Harnessing the Power of Digital Technologies to Protect Plants & the Environment

D6.6: E-learning platform

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Executive Summary

The STELLA e-learning platform is an interactive online hub designed to train, inform, and connect stakeholders around plant health and phytosanitary issues. Developed within the STELLA project and incorporated into the STELLA PSS digital platform, the STELLA e-learning platform integrates content from WPs 2–5 and will progressively evolve and incorporate diverse training material as the project advances. The platform is structured around four modular learning units, each combining diverse types of material like manual documents, presentations, quizzes, and multimedia resources like videos and audiobooks. In its first release, two modules are made available:

- **Module 1** introduces the STELLA Plant Surveillance System (PSS), guiding users through its functionalities and practical use cases.
- **Module 2** delivers dedicated training on existing digital phytosanitary monitoring and alerting systems in the EU, enabling users to understand their operation and apply them effectively for early detection, prevention, and coordinated management of pests and diseases.
- **Module 3** will offer training material on the lessons learnt based on feedback from the STELLA project UCPs. Material will be incorporated in this Module during M35 of the project.
- **Module 4** will deliver training material on policy recommendations, aiming to support the development of plant health policies in the EU. Furthermore, guidelines on efficient, practical use of digital technologies relevant to plant health monitoring, on a cost benefit level. Material will be incorporated in this Module during M45.

By the end of the project, material in the e-learning platform will be provided in multiple formats, including videos, manuals, and presentations, tailored to stakeholder needs and preferences, aiming to support and train users on the use of such relevant technologies and methods. Moreover, by the end of the project the STELLA e-learning platform is set to provide structured training of up to three hours per module, summing up at a total of 12 hours of training material. Its functionality and the traceability of the material are supported by intuitive filters, designed to filter material in the platform, per plant species, pathogen type, and content format, aiming at further simplifying the process of locating relevant content to the interested stakeholders. The platform has been designed to address the needs of farmers, foresters, policymakers, researchers, and citizens seeking practical knowledge on quarantine pests (QPs) and regulated non-quarantine pests (RNQPs), as well as targeted insights into preventive plant health practices and the use of digital monitoring and alerting infrastructure.

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Glossary of terms and abbreviations used

List of Abbreviations and Acronyms	
CBW	Capacity Building Workshop
EU	European Union
EWS	Early Warning System
PDS	Pest Detection System
PRS	Pest Response System
PSS	Pest Surveillance System
QP	Quarantine Pests
RNQP	Regulated Non-Quarantine Pests
UCP	Use Case Pilot
WP	Work Package

1 Learning Hub

The STELLA e-learning platform equips users and stakeholder organizations with the knowledge, skills, and capacities needed to effectively utilize the newly developed STELLA PSS digital platform, as well as relevant modern technologies used for the prevention and monitoring of EU-regulated pests and diseases studied in the STELLA project. In parallel, it supports the work of phytosanitary authorities and contributes to strengthening territorial plant health surveillance across EU countries by providing training on such technologies, as well as on the use of the STELLA PSS digital platform and its three main subsystems. The aim of the STELLA e-learning platform is to enhance the ability of agricultural and forestry actors to adopt modern, digital solutions, reinforce prevention capacities, and ensure more coordinated and efficient monitoring of plant health.

At its core, the platform is organized as a **Learning Hub,** available through the Learning Hub button in the stella website (Figure 1) is composed of four modules, each set to offer up to three hours of structured training material by the end of the STELLA project. An overview of the STELLA e-learning platform landing page as it has been designed is provided in Figure 2. **Module 1** serves as an introduction, drawing on best practices and methodologies from already established plant disease alarm and monitoring networks. It incorporates material from existing platforms and technologies applied in the monitoring, detection, and management of QPs and RNQPs studied in the STELLA project. In addition, it integrates presentations and relevant training material derived from the Capacity Building Workshops held in June 2025 as provided by relevant partners, and it will be further enriched once the second set of CBWs is finalized by the end of autumn 2025 in the remaining UCPs of the project (New Zealand, France, Greece). Moreover, additional input from consortium partners and other relevant sources (e.g., internet resources, partners' knowledge, and networks) is expected to be gradually incorporated to ensure the module remains comprehensive and up to date. In the first version of the STELLA PSS manual (**Module 2**), the subsystems of the STELLA PSS platform are presented based on the STELLA PSS mockups and the platform that has been designed and developed so far. It also presents the functionalities and use of the platform as currently designed. This version is expected to be further updated as the models are developed and incorporated, as the overall development progresses, and based on the feedback from T3.5 Platform Evaluation. To facilitate learning, the Hub integrates **practical filters** that allow users to navigate content by plant species, pathogen type, and format (e.g. pdf documents or video). This functionality ensures that training materials are easy to locate and tailored to user needs. Importantly, the content is not static, meaning that as the project

