



# **Alliance for Innovative Learning Environment in Advanced Agriculture through Technology and Management Project 101187399 - AGRITECH**

## **D3.2 AgriTech Online certification model**

**#OECON**



Co-funded by  
the European Union

Final Version  
September 2026

**INNOVATION**



|                             |                                                            |
|-----------------------------|------------------------------------------------------------|
| Dissemination level         | <b>Public</b>                                              |
| Coordinating partner        | OECON                                                      |
| Authors                     | Alexandra Thomaidou, Sebo Santa, Daniel Amarei             |
| Contributors                | ELGO, POLITO, CARDET, AUTH, WRLS, USAMV, DDTG, ZSCR, AUTOM |
| Due date of deliverable     | 30/09/2025                                                 |
| Actual date of deliverable  | -                                                          |
| Status (F: final, D: draft) | F                                                          |
| File name                   | D3.2 AgriTech Online certification model                   |

#### Document Change Control

| Version Number | Date of Issue | Author(s)               | Brief Description of Change                            |
|----------------|---------------|-------------------------|--------------------------------------------------------|
| Version 1.0    | 30.10.2025    | Ms Alexandra Thomaidou, | Initial version for review                             |
| Final          | 29.09. 2026   | Ms Alexandra Thomaidou  | Final Version after Review (DDTG, CARDET, ELGO, PAMEA) |
|                |               |                         |                                                        |
|                |               |                         |                                                        |

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



## Index

|                                                                                   |           |
|-----------------------------------------------------------------------------------|-----------|
| <b>Executive Summary</b> .....                                                    | 6         |
| Purpose and Audience of the Validation Framework .....                            | 7         |
| Purpose .....                                                                     | 7         |
| Audience .....                                                                    | 7         |
| Relationship to Other Project Artifacts .....                                     | 7         |
| Governance and Role Model .....                                                   | 8         |
| Principles of Governance .....                                                    | 8         |
| Roles and Responsibilities (RACI) .....                                           | 9         |
| <b>Role Descriptions</b> .....                                                    | 9         |
| <b><i>Pre-Training Validations (Readiness)</i></b> .....                          | <b>10</b> |
| Learner Registration & Identity Assurance .....                                   | 10        |
| Baseline & Diagnostic Assessment .....                                            | 11        |
| Recognition of Prior Learning (RPL) .....                                         | 12        |
| Accessibility & Language Policy .....                                             | 12        |
| Test Specification Approval .....                                                 | 13        |
| <b>Readiness Gate – Definition of “Go/No-Go”</b> .....                            | 13        |
| <b><i>In-Training Formative Validation</i></b> .....                              | <b>14</b> |
| Learning Analytics & Progression Rules .....                                      | 14        |
| Formative Assessment Integrity .....                                              | 15        |
| <b><i>Post Training Summative Validation &amp; Online Certification</i></b> ..... | <b>15</b> |
| Examination Security and Proctoring .....                                         | 15        |
| Assessment Design and Blueprints .....                                            | 17        |
| Standard Setting & Cut-Scores .....                                               | 18        |
| Scoring, Rubrics, and Inter-Rater Reliability .....                               | 19        |
| Grading Model and Compensation Rules .....                                        | 19        |
| Award Ratification .....                                                          | 20        |
| <b><i>Evidence &amp; Records Management</i></b> .....                             | <b>21</b> |
| E-Portfolios and Provenance .....                                                 | 21        |
| Data Retention and Access Control .....                                           | 22        |
| Archiving for Audit .....                                                         | 22        |
| <b><i>Moderation &amp; Quality Assurance</i></b> .....                            | <b>23</b> |
| Pre-Assessment Moderation (Design Moderation) .....                               | 25        |
| In-Assessment Moderation (Marking and Scoring Consistency) .....                  | 25        |
| Post-Assessment Moderation (Award Decision Assurance) .....                       | 25        |
| 8.4 External Moderation and Independent Oversight .....                           | 25        |
| 8.5 Continuous Quality Assurance Cycle .....                                      | 26        |
| Assurance of Learner Fairness and Transparency .....                              | 26        |
| <b><i>Appeals, Complaints, and Malpractice</i></b> .....                          | <b>27</b> |
| Appeals .....                                                                     | 27        |
| <b>Appeals Procedure</b> .....                                                    | 27        |
| Complaints .....                                                                  | 27        |
| Malpractice and Academic Integrity .....                                          | 28        |
| <b><i>Continuous Improvement Cycle</i></b> .....                                  | <b>28</b> |



|                                                                                                                                                                                            |           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Purpose of the Continuous Improvement System.....                                                                                                                                          | 29        |
| Data Sources Feeding Continuous Improvement .....                                                                                                                                          | 29        |
| Annual Review and Synthesis .....                                                                                                                                                          | 29        |
| Decision-Making and Change Authorization .....                                                                                                                                             | 30        |
| Implementation, Monitoring, and Verification.....                                                                                                                                          | 30        |
| <b>Recognition &amp; Portability .....</b>                                                                                                                                                 | <b>31</b> |
| Alignment with the European Qualifications Framework (EQF) .....                                                                                                                           | 31        |
| Relationship to ECTS and Academic Credit Transfer .....                                                                                                                                    | 31        |
| Alignment with VET Systems and Occupational Standards .....                                                                                                                                | 32        |
| Digital Credentialing and Verification (Europass Alignment) .....                                                                                                                          | 32        |
| Functional Integration within the AGRITECH Certification Model .....                                                                                                                       | 33        |
| Requirements for Issuing European Digital Credentials .....                                                                                                                                | 33        |
| Maintain quality assurance procedures informed by ESG and EQAVET principles (ENQA et al., 2015; Council of the European Union, 2020).Process for Issuing European Digital Credentials..... | 33        |
| Benefits for the AGRITECH Certification Ecosystem .....                                                                                                                                    | 34        |
| Future Development and Scalability.....                                                                                                                                                    | 34        |
| Recognition by Employers and Sector Bodies.....                                                                                                                                            | 35        |
| Portability for Further Study and Career Progression .....                                                                                                                                 | 35        |
| <b>Stakeholder Engagement &amp; Communication.....</b>                                                                                                                                     | <b>35</b> |
| Engagement with Learners .....                                                                                                                                                             | 36        |
| Engagement with Instructors, Tutors, and Assessors.....                                                                                                                                    | 36        |
| Engagement with HEIs and VET Centres.....                                                                                                                                                  | 36        |
| Engagement with Employers and Sector Bodies .....                                                                                                                                          | 37        |
| Engagement with Accreditation and Policy Bodies .....                                                                                                                                      | 37        |
| Communication Infrastructure and Transparency Assurance .....                                                                                                                              | 37        |
| <b>Risk Management &amp; Contingency Planning .....</b>                                                                                                                                    | <b>37</b> |
| Risk Management Framework.....                                                                                                                                                             | 38        |
| Operational Continuity Risks .....                                                                                                                                                         | 38        |
| Academic Validity and Standard Stability Risks .....                                                                                                                                       | 38        |
| Equity and Access Risks.....                                                                                                                                                               | 39        |
| Reputational and Regulatory Risks .....                                                                                                                                                    | 39        |
| Contingency Planning and Response .....                                                                                                                                                    | 39        |
| 13.7 Documentation and Accountability .....                                                                                                                                                | 39        |
| <b>Data Protection, Legal Compliance &amp; Ethical Assurance .....</b>                                                                                                                     | <b>40</b> |
| Legal and Regulatory Framework .....                                                                                                                                                       | 40        |
| Lawful Basis for Data Processing .....                                                                                                                                                     | 40        |
| Ethical Assurance and Respect for Learner Rights.....                                                                                                                                      | 41        |
| Consent, Disclosure, and Transparency.....                                                                                                                                                 | 41        |
| Data Security and Storage Controls .....                                                                                                                                                   | 41        |
| Data Retention, Deletion, and Minimization .....                                                                                                                                           | 42        |
| Oversight and Accountability .....                                                                                                                                                         | 42        |
| <b>Sustainability, Scalability &amp; Future Development of the Certification Model.....</b>                                                                                                | <b>42</b> |
| Institutional Sustainability .....                                                                                                                                                         | 42        |
| Academic Sustainability .....                                                                                                                                                              | 43        |
| Technological Sustainability.....                                                                                                                                                          | 43        |
| Financial and Administrative Sustainability .....                                                                                                                                          | 43        |
| Scalability Across Languages and Cultural Contexts .....                                                                                                                                   | 44        |



|                                                              |           |
|--------------------------------------------------------------|-----------|
| Scalability Across Institutions and Regions.....             | 44        |
| Future Development Pathways .....                            | 44        |
| <b><i>Evaluation of the VET Piloting Activities.....</i></b> | <b>45</b> |
| Evaluation of the VET Piloting Activities .....              | 45        |
| Greece.....                                                  | 46        |
| Italy .....                                                  | 46        |
| Czech Republic .....                                         | 46        |
| Overall Conclusions from the Piloting .....                  | 46        |
| <b><i>Conclusion.....</i></b>                                | <b>46</b> |
| <b><i>References .....</i></b>                               | <b>48</b> |



## Executive Summary

This Validation Framework establishes the structured processes, governance mechanisms, and quality assurance controls that underpin the recognition of learning and the award of certification within the AgriTech Manager (ATM) training and assessment ecosystem. It provides a comprehensive reference for Higher Education Institutions (HEIs), Vocational Education and Training (VET) centres, accredited training providers, and affiliated professional bodies that intend to adopt, deliver, or formally recognize the ATM Certification Model developed within the AGRITECH project.

The purpose of this framework is to ensure that the certification of the AgriTech Manager role is based on transparent, evidence-driven, and academically credible validation practices, aligned with the European Qualifications Framework (EQF) at Levels 5, 6 and 7. It confirms that competence is not awarded on the basis of attendance, participation, or time spent in training, but rather through the demonstration of verifiable knowledge, skills, and professional autonomy consistent with outcomes-based qualification standards.

**The framework applies validation activities across the entire learning lifecycle:**

>> **Before** training, through learner profiling, baseline competence orientation, Recognition of Prior Learning (RPL), and accessibility planning, ensuring appropriate placement and equitable entry conditions.

>> **During** training, through structured formative validation, progression monitoring, feedback loops, and learner support interventions, ensuring that learners move toward the expected competence trajectory.

>> **After** training, through standardized summative assessment, moderation, and certification award decision-making governed by consistent evaluation criteria and transparent auditability.

The framework integrates the online certification platform as the central infrastructure for identity verification, assessment delivery, data traceability, evidence archiving, and digital credential issuing. Learner competence records and certification decisions are stored in verifiable form to support employer recognition, professional mobility, and cross-institutional portability.

Governance is maintained through a defined structure involving the Certification Steering Committee, Programme Assessment Board, Central Exam Administration, assessors, external reviewers, and quality assurance authorities. Their collective roles ensure academic integrity, fairness of assessment, impartiality of evaluation, and consistency of outcomes across delivery centres and learner cohorts.

The Validation Framework draws on relevant principles from the European Standards and Guidelines for Quality Assurance in Higher Education (ESG) and the European Quality Assurance Reference Framework for VET (EQAVET) (ENQA et al., 2015; Council of the European Union, 2020), ensuring institutional legitimacy and compatibility with national and international accreditation systems. It also aligns with the European approach to micro-credentials and its standard elements for describing micro-credentials (Council of the European Union, 2022), supporting digital credential portability and transparency in academic and labour market contexts.

Through its structured, transparent, and iterative approach, the Validation Framework ensures that the AgriTech Manager Certification is credible, portable, and future-relevant. It supports the professionalization of roles operating at the intersection of agriculture, digital innovation, sustainability, and organizational decision-making, contributing to workforce readiness and innovation capacity across the European agrifood sector.



## Purpose and Audience of the Validation Framework

### Purpose

The purpose of this Validation Framework is to guarantee that the AGRITECH online certification model for the AgriTech Manager profile produces assessment outcomes that can be trusted—by universities and VET providers who may award credit or recognition, by employers who will use certification as a hiring and upskilling signal, and by learners who expect fair recognition of their knowledge, skills and professional autonomy at EQF levels 5, 6 and 7. To achieve that guarantee, the framework turns high-level principles into enforceable practice. It specifies the exact validation processes that must occur before any assessment is delivered, while it is being delivered, and when grading and award decisions are made. It defines the evidence that must be created, the decision rules that must be applied, and the quality assurances that must be demonstrated for each stage.

In concrete terms, the framework ensures that the constructs we claim to assess are precisely defined and coherently mapped to the ATM competence architecture; that item pools and tasks demonstrably cover the intended learning outcomes and cognitive demands for each EQF level; that delivery conditions protect the integrity of high-stakes decisions without disadvantaging learners who require accommodations; that scoring is governed by calibrated rubrics with traceable rationales for judgements; and that award decisions are supported by documented standard-setting, moderation and psychometric checks. It provides a single source of truth for validation, moderation, appeals, data protection and continuous improvement, so that all centres and partners adhere to the same expectations, use the same terminology, and archive the same evidence, thereby enabling consistency, external scrutiny and recognition across Europe.

This document is also purposive in its alignment: it ties validation to the explicit EQF level descriptors of knowledge, skills and responsibility/autonomy, ensuring that level 5 represents competent execution, level 6 represents independent interpretation and contextual adaptation, and level 7 represents strategic orchestration and leadership within the organization or ecosystem. The validation regime is therefore not an administrative wrapper; it is the mechanism by which level claims are substantiated, defended and, when necessary, refined through continuous evidence-informed review.

