



# USAGE-NG

Up-skilling Agricultural Engineering  
Next Generation

## EU Micro-Credentials and Recognition Frameworks for Lifelong Learning

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## 1 Overview

This report presents the outcomes of Activity 3.3, which focuses on the implementation of European educational approaches within the context of smart-farming education and training. The activity addresses a core challenge faced by contemporary vocational and higher education systems: how to translate high-level EU policy frameworks on skills, lifelong learning, and recognition into concrete, operational solutions that respond to sector-specific needs while remaining interoperable across countries and institutions.

Against the backdrop of rapid technological change and increasing demand for flexible upskilling pathways, the report examines how concepts such as micro-credentials, modular learning, and validation of prior learning can be meaningfully applied to smart agriculture. It situates the activity within the evolving European policy landscape, notably the EU recommendations on micro-credentials and the European Qualifications Framework (EQF), and interprets these instruments in a way that is actionable for educators, training providers, and learners.

The report combines desk research, comparative analysis, and framework development. It reviews national validation and credentialing practices in selected EU countries to identify common patterns, divergences, and structural constraints that affect recognition and portability. Building on this analysis, it proposes a coherent design framework that defines the essential characteristics of high-quality micro-credentials, clarifies their relationship to learning outcomes, workload, assessment, and quality assurance, and highlights the conditions under which modular learning can support coherent learning pathways rather than fragmented provision.

Overall, the report aims to bridge policy and practice. It provides a structured reference for designing, documenting, and validating learning units in smart farming that are transparent, stackable, and aligned with European standards, while remaining adaptable to national and institutional contexts.

## 2 EU Frameworks and Standards

### 2.1 The European Approach to Micro-Credentials

The European Union has defined a common approach to micro-credentials, including a set of standard elements that each micro-credential should contain for transparency and recognition. These elements ensure that key information about the credential is clearly communicated. There are mandatory elements which every micro-credential must include, and additional optional elements that can be provided for further detail. According to the Council Recommendation on micro-credentials (2022), the following apply: (Council of the European Union 2022)

- **Mandatory elements:** Identification of the learner; Title of the micro-credential; Country/region of the issuer; Awarding body; Date of issue; Learning outcomes; Notional workload (ideally expressed in ECTS credits); Level of the learning experience (e.g. EQF level or QF-EHEA cycle); Type of assessment; Form of participation (e.g. online, in-person); and the Type of quality assurance underpinning the micro-credential. These fields constitute the core description of a micro-credential and are intended to be included in a standardized “credential description” or even in digital credential formats (like Europass). Each mandatory item has practical importance – for instance, listing

learning outcomes and workload in ECTS helps other institutions or employers immediately understand what was learned and the scope of effort involved, and specifying the EQF level situates the credential within a common competency framework. (Council of the European Union 2022)

- **Optional elements:** Prerequisites for enrolment (entry requirements); Details on supervision and identity verification during assessment (whether assessment was unsupervised, proctored online, on-site with ID check, etc.); Grade achieved (if applicable); Integration and stackability options (whether the micro-credential stands alone or can be combined into a larger qualification); and any further information (such as a weblink to the course or curriculum). Including these optional details, while not required, can enhance transparency. For example, stating prerequisites (like needing a prior basic course in agronomy) can help learners and institutions see how the micro-credential fits into a learning pathway, and indicating if the micro-credential is part of a stackable series (e.g. one module of a larger program) shows how it could lead to advanced standing in a degree. (European Commission 2021)

**Practical relevance for agricultural HE and LLL:** In the context of agricultural higher education and lifelong learning, adhering to this European approach ensures that micro-credentials are portable and meaningful across institutions. For instance, an agricultural university issuing a micro-credential in “Precision Farming Technologies” would include all mandatory elements: the learner’s name, the title (e.g. *Micro-Certificate in Precision Farming*), the issuing body (say, University X Faculty of Agriculture), the date, and crucially a description of learning outcomes such as *ability to deploy IoT sensors for crop monitoring*, etc. It would also list the workload (perhaps 5 ECTS credits) and the EQF level (e.g. Level 6 if it’s bachelor’s level learning). By providing this information, the micro-credential becomes immediately understandable to other education providers or employers. For example, if a lifelong learner (such as a farm manager) earns this micro-credential, another university or a professional body can recognize that it involved ~5 ECTS worth of learning at EQF Level 6, with defined outcomes and quality-assured assessment. This is extremely useful for recognition and transfer – a learner could present the micro-credential when enrolling in a formal program (say a degree in Agricultural Engineering), and the institution can more easily consider it for credit transfer or exemption because the learning has documented level and workload. (Council of the European Union 2022)

Projects in Europe are already applying these principles in agricultural education. For example, the Erasmus+ USAGE-NG project is developing micro-credential modules on smart farming and climate-smart agriculture *for both university students and lifelong learners*, explicitly aligning with the European approach. Each module is designed with clear learning outcomes and credit weight (around 5–6 ECTS) and is assigned a qualification level (EQF Levels 5–8, depending on module difficulty). By doing so, USAGE-NG ensures comparability and transparency, so that a micro-credential earned in one institution or country can be more readily accepted elsewhere. The stackability of such micro-credentials is also a key feature: USAGE-NG is structuring its short courses so that multiple micro-credentials can be combined into larger qualifications like certificates or even count towards degree programs. In practice, this means an agricultural professional might accumulate several related micro-credentials (e.g. *Smart Irrigation, Climate-Adaptive Crop Management, IoT in Precision Livestock Farming*) which together could be recognized as part of a postgraduate certificate or even give ECTS credit in a master’s program. The EU’s standard elements (especially the common

format for title, outcomes, credits, level, etc.) make such integration feasible by giving institutions a common language for evaluation.

In summary, the European approach's mandatory and optional elements serve to make micro-credentials transparent, comparable, and relevant. In agricultural HE and lifelong learning contexts, where learners may seek short, skills-focused courses (for example, a working professional learning about the latest sustainable farming techniques), these elements ensure the micro-credentials have real value. A farmer or agronomist who earns a micro-credential can present a *credible, information-rich certificate* that universities and employers will understand and trust. This is crucial in fields like agriculture where technology and practices evolve quickly – micro-credentials allow upskilling in specific topics, and the EU framework ensures those achievements can be recognized across the education system and labour market.

## **2.2 Validation of Non-Formal and Informal Learning (VNFIL / RPL)**

**Validation of non-formal and informal learning (VNFIL)** – also known as Recognition of Prior Learning (RPL) – is a process that enables individuals to obtain recognition (in the form of credentials or credits) for knowledge, skills and competences acquired outside of formal education. The EU has promoted VNFIL as a key component of lifelong learning policies. Notably, a 2012 Council Recommendation invited all Member States to establish arrangements for validating non-formal and informal learning by 2018, so that people could have their self-acquired skills officially validated and even obtain full or partial qualifications on that basis. In the context of micro-credentials and lifelong learning, VNFIL is highly relevant – it provides a mechanism to *translate real-world learning into certified micro-credentials or credits*. CEDEFOP (the European Centre for Development of Vocational Training) outlines four distinct phases in the validation process. Each phase involves specific steps, stakeholders, and quality assurance measures: (European Centre for the Development of Vocational Training 2015)

- 1. Identification:** This first phase is about discovering and clarifying the learner's competences gained through informal or non-formal means. It often involves the individual (learner/candidate) working with a counsellor or facilitator to identify what learning outcomes they have from work experience, volunteering, short courses, farming practice, etc. It is a candidate-centered step where guidance is provided to help the person articulate their skills and knowledge. Importantly, this phase may also include identifying any gaps relative to the standards or qualification the person aims for. *Practical steps:* typically include counselling sessions or workshops where the candidate reflects on their experience and starts mapping out skills. Tools like self-assessment checklists or interviews can be used. *Stakeholders involved:* the learner themselves is central, supported by a VNFIL advisor or mentor (for instance, a university's RPL advisor or a training center counsellor). In an agricultural HE example, imagine a seasoned farm manager who left school early but has decades of experience – during Identification, an advisor at an agricultural university helps him identify competencies he has (e.g. pest management, machinery operation, farm business planning) that could correspond to learning outcomes of a formal program. *Quality assurance:* To ensure fairness and thoroughness, this phase should be well-documented and transparent. Guidelines are usually in place so that all candidates are guided through a similar process. For instance, validation centers often have a documented policy to ensure a non-discriminatory, unbiased approach in identification. Quality criteria might include confirming that the candidate understands the process and that all relevant skills are considered (so nothing is overlooked due to poor guidance). (MFHEA 2024)

