





An initiative of the European Commission

# Inclusive REskilling and upSkilling Toward competitive Agrifood and veterinary sector: European agenda Strategy

| D4.2 Curricula design   |  |  |  |  |  |
|---|--|--|--|--|--|
| Document description  | This task involves the design of the curricula of 10 new occupational profiles in the following areas: 1) Food industry and processing, 2) Animal production, 3) Digital technologies for food industry, e-commerce, export, online marketing, logistics 4) Veterinary activities, 5) Advanced Entrepreneurial skills. |  |  |  |  |
| Partner responsiblePaola Pittia (UNITE), Department of Biosc<br>Technology for Food Agriculture and Environment |  |  |  |  |  |
| Due date  | 31/08/2024, revision 31/03/2025  |  |  |  |  |
| Work package title         Training design and development  |  |  |  |  |  |
| Task title  | Curriculum Design  |  |  |  |  |
| Status*   | F  |  |  |  |  |
| Author(s) and datePaola Pittia, Milena Corredig, Remigio Berruto, P<br>Busato, Konstantina Ntrallou             |  |  |  |  |  |

\*F: final; D: draft; RD: revised draft



Project Erasmus+ I-RESTARTAgreement: 101055774 - ERASMUS-EDU-2021-PI-ALL-INNO





# Table of Contents

| 1 | 1 Deliverable's summary   |   |               |  |  |  |  |
|---|---|---|---------------|--|--|--|--|
| 2 | 2 Introduction  |   |               |  |  |  |  |
| 3 | Me  | thodology   | 4             |  |  |  |  |
|   | 3.1   | Task description as presented in the project work plan  | 4             |  |  |  |  |
|   | 3.2   | The I-RESTART approach in the curriculum design   | 5             |  |  |  |  |
|   | 3.3   | Background information  | 6             |  |  |  |  |
|   | 3.4   | Methodology used for the development of curricula for the new OPs   | 6             |  |  |  |  |
|   | 3.5   | Mapping the Occupational Profiles (OPs)   | 9             |  |  |  |  |
| 4 | Cor   | clusion   | 10            |  |  |  |  |
| 5 | Anr   | iexes   | 12            |  |  |  |  |
|   | Annex   | 1: Curriculum for Occupational profiles of the "Food Industry" sector   | 13            |  |  |  |  |
|   | Annex 2: Curriculum for Occupational profiles of the "Animal Production" sector 20  |   |               |  |  |  |  |
|   | Annex 3: Curriculum for the Occupational Profiles of the "Veterinary" Sector 30   |   |               |  |  |  |  |
|   | Annex<br>Agri-fa  | 4: Curriculum for the multi-sector Occupational profile (1): Entrepreneurial skilled specialist j<br>and sector | for the<br>36 |  |  |  |  |
|   | Annex 5: Curriculum for the Animal Production & Veterinary multi-sector occupational profile: One health specialist in livestock farming and veterinary activities 39 |   |               |  |  |  |  |





## 1 Deliverable's summary

The Deliverable 4.2 "Curriculum Design" is a summary of the outcomes of the I-RESTART project related to the process of designing the curricula of new occupational profiles for the sectors of:

- food industry,
- animal production, and
- veterinary.

This work was carried out in WP4 and included bimonthly updates to ensure sufficient time to brainstorm and coordinate amongst the sectors; interactions with WP3 and WP7 occurred due to the interrelation of outcomes of these last two WPs with D4.2.

In an in-person workshop, the curriculum design was developed by the identification of "*personas*" representing the new occupational profiles (OPs) and by considering that the top new skills and competences were related to Information Technologies (IT) including digitalization, innovative technologies and sustainability.

The outcome of the task 4.2 "Curricula design" activities is the set of the curricula of the 12 prioritised (T7.2, D7.2) Occupational profiles [OPs] that address the skill needs identified in WP3, categorised within the three main sectors identified by the project, i.e. Animal production (AP), Food industry (FI), Veterinary (VET). However, by considering the common new skills and competences needs, one out of them have been intended applicable to two sectors (i.e. AP and VET), one to the three (AP, FI and VET) sectors.

Based on the 12 occupational profiles descriptions following the ESCO format, (knowledge/skills and competences) provided in D 7.1 and D 7.2, the curriculum of each of them has been defined considering the expected competences to be acquired. By using a "reversed engineering " process the learning outcomes of each curriculum have been defined and the corresponding curriculum designed as a set of modules (intended also as "learning units"), each made of one or more "lessons" on specific topics. Each curriculum is, thus, composed by a set of learning units each of them providing learning outcomes aligned with the skills and competences of the Occupational profile. The Bloom's Taxonomy were used to define the set of skills and sub-skills within each curriculum.

Despite each OP has been defined with a well-defined set of skills and competences to which the corresponding modules and lessons have been identified, a limited number of the latter resulted of interest to two (or more?) professional profiles. This led to include in the curricula of the corresponding OPs, common (or overlapping) learning units or individual lessons.

For each OP, the level of education or schooling in terms of EQF (from 4 to 8, depending on the OP) has been identified based on the technical and scientific background and skills acquired by the training defined within each curriculum. For some OPs a range of EQF was, instead, defined to consider the diversified VET and Higher education system and study programs system in Europe and/or the potential applicability for diversified roles in the sector.

Curricula has been developed for the following OPs:

<u>Animal Production</u>: Operator in data driven Livestock farming, Sustainable and digital livestock production manager, Technician for animal handling, welfare and transparency in livestock production, Technician for digital marketing in livestock business, Specialist in innovative livestock business.

**<u>Food</u> Industry**: Food industry sustainability Manager, Specialist in Food Industry Innovation, Traceability specialist in the agri-food value chain, Specialist in sustainable and alternative food packaging3.

<u>Veterinary Sector</u>: Veterinary Specialist in data science, One-Health veterinary specialist in medicines and chemicals, Specialist for Veterinary business.





#### Multi-Sector Competencies:

- Animal production & Veterinary: One-Health Specialist in livestock farming and veterinary activities

- *Animal production, Veterinary and Food Industry*: Entrepreneurial skilled Specialist for the Agrifood sector.

The curriculum design connected with the selected occupational profiles took, eventually, into account the application of micro-credentials in the sake of upskilling and reskilling the workforce.

Challenges that I-RESTART partners faced as referred to the previous Erasmus+ FIELDS project were:

- 1. valorisation of the project outcomes;
- 2. avoidance of results' overlaps.

Furthermore, the country-related peculiarities of some member states related to the occupational profiles needed to be considered, as the latter were developed and intended to be applicable and integrated into the diverse national education and professional systems.

While the co-design process was challenging, the developed curricula of the selected 12 occupational profiles may represent a reference for the modernisation and transition of the agrifood sector towards sustainability, in its broadest approach, considering not only environmental aspects but also economic and social elements.

### 2 Introduction

In a world whereby content is exponentially growing, the ability to apply innovative technologies and translate scientific advancements to professionals are becoming increasingly challenging. The growing importance of the IoT and AI in the agri-food industry, animal production and veterinary sectors along with the technological innovations that will drive innovation and sustainability highlight the emerging need of new occupational profiles, with skills, competences and abilities in continuous transformation. Furthermore, the professional 'persona' is also more varied, providing different sets of skills, with an increased need of transversal skills including entrepreneurship and business acumen. In sum, innovation, a holistic approach to sustainability and digitalization are and will be leading the job market demand of professionals, practitioners and technicians at all levels.

Dedicated training and educational materials and tools within specific curricula, accompanied by the corresponding learning outcomes will be made available to Higher Education institutions, VET and training providers to match the skills' needs of new occupational profiles in the three subsectors of the food system, i.e. animal production, food industry and veterinary, of the I-RESTART project.

Curricula design, being one of the critical tasks of the I-RESTART project, represents the foundation of the learning content, which will be developed in task 4.4.

### 3 Methodology

#### 3.1 Task description as presented in the project work plan

Task participants under the responsibility of UNITE will develop the outline of 10 new occupational profiles in the following areas: 1) Food industry and processing, 2) Animal production, 3) Digital technologies for food industry, e-commerce, export, online marketing, logistics, 4) Veterinary activities, 5) Advanced Entrepreneurial skills corresponding to job profiles identified in T2.1, T31, T3.3, T3.4 and summarised in T7.1, for three levels: EQF level 4 (industry and SMEs) and EQF level 5-6 (students and unemployed workers) in line with the sector changing needs in the short to longer





term.

UNITO, AU, LVA, ISEKI, INFOR, UHOH, UNITE, CONFAGRI, AERES, EfVET (experts from their network), EIT Food, UMU, CTAEX, AKMI, CONFAGRI PT will help to design curricula for identified new profiles. The collective expertise will be shared in a coordinated effort and a cooperative structure.

ANIA, AERES, FIAB, GZS will review the outlines of the curricula by validating them with education and VET providers from their networks.

For each module the design will start from learning objectives (mainly represented by the ESCO skills and described in a similar manner), what the learner should be able to perform in order to be able to demonstrate his/her knowledge/skill, the conditions in which he/she will be able to carry out the action, that will be verified through an assessment, and finally the training material that should be developed in function of learning objectives and assessment of the knowledge, and should be engaging for the trainees.

The design is intended to be sufficiently flexible to be refined by the agreement reached in T8.5 for the European accreditation of the micro-credentials.

Each occupational profile outline will correspond approximately to 680 h, 120 h out of them delivered online, 180 h in-class, and 360 has a work-based; additional 20 hours will be dedicated to the assessment as required for EQAVET certification. The number of hours dedicated to specific subjects could vary among countries, based on the country roadmaps of T7.4, because the distribution among essential or optional skills, essential or optional knowledge for each topic may vary as well. The VET providers will be involved in this task.

The full curricula will be created by I-RESTART for integration in national education and training systems, those curricula will be made available in the platform created in T5.4 for future implementation by VET providers involved in the project through T6.3.

This approach is aimed to allow more flexibility and an uptake of the needed modules for the efficient upskilling or reskilling of workers in the field.

#### 3.2 The I-RESTART approach in the curriculum design

Throughout the online and in-person activities, the discussion for this deliverable centred around the development of the curricula of the new occupational profiles defined and prioritised in WP7 based on the skill needs identified in WP3.

On February 5-7, 2024, WP4 and WP7 I-RESTART partners convened at the EIT-Food Headquarters in Brussels to collaborate on progressing task 4.2, "Curricula design," and tasks 7.1 and 7.2, which involve the analysis and discussion of the outcomes of WP3. Given that the curricula were to be developed from a set of prioritised occupational profiles, the connection between these tasks was crucial for finalizing the curriculum design.

From a methodological perspective, the deliverable D7.1 presents in more detail level the baseline of the OPs developed by the I-RESTART partners based on the skills' needs identified in WP3 for the three selected sectors, while the deliverable D7.2 presents the list of the prioritised OPs, which are used for the curricula design in this D4.2.

The I-RESTART partners, following the timeline and logical sequence of the project tasks and activities, defined the new Occupational profiles grouping the emerging skills needs in the three sectors resulting from WP3 activities following ESCO format, each OP was described in terms of essential and optional knowledge/skills and competences (Task 7.1)

With a modern "reversed-engineering" approach for the curriculum design scope, OPs were initially converted in "learner personas" and then, working backward, the corresponding essential and optional knowledge/skills/competences were used to identify the OP-specific desired learning





outcomes of training initiatives. For the Learning outcomes of each curriculum the Bloom's Taxonomy was used.