### Audience

The primary audience comprises senior academic and administrative actors who hold formal responsibility for the integrity of assessment and certification within HEIs and VET centres. Academic leaders and programme directors will use the framework to plan delivery models and to confirm that programme-level regulations are congruent with the certification's high-stakes requirements. Assessment committee members and exam board participants will rely on its decision rules for moderation, anomaly handling and award ratification. Quality assurance officers will use the evidence requirements and audit trails to verify compliance with institutional policies and external standards. Certification platform administrators and central exam offices will operationalize identity assurance, secure delivery, timetable control, incident response and records management as prescribed. A substantial secondary audience interacts with the framework at different points in the lifecycle. Instructors, assessors and examiners apply its calibration protocols, rubrics and moderation expectations; industrial partners participate in external review, authenticity checking of workplace artefacts and relevance audits; and regulatory or recognition bodies consult the framework to appraise portability, transparency and equivalence with national or sectoral standards. While the language is deliberately academic and procedural, it is written to be understandable and implementable by operational staff, with the expectation that each centre will integrate the framework into its assessment regulations, quality manuals and assessor training.

## Relationship to Other Project Artifacts



This Validation Framework sits alongside, and deliberately does not duplicate, two core project artifacts. The Certification Framework (D3.1) defines the ATM competence model, learning outcomes, EQF alignment strategy and assessment philosophy. The Online Certification Model (D3.2) operationalises those principles into a digital delivery environment with defined learners' journeys, identity verification, proctoring configuration and credential issuance. The Validation Framework you are reading provides the governance, checks and empirical evidence requirements that ensure the Online Certification Model actually fulfils the promises of the Certification Framework in situ, across real cohorts and delivery contexts.

Accordingly, this document should be read together with institutional assessment regulations, programme-level handbooks, quality assurance standards and data protection policies. Where institutional documents prescribe stricter requirements—for example, on Board of Examiners composition, resit entitlements, or data retention—the stricter requirement prevails. Where institutional documents are silent, this framework provides the default position. References within centre documentation should cross-link to the relevant validation clauses so that assessors, examiners and administrators can navigate seamlessly from principle to procedure to evidence. This layered relationship ensures conceptual alignment, technical feasibility and regulatory compliance, while keeping responsibilities clear: D3.1 articulates what must be assessed and to which level, D3.2 describes how assessment is delivered online, and this Validation Framework proves that the delivery and its outcomes are defensible, auditable and worthy of recognition.

## Governance and Role Model

Governance establishes **who holds authority, who performs operational work, who provides expert oversight, and how decisions are documented and justified**. It ensures that all certification-related activities meet standards of **academic integrity, impartiality, transparency, and learner protection**, and that outcomes are valid and defensible in both academic and professional contexts. Governance must be stable across delivery centres, scalable for multiple cohorts, and robust against conflicts of interest or inconsistent interpretation.

## Principles of Governance

The governance approach underpinning the Validation Framework is guided by four core principles:

**Academic Integrity** >> Certification decisions must be grounded in accurate demonstration of competence rather than participation, seniority, or subjective impression. Assessors apply standardised rubrics and provide evidence-based justifications for every judgement. No learner may be awarded certification in the absence of documented performance above the established standard-setting threshold.

**Transparency** >> The rules governing assessment, moderation, progression, award decisions, re-assessment rights, and appeals must be public and accessible to all stakeholders. Learners must understand the criteria on which they are evaluated; assessors must be able to trace how criteria map to learning outcomes; and reviewers must be able to access evidence supporting each decision.

**Accountability** >> Assessment authority is separated from instructional delivery wherever possible to prevent biases and ensure impartiality. Individuals participating in award decision-making must be free from direct conflicts of interest. Committees with oversight roles must maintain documented rationales for decisions, supported by reference to evidence and approved policy.



**Learner Protection & Fairness** >> Every stage of the validation process must protect learners' rights to equitable treatment, data privacy, reasonable accommodation, and academic due process. This includes the right to request clarification, receive feedback, submit appeals, and have concerns reviewed independently.

These principles require that governance structures are **formalized, documented, and enforced**. Informal or ad-hoc practices are not sufficient in a certified, multi-institution, multi-country environment.

## Roles and Responsibilities (RACI)

Clear role definition ensures accountability and prevents ambiguity. The Validation Framework uses a **RACI model**:

|                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• <b>R (Responsible)</b>: Performs the work.</li> </ul>                                       |
| <ul style="list-style-type: none"> <li>• <b>A (Accountable)</b>: Holds final decision authority and answers for outcomes.</li> </ul> |
| <ul style="list-style-type: none"> <li>• <b>C (Consulted)</b>: Provides expert input but does not decide.</li> </ul>                 |
| <ul style="list-style-type: none"> <li>• <b>I (Informed)</b>: Must be notified of decisions.</li> </ul>                              |

### Role Descriptions

#### **Certification Steering Committee (CSC) – Accountable**

The CSC is the principal academic authority overseeing the certification system. It approves the Validation Framework, endorses standard-setting decisions, ratifies final certification awards, approves modifications to assessment policy, and ensures alignment with EQF and institutional regulations. The CSC also reviews performance, risk, and audit reports to authorise continuous improvement actions.

#### **Central Exam Administration (CEA) – Responsible**

The CEA manages operational assessment delivery. This includes publishing examination schedules, managing secure item banks, configuring proctoring systems, verifying identity tokens, managing submission workflows, generating item statistics post-exam, and issuing official results notifications. The CEA ensures chain-of-custody protection during all high-stakes assessment events.

#### **Programme Assessment Board (PAB) – Responsible / Consulted**

The PAB conducts moderation reviews, validates the consistency of marking and grading processes, reviews grade distributions to detect anomalies, and adjudicates appeals within the scope of institutional policy. During standard setting, the PAB is consulted to confirm practical implications of performance thresholds and report patterns observed in learner profiles.

#### **Lead Psychometrician – Responsible / Consulted**

The lead psychometrician conducts validation and reliability analyses, including item difficulty and discrimination indices, scoring distribution modelling, inter-rater reliability studies, cut-score calibration, bias detection, and assessment quality reporting. The psychometrician advises both the CSC and PAB but does not make final award decisions.

#### **Institutional Quality Assurance (QA) – Consulted / Informed**

QA ensures alignment with external regulatory frameworks and internal academic standards. QA conducts cyclical audits, verifies documentation completeness, and reviews conformance with institutional assessment regulations. QA does not interfere in marking or award decisions but ensures procedures are properly followed.

#### Data Protection Officer (DPO) – Accountable

The DPO ensures all identity verification, proctoring data, video recordings, biometric confirmations, storage logs, and analytics outputs comply with GDPR and applicable national data protection laws (European Parliament & Council of the European Union, 2016). The DPO authorises all data retention schedules, access permissions, and data breach protocols.

#### External Reviewer(s) – Consulted

External academic or professional reviewers examine assessment blueprints, sample assignments, moderated scripts, and rubrics. They verify that assessments remain aligned to sector standards, that learner outcomes reflect real competence expectations, and that award thresholds are defensible. External review strengthens portability and employer trust.

| Activity                      | CSC | CEA | PAB | Psychometrician | QA | DPO | External Reviewer |
|-------------------------------|-----|-----|-----|-----------------|----|-----|-------------------|
| Approve Validation Framework  | A   | I   | C   | C               | C  | I   | C                 |
| Summative Assessment Delivery | I   | R   | I   | C               | I  | C   | I                 |
| Standard Setting              | A   | R   | C   | R               | C  | I   | C                 |
| Moderation of Scoring         | I   | R   | R   | C               | I  | I   | C                 |
| Award Ratification            | A   | I   | R   | C               | C  | I   | I                 |
| Appeals Resolution            | A   | I   | R   | C               | C  | I   | I                 |
| Data Protection & Security    | I   | R   | I   | I               | I  | A   | I                 |

### Pre-Training Validations (Readiness)

Pre-training validation establishes the legal, technical, pedagogical, and ethical foundations upon which all subsequent assessment and certification decisions will rely. It is the point at which the certification authority confirms that each learner is who they claim to be, is entering the programme on an appropriate pathway (EQF 5–6–7), has equitable access and necessary accommodations, and will be assessed against instruments that have been specified, reviewed, and approved to the required academic standards. The outcome of this stage is a fully evidenced “readiness state”: every learners has a verified identity, a documented baseline profile, any prior learning has been fairly recognized, accessibility and language arrangements are in place, and the approved test specification is locked for delivery with complete version metadata.

### Learner Registration & Identity Assurance

**Purpose and outcomes.** Registration and identity assurance are designed to create an unbroken, auditable chain between the learners civil identity and every artefact they submit or generate on the platform. A learner is considered “identity-verified” only when (a) a government-issued identity document has been validated, (b) a liveness check has confirmed that the person presenting the document is physically present and matches the document holder, and (c) a secure identity token has been issued and bound to the learner’s platform account for continuous authentication during learning and assessment.

**Process detail.** Learners create an account and submit identity documentation via a secure capture flow. The platform performs automated checks (document authenticity, data consistency, facial match



score) and—when any automated check falls below confidence thresholds—routes the case to a human verifier. A liveness test (micro-gestures and randomized prompts) is required to mitigate spoofing. When available, institutional single sign-on (SSO) is federated with the platform account; however, SSO does not replace primary identity proofing. Instead, the platform binds a persistent identity token to the SSO identity so that subsequent submissions—formative tasks, summative scripts, proctored sessions, and capstone artefacts—carry cryptographic linkage to the verified identity.

**Controls and evidence.** The system produces an identity verification report with time stamps, verification method, confidence scores, and manual override notes where applicable. For each assessment session, the token is re-challenged (step-up authentication) and a session integrity log is created. Any anomalies (multiple IP addresses in short intervals, device changes during secure sessions, or failed liveness checks) are flagged to the Central Exam Administration (CEA) for investigation before results are released.

**Exceptions and risks.** If a learner cannot complete digital proofing (e.g., lack of acceptable IDs), an in-person or notarized alternative is provided through an approved centre. Failure to achieve identity assurance results in a deferral of summative assessment until the issue is resolved. The primary risks—impersonation and account takeover—are mitigated by step-up authentication before high-stakes actions, device fingerprinting, and anomaly detection.

## Baseline & Diagnostic Assessment

**Purpose and outcomes.** The diagnostic determines a learner's initial position against the knowledge, skills, and responsibility/autonomy descriptors associated with EQF Levels 5, 6, and 7 for the AgriTech Manager (ATM) profile. It is non-credit-bearing and cannot disadvantage the learner; rather, it informs placement decisions, individualized scaffolding, and monitoring of learning gain.

**Design characteristics.** The diagnostic blueprint mirrors the main certification blueprint but at reduced sampling density. Items and tasks span foundational AgriTech concepts (e.g., data literacy for agriculture, digital agronomic practices), applied problem-solving (scenario-based questions), and professional judgement (short structured responses). Cognitive demand is tiered: items tagged to Level 5 emphasize execution and application in familiar contexts, Level 6 emphasizes interpretation, integration, and adaptation to varied contexts, and Level 7 emphasizes synthesis, strategy, and leadership of complex, interdependent tasks.

**Administration and scoring.** The diagnostic is delivered online under standard conditions without proctoring; its purpose is formative placement rather than gatekeeping. Automated scoring is used where appropriate; constructed responses are sampled and double-scored to calibrate difficulty estimates. Performance profiles are produced per competency domain and mapped to provisional EQF level indicators. The system proposes an initial learning pathway (e.g., “enter at EQF-5 with stretch objectives into EQF-6”), which is reviewed by the programme team before being confirmed to the learner .

**Use of results and protections.** Diagnostic outcomes are stored as baseline evidence and compared to summative outcomes to quantify learning gain and the appropriateness of pathway placement. Results never contribute to award decisions, may not be appealed as grades, and are disclosed to the learner with explanatory feedback and recommended resources. Any anomalies (e.g., unusually high diagnostic vs. low formative performance) trigger a tutor review for possible support needs rather than punitive action.



## Recognition of Prior Learning (RPL)

**Purpose and principles.** RPL ensures that learners with verifiable prior learning—formal, non-formal, or informal—are not required to duplicate competence acquisition. It upholds fairness by recognizing genuine attainment while preserving the integrity of the ATM certification outcomes.

**Submission and admissibility.** Learners compile a portfolio that may include certified transcripts, micro-credentials, employer attestations, work products, reflective statements, and—where relevant—evidence of impact (e.g., yield optimization reports, decision-support tools deployed on farm). Admissible evidence must be authentic, current, sufficient, and relevant to the specified learning outcomes. The platform provides templates to structure evidence against each outcome and requires provenance declarations (e.g., contribution statements for team artefacts).

**Evaluation and decision-making.** Two independent assessors evaluate the portfolio against published RPL criteria and the same outcome descriptors used in the certification framework. Where assessors differ materially, a senior assessor adjudicates and records the rationale. RPL may lead to exemption from discrete micro-components (modules, micro-credentials) or—rarely—direct eligibility for a summative capstone at a higher level. Exemptions never bypass critical safety-related outcomes, and they do not automatically confer a final award; they merely adjust the route to demonstration.

**Documentation and transparency.** Every RPL decision includes the outcomes covered, the evidence accepted, the assessment judgement with references to criteria, and any conditions (e.g., “exempt from X if learner completes updated compliance micro-module”). Learners receive a detailed decision letter and may request reconsideration if they can present additional evidence. Aggregated RPL statistics are reviewed termly to ensure consistency across centers and cohorts.

