



EU-FarmBook

Guide to the EU-FarmBook metadata

Explaining the metadata used in the EU-FarmBook platform for Knowledge Object description



Funded by
the European Union

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1. Preface

The EU-FarmBook platform is the point of reference for agriculture and forestry related content and information targeting the Agricultural Knowledge and Innovation Systems networks (AKIS) that exist at the regional, national, and EU levels. It provides access to outputs of Research and Innovation projects funded by EU Framework Programmes (Horizon 2020 and Horizon Europe), Operational Group projects, as well as material from national and/or regional platforms for practice. These outputs are grouped into seven (7) broad categories relating to the format into which information is being conveyed: (i) text documents; (ii) slideshow presentations; (iii) videos; (iv) audios; (v) images; (vi) software applications; and (vii) datasets. Knowledge Objects is the term used to refer to the digital (practice-oriented) material pertaining to the above categories, which is delivered from the EU-FarmBook platform.

This document presents and explains the information needed for the description of each of the Knowledge Objects hosted in the EU-FarmBook platform. This information is called metadata and is important for the efficient storage of Knowledge Objects in the platform, as well as their search and retrieval by the platform users. In the next section, accounts of what metadata is, and what it is used for, are given. Section 3 presents and explains the metadata of the EU-FarmBook platform. An illustrative example is provided in Section 4 to make clear the use of the EU-FarmBook platform metadata and details on the values of specific metadata are provided in the Annexes of the document.

2. What is metadata and what do we need it for?

Metadata is information about a Knowledge Object (document, presentation, video, etc.) that helps index it in the EU-FarmBook platform and deliver it to the platform users. It is background information that the users of the EU-FarmBook platform should be provided with to make decisions about whether the Knowledge Object is relevant to their needs and interests. Describing Knowledge Objects with the “correct” metadata is of utmost importance as it can facilitate successful searches of Knowledge Objects in the EU-FarmBook platform.

Examples of metadata include the **creator(s)** of a Knowledge Object, the Knowledge Object’s **title**, as well as **keywords** or **subject labels** stating what the Knowledge Object is about. Metadata should be easily interpreted so as to efficiently categorise Knowledge Objects and make them easier to find and collect.

3. EU-FarmBook metadata for Knowledge Object description

The EU-FarmBook metadata has been identified as the minimum set of information that is considered as a “must have” for the adequate description of the Knowledge Objects hosted in the EU-FarmBook platform. All metadata have been defined using existing and well-known ontologies and vocabularies. In the following subsections, a brief explanation

for each of the EU-FarmBook's metadata is provided. Expected values are mentioned, as well as an indication about whether each of our metadata is mandatory or optional.

3.1. Title

Explanation: A descriptive name provided to the Knowledge Object by its creator(s).

Is required: Mandatory.

Expected value(s): A short sentence or phrase being the title of the Knowledge Object.

3.2. Description

Explanation: A short textual summary of the content of a Knowledge Object, or what the Knowledge Object is about. In the case of Knowledge Objects that are documents, their description can be the abstract of the document (if there is an abstract available).

Is required: Mandatory.

Expected value(s): A short text of not more than 100 words serving the purpose of the description (summary) of the Knowledge Object.

3.3. Keywords

Explanation: A list of words/phrases providing indications of what the Knowledge Object is about. They need to be indicative of the Knowledge Object's information and content, thus enabling search and findability by the EU-FarmBook platform users.

Is required: Mandatory.

Expected value(s): A short list of keywords or key phrases separated by a comma (",") or semi-colon (";") separator.

3.4. Creator(s)

Explanation: The person(s) involved in the creation of a Knowledge Object.

Is required: Mandatory.

Expected value(s): The name/names of the person/persons involved in the creation of the Knowledge Object. In cases of more than one creator, the names can be separated by a comma (",") or semi-colon (";") separator.

3.5. Language(s)

Explanation: The language in which the Knowledge Object can be accessed and used (for instance, in the case of software applications) or in which its content is available.

Is required: Mandatory.

Expected value(s): Language from the list of languages officially spoken in Europe. {Bulgarian; Croatian; Czech; Danish; Dutch; English; Estonian; Finnish; French; German; Greek; Hungarian; Irish; Italian; Latvian; Lithuanian; Maltese; Polish; Portuguese; Romanian; Slovak; Slovenian; Spanish; Swedish}.