progresses, the e-learning platform will be continuously updated and diversified with new material and types of material, including manuals, videos, presentations and other resources. This iterative enrichment process is designed to maximize accessibility, respond to stakeholder feedback, and ensure the platform remains a relevant and practical tool for end-users throughout the project and beyond.

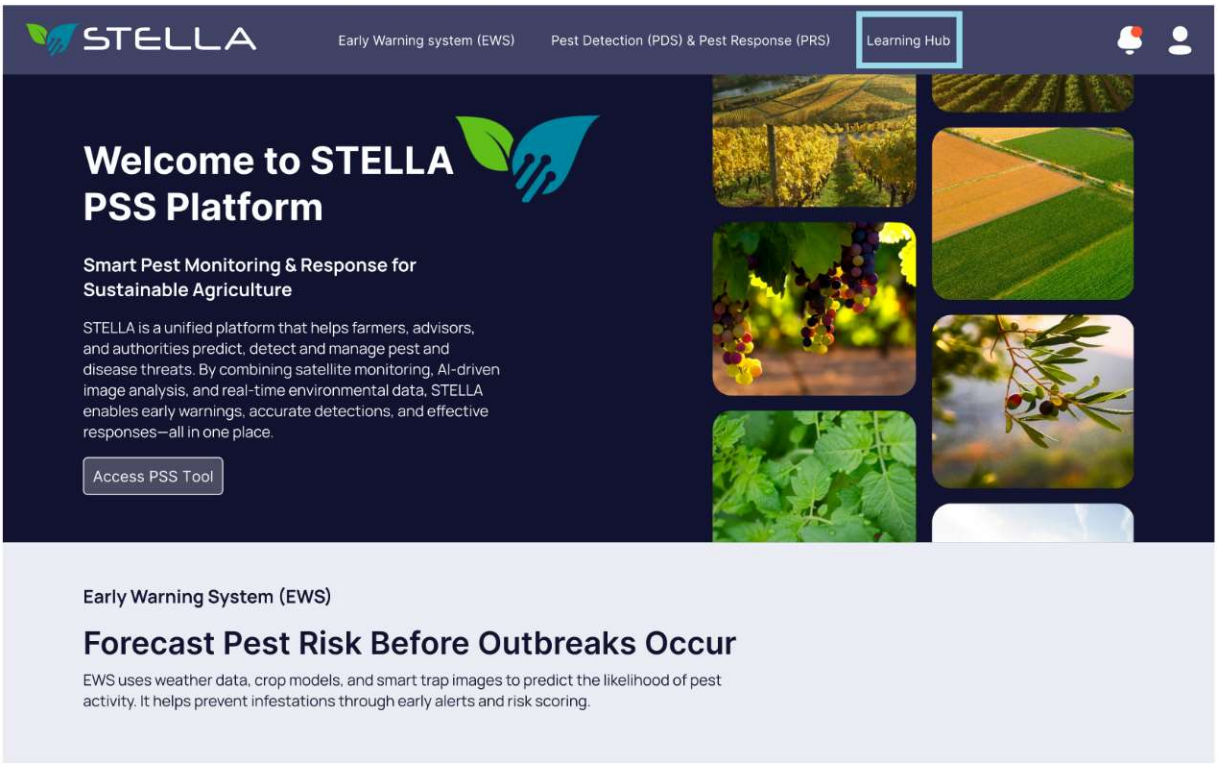

Figure 1. *Accessing the e-learning platform, named "Learning Hub" through the STELLA website*

The e-learning platform is made accessible to interested users, by clicking on the “Learning Hub” button, available to the right of the STELLA-PSS subsystems (https://www.platform.stella-pss.eu/learninghub).