2. **Documentation:** In this phase, the individual's learning outcomes are documented and evidenced. This means collecting proof or records of the skills and knowledge identified. *Practical steps:* the candidate, often with support from the advisor, compiles a portfolio of evidence. This can include certificates from non-formal training, work samples, project reports, photos or videos demonstrating skills, records of farm yields or experiments, letters of reference from employers or clients, etc. For example, a lifelong learner in agriculture might provide a logbook of crop trials they conducted, along with a reference letter from a cooperative extension officer attesting to their expertise in organic pest control. All such evidence is organized to match specific learning outcomes or competency standards. Both identification and documentation work together – identification finds the skills, documentation proves them. *Stakeholders:* the candidate is responsible for providing evidence, but the advisor or facilitator often helps verify and organize it. Sometimes third parties are involved: e.g. former employers or trainers who can certify that the person indeed performed certain tasks. In academic settings, there might be forms the candidate fills out to align their experiences with course outcomes. *Quality assurance:* A robust documentation phase has clear guidelines on what counts as valid evidence and how to authenticate it. For instance, a validation procedure may require that at least one piece of evidence for each claimed skill is verified (signed by a supervisor or compared against standards). Ensuring the evidence's authenticity is crucial – plagiarism or false claims must be guarded against. Many institutions have checklists for portfolio quality and may require the portfolio to be reviewed by a counsellor before it proceeds to assessment. In our agricultural example, quality assurance might include the university cross-checking that the reference letter is on official letterhead or possibly contacting the referee to confirm the candidate's role. Documentation is seen as *crucial for fairness and transparency*, since a well-evidenced portfolio creates a solid foundation for the next phase. (MFHEA 2024)
3. **Assessment:** This is the evaluation phase, where the documented learning outcomes of the individual are assessed against predefined standards or criteria. Essentially, assessors judge whether the candidate's non-formal/informal learning is equivalent to the learning outcomes required for a certain micro-credential, course credit, or qualification.

*Practical steps:* depending on the context, assessment can take various forms. It might be a portfolio review, an interview or viva, a skills demonstration, a test/exam, or a practical observation. For example, in an agricultural HE context, if a candidate seeks credit for a "Farm Business Management" course via RPL, the assessment might involve reviewing the business plans and financial records the candidate provided (documentation) and then perhaps an interview where the candidate answers questions or solves a case scenario, so the assessor can verify the depth of knowledge. In a more hands-on skill (say, operating a certain piece of farm machinery safely), the assessment might include the candidate performing the task in front of an assessor or providing a video demonstration under certain conditions.

*Stakeholders:* typically, a qualified assessor or panel of assessors conducts this phase. Assessors are subject matter experts – in higher education this could be faculty members; in a professional context it might be certified evaluators or master craftsmen. Sometimes an external examiner or observer is involved, especially if the result can lead to a formal qualification, to ensure impartiality. The candidate is also a stakeholder here, as they must often actively participate (through tests, interviews, etc.).

*Quality assurance:* The assessment phase must be rigorously quality-controlled because this is where a decision is made. Standardized assessment criteria/rubrics are used to judge the evidence against learning outcomes. Assessors should be trained in RPL assessment to avoid bias (for example, giving neither unfair advantage nor undue

scepticism towards non-traditional learning). Often, there are multiple assessors or a moderation process – e.g., a second assessor reviews the decision or an assessment board at the university approves RPL credit awards. Transparency is key: candidates should be informed of how they will be assessed and on what criteria. In our example, the agricultural university might use the same grading rubrics or competency checklist that they use for the formal course, to judge the RPL candidate's competence. Additionally, mechanisms for appeal are part of QA – if a candidate feels the assessment was not fair, they should have the right to appeal or undergo a second assessment.

4. **Certification:** The final phase is the formal certification of the outcomes of the assessment. If the candidate successfully demonstrated the required competencies, they receive official recognition – which could be a certificate, diploma, academic credits, or a micro-credential. According to the EU definition, certification in validation can award a full qualification, or partial qualification (like credits) or another appropriate form of recognition.

*Practical steps:* the results from the assessment are recorded and the competent authority (e.g., the university, training center, or awarding body) issues the credential. For instance, an individual might receive an official certificate stating they have achieved the learning outcomes of a particular course or module, or they might be granted, say, 10 ECTS credits towards a degree program. In the micro-credential context, this is often where a digital badge or micro-credential document is issued to the learner, detailing what has been achieved (and here all the elements from section 4.1 come into play – the certificate will list the title, level, etc., making the achievement portable).

*Stakeholders:* the awarding body (such as the university's examinations office or a certification authority) is key in this phase. They ensure the certification is entered into official records (e.g., student transcripts or national qualification databases). The learner of course is a stakeholder, as they receive the credential which they can then use for employment or further study. If the process is part of a national system, sometimes a national qualifications authority also keeps a record (especially if the certification leads to a nationally recognized qualification or part thereof).

*Quality assurance:* The certification phase should ensure that the credential issued is credible and secure. This involves using templates or formats that prevent fraud (perhaps digital certificates with verification) and ensuring that what is certified is exactly supported by the assessment results. Quality assurance here also means that no qualification is partially or fully awarded unless all required standards were met in assessment – i.e., the integrity of qualifications is upheld. In higher education, for example, an academic board might need to sign off that the RPL process was conducted properly before credits are officially granted. Additionally, linking back to EU frameworks, if a certificate is being issued with an EQF level or ECTS credits, the institution needs to be authorized to do so (part of QA is making sure only accredited institutions issue credentials with EQF/ECTS alignment). In an agricultural lifelong learning scenario, imagine the outcome is a certificate in “Advanced Organic Farming Practices” awarded by an accredited adult education institute; QA would entail that this institute's validation process is itself reviewed and approved by education authorities so that the certificate can be trusted by employers or other schools. (Council of the European Union 2022)

Throughout all four phases, stakeholder involvement and quality assurance form a thread that holds the process together. Typically, a range of stakeholders – including the learners, advisors, assessors, institutional administrators, and sometimes industry experts – contribute to a robust validation system. For example, developing the assessment criteria

for an agricultural skill might involve university faculty and perhaps input from an agricultural industry board to ensure relevance. Quality assurance measures (such as those recommended by CEDEFOP and national agencies) ensure the validation is fair, transparent, and reliable at each step. This may include internal and external monitoring: internally, institutions often have RPL coordinators and quality committees; externally, there could be audits or peer reviews of the validation process. (MFHEA 2024)

A concrete example from the field of agricultural education is the USAGE-NG project mentioned earlier. BOKU (Vienna) as the lead university in that project is responsible for both developing the micro-credential modules and overseeing quality assurance and RPL guidelines. In practice, this means the project is creating a *guideline for curriculum development for RPL and VNFIL* in the context of micro-credentials. So, if a farmer or a professional gains a micro-credential through one of USAGE-NG's short courses, there are clear procedures in place to validate any prior experiential learning they brought in, and to ensure the issuance of the micro-credential is quality-assured. By involving multiple stakeholders (universities, industry partners, farmer associations) in designing these validation procedures, the project embeds quality at each stage – from identifying what farmers already know, to documenting their field experience (perhaps via farm logs or videos), to assessing them (maybe through practical tasks on demonstration farms), and finally certifying their new skills with a recognized micro-credential. This approach illustrates how VNFIL/RPL can be effectively implemented in agricultural lifelong learning, allowing experienced individuals to gain formal recognition for skills – which not only motivates learners but also helps educational institutions broaden access and uphold standards.

### **2.3 EQF, ECTS, and Quality Assurance in Micro-Credentials**

European frameworks such as the European Qualifications Framework (EQF), the European Credit Transfer and Accumulation System (ECTS), and established quality assurance (QA) standards have a profound influence on the design of micro-credentials. In essence, these frameworks provide the common reference points that make micro-credentials understandable and portable across institutions and countries and ensure they meet accepted quality standards. When designing a micro-credential, educators and institutions must carefully consider the EQF level, assign a suitable ECTS workload, and apply robust QA measures – these steps are essential for the micro-credential to be trusted and recognized widely. (European Commission 2021)