3.6. Date of completion

Explanation: The date on which the creation of a Knowledge Object was completed. It is a useful piece of information considering the pace at which new project results become available and how quickly they get outdated.

Is required: Mandatory.

Expected value(s): A full date provided in the form DD/MM/YYYY. In case a full date is not available, the year of completion, provided in the form YYYY, will suffice.

3.7. Intended purpose

Explanation: The purpose for which the Knowledge Object was created. Starting from the assumption that not all Knowledge Objects have the same purpose, making their purpose known can help the identification of content and information of usefulness to the EU-FarmBook platform users.

Is required: Mandatory.

Expected value(s): One or more of the purposes in the following list.

{access to data; communication; dissemination; education/training; data storage/processing; monitoring; modelling; evaluation; decision-making support; prediction/forecasting; experimentation}.

3.8. Geographic location(s)

Explanation: The geographic location(s) the content of a Knowledge Object relates to. Providing information on the location or locations the content of a Knowledge Object is related helps users of the platform find information of relevance to where they are being located, and thus what information and content they would be interested in accessing.

Is required: Optional.

Expected value(s): One or more of the countries in the following list.

{Åland Islands; Albania; Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Republic; Denmark; Estonia; Faroe Islands; Finland; France; Germany; Gibraltar; Greece; Guernsey; Hungary; Iceland; Ireland; Isle of Man; Italy; Jan Mayen; Jersey; Latvia; Liechtenstein; Lithuania; Luxembourg; Malta; Moldova; Monaco; Montenegro; Netherlands; Norway; Poland; Portugal; Republic of Northern Macedonia; Romania; Russia; San Marino; Serbia; Slovakia; Slovenia; Spain; Svalbard; Sweden; Switzerland; Ukraine; United Kingdom; and Vatican City}.

3.9. Knowledge Object URL

Explanation: The link to the web location where the Knowledge Object was initially made available.

Is required: Optional.

Expected value(s): A URL directing to the webpage from which the Knowledge Object was initially made available (e.g., the web inventory of the project in which the Knowledge

Object has been created, or the platform in which the Knowledge Object has been made initially available).

3.10. Category

Explanation: The category to which the Knowledge Object belongs.

Is required: Mandatory.

Expected value: A category from the following list.

{document; slideshow presentation; dataset; video; audio; image; software application; dataset}.

3.11. Type

Explanation: The type that the Knowledge Object belongs to Knowledge Objects in the EU-FarmBook platform are also associated with various types depending on the content/information they convey. There are specific types of Knowledge Objects per Knowledge Object category.

Is required: Mandatory.

Expected value(s): One or more types from each of the following lists of types available per Knowledge Object category.

Knowledge Object Category	Associated types
Document	article in conference proceedings; book; booklet; brochure; chapter in edited volume; deliverable report; factsheet; flyer; handbook; guide; journal article; manual; milestone report; newsletter; policy brief; practice abstract; press release; review document; report/paper; technical/technology article; technical information/ specifications card; thesis; tutorial
Slideshow presentation	decision-making presentation; educational/training presentation; guide; informative presentation; motivational presentation; tutorial
Video	case study; documentary video; educational/training video; event capturing video; guide; interview video; presentation/live talk capturing video; product/feature review video; question-and-answer video; simulation video; testimonial; tutorial/how-to video; vlog; webinar
Audio	audio magazine; commentary; educational/training podcast; event capturing podcast; guide; interview; on-demand seminar; panel discussion; question-and-answer podcast; solo podcast; tutorial
Image	chart/graph; infographic; interactive figure/image; interactive map; static figure/ image; static map
Software application	AI software; business software; data repository/database; data analysis software; decision support tool; educational/training software; Farm Management Information System (FMIS); game; scientific software; simulation

Dataset	auditory data; crop-related data; geospatial data; graph-related data; imagery data; input-related data; network-related data; temporal data; textual data; video data; weather/climate data; yield-related data
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Explanations of the types of Knowledge Objects available per category are available in the Annex.

3.12. Subject

Explanation: It is the Knowledge Object's subject (topic). A Knowledge Object may have more than one subject. To capture subjects in an as detailed way as possible, we define subjects at two levels of detail (top-level subjects and second-level subjects).

Is required: Mandatory.

Expected value(s): One or more subjects from each of the following subject lists.