Similar to the description of the ESCO occupational profiles, each I-RESTART new OP includes a general description, a list of related knowledge, skills, and competencies, that will constitute the baseline and reference for the definition of the learning outcomes and the design of the set of learning units to be used in the form of micro-credentials as the project progresses to the following task. In particular, Task's 8.6 (Certification and Recognition) activities, ed by INFOR, will be focused on ensuring national certification (micro-credentials) for the training materials developed in WP4 that will be delivered in WP5. The aim is to optimise course certification and outline the requirements and process for future adoption be external VET providers.

#### 3.3 Background information

In WP3, data regarding skill requirements for the I-RESTART sectors—animal production, veterinary services, and food industry—were gathered. In parallel, WP2 hosted Open Days events aimed at discussing and outlining the key skills and knowledge areas to be incorporated into the curricula. The primary sources of information that guided the development of the Occupational Profiles and the developed curricula to cover their skills' gaps included:

<u>- Focus Groups Analysis Report (D3.5)</u>: This report compiled the insights and outcomes from focus groups held across several European nations, including Austria, Denmark, Germany, Greece, Italy, The Netherlands, Portugal, Slovenia, and Spain. Each country conducted three focus groups, one per sector, resulting in a total of 27 sessions with 219 participants. The participants represented a wide array of stakeholders, such as farmers, agri-food cooperatives, food companies, veterinarians, advisors, educators, and professional and sectoral associations.

<u>-Survey Analysis Report (D3.7)</u>: This report detailed the findings of a Europe-wide survey on skill and training needs, which included responses from 540 professionals working in the three target sectors.

- <u>Scenario Analysis Report (D3.8</u>): This report provided the results of a scenario analysis on skill requirements for the three sectors, developed based on focus group discussions, survey data, and literature reviews.

Partners agreed to use the focus groups' analysis as the main source of information and carried out a brainstorming event to discuss the professional persona, the skills needed and develop the OPs and the other two reports' outcomes to finalise and revise the developed OPs.

Bibliographic information and partners' professional background knowledge and expertise supported the task's activities.

#### 3.4 Methodology used for the development of curricula for the new OPs

I-RESTART partners agreed in the dedicated workshop (EIT-Food Headquarters, Bruxelles-BE, 5-7 February 2024), the methodology to be applied to design the curriculum for the new occupational profiles (OPs). A brainstorming, collaborative co-creation session was carried out, followed by the discussion on the priorities on the new knowledge and competences and the development of the new OPs; a dedicated session was organised to align the participants on the sector-specific background on skills needs (see paragraph 3.3) and on the design of training and educational initiatives.

Partners were then divided into three groups based on their competences and expertise (Food Industry, Animal production, Veterinary) on the development of the OPs.

The methodology used to design the curriculum for each OP, including the wider skills (competences and knowledge/topic) and associated set of subskills, along with the main learning





outcomes is presented in the following paragraphs.

Eventually, it was agreed that for the curriculum of the new OPs, the material and learning outcomes developed in the previous Erasmus+ Blueprint project FIELDS could be used within a complementing approach.

Moreover, partners discussed the definition of the EQF level (in the range from 4 to 8) for the OPs identified which have a main impact in the curriculum design. This was made by evaluating for each OP, the level of education or schooling needed to achieve the technical and scientific background and the skills acquired by the training defined within each curriculum and corresponding learning outcomes as well as existing OPs in the ESCO database. For some OPs, a range of EQF was defined to consider the diversified VET and Higher education system and study programs in Europe to achieve a specific background and knowledge pre-requisites. For these latter cases the trainer will be able to adapt the curriculum and related material developed to the target audience and EQF.

Key elements that were aligned to the project scope included:

- the professional persona and the learner profiles (e.g. sector and sector needs, pre-requisites or knowledge background, etc.),

- applicability of the curricula in different training environments (e.g. Higher education, Lifelong Learning, VET, industry) depending on the defined EQF.

- the number of learning hours. As regards this latter aspect, some flexibility was suggested, since the individual lessons associated with each OP will have a length depending on the content developed to achieve them. So, the final number of teaching and learning hours will depend on the overall teaching material developed to fulfil the skills and knowledge needs of the new OPs.

- accessibility and applicability in all scenarios, based on the demographic profile of learners. The training content is intended to be used in a modular approach, allowing for selective delivery, based on the needs of the audience. This approach will ensure the long-term sustainability of the overall training programme of each curriculum and its use in a post project perspective.

Based on these premises, the curricula design process applied the process "reverse engineered", starting from the desired outcomes of each OP. As such, of vital importance was the identification of the learning outcomes (LOs).

On the basis of the wider skills and knowledge listed in each OP, sets of sub skills and knowledge were identified, from which the corresponding learning outcomes to acquire such skills and knowledge were identified. Then for each identified skill and sub-skill within each OP was then converted in the corresponding "module" and lesson, respectively.

In identifying the LOs, their mapping against the Essential Skills and Essential Knowledge criteria established by the ESCO methodology in the description of the Skills Profiles, enabled the development of the learning outcomes for each skill/OP.

In defining the learning outcomes and their descriptors, partners made use of the **six levels of cognitive learning of Bloom's Taxonomy**<sup>1</sup> that are classified in 6 levels with increasing levels of complexity, namely: 1) Remembering, 2) Understanding, 3) Applying, 4) Analysing, 5) Evaluating and 6) Creating. For the 6 levels, a set of verbs that can be used to describe LOs (see Figure 1) were also taken as reference.





| Action Words for Bloom's Taxonomy  |   |   |  |   |   |  |
|--|---|---|--|---|---|--|
| Knowledge  | Understand  | Apply   | Analyze  | Evaluate  | Create  |  |
| Knowledge<br>define<br>identify<br>describe<br>label<br>list<br>name<br>state<br>match<br>recognize<br>select<br>examine<br>locate<br>memorize<br>quote<br>recall<br>reproduce<br>tabulate<br>tell<br>copy<br>discover<br>duplicate<br>enumerate<br>listen<br>observe<br>omit<br>read<br>recite<br>record<br>repeat<br>retell<br>visualize | Vinderstand<br>explain<br>describe<br>interpret<br>paraphrase<br>summarize<br>classify<br>compare<br>differentiate<br>discuss<br>distinguish<br>extend<br>predict<br>associate<br>contrast<br>convert<br>demonstrate<br>estimate<br>express<br>identify<br>indicate<br>infer<br>relate<br>restate<br>select<br>translate<br>ask<br>cite<br>discover<br>generalize<br>give examples<br>group<br>illustrate<br>judge<br>observe<br>order<br>report<br>represent<br>research | solve<br>apply<br>illustrate<br>modify<br>use<br>calculate<br>change<br>choose<br>demonstrate<br>discover<br>experiment<br>relate<br>show<br>sketch<br>complete<br>construct<br>dramatize<br>interpret<br>manipulate<br>paint<br>prepare<br>produce<br>report<br>teach<br>act<br>administer<br>articulate<br>chart<br>collect<br>compute<br>determine<br>develop<br>employ<br>establish<br>examine<br>explain<br>interview<br>judge<br>list | Bloom's Taxono<br>Analyze<br>compare<br>classify<br>contrast<br>distinguish<br>infer<br>separate<br>explain<br>select<br>categorize<br>connect<br>differentiate<br>discriminate<br>divide<br>order<br>point out<br>prioritize<br>subdivide<br>survey<br>advertise<br>appraise<br>break down<br>calculate<br>conclude<br>correlate<br>criticize<br>deduce<br>devise<br>diagram<br>dissect<br>estimate<br>experiment<br>focus<br>illustrate<br>organize<br>outline<br>plan<br>cusetior | Evaluate<br>reframe<br>criticize<br>evaluate<br>order<br>appraise<br>judge<br>support<br>compare<br>decide<br>discriminate<br>recommend<br>summarize<br>assess<br>choose<br>convince<br>defend<br>estimate<br>find errors<br>grade<br>measure<br>predict<br>rank<br>score<br>select<br>test<br>argue<br>conclude<br>consider<br>critique<br>debate<br>distinguish<br>editorialize<br>justify<br>persuade<br>rate<br>weigh | Create<br>design<br>compose<br>create<br>plan<br>combine<br>formulate<br>invent<br>hypothesize<br>substitute<br>write<br>compile<br>construct<br>develop<br>generalize<br>integrate<br>modify<br>organize<br>prepare<br>produce<br>rearrange<br>rewrite<br>role-play<br>adapt<br>anticipate<br>arrange<br>assemble<br>choose<br>collaborate<br>collaborate<br>collect<br>devise<br>express<br>facilitate<br>imagine<br>intervene<br>justify<br>make<br>manage |  |
| retell<br>visualize  | give examples<br>group<br>illustrate<br>judge<br>observe<br>order<br>report<br>represent<br>research  | compute<br>determine<br>develop<br>employ<br>establish<br>examine<br>explain<br>interview<br>judge  | dissect<br>estimate<br>evaluate<br>experiment<br>focus<br>illustrate<br>organize<br>outline<br>plan  | debate<br>distinguish<br>editorialize<br>justify<br>persuade<br>rate<br>weigh   | devise<br>express<br>facilitate<br>imagine<br>infer<br>intervene<br>justify<br>make<br>manage   |  |
|  | review<br>rewrite<br>show<br>trace<br>transform   | list<br>operate<br>practice<br>predict<br>record<br>schedule<br>simulate<br>transfer<br>write   | question<br>test   |   | negotiate<br>originate<br>propose<br>reorganize<br>report<br>revise<br>schematize<br>simulate<br>solve<br>speculate<br>structure<br>support<br>test<br>validate   |  |

Figure 1: Action words used to describe the Learning Outcomes (LO) according to the Bloom Taxonomy1<sup>1</sup>

The curricula of the prioritized OPs and related training materials (T4.4.) will be made available to be incorporated in the training offered by the partners of the I-RESTART project, as well as the members of the Pact for Skills.

<sup>&</sup>lt;sup>1</sup> Bloom, Benjamin S., (Ed.), Taxonomy of Education Objectives: Handbook I: Cognitive Domain, N.Y., David McKay Company, Inc. 1956





#### 3.5 Mapping the Occupational Profiles (OPs)

The 12 new OPs that were created (Task 7.1) and prioritised (Task 7.2) by the I-RESTART consortium are below reported. Actually, based on the identified skills needs in WP3, in Task 7.1 14 new OPs were created, including n. 5 for the Animal Production, n. 4 for the Food Industry and n. 3 for the Veterinary sectors, but only n.12 were then selected (Task 7.2) based on relevance for the specific sector and skills demand for the curriculum design.

Based on the similarity in the skill needs identified in WP3, the "Entrepreneurial skilled specialist for the Agri-food sector" OP resulted to be applicable in all three sectors, while the "One health specialist in livestock farming and veterinary activities" relevant for the sectors of animal farming and veterinary activities.

In Table 1 the full list of the 12 new OPs selected is reported.

For each OP, in view of the development of the curriculum design and corresponding training material, the set of wider skills with an associated set of sub-skills to be achieved were used to define and describe the general and specific learning outcomes are reported in Annexes 1-5.

The EQF level of the new OPs and the corresponding educational level, along with the different roles learners/trainees in the working environments of the specific sectors, considering also the geographical diversity, have been well considered in the curriculum design.

For some OPs, an overlap between few identified skills or subskills and the learning units and training materials to be developed occurred among the new one created in I-RESTART (intraproject) and/or with those previously created in the FIELDS project (inter-project) due to the unavoidable communality of some knowledge, skills and competences within specific the three sectors and of the emerging skills identified in WP3.