**European Qualifications Framework (EQF):** The EQF is a Europe-wide reference framework that maps out qualification levels (from 1 to 8) based on learning outcomes complexity. Incorporating EQF level in a micro-credential's design means determining *how advanced the learning is* and which level descriptors it matches. For example, is the micro-credential at the level of a short course for technicians (EQF 5), at bachelor's degree level (EQF 6), or at master's level (EQF 7). By pinning the credential to an EQF (or corresponding national framework) level, the issuer signals the difficulty and depth of the knowledge/skills involved. This precision is crucial: it allows different institutions to compare credentials. A micro-credential in "Advanced Viticulture Practices" marked as EQF Level 7 tells any university or employer that the content likely involves complex, research-based understanding (e.g., equivalent to postgraduate level) rather than basic know-how. Without a level, the credential's value is ambiguous. EQF-based level-setting thus directly aids portability – learners can take a micro-credential from one country

and have its level understood abroad, facilitating recognition. In fact, the EU approach explicitly lists the “level of the learning experience (EQF or QF-EHEA)” as a key element of a micro-credential. For institutional recognition, precise level alignment is essential: universities typically will only accept an external micro-credential for credit if its level matches the level of their course. For instance, an agricultural college considering whether to recognize a micro-credential in “Drone Technology for Crop Monitoring” will look at the EQF level; if it’s labelled EQF 5 (short-cycle HE level) but they need learning at EQF 6 for their program, they might not grant full credit. Thus, to make micro-credentials stackable and combinable, designers ensure the learning outcomes and assessments meet the intended EQF level descriptors. The USAGE-NG project demonstrates this by aligning its modules to EQF levels 5 through 8 depending on the target audience (from vocational learners up to master’s students), thereby smoothing the path for those credentials to slot into formal qualifications appropriately. (European Centre for the Development of Vocational Training 2015)

**ECTS (European Credit Transfer and Accumulation System):** ECTS provides a standard for expressing the *workload* of learning activities (with 1 ECTS credit typically equating to 25–30 hours of total learner effort). Integrating ECTS in micro-credentials means quantifying the volume of learning in a widely understood unit. The design of a micro-credential must include a careful estimate of how many hours of study, practice, and assessment are required, and thereby how many ECTS it carries (for example, a micro-credential might be 3 ECTS, 5 ECTS, etc.). Workload definition is not just a formality – it affects how deep or extensive the content will be. A 5 ECTS micro-credential in “Sustainable Soil Management” will be planned to involve roughly 125–150 hours of learning (including, say, online lectures, readings, field exercises and assignments). Being precise and transparent about workload is vital for two reasons: learner expectations and credit portability. Learners (especially adult learners juggling other responsibilities) need to know the commitment required. Meanwhile, other institutions use the ECTS to judge whether they can *transfer* or *accumulate* the credit. If a learner wants to use a micro-credential towards an academic program, that program will consider the ECTS value – for instance, a university might allow up to a certain number of ECTS from accredited micro-credentials to count toward electives. Portability is enhanced when the micro-credential’s credits are clear and are in the ECTS system, because ECTS is the “common currency” in European higher education. Many European micro-credentials are indeed expressed in ECTS (the Council Recommendation encourages this “wherever possible”) to enable accumulation. For example, the LATEST project has been working on developing “micro-ECTS credentials” for AgTech education– indicating that these short courses carry ECTS credits and can thus be combined into larger blocks of learning. A precise workload also guards against *overestimating* what a micro-credential delivers; it prevents inflation of credentials. In an agricultural LLL scenario, if a digital badge claimed to signify comprehensive knowledge of precision agriculture but was only a 10-hour course (0.5 ECTS), that mismatch would undermine trust. By contrast, clearly stating something like “5 ECTS (approximately 125 hours of study)” gives receiving institutions confidence in how substantial the learning was. (European Centre for the Development of Vocational Training 2015)

**Quality Assurance (QA) frameworks:** Quality assurance is the backbone that underpins both EQF levelling and ECTS crediting. The EU’s definition of micro-credentials explicitly notes that they “*are underpinned by quality assurance following*

*agreed standards in the relevant sector or area of activity*". In other words, a micro-credential should be subject to the same kind of quality checks as any reputable educational provision. How does this influence design? First, when creating a micro-credential, providers must decide which QA framework applies. If the micro-credential is offered within higher education, the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) apply; if it's in vocational education, the EQAVET (European Quality Assurance Reference Framework for VET) principles would apply; some fields might use sector-specific quality labels. This means from the outset, the course content, delivery, and assessment of the micro-credential should meet the same standards of rigor as a traditional program. For example, a university designing a micro-credential in *Agricultural Data Analytics* will put it through internal approval committees, ensure the instructors are qualified, the learning outcomes are reviewed, and assessment methods are valid – just as they would for a regular course module. They might also invite an external expert to review the syllabus, or ensure student feedback is collected and acted upon, following their normal QA cycle. All these steps ensure the micro-credential's quality is transparent and trustworthy. This transparency is essential for portability: other institutions or employers will recognize the micro-credential if they trust that it was well-delivered and assessed. Imagine an employer considering two micro-credential certificates held by a job candidate – one has a note that it was issued by an accredited university and quality-assured per national higher education standards, and the other has no such information. The employer (or any recognizing institution) is far more likely to value the one backed by clear QA. The EU approach even makes *"type of quality assurance used"* a mandatory field in describing a micro-credential, highlighting that the issuer should disclose how it was quality-checked (for instance, stating it was internally quality assured under the university's QA system, or externally accredited). (European Association for Quality Assurance in Higher Education 2021)

For institutional recognition, the presence of robust QA is often a deciding factor. Universities, for example, typically have recognition policies that say they will accept credits or learning from external sources *only if* the quality of that provision is equivalent to their own. Because of this, micro-credential designers often proactively align with established QA processes to remove doubts. We can see this in practice: the MicroHE (Micro-credentials for Higher Education) and similar initiatives have noted that no entirely new QA systems are needed – instead micro-credentials should use existing ones. For an agricultural faculty considering whether to recognize a micro-credential a student earned from an NGO program, knowing that the program underwent external quality review (maybe it was part of an Erasmus+ project with external evaluators, or it was audited by a national agency) will be key to granting recognition. Some projects are even developing quality labels for micro-credentials. For instance, the EU-funded Microbol project looked at how Bologna Process tools (like QA, qualifications frameworks, ECTS) can be extended to micro-credentials, and one outcome is that micro-credentials should adhere to these same tools to ensure they are credible. Providers are encouraged to make QA information accessible – e.g., publishing the learning outcomes and assessment strategy openly, and stating which quality standards were followed. This level of transparency builds trust so that a micro-credential can be *portable* (accepted by other institutions) and valued for *recognition* (counted towards something bigger). (Diplomasafe 2024)

In the agricultural education arena, where numerous organizations (universities, vocational colleges, extension services, even agribusiness companies) might offer short trainings, having common reference points of EQF, ECTS, and QA is enabling a more cohesive ecosystem. Precise level-setting ensures that a course on, say, *Integrated Pest Management* offered to farm advisors is pitched at the right level (perhaps EQF 5 if it's technical training, or EQF 7 if it's part of a master-level continuous education), and this level is communicated so that others know how advanced it is. Workload via ECTS means that if that course is 2 ECTS, a learner who later enrolls in a degree might be exempted from an equivalent 2 ECTS worth of content. And transparent QA means that whether that course was delivered by a university agriculture department or a certified training institute, it met agreed standards (e.g., using qualified instructors, proper assessment of the advisors' knowledge gain). We see initiatives like USAGE-NG explicitly ensuring their micro-credentials follow EQF and ECTS guidelines and providing a "*Framework and Guidance Handbook*" for micro-credential development with key criteria of relevance, recognition, and learner-centered approach. This indicates that right from the design phase, they are integrating these European frameworks to maximize acceptance. Likewise, the LATEST project's focus on "rewarding excellence in learning and teaching with micro-credentials" implies rigorous QA – BOKU's role in researching best practices and producing a guide suggests that the micro-credentials will be developed under strict quality considerations.

To conclude, precise EQF level-setting, clear ECTS workload, and transparent quality assurance are indispensable for micro-credentials because they make these small learning units *legible and trustworthy* beyond their immediate context. EQF gives a level of competency, ECTS gives a volume of learning, and QA gives a mark of reliability. Together, they enable a micro-credential earned in one place (for example, a digital farming course at a continuing education center) to travel with the learner into other educational institutions or across borders, and to be recognized by employers and universities as a legitimate, rigorous credential. This portability and recognition fulfill the promise of micro-credentials as a flexible learning innovation – one that fits into the lifelong learning landscape without compromising the coherence and quality of the broader qualification framework. In practical terms, an agricultural professional can continue learning in bite-sized chunks and be confident that each "bite" (each micro-credential) carries clear information (level, credits, quality stamp) that will allow it to be pieced together into the larger puzzle of their qualifications and career progression. (European Association for Quality Assurance in Higher Education 2021)