Level	Subjects defined
Top-level subjects	Crop farming; livestock; forestry; environment; society; economics
Second-level subjects	Agroecology; AKIS; animal husbandry and welfare; aquaculture; biodiversity and nature management; biomass production; climate and climate change; competitiveness; crop rotation/crop diversification; digitalisation; energy management; farm diversification/new business models; farming equipment and machinery; farming/forestry competitiveness; fertilisation and nutrients management; food quality/processing and nutrition; genetic resource; landscape/land management; organic farming; pest/disease control; plant production and horticulture; soil management/functionality; supply chain, management, and consumption; waste, by-products, and residues management

Explanations of the subjects available both at the top-level and second level are provided in the Annex.

The subjects defined at the second level are associated with top-level subjects as shown in the table below.

Top-level subject	Associated second-level subjects
Crop farming	Agroecology; AKIS; biodiversity and nature management; biomass production; climate and climate change; competitiveness; crop rotation/crop diversification; digitalisation; energy management; farm diversification/new business models; farming equipment and machinery; farming/forestry competitiveness; fertilisation and nutrients management; food quality processing & nutrition; genetic resource; organic farming; pest/disease control; plant production and horticulture; soil management/functionality; supply chain, marketing & consumption; waste, by-products & residues management
Livestock	Agroecology; AKIS; animal husbandry and welfare; aquaculture; biodiversity and nature management; biomass production; climate and climate change; competitiveness; digitalisation; energy management;

	farm diversification/new business models; farming/forestry competitiveness; farming equipment and machinery; food quality processing & nutrition; genetic resource; organic farming; pest disease/control; plant production and horticulture; supply chain, marketing & consumption; waste, by-products & residues management
Forestry	Agroecology; AKIS; biodiversity and nature management; biomass production; climate and climate change; competitiveness; digitalisation; energy management; farm diversification/new business models; farming equipment and machinery; farming/forestry competitiveness; genetic resource; landscape/land management; pest/disease control; soil management/functionality; waste, by-products & residues management.
Environment	Agroecology; AKIS; animal husbandry and welfare; aquaculture; biodiversity and nature management; biomass production; climate and climate change; competitiveness; crop rotation/crop diversification; digitalisation; energy management; farm diversification/new business models; farming/forestry competitiveness; fertilisation and nutrients management; food quality processing & nutrition; genetic resource; landscape/land management; organic farming; pest/disease control; plant production and horticulture; soil management/functionality; supply chain, marketing & consumption; waste, by-products & residues management
Society	Agroecology; AKIS; animal husbandry and welfare; biodiversity and nature management; biomass production; climate and climate change; competitiveness; digitalisation; energy management; farm diversification/new business models; farming/forestry competitiveness; food quality processing & nutrition; genetic resource; landscape/land management; organic farming; pest/disease control; plant production and horticulture; soil management/functionality; supply chain, marketing & consumption; waste, by-products & residues management
Economics	Agroecology; AKIS; animal husbandry and welfare; aquaculture; biomass production; climate and climate change; competitiveness; crop rotation/crop diversification; digitalisation; energy management; farm diversification/new business models; farming equipment and machinery; farming/forestry competitiveness; fertilisation and nutrients management; food quality processing & nutrition; genetic resource; landscape/land management; organic farming; plant production and horticulture; pest/disease control; soil management/functionality; supply chain, marketing & consumption; waste, by-products & residues management

Explanations of the types of Knowledge Objects available per category are provided in the Annex.

3.13. License

Explanation: The license under which the Knowledge Object is made available, which specifies terms and conditions of the Knowledge Object's (re-)use.

Is required: Mandatory.

Expected value(s): The URL of the license (e.g., <https://creativecommons.org/licenses/by-sa/4.0/>) or the license name (e.g., “Attribution-ShareAlike 4.0 International (CC BY-SA 4.0)”). The license to be assigned to a Knowledge Object by default is CC BY. Other Creative Commons licenses to consider are:

- CC BY-SA (Attribution-ShareAlike 4.0 International)
- CC BY-NC (Attribution-NonCommercial 4.0 International)
- CC BY-NC-SA (Attribution-NonCommercial-ShareAlike 4.0 International)
- CC BY-ND (Attribution-NoDerivs 4.0 International)
- CC BY-NC-ND (Attribution-NonCommercial-NoDerivs 4.0 International)

Details are available at the website of Creative Commons (<https://creativecommons.org/share-your-work/licenses/>).

3.14. Format

Explanation: The file format in which the Knowledge Object is available.

Is required: Mandatory.

Expected value(s): File formats to consider for each category of Knowledge Objects are listed below.