This aspect was carefully considered in the curriculum design and definition of the modules and lessons for the development of the corresponding training materials. In particular, as regards the last aspect, in fact, some individual modules and/or lessons materials were already developed in the Erasmus+ FIELDS project that were considered valid and properly updated also for the purposes of the I-RESTART project.

This occurred in the design of the curriculum and corresponding learning units and lessons of the following

- "Operator in data driven livestock farming" (inter-project): n. 3 learning lessons (out of 20) with training materials of the FIELDS project

- "Sustainable and digital livestock production manager" (inter-project): n. 4 learning lessons (out of 38) with training materials of the FIELDS project;

and within Learning units (intra-project)

- "One health specialist in livestock farming and veterinary activities" with "One-Health veterinary specialist in medicines and chemicals" (5 Learning Units)

- "Specialist for veterinary business" with "Entrepreneurial skilled specialist for the Agri-food sector" (3 Learning Units)

- Entrepreneurial skilled specialist for the Agri-food sector with Food industry sustainability manager" (1 Learning Unit) and with Specialist for veterinary business (2 Learning Unit), and with One health specialist in livestock farming and veterinary activities (1 Learning Unit)

However, after discussion, the entity of the overlap in the skills, LOs within each specific curricula and corresponding training material to be developed, both intra- and inter-project was considered acceptable by considering both the limited number and the fact that for already existing OPs, the skills and the related curricula/training required to achieve them could have some communalities





due to several reasons (sector of application, schooling background, topic, etc.).

The highest care was taken to design curricula for the new OPs characterized by new LOs, for the emerging skills and corresponding modules/lessons by combining, only where needed a limited number of existing, either intra-project or iter-project ones).

The overlaps across the different OP have been identified and clearly indicated in the Annexes.

| Subsector(s)  | Occupational profile   | EQF level |
|---|--|-----------|
| Animal  | Operator in data driven livestock farming  | 4         |
| Production  | Sustainable and digital livestock production manager                             | 6-7       |
| (AP)  | Technician for animal handling, welfare and transparency in livestock production | 5         |
|   | Food industry sustainability manager   | 6-7       |
| Food Industry   | Specialist in Food Industry Innovation   | 6-7       |
| (FI)  | Traceability specialist in the agri-food value chain                             | 6         |
|   | Specialist in sustainable and alternative food packaging <sup>3</sup>            | 6         |
|   | Veterinary specialist in data science  | 6-8       |
| veterinary  | One-Health veterinary specialist in medicines and chemicals                      | 6-8       |
| (VEI)   | Specialist for veterinary business   | 5-8       |
| Animal<br>Production<br>& Veterinary                    | One-Health specialist in livestock farming and veterinary activities             | 5-8       |
| Animal<br>Production<br>& Veterinary &<br>Food Industry | Entrepreneurial skilled specialist for the Agri-food sector                      | 5-7       |

Table 1: Occupational profiles developed in I-RESTART categorised by sector and associated EQF level.

### 4 Conclusion

The designing of the curricula for the new 12 OPs was quite challenging, due to the large set of emerging skills needs, the identification of LOs and learning units complying with them with a modern approach and limiting the overlapping between occupational profiles of interest of different sectors and/or resulting from previous projects (i.e. FIELDS). The partnership designed the curricula and related learning outcomes, in a sufficient detail to assure a high-quality achievement of the expected skills and competences.

This deliverable allows the I-RESTART project to be in the forefront by developing new material (Task 4.4.) that could be used to complement that already developed and available from other previous projects (FIELDS).

The progress and completion of the curricula design process was delayed, due to the main efforts in the detailed description of the LOs and identification of the learning units and lessons along with the need of a deep analysis of the results and deliverables from the WP3 (focus groups outcomes) and WP2 (open days), that took more time than expected to be finalized, and the 10+ brainstorming and prioritization exercises carried out in the next weeks.

However, the meeting held in Bruxelles to recap and speed-up the process allowed both to align the partners activities and to define the working approach in terms of methodology, terminology and goals to design the curricula in the three different sectors. A main attention to both the design





and development of the curricula and the identification of the learning units and lessons to be used to develop the training material was then given by the 3 partners teams. Several online meetings were required to align the work on the OPs, both at sector level and overall, thereby any further challenge could be easily sorted out and the task finalized.

The curricula of the new I-RESTART OPs consider skill needs on topics related to Agri-food sustainability, animal production, veterinary, business and digital skills, and one-health skills. The training content based on the modules and lessons developed in Task 4.4. will allow to train workers, graduates and students for the emerging job needs of the specific sector.

The curricula and their structure have been designed also as tool to support the implementation of modern training initiatives based on micro-credentials, a new way of approaching learning and for continuous training in a lifelong learning perspective.





#### 5 Annexes

Annex 1: Curriculum for Occupational profiles of the "Food Industry" Sector

Annex 2: Curriculum for Occupational profiles of the "Animal production" Sector

Annex 3: Curriculum for Occupational profiles of the "Veterinary" Sector

Annex 4: Curriculum for multi-sector Occupational profile Entrepreneurial skilled specialist for the Agri-food sector

Annex 5: Curriculum for Animal production and Veterinary sectors: One health specialist in livestock farming and veterinary activities







### Annex 1: Curriculum for Occupational profiles of the "Food Industry" sector

| Occupational<br>Profile             | Main competences   | Module   | Lesson                                      | Learning Outcomes   |
|-------------------------------------|--|--|---|---|
| (1) Food industry<br>sustainability | -System thinking of the food chain, from cradle  | ng of the System thinking in the<br>m cradle food industry<br>cy.<br>action<br>seline<br>g | Sustainability<br>Dimensions                | Explain the 3 dimensions of sustainability and their interactions.  |
| manager                             | to grave.<br>-Food Circularity.<br>-Resources<br>management.<br>-Footprint reduction<br>strategies.<br>-Measuring baseline<br>and quantifying<br>sustainability. |  | Food System<br>Aspects Actors               | Describe the various aspects of the food system, and identify the actors<br>involved in a specific food chain, and understand the role of each actor,<br>in relation to the environmental, social, economic and technological<br>consequences (food waste, greenhouse gas emissions, biodiversity loss,<br>resources depletion) of their actions. |
|                                     |  |  | Food Opportunities                          | Identify gaps and opportunities for change in the food system, using concrete challenges, and evaluate possible sustainable solutions that create a positive impact on the environment and society.   |
|                                     |  | Sustainable resources<br>management  | Raw Materials<br>Sustainability             | Identify sustainability of raw materials and ingredients, Understand the importance of sustainable sourcing practices, and their impact on the society, the environment and biodiversity.   |
|                                     |  |  | Raw Materials<br>Waste Strategies           | Practice strategies for minimizing food loss and waste at the raw material stage (e.g. efficient harvesting, storage, and transportation practices).  |
|                                     |  |  | Food Manufacturing                          | Understand the factors involved in producing and manufacturing food,<br>evaluate the input resources and describe how to efficiently manage the<br>resources: ingredients, packaging, water, energy.  |
|                                     |  |  | Waste in Value<br>Chain                     | Describe the byproducts and waste streams in selected value chain<br>processes and determine the steps necessary for valorisation or<br>utilization of side streams and describe parameters that must be met<br>for discharge to the environment.   |
|                                     |  |  | Energy Saving<br>Techniques <i>(content</i> | Gain a basic knowledge about the energy efficiency (main measures),<br>energy saving and efficiency techniques in agrifood industry   |







| covered in FIELDS<br>project)  |  |
|--|--|
| Renewable Energy<br>(content covered in<br>FIELDS project)                   | Gain a basic knowledge about renewable energy.   |
| Sustainable Energy<br>Technologies<br>(content covered in<br>FIELDS project) | Explore how sustainable energy technologies (by-products, biomass digesters, and photovoltaic systems) harness and transform renewable resources, unlocking environmental benefits and energy efficiency.  |
| Sustainability Value<br>Chain  | Analyse a case study, identify gaps and opportunities for improvement and create value-added solutions for a particular value chain.   |
| EU Circular<br>Economy Plan  | Discuss the EU's Farm to Fork Strategy and Circular Economy Action<br>Plan, which aim to promote sustainable food production and<br>consumption, reduce food waste, and improve resource efficiency.   |
| Food Policies  | Understand and describe the current environmental policies linked to the food system and evaluate their impact on the economic landscape, and the development of a more circular economy.  |
| Food Waste<br>Reduction Policies   | Highlight policies and programs aimed at reducing food waste throughout the supply chain, including food recovery and redistribution, waste diversion targets, and landfill bans.  |
| Life Cycle<br>Assessment Process   | Understand and explain the Life cycle assessment process and identify systems boundary conditions and describe the unit.   |
| Environmental<br>Footprint   | Measure baselines and quantify means to improve the environmental footprint of a product unit.   |
| Food European<br>Policy Drivers  | Explain the main European Policy Drivers<br>State the main objectives of CAP   |
|  | covered in FIELDS<br>project)<br>Renewable Energy<br>(content covered in<br>FIELDS project)<br>Sustainable Energy<br>Technologies<br>(content covered in<br>FIELDS project)<br>Sustainability Value<br>Chain<br>EU Circular<br>Economy Plan<br>Food Policies<br>Food Policies<br>Food Waste<br>Reduction Policies<br>Life Cycle<br>Assessment Process<br>Environmental<br>Footprint<br>Food European<br>Policy Drivers |