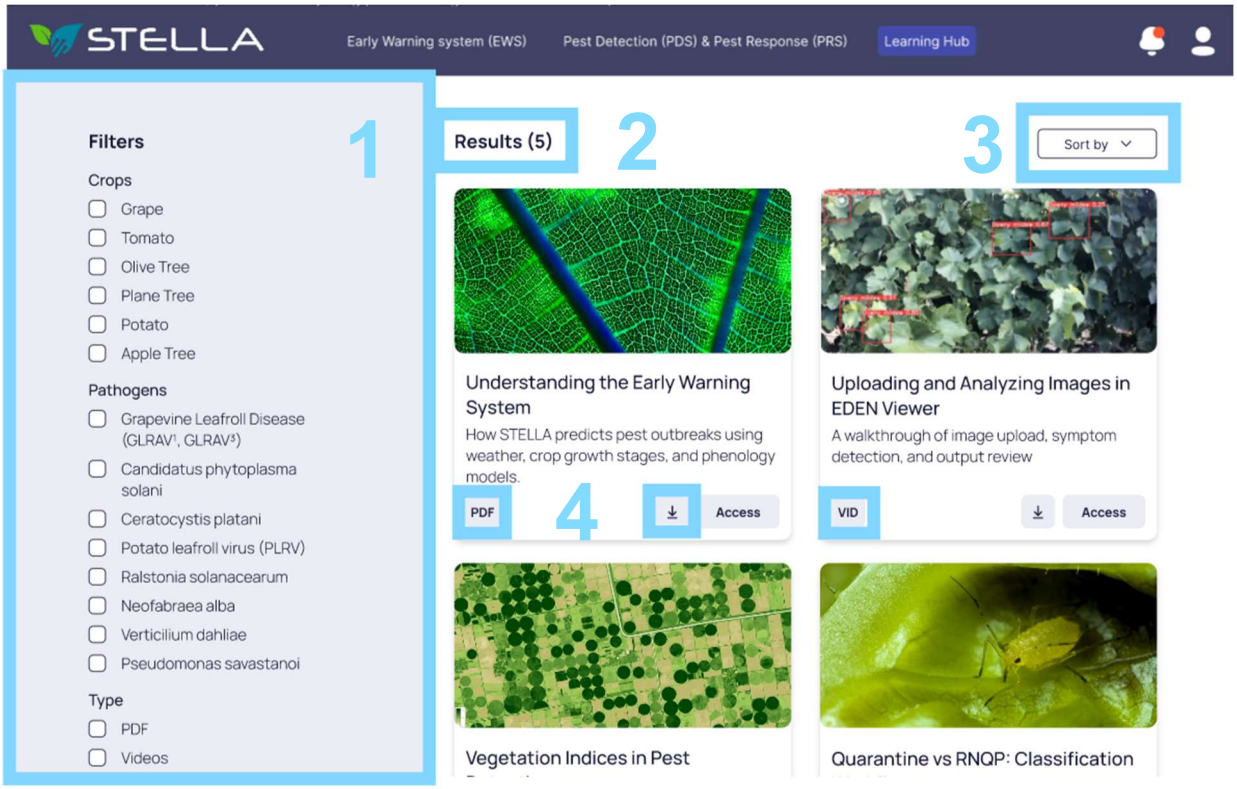

Figure 2. *Landing page of the e-learning platform. (1) The available Filters used for targeted tracing of training material in the platform; (2) The total amount of results fetched in the platform, based on user search; (3) The sorting functionality is made available through this button; (4) The format that the training material is delivered is indicated underneath the title and the short description, to the* ***left****, a download button is provided to the* ***right****, as indicated in the figure above.*

1.1 Modules

1.1.1 Module 1

Module 1 of the STELLA e-learning platform is designed to deliver targeted training on the use and functionalities of existing monitoring and alerting infrastructures applied in plant health management. This includes digital monitoring and alerting systems (Vegecultures, Epicure, FieldClimate, EDEN Viewer etc.) and tools (e.g., sensors, smartphone applications) currently used in the project and globally for monitoring and managing QPs and RNQPs in agriculture and forestry. Module 1 brings together existing manuals, technical guidelines, and complementary training material provided by relevant consortium partners, as well as other resources such as internet sources, partners' knowledge, and professional networks, to familiarize users with the practical application of these infrastructures. Through structured content, participants gain insight into how such systems operate, how they can be integrated into farm and forestry management practices, and how they contribute to early detection, prevention, and coordinated responses to plant pests and diseases. The material in this first version of module 1 is offered in diverse formats including presentations, documents, and videos, aiming to ensure accessibility and adaptability for different user needs. Module 1 ensures that all relevant stakeholder groups recognized in the project, including farmers, advisors, researchers, and phytosanitary authorities (POs) are better equipped to adopt and apply these existing digital solutions in their daily pipelines of work. Training material in Module 1 is designed to support and enrich user knowledge and confidence, while also laying the foundation for a more harmonized and proactive approach to plant health monitoring and management across the EU. As the project progresses, Module 1 will be further enriched and diversified, incorporating additional inputs from consortium partners, ongoing CBWs, and other relevant sources to better respond to user needs and ensure practical applicability.