**Quality risks and mitigations.** Risks include inconsistent judgements and over-reliance on employer attestations. Mitigations include calibration sessions with benchmark portfolios, sampling by the Programme Assessment Board (PAB), and periodic external moderation. Any pattern of systematic leniency or stringency is addressed through targeted re-training and, if necessary, re-assessment of prior decisions.

## Accessibility & Language Policy

**Equity and legal compliance.** The framework guarantees that no learner is disadvantaged by disability, health condition, language background, or other protected characteristics. Accommodation is designed to remove barriers without diluting learning outcomes or altering the constructions being assessed.

**Accommodation process.** Learners may request accommodation during registration or at any time prior to summative assessment. Requests are supported by relevant documentation and handled confidentially by the Centre’s accessibility officer in coordination with the CEA. Typical accommodation includes additional time, assistive technologies, alternative item formats, rest breaks, or adapted proctoring arrangements. All approved accommodation is recorded as part of the learner’s assessment plan and is visible to assessors only insofar as needed to deliver the accommodation (to avoid bias).

**Language policy.** English is the master delivery language to ensure consistency and cross-centre comparability. Where translations are offered, they are prepared through a controlled process—forward translation, independent back-translation, reconciliation, and pilot testing—to preserve meaning and



difficulty. Learners may submit capstone artefacts in approved languages provided that required technical terminology is preserved and an English abstract is supplied for moderation. Language choice does not change performance expectations or standards.

**Evidence and audit.** Accommodation decisions include the justification and the exact adjustments granted. The platform tracks the use of accommodation during delivery. Periodic audits confirm that accommodation is being applied consistently across centers and that outcome distributions for accommodated vs non-accommodated learners are free from systematic bias after controlling for baseline differences.

## Test Specification Approval

**Purpose and governance.** The test specification is the authoritative blueprint for summative assessment. Approving it before delivery supports content validity, fairness, and appropriate interpretation of assessment outcomes (American Educational Research Association et al., 2014), while also ensuring EQF alignment and operational feasibility across HEI and VET contexts. Approval is a formal act of governance: once approved, the specification is version-locked, and any change requires documented impact analysis and re-approval.

**Content of the specification.** The document defines the assessment purpose, constructs, domains and sub-domains, the EQF level coverage, weightings, target cognitive processes per level, item types and formats, scoring model (including rubrics for performance tasks), time limits and conditions, permitted resources, integrity measures (e.g., secure browser, proctoring configuration), and accessibility parameters. It also lists critical outcomes that cannot be compensated (e.g., data ethics compliance, safety-critical decision-making).

**Review and approval process.** The CEA drafts the specification based on the certification framework; the Lead Psychometrician reviews for constructing coverage and measurement quality; the PAB reviews for academic appropriateness and feasibility; the Data Protection Officer confirms that delivery modalities comply with privacy and security requirements. The Certification Steering Committee (CSC) then meets to approve or request revisions. Minutes record queries raised, decisions taken, and any conditions attached to approval (for example, “approve subject to additional pilot of translation X”).

**Piloting and readiness checks.** Before first use—or after material changes, the specification is operationalized in a pilot with a representative sample to check timing, clarity, translation equivalence, item functioning, and accessibility. Pilot data are analyzed for item facility, discrimination, and differential item functioning across key groups. Any items or tasks failing with acceptance criteria are replaced or revised. A “readiness to deliver” checklist is signed off by the CEA before the first live window.

**Versioning and changing control.** Each specification carries a semantic version (MAJOR.MINOR.PATCH), an approval date, and a change log. Minor changes (e.g., clarifying wording without constructing impact) may be approved of between windows by the CEA with notification to the CSC. Major changes (constructors, blueprints, scoring) require full re-approval. Archived versions and their associated results are retained to support comparability studies over time.

### Readiness Gate – Definition of “Go/No-Go”

Pre-training validation concludes with a readiness gate. A “Go” decision is recorded only when: every registered learner has passed identity assurance or has an approved alternative process; all diagnostics



are complete and pathways confirmed; RPL decisions have been issued (or deadlines passed with learners informed); accommodations and language provisions are configured on the platform; and the current test specification is approved and version-locked with pilot evidence on file. A **“No-Go”** triggers corrective actions with a documented timeline, and no summative assessments may be scheduled until all gaps are closed.

## In-Training Formative Validation

In-training formative validation ensures that learning progresses in a structured, monitored manner and that no learner reaches high-stakes summative assessment without having had equitable opportunity to achieve the required level of competence. Formative validation is not merely instructional support; it is a **systematic, documented assurance mechanism** that tracks progression, detects barriers early, triggers timely interventions, and prevents assessment inequity caused by silent disengagement, unaddressed misconceptions, or varying levels of self-regulation.

The purpose of this stage is to provide **ongoing evidence of learning progression** and, where necessary, institute targeted remediation. These activities contribute directly to fairness and reliability in summative assessment because they reduce variance arising from preventable learning gaps rather than true difference in ability.

## Learning Analytics & Progression Rules

**Monitoring dimensions.** The digital learning platform continuously tracks multiple indicators that together form the learner’s progression profile:

- **Engagement:** login frequency, duration, and continuity of study sessions.
- **Task Completion:** timely fulfillment of assigned formative tasks and checkpoints.
- **Competence Development:** performance trends on formative quizzes, scenarios, and practice activities.
- **Concept Mastery Confidence:** repeated exposure and correction cycles for core domain concepts and applied reasoning tasks.

**Analytics interpretation.** These analytics are not used punitively; rather, they are used to detect emerging patterns that suggest either progress or risk such as:

- Sudden decline in performance after initial stability.
- Persistent difficulty in foundational areas required for EQF threshold performance.
- Disengagement indicators (e.g., extended inactivity, repeated late submissions).

**Progression rules.** Minimum formative engagement thresholds are defined for each course component. These thresholds are calibrated to ensure that the learner has had sufficient practice and feedback before attempting the summative assessment. A learner who does not meet progression thresholds is not deferred from summative assessment automatically; instead, the platform triggers **support and remediation protocols**, ensuring that barriers are addressed before high-stakes outcomes are affected.

**Evidence and reporting.** Learners receive periodic progression reports summarizing their current status relative to expected milestones, with recommended actions. Tutors and programme coordinators receive dashboards that highlight learners “at risk” so interventions can be timely and targeted. Data



are anonymized and aggregated when used for cohort-level teaching quality and curriculum improvement.

## Formative Assessment Integrity

Formative assessment functions as an instructional and validation mechanism and must therefore be protected from unintended leakage into high-stakes summative contexts.

**Assessment design.** Formative assessments include:

- Short knowledge checks linked to micro-concepts.
- Scenario-based exercises that mirror real-world contexts without replicating summative scenarios.
- Reflection prompts encouraging learners to self-evaluate skill development and reasoning strategies.

**Randomization and variation.** To avoid item memorization and ensure sustained cognitive engagement, formative assessments use:

- Randomized item selection from validated item pools.
- Variant forms of similar questions with altered contexts.
- Adaptive feedback based on learner response patterns.

**Feedback approach.** Feedback is designed to enhance conceptual understanding rather than to reveal summative answers. It includes:

- Explanation of reasoning steps.
- Clarification of underlying principles.
- Guidance on how to improve performance.

Feedback **does not** include:

- Disclosure of summative exam items.
- Direct correction of summative task formats.

**Security controls.** The system monitors for copy-paste behaviors, excessive retry patterns, and suspicious performance fluctuations. Where potential misuse is detected, the system prompts review and learning reinforcement activities rather than sanctions—unless there is clear evidence of academic misconduct (see Section 10).

## Post Training Summative Validation & Online Certification

### Examination Security and Proctoring

Summative assessments are administered within a controlled, security-hardened environment designed to preserve the validity of scores and safeguard the reputation of the award. Each session begins with identity re-verification using the learner's previously approved identity token. A two-step process is followed: first, optical character recognition validates document integrity (MRZ/ID security



features), then a liveness check compares a real-time facial capture with the learner's reference template. A confidence score threshold is enforced; sub-threshold matches trigger a manual review before the learner is permitted to proceed. A Data Protection Impact Assessment (DPIA) must be completed for this biometric identity-verification process prior to deployment. Processing relies on a documented lawful basis under GDPR Article 9(2) (e.g., explicit learner consent), and the facial reference template is deleted once the identity check for that session is complete.

The test delivery client launches in a secure browser mode that disables clipboard, external applications, printing, and screen sharing. Prior to unlocking the assessment, the proctoring system conducts an environmental scan: the learner rotates the camera to show the work surface and surrounding area; secondary devices (phones, tablets, smartwatches, secondary monitors) must be powered down and removed from reach. All scans, plus device fingerprints and network metadata, are time-stamped and appended to the session log.

Throughout the assessment session, continuous proctoring combines automated analytics (eye-gaze variance, voice/speech detection, unusual head pose, secondary screens) with human review. Potential anomalies, such as, repeated glances off-screen, overlapping audio streams, or extended inactivity, are flagged and annotated in real time. Learners are informed that brief natural movements will not be penalized; only sustained or patterned anomalies escalate for investigation. These behavioral signals are used solely to identify potential test-security concerns and are not used to infer learner's emotional, psychological, or other personal states. For performance-based tasks that require software tools, a whitelisted application model is used, and all file system interactions are captured in an immutable provenance log.

At session close, the system performs an integrity reconciliation: item-level response timelines, keystroke dynamics (where applicable), IP/location consistency, and proctor annotations are cross-checked. If the anomaly score exceeds the pre-set threshold, results are quarantined pending review under the malpractice process (see Section 10). Where connectivity interruptions occur, the platform invokes a resilience protocol (local encryption + delayed sync). In all cases, learners retain their right to reasonable accommodation; the proctoring vendor and center implement those accommodations without reducing the assessment's construct coverage. The Online Certification Model is available in the Project Platform and is ready to be released and be functional for the upcoming pilotings:



The screenshot shows the AGRITECH Masters Course Dashboard. The left sidebar lists course modules: MSc M05 Quiz EN, MSc Assessment Scenario M..., Feedback M05 MSc - EN, 6 - BLOCKCHAIN TECHNOLOGY..., MSc Manual M06 EN, MSc M06 Presentation EN, MSc M06 Quiz EN, MSc Assessment Scenario M..., Feedback M06 MSc - EN, 7 - INTEGRATION FOR AGRICULTURE..., MSc Manual M07 EN, MSc M07 Presentation EN, MSc M07 Quiz EN, MSc Assessment Scenario M..., Feedback M07 MSc - EN, Capstone, Your opinion matters, and Certificate. The main area displays progress bars for various modules: 1-DEEP TECH AGRICULTURE (25%), 2-PROJECT MANAGEMENT AND INNOVATION (25%), 3-ARTIFICIAL INTELLIGENCE FOR DEEP TECH AGRICULTURE (0%), 4-SENSOR TECHNOLOGY IN SMART AGRICULTURE (0%), 5-DATA COMPUTING FOR SMART AGRICULTURE (0%), 6-BLOCKCHAIN TECHNOLOGY FOR AGRICULTURE (0%), 7-INTEGRATION FOR AGRICULTURE DEEP TECH (0%), and CAPSTONE (0%). A 'Your opinion matters' section shows a progress bar at 50%. A 'Certificate' section shows a progress bar at 0%. A 'Certificate' modal is open, displaying the 'MASTERS Course Certificate' and a message: 'Not available unless: The activity MSc M01 Quiz EN is marked complete ...'.

The screenshot shows the AGRITECH VET Course Dashboard. The left sidebar lists course modules: 1. DEEP TECH AGRICULTURE, VET Manual M01 EN, VET M01 Presentation EN, VET Quiz M01 (EN), VET Assessment Scenario M..., 2. PROJECT MANAGEMENT..., VET Manual M02 EN, VET M02 Presentation EN, VET Quiz M02 EN, VET Assessment Scenario M..., 3. ARTIFICIAL INTELLIGENCE..., VET Manual M03 EN, VET M03 Presentation EN, VET Quiz M03 EN, VET Assessment Scenario M..., 4. SENSOR TECHNOLOGY IN..., VET Manual M04 EN, VET M04 Presentation EN, VET Quiz M04 EN, VET Assessment Scenario M..., 5. DATA COMPUTING FOR S..., VET Manual M05 EN, VET M05 Presentation (EN), VET Quiz M05 EN, VET Assessment Scenario M..., and Certificate. The main area displays progress bars for various modules: 1-DEEP TECH AGRICULTURE (0%), 2-PROJECT MANAGEMENT AND INNOVATION (33%), 3-ARTIFICIAL INTELLIGENCE FOR DEEP TECH AGRICULTURE (0%), 4-SENSOR TECHNOLOGY IN SMART AGRICULTURE (33%), 5-DATA COMPUTING FOR SMART AGRICULTURE (0%), 6-BLOCKCHAIN TECHNOLOGY FOR AGRICULTURE (0%), 7-INTEGRATION FOR AGRICULTURE DEEP TECH (0%), and CAPSTONE (0%). A 'Your opinion matters' section shows a progress bar at 0%. A 'Certificate' section shows a progress bar at 0%. A 'Certificate' modal is open, displaying the 'VET Course Certificate' and a message: 'Not available unless: The activity VET Quiz M01 (EN) is marked complete ...'.