| Sustainability       Outline the main initiatives impacting farmers and industry<br>Frameworks         Frameworks       Demonstrate what is meant by the Biodiversity Strategy<br>(content covered in Explain the Circular Economy Actions Plans and the Bioeconomy<br>Strategy in an EU context<br>Identify sources of funding to support the financing of sustainable<br>practices         Collaborative Skills       Effective<br>Collaborative Skills       Identify key components of effective collaboration, including<br>communication, trust, shared goals, and conflict resolution.         Communication       Demonstrate effective communication skills, including active listening,<br>Skills         Collective<br>Analytical and critical<br>thinking (overlap of the<br>Patterns       Demonstrate skills in negotiation, compromise, and finding win-win<br>solutions to overcome challenges.         Analytical and critical<br>thinking (overlap of the<br>Patterns       Data Trends and<br>theirspips       Identify patterns and trends in data or other information.         Skilled specialist for the<br>Patterns       Cause Effect<br>Relationships       Demonstrate capability to analyse and evaluate arguments.<br>and Evaluation         Complex<br>information<br>Synthesise       Synthesise complex information.       Synthesise complex information.         Complex<br>Thinking       Complex information<br>Synthesise       Demonstrate capability to identify complex problems, frame them<br>effectively and develop appropriate solutions.  |  |   |  |   |
|---|--|---|--|---|
| Collaborative Skills       Effective<br>Collaboration       Identify key components of effective collaboration, including<br>communication, trust, shared goals, and conflict resolution.         Complex Figure 1       Communication<br>Skills       Demonstrate effective communication skills, including active listening,<br>clear expression of ideas, and providing constructive feedback.         Analytical and Critical<br>thinking (overlap of the<br>Skilled specialist for the<br>Agri-food sector" OP<br>Algriment       Data Trends and<br>thinking (overlap of the<br>"Entrepreneurial<br>skilled specialist for the<br>Agri-food sector" OP<br>Agri-food sector" OP<br>And the sector of the<br>complex<br>information       Demonstrate capability to analyse and evaluate arguments.<br>and Evaluation         Openex Figure 2       Complex Collective<br>Problems       Demonstrate capability to identify complex problems, frame them<br>effectively and develop appropriate solutions.  |  |   | Sustainability<br>Frameworks<br>(content covered in<br>FIELDS project) | Outline the main initiatives impacting farmers and industry<br>Demonstrate what is meant by the Biodiversity Strategy<br>Explain the Circular Economy Actions Plans and the Bioeconomy<br>Strategy in an EU context<br>Identify sources of funding to support the financing of sustainable<br>practices |
| Communication       Demonstrate effective communication skills, including active listening, clear expression of ideas, and providing constructive feedback.         Skills       Conflict Resolution       Demonstrate skills in negotiation, compromise, and finding win-win solutions to overcome challenges.         Collective       Discuss the importance of aligning individual and collective goals to ensure everyone is working towards a common purpose.         Analytical and Critical       Data Trends and thinking (overlap of the Patterns         module in the       "Entrepreneurial skilled specialist for the Agri-food sector" OP)         Agri-food sector" OP)       Complex         Complex       Synthesis         Complex       Synthesis         Complex       Synthesis         Complex       Complex Problems         Complex       Synthesis         Complex       Complex Problems         Complex       Complex Problems         Complex       Synthesis         Complex       Demonstrate capability to identify complex problems, frame them effectively and develop appropriate solutions.         Complex       Thinking       Demonstrate creative and innovative thinking for real world problems.  |  | Collaborative Skills  | Effective<br>Collaboration   | Identify key components of effective collaboration, including communication, trust, shared goals, and conflict resolution.  |
| Analytical and Critical thinking (overlap of the xinking (overlap of th |  |   | Communication<br>Skills  | Demonstrate effective communication skills, including active listening, clear expression of ideas, and providing constructive feedback.   |
| Collective<br>AlignmentDiscuss the importance of aligning individual and collective goals to<br>ensure everyone is working towards a common purpose.Analytical and Critical<br>thinking (overlap of the<br>module in the<br>"Entrepreneurial<br>skilled specialist for the<br>Agri-food sector" OPI<br>Agri-food sector" OPI<br>Agri-food sector OPIData Trends and<br>PatternsIdentify patterns and trends in data or other information.Cause Effect<br>RelationshipsDemonstrate understanding of cause-and-effect relationships.<br>RelationshipsDemonstrate capability to analyse and evaluate arguments.<br>Arguments Analysis<br>and EvaluationComplex<br>NontexiseSynthesise<br>Complex Problems<br>ApproachesDemonstrate capability to identify complex problems, frame them<br>effectively and develop appropriate solutions.Complex<br>Problems<br>ApproachesDemonstrate creative and innovative thinking for real world problems.   |  |   | Conflict Resolution  | Demonstrate skills in negotiation, compromise, and finding win-win solutions to overcome challenges.  |
| Analytical and Critical<br>thinking (overlap of the<br>"Entrepreneurial<br>skilled specialist for the<br>Agri-food sector" OP)Data Trends and<br>PatternsIdentify patterns and trends in data or other information.Agri-food sector" OP)Cause Effect<br>RelationshipsDemonstrate understanding of cause-and-effect relationships.Agri-food sector" OP)Complex<br>Information<br>SynthesisDemonstrate capability to analyse and evaluate arguments.Complex<br>Normetex<br>ApproachesSynthesise complex information.Complex Problems<br>ApproachesDemonstrate capability to identify complex problems, frame them<br>effectively and develop appropriate solutions.Creative Innovative<br>ThinkingDemonstrate creative and innovative thinking for real world problems.   |  |   | Collective<br>Alignment  | Discuss the importance of aligning individual and collective goals to ensure everyone is working towards a common purpose.  |
| module in the<br>"Entrepreneurial<br>skilled specialist for th<br>Agri-food sector" OPCause Effect<br>  |  | Analytical and Critical<br>thinking (overlap of the<br>module in the<br>"Entrepreneurial<br>skilled specialist for the<br>Agri-food sector" OP) | Data Trends and<br>Patterns  | Identify patterns and trends in data or other information.  |
| Agri-food sector" OP)       Arguments Analysis<br>and Evaluation       Demonstrate capability to analyse and evaluate arguments.         Complex<br>Information<br>Synthesis       Synthesise complex information.         Complex Problems<br>Approaches       Demonstrate capability to identify complex problems, frame them<br>effectively and develop appropriate solutions.         Creative Innovative<br>Thinking       Demonstrate creative and innovative thinking for real world problems.   |  |   | Cause Effect<br>Relationships  | Demonstrate understanding of cause-and-effect relationships.  |
| Complex<br>Information<br>SynthesisSynthesise complex information.Complex Problems<br>ApproachesDemonstrate capability to identify complex problems, frame them<br>   |  |   | Arguments Analysis<br>and Evaluation                                   | Demonstrate capability to analyse and evaluate arguments.   |
| Complex Problems<br>ApproachesDemonstrate capability to identify complex problems, frame them<br>effectively and develop appropriate solutions.Creative Innovative<br>ThinkingDemonstrate creative and innovative thinking for real world problems.   |  |   | Complex<br>Information<br>Synthesis                                    | Synthesise complex information.   |
| Creative Innovative Demonstrate creative and innovative thinking for real world problems.<br>Thinking   |  |   | Complex Problems<br>Approaches   | Demonstrate capability to identify complex problems, frame them effectively and develop appropriate solutions.  |
|   |  |   | Creative Innovative<br>Thinking  | Demonstrate creative and innovative thinking for real world problems.   |







|  |  | Adaptability skills   | Adaptability                   | Identify key characteristics of adaptable individuals, such as openness to new experiences, resilience, and flexibility.  |
|--|--|---|--------------------------------|---|
|  |  |   | Dynamic<br>Adaptability        | Explain how each of the above characteristics contributes to adaptability and problem-solving in dynamic environments.  |
| (2) Traceability<br>specialist in the<br>agri-food value | -Ability to understand<br>traceability processes,<br>the importance of food  | Basics of data<br>management and<br>digitalization (this is                     | Data Types                     | Describe what are data and different types of data (e.g. structured, unstructured, semi-structured)   |
| chain  | safety and security,   | transversal to others)  | Data Importance                | Explain the importance of data  |
|  | transparency and consumer  |   | Data Management<br>Cycle       | Describe the data management cycle and its application.   |
|  | communication.<br>-Application of novel<br>tools to implement<br>traceability in the food<br>chain.<br>-Determination of<br>opportunities where<br>traceability could be<br>applied to a value<br>chain. |   | Circular<br>Technologies       | Explore the role of digital technologies, including the Internet of Things (IoT), blockchain, and big data analytics, in enabling circular economy solutions such as product tracking, waste management optimization, and resource sharing platforms. |
|  |  |   | Supply Chain<br>Technologies   | Describe new technologies in sensors and digital tools aiding in traceability and efficiency of supply chain.   |
|  |  | Traceability concepts in<br>supply chains <i>(CAN BE</i><br><i>TRANSVERSAL)</i> | Machine Learning<br>Processing | Describe data and machine learning tools, and their potential utilization in food processing and supply chain.  |
|  |  |   | Machine Learning<br>Safety     | Describe new development in machine learning tools for food safety.   |
|  |  |   | HACCP Safety and<br>Quality    | Describe the principles of HACCP, food safety risk management and quality control.  |
|  |  |   | Food Chain Safety<br>Tools     | Design a secure food chain, describe tools needed and evaluate opportunities to apply new tools and implement new technologies to provide transparency to stakeholders and consumers.   |
|  |  |   | Food Fraud<br>Avoidance        | Describe current strategies to determine and avoid food fraud.  |







|  |  |   | Strategies  |   |
|--|--|---|---|---|
|  |  | Blockchain definition<br>and general<br>applications                      | Blockchain<br>Technologies                            | Understand and describe the principles of blockchain technologies, including data management, and data ownership.   |
|  |  |   | Food Blockchain                                       | Identify opportunities where distributed ledgers and blockchain technologies could be adding value to food chains and design an example of how they could be implemented.   |
|  |  |   | Food Chain Digital<br>Twins                           | Understand digital twins approaches and applications in the food supply chain; identify and understand the potential application in blockchain technologies.  |
| (3) Specialist in<br>Food Industry<br>Innovation | -Able to apply new<br>ingredients and<br>technologies in food<br>product development<br>-Understand and<br>describe of new trends<br>-Practice<br>entrepreneurship,<br>design thinking for<br>innovative food<br>solutions<br>-Apply best practices<br>for ensuring the safety<br>and quality of novel<br>food products. | New ingredients and<br>technologies for<br>processing innovative<br>foods | Novel Foods<br>Regulations                            | Define novel food according to regulatory definitions and classify novel foods  |
|  |  |   | Synthetic Biology                                     | Explain the principles behind synthetic biology and cellular agriculture, describe state of the art with examples from innovative business in the food ecosystem.   |
|  |  |   | New sustainable<br>sources                            | Identify opportunities and gaps in the production of alternative proteins<br>from blue, green and alternative sources: insects, food waste, algae,<br>microalgae; describe products and side streams from selected processes<br>and demonstrate their commercial viability through examples from the<br>food ecosystem. |
|  |  | Food product design   | Technological<br>Functionality of<br>Food ingredients | Evaluate the relationship between ingredient composition, processing history and technological functionality.   |







|  |   | New ingredients and<br>technologies for<br>processing innovative | New Ingredients<br>Formulated<br>Products and Safety<br>Risks                        | Describe the food safety risks associated to the use of new sources of ingredients for food, including antinutritional and allergenic potential.                          |
|--|---|--|--|---|
|  |   |  | New Ingredients  | Identify gaps and opportunities to create viable business models based<br>on new sources of food ingredients. create a polished pitch deck for the<br>solutions proposed. |
|  | foods<br>3D printing in Food<br>processing  | Impact of food<br>processing quality                             | Describe the impact of conventional technologies on quality and nutritional aspects. |   |
|  |   |  | Processing<br>Technologies   | Describe new food processing technologies and their potential for innovation and sustainability.  |
|  |   | 3D printing in Food<br>processing                                | Food Products 3D<br>Technology   | Understand the basic concepts of 3D technology and its specific applications in the food industry.  |
|  |   |  | 3D -Printing Food<br>Customization   | Explore the practical applications of 3D printing in food customization and the creation of innovative food products.   |
|  |   |  | 3D_Printing_Food_<br>Risks   | Evaluate the risks and opportunities associated with 3D printing in food production in terms of food safety and product quality.  |
| (4)<br>Specialist in                             | <ul> <li>Apply concepts of<br/>sustainable packaging</li> </ul>   | Food contact materials   | Food Contact<br>Materials  | Describe the different food contact materials, fossil fuel and bio-based, compostable, and recyclable.  |
| sustainable and<br>alternative food<br>packaging | in food production<br>- Evaluating and<br>applying new and<br>innovative packaging<br>- Practice safety<br>concepts and legal<br>regulation in food |  | Food Contact<br>packaging<br>regulations   | Evaluate the current food safety regulations in regards to food contacts materials, and the implications for packaging eco-design.  |
|  |   |  | Packaging<br>Requirements  | Describe the techno-functional properties required for food packaging as a function of product properties, and explain the methods used to analyse them.                  |







|  | packaging | Eco-design of P<br>sustainable and R<br>innovative food<br>packaging P<br>d<br>A<br>Ir<br>P | Packaging<br>Regulations               | Evaluate the implication of the current regulatory landscape for sustainable food packaging in Europe and describe the challenges to implementation.  |
|--|-----------|---|--|---|
|  |           |   | Packaging and Eco-<br>design           | Define sustainable packaging and develop a holistic approach for eco-<br>design. Understand the principles behind eco-design, present a case<br>study for a food product, describe the principles used to determine the<br>appropriate packaging solution and provide with the next steps in the<br>development of such solution. |
|  |           |   | Packaging Change                       | Evaluate current packaging solutions, evaluate the extent of their overpackage, determine barriers and opportunities for change to a more sustainable package, and quantify the environmental footprint of such change.   |
|  |           |   | Active and<br>Intelligent<br>Packaging | Understand and describe the principles behind intelligent and smart packaging and present a case study that illustrates such principles.  |