1.1.2 Module 2

Module 2 of the STELLA e-learning platform provides a comprehensive, step-by-step guide to the optimal use of the STELLA-PSS platform. It is designed to familiarize users with the platform's core subsystems, namely the Early Warning Subsystem (EWS), the Pest Detection Subsystem (PDS), and the Pest Response Subsystem (PRS), as well as their design and functionalities, and to demonstrate how each can be applied successfully in practice. This module delivers concise training material in the form of pdf manual document, ensuring that information remains clear, targeted, and easy to follow, regardless of the stakeholders' expertise and knowledge level. Through explanatory text, screenshots, and structured examples, users are guided through the platform's design, main functions, the types of data that will be made available through the platform, and the interpretation of key indicators and indices used within the system as it has been envisioned, designed and developed so far in the project. The accompanying manual has been designed and developed based on the platform as it exists so far in the project and it is expected to be updated continuously as the project progresses and as models are developed and incorporated into the relevant subsystems of the STELLA PSS patform. Moreover, the material will be further diversified over time, including additional types of manuals such as video guides, updated written manuals, and manuals focusing on the specific applications of each subsystem module, aiming to improve accessibility, better address user needs, and support users in effectively incorporating the models and tools into their workflows and daily pipelines. By completing **module 2** (Figures 3-7), users will be able to confidently navigate the STELLA-PSS platform, understand the role and functionalities of each subsystem, and apply the tool effectively for pest monitoring, early detection, and response planning.

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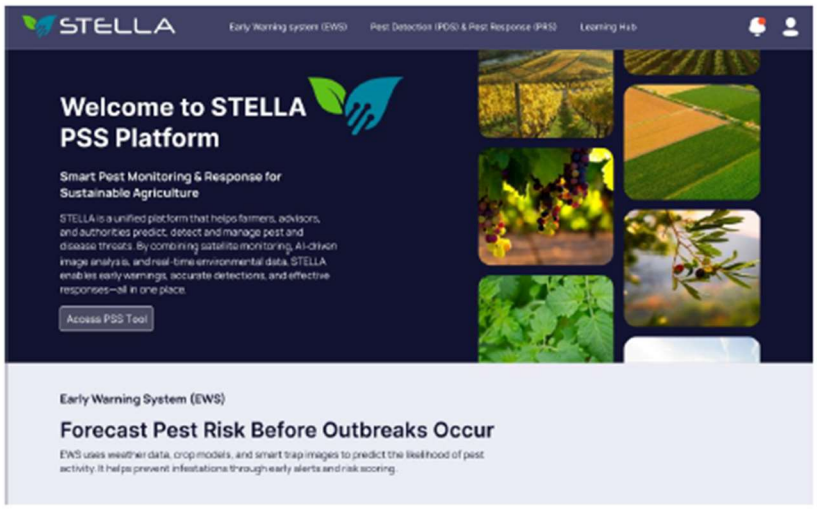

Figure 3. Overview of the platform's landing page

- Upon entering, the user is shown a brief description of the STELLA-PSS platform and its functionality. Each of the three (3) available subsystems are presented. These subsystems include:
  - The **Early Warning System (EWS)**
  - The **Pest Detection System (PDS)** split into
    - The **Satellite-based PDS**
    - The **EDEN Viewer PDS**
  - The **Pest Response System (PRS)**
  - The **Learning Hub**

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Figure 3. *Screenshot of the available Manual for the STELLA-PSS Platform, explaining the Landing Page*