Knowledge Object Category	Associated types
Document	txt; csv; htm/html; markdown; dvi; dbk; xml; epub; fb2; fbz; doc; docm; docx; odt; fodt; oxps; xps; pdf; ps
Slideshow presentation	pdf; potm; potx; ppt, pptx
Dataset	shp; shx; dbf; prj; sbx; sbn; tif; tfw; dwg; gml; mdb; mif; kml; ai; dxf; svg
Video	drc; mkv; mk3d; mka; mks; mp4; m4a; m4p; m4b; m4r; m4v; webm; ogv; ogg
Audio	m4a; caf; flac; mpc; mp+; mpp; mp3; bit; ogg; ogv; oga; ogx; ogm; spx; opus; spx; wv
Image	png; apng; flif; gbr; gif; jp2; j2k; jpf; jpg; jpx; jpm; mj2; mng; exr; pdf; png; svg; svgz; tiff; webp; xpm

3.15. File size

Explanation: The size of the digital file through which the Knowledge Object is available (e.g., in KBs, MBs, or GBs).

Is required: Mandatory.

Expected value(s): A numerical value followed by the file size unit (in KBs, MBs, or GBs).

3.16. Project name

Explanation: The name of the project that is the source of the Knowledge Object (i.e., the project in which the Knowledge Object has been created).

Is required: Mandatory.

Expected value(s): A short phrase providing the project's name.

3.17. Project acronym

Explanation: The acronym of the project that is the source of the Knowledge Object (i.e., the project in which the Knowledge Object has been created).

Is required: Mandatory.

Expected value(s): One or more words constituting the acronym of the project.

3.18. Project URL

Explanation: The URL of the official website of the project or the link to the webpage of the project in CORDIS (in the case of EU-funded Research and Innovation projects).

Is required: Mandatory.

Expected value(s): A URL.

4. An illustrative example of metadata use

In this section, we provide an example of a Knowledge Object. The Knowledge Object is a factsheet from the [AFINET Thematic Network](#). The title of the Knowledge Object as it appears on the first page is: “Productive Use of the Tree Row Understorey”. This is the value to assign to the “Title” metadata property¹.

Apart from the title, we also need to provide a short textual description (a short summary) of the Knowledge Object's content. Let us assume that this summary is provided by the following piece of text: *“Planting trees into arable or vegetable fields means that land is taken out of annual production; depending on the design of the system, this could be up to 25% of the cropping area. Establishing understorey crops can provide income in the short term before the trees reach a productive stage, increase diversity and overall productivity.”* This text is the value to assign to the “Description” metadata property.

The keywords associated with the factsheet are: “diversification”, “silvoarable”, “tree row”, “crops”, and “understorey”. It is important to consider the order in which the



¹ We use the term “metadata property” to refer to one of the metadata used to describe Knowledge Objects in the Eu-FarmBook platform.

keywords will be provided, starting from the one that best indicates what the content of the Knowledge Object relates to. They can be assigned as values to the “Keyword(s)” metadata property by having them separated by a comma “,” or a semi-colon “;”.

The creators of the Knowledge Object are Jo Smith and Sally Westaway. These are the names to be provided as values to the “Creator(s)” metadata property. The language in which its content is available is English.

The document was created on the 1st of March 2018. Therefore, the value to assign to “Date of completion” is “01/03/2018”. The factsheet has been created for communication purposes, meaning that “communication” is the value to assign to “Intended Purpose”. Our Knowledge Object describes solutions related to crop diversification tested in Spain and Portugal (as made evident from the descriptions provided in the document). So, the names of these two countries should be provided as values to “Geographic Location(s)”.

The URL to provide as value to the metadata property “Knowledge Object URL” is the URL from which the factsheet was initially made available:

https://euraf.isa.utl.pt/files/pub/20190529_factsheet_14_en_web.pdf

It is a document, which means that “document” is the value to assign to “Category”. The value of the “Type” metadata property is “factsheet”.

In the case of our example, the Knowledge Object subjects at the top level are: “Forestry” and “Environment” (more than one subject are allowed). The second-level subject of the Knowledge Object is: “Farming/forestry competitiveness”.

Next, we need to provide the license under which the Knowledge Object gets available. The license makes explicit the way(s) in which the Knowledge Object can (and needs to) be (re-)used by any interested parties. In our example, the license is [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/). This is the value to provide to the “License” metadata property.