### Annex 2: Curriculum for Occupational profiles of the "Animal Production" sector

| Occupational profile                             | Main<br>competences   | Module   | Lesson  | Learning Outcomes   |
|--|---|--|---|---|
|  |   |  |   |   |
| (1) Operator in data<br>driven livestock farming | -Understand and<br>apply basic IT<br>-Utilize data<br>management tools<br>-Interpret results of | Basic IT skills<br>(overlap of the<br>module in the<br>"Sustainable and<br>digital livestock | Basic ICT Skills (skill covered in<br>FIELDS project) | Identify the basic ICT skills, essential for everyday tasks,<br>explain the difference between software and hardware,<br>recognise different types of computers, utilise popular tools<br>for email management, event management, and video<br>conferencing |
|  | data elaboration  | production<br>manager" OP)   | Text edition  | Utilise popular tools for text edition  |
|  |   |  | Spreadsheets  | Utilise popular tools for spreadsheet edition   |
|  |   |  | Internet Browsers Wifi                                | Describe what is internet and be able how to connect internet, use a web browser and set up a wifi network  |
|  |   |  | Agrifood Digitalization                               | Present the recent digitalization advances and their application in the Agri-food sector  |
|  |   | General<br>overview of data<br>management in   | Data Types  | Describe what are data and different types of data (e.g.<br>structured, unstructured, semi-structured), applied to<br>livestock farming   |
|  |   | animal farms   | Data Importance                                       | Explain the importance of data in modern livestock farming  |
|  |   |  | Data Management Cycle                                 | Describe the data management cycle and its application to animal farm activities  |
|  |   | Best practices on<br>data collection   | Data Sources  | Recognise the main sources of data in modern livestock farming (registers, sensors, reports)  |
|  |   | (incl. machinery, sensors and  | Data Collection                                       | Explain what data collection and the different steps is involved in data collection   |







|  |  | robots)  | Machinery data collection                                    | Describe the main methods of data collection from machinery, sensors and robots   |
|--|--|--|--|---|
|  |  |  | Data collection quality                                      | Evaluate the quality of collected data  |
|  |  | Data<br>interpretation.  | Data device transferring (skil<br>covered in FIELDS project) | Explain how transfer data between two or more digital devices   |
|  |  |  | Farms decision making  | Explain the concept of decision making applied to farms   |
|  |  | decision making<br>and   | Data Biases Awareness  | Raise awareness (internally) about how biases/prejudices can affect the interpretation of data.   |
|  |  | internal<br>communication  | Internal communication                                       | Communicate findings internally clearly and honestly (transparency and communication)   |
|  |  | Data sharing and communicating/  | Data sharing   | Explain the benefits of data sharing in animal production businesses  |
|  |  | Cybersecurity<br>and related legal<br>aspects.                                     | Data sharing best practices                                  | Share your data in a GDPR compliant and FAIR way in a data repository   |
|  |  |  | Cybersecurity basics (skill covered in FIELDS project)       | Describe the basic concepts and terms related to<br>cybersecurity, explain the main cybersecurity threats,<br>vulnerabilities, and technological attacks, recognize cyber<br>fraud, describe different types of control and specific<br>defence mechanisms  |
|  |  |  | Data regulations   | Identify the main regulations related to data sharing and data security   |
| (2) Sustainable and<br>digital livestock<br>production manager | Integrate and<br>analyse the data<br>collected on the<br>farm to support<br>informed decisions | Basic IT skills<br>(overlap of the<br>module in the<br>"Operator in<br>data driver | Basic ICT Skills (skill covered<br>in FIELDS project)        | Identify the basic ICT skills, essential for everyday tasks,<br>explain the difference between software and hardware,<br>recognise different types of computers, utilise popular tools<br>for email management, event management, and video<br>conferencing |







| a<br>n | and better<br>management. | livestock<br>farming" OP)   | Text edition  | Utilise popular tools for text edition   |
|--------|---------------------------|-----------------------------|---|--|
|        |                           |                             | Spreadsheets  | Utilise popular tools for spreadsheet edition  |
|        |                           |                             | Internet Browsers Wifi                                  | Describe what is internet and be able how to connect internet, use a web browser and set up a wifi network   |
|        |                           |                             | Agrifood Digitalization                                 | Present the recent digitalization advances and their application in the Agri-food sector   |
|        |                           | Basics on<br>sustainability | Production sustainability                               | Describe key principles of sustainability, bioeconomy and circular economy and their relevance to animal production  |
|        |                           |                             | Regulatory frameworks (skill covered in FIELDS project) | Describe the most relevant regulatory frameworks   |
|        |                           |                             | One-Health Sustainability                               | Explain the relation between One-Health and Sustainability   |
|        |                           |                             | Livestock impact  | Identify sustainable practices to manage environmental impact in livestock systems.  |
|        |                           |                             | Sustainable practices                                   | Advocate for and promote sustainable consumption,<br>implement nudges for sustainability, and consider both local<br>and global  |
|        |                           |                             | Innovative sustainability                               | Apply creative thinking to address sustainable strategies, and promote sustainable mark  |
|        |                           |                             | Strategic integration                                   | Identify sustainable opportunities and develop innovative<br>solutions to address sustainability challenges while<br>employing a transdisciplinary approach to conver ambiguous<br>situations into actionable steps. |
|        |                           | Biodiversity                | Livestock biodiversity                                  | Describe the relationship between biodiversity and livestock management  |







|  | Biodiversity practices      | Identify livestock management practices that can benefit biodiversity   |
|--|-----------------------------|---|
| Livestock<br>outputs (waste  | Waste sources               | Identify the main waste and by-products sources in livestock activities   |
| management<br>and valorisation   | Waste impact                | Analyse the environmental impact of livestock waste and by-<br>products   |
|  | Waste regulatory frameworks | Identify the regulatory frameworks related with waste management and valorisation   |
|  | Pollution minimisation      | Evaluate outputs' management techniques to minimise environmental pollution.  |
|  | Outputs management          | Apply strategies and best practices to enhance livestock outputs' management in a sustainable way.  |
|  | Livestock circular economy  | Understand livestock products and by-products value and market opportunities (circular economy).  |
|  | Livestock technologies      | Apply innovative technologies to market livestock products and by-products.   |
| Use of digital<br>tools and apps to<br>improve animal<br>production<br>management<br>(incl. use of<br>statistical<br>models,<br>software).<br>Combine this | Precision systems           | Implement and Utilize Precision Livestock Farming (PLF)<br>Systems: Learners will gain practical skills in implementing<br>and utilizing Precision Livestock Farming (PLF) systems,<br>including sensors, wearables, automated feeding systems,<br>and milking robots. They will learn how these technologies<br>monitor animal health, behavior, and environmental<br>conditions, optimize nutrition, and enhance productivity. By<br>mastering PLF systems, learners can improve efficiency and<br>animal welfare in production operations. |







| technical<br>information wit<br>that practic<br>(dairy<br>production) t<br>make informe<br>decisions. | Data management<br>h<br>al<br>o<br>d | Integrate Data Management Platforms in Animal Production:<br>Learners will develop proficiency in integrating data<br>management platforms such as farm management software<br>(e.g., DairyComp, CattleMax) and cloud-based solutions<br>(e.g., Agrivi, FarmLogs) into their operations. They will learn<br>how these platforms help manage records, monitor<br>performance, and make data-driven decisions, providing a<br>comprehensive approach to managing various aspects of<br>animal production from anywhere.  |
|---|--------------------------------------|--|
|   | Genetic digital tools                | Improvement of breeding and genetic outcomes using digital<br>tools: this outcome focuses on the use of genetic and<br>breeding tools, including genomic selection and breeding<br>management software (e.g. Breedr, Smartbow). Learners<br>will understand how to use DNA information to select<br>animals with the best genetic potential and monitor<br>breeding cycles to improve genetic outcomes. This includes<br>monitoring reproductive health and effectively managing<br>breeding programs to enhance productivity.   |
|   | Disease digital solutions            | Improve animal health and disease management with digital<br>solutions: Learners will explore digital solutions for health<br>monitoring and disease management, such as telemedicine<br>platforms (e.g. TeleVet), disease tracking systems (e.g.<br>HealthTrack) and nutritional analysis software (e.g.<br>RationPro). They will learn how these tools facilitate remote<br>consultations, monitor disease outbreaks, manage<br>vaccination programmes and optimise feed formulations,<br>ensuring proactive health management and disease<br>prevention in animal production. |







| Input<br>management                          | Sustainable inputs  | Identify the importance of inputs (soil, feed, energy, water)<br>and their relationship to sustainable animal production.  |
|--|---|--|
|  | Livestock strategies  | Identify strategies for inputs management in livestock systems.  |
|  | Livestock practices   | Apply best practices for efficient inputs management in animal production operations.  |
| Cybersecurity<br>and related lega<br>aspects | Cybersecurity basics (skill<br>alcovered in FIELDS project) | Describe the basic concepts and terms related to cybersecurity, explain the main cybersecurity threats, vulnerabilities, and technological attacks, recognize cyber fraud, describe different types of control and specific defence mechanisms |
| Risk<br>management                           | Threats digital tools                                       | Identify, with the help of digital tools, potential risks and<br>uncertainties in animal farming operations, especially the<br>new threats (e.g. climate change, markets volatility)   |
|  | Risk factors and strategies                                 | Evaluate risk factors and prioritize risk management strategies  |
|  | Resilient mitigation  | Implement risk mitigation measures to enhance farm resilience and sustainability   |
|  |   |  |







| Problem solving Decision making<br>and decision<br>making-Develop Critical Thinking: The course aims to ent<br>participants' critical thinking skills, enabling them to eva<br>situations objectively, identify underlying issues, and an<br>information accura<br>-Enhance Analytical Skills: Participants learn how to t<br>down complex problems into manageable compon<br>facilitating a deeper understanding of the issues at H<br>-Identifying Solutions: The course aims to aware particip<br>about the importance of generating creative and pra<br>solutions to problems, fostering innovation and adaptal<br>-Understanding<br>Decision-Making Mc<br>-Collaborative Problem-Solving: Participants learn ho<br>collaborate with others to solve problems, leveraging div<br>perspectives and skills to arrive at more comprehe<br>solutions.Communication<br>(for<br>sustainability)Sustainability management<br>Effective communicationIdentify possible sustainability certification and label<br>farms and farm products'<br>sustainability to consumers |   |
|--|---|
| Communication<br>(for<br>sustainability)Sustainability management<br>Identify possible sustainability certification and label<br>farms and farm productsSustainability)Effective communicationApply effective communication strategies to market<br>farm's and products' sustainability to consumers   | Problem solving<br>and decision<br>making |
| Effective communication Apply effective communication strategies to market farm's and products' sustainability to consumers  | Communication<br>(for<br>sustainability)  |
| stakeholders   |   |
| Discussing animal welfare Engage in informed discussions on meat consumption animal welfare  |   |