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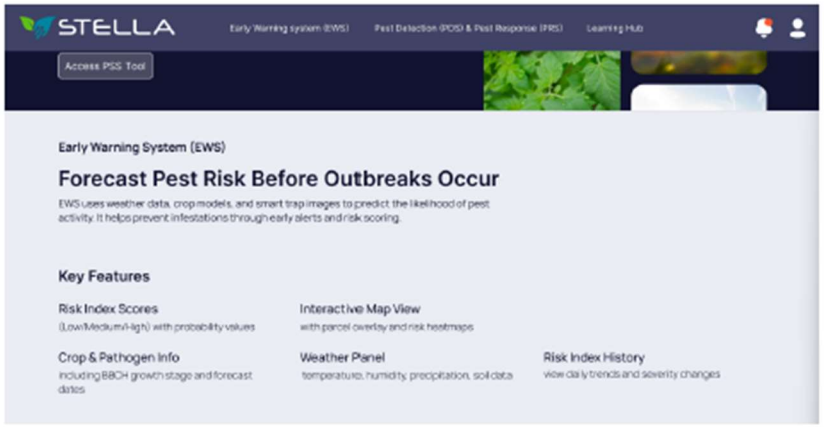

Figure 4. An overview of the EWS

- By scrolling through the landing page, the user can find basic information on each system present within the platform, starting with the **Early Warning System (EWS)**, as shown above.
- The user is shown a number of key functionalities. Understanding these, is important for having the best user experience within the **EWS.**
  - **Risk Index Scores** (ranging from Low to High, indicates the level of risk present in the selected field)
  - **Crop & Pathogen info** (some basic information regarding the crop and the pathogen present in the field)
  - **Interactive Map View** (user friendly worldwide map showcasing the position of each field)
  - **Weather Panel** (containing temperature, humidity, precipitation and soil data of the selected field. This data is available through close-by weather stations)
  - **Risk Index History** (a scroll-down tab containing all the previous Risk Index Scores of the field)

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Figure 4. *Screenshot of the Manual for the STELLA-PSS Platform, showcasing its Key Functionalities*

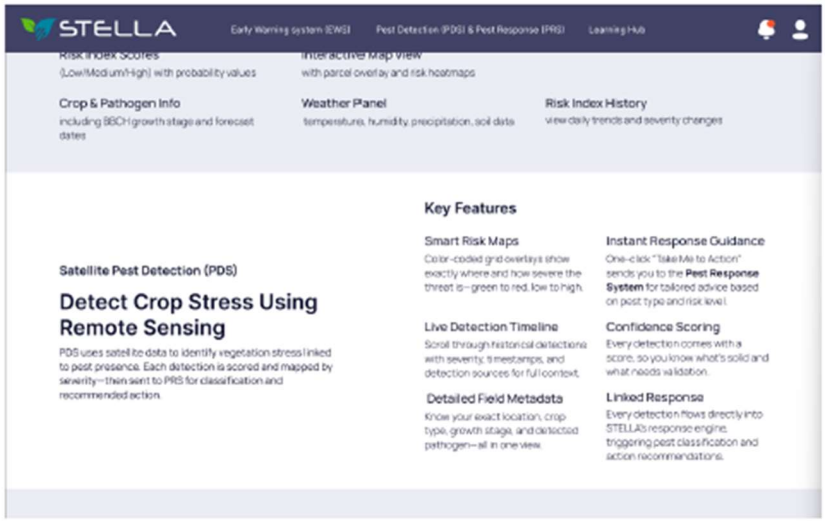

Figure 5. Satellite-based PDS

- Further down, the second system can be found, known as the **Pest Detection Subystem (PDS).** This is split into two (2) subsystems. The **Satellite-based PDS** and the **EDEN Viewer PDS.** In the image above, an overview of the **Satellite-based PDS** can be seen. Its key features containing
  - **Smart Risk Maps** (colour coded, showing the severity of the pathogen ranging from green to red, low to high)
  - **Live Detection Timeline**
  - **Detailed Field Metadata** (containing coordinates of the field, crop cultivated, growth stage of the crop, name of pathogen)
  - **Instant Response Guidance** (The "Take me to action" button redirects you to the **Pest Response System PRS** for further guidance and tailored advice on how to manage your infected field)
  - **Confidence scoring** (a score in percentage form showing the probability of the pathogen's presence in the field)
  - **Linked Response** (Every detection flows directly into STELLA's response engine, triggering pest classifications and action recommendations)

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Figure 5. *Screenshot of the Manual explaining the contents of the PDS Module*