The size of the file through which the Knowledge Object becomes available is 1.3 MBs. The file format is “pdf”. The acronym of the project in which the Knowledge Object was created is “AFINET”. The full name of the project is “Agroforestry Innovation Networks”. The URL of the project page in [CORDIS](https://cordis.europa.eu/) is <https://cordis.europa.eu/project/id/727872> (the link to the webpage of a project in CORDIS can be provided instead of the URL of the official website of the project).

The metadata values of our example Knowledge Object are summarised in the following table.

Metadata property	Value
Title	Productive Use of the Tree Row Understorey
Description	Planting trees into arable or vegetable fields means that land is taken out of annual production; depending on the design of the system, this could be up to 25% of the cropping area. Establishing understorey crops can provide income in the short term before the trees reach a productive stage, increase diversity and overall productivity.

Keywords	diversification; silvoarable; tree row; crops; understorey
Creator(s)	Jo Smith; Sally Westaway
Language(s)	English
Date of completion	01/03/2018
Intended purpose	Communication
Geographic location(s)	Portugal; Spain
Knowledge Object URL	https://euraf.isa.utl.pt/files/pub/20190529_factsheet_14_en_web.pdf
Category	Document
Type	Factsheet
Subject	Top-level subject(s): Forestry; Environment
	Second-level subject(s): Farming/forestry competitiveness
License	https://creativecommons.org/licenses/by/4.0/
Format	pdf
File size	1.3 MBs
Project name	Agroforestry Innovation Networks
Project acronym	AFINET
Project URL	https://cordis.europa.eu/project/id/727872

5. Annex

5.1. Knowledge Object type

5.1.1. Documents

Type	Description
Article in conference proceedings	A research paper presented in a conference by one (or more) of its authors; after the end of the conference, the paper is published in the conference proceedings (i.e., an edited volume with all the papers presented in the conference).
Book	A digital version of a book.
Booklet	A small book or group of pages.

Brochure	A digital document (of limited size in terms of its number of pages) containing pictures and information on a product or a company (or, in our case, a Multi-Actor Project).
Chapter in edited volume	A document presenting research work, which has been included in a book (edited volume) containing chapters from various contributors. This edited volume usually addresses a specific research topic. An example of a chapter in an edited volume is provided here.
Deliverable report	A document used to report the work done in a project as part of one, or more, tasks, which has led to some results.
Factsheet	A document containing detailed information, for the public, about a product or service.
Flyer	A form of paper-based advertisement intended for wide distribution and typically distributed or posted in a public place, handed out to individuals or sent through the mail. This document type is very close to the “brochure” type.
Handbook	A book including instructions on how to use something or information about a particular subject.
Guide	A book that gives the most important information about a particular subject.
Journal article	A piece of writing documenting the process and results of a research effort, which is published in a scientific journal. An example of a journal article is available here.
Manual	A book giving instructions or information.
Milestone report	A document used to report the work undertaken in a research project, which has resulted in the achievement of a milestone (milestone = a significant stage or event in a development process).
Newsletter	A short official statement or broadcast summary of news issued periodically to the members of a society or other organisation.
Policy brief	A policy brief is a concise summary of a particular issue, the policy options to deal with it, and some recommendations on the best option. It is aimed at government policymakers and others who are interested in formulating or influencing policies.
Practice abstract	A document used to disseminate the results of the project in a concise and understandable way to the practitioners. An example of a practice abstract is available here.
Press release	A press release is an official statement delivered to members of the news media for the purpose of providing information, an official statement, or making an announcement. Press releases can be delivered to

	members of the media physically on paper and electronically.
Review document	A document used with the aim to provide a review of some piece of work (review = a formal assessment of something with the intention of instituting change if necessary).
Report/paper	A document containing an account given on a particular matter, after thorough investigation or consideration, by a person or body. The information presented is usually supported by strong evidence.
Technical/technology article	This is usually a document presenting a technical topic, and typically the article drills down into some low-level of detail.
Technical information/specifications card	A document presenting a list of technical information about a product or service by having the layout of a “card”.
Thesis	A piece of writing involving original study of a subject, esp. for a college or university degree.
Tutorial	A document showcasing how to use a product or service in a series of steps.