## Assessment Design and Blueprints

Summative assessment is delivered through a tripartite structure that mirrors the competency architecture of the AgriTech Manager (ATM) role and ensures fidelity to the EQF descriptors at Levels 5, 6, and 7:



1. **Scenario-based examinations** assess applied knowledge and analytic decision-making under time constraints. Items are constructed from authentic AgriTech contexts—e.g., precision agriculture data interpretation, regulatory compliance choices, or ethical dilemmas in AI-enabled farming. Each item is tagged to a specific learning outcome (LO), cognitive process (recall, application, analysis, synthesis/evaluation), and EQF level. The blueprint stipulates domain coverage, minimum and maximum item counts per LO cluster, and the proportion of items requiring multi-step reasoning.
2. **Performance tasks** require learners to produce artefacts (e.g., data cleaning scripts, dashboard prototypes, risk registers, stakeholder briefing notes). Tasks specify inputs, constraints, evidence requirements, and performance conditions. Rubrics describe observable behaviors at each EQF level—execution accuracy and safety at Level 5; contextual adaptation and justified trade-offs at Level 6; orchestration across systems, risk governance, and strategic alignment at Level 7.
3. **Capstone project with oral defense** integrates multiple domains in a substantial, evidence-rich deliverable aligned to real-world enterprise needs. Capstones include a proposal (scope, intended outcomes, ethical considerations), an implementation artefact (prototype, pilot, or plan), and a reflection on impact and sustainability. The defense assesses the learner's ability to justify choices, critique limitations, and translate outcomes for different audiences (technical and managerial).

Each sitting is assembled from the blueprint using constrained randomization to preserve coverage while varying forms across cohorts. Item exposure is controlled via content balancing and statistical surveillance (facility, discrimination, differential item functioning), with retirement rules for over-exposed items. Parallel forms are equated through common-item anchors to stabilize standards over time and across centers.

## Standard Setting & Cut-Scores

Minimum competence thresholds are established per EQF level using recognised, transparent methods and documented for audit:

**Panel composition and training.** Panels include subject-matter experts from HEIs/VET, industry partners, and at least one psychometrician. Prior to judgement, panelists complete calibration exercises using anchor items/artefacts and exemplar scripts representing borderline performance for each level.

**Modified Angoff (for scenario-based exams), applied in line with recognized testing standards (the AERA/APA/NCME Standards for Educational and Psychological Testing).** For each item, panelists estimate the probability that a minimally competent learner at a given EQF level would answer correctly. Estimates are discussed and re-rated after feedback on empirical item difficulty from pilot data. Aggregated probabilities are summed to produce an initial cut-score; conditional standard error of measurement (CSEM) bands are computed, and the recommended cut-score is adjusted within the CSEM to balance false-positive/false-negative risks.

**Bookmark (for mixed-format forms).** Items are ordered by empirical difficulty on a calibrated scale. Panelists place bookmarks at the point where a minimally competent learner at each level would begin to struggle systematically. Bookmark positions are converted to raw-score cut-scores through the test characteristic curve.



**Performance tasks and capstones.** Standard setting relies on **borderline regression** and **contrasting groups** methods. Assessors independently rate a stratified sample with analytic rubrics; a standard-setting workshop then identifies rubric descriptors that constitute “minimally acceptable” performance per level. Cut-scores are derived from the intersection of borderline ratings and total scores.

**Consequential validity checks.** Proposed standards are stress-tested against historical performance (where available), cohort characteristics, and pass-rate expectations from stakeholders. Disparities require reasoned justification or recalibration. Final recommendations, together with impact data and alternate standards considered, are documented in Standard Setting Minutes and ratified by the Certification Steering Committee (CSC).

**Maintaining standards over time.** Equating designs (anchor items and anchor tasks), drift monitoring, and periodic re-standard-setting (every 24 months or sooner if KPIs breach thresholds) ensure stability and fairness across sittings and centres.

## Scoring, Rubrics, and Inter-Rater Reliability

All constructed responses are scored with **analytic rubrics** that articulate distinct criteria (e.g., data integrity, methodological rigor, stakeholder engagement, risk and ethics, economic feasibility) and performance descriptors aligned to EQF 5, 6, and 7. Descriptors avoid vague adjectives; they specify observable evidence and decision rules. Each criterion carries a defined weight per level consistent with the blueprint (e.g., at Level 7, strategic alignment and governance carry greater weight than at Level 5).

**Assessor qualification and calibration.** Assessors must complete annual training and pass a calibration exercise using benchmark scripts and capstone exemplars. Calibration targets are pre-announced (e.g., absolute agreement  $\geq 70\%$  within one score point; weighted Cohen’s kappa  $\geq 0.75$ ). Assessors who do not meet thresholds receive remedial training and are restricted from high-stakes marking until re-qualified.

**Double marking and resolution.** Capstones and high-stakes performance tasks are double-marked independently. If the absolute difference exceeds the tolerance (e.g.,  $>1$  point on any critical criterion or  $>5\%$  total score), a senior examiner conducts an adjudication review. The adjudicator records a narrative justification referencing evidence against rubric descriptors; all adjustments are logged for moderation analysis.

**Live reliability monitoring.** During marking, inter-rater reliability (IRR) is continuously estimated using a seeded set of common scripts/tasks. Real-time dashboards alert the Programme Assessment Board (PAB) to drift by assessor, criterion, or centre. Corrective actions include targeted guidance, temporary pause of specific assessors, or re-marking of affected scripts.

**Quality of scoring outputs.** Post-hoc psychometrics evaluate criterion functioning (item/criterion discrimination), internal consistency (Cronbach’s alpha or omega), and fairness (DIF analyses across protected characteristics). Findings feed into the continuous improvement cycle and, where necessary, trigger rubric refinement.

## Grading Model and Compensation Rules



Grades are derived from a **composite model** that respects the hierarchical structure of competencies and the safety-critical nature of some outcomes:

**EQF level determination.** The primary decision is pass/fail at the targeted EQF level based on meeting or exceeding the cut-score *and* satisfying any **critical outcome requirements** (non-compensable criteria). For example, a learner cannot be certified at Level 6 without demonstrating compliant data governance and ethical risk management, regardless of aggregate score.

**Aggregation and weights.** Each assessment component contributes to the overall decision with level-appropriate weights—for instance, scenario-based exam (30–40%), performance tasks (30–40%), capstone + defence (30–40%). Within components, rubric criteria weights reflect the increasing emphasis on autonomy and leadership at higher levels.

**Compensation rules.** Limited compensation is permitted across sub-domains to recognize holistic competence while protecting public/organizational safety. A compensated pass cannot exceed a defined ceiling (e.g., final grade capped at “Pass” rather than “Merit/Distinction”), and cannot apply to critical outcomes. Compensation boundaries and examples are published in learner handbooks to ensure transparency.

**Borderline policy.** A **borderline review** is applied where the total score falls within a predefined band around the cut-score (e.g.,  $\pm 2$  SEM). The PAB considers qualitative evidence (consistency across tasks, capstone defence performance, professional conduct) before confirming or denying the award. All borderline decisions are documented with reasons.

**Resit and progression.** Learners who fail may resit failed components according to a defined schedule. If only one component is failed and others are strong, **component-wise resit** is offered. Re-assessment uses alternate forms/items; coaching focuses on the specific gaps that prevented demonstration of competence at the target level.

## Award Ratification

The **Programme Assessment Board (PAB)** convenes after marking and preliminary quality checks to consider cohort-level and learner-level evidence. Inputs include: distribution statistics by component and criterion; IRR and moderation reports; integrity/proctoring outcomes; standard-setting confirmation; anomaly flags (e.g., unusual time-on-task, improbable response patterns). The PAB verifies that grading and compensation rules have been applied consistently and that any deviations are justified and recorded.

Cases involving suspected malpractice, unresolved appeals, or accessibility adjustments with potential impact on comparability are addressed first, with outcomes noted. Borderline cases are then reviewed against the published policy. The PAB may commission targeted re-marking where evidence indicates a material risk of misclassification.

Once satisfied, the PAB recommends award decisions to the **Certification Steering Committee (CSC)**. The CSC’s ratification is a formal governance act: it confirms that due process has been followed, standards have been maintained, and risks have been managed. Ratification minutes enumerate: (a) standards adopted; (b) any special considerations; (c) statistics on passes/fails and distributions by EQF level; (d) actions arising for quality improvement. Once ratified, credential issuance begins immediately, following the process described in Section 9



## Evidence & Records Management

Evidence and records management safeguards the **integrity, auditability, and recognisability** of the certification process. It ensures that every assessment judgement and award decision can be traced back to verifiable underlying evidence and that such evidence is stored, protected, retained, and accessible only to authorized individuals, in full compliance with GDPR, national data protection regulations, and institutional ethics policies. Effective records management also supports **external recognition**, accreditation reviews, longitudinal studies of impact, and the capacity to defend decisions in the event of appeals or legal scrutiny.

The system therefore treats assessment evidence as a formal academic record. No certification outcome is valid unless it is supported by documented, versioned, and access-controlled evidence retained in accordance with this section. These practices align with the GDPR data-protection principles (Articles 5-6); Article 9 additionally applies to the biometric proctoring data described in Section 6,

## E-Portfolios and Provenance

**Purpose and Scope:** For performance tasks and capstone projects, **e-portfolios** serve as the primary evidence record of demonstrated competence. E-portfolios provide a structured, traceable, and auditable container that aggregates the full set of artefacts generated during the learning and assessment process.

**Required Components of E-Portfolios:** Each learner's e-portfolio must include:

- **The core artefact(s)** produced for the capstone or performance task (e.g., data models, agronomic dashboards, business plans, project proposals, technical proofs-of-concept).
- **Repository logs**, commit histories, revision timestamps, and version metadata demonstrating how the artefact evolved over time.
- **Dataset citations and provenance statements**, including sources, licensing, collection methods, and any preprocessing techniques used.
- **Contribution statements**, detailing the specific contributions of the learners in cases where collaborative work or shared tools were involved.
- **Reflective commentary**, explaining decision-making processes, trade-offs evaluated, ethical considerations, and alignment with the intended outcomes and professional responsibilities of the AgriTech Manager role.
- **Originality and integrity declaration**, signed by the learner..

**Use of Generative AI and External Assistive Tools >>** Learners must **declare and justify** any use of generative AI systems, advanced language models, automated code assistants, statistical generators, or optimization engines. Declaration must include:

- Tool name, version and date of use (where known)
- Scope and nature of use
- Rationale for use
- Confirmation that human judgement was retained

Undeclared use of generative AI, or use that replaces the learner's own reasoning or strategic decision-making, is considered **academic malpractice** (see Section 10).

**Verification and Authenticity Checks >>** E-portfolios undergo automated and human authenticity checks, including:



- Metadata pattern analysis
- Document and code stylometry
- Cross-referencing against public repositories
- AI-output detection heuristics
- Oral defence questioning aligned with submitted artefacts

Failure to demonstrate authorship authenticity may result in annulment of assessment outcomes.

## Data Retention and Access Control

Retention periods are defined to balance auditability and learner privacy:

| Data Type                                                            | Minimum Retention Duration                                                                                                                               | Purpose                                                            |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Raw exam event logs, keystroke traces, and proctoring video/audio    | 12 months                                                                                                                                                | Investigation of anomalies, malpractice, and appeals               |
| Summative assessment scores, component grades, and award decisions   | 5 years                                                                                                                                                  | Verification requests, institutional audits, employer recognition  |
| Credential metadata and digital credential registry entries          | 10 years (minimum)                                                                                                                                       | Long-term credential verification and professional mobility        |
| Standard-setting reports, moderation records, and validation studies | "Retained permanently in anonymised/statistical form; any personally identifiable information is removed or follows the shorter retention periods above" | Longitudinal comparability, accreditation, and recognition reviews |

Periods may be extended where required by national regulations, accreditation conditions, or legal proceedings.

### Access Control and Permissions

- >> Access follows the **principle of least privilege**: only those whose roles explicitly require access may view or interact with records.
- >> The **Data Protection Officer (DPO)** approves and periodically reviews access rules. The DPO also maintains a Record of Processing Activities (GDPR Article 30) and oversees the Data Protection Impact Assessment (GDPR Article 35) for these processes.
- >> All access events are logged and stored for audit.
- >> External reviewers and auditors receive **read-only, time-limited** access through secure channels.
- >> Learners may request access to their own submitted work, scoring feedback, and final award decisions, but not to internal moderation or comparative peer data.

### Encryption and Security

- >> Evidence is stored in encrypted form at rest and in transit.
- >> Proctoring recordings and identity verification materials are stored separately from scoring and credential data to minimize linkage risk.
- >> Any data transfer to external archival systems or registries uses cryptographically signed packages with integrity validation.

## Archiving for Audit

Purpose of Archiving >> Archiving ensures that certification processes remain transparent, defensible, and externally verifiable. Archives enable:

1. Institutional internal reviews
2. External accreditation visits



3. Recognition and equivalence evaluations by international bodies
4. Investigations related to academic integrity or appeals
5. Longitudinal analysis of scoring stability and curriculum impact

Archival Scope >> The following evidence sets must be archived in structured, indexed, and version-controlled form:

1. Validation studies (construct validity, reliability analyses, norming and equating outputs)
2. Standard-setting documentation (methods used, panel composition, statistical summaries, recommended cut-scores, and ratification confirmation)
3. Moderation samples and reports (pre- and post-assessment)
4. Records of assessor calibration and inter-rater reliability audits
5. Minutes of the Programme Assessment Board (PAB) and Certification Steering Committee (CSC) meetings related to award decisions
6. Records of appeals, their outcomes, and any remediation actions taken

Audit Readiness Requirements >> For audit readiness, archived materials must:

1. Be discoverable (indexed and searchable with metadata).
2. Be complete (contain all required layers of evidence).
3. Be tamper-evident (immutable logs or blockchain signing strongly recommended).
4. Be accompanied by explanatory context, enabling auditors to understand the basis of decisions without requiring access to confidential learner identity data.