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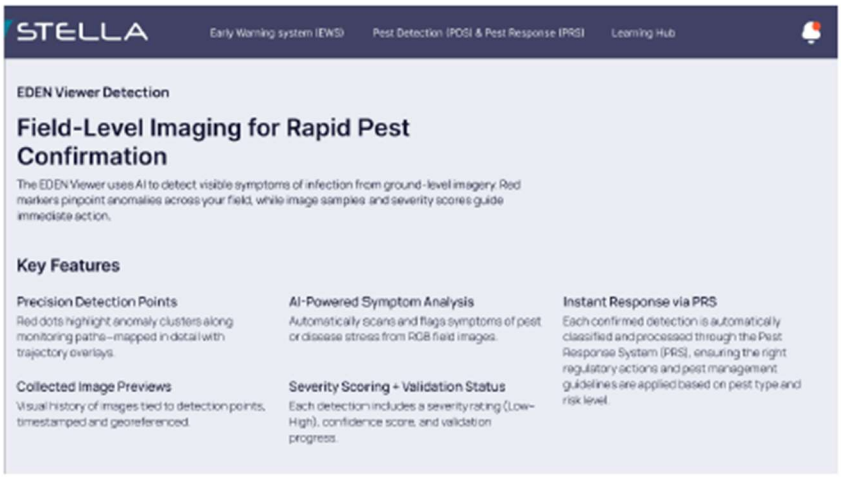

Figure 6. EDEN Viewer-based PDS

- The above image gives the user some basic information about the **EDEN Viewer PDS**, with its key features being
  - **Precision Detection Points** (shown as red dots on the field map, indicating pathogen presence)
  - **Collected Image Previews** (history of images tied to detection points, containing time of acquisition~~/or detection?~~ and coordinates)
  - **AI-Powered Symptom Analysis** (AI scans and detects symptoms of pests or disease on RGB images of the field)
  - **Severity Scoring + Validation Status** (each detection includes a severity rating raging from Low to High, a confidence score and a validation progress)
  - **Instant Response via the Pest Response System PRS** (each detection is classified and processed though the **PRS**, ensuring correct regulatory action and application of pest management guidelines)

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Figure 6. *Screenshot of the Manual showcasing the features of the EDEN-Viewer PDS*