### 3 Framework for Micro-Credential Design

In European agricultural higher education and lifelong learning, micro-credentials have emerged as a flexible way to certify specific skills and knowledge. A micro-credential is generally defined as a *record of the learning outcomes that a learner has acquired following a small volume of learning*, often documented in a digital or paper certificate. The EU sees micro-credentials as key to enabling *flexible learning pathways* and bridging skill gaps in rapidly evolving fields. In agriculture, where professionals must continually update their skills in areas like smart farming and sustainability, well-designed micro-credentials can provide targeted, *bite-sized* learning opportunities. Importantly, the Council of the European Union's 2022 Recommendation on micro-credentials calls for a common approach so that these credentials are portable and trusted across institutions and

countries. This chapter proposes a framework for designing micro-credentials that aligns with European standards and the needs of agricultural education. It outlines the mandatory components that each micro-credential should include (per EU guidelines), additional optional elements that add value, and strategies for modularisation and stackability. The aim is to ensure micro-credentials are rigorous yet practical – facilitating recognition, quality assurance, and meaningful learning for diverse learners such as university students, farmers, and agricultural professionals. (Clite 2025)

### 3.1 Mandatory Components (EU-Aligned)

European guidelines specify a set of core elements that every micro-credential should contain to ensure transparency and recognition. Incorporating these in the design of a micro-credential makes it easier for other institutions, employers, and learners to understand its value. The following mandatory components form the foundation of an EU-aligned micro-credential framework:

- **Learner Identification:** Each micro-credential must clearly identify the individual who earned it (e.g. full name of the learner). This ties the credential to its holder and helps prevent fraud or misrepresentation. For instance, a digital certificate in “Smart Irrigation Techniques” would include the name of the farmer or student who completed the module, ensuring any viewer knows who achieved the outcomes. (Council of the European Union 2022)
- **Learning Outcomes:** The specific knowledge, skills, and competences that the learner has gained must be explicitly stated. Clear learning outcomes communicate what the learner is capable of after earning the micro-credential. In practice, an agricultural micro-credential might list outcomes such as “Ability to analyse soil moisture data using IoT sensors” or “Skill in implementing climate-resilient crop rotations.” Defining outcomes in measurable terms aligns with the learner-centred approach promoted by the European framework and aids in both instructional design and later recognition of the credential. (Clite 2025)
- **Assessment Format:** A valid *assessment* is essential to ensure the learner has achieved the outcomes. The micro-credential should describe the type of assessment used (for example, exam, project, demonstration, oral test). This transparency boosts credibility: a micro-credential in *Precision Farming Technologies* might require a practical field project or an online proctored exam. By specifying the assessment format, providers demonstrate that the credential is backed by evidence of competence, aligning with the EU principle of “valid assessment” for micro-credentials. (Clite 2025)
- **Workload (ECTS):** Indicating the *notional workload* needed to achieve the learning outcomes is crucial. European practice encourages expressing this in terms of the European Credit Transfer and Accumulation System (ECTS) credits wherever possible. Assigning ECTS (or at least total hours) allows stakeholders to gauge the volume of learning. For example, a micro-credential might represent *125–150 hours of study (equivalent to 5 ECTS)*, signalling a substantial short course. The USAGE-NG project adopts this approach by structuring its agricultural micro-credential modules to carry about 5–6 ECTS each. This not only quantifies learner effort but also facilitates credit transfer between institutions. (European Commission 2022)
- **EQF Level:** Every micro-credential should indicate the *level* of the learning experience on the European Qualifications Framework (EQF) (or the corresponding national/HE framework). The EQF level (ranging from basic skills at Level 1 up to doctoral-level at Level 8) reflects the complexity and depth of learning. Aligning a micro-credential with

an appropriate EQF level helps employers and educational institutions instantly recognize whether it corresponds, for example, to vocational training (e.g. EQF 4) or to Master’s-level study (EQF 7). In the USAGE-NG agricultural modules, the content is targeted at EQF levels 5–8 to address both undergraduate and postgraduate learning needs. Stating the EQF level on the credential (e.g. “EQF Level 6”) ensures comparability and clarity about the proficiency level of the learner. (European Commission 2021)

- Quality Assurance Mechanisms:** Robust quality assurance (QA) underpins the credibility of micro-credentials. The credential should note what quality assurance processes or standards support it. In higher education contexts, this often means the module was developed and/or approved under the institution’s accredited QA system (in line with the European Standards and Guidelines for Quality Assurance). For non-formal training providers, it might reference industry standards or certification of the course. The Council Recommendation emphasizes that micro-credentials must be *underpinned by quality assurance following agreed standards* in the relevant sector. In practice, this could involve internal and external reviews of the course, qualified instructors, and secure certification issuance. For example, an agricultural micro-credential issued by a university would be subject to the same academic QA as a regular course, and only an **accredited institution** can award ECTS credits at an EQF level. By making QA explicit (e.g. “Quality assured under University X’s accreditation framework”), the credential inspires trust that it meets high standards of curriculum and assessment quality. (European Association for Quality Assurance in Higher Education et al. 2015)

Each of these mandatory components contributes to the transparency and portability of the micro-credential. When a learner presents such a credential – for instance, a farm manager applying for a job with a “Digital Pest Management” micro-credential – the clear statement of outcomes, workload/ECTS, EQF level, assessment, and QA gives the employer confidence in what the credential represents. Similarly, another university can more easily *recognize or award credit* for that micro-credential if it knows the exact workload and level. This common structure, promoted by the European approach, allows micro-credentials to be comparable, stackable, and transferable across institutions and countries. (Clite 2025)

### 3.2 Optional Components

In addition to the core elements above, the European framework suggests several optional components that can enrich a micro-credential’s description and utility. These elements are not always required but can provide extra information relevant to learners and credential users (such as admissions officers or employers). Including them can further strengthen the *flexibility and trustworthiness* of the credential:

- Prerequisites:** Indicating any prerequisites needed to enroll in the learning activity can be helpful. For example, a micro-credential on advanced drone usage in agriculture might require prior basic knowledge of farm management or a lower-level course in precision agriculture. Stating prerequisites ensures learners are aware of the entry requirements and helps explain the context of the credential (i.e. what baseline knowledge was assumed). (European Training Foundation 2023)
- Identity Verification in Assessment:** This refers to whether and how the learner’s identity was verified during assessment, and the supervision level of the assessment. For instance, an online micro-credential could note if the final exam was proctored (supervised) and if formal ID verification was done. Options range from *unsupervised assessments with no ID check* up to *exams supervised on-site or online with secure ID*

*verification*. Including this information signals the level of rigor: a credential with verified, supervised assessment will carry more weight than one based on self-assessment. It assures stakeholders that the work was indeed done by the learner in question. (European Training Foundation 2023)

- **Grade (if applicable):** While many micro-credentials are issued on a simple pass/fail or mastery basis, some may include a grade or score. If a grading scale was used (e.g. a percentage score or letter grade), it can be recorded on the credential. This is particularly relevant if the micro-credential might count towards a larger award or if an employer desires to know how well the learner performed. For example, achieving “85% - *Distinction*” in a *Sustainable Soil Management* module provides additional insight into the learner’s proficiency. When included, grading should align with standard grading systems or descriptors to be interpretable across contexts. (Council of the European Union 2022)
- **Stackability Options:** Micro-credentials can be either standalone or stackable towards another credential, and it is useful to indicate this status. A standalone micro-credential is a self-contained certification (for instance, a course on organic composting techniques taken for personal development). In contrast, a stackable micro-credential is one that is designed to be combined with other micro-credentials as part of a larger qualification pathway – for example, a set of three 5-ECTS micro-credentials in different smart farming topics that together could count toward an elective module in a degree, or towards a professional certificate in agriculture. Noting “This micro-credential is part of the Smart Farming Specialization bundle leading to a Diploma” or conversely “This is an independent micro-credential not currently integrated into a broader program” guides learners in how they can use the credential. It also signals to institutions how easily the credential might slot into or complement formal qualifications. (Council of the European Union 2022)

These optional components add nuance and utility to micro-credentials. For instance, specifying prerequisites and stackability helps prospective learners chart their learning pathways – a lifelong learner could see that after completing an “Intro to Agribusiness” micro-credential, they become eligible for an advanced agribusiness course that is stackable into an MBA program. Likewise, information on identity verification and grading provides additional assurance to whoever is evaluating the credential. Although these elements are not strictly required by the EU recommendation, they exemplify *good practice in design*, especially in academic settings. They contribute to making micro-credentials more informative and trustworthy, thereby enhancing their acceptance. As the EU Council Recommendation notes, providing clear, transparent information (on learning outcomes, content, level, workload, etc.) is essential for micro-credentials to be *understandable and comparable* – the optional elements discussed here further that goal. (European University Association 2021)