5.1.2. Slideshows/presentations

Type	Description
Decision-making presentation	A presentation developed and used with the aim to facilitate decision-making purposes. In this case, however, decision-making is facilitated by the display and analysis of facts/data/results. It does not draw on the emotional factor as in the case of motivational presentations.
Educational/training presentation	A presentation developed and used for educational/training purposes in an educational/ training event/session.
Guide	A type of presentation providing information and/or instructions to help a person understand or execute something.
Informative presentation	This type of presentation is used to present specific information to specific audiences for specific goals or functions. Informative presentations are often analytical or involve the rational analysis of information. Sometimes they simply “report the facts” with no analysis at all, but still need to communicate the information in a clear and concise format.
Motivational presentation	A presentation aiming to provide its audience with the incentive to do something specific (e.g., make a decision, take an action, etc.).
Problem-solving presentation	A presentation created and used with the aim to provide help on how to solve a problem.

Tutorial (similar to guide)	A presentation type providing practical information about a specific subject.
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5.1.3. Videos

Type	Description
Case study	A video providing detailed information about the development of a person, group, or thing, especially in order to show general principles. See example here .
Documentary video	A video presenting facts and information about a subject. For instance, a documentary video on animal communication. See example here .
Educational/training video	A video that has been developed for educational/training purposes. See example here .
Event capturing video	A video recording of an event. As an example, case, we may refer to the video recording of the consortium meeting of a project. See example here .
Guide	A video that gives you the most important information about a particular subject. For instance, a travel guide available as a video or a wine guide available as a video.
Interview video	A video recording of an interview event. See example here .
Presentation/live talk capturing video	A video recording of a discussion of two or more people. See example here .
Product/feature review video	A video presenting the basic features of an object/product/device. See example here .
Question-and-answer video	A video where a person responds to a number of questions posed by a live audience or being made available in another way. See example here .
Simulation video	A video presenting a model of a real activity or phenomenon, created for training purposes or to solve a problem. See example here .
Testimonial	A video presenting a person's statement extolling the virtue of a product/service or something else. See example here .
Tutorial/how-to video	A video showing how to use or do something in a series of easy stages.
Vlog	A record of someone's thoughts, opinions, or experiences that he/she films and publishes on the internet.
Webinar	The video recording of a seminar session that has taken place online (i.e., a webinar).

5.1.4. Images

Type	Description
Chart/graph	<ul style="list-style-type: none"> A chart is a sheet providing information in tabular form. Chart examples are available here.

	<ul style="list-style-type: none"> A graph is a diagram (e.g., a series of one or more points, lines, line segments, curves, or areas) representing the variation of a variable in comparison to one or more other variables. Graph examples are available here.
Infographic	A collection of imagery, charts, and minimal text providing an easy-to-understand overview of a topic. Infographic examples are available here .
Interactive figure/image	A figure or image that makes use of motion-related aspects. See examples here .
Interactive map	Interactive map examples are available here .
Static figure/image	A display of information through various illustration means (e.g., colours, lines, borders, arrows, photographs) that does not employ any motion-related aspects. Examples are available here .
Static map	A representation usually on a flat surface of the whole or a part of an area/a diagram or other visual representation that shows the relative position of the parts of something. Examples of static maps are available here .

5.1.5. Audios

Type	Description
Audio magazine	A podcast that incorporates a range of different thematic units as a magazine does.
Commentary	An audio object/podcast containing opinions or explanations of an event or situation.
Educational/training podcast	An audio object/podcast that has been developed and used for educational/training purposes in the context of an educational/training event/session.
Event capturing podcast	An audio object/podcast created with the aim to record an event. It is an audio documentary of this event.
Interview	This type of audio object/podcast is to provide the recorded interview of some person.
On-demand seminar	An audio object/podcast that has been created with the purpose to record a seminar/training session. The recorded session is then available to any interested individual on his/her demand.
Panel discussion	An audio object/podcast recording a group of people gathered together to discuss a topic in the presence of an audience. Panels usually include a moderator who coordinates the discussion and sometimes elicits audience questions, with the goal of being informative and entertaining.
Question-and-answer podcast	An audio object/podcast used to record the responses of an expert to the questions asked by another person who is in charge of the Q&A session.

Solo podcast	This is a common type of audio object/podcast and it is often used by people who have expertise in a certain area and want to share with an audience.
Tutorial/guide	An audio object/podcast providing instructions on how to use a product, or undertake a process, in a series of easy stages.