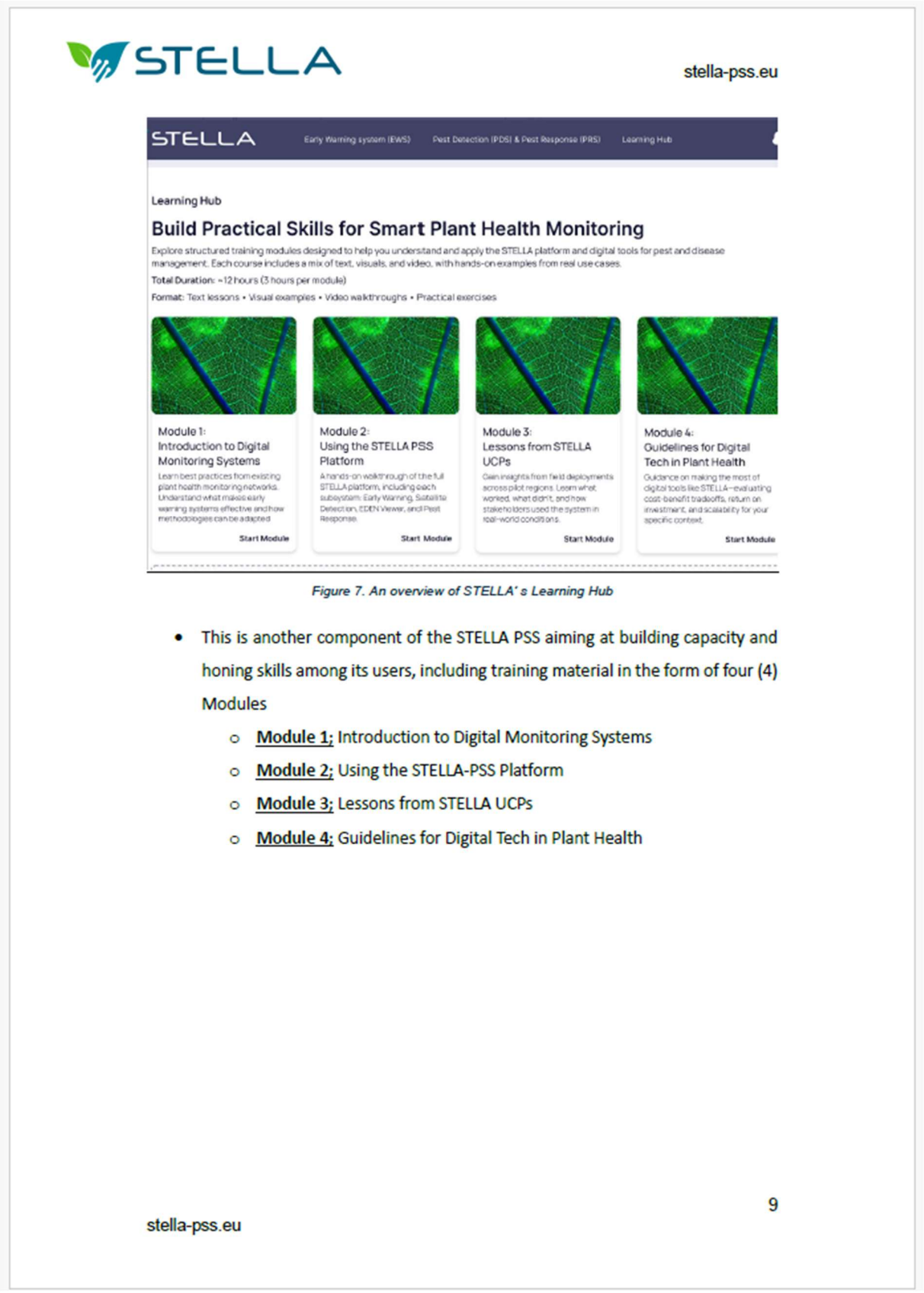

Figure 7. An overview of STELLA' s Learning Hub

- This is another component of the STELLA PSS aiming at building capacity and honing skills among its users, including training material in the form of four (4) Modules
  - **Module 1;** Introduction to Digital Monitoring Systems
  - **Module 2;** Using the STELLA-PSS Platform
  - **Module 3;** Lessons from STELLA UCPs
  - **Module 4;** Guidelines for Digital Tech in Plant Health

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Figure 7. *Screenshot of the available e-learning platform within the STELLA-PSS*

2 Conclusions

To ensure that the material and knowledge developed within the STELLA project are effectively delivered to target stakeholder groups and translated into practical use, the STELLA e-learning platform was developed. The platform provides structured training resources that make the outcomes of the project accessible, actionable, and relevant to end users. **Module 1** introduces training material on existing monitoring and alerting infrastructures, drawing on established plant disease alarm systems and digital tools (e.g., Vegecultures, Epicure, FieldClimate, EDEN Viewer, sensors, and smartphone applications like the iSCOUT app) used globally and within the project for monitoring and managing QPs and RNQPs. The module consolidates manuals, technical guidelines, presentations, and training material provided by consortium partners, complemented by additional resources from internet sources, partners' knowledge, professional networks, and material derived from the Capacity Building Workshops (CBWs) held in June 2025. Content is offered in diverse formats including presentations, pdf documents, and videos, aiming at ensuring accessibility, adaptability, and engagement for different user types and needs. **Module 1** equips farmers, advisors, researchers, and phytosanitary authorities (POs) to adopt and apply these digital solutions effectively in their daily workflows, supporting user knowledge and confidence while laying the foundation for a harmonized and proactive approach to plant health monitoring and management across the EU. As the project progresses, this module will be further enriched and diversified to incorporate additional resources and better address evolving user needs. **Module 2** provides step-by-step training on the use of the STELLA-PSS platform, focusing on its core subsystems, namely the Early Warning Subsystem (EWS), the Pest Detection Subsystem (PDS), and the Pest Response Subsystem (PRS). Users are guided through the platform's functionalities, available data, and interpretation of key indicators and indices via structured examples, explanatory text, and screenshots. The accompanying manual has been developed based on the platform as designed and implemented so far and is expected to be updated continuously as models are developed and incorporated into each subsystem from WP2. Over time, the training material in **Module 2** will be further diversified, including video guides, updated manuals, and manuals dedicated to the specific applications of each subsystem, improving accessibility, addressing user needs in detail, and supporting stakeholders in effectively incorporating the platform into their workflows. Together, Modules 1 and 2 provide a structured and practical pathway for stakeholders to acquire the knowledge and skills needed to implement effective plant health monitoring and management strategies. As the project progresses, the Learning Hub will be continuously updated with additional

content and diverse training formats, with the next updates planned for M35 and M45, delivered in D6.7 and D6.8 respectively, delivering module3 and module 4 of the e-learning platform respectively.