### 3.3 Modularisation and Stackability

One of the greatest strengths of micro-credentials is their ability to function as modular learning units that can stand alone or be combined into larger curricula. In designing micro-credentials for agricultural education, it is vital to consider how they can connect to existing lifelong learning courses and even formal Bachelor’s or Master’s programs. This ensures that learners have flexibility: they can take a single module for immediate upskilling or accumulate modules over time as part of a broader qualification. Below, we discuss strategies for both standalone and integrated (stackable) micro-credential designs, and how modularisation supports portability and recognition. (Murphy 2023)

**Standalone Micro-Credentials:** A standalone micro-credential is designed to deliver a focused competency that is valuable on its own. The content is usually tailored to a specific skill or topic (for example, “*Integrated Pest Management for Vineyards*” as a 3 ECTS micro-credential) with immediate relevance to practice. When designing standalone offerings, educators should ensure each micro-credential has a coherent set of learning outcomes and assessments that yield a meaningful certificate by itself. In the agricultural sector, standalone modules might target niche skills (like operation of a particular farm drone technology, or a course on EU organic farming regulations) that benefit learners in their jobs without needing a full degree. However, even as standalone units, aligning them with the EQF and ECTS frameworks remains important. This alignment means that if a learner later pursues formal education, the standalone micro-credential can potentially be recognized for credit via mechanisms like recognition of prior learning. For example, a farmer who completed a standalone micro-credential on *Precision Irrigation* could have that learning validated and count it towards an agricultural engineering certificate or towards an elective in a degree program. Standalone design should also consider delivery format – many such micro-courses are offered online or in a blended format to maximize access for working professionals. The USAGE-NG project, for instance, is developing a mobile-learning MOOC “*Fighting Climate Change – Smart Farming and IoT Technologies for Small-Scale Farmers*” as an open, standalone course accessible to farmers across Europe. Even as a separate module, this MOOC-based micro-credential adheres to the EU framework (with defined outcomes, ECTS credits, etc.) so that it can be widely recognized. By crafting standalone micro-credentials that meet high quality standards, institutions empower learners to acquire specific new skills with confidence that their credential will be *portable* and valued by others. (Council of the European Union 2022)

**Stackable Micro-Credentials:** Stackability refers to designing micro-credentials such that they can be combined and integrated into larger qualifications. Rather than isolated learning experiences, stackable micro-credentials are part of a deliberate modular system. In practice, this might mean a university creates a suite of micro-credentials in agriculture (e.g. “*Soil Health Basics*”, “*Crop Data Analytics*”, “*Farm Business Management*”), each worth a few ECTS, which together could fulfill a semester of a postgraduate certificate, or count toward elective credits in a BSc Agriculture program. The *European approach to micro-credentials* explicitly encourages this integration, noting that micro-credentials “may be standalone or combined into larger credentials”. For seamless stackability, common design rules are applied across the set: consistent credit values (for easier accumulation), aligned EQF levels (to ensure they are on the same academic level when stacked), and complementary content without overlap. An important strategy is to embed micro-credentials into the curriculum architecture of formal programs. For example, the USAGE-NG project plans to ensure that multiple micro-credential modules can be *integrated into lifelong learning courses and even Bachelor’s/Master’s programs* offered by partner universities. This involves mapping the micro-credential outcomes to program learning outcomes and validating that the assessments meet the academic standards of the larger qualification. Quality assurance plays a critical role here: faculty boards or accrediting bodies may need to approve micro-credentials as components of a degree curriculum, and the micro-credentials must be regularly reviewed and updated to remain compatible with the full program. Another key aspect of stackability is providing guidance to learners on learning pathways. Institutions should publish how a learner can progress from one micro-credential to another and what combination might lead to a certificate or degree. For

instance, learners could be advised that after completing two introductory agri-tech micro-credentials, they become eligible for an advanced module, and completion of all three earns an overall diploma. This transparent path encourages ongoing engagement: a mid-career agronomist might start with one micro-credential for immediate needs, then decide to pursue a series and eventually attain a higher qualification. (European Commission 2021)

**Connecting to Formal Qualifications:** Whether standalone or stackable, a critical design consideration is how micro-credentials can be formally recognized or transferred into the traditional education system. Utilizing ECTS credits and EQF levels is a facilitator, but mechanisms like articulation agreements or credit transfer policies are needed to make it operational. Many European universities are developing procedures to accept micro-credentials for credit – often through recognition of prior learning (RPL) or exemption processes. In agricultural education, this means if a lifelong learner earns a micro-credential from a short course (for example, via an extension training program), a university might recognize that learning as equivalent to a module in their degree program, provided the micro-credential met the requisite standards. The USAGE-NG project explicitly addresses this by creating guidelines for curriculum development that incorporate RPL and Validation of Non-Formal and Informal Learning (VNFIL), ensuring that skills gained through micro-credentials (or prior experience) can be formally validated. By involving multiple stakeholders – universities, industry partners, farmer associations – in designing these procedures, the project ensures the micro-credentials are relevant and accepted by both academic and professional communities. For example, a micro-credential in “Advanced Organic Farming Practices” offered by an accredited adult education institute would have its validation process reviewed by education authorities so that the certificate can be trusted by employers or other schools. Such quality-assured integration is fundamental to making micro-credentials *portable* across different contexts. (European University Association 2021; Council of the European Union 2022)

In summary, modularisation and stackability are about building micro-credentials that offer flexibility without sacrificing coherence. A well-designed micro-credential framework in the agricultural sector will allow a dairy farmer in one country to take a few targeted courses (e.g. on animal nutrition, farm data management) and have those learning achievements recognized by a university in another country or by a professional certifying body. Thanks to the common EU approach, when micro-credentials carry standard information (learning outcomes, ECTS, EQF level, assessment method, etc.) and uphold high quality, they become trusted “currency” of learning. This portability and recognition, supported by robust design elements, ultimately benefits diverse learners – from young agricultural graduates to seasoned farmers – by enabling lifelong learning that is both autonomous and formally acknowledged. The proposed framework thus supports not only academic rigor but also practical applicability, ensuring micro-credentials truly contribute to skill development and innovation in the agricultural sector. (Council of the European Union 2022)

### 3.4 Key Findings

Micro-credentials in agricultural education hold significant promise for lifelong learning (LLL) and higher education (HE), particularly as they relate to skills development in sectors such as smart farming, climate-smart agriculture, and precision agriculture.

However, while modularity enables flexibility in learning, over-modularization can lead to fragmentation, which might undermine the coherence and credibility of the credentials awarded. To prevent this issue, it is essential to align the development of micro-credentials with principles of open access content and modular coherence.

**Over-modularization** refers to the risk of breaking down learning into too many isolated modules, which may make it difficult for learners to see how individual credentials fit into broader educational pathways or professional development. This fragmentation poses challenges for both learners and institutions, as it can diminish the perceived value of a micro-credential. For example, learners may struggle to accumulate enough micro-credentials to build a meaningful qualification, while educational institutions may face difficulties in aligning modular content with existing formal qualifications. (European University Association 2021)

To address this challenge, the EU micro-credential approach emphasizes a coherent framework in which modules can be stacked and integrated into larger qualifications without losing their modular integrity. This coherence can be achieved through several key principles.

### ***3.4.1 Alignment with Quality Standards***

Quality assurance (QA) mechanisms are crucial in ensuring that micro-credentials meet the necessary standards for recognition. This includes alignment with the European Qualifications Framework (EQF) and the European Credit Transfer and Accumulation System (ECTS). Each micro-credential should adhere to these frameworks to ensure comparability and transparency. For example, agricultural micro-credentials, whether standalone or part of a stackable pathway, must include clear learning outcomes, workload (in ECTS), and assessment formats to ensure the learner's achievements are easily understood across institutions and employers. Adopting standardized frameworks helps maintain the integrity and transparency of each micro-credential, mitigating the risk of fragmentation. (European Commission 2022)

### ***3.4.2 Focus on Learner-Centered, Modular Learning***

A key principle in the development of open access content is ensuring that it is learner-centered, which focuses on modular learning paths designed to be both flexible and interconnected. Micro-credentials should be created with the learner's needs and context in mind, enabling them to progress at their own pace while ensuring the learning modules align to broader qualifications. For example, agricultural modules like "Sustainable Crop Management" or "Advanced Irrigation Systems" could be designed to complement existing educational qualifications, allowing learners to choose topics that suit their immediate needs, and later stack those credentials to fulfill requirements for more advanced qualifications. (European Commission 2022)

### ***3.4.3 Coherence in Curriculum Design***

To prevent over-modularization from leading to fragmentation, it is critical to maintain coherence in curriculum design. Each micro-credential, even if standalone, should align with a larger educational or professional trajectory. This can be achieved through clear

learning outcomes, consistent learning paths, and opportunities for stackability. The USAGE-NG project exemplifies this by ensuring that its micro-credentials in agricultural education are modular yet interlinked, allowing learners to gradually accumulate knowledge without feeling lost in isolated units. For example, completing a short micro-credential in "Digital Farming Tools" could be a stepping stone to more advanced modules in "Precision Agriculture" or "Agri-Tech for Climate Change Adaptation," with each credential building logically on the previous one. (European University Association 2021)