|  |   | Basics on<br>economic and<br>marketing<br>aspects  | Production economy (ski<br>covered in FIELDS project) | <ul> <li>I-Understand Economic Systems: Economic basics aim to help<br/>individuals comprehend different economic systems.</li> <li>-Familiarize individuals with the fundamental concepts of<br/>supply and demand.</li> <li>-Provide individuals with the tools to make rational<br/>economic decisions.</li> <li>-Explore the principles of resource allocation.</li> <li>-Promote an understanding of market efficiency.</li> <li>-Explore the factors that drive economic growth and<br/>development.</li> </ul> |
|--|---|--|---|---|
|  |   | Adaptability<br>(overlap of the<br>module in the<br>"Food industry<br>sustainability<br>manager" OP) | Adaptability  | Identify key characteristics of adaptable individuals, such as openness to new experiences, resilience, and flexibility.  |
| (3) Av<br>Technician for animal <sup>ar</sup><br>handling, welfare and <sup>pr</sup><br>transparency in livestock <sup>ar</sup><br>production pr<br>m<br>vv<br>liv | Awareness of<br>animal welfare<br>principles, to apply<br>animal welfare best<br>practices and to<br>measure animal<br>welfare on a<br>livestock farm | Animal handling<br>and welfare<br>principles and<br>practices  | Five freedoms   | Understand the principles of animal welfare, including the Five Freedoms, and how they relate to the production of meat animals   |
|  |   |  | Handling dangers                                      | Demonstrate an awareness of the dangerous aspects of handling   |
|  |   |  | Meat practices  | Identify common practices in meat/dairy production<br>(housing systems, handling and transportation, feeding<br>practices, and slaughter methods) and how these practices<br>can impact animal welfare  |
|  |   | Transparency in meat/dairy production  | Dairy transparency                                    | Describe the concept of transparency in meat/dairy production (production practices, animal welfare standards, supply chain traceability to consumers)  |







|  |   | Meat transparency    | Identify the various factors that influence transparency in meat production (regulatory requirements, consumer demand and industry practices)  |
|--|---|----------------------|--|
|  |   | Meat communication   | Communicate transparently with stakeholders, including consumers, policymakers, and advocacy groups, about meat production practices and their impacts   |
|  | Animal welfare<br>certification and                           | Certification        | Recognize the importance of animal welfare certification and labelling schemes   |
|  | labelling   | Consumers awareness  | Assess the role of labelling in promoting consumer awareness and understanding of animal welfare issues in the food industry   |
|  |   | EU regulations       | Outline relevant EU and global regulations, and industry standards (e.g. summaries of EU legislation for protection of farmed animals)   |
|  |   | Labelling challenges | Discuss the challenges and limitations associated with labelling animal welfare (label confusion, greenwashing, and enforcement issues)  |
|  |   | Emerging trends      | Explore emerging trends and innovations in animal welfare labelling, such as blockchain technology and QR code traceability  |
|  | Marketing<br>animal welfare<br>and consumers'<br>expectations | Marketing strategies | Understand the importance of animal welfare in marketing strategies within the food industry   |
|  |   | Branding labelling   | Identify the role of branding and labelling in promoting animal welfare-friendly products  |
|  |   | Communications       | Identify key concepts related to marketing and<br>communications for animal welfare (social media and digital<br>marketing, positive marketing vs. guilt marketing, press<br>releases, and interview strategies) |







| Consumer behaviour | Learn factors influencing consumer behaviour (cultural,<br>social, ethical, and economic factors), and how these<br>influence attitudes towards animal welfare in food<br>production.           |
|--------------------|---|
| Welfare trends     | Learn about market trends and consumer preferences<br>related to animal welfare (the growing demand for ethically<br>produced food products and the influence of labels and<br>certifications). |







### Annex 3: Curriculum for the Occupational Profiles of the "Veterinary" Sector

| Occupational profile      | Main<br>competences | Module  | Lesson                  | Learning Outcomes   |
|---------------------------|---------------------|---|-------------------------|---|
| (1) Veterinary specialist | Knowledge of the    | An introduction to                                  | Data Types              | Describe types of data  |
| in data science           | different sources   | data  | Data Structures         | Critically evaluate data and data structures  |
|                           | of data produced    |   | Bias and Errors         | Describe bias, causes of error  |
|                           | activities.         |   | Data Validation         | Be able to validate data and create structures to avoid bias  |
|                           |                     |   | Presenting Data         | Summarise data using appropriate visualisations and tools relevant to the type of data  |
|                           |                     |   | Interpret Data          | Interpret and critique complex data summaries   |
|                           |                     |   | Data Comparison         | Undertake univariate or multivariate comparisons relevant to different data sets  |
|                           |                     |   | Bayesian Statistics     | Describe the concept of bayesian statistics as they apply to biological systems   |
|                           |                     | Complex data sources<br>in the veterinary<br>sector | Tools Data Extraction   | Extract data from tools through an understanding of<br>the infrastructure of that tool including Milk<br>production systems, feeding, biosensors, GPS,<br>behaviour, productivity and other |
|                           |                     |   | Data Format Translation | Use specific software packages and translate data into consistent formats   |
|                           |                     |   | Data Sources            | Calculate and present summary data from individual data sources   |
|                           |                     | Big data for Vets                                   | Big Data                | Outline the concepts of developing technologies in the analysis of big data   |
|                           |                     |   | Complex Datasets        | Explain how developing technologies can solve complex problems in animal production systems by leveraging large complex datasets: Block chain,  |







|  |   |   | Machine learning/neural networks, Generative<br>Al/transformers  |  |
|--|---|---|--|--|
|  |   |   | Big Data Opportunities   | Identify potential opportunities that arise from<br>analysis of large data sets in animal health and welfare   |
|  |   |   | Developing Technologies  | Create scenarios for specific problems that could be addressed with these technologies   |
|  |   |   | Bias Scenarios   | Create scenarios of how interpretation of biased models could have negative impacts  |
|  |   |   | Advanced Data Models   | Describe methods for validation of advanced data models  |
|  |   |   | Data Sharing Risks   | Outline risks from sharing data in the development of large data structures (GDPR, BI)   |
|  | Evaluating and<br>applying data<br>structures in the real<br>world      | Big Data Impact   | Deliver impact through recommendations about sustainability /food quality / animal health and welfare based upon big data analysis |  |
|  |   | world   | Predictions Derivations  | Derive predictions and model future changes  |
|  |   |   | Behaviour Changes  | Influence behaviour change in animal production systems  |
|  |   |   | Misuse Mitigation  | Predict the impact of misuse and misinterpretation and explain how to mitigate these risks   |
|  |   |   | Big Data Frameworks  | Explain the emerging regulatory frameworks in big-<br>data, machine learning and generative AI   |
|  |   | Future Regulations  | Identify potential future regulatory mechanisms and gaps in the current regulatory frameworks                                      |  |
| (2) One-Health<br>veterinary specialist in<br>medicines and<br>chemicals | Ability to handle,<br>store and use<br>veterinary<br>medicines in a way | An introduction to<br>Responsible use of<br>medicines and<br>chemicals <i>(overlap of</i> | Pharmaceuticals Life Cycle   | Explain the life cycle and potential impact of selected<br>pharmaceuticals and chemicals<br>Soil and water, Animal based, Consumers,<br>Workers, Fauna and flora |
|  |   |   |  |  |







| that ensures the<br>safety of farm               | the module in the<br>"One health specialist<br>in livestock farming<br>and veterinary<br>activities" OP) | Pharmaceuticals Disposal   | Explain how pharmaceuticals and chemicals can be disposed   |
|--|--|--|---|
| personnel and<br>animals, protects               |  | Waste Management Impact  | Explain the impact of waste management practices and potential ecotoxicity  |
| the environment<br>and guarantees<br>the quality |  | Medicines Chemicals Regulations                                    | Explain regulations that exist to limit the use and misuse of medicines and chemicals                                 |
| standards of the<br>farm products.               | Antibiotic resistance<br>(overlap of the   | Antibiotic Resistance  | Basic introduction to antibiotic resistance   |
|  | module in the "One<br>health specialist in<br>livestock farming and<br>veterinary activities"<br>OP)     | Antimicrobial Resistance<br>mechanisms                             | Explain how antimicrobial resistance occurs in<br>different classes of medicine                                       |
|  |  | EU Antimicrobial Use<br>Measurement                                | Describe how antimicrobial use is measured by EU  |
|  |  | AMR Impact   | Describe the impact of AMR on animal disease,<br>human disease, the environment, the microbiome<br>and the resistome  |
|  |  | Antibiotics Negative Impacts                                       | Explain other negative impacts of antibiotic use  |
|  |  | Microbiological Molecular<br>Antibiotic Enhancement                | Explain how microbiological and molecular techniques can be used to enhance antibiotic use                            |
|  |  | Antibiotic Cost Factors  | Derive the factors that impact on the true costs of antibiotic use  |
|  |  | AMR Impact Reduction   | Awareness of best-practice strategies to reduce the<br>impact of AMR on one-health in different production<br>systems |
|  |  | Antibiotics Alternatives<br>Scenarios                              | Predict scenarios where antibiotics are not available for treatment of particular diseases                            |
|  |  | Antibiotics Livestock Alternatives<br>(lesson from One Health LoC) | Alternatives to antimicrobials in livestock   |







|  | Disinfectants (overlap<br>of the module in the   | Disinfectants Resistance                      | Explain how resistance occurs in different classes of<br>disinfectants  |
|--|--|---|---|
|  | "One health specialist<br>in livestock farming<br>and veterinary<br>activities" OP)  | Disinfectants and Biofilms<br>Impact          | Describe the impact of disinfectant use on the animal,<br>human health, the environment and the resistome<br>and the impact of biofilms |
|  |  | Disinfectants in Animal Products              | Explain the fate of disinfectants in animal products  |
|  |  | Disinfectant Microbiological<br>Effectiveness | Explain how microbiological and molecular<br>techniques can be used to measure the effectiveness<br>of disinfectant protocols           |
|  | Antiparasite<br>resistance (overlap of<br>the module in the<br>"One health specialist<br>in livestock farming<br>and veterinary<br>activities" OP) | Antiparasite. Resistance Impact               | Explain how antiparasite resistance occurs and the impact on treatment of clinically important disease                                  |
|  |  | Antiparasitics Environmental<br>Impact        | Describe the health and environmental impacts of antiparasitics   |
|  |  | Anthelmintic Environmental<br>Impact          | Explain the impact of anthelmintic use on the environment   |
|  |  | Anthelmintic Diagnostic<br>Approach           | Develop risk-based diagnostic lead approaches to anthelmintic use in production animal systems  |
|  | Sustainable<br>approaches to   | Vaccination Strategies                        | Explain how vaccination strategies can be used to control viral, bacterial and parasitic disease  |
|  | (overlap of the<br>module in the "One  | Vaccines Impact                               | Describe the impacts of different vaccine technologies to diagnostic testing  |
|  | health specialist in<br>livestock farming and<br>veterinary activities"  | Emerging Approaches Disease<br>Control        | Describe how emerging approaches to disease control<br>might impact on the need for conventional medicines<br>including bacteriophages  |
|  | 07)  | Genetics Breeding Disease<br>Reduction        | Identify opportunities to reduce disease through genetics and breeding  |
|  | 1  | 1   | 1   |