Longitudinal Evidence Utility >> Archived data also support continuous improvement, standard re-calibration, equity monitoring (across gender, language background, geography), and the evolution of the ATM competence model in future project phases or successor programmes.

## Moderation & Quality Assurance

Moderation and quality assurance activities ensure that the certification system remains academically credible, consistent across delivery contexts, and defensible in all high-stakes decisions. Moderation is not an isolated step after assessment; it is a continuous, cyclical system of verification embedded throughout the design, delivery, scoring, and award phases. Quality assurance, in this context, refers to the structured oversight mechanisms that maintain alignment with institutional regulations, professional expectations, sector-level competence standards, and the European Qualifications Framework.

Moderation is grounded in the principle that assessment is a professional judgement that must be reliable, transparent, and justifiable. While instructional variation may be expected across HEI and VET centres, the **judgement of competence must not vary**. Therefore, moderation is the primary mechanism through which the system protects learners from unfair advantage or disadvantage due to assessor differences, institutional differences, or unintentional bias.

The moderation system is constructed in three complementary layers. The first layer focuses on **assessment design moderation**, which occurs before delivery. At this stage, all summative assessment instruments are reviewed against the approved assessment blueprint and the EQF-aligned learning outcomes. The purpose of this review is to confirm that each assessment task genuinely measures the intended competence domain, that cognitive demand is appropriate to the targeted EQF level, and that no item introduces cultural, linguistic, or contextual bias. This phase also confirms that any translated



or adapted forms preserve meaning and difficulty equivalence. The assessment cannot proceed to delivery until this design validation has been formally documented.

The second layer is **in-delivery moderation**, which focuses on scoring consistency. Assessors are required to complete annual training and calibration exercises before marking any summative work. Calibration involves reviewing benchmark scripts or capstone exemplars, comparing scoring decisions with reference standards, and achieving consistency thresholds. The calibration process creates a shared understanding of the performance characteristics that distinguish EQF 5 from 6, and 6 from 7. Only assessors who demonstrate acceptable alignment are authorized to mark. Once scoring is underway, inter-rater reliability is continuously monitored. A predefined sample of submissions is “double scored” or compared against anchor scripts to detect drift. If the degree of variation between assessors exceeds tolerance boundaries, targeted recalibration, temporary removal from marking duties, or re-marking of affected submissions may be required. Throughout this stage, assessors must base every scoring decision on explicit evidence visible in the learner’s work and not on inferred ability, personality, or presentational style.

The third layer is **post-assessment moderation**, which occurs once initial marking is complete but before any awards are ratified. The Programme Assessment Board (PAB) reviews score distributions across components and checks the coherence between criterion-level performance and final outcomes. Particular attention is paid to borderline cases, unusual grade patterns, and evidence of systematic biases. This review is documentary in nature: all decisions must be supported by evidence contained within the record, and any adjustments must be justified in writing. The PAB does not replace assessor judgement but ensures that judgment has been applied consistently and correctly. It also identifies patterns that may indicate underlying issues in curriculum delivery, assessment interpretation, or execution conditions, feeding these insights into the continuous improvement cycle.

Quality assurance operates in parallel to moderation and governs the integrity of the overall assessment environment. Institutional QA bodies perform periodic audits to verify that assessment processes are implemented exactly as specified in this framework and as required by institutional and regulatory standards. QA review includes verification that documentation is complete and appropriately stored, that identity assurance and proctoring protocols have been followed, that accommodations have been granted fairly and transparently, and that appeals and complaints have been resolved according to policy. The QA function has no role in determining marks or outcomes but serves as the guardian of procedural fidelity and institutional accountability.

External review forms an additional safeguard. At least once per certification cycle, independent external reviewers with no current affiliation to the consortium examine a representative sample of assessment instruments, scored work, moderation records, and award ratification minutes. External reviewers evaluate the **comparability of standards** across cohorts and centres and confirm that the awarded EQF levels correspond to the expected complexity and autonomy descriptors. Their feedback is reported to the Certification Steering Committee (CSC), which determines whether adjustments, recalibrations, or policy updates are necessary.

Together, moderation and quality assurance create a system where assessment outcomes are not only accurate reflections of demonstrated competence but are also credible to employers, institutions, regulators, and international recognition bodies. This ensures that every learner awarded certification has demonstrably achieved the level of capability the qualification claims to represent, and that no learner is awarded certification without appropriate, transparent, and academically defensible evidence.



## Pre-Assessment Moderation (Design Moderation)

Before assessments are delivered, summative assessment instruments undergo structured design moderation. This moderation confirms that each task or examination accurately measures the intended learning outcomes and is aligned with the expected cognitive sophistication of the EQF level to which it belongs. Assessment designers provide a rationale for each component, explaining how it reflects the competency profile and the authentic professional challenges of the AgriTech Manager role. Moderators evaluate whether the proposed tasks contain any embedded bias or contextual limitations that may disadvantage particular groups of learners. If translations or alternative language versions are provided, they undergo meaning and difficulty equivalence review through forward and backward translation. Assessments may not proceed to delivery until the moderation panel formally records that the design is approved.

## In-Assessment Moderation (Marking and Scoring Consistency)

Once learners begin submitting work, moderation shifts toward ensuring the consistency and reliability of scoring. Assessors must complete certification and calibration exercises prior to marking to ensure shared interpretation of rubric descriptors. Calibration involves reviewing benchmark exemplars representing performance at different EQF levels and demonstrating scoring alignment within acceptable tolerance. During the marking process, inter-rater reliability is monitored continuously by periodically inserting anchor tasks or duplicated submissions to detect divergence among assessors. If variation exceeds acceptable thresholds, corrective actions such as targeted re-training, temporary suspension of marking privileges, or re-marking of affected work are initiated. The objective is not to eliminate assessor judgement but to ensure that judgement is being applied consistently across individuals, settings, and time.

## Post-Assessment Moderation (Award Decision Assurance)

Post-assessment moderation occurs after marking is complete but before awards are confirmed. The Programme Assessment Board reviews score distributions, patterns of performance, and outcomes for consistency. Particular attention is given to borderline cases, unexpected clusters of high or low scores, and discrepancies between component scores and overall final results. The Board ensures that compensation rules were applied correctly and that all critical, non-compensable learning outcomes were satisfactorily demonstrated. If irregularities are detected—such as a cluster of unusually high results in a single centre, or systematic grading differences between assessors—the Board may commission targeted re-marking, request additional evidence, or place temporary holds on certain results. All decisions made during this phase are recorded carefully, including the rationale behind any adjustments.

## 8.4 External Moderation and Independent Oversight

External moderation introduces an independent academic and professional perspective. External reviewers are invited to examine a curated sample of assessment instruments, learner work, moderation reports, and award decisions. They assess whether standards are being upheld consistently across cohorts and whether the awarded EQF levels are defensible in terms of cognitive complexity, autonomy, and responsibility demonstrated. The external review also ensures continued relevance of the certification to professional practice and sector innovation trends. Evaluations and recommendations from external moderation are formally submitted to the Certification Steering Committee, which determines whether adjustments, recalibrations, or policy updates are required.



## 8.5 Continuous Quality Assurance Cycle

Quality assurance is not limited to periodic audits; it forms a continuous cycle of monitoring, reflection, and improvement. Institutional QA officers verify that assessment processes conform to both internal regulations and the Validation Framework. They review documentation completeness, identity verification logs, accommodation decisions, and examination security records. At the end of each certification cycle, quality assurance findings, moderation conclusions, learner feedback, employer or partner feedback, and psychometric analyses are synthesized into a continuous improvement report. This report identifies strengths, risks, and recommended adjustments to assessment tasks, rubrics, progression rules, or centre readiness conditions. The CSC reviews and prioritizes improvement actions and assigns responsibility and implementation timelines.

### Assurance of Learner Fairness and Transparency

Moderation and QA systems must preserve learner fairness. Learners are entitled to clear communication regarding assessment expectations, criteria, progression rules, and grounds for appeal. They must have access to feedback that is constructive, meaningful, and aligned with the learning outcomes. Fairness also extends to ensuring that accommodations for disability, language, or other learning needs are implemented without altering the rigor of assessment or the meaning of competence. Transparency is achieved by ensuring that assessment policies, marking rubrics, moderation procedures, and award criteria are published and consistently applied.



## Appeals, Complaints, and Malpractice

The AgriTech Manager Certification system upholds principles of fairness, transparency, and learner protection. To maintain confidence in the integrity of the award, learners must have clear avenues to express concerns, request reviews, and challenge academic decisions. Likewise, the system must safeguard academic standards by identifying, investigating, and resolving cases where the authenticity, independence, or fairness of assessment work is in doubt. This section defines the formal procedures for appeals, complaints, and malpractice investigations, ensuring that all such matters are handled consistently, impartially, and in alignment with applicable institutional policies and legal frameworks.

### Appeals

An **appeal** concerns the outcome of an academic decision—most commonly, a summative assessment result or the application of progression or award criteria. Appeals may be submitted only on defined, legitimate grounds. Disagreement with academic judgement alone does not constitute grounds for appeal; academic judgement is respected unless there is credible evidence of error or procedural failure.

Learners may lodge an appeal if they believe that:

1. The assessment was not conducted in accordance with the published procedures.
2. An error occurred in the calculation or transcription of grades.
3. New, material evidence has emerged that could not reasonably have been provided earlier (e.g., medical or personal circumstances restricting performance, supported by documentation).
4. Reasonable accommodations that were approved were not implemented during assessment delivery.

### Appeals Procedure

The appeal must be submitted within a defined window following the release of results. Upon submission, the appeal is acknowledged, and the learner is informed of the expected timeline and process.

An initial review is conducted to confirm eligibility. If accepted, the appeal is referred to the Programme Assessment Board (PAB), which appoints a review panel that did not participate in the original assessment. The panel examines relevant records, including assessment scripts, feedback, moderation evidence, and procedural logs. Where appropriate, assessors involved in the original marking may be consulted for clarification, though they do not participate in the decision.

The outcome may include: confirmation of the original decision, correction of an identified error, re-marking of the assessment by a new assessor, or permission for a re-assessment attempt under defined conditions. All outcomes are documented with explanatory reasoning. The decision is final within the academic domain; however, institutional dispute mechanisms and ombuds services may be invoked where procedural compliance is disputed.

### Complaints



A **complaint** is distinct from an appeal. A complaint concerns the learner's experience of the process—such as accessibility conditions, communication quality, staff conduct, administrative errors, scheduling issues, or perceived inequities in service—but does not contest an academic result directly.

Complaints are submitted through a confidential channel managed by the Central Exam Administration (CEA). Upon receipt, the complaint is logged and reviewed by a senior administrator, who may consult relevant personnel for factual clarification. If the complaint relates to conduct, dignity, or discrimination concerns, it is referred to the appropriate institutional authority (e.g., ethics board, equality office) according to policy.

The complainant receives a written response outlining findings and, where appropriate, measures taken to resolve the issue or prevent recurrence. Complaints data are reviewed periodically to identify systemic service or communication issues and to inform continuous improvement within the certification ecosystem.

## Malpractice and Academic Integrity

Malpractice refers to any behaviour that compromises the authenticity of assessment performance, violates the conditions of assessment, or enables unfair advantage. Protecting the integrity of assessment is essential to protect learners, institutions, and the value of the certification itself. Common forms of malpractice include impersonation, obtaining assistance during proctored assessment, unauthorized collaboration, use of unapproved materials, data fabrication, falsification of portfolio evidence, plagiarism, and undeclared or inappropriate use of generative artificial intelligence tools.

**Detection and Reporting >>** Potential malpractice may be identified through automated proctoring alerts, plagiarism detection tools, data and metadata forensics, assessor concern, or third-party reports. Any suspected case triggers a formal investigation; no certification outcome may be awarded or withheld until the investigation is concluded.

**Investigation Procedure >>** Investigations are impartial, confidential, and evidence-based. The learner is notified of the allegation and invited to provide an explanation or supporting evidence. The investigating officer reviews proctoring logs, assessment artefacts, timestamp evidence, and assessor notes. For capstones, the learner may be requested to undertake an oral authentication interview to demonstrate understanding of submitted work.

**Decision and Outcomes >>** If malpractice is confirmed, outcomes range from requiring reassessment under controlled conditions, to annulment of the assessment attempt, to disqualification from the certification pathway. Intent, impact, and recurrence are considered in determining sanctions. If evidence is insufficient to substantiate malpractice, the case is dismissed and the assessment result proceeds.

Learners retain the right to appeal a malpractice decision through the appeals process defined above.

## Continuous Improvement Cycle

The AgriTech Manager Certification system is designed to be **dynamic rather than static**, evolving in response to evidence generated through its own operation. Continuous improvement ensures that the certification model remains pedagogically effective, professionally relevant, and academically defensible over time. It also ensures that the certification remains aligned to shifts in agricultural technologies, sector practices, regulatory frameworks, sustainability imperatives, and employer



expectations. This section outlines the structured cycle through which data are collected, interpreted, and translated into coherent improvements at the levels of curriculum, assessment design, delivery practice, and governance.