### ***3.4.4 Transparency and Open Access***

Open access content also emphasizes transparency, which supports coherence and reduces the risk of fragmentation. Learners must be able to see how individual modules relate to one another, their overall educational goals, and career aspirations. This requires clear documentation on learning outcomes, qualifications, and the pathways through which the modules can be stacked. By ensuring that every micro-credential is backed by transparent and consistent information (such as workload, EQF level, and assessment criteria), the potential for learners to build meaningful educational trajectories is increased. (European Commission 2022)

### ***3.4.5 Harmonization Across Platforms and Institutions***

Finally, one of the goals of the EU's approach to micro-credentials is to ensure that these credentials are harmonized across institutions and platforms. This is especially critical for open access content, where learners from various regions and institutions may pursue different courses but expect to achieve comparable learning outcomes. In agricultural education, this could involve harmonizing the development of micro-credentials across universities, technical institutions, and non-formal learning providers. By adhering to EU standards (such as EQF, ECTS, and QA frameworks), micro-credentials become portable and recognized across different educational and professional contexts, which further ensures their relevance and value. (European Commission 2021)

## **4 Comparative Analysis of National Validation**

### **4.1 Local Validation Procedures in Austria, Italy, and Germany**

**Austria:** Austria's framework for validating non-formal and informal learning is anchored in a national strategy adopted in 2017 as part of its Lifelong Learning strategy. This strategy established the groundwork for recognizing prior learning, but it remains only partially implemented in practice. Legally, Austria has developed a comprehensive National Qualifications Framework (NQR) open to all types of qualifications from formal and non-formal sectors. The NQR is a Bologna-aligned eight-level framework (mirroring EQF levels) that includes a "Y-structure" to accommodate both academic (higher education) and vocational qualifications. The main institutional responsibility lies with the Federal Ministry of Education, supported by the Austrian Agency for Education and Internationalisation (OeAD), which hosts the EQF National Coordination Point (NCP) as

an independent body under contract with the Ministry. All qualifications formally leveled to the NQR must be published in the National Qualifications Register, a public database – publication is a legal requirement for the levelling to take effect. This register currently lists over one hundred qualifications, including dozens from outside formal education. In principle, this means micro-credentials or other non-formal learning certificates can be assigned an NQR/EQF level and recorded in the register, though few such cases exist to date. The recognition of prior learning (RPL) processes at Austrian institutions like BOKU (an agricultural university) involve multiple units and quality checks – in fact, BOKU has developed a Validation of Non-formal/Informal Learning (VNFIL) concept that emphasizes expert review and the involvement of all relevant university departments to ensure quality. Tools such as portfolios of evidence are commonly used: candidates prepare documentation of their competencies (CVs, work samples, certificates, etc.) which is reviewed for equivalence to formal learning outcomes. While Austria does not yet have a unified online validation platform, the existence of the national register and OeAD's coordination role provides the digital infrastructure to log recognized learning outcomes. Overall, Austrian higher education institutions operate within a supportive legal framework (the NQR Act and national strategy) but must internally operationalize validation through exam regulations and lifelong learning centers. (Eurydice 2025)

**Italy:** In Italy, validation of non-formal/informal learning has recently been bolstered by a *National Framework for Certification of Competences*. The Italian National Qualifications Framework (Quadro Nazionale delle Qualificazioni, QNQ) was formally adopted in 2018, dividing qualifications into eight EQF-aligned levels. A National System for Certification of Competences (NSCC) was established to standardize how skills are identified, validated, and certified across regions and sectors. A milestone came with the adoption of National Guidelines on validation in 2021, which provide a common reference for procedures across the country. Institutional responsibilities are shared: the Ministry of Labour, Ministry of Education, and Ministry of University and Research jointly drive policy (with input from regions and social partners), while the National Agency for Active Labour Policies (ANPAL) acts as the EQF NCP and leads implementation. Italy's approach is thus more centralized than Germany's, aiming for a coherent national system. A national repository of qualifications (learning outcome-based) is under development to compile all certified qualifications at national and regional levels. Currently, however, relevant databases are fragmented and not yet interconnected, indicating ongoing work to unify digital systems. Tools for validation include portfolios and competency databases managed by regional authorities and universities. For example, candidates undergoing validation might prepare a dossier of evidence which assessors evaluate against occupational standards. At the university level, the trend toward micro-credentials is notable: the Ministry's 2024 planning guidelines even use the number of *open badges* earned by students (for transversal skills training) as a performance indicator. The University of Udine provides a practical example through its "Uniud\_XL" micro-credentials initiative – a set of short (1–3 ECTS) modules for students to gain additional transversal competencies. These micro-courses, which are delivered either in person or online and conclude with an assessment, are formally documented: upon completion, students receive a certificate and the ECTS credits are recorded on their academic transcript and Diploma Supplement. This illustrates how Italian institutions are embedding micro-credentials within formal higher education pathways. Beyond academia, professional bodies in agriculture have embraced micro-credentials for lifelong learning: for instance, the National Order of Agronomists requires continuous professional development by law, and it collaborates

with universities and training providers to offer short courses (e.g. in GIS or remote sensing) as certified micro-credentials for agronomists and foresters. In summary, Italy has a robust legal framework and emerging digital infrastructure for validation, with growing examples of integration of micro-credentials, though practical implementation (like linking databases or consistent use of e-portfolios) is still underway. (CEDEFOP 2022)

**Germany:** Germany presents a contrasting case, as it lacks a single national system for validation of non-formal and informal learning. Education legislation and administration are decentralized to the 16 federal states (Länder), so no common legal framework or standardized national procedure for validation (VNFIL) exists. Instead, broad guidelines are set through the Standing Conference of Länder Education Ministers (KMK), and these are implemented via state-level higher education laws and regulations. For example, KMK agreements have enabled universities to award credit for externally acquired competencies and to admit experienced professionals into higher education without the traditional entrance qualifications, but each state's laws detail the criteria. As a result, institutional practices vary. Typically, at the university level, validation (such as recognizing prior learning for credit or access) is governed by each institution's exam regulations. The process is often triggered by a student's request and handled by the relevant *examination board*, which appoints academic experts to evaluate the equivalence of the applicant's prior learning to the university's course requirements. The exam board then decides whether to grant credit or admission based on this expert assessment. Quality assurance for these decisions is internal – outcomes can differ from one university to another since there is no national quality standard beyond the general framework of the KMK rules. Germany does align with the European four-stage validation model (identification, documentation, assessment, certification), but how these stages are executed is context-dependent. For instance, during the documentation stage, German procedures allow a wide range of evidence: from standard documents like CVs and employer references to “alternative” evidence such as work samples, descriptions of work experience, partially completed academic coursework, or even a self-authored account of skills. In effect, candidates compile a portfolio of proofs of their competencies – a process typically guided in vocational contexts by the chambers of commerce or craft (which advise external examinees). Guidance and counselling for validation are usually provided in person or via telephone through these competent bodies (e.g. Chamber advisors for vocational qualifications), with some support from online portals in certain sectors. Digital systems for validation are not widespread nationally; there is no unified online platform to apply for RPL across universities. (One notable tool is the “*Qualifikationssuche*” database, an online national DQR register listing all qualifications that have been assigned to the German Qualifications Framework – however, this database currently focuses on formal qualifications; the inclusion of non-formal learning certificates in the DQR is still under discussion.) In the realm of micro-credentials, Germany is in an exploratory phase. There is no national strategy for micro-credentials yet, and universities have autonomy to pilot their own offerings. The German Rectors' Conference (HRK) is in the process of formulating recommendations on micro-credentials for higher education, signalling an emerging consensus-building effort. Until such guidelines materialize, German agricultural universities proceed cautiously: for example, the University of Hohenheim has not adopted a dedicated micro-credential strategy and notes that while traditional credit transfer under the Lisbon Recognition Convention is well-established, it is “not immediately obvious” how micro-credentials will integrate into degree programs. Nonetheless, Hohenheim acknowledges that in the

lifelong learning context (e.g. continuing education for agricultural professionals), micro-credentials could provide a common reference framework for skills, potentially making it easier for institutions to collaborate and recognize each other's short-course offerings. In summary, Germany's practice is characterized by decentralization: validation is handled by exam boards and state rules on a case-by-case basis, and while the principles of RPL are acknowledged nationwide, the tools (e.g. use of portfolios, online systems) and degree of formality can differ significantly by institution. Micro-credentials in agriculture remain at a pilot stage, awaiting clearer guidelines. (CEDEFOP 2024)

