners' networks, aiming to enroll at least 300 individuals. A key focus will be on engaging at least 100 participants from Greece, Spain, and Italy for specialized sessions for the EQF levels that apply to each partner. Following this, further modifications and adjustments may be implemented, resulting in a revised version of the curricula. A second round of testing will be conducted with additional partners selected from outside our core consortium in each country, and the outcomes will be evaluated.

The procedure will consist of two phases. Initially, the educational material will be provided via an asynchronous learning platform (i.e., 15 hours), where students will be enrolled. The second phase will involve in-person classes (i.e., 5 hours), during which practical assignments, such as virtual sessions and case studies, will be conducted. Additionally, an evaluation form will be distributed to gather feedback from partners regarding their views on the educational content and the delivery method.

7 References

CEDEFOP (2013) USING LEARNING OUTCOMES European Qualifications Framework Series: Note 4, p.3 (Link:

https://www.cedefop.europa.eu/files/Using_learning_outcomes.pdf)

Working towards EQAVET (2015) (Link: <https://www.qc-vet.eu/en/tools-en/pdca-circle>)

EQAVET quality assurance cycle (Link:

<https://ec.europa.eu/social/main.jsp?catId=1546&langId=en>)

Malith Senevirathne, Dilanthi Amaratunga, Richard Haigh, Dhimman Kumer, Arturas Kaklauskas, A common framework for MOOC curricular development in climate change education - Findings and adaptations under the BECK project for higher education institutions in Europe and Asia, Progress in Disaster Science, Volume 14, 2022, 100222, ISSN 2590-0617 (Link: <https://doi.org/10.1016/j.pdisas.2022.100222>)

The Tenth Annual Curriculum Mapping Institute: Snowbird Utah, July 15-18, 2004 Adapted from Benjamin Bloom (Link: https://www.eiu.edu/fdic/Blooms_Wheel.pdf)

8 Annexes

AF4F Curricula. Available at:

https://drive.google.com/drive/folders/14fcVsJqRAb22fKF4mP6G8i4-y8VcWjpC?usp=drive_link