## Purpose of the Continuous Improvement System

The purpose of continuous improvement is not simply to refine administrative efficiency, but to preserve the **validity, reliability, fairness, and relevance** of assessment outcomes. The improvement cycle ensures that changes to the certification system are not made reactively or anecdotally, but are supported by evidence trends, stakeholder feedback, and systematic review. Adjustments are therefore made deliberately, proportionately, and transparently, preserving comparability across cohorts while allowing innovation and responsiveness.

## Data Sources Feeding Continuous Improvement

Improvement decisions are informed by multiple forms of evidence gathered throughout each assessment cycle. The validity of the system is sustained only when different evidence sources are interpreted together rather than in isolation.

Data sources include:

- Statistical analyses of assessment performance, including item difficulty and discrimination indicators for scenario-based examinations, distribution patterns in performance tasks, and scoring stability across assessors and centres.
- Inter-rater reliability metrics and moderation reports, which reveal whether assessor guidelines are being interpreted uniformly and whether rubric descriptors are sufficiently precise.
- Proctoring and assessment integrity records, which identify emerging risks such as novel forms of misconduct or vulnerabilities in current assessment formats.
- Patterns in appeals and complaints, which indicate where procedures may lack clarity or accessibility.
- Learner and tutor feedback, collected through structured reflection instruments that assess perceived clarity of expectations, adequacy of resources, and learning experience quality.
- Employer and industry partner consultations, which assess whether certified learners demonstrate the competencies needed in practical professional contexts.

## Annual Review and Synthesis

At the end of each certification cycle, the Programme Assessment Board synthesizes the available evidence into a written Continuous Improvement Report. The report identifies:

- Strengths of the current assessment model, particularly where assessments demonstrably elicit authentic professional reasoning and align well with EQF-level descriptors.
- Areas where performance patterns suggest misalignment between intended outcomes and demonstrated learner achievement (e.g., persistent difficulty in a domain may signal insufficient instructional scaffolding or task ambiguity).
- Risks to assessment validity (e.g., excessive familiarity with certain item types leading to strategic test behavior rather than authentic competence demonstration).
- Any emerging inequities across demographic or institutional groups revealed through controlled statistical comparison.



This report is submitted to the Certification Steering Committee, which determines whether recommended actions should be **mandatory adjustments**, **optional enhancements**, or **areas for future study**.

## Decision-Making and Change Authorization

Changes that may affect **assessment standards**, **blueprint coverage**, **rubric descriptors**, **EQF alignment**, or **progression rules** require formal approval by the Certification Steering Committee. Such changes must include:

1. An explicit description of the proposed adjustment and its rationale.
2. A mapping of the anticipated effect on assessment validity and comparability.
3. A plan for communication to assessors, tutors, QA personnel, and learners.
4. A transition strategy to prevent unfair advantage or disadvantage to any cohort.

Changes that affect **operational processes only** (e.g., improving identity verification UX, updating proctoring vendor integration, adjusting dashboard display logic) may be authorized jointly by the Central Exam Administration and QA office but must still be documented and versioned.

## Implementation, Monitoring, and Verification

Once a change is authorized, implementation proceeds with clear timelines, assigned responsibility holders, and monitoring points. Implementation must always include:

- Training or briefing for assessors and instructional staff, where relevant.
- Updated documentation in all affected policy repositories, learners information guides, and assessor reference materials.
- Version control applied to affected blueprint documents, rubrics, or specifications.

After implementation, early-cycle monitoring verifies whether the change has the intended effect without introducing unintended distortions. Monitoring focuses on stability of scoring patterns, learner comprehension of expectations, clarity of instructions, and maintenance of fairness. If issues arise, adaptive correction occurs promptly and is similarly documented.



## Recognition & Portability

The value of the AgriTech Manager Certification depends not only on the validity of its assessment practices but also on the **extent to which certified competence is portable across educational systems, labour markets, and national jurisdictions**. Recognition and portability ensure that the award is understandable to employers, compatible with institutional qualification structures, and usable by learners as a transferable credential for progression into further training, employment, or advanced study.

This section defines how the certification aligns with international qualifications frameworks, connects to the ECTS and ECVET principles adopted across the European Higher Education Area, and integrates into emerging European digital credential infrastructures. It also outlines the expectations and mechanisms under which receiving institutions and employers may evaluate or formally recognize the credential.

## Alignment with the European Qualifications Framework (EQF)

The Certification Framework establishes explicit mapping of demonstrated competence to the **EQF levels 5, 6, and 7**. This mapping reflects structured progression in knowledge sophistication, problem-solving ability, and autonomy/responsibility:

- **EQF Level 5** certification indicates that the learner can execute defined operational and analytical tasks reliably in structured professional contexts, applying established methods under limited supervision.
- **EQF Level 6** certification signifies that the learner can independently diagnose and evaluate complex AgriTech scenarios, select among multiple viable approaches, justify decisions, and integrate ethical, sustainability, and stakeholder considerations into professional practice.
- **EQF Level 7** certification confirms the ability to lead strategic planning, innovation, risk governance, and cross-stakeholder collaboration at organizational or ecosystem scale, demonstrating judgement in emerging or ambiguous situations.

The EQF mapping ensures that the certification can be meaningfully understood beyond national systems, supporting:

- Mutual recognition discussions between institutions.
- Transparent communication of competence to employers.
- Compatibility with qualifications registers and micro-credential frameworks.

## Relationship to ECTS and Academic Credit Transfer

The certification does not automatically award ECTS credits; however, **Receiving Institutions may choose to award credit** through Recognition of Prior Learning (RPL) processes. To support such decisions, the certification provides:

- **Published Learning Outcomes** with demonstrable evidence traces.
- **Assessment rubrics** that articulate expected performance standards.
- **Portfolio artefacts** that illustrate applied competence.
- **Documentation of workload equivalence** (indicative study hours and assessment preparation effort).



Institutions may decide to award credit toward modules in agricultural sciences, digital agriculture, sustainability leadership, innovation management, or related programmes, depending on curricular alignment. The certification therefore supports ECTS recognition by providing **transparent, evidence-based artefacts** that facilitate institutional evaluation.

## Alignment with VET Systems and Occupational Standards

For VET centres and professional qualification bodies, the certification provides **competence descriptors written in task-based, performance-centered language**, allowing alignment with:

- National occupational classification frameworks.
- Sectoral qualification standards.
- Apprenticeship progression models and professional routeways.

This supports both **upskilling** (progression from VET to higher education) and **reskilling** (transition from traditional agriculture roles to data-driven, technology-intensive AgriTech roles). The certification thus functions as a **bridge between VET and HE**, enabling mobility across learning pathways that have historically been difficult to integrate.

## Digital Credentialing and Verification (Europass Alignment)

The AGRITECH certification model adopts a digital-first approach to credentialing, ensuring that all certification outcomes are issued as secure, verifiable, and portable digital credentials. In alignment with European standards for transparency, interoperability, and lifelong learning (European Parliament & Council of the European Union, 2018), the project integrates the **European Digital Credentials for Learning (EDC)** infrastructure made available through the Europass platform, where learners view, store, and share their credentials, established under Decision (EU) 2018/646 (the "Europass Decision"). European Digital Credentials for Learning are **tamper-proof, electronically sealed digital records** issued by an authorised organisation to certify learning achievements, qualifications, or competences. These credentials are designed to be **portable across the European Education Area**, enabling automatic verification of authenticity and facilitating recognition by employers, education providers, and public authorities. Within the AGRITECH framework, digital credentials will document the achievement of competencies associated with the AgriTech Manager (ATM) profile, including learning outcomes, EQF level alignment, assessment results, and associated metadata. Credentials may be issued for:

- Full certification (AgriTech Manager qualification)
- Micro-credentials (specific competence units or modules), each including the EU's standard micro-credential elements (title, awarding body, date of issue, learning outcomes, workload, EQF level, type of assessment, and type of quality assurance)
- Assessment outcomes and learning achievements

All issued credentials are compatible with Europass and can be:

- Stored in the learner's Europass wallet
- Shared securely with employers and institutions
- The EDC Viewer automatically checks the credential's electronic seal, origin and integrity when the credential is opened.



## Functional Integration within the AGRITECH Certification Model

The digital credentialing process is fully embedded within the AGRITECH online certification workflow (WP3), while technically supported by the WP4 e-learning platform. The system ensures that:

- Certification is issued only after successful completion of validated assessment procedures
- Credential data is structured according to EU standards (European Learning Model)
- Each credential includes:
  - Learner identification
  - Issuing organisation
  - Learning outcomes and competencies
  - EQF level
  - Assessment and grading information

The use of digital credentials enhances:

- **Transparency and trust** in certification outcomes
- **Recognition across borders and sectors**
- **Learner ownership and control of qualifications**

## Requirements for Issuing European Digital Credentials

To act as a credential-awarding body within the Europass Digital Credentials infrastructure, an organization must meet specific legal and technical requirements.

**>> Authorized Issuing Body:** Any education or training provider, organisation, or institution may issue digital credentials, provided that it is formally recognised as a credential-awarding entity.

**>> Qualified Electronic Seal (eSeal):** The issuing organisation must obtain a **qualified electronic seal**, which acts as a digital signature ensuring authenticity and legal validity of the credential. This seal must comply with the **eIDAS Regulation (EU No 910/2014)**.

**>> Compliance with EU Data and Quality Standards:** The issuing body must:

- Ensure compliance with GDPR and data protection requirements
- Align certification with recognised frameworks (EQF, ESCO, etc.)

**Maintain quality assurance procedures informed by ESG and EQAVET principles (ENQA et al., 2015; Council of the European Union, 2020).**

### Process for Issuing European Digital Credentials

The process of issuing Europass Digital Credentials follows a structured workflow:

**Step 1: Registration and Access to Europass Infrastructure** >> The organisation registers as an issuer and gains access to the **European Digital Credential Issuer (EDC)** platform, a web-based application provided by the European Commission for creating and issuing credentials.



**Step 2: Preparation of Credential Data >>** Credential templates are created using structured data aligned with the European Learning Model. This includes:

- Credential/learning achievement title
- Learning outcomes
- Assessment details
- EQF level and metadata

**Step 3: Integration of Accreditation Information (if applicable) >>** Where relevant, accreditation data may be linked (e.g., via DEQAR or national frameworks, EQAVET-aligned national VET quality-assurance registers, or other national frameworks) to enhance trust and recognition of the credential .

**Step 4: Issuance of Digital Credential >>** The credential is generated and digitally sealed using the organisation's advanced or qualified electronic seal. It is then:

- Sent to the learner via email, or
- Directly deposited into the learner's Europass wallet

**Step 5: Verification and Validation >>** Each credential can be automatically verified using the EDC Viewer, ensuring:

- Authenticity of the issuer
- Integrity of the credential (no tampering) Validity of the digital seal

**Step 6: Storage and Sharing by the Learner >>** Learners store their credentials in their Europass wallet and can:

- Share them securely with employers or institutions
- Generate temporary access links
- Include them in job or education applications

## Benefits for the AGRITECH Certification Ecosystem

The integration of European Digital Credentials for Learning provides significant added value:

**Interoperability:** Credentials follow a common European data model and can be used across compatible systems.

**Authenticity:** Electronic seals allow users to verify the issuer and confirm that the credential has not been altered.

**Portability:** Learners can store and share their credentials with employers and education providers.

**Scalability:** Templates and bulk issuance support delivery to larger groups of learners.

**EU policy alignment:** The model supports European priorities for lifelong learning, skills transparency and micro-credentials (Council of the European Union, 2022).

## Future Development and Scalability



The AGRITECH certification model is designed to remain fully interoperable with evolving EU digital credential infrastructures. Future developments may include:

- Integration with national qualification systems
- Expansion to additional micro-credential pathways
- Automated credential issuance via platform APIs
- Enhanced linkage with labour market platforms

## Recognition by Employers and Sector Bodies

Employer recognition is supported through:

- Co-development of competence descriptors with sector partners.
- Authentic, scenario-based and project-based assessment tasks reflecting real enterprise challenges.
- Transparency of the applied decision-making criteria used in certification.
- Documentation that clearly differentiates operational, analytic, and leadership competencies.

Employers are provided with a **Competence Interpretation Guide** that explains how the demonstrated capabilities correspond to workplace expectations at different professional maturity levels. This enables employers to:

- Interpret the certification as evidence of job readiness.
- Match certified individuals to appropriate roles and responsibilities.
- Integrate the credential into progression and professional development frameworks.

## Portability for Further Study and Career Progression

Certified individuals may use the credential to:

- Apply for advanced degree programmes where evidence of competence and practice-based ability is required.
- Transition from operational roles to management, advisory, or innovation leadership roles within AgriTech sectors.
- Support eligibility for entrepreneurship programs, incubators, accelerators, and funding competitions where technical understanding and systems leadership are prerequisites.

Because the certification carries **explicit and verifiable evidence of competence**, it functions as a stable, transferable indicator of professional capability across countries and sectors

## Stakeholder Engagement & Communication

The credibility and long-term viability of the AgriTech Manager Certification depend upon sustained, transparent, and structured engagement with its key stakeholder groups. These include learners, instructors, assessors, HEIs, VET centres, employers, sectoral bodies, accreditation agencies, and policy influencers. Stakeholder engagement is not simply informational; it is dialogic and iterative. This means that stakeholders are not only recipients of information but active contributors to the ongoing refinement of the certification and its alignment with evolving industry and educational needs.