|  |                                     |   | Animal Systems Auditing         | Audit critical control points within animal systems based on published and farm data  |
|--|-------------------------------------|---|---------------------------------|---|
|  |                                     |   | Disease Critical Control Points | Determine critical control points in management structures that limit disease risks   |
|  |                                     |   | Disease Risk Factors Control    | Develop management structures by controlling risk factors in important diseases   |
| (3) Specialist for   | Get a solid                         | Veterinary Business   | Vet Models                      | Explain current and emerging vet business models  |
| veterinary business<br>running a<br>successful<br>business | running a<br>successful<br>business | module in the<br>"Entrepreneurial<br>skilled specialist for<br>the Agri-food sector"<br>OP) | Innovation Impact               | Explain how innovation, regulation, climate change, globalisation and sustainability will impact on established business models |
|  |                                     |   | Change Management               | Explain the principles of change management in business models  |
|  |                                     |   | Social Challenges               | Predict how social challenges will influence change in<br>business models   |
|  |                                     |   | Future Scenarios                | Design novel business models that address future scenarios  |
|  |                                     |   | Change Road Maps                | Develop a roadmap for change management within the business   |
|  |                                     | Business<br>preparedness  | Crisis Scenarios                | Describe scenarios and develop strategies for crisis management   |
|  |                                     | (overlap of the<br>module in the  | Crisis Management               | Evaluate protocols for the management of crises   |
|  |                                     | "Entrepreneurial skilled specialist for   | System Analyses                 | Evaluate system analyses and provide alternative paths  |
|  |                                     | the Agri-food sector"<br>OP)  | Rapid Change                    | Identify critical processes that are not amenable to rapid change   |







| Communication Skills<br>for business <i>(overlap</i> | Value Chain                          | Explain the value chain in veterinary business  |
|--|--------------------------------------|---|
| of the module in the<br>"One health specialist       | Value Chain Analysis                 | Undertake value chain analysis in different business<br>models                                      |
| and veterinary                                       | System Thinking and Networking       | Explain and practice System thinking and networking   |
| activities" OP, except<br>of the "Value chain")      | Challenge and inspire                | Challenge and inspire others  |
|  | Conflict Management                  | Demonstrate Emotional intelligence and effectively manage conflict within teams and with the public |
|  | Opportunities Strategies Actions     | Create opportunities, devise strategies and design effective action                                 |
|  | Leadership Strategies<br>Development | Explain the principles of leadership and develop strategies   |







### Annex 4: Curriculum for the multi-sector Occupational profile (1): Entrepreneurial skilled specialist for the Agri-food sector

| Occupational<br>profile                      | Main<br>competences   | Module                                | Lesson   | Learning Outcomes   |
|--|---|---------------------------------------|--|---|
| (1)<br>Entrepreneurial<br>skilled specialist | Acquire knowledge<br>and skills to design<br>and develop business   | Teamwork, negotiation<br>and conflict | Teamwork Fundamental<br>Principles                                     | Describe the fundamental principles of effective team working, negotiation skills and conflict management |
| for the Agri-food<br>sector                  | strategies as well as<br>implement<br>innovation  |                                       | Effective Communication  | Demonstrate effective communication, active listening and collaborative problem solving                   |
|  | procedures in the<br>agri-food company<br>or veterinary   |                                       | Negotiation  | Demonstrate key negotiation skills and appropriate conflict resolution strategies                         |
|  | business.   | Leadership                            | Leadership Styles  | Demonstrate understanding of leadership styles and effective communication skills                         |
|  |   |                                       | Team Building Strategies   | Explain strategies for building cohesive teams and motivating members towards common goals                |
|  |   |                                       | Under Pressure Decisions   | Demonstrate skills in resolving conflicts and making effective decisions under pressure                   |
|  |   |                                       | Strategic Management   | Describe the principles of Strategic Management   |
|  |   | Strategic Thinking                    | Demonstrate strategic thinking and articulation of a compelling vision |   |
|  |   |                                       | Change Leadership  | Demonstrating effective and innovative change leadership  |
|  | Analytical and critical<br>thinking (overlap of the<br>module in the "Food<br>industry sustainability<br>manager" OP) | Data Trends and Patterns              | Identify patterns and trends in data or other information              |   |
|  |   | Cause Effect                          | Demonstrate understanding of cause-and-effect<br>relationships         |   |
|  |   | Arguments Analysis                    | Demonstrate capability to analyse and evaluate arguments               |   |
|  |   |                                       | Complex Information  | Synthesise complex information  |







|  |  | Complex Problems                           | Demonstrate capability to identify complex problems, frame them effectively and develop appropriate solutions                   |
|--|--|--|---|
|  |  | Innovative Thinking                        | Demonstrate creative and innovative thinking for real world problems  |
|  | Veterinary business  | Current Emerging Models                    | Explain current and emerging business models  |
|  | (overlap of the module in<br>the "Specialist for<br>veterinary business" OP)                       | Innovation Impact Current<br>Models        | Explain how innovation, regulation, climate change, globalisation and sustainability will impact on established business models |
|  |  | Change Management<br>Principles            | Explain the principles of change management in business models  |
|  |  | Social Challenges Change<br>Prediction     | Predict how social challenges will influence change in business models  |
|  |  | Future Scenarios Novel<br>Models           | Design novel business models that address future scenarios  |
|  |  | Change Management Road<br>Maps             | Develop a roadmap for change management within the business   |
|  | Business preparedness (overlap of the module in  | Crisis Management Scenarios<br>Strategies  | Describe scenarios and develop strategies for crisis<br>management  |
|  | the "Specialist for<br>veterinary business" OP)  | Crisis Management Protocols<br>Evaluation  | Evaluate protocols for the management of crises   |
|  |  | System Analysis Evaluation<br>Alternatives | Evaluate system analyses and provide alternative paths  |
|  |  | Rapid Change Critical<br>Processes         | Identify critical processes that are not amenable to rapid change   |
|  | Risk communication for<br>businesses (overlap of<br>the module in the "One<br>health specialist in | Agri-food value chain                      | Explain the value chain in Agri-food businesses   |







| livestock farming and veterinary activities" OP) | Value chain analysis                    | Undertake value chain analysis in different business models   |
|--|---|---|
|  | System thinking and<br>networking       | Explain and practice System thinking and networking   |
|  | Conflict management                     | Demonstrate Emotional intelligence and effectively manage conflict within teams and with the public |
|  | Opportunities strategies<br>development | Create opportunities, devise strategies and design effective action                                 |
|  | Leadership strategies<br>development    | Explain the principles of leadership and develop strategies   |







# Annex 5: Curriculum for the Animal Production & Veterinary multi-sector occupational profile: One health specialist in livestock farming and veterinary activities

| Occupational profile               | Main<br>competences              | Module                             | Lesson  | Learning Outcomes   |
|------------------------------------|----------------------------------|------------------------------------|---|---|
| One health                         | Apply One Health                 | Awareness of the                   | One Health Approach   | Define the One Health approach  |
| specialist in<br>livestock farming | concept in animal<br>farming and | One-Health<br>approach             |   | Explain the interconnectedness of human health, animal health and environmental health                                    |
| activities                         | veterinary sector                |                                    | Disease Transmission  | Explain the important role of biodiversity, climate change and habitat transformation in influencing disease transmission |
|                                    |                                  |                                    | Multidisciplinary<br>Approach   | Explain the benefits and challenges of a multidisciplinary approach   |
|                                    |                                  |                                    | One-Health Workforce  | Describe the One-Health workforce   |
|                                    |                                  |                                    | Agri Food Challenges  | Apply the One Health approach to analyze complex agrifood challenges and propose holistic solutions.                      |
|                                    |                                  |                                    | One-Health<br>Communication   | Develop effective communication strategies to disseminate One Health principles and promote awareness among stakeholders  |
|                                    |                                  | Food safety<br>awareness           | Food Safety Hygiene   | Develop a comprehensive understanding of Food safety and hygiene  |
|                                    |                                  |                                    | One-Health Food Safety  | Explain One-Health approach's relation to food safety   |
| H                                  |                                  | Food Borne Diseases                | Describe how food borne diseases (causes, symptoms, transmission routes) impact on all aspects of one health (Public health, animal health and the environment)     |   |
|                                    |                                  | Food Supply Chain<br>Hazards       | Recognize common hazards in the food supply chain, including biological (pathogens), chemical (pesticides, food additives), and physical (foreign objects) hazards. |   |
|                                    |                                  | Human nutrition<br>within the One- | Food, Feed, Water<br>Security   | Explain the concepts of food, feed and water security and their relation with One-health                                  |
|                                    | Health concept                   | Nutritional Ecology                | Explain the concept of nutritional ecology (how dietary choices and food production practices influence One-Health)   |   |







|  |  | Impact of Food<br>Production         | Explain the impact of food production and nutrition on the environment, animals and health according to the one health concept  |
|--|--|--------------------------------------|---|
|  |  | Healthy Food Supply<br>Chain         | Illustrate how regulatory frameworks, socio-economic factors, animal wellness and health management practices contribute to a healthy food supply chain   |
|  |  | Long Term One-Health<br>Implications | Evaluate long term implications of the one health concept in the food supply chain  |
|  | One-Health EU<br>legislation             | International One-Health             | Outline the role of international organizations (e.g., World Health<br>Organization, World Organisation for Animal Health, Food and Agriculture<br>Organization) in promoting One Health principles.            |
|  |  | EU and Global<br>Regulations         | Outline relevant EU and global regulations, such as the European Union's<br>General Food Law and the Codex Alimentarius, related to food safety and<br>agrifood systems.  |
|  |  | EU Antimicrobial<br>Resistance       | Provide an overview of the EU's action plan against antimicrobial resistance and relevant global initiatives  |
|  | Basic knowledge<br>on food, nutrition    | EU Antimicrobial<br>Resistance       | Outline the EU's action plan against antimicrobial resistance and relevant global initiatives   |
|  |  | EU Food Safety<br>Regulations        | Outline the EU's food safety regulations, such as the General Food Law<br>and the Rapid Alert System for Food and Feed (RASFF), as well as relevant<br>international standards and guidelines.                  |
|  |  | EU Sustainable Policies              | Briefly list the EU's policies and initiatives related to sustainable development, food security, and rural development, as well as relevant global frameworks and goals (e.g., Sustainable Development Goals). |
|  |  | Human Nutrition Concept<br>า         | Explain the concept of human nutrition  |
|  | (including                               | Healthy Dietary Habits               | State basic nutritional facts and healthy dietary habits  |
|  | nutraceuticals<br>and gut<br>microbiome) | Dietary Related Diseases             | Identify and describe noncommunicable diseases related to dietary habits<br>(including obesity)   |
|  |  |                                      |   |







|  | Gut Microbiota                         | Explain the impact of dietary habits on the gut microbiota   |
|--|--|--|
|  | Functional Foods Health                | Describe how functional foods can improve human wellbeing and health   |
| Responsible use<br>of medicines and<br>chemicals | Pharmaceuticals Life<br>Cycle          | Explain the life cycle and potential impact of selected pharmaceuticals and chemicals: Soil and water, Animal Based, Consumers, Workers, Fauna and Flora |
|  | Pharmaceuticals Disposal               | Explain how pharmaceuticals and chemicals can be disposed  |
|  | Waste Management<br>Impact             | Explain the impact of waste management practices and potential ecotoxicity   |
|  | Medicines Chemicals<br>Regulations     | Explain regulations that exist to limit the use and misuse of medicines and chemicals  |
| Antibiotic                                       | Antibiotic Resistance                  | Basic introduction to antibiotic resistance  |
| resistance                                       | Antimicrobial Resistance<br>mechanisms | Explain how antimicrobial resistance occurs in different classes of medicine   |
|  | Antimicrobial Use<br>Measurement       | Describe how antimicrobial use is measured by EU   |
|  | AMR Impact                             | Describe the impact of AMR on animal disease, human disease, the environment, the microbiome and the resistome   |
|  | Antibiotics Negative<br>Impacts        | Explain other negative impacts of antibiotic use   |
|  | Optimising Antibiotic use              | Explain how microbiological and molecular techniques can be used to enhance antibiotic use   |
|  | Antibiotic Cost Factors                | Derive the factors that impact on the true costs of antibiotic us  |
|  | AMR Impact Reduction                   | Awareness of best-practice strategies to reduce the impact of AMR on one-health in different production systems  |
|  |  |  |