## 4.2 Gaps and Divergences Identified

A comparative look at Austria, Italy, and Germany reveals significant divergences in how non-formal learning and micro-credentials are validated, despite shared high-level goals. Some key differences include:

- Governance and Responsibility:** The role of governing bodies in validation varies widely. In Germany, responsibility is highly decentralized – each university's examination board takes charge of prior learning assessments within the legal context of state regulations. There is no single national authority or unified procedure, leading to variability and local interpretation. In contrast, Italy has moved toward a coordinated national system: the adoption of national guidelines (2021) and the establishment of ANPAL and a national certification framework mean there is a clearer central architecture for validation. Austria sits somewhat in between. It has a national strategy and NQF for reference, but practical implementation relies on institutions like universities to organize validation processes internally. Thus, an Italian learner's experience of validation is more likely to be shaped by standardized national criteria, whereas a German learner's experience depends on the policies of a particular Land and university. For micro-credentials, Italy's ministry and Rectors' Conference (CRUI) are proactively developing a common approach, whereas German universities are awaiting recommendations from the HRK and proceeding cautiously on their own. This gap in policy leadership means any harmonised framework must accommodate both centralized and decentralized models. (Eurydice 2025)
- Quality Assurance Maturity:** Another divergence lies in how developed and uniform quality assurance (QA) mechanisms are. Italy's validation system is underpinned by legislation and national bodies that aim to ensure consistency and trust in outcomes – for example, ANVUR (the national QA agency) has been involved in European projects to define quality standards for micro-credentials. This indicates a relatively mature QA approach, where common standards and monitoring are envisaged for all institutions. Austria's 2017 strategy explicitly calls for validation to become an *integral part* of the education system and emphasizes *learning outcomes orientation and quality assurance* in validation practices. However, since that strategy is not fully implemented, QA still largely depends on how each university or provider enacts it. BOKU's internal concept, for instance, introduced an expert review and cross-departmental oversight to uphold quality, but such practices are not yet systemic across all Austrian institutions. Germany's QA for validation is comparatively less uniform – without a national framework, quality control is left to individual exam boards or faculty committees. This can result in uneven rigor: one program's exam board might apply very stringent equivalence criteria while another is more flexible. Moreover, Germany places greater emphasis on formal qualifications (e.g. the Recognition Act focuses on foreign formal qualifications), and validation of experiential learning is less embedded in higher education QA processes. In practice, this means that a German university's recognition

of, say, a farmer's practical experience may be considered an exceptional case rather than a standard practice. The overall divergence in QA maturity is evident: Italy is building a cohesive certification and QA system around competences, whereas Germany is still discussing basic procedures (the DQR committee is "*currently discussing*" how to level non-formal competences to the NQF). This gap affects mutual trust – partners will question each other's validation outcomes if quality standards aren't transparent and equivalent. (European Association for Quality Assurance in Higher Education 2021)

- **Digital Readiness and Tools:** The use of digital tools (such as online platforms, e-portfolios, and credential databases) in validation also differs. Italy has shown commitment to digital credentials – the use of *open badges* to certify transversal skills is actively encouraged in universities, and efforts are underway to create a unified digital qualifications repository. Some Italian universities already issue micro-credentials in digital format and record them on official transcripts. Austria's national qualifications register is an online database that publishes recognized qualifications, a helpful tool for transparency, but we do not yet see a comprehensive online system for individuals to *manage* their RPL applications or learning portfolios (much of the process is still face-to-face or via paperwork at institutions). Germany appears the least digitally integrated in this context: guidance for candidates is predominantly in person or by telephone through chambers and university offices, with only ad-hoc use of online portals for certain steps. The absence of a nationwide platform means a learner often cannot initiate a validation claim online in a centralized way; they must navigate each institution's process. By contrast, some European peers (e.g. French universities) have innovated with online application systems, e-portfolio tools, and even remote assessments via videoconference for VAE (validation of experience). Those innovations highlight the relative lag in digital readiness in Austria and Germany. Indeed, within the LATEST project partners, a need was noted for a "sustainable online tool" to support validation – current methods (interviews, paper portfolios, email exchanges) could be enhanced by a unified digital platform. This digital gap matters because without modern tools, scaling up validation and micro-credentialing (especially to reach rural lifelong learners in agriculture) is more labour-intensive and less accessible. An Italian smallholder farmer, for example, might eventually access an online portal to get her skills certified (once the national system is fully operational), whereas an Austrian or German farmer might still deal with fragmented paper-based processes at various institutions. (CEDEFOP 2024)
- **Scope of Recognition (What is Validated):** There are also differences in what types of learning are commonly validated. Italy's framework is expansive, intending to certify competences from a variety of contexts (formal, non-formal, vocational, academic) under the NSCC. This includes micro-credentials, as evidenced by engagement of Italian universities and even professional orders in developing short courses. Austria likewise aims to open the NQR to all sectors, but in practice the bulk of NQR-recorded qualifications remain formal ones. Germany's current practice prioritizes formal vocational qualifications (e.g. apprenticeships) and foreign formal qualifications for recognition, with non-formal learning outcomes playing a secondary role. Consequently, a micro-credential in sustainable farming might be readily recognized as a valid upskilling credit in an Italian context (since the system is being tuned to value such non-formal training), whereas in Germany it might not be formally recognized unless it's part of an established university continuing education program. This divergence could create friction when trying to mutually recognize micro-credentials across borders. (CEDEFOP 2022)

These gaps underscore that while all three countries value lifelong learning in agriculture, they operate under different assumptions and structures. For instance, Italy assumes a *nationally coherent* approach is possible (and even necessary for labor mobility), whereas

Germany assumes *institutional autonomy* and diversity of practices is acceptable or even preferred. Austria assumes that aligning with European frameworks (EQF/NQF) and strategies will naturally guide institutions to update their practices, albeit gradually. Each assumption can be challenged: is a national system inherently better, or does it risk ignoring local needs? Does institutional autonomy foster innovation, or does it hinder learners' mobility? These questions need to be kept in mind when interpreting the comparative findings.

### 4.3 Implications for a Harmonised Framework

Given the above divergences, developing a harmonised framework for validation and micro-credentials across these partners must balance alignment with respect for local contexts. On one hand, there are clear opportunities for alignment: all three countries are committed to the European Qualifications Framework (EQF) and the idea of learning outcomes, which provides a common language. On the other hand, rigid “one-size-fits-all” solutions are likely to fail – a degree of heterogeneity is inevitable and even desirable. Below we discuss feasible alignments and necessary flexibilities, and then offer concrete recommendations. (Council of the European Union 2022)

**Feasible Areas for Alignment:** A minimum set of shared standards can underpin validation procedures without impinging on national sovereignty. The first is adopting the CEDEFOP four-phase validation model universally – every partner should ensure that identification, documentation, assessment, and certification of learning are part of their process. This doesn't dictate *how* each phase is done, but it provides a common process architecture. For example, in the identification phase, all partners could use tools like self-assessment checklists aligned to agreed learning outcomes, ensuring that learners in Austria, Italy, or Germany start by mapping their skills in a comparable way. Another alignment point is referencing outcomes to qualification frameworks: if each micro-credential or validated learning outcome can be tied to an NQF/EQF level, it becomes easier for other institutions to understand its value. A harmonised framework might thus set a rule that any micro-credential awarded in the partnership should come with an EQF level indication and ECTS credits, where applicable, to facilitate recognition across borders. Additionally, partners can agree on certain quality principles: for instance, that all validations of prior learning are carried out by qualified experts, follow transparent criteria, and include an external or second review for consistency. Such principles could draw on the work of projects like MICROBOL and European QA frameworks that Italy's ANVUR and others have been shaping. Embracing digital credentials is another alignment area – using common standards like Open Badges or the Europass Digital Credentials Infrastructure for issuing micro-credentials would enable interoperability. If BOKU, Uni Udine, and Hohenheim all issue a digital certificate for a “Precision Agriculture Basics” module, embedding the same metadata (learning outcomes, EQF level, hours, issuer, etc.), then a learner's achievement can be more readily accepted across institutions. In essence, alignment is feasible in terms of frameworks and formats: shared outcome descriptors, common credit systems, similar documentation templates (e.g. a standardised portfolio format), and mutual transparency about each institution's validation criteria. These create a foundation of trust. As one partner noted, micro-credentials could serve as a “*common framework*” to ease cooperation in lifelong learning – meaning that if we develop them with compatible design and QA, they act like a “universal adapter” between different educational systems. (European Association for Quality Assurance in Higher Education et al. 2015)