Communication processes are therefore designed to ensure clarity of expectations, shared understanding of assessment standards, feedback loops for improvement, and confidence in award decisions. Engagement is structured to prevent information asymmetry, reduce misinterpretation risk, and build trust across all parties who rely on the certification.

## Engagement with Learners

Learners are central stakeholders, and their engagement must balance empowerment with academic integrity. From the outset of the learning journey, learners receive clear and accessible information on assessment formats, learning outcomes, EQF level expectations, progression rules, and support mechanisms. This is delivered through orientation materials, platform guidance modules, and learner handbooks.

Throughout the training period, communication remains active rather than reactive. Learners receive structured feedback on formative tasks, analytics-driven learning progression updates, and targeted guidance where learning gaps emerge. Communication avoids punitive framing and instead supports learner autonomy, confidence, and self-regulation.

Before summative assessment, learners are informed of the conditions of administration, use of online proctoring, identity verification requirements, and academic integrity expectations. After assessment, feedback is provided at the level appropriate to the assessment component, offering insight into strengths, areas for improvement, and potential resit strategies where relevant.

## Engagement with Instructors, Tutors, and Assessors

Instructors and assessors require deep understanding of the competency model and EQF performance expectations to ensure alignment between teaching, learning, and assessment. Therefore, structured professional development is provided, including training sessions on:

- Competence descriptors and their interpretation in real-world contexts.
- Assessment rubrics and evidence-based scoring practices.
- Strategies for supporting learners without compromising assessment validity.
- Procedures for handling suspected misconduct while maintaining impartiality.

Regular briefing sessions before each certification cycle ensure that instructors and assessors are informed of any updates in rubrics, marking tolerance, moderation focus, or proctoring protocols. This maintains consistency across delivery centres and cohorts and prevents local drift.

## Engagement with HEIs and VET Centres

Institutions that host delivery, instruction, or assessment activities must be supported in maintaining consistent quality standards. Institutional engagement includes:

- Memoranda of academic collaboration clarifying roles, responsibilities, QA expectations, and escalation channels.
- Training for institutional QA officers and programme coordinators on documentation, archival procedures, and audit readiness.
- Shared access to performance analytics and cohort outcome summaries to inform curriculum integration and institutional reflection.



Institutions participate in the Programme Assessment Board and Continuous Improvement cycles, ensuring their perspectives influence certification evolution while maintaining systemwide coherence.

## Engagement with Employers and Sector Bodies

Employer engagement ensures that the certification remains aligned with current and emerging labour market expectations. Engagement includes:

- Structured consultations on competency relevance, sector trends, and new technology adoption pathways.
- Invitations for employers to contribute case material, data scenarios, or capstone project opportunities.
- Feedback channels evaluating the workplace performance of certified professionals.
- Periodic employer surveys and roundtables to assess evolving role profiles.

This engagement ensures that the certification is not merely academically sound but **professionally credible and economically meaningful**.

## Engagement with Accreditation and Policy Bodies

Where national or sectoral regulatory environments are relevant, communication with accreditation agencies, qualifications authorities, and policy networks ensures that the certification remains compliant with recognition frameworks. This includes sharing:

- EQF alignment documentation.
- Assessment standard-setting methodologies.
- Moderation and quality assurance evidence.
- Credential structure and issuance models.

This supports system stability, recognition in qualifications databases, and long-term portability across jurisdictions.

## Communication Infrastructure and Transparency Assurance

Communication operates across several coordinated channels, including:

- Formal documentation repositories with version control.
- Online learner and assessor portals.
- Scheduled stakeholder briefings and feedback reviews.
- Public-facing summaries describing certification purpose, level descriptors, and recognition parameters.

Transparency is reinforced by ensuring that all policy updates, changes to assessment expectations, or procedural revisions are not only announced but explained, including the rationale and evidence that informed the change.

## Risk Management & Contingency Planning



The AgriTech Manager Certification system operates across multiple institutions, assessment modalities, jurisdictions, and technological platforms. As a result, it is exposed to a spectrum of risks that may affect reliability, fairness, operational continuity, or perceived legitimacy. Effective risk management requires both proactive identification of potential threats and the establishment of structured response mechanisms that ensure continuity without compromising academic integrity. Risk management in this context is therefore not merely operational but strategic, safeguarding the trust placed in the certification by learners, employers, educational institutions, and regulatory authorities.

## Risk Management Framework

Risk management is integrated into all governance processes. Risks are identified, documented, assessed, and monitored continuously, rather than addressed reactively. The framework distinguishes between:

- **Operational risks**, affecting the administration of assessments, digital platforms, and identity verification systems.
- **Academic risks**, affecting the validity, reliability, and comparability of assessment results.
- **Equity and inclusion risks**, affecting access to learning, assessment fairness, and learner support.
- **Reputational and regulatory risks**, affecting stakeholder trust, recognition, and compliance with legal obligations.

Each identified risk is assigned a responsible unit for monitoring and mitigation. Risk evaluation considers both likelihood and impact, ensuring that mitigation strategies are proportionate and sustainable.

## Operational Continuity Risks

Because the certification relies on digital platforms, proctoring systems, and secure identity verification processes, system failures or disruptions can impede assessment delivery. To protect continuity:

The Central Exam Administration maintains backup servers, redundant authentication pathways, and failover procedures that allow learners to resume examinations without loss of progress or integrity. In circumstances where network interruptions occur during proctored assessment, encrypted local recording protocols ensure that assessment evidence remains intact until synchronisation is restored. Clear learner support pathways exist for reporting and resolving technical disruption, accompanied by time-stamped logs enabling objective reconstruction of events. Where rescheduling is necessary, security and fairness are preserved by providing alternate assessment forms rather than reusing disrupted materials.

## Academic Validity and Standard Stability Risks

Academic risk arises when the evidence produced during assessment no longer reliably reflects the intended competencies or EQF-level standards. This may occur through item overexposure, assessor drift, shifts in sector practices, or unintended changes in curriculum emphasis.

To prevent such drift, validation studies, moderation cycles, external review, and continuous improvement reports serve as safeguards. When evidence suggests that standards are shifting—such



as unexpected variations in cohort performance not attributable to learner preparation—standard-setting panels may be reconvened, rubrics refined, or assessment formats adjusted. Any such adjustments are controlled, documented, and implemented only at defined transition points, ensuring that comparisons across cohorts remain defensible.

## Equity and Access Risks

Ensuring fairness requires careful monitoring of differences in learner experience across geographical, socioeconomic, linguistic, or accessibility contexts. Risks may arise from uneven digital infrastructure, differing educational preparation backgrounds, or varying levels of familiarity with online assessment formats.

To mitigate these risks, accessibility accommodations are available through standardized procedures; diagnostic and formative assessments identify and address competency gaps before summative evaluation; learning platforms are optimized for low-bandwidth environments; and assistance is available for learners requiring technological or procedural support. The Programme Assessment Board periodically reviews anonymized performance data disaggregated by relevant demographic indicators to detect inequities requiring system-level remediation rather than individual-level correction.

## Reputational and Regulatory Risks

The certification must maintain alignment with external qualifications frameworks and employer expectations to preserve recognition and value. Any inconsistency in award decisions, assessment quality, or communication can jeopardize stakeholder confidence. Reputational risks also arise if cases of malpractice are not investigated thoroughly or transparently.

Mitigation includes regular engagement with accreditation authorities and sector bodies, external moderation cycles, publicly available certification descriptors, and the robust appeal and investigative procedures described in Section 10. Decisions, policies, and changes are carefully documented to ensure preparedness for external audit, qualification recognition reviews, or legal challenge.

## Contingency Planning and Response

Contingency planning ensures that, when disruptions occur, responses are structured, timely, and consistent with academic integrity. Contingency actions follow predefined protocols, ensuring predictability and transparency.

Examples include temporary migration from online proctoring to supervised in-person assessment in case of widespread digital outage, substitution of performance-based task formats when field data collection becomes infeasible, or delayed certification issuance in the event of unresolved appeals or integrity investigations. Throughout any contingency, the principle remains that **no learner should be disadvantaged by factors outside their control**, but that **no assessment standard may be compromised to achieve convenience**.

## 13.7 Documentation and Accountability

All risk assessments, mitigation plans, incident reports, and contingency actions are documented in the Risk and Assurance Register. This register is reviewed by the Certification Steering Committee at



regular intervals and during any event triggering a system-wide risk response. Each entry in the register includes the description of the risk, its assessed level, the actions taken, the rationale for these actions, and the evaluation of their effectiveness. This archive becomes part of the institutional memory, preventing recurrence of previously resolved issues and supporting external audit transparency.

## Data Protection, Legal Compliance & Ethical Assurance

The AgriTech Manager Certification system processes personal, academic, and performance-related data across multiple jurisdictions and institutions. Ensuring legal compliance and ethical stewardship is therefore central to safeguarding learner rights, institutional credibility, and the legitimacy of certification outcomes. Data protection is treated as an embedded design principle rather than an administrative afterthought; every stage of the certification lifecycle—registration, assessment, proctoring, scoring, credential issuance, record retention, and auditing—operates under explicit legal and ethical controls.

## Legal and Regulatory Framework

All data handling, processing, storage, and transfer activities comply with:

- The **General Data Protection Regulation** (GDPR), Regulation (EU) 2016/679 (European Parliament & Council of the European Union, 2016) National data protection acts applicable in the jurisdictions of delivery
- Institutional data governance and learning analytics policies
- Applicable legislation related to remote proctoring, digital identity, and electronic credentialing

GDPR compliance is foundational because the certification system processes special-category data in some cases (e.g., disability documentation, proctoring biometric data). As such, data processing follows GDPR's core principles of **lawfulness, fairness, transparency, purpose limitation, data minimization, accuracy, storage limitation, integrity, confidentiality, and accountability** (European Parliament & Council of the European Union, 2016).

## Lawful Basis for Data Processing

The lawful bases for processing vary based on the category of data and stage of certification:

- **Identity verification and assessment administration** rely on *legitimate interest* and *public interest in education quality assurance*.
- **Disability and accommodation requests** require *explicit consent*, which must be informed, revocable, and un-coerced.
- **Proctoring audio/video monitoring** is conducted under *legitimate interest* tied to the integrity of high-stakes assessment.
- **Learning analytics** operate under *legitimate interest*, but only when anonymized or pseudonymized where feasible.

Before commencing training and assessment, all learners receive an explanation of what data will be collected, why, how long it will be retained, how it will be protected, and their rights to access, correction, and deletion.



## Ethical Assurance and Respect for Learner Rights

Ethical assurance goes beyond legal compliance. Learners must be treated with dignity, fairness, and respect throughout the certification process. This includes:

- Clear communication of how assessment evidence will be used.
- Ensuring proctoring does not impose unnecessary surveillance or discomfort.
- Respectful handling of accommodation requests, avoiding stigmatization.
- Avoiding algorithmic bias in automated analytics, anomaly detection, or evaluation tools.

Ethical assurance also extends to avoiding assessment designs that disadvantage any demographic, socioeconomic, linguistic, or cultural group. Validation and moderation procedures include bias reviews to ensure fairness across diverse learner profiles.

## Consent, Disclosure, and Transparency

Consent for data usage, when required, must be:

- Clearly requested
- Written in plain, non-technical language
- Separable from other agreements (no bundled consent)
- Withdrawable at any time without penalty (except where withdrawal would invalidate necessary identity verification for assessment security)

Learners must have access to:

- Their stored personal and assessment data
- The logic and criteria used to determine assessment outcomes
- Documentation on appeals, complaint procedures, and rights to challenge decisions

No decision affecting certification status is made by automated systems alone. Human academic judgement remains decisive.

## Data Security and Storage Controls

All data systems supporting certification are secured through:

- Encryption of data at rest and in transit
- Role-based access controls and multi-factor authentication
- Regular vulnerability assessments and monitored security logging
- Separation of identity data, assessment data, and credentialing records to reduce risk of linkage misuse

Where external vendors (e.g., proctoring services) are used, data processing agreements ensure:

- Data residency in approved jurisdictions
- Controlled retention periods
- Prohibition of secondary usage (e.g., AI model training)
- Full audit traceability



## Data Retention, Deletion, and Minimization

Retention schedules are strictly defined to avoid indefinite storage:

- Proctoring video/audio and identity capture are retained only for the duration needed to resolve anomalies or appeals.
- Assessment records are retained for academic audit and verification windows (as defined in Section 8).
- Digital credential records are retained long term to support verification and mobility.

When retention periods expire, data are securely deleted or anonymized. Learners may request deletion of non-essential data once all active certification or appeal processes are complete.

## Oversight and Accountability

The **Data Protection Officer (DPO)** provides oversight of all data processing activities and is responsible for:

- Approving data flows and risk assessments
- Monitoring compliance and responding to data requests
- Investigating and reporting data breaches
- Advising on ethical considerations in learning analytics and proctoring

Additionally:

- Institutional QA audits confirm procedural compliance.
- The Certification Steering Committee is informed of any systemic risks or breaches.
- All data handling incidents are documented and reviewed to prevent recurrence.

## Sustainability, Scalability & Future Development of the Certification Model

Sustainability and scalability ensure that the AgriTech Manager Certification can be maintained, expanded, and continuously improved beyond the duration of the project. A certification system is sustainable when it can be delivered consistently, supported institutionally, financed securely, maintained technically, and recognised externally without depending on temporary or exceptional conditions. Scalability, in turn, refers to the system's ability to support increased learner numbers, new delivery centres, additional languages, evolving sector needs, and cross-border recognition—while **preserving the integrity, comparability, and credibility of assessment outcomes**.