|   | Antibiotics Alternatives<br>Scenarios            | Predict scenarios where antibiotics are not available for treatment of particular diseases  |
|---|--|---|
|   | Antibiotics Livestock<br>Alternatives            | Alternatives to antimicrobials in livestock   |
| Disinfectants                                   | Disinfectants antiseptic<br>Resistance           | Explain how resistance occurs in different classes of disinfectants   |
|   | Disinfectants antiseptics<br>and Biofilms Impact | Describe the impact of disinfectant use on the animal, human health, the environment and the resistome and the impact of biofilms |
|   | Disinfectants in Animal<br>Products              | Explain the fate of disinfectants in animal products  |
|   | Disinfectants<br>Effectiveness                   | Explain how microbiological and molecular techniques can be used to measure the effectiveness of disinfectant protocols           |
| Antiparasite<br>resistance                      | Antiparasite Resistance<br>Impact                | Explain how antiparasite resistance occurs and the impact on treatment of clinically important disease                            |
|   | Antiparasitics Impact                            | Describe the health and environmental impacts of antiparasitics   |
|   | Anthelmintic Impact                              | Explain the impact of anthelmintic use on the environment   |
|   | Anthelmintic Diagnostic<br>Approach              | Develop risk-based diagnostic lead approaches to anthelmintic use in production animal systems                                    |
| Sustainable<br>approaches to<br>disease control | Vaccination Strategies                           | Explain how vaccination strategies can be used to control viral, bacterial and parasitic disease                                  |
|   | Vaccines Impact                                  | Describe the impacts of different vaccine technologies to diagnostic testing  |
|   | Disease Control                                  | Describe how emerging approaches to disease control might impact on the need for conventional medicines including bacteriophages  |
|   | Disease Reduction                                | Identify opportunities to reduce disease through genetics and breeding  |
|   |  |   |







| Animal Systems Auditing       Audit critical control points within animal systems based on published and farm data         Disease Critical Control       Determine critical control points in management structures that limit diseases risks         Disease Risk Factors Control       Develop management structures by controlling risk factors in important diseases         Prevention and treatment of livestock infectious diseases       Common Livestock       Develop management structures by controlling risk factors in important diseases         Vaccination Disease Approaches       Monitoring Surveillance       Describe monitoring and surveillance approaches         Vaccination Disease Prevention       Treatment and Control Options       Develop knowledge of treatment options and control measures         Vaccination Disease At the workplace       Responsibilities (skill covered in FILEDS)       Explain the responsibilities of the employer, employee and self-employed Responsibilities (skill covered in FILEDS)         Health and Safety Authority (skill covered in FILEDS)       Understand the legal requirements       Explain the role of the Health and Safety Authority (HSA) Authority (skill covered in FILEDS)         Health and Safety Authority (skill covered in FIEDS)       Understand and manage risks during emergency situations Risks (skill covered in FIEDS)         Requirements (skill covered in FIEDS)       Explain the value chain in Agri-food businesses |  |                                    |  |   |
|--|--|------------------------------------|--|---|
| Disease Critical Control       Determine critical control points in management structures that limit disease risks         Disease Risk Factors Control       Develop management structures by controlling risk factors in important diseases         Prevention and treatment of livestock diseases       Common Livestock Disease       Identify the common livestock diseases         Monitoring Surveillance approaches       Monitoring Surveillance Approaches       Describe monitoring and surveillance approaches         Vaccination Disease Prevention       Understand the role of vaccination in preventing and controlling infectious diseases in livestock         Health and safety       Human Resources at the workplace Legal Requirements (skill covered in FILEDS)       Explain the responsibilities of the employer, employee and self-employed authority (skill covered in FIELDS)         Health and Safety       Human Kasafey Authority (skill covered in FIELDS)       Understand the legal requirements         Requirements (skill covered in FIELDS)       Examine the role of the Health and Safety Authority (HSA)         Authority (skill covered in FIELDS)       Emergency Situations Risks (skill covered in FIELDS)         Risk       Agri-food Value Chain       Explain the value chain in Agri-food businesses  |  |                                    | Animal Systems Auditing  | Audit critical control points within animal systems based on published and farm data              |
| Disease Risk Factors<br>Control       Develop management structures by controlling risk factors in important diseases         Prevention and treatment of livestock infectious diseases       Common Livestock       Identify the common livestock diseases         Monitoring Surveillance Approaches       Monitoring Surveillance Approaches       Describe monitoring and surveillance approaches         Vaccination Disease Prevention       Understand the role of vaccination in preventing and controlling infectious diseases in livestock         Health and safety Human Resources at the workplace Responsibilities (skill covered in FILEDS)       Explain the responsibilities of the employer, employee and self-employed Northority (skill covered in FILEDS)         Workplace Legal Requirements (skill covered in FIELDS)       Understand the legal requirements fusion trip FIELDS)         Health and Safety Authority (skill covered in FIELDS)       Examine the role of the Health and Safety Authority (HSA) Authority (Skill covered in FIELDS)         Risk       Agri-food Value Chain       Understand and manage risks during emergency situations Risks (skill covered in FIELDS)         Risk       Agri-food Value Chain       Explain the value chain in Agri-food businesses  |  |                                    | Disease Critical Control<br>Points                               | Determine critical control points in management structures that limit disease risks               |
| Prevention and<br>treatment of<br>livestock<br>infectious<br>diseases       Common Livestock<br>Diseases       Identify the common livestock diseases         Monitoring Surveillance<br>approaches       Monitoring Surveillance<br>  |  |                                    | Disease Risk Factors<br>Control                                  | Develop management structures by controlling risk factors in important diseases                   |
| livestock<br>infectious<br>diseases       Monitoring Surveillance<br>Approaches       Describe monitoring and surveillance approaches         Vaccination Disease<br>Prevention       Understand the role of vaccination in preventing and controlling<br>infectious diseases in livestock         Health and safety<br>at the workplace<br>equirements (skill<br>covered in FILEDS)       Develop knowledge of treatment options and control measures<br>Responsibilities (skill<br>covered in FILEDS)         Workplace Legal<br>Requirements (skill<br>covered in FILEDS)       Understand the legal requirements<br>Responsibilities of the employer, employee and self-employed<br>Responsibilities (skill<br>covered in FILEDS)         Health and Safety<br>Authority (skill covered in<br>FIELDS)       Understand the legal requirements<br>Responsibilities of the Health and Safety Authority (HSA)<br>Authority (skill covered in<br>FIELDS)         Risk       Agri-food Value Chain       Understand and manage risks during emergency situations<br>Risks (skill covered in<br>FIELDS)  |  | Prevention and treatment of        | Common Livestock<br>Diseases                                     | Identify the common livestock diseases  |
| Uiseases       Vaccination Disease<br>Prevention       Understand the role of vaccination in preventing and controlling<br>infectious diseases in livestock         Treatment and Control<br>Options       Develop knowledge of treatment options and control measures         Health and safety<br>at the workplace<br>at the workplace       Human Resources<br>Responsibilities (skill<br>covered in FILEDS)       Explain the responsibilities of the employer, employee and self-employed         Workplace Legal<br>Requirements (skill<br>covered in FIELDS)       Understand the legal requirements         Health and Safety<br>Authority (skill covered in<br>FIELDS)       Examine the role of the Health and Safety Authority (HSA)         Emergency Situations<br>Risks (skill covered in<br>FIELDS)       Understand and manage risks during emergency situations<br>Risks (skill covered in<br>FIELDS)         Risk       Agri-food Value Chain       Explain the value chain in Agri-food businesses  |  | livestock<br>infectious            | Monitoring Surveillance<br>Approaches                            | Describe monitoring and surveillance approaches   |
| Image: Free tree tree tree tree tree tree tree   |  | diseases                           | Vaccination Disease<br>Prevention                                | Understand the role of vaccination in preventing and controlling infectious diseases in livestock |
| Health and safety<br>at the workplace<br>at the workplace<br>Human Resources<br>at the workplace<br>Performed in FILEDS)Explain the responsibilities of the employer, employee and self-employed<br>Responsibilities (skill<br>covered in FILEDS)Workplace Legal<br>Requirements (skill<br>covered in FIELDS)Understand the legal requirements<br>Requirements<br>(skill<br>covered in FIELDS)Health and Safety<br>Authority (skill covered in<br>FIELDS)Linderstand the role of the Health and Safety Authority (HSA)<br>Authority (skill covered in<br>FIELDS)Regency Situations<br>Risks (skill covered in<br>FIELDS)Understand and manage risks during emergency situations<br>Risks (skill covered in<br>FIELDS)RiskAgri-food Value ChainExplain the value chain in Agri-food businesses  |  |                                    | Treatment and Control<br>Options                                 | Develop knowledge of treatment options and control measures                                       |
| Workplace Legal<br>Requirements (skill<br>covered in FIELDS)Understand the legal requirementsHealth and Safety<br>Authority (skill covered in<br>FIELDS)Examine the role of the Health and Safety Authority (HSA)Emergency Situations<br>Risks (skill covered in<br>FIELDS)Understand and manage risks during emergency situations<br>Risks during emergency situations<br>Risks (skill covered in<br>FIELDS)RiskAgri-food Value ChainExplain the value chain in Agri-food businesses  |  | Health and safety at the workplace | Human Resources<br>Responsibilities (skill<br>covered in FILEDS) | Explain the responsibilities of the employer, employee and self-employed                          |
| Health and Safety<br>Authority (skill covered in<br>FIELDS)Examine the role of the Health and Safety Authority (HSA)Emergency Situations<br>Risks (skill covered in<br>FIELDS)Understand and manage risks during emergency situationsRiskAgri-food Value ChainExplain the value chain in Agri-food businesses  |  |                                    | Workplace Legal<br>Requirements (skill<br>covered in FIELDS)     | Understand the legal requirements   |
| Emergency Situations<br>Risks (skill covered in<br>FIELDS)Understand and manage risks during emergency situationsRiskAgri-food Value ChainExplain the value chain in Agri-food businesses  |  |                                    | Health and Safety<br>Authority (skill covered in<br>FIELDS)      | Examine the role of the Health and Safety Authority (HSA)   |
| Risk Agri-food Value Chain Explain the value chain in Agri-food businesses   |  |                                    | Emergency Situations<br>Risks (skill covered in<br>FIELDS)       | Understand and manage risks during emergency situations   |
|  |  | Risk                               | Agri-food Value Chain  | Explain the value chain in Agri-food businesses   |







|  | Communication<br>Skills for business<br>(overlap of the<br>module in the | Value Chain Analysis                 | Undertake value chain analysis in different business models   |
|--|--|--------------------------------------|---|
|  |  | System Thinking and<br>Networking    | Explain and practice System thinking and networking   |
|  | "Entrepreneurial skilled specialist                                      | Challenge and Inspire                | Challenge and inspire others  |
|  | for the Agri-Food<br>sector" OP)   | Conflict Management                  | Demonstrate Emotional intelligence and effectively manage conflict within teams and with the public |
|  |  | Opportunities Strategies<br>Actions  | Create opportunities, devise strategies and design effective action                                 |
|  |  | Leadership Strategies<br>Development | Explain the principles of leadership and develop strategies   |









#### **Disclaimer:**

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