**Respecting Necessary Divergences:** However, harmonisation must stop short of erasing all differences. Certain divergences are rooted in non-negotiable factors like national law, language, and educational culture. For example, Germany’s federal structure means it is unrealistic to expect the creation of a single national validation authority or a uniform law – any framework must work *through* the Länder and universities, perhaps by providing a model policy that each university can adopt within state regulations. Over-harmonising here could infringe on academic autonomy and Germany’s legal context. Similarly, Italy’s extensive regulatory approach might not be fully replicable elsewhere; trying to impose Italy’s centralized model on Austria could conflict with the more autonomous Austrian university system. A harmonised framework should therefore allow modular implementation: it might set common goals and reference points but let each country fill in the operational details. For instance, the framework could recommend that “*each institution should have a designated committee for RPL decisions*” – Italy might fulfill this with its existing competence certification centers, Austria might use its *Studienkommission* or a lifelong learning office, and Germany might continue with exam boards. All fulfill the recommendation in spirit, but the execution remains culturally appropriate. Additionally, not all quality criteria can be identical; some national divergence in standards must be respected. If Italy requires that assessors of prior learning hold a specific certification, but Austria and Germany do not, the framework can suggest assessor training as a best practice without making it mandatory in all contexts. The tone of the harmonised framework should be enabling rather than prescriptive, to avoid what one might call the over-harmonisation trap – where in trying to force convergence, the framework becomes either impossible to implement or so general it’s meaningless. It’s also worth acknowledging differing needs in the agricultural sector: for example, Italy’s system must account for regional vocational training in agriculture, whereas Austria’s might focus on master craftsperson pathways and Germany’s on its dual training system. A unified approach to micro-credentials should allow content and assessment methods to differ (case in point: an Italian micro-credential might be awarded after a short course and an exam, while a German one might come from an intensive practical training and a portfolio review). As long as the learning outcomes and transparency are comparable, such divergence is fine. Indeed, maintaining some diversity can foster innovation – each country can pilot new validation tools (as France did with online VAE platforms) and share results without everyone having to march in lockstep. (Council of the European Union 2022)

**Actionable Recommendations:** Considering this analysis, we propose the following concrete steps toward a pragmatic harmonised framework:

- **Develop a Joint Validation Guide:** Assemble a guidebook agreed by all partner institutions outlining the validation procedure in alignment with CEDEFOP’s four phases. This guide should define common terminology (what constitutes “informal learning,” what is a “micro-credential”), minimal requirements for each phase (e.g. *documentation* must include a portfolio of evidence with CV, references, work samples), and reference points to NQF/EQF levels. Each university can adapt this guide to its context (add more requirements or steps as needed), but the core structure will be shared. This ensures a baseline consistency — for instance, a farmer applying for skills validation at BOKU or Udine would encounter a similar sequence of steps and clarity of criteria. (CEDEFOP 2015)
- **Establish Mutual Recognition of Micro-Credentials:** Formulate an agreement within the consortium that micro-credentials issued by one partner can be recognized by the

others for equivalent credit or as entry qualifications (where relevant). This could involve mapping each micro-credential to an EQF level and learning outcomes, so that if (for example) the University of Udine awards a 2 ECTS micro-credential in *Sustainable Viticulture (EQF 6)*, Hohenheim could easily judge how it might fit into their curriculum or professional development offerings. A practical step is to create a cross-institution credential directory: a shared database or catalogue of the partners' lifelong learning micro-credentials, with details on outcomes and credit. This fosters transparency and trust, making alignment tangible rather than abstract. (Council of the European Union 2022)

- **Enhance Training and Quality Assurance Collaboration:** Organize regular workshops and peer-review exercises among the partner institutions' staff responsible for validation and continuing education. By reviewing each other's validation cases or micro-credential designs, partners can calibrate their quality standards. For example, an Austrian RPL case (farmer's portfolio leading to admission into a certificate program) could be peer-reviewed by Italian and German experts to provide feedback on rigor and fairness, and vice versa. Additionally, encourage national bodies like the HRK in Germany and CRUI/ANVUR in Italy to share their evolving guidelines with the consortium. This will ensure the consortium's practices anticipate and align with emerging national recommendations on quality assurance of micro-credentials. (European Association for Quality Assurance in Higher Education 2021)
- **Invest in a Shared Digital Platform:** To address the digital gap, the consortium should collaborate on a pilot online platform for validation and micro-credentials. This could be as simple as a common e-portfolio and open badge system that all partners use. Candidates would be able to upload evidence, track the status of their validation application, and ultimately receive a digital credential through this platform. A unified platform could incorporate multilingual support and adapt to each institution's workflow. While each university might still make the decision separately, the *tool* they use can be the same, enhancing efficiency and user-friendliness. Such a platform can also host a "Credential Wallet" for learners – particularly useful for agricultural professionals who often gather learning from various sources. This recommendation builds on the observation that current practices would benefit from a sustainable online tool to complement traditional methods. By implementing a shared solution, partners increase their digital readiness together and send a signal to national authorities that a modern approach is viable. (European Commission 2021)
- **Respect Context through Flexible Framework Design:** Ensure that the framework document explicitly allows for national divergence. For instance, include statements like: *"Each partner may designate the appropriate body (exam board, faculty council, etc.) to conduct assessments, in line with their national regulations."* By writing flexibility into the framework, we avoid forcing changes to legal responsibilities (e.g. we wouldn't require Italy to use exam boards if their norm is to use external commissions, nor require Germany to create new central units bypassing exam boards). The framework should set *outcome-based standards* rather than process-based mandates. One concrete measure is to agree on a few core quality criteria (e.g. validity, reliability, transparency, fairness of validation) and require each institution to document how their own procedure meets those criteria, rather than dictate identical procedures. This way, Austria might demonstrate transparency by publishing its validation criteria on a website, Italy might do so via its guidelines and regional centers, and Germany via university regulations – different routes to the same goal. (Council of the European Union 2022)

In crafting a harmonised framework, a sceptical stance toward over-harmonisation is prudent. We assume not everything will align perfectly – and that's acceptable. The aim is

to create a scaffold that supports mutual understanding and portability of learning in agricultural education, without dismantling the pillars that hold up each national system. By focusing on common denominators like learning outcomes, credit systems, and transparency, the partners can move toward greater alignment incrementally. For example, over time, as trust builds, a micro-credential in “Climate-Smart Farming” earned through an Italian university extension course could be directly accepted for credit by an Austrian university’s master program – not because the procedures were identical, but because both followed the agreed framework ensuring the credential’s integrity. Conversely, where national or cultural differences run deep (as with governance structures or legal mandates), the framework will accommodate parallel approaches. (Council of the European Union 2022)

In conclusion, a harmonised framework for validation and micro-credentials in the agricultural higher education context is best seen as a *common roadmap* rather than a single highway. All partners are traveling toward the same objectives – empowering lifelong learners, upskilling the agricultural workforce, and fostering mobility – and the framework will map out key milestones and reference points on this journey (common phases, shared definitions, quality benchmarks). But each country may take a slightly different vehicle and lane. By stress-testing our assumptions (e.g. recognizing that an over-centralized solution may backfire, or that digital tools alone cannot overcome policy gaps), we ensure the framework remains rigorous yet realistic. Ultimately, the value of this comparative exercise is in showing that harmonisation is possible to a degree – enough to improve compatibility and cooperation – while affirming that respecting local institutional practices is not a weakness but a necessity for sustainable implementation. The recommended actions above seek to operationalize this philosophy, enabling partners to speak a common language of validation without losing their individual voices. Such a balanced approach will support agricultural lifelong learning by making the recognition of skills more transparent and transferrable, all while honoring the unique educational ecosystems in Austria, Italy, and Germany.

## 5 Conclusion

Activity 3.3 translated EU policy guidance on micro-credentials and validation into an operational framework for smart-farming education that can be used in both higher education and lifelong learning. It specifies the core information a micro-credential should carry (e.g., issuer, learning outcomes, workload/ECTS, EQF level, assessment and delivery mode, and the quality assurance basis), supporting transparency, comparability, and recognition across contexts.

The report’s design framework emphasises that modularity only adds value when paired with coherent learning pathways and robust quality standards; otherwise, over-modularisation risks fragmenting learning and weakening credential credibility. Accordingly, it foregrounds QA alignment (EQF/ECTS), learner-centred modular pathways, and transparent, open-access documentation to make stackability and cross-institutional portability feasible.

Finally, the comparative analysis of validation practices in Austria, Italy, and Germany shows shared ambitions but substantial differences in governance, standardisation, and

implementation maturity, which can impede consistent recognition. The report therefore points to a pragmatic harmonisation logic: shared minimum standards and a common process architecture, while retaining flexibility for national and institutional responsibilities.

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