Both sustainability and scalability are anchored in the governance model, quality assurance architecture, competence framework, and credential infrastructure established in previous sections. The system is designed not as a single-institution qualification but as a distributed credential supported by shared standards, documented processes, and interoperable digital infrastructure.

## Institutional Sustainability

Sustainability requires ongoing institutional ownership. The Certification Steering Committee (CSC) continues to function after initial project implementation, assuming responsibility for oversight, policy



updates, approval of assessment changes, and coordination between delivery centres. Participating HEIs and VET centres integrate the certification into their academic or continuing education portfolios through:

- Formal programme boards or continuing education units.
- Staff training and assessor qualification pathways.
- Long-term curriculum integration for feeder courses and recognition-based progression.

This ensures that the certification is embedded in institutional systems rather than dependent on individual personnel or temporary project teams.

## Academic Sustainability

Academic sustainability is supported through the established **Continuous Improvement Cycle** and **Moderation System**. The certification remains aligned with the evolving AgriTech sector through:

- Regular external review by industry partners.
- Updating contextual materials and case studies to reflect current technological and regulatory developments.
- Periodic re-validation of EQF-level alignment to ensure that required cognitive and autonomy complexities remain accurate.
- Scheduled reassessment of workload equivalence for credit transfer alignment.

In this way, the certification remains academically relevant while safeguarding the continuity of standards across cohorts.

## Technological Sustainability

The certification platform—encompassing learning management, identity verification, proctoring, assessment delivery, evidence storage, and digital credential issuance—has been designed using interoperable standards to avoid vendor lock-in and ensure longevity. Sustainability is achieved by:

- Supporting open credential standards such as Europass Digital Credentials, W3C Verifiable Credentials, and IMS Global standards.
- Using containerized, modular service architectures that allow components to be replaced or upgraded without disrupting the entire system.
- Maintaining structured API documentation for integration with institutional systems (e.g., SIS, LMS, HR certification verification portals).
- Ensuring that data migration pathways are documented and reversible, enabling long-term platform succession planning.

This design ensures the certification remains future-proof and adaptable to evolving digital ecosystems.

## Financial and Administrative Sustainability

To sustain delivery beyond the project phase, the certification adopts a cost-sharing and fee structure model that can be implemented by participating institutions. The model maintains affordability for



learners while covering necessary operational costs such as proctoring services, assessor training, exam administration, and credential issuance. Financial sustainability is achieved through:

- A tiered fee model that accounts for regional income differences and institutional membership status.
- Optional institutional licensing agreements that allow HEIs and VET centres to integrate the certification into degree or continuing education programmes.
- Cost efficiencies achieved through shared item banks, shared assessor pools, and centralized standard-setting governance.

This ensures stable funding without introducing inequity in access.

## Scalability Across Languages and Cultural Contexts

The certification is designed for multilingual expansion. Scaling to new languages is supported by:

- A translation methodology using forward translation, back-translation, expert semantic review, and pilot testing.
- Cultural neutrality of core competence descriptors, ensuring functional equivalence across regions.
- Assessment materials structured so contextual examples can be localized without altering difficulty level or intended cognitive processes.

Scalability is therefore not only linguistic but **contextual**, maintaining fairness across diverse agricultural and technological environments.

## Scalability Across Institutions and Regions

The governance and quality assurance architecture is intentionally designed to allow new delivery centers to join the certification network. Institutions wishing to adopt the certification undergo:

- A readiness evaluation assessing staff capacity, infrastructure, language support, and quality assurance alignment.
- Training for instructors, assessors, programme coordinators, and QA staff.
- A provisional accreditation period during which moderation frequency is higher to ensure alignment with standards.
- Full certification center status granted only after demonstrated consistency across at least one complete assessment cycle.

This controlled onboarding process ensures **expansion without dilution of standards**.

## Future Development Pathways

The certification is designed as a foundation that can expand horizontally (into related roles) and vertically (into specializations and advanced strategic certifications). Potential developments include:

- Micro-credentials for precision agriculture data analytics, regenerative agriculture planning, sustainability governance, and digital agribusiness innovation.



- Laddered progression models linking VET-based entry qualifications to postgraduate executive training programmes.
- Partnerships with sectoral bodies to embed the certification within professional licensure or continuing professional development requirements.

Such evolution is always **evidence-driven** and retains alignment with the competence progression architecture established under EQF levels 5, 6, and 7.

## Evaluation of the VET Piloting Activities

The AGRITECH VET piloting activities provided practical evidence for evaluating the relevance, usability and overall effectiveness of the proposed AgriTech Manager learning and assessment approach at **EQF Level 5**. The testing covered Greek, Italian, Czech and English language groups and generated **236 student questionnaire submissions**, including course-level, module-level and e-learning platform feedback.

Overall, the results demonstrate a **high level of learner satisfaction and acceptance of the programme**. Overall course satisfaction reached **4.47/5**, while the extent to which the programme met learners' expectations reached **4.45/5**. Participants' willingness to recommend the programme averaged **8.55/10**. Particularly positive results were recorded for scenario-based learning and the alignment between assessment and taught content, both reaching **4.58/5**. Module satisfaction across the available module questionnaires reached **4.54/5**, while the e-learning platform received an overall evaluation of **4.68/5**.

The piloting also provided evidence of perceived competence development. **58% of respondents identified sustainability and green agriculture among the areas in which they improved most, 53% identified technical and digital skills—including sensors, data, AI and blockchain—and 47% identified data analysis and decision-support competences**. These results support the relevance of the competence areas incorporated into the AgriTech Manager profile.

At module level, all evaluated modules achieved positive results, with combined satisfaction ranging from **4.29/5 to 4.82/5**. M06 *Blockchain Technology for Agriculture* received the highest combined rating, followed by M04 *Sensor Technology in Smart Agriculture*, while M01 and M02 showed comparatively greater scope for refinement. Importantly, no module demonstrated a result suggesting the need for fundamental redesign.

The evaluation nevertheless identified several areas for improvement. Learners requested **more time for practical application and deeper engagement with selected topics**, while technical feedback highlighted the need to strengthen quiz reliability, multilingual functionality and platform testing. The findings also indicate the need for stronger quality control of learner-facing materials and some targeted refinement of module content and terminology.

Overall, piloting **supports the suitability of the seven-module VET structure and the scenario-based assessment approach for EQF Level 5**, while identifying targeted improvements rather than a need for structural redesign. The findings will therefore feed into the continuous improvement of the AGRITECH learning, assessment and certification model before subsequent implementation and scaling.

## Evaluation of the VET Piloting Activities

The AGRITECH VET piloting provided evidence for evaluating the relevance, usability and effectiveness of the AgriTech Manager learning and assessment approach at **EQF Level 5**. Testing was conducted across the Greek, Italian, Czech and English language groups and covered course-level experience, individual modules and the e-learning platform. Overall, **236 student questionnaire submissions** were collected. The overall results were strongly positive. Course satisfaction reached **4.47/5**, fulfilment of learning expectations **4.45/5**, and willingness to recommend the programme **8.55/10**. Scenario-based learning and assessment alignment both achieved **4.58/5**, while the e-learning platform achieved **4.68/5**.



## Greece

The Greek piloting produced **10 course-level responses, 70 module questionnaire records and 8 platform responses**. Overall course satisfaction and fulfilment of learning expectations both reached **4.40/5**, while willingness to recommend the programme was **8.30/10**. Scenario-based activities were particularly successful, receiving **4.80/5**, while assessment fairness and alignment reached **4.70/5**. The e-learning platform achieved **4.88/5**, the highest overall platform rating among the four groups. Module satisfaction was also high at **4.49/5**, with M06 *Blockchain Technology for Agriculture* achieving the strongest result. Some technical issues and greater variation concerning content volume, structure and practical application were nevertheless identified and should inform further refinement.

## Italy

The Italian piloting generated **4 course-level responses, 21 module records, 5 platform responses and 3 educator responses**. The results indicate a very positive reception, with overall course satisfaction and fulfilment of learning expectations both reaching **4.75/5** and willingness to recommend the programme reaching **9.00/10**. Scenario engagement achieved **5.00/5**, while all recorded module-level satisfaction ratings were **5/5**. Learners particularly valued practical applications, real-company cases and the opportunity to retain and use the learning materials. The main suggestions concerned allocating more time for practical exercises, improving platform and quiz testing, and further strengthening the quality control of learner-facing materials. The small number of course-level respondents mean that these results should nevertheless be interpreted with appropriate caution.

## Czech Republic

The Czech piloting generated **10 course-level responses, 70 module questionnaire records and 11 platform responses**. Overall course satisfaction reached **4.50/5**, fulfilment of learning expectations **4.40/5**, and willingness to recommend the programme **8.60/10**. Module satisfaction reached **4.46/5**, while the platform received **4.73/5**. M03 *Fundamentals of AI* was particularly valued, being selected by 9 of the 10 respondents and demonstrating strong perceived applicability. The evaluation also highlighted opportunities to improve course sequencing, assessment alignment, language functionality and selected introductory content. These findings are particularly useful for targeted refinement because the Czech piloting also generated a structured trainer review of the learning content.

## Overall Conclusions from the Piloting

The country-level results demonstrate **consistently positive performance across the different implementation contexts**, with overall course satisfaction ranging only from **4.40/5 to 4.75/5**. The findings support maintaining the seven-module structure and the scenario-based assessment methodology while introducing targeted improvements rather than major structural changes.

The main cross-country improvement priorities concern **additional time for practical application, reliable operation of quizzes and platform functions across languages, improved language and localization management, and stronger quality control of learner-facing materials**. Overall, the piloting provides positive evidence that the AGRITECH VET model is suitable for continued implementation and refinement within the broader AgriTech Manager certification framework.

## Conclusion

The AgriTech Manager Certification Validation Framework establishes a comprehensive, robust, and academically defensible system for assessing, verifying, and certifying competence at EQF Levels 5, 6, and 7 within the evolving agricultural technology sector. It ensures that learning and assessment are



aligned with authentic professional practice, that certifications reflect demonstrated capabilities rather than participation alone, and that award decisions are transparent, fair, and supported by documented evidence. By integrating formative analytics, rigorous summative assessment design, standardized moderation, structured appeals procedures, and continuous improvement cycles, the framework provides a strong assurance of quality and consistency across delivery contexts.

The framework also ensures that the certification is portable and recognizable: it is rigorously mapped to the European Qualifications Framework, compatible with academic credit recognition procedures, and supported by interoperable digital credential structures that enable verification across borders. The certification's governance model distributes responsibilities clearly among academic committees, assessors, institutional partners, and quality assurance bodies, ensuring that accountability and integrity are preserved at every stage of the assessment lifecycle.

Sustainability and scalability have been designed into the framework so that the certification can grow responsibly, adapting to new institutions, new languages, and evolving sectoral demands without sacrificing comparability of standards. Through structured engagement with learners, educators, employers, and regulatory partners, the certification remains both academically rigorous and professionally relevant.

Ultimately, this Validation Framework ensures that certification holders are recognized not only as learners who have completed training, but as professionals who have demonstrated competence, judgement, and readiness to contribute to the future of agriculture driven by technology, sustainability, and innovation. It provides institutions, employers, and policy-making bodies with a trustworthy indicator of capability—strengthening the bridge between advanced education, professional practice, and real-world impact.



## References

- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing*. American Educational Research Association.
- Council of the European Union. (2022). *Council Recommendation of 16 June 2022 on a European approach to micro-credentials for lifelong learning and employability (2022/C 243/02)*. *Official Journal of the European Union*, C 243, 10–25.
- European Commission. (n.d.). *European digital credentials for learning*. <https://europass.europa.eu/en/european-digital-credentials-learning>
- European Commission. (n.d.). *How to issue European digital credentials for learning*. <https://europass.europa.eu/en/how-issue-european-digital-credentials-learning>
- European Commission. (2017). *European qualifications framework for lifelong learning (EQF)*. <https://europa.eu/europass/en/european-qualifications-framework-eqf>
- Council of the European Union. (2020). Council Recommendation of 24 November 2020 on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience (2020/C 417/01). *Official Journal of the European Union*, C 417, 1–16.. <https://ec.europa.eu/social/main.jsp?catId=1223>
- European Commission. (2015). *Standards and guidelines for quality assurance in the European Higher Education Area (ESG)*. <https://www.enqa.eu/index.php/home/esg/>
- European Commission. (2020). *European quality assurance reference framework for vocational education and training (EQAVET)*. <https://eqavet.eu>
- European Parliament & Council of the European Union. (2014). *Regulation (EU) No 910/2014 on electronic identification and trust services for electronic transactions in the internal market (eIDAS)*. <https://eur-lex.europa.eu/eli/reg/2014/910/oj>
- European Parliament & Council of the European Union. (2016). *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)*. *Official Journal of the European Union*, L 119, 1–88.
- European Parliament & Council of the European Union. (2018). *Decision (EU) 2018/646 of the European Parliament and of the Council of 18 April 2018 on a common framework for the provision of better services for skills and qualifications (Europass) and repealing Decision No 2241/2004/EC*. *Official Journal of the European Union*, L 112, 42–50.
- European Commission. (2022). *A European approach to micro-credentials for lifelong learning and employability*. <https://education.ec.europa.eu>