5.1.6. Datasets

Type	Description
Auditory data	An auditory dataset contains audio-related data.
Crop-related data	Crop-related datasets contain values associated with variables of interest to the growing of crops and crop production.
Geospatial data	According to the Cambridge online dictionary, the term “geospatial” is used to denote data and information identifying where particular features are on the earth's surface, such as oceans and mountains. Thus, a set of geospatial data contains records that have locational information tied to them such as geographic data in the form of coordinates, address, city, or ZIP code.
Graph-related data	The term “graph-related data” is used to denote any dataset available in the format of a graph. There may be various sources from which a graph-based dataset may have originated from. Well known examples of such datasets are Knowledge Graphs.
Imagery data	A dataset that has images as its records. These images may show, for instance, plants infected by various diseases, which can be used for precision crop protection applications.
Input-related data	A dataset of this type contains data in various formats, which relate to the inputs applied to a crop.
Network-related data	This dataset type has similarities with the graph-related dataset type given the fact that from a mathematical perspective graphs and networks are defined upon similar theoretical foundations. Network-based data may convey information about network structures such as relationships and interactions among stakeholders in a value chain.
Temporal data	Sets of temporal data contain data that represents a state in time. Temporal data is collected and utilised for purposes such as the analysis of weather patterns and other environmental variables, monitoring traffic conditions, studying demographic trends, etc. Data relating to this type may be collected manually, by using sensors, or generated from simulation models.
Textual data	Textual data originate from plain text. It is an unstructured type of data having the potential to reveal useful insights relating to various variables of interest. Natural Language Processing (NLP) is a continuously growing research field in

	the domain of computational linguistics that involves research in models and techniques used to process textual data.
Video data	Video data relates to data that can be potentially extracted or relating to video recordings.
Weather/climate data	In the case of this type of datasets, we are dealing with data relating to the weather and climatic conditions affecting a geographic region. This data may become available from weather stations and satellites.
Yield-related data	This type of dataset contains data about the yield of a crop. Historical yield-related data may be potentially used (together with data of other types) to proceed to yield estimations. This type of data has a temporal dimension.

5.1.7. Software applications

Type	Description
AI software	This type relates to software applications deploying Artificial Intelligence algorithms/models. As an example, we may refer to chatbots or Q&A tools the use of which allows the user to verbally pose queries (e.g., Amazon Alexa).
Business software	This type relates to software developed to support various business processes. As an example, we may refer to software applications used for storing and information about the customers of a business. This type of software is usually developed by software development vendors and made available through license purchase.
Data analysis software	Software applications used for performing various types of data analysis. WEKA is a well-known data analysis application.
Data repository/database	This software application type relates to systems used to store data/information of various types of importance to an organisation. SQL and NoSQL systems are two prominent paradigms of such applications.
Decision support tool	A Decision Support Tool or Decision Support System is an information system used with the aim to support decision-making processes. This type of software applications serve the management, operations and planning levels of an organisation and help people make decisions with regard to problems that may be rapidly changing and that cannot be easily specified in advance.
Educational/training software	Software applications that have been specifically developed for education and training purposes.
Farm Management Information System (FMIS)	The acronym FMIS stands for Farm Management Information System. A Farm Management Information System is a management information system designed to assist agricultural farmers to perform various tasks ranging

	from operational planning, implementation and documentation for assessment of performed field work.
Game	The term game is used here to refer to a video game developed with the aim to support training and educational purposes. This kind of educational/training video games are termed as serious games. The reason for not including this type into the educational/training software application category is because of their prominent role in educational/training contexts. A serious game is a game designed for a primary purpose other than pure entertainment.
Scientific software	This type includes software applications developed with the aim to support scientific purposes. As an example, we may refer to bioinformatics software.
Simulation	A simulation is a software application developed with aim to deliver an approximate imitation of the operation of a process or system that represents its operation over time.

5.2. Subject

5.2.1. Top-level subjects

Type	Description
Crop farming	The cultivation of plants for food, animal feed, or other commercial uses.
Livestock	The activity of raising domesticated animals in an agricultural setting to produce labour and commodities such as meat, eggs, milk, fur, leather, and wool.
Forestry	Managing and using trees, forests, and their associated resources for human benefit.
Environment	The natural environment encompasses all living and non-living things occurring naturally, meaning in this case not artificial.
Society	People in general thought of as living together in organized communities with shared laws, traditions, and values.
Economics	Economics focuses on the actions of human beings, based on assumptions that humans act with rational behaviour, seeking the most optimal level of benefit or utility. The building blocks of economics are the studies of labour and trade. Since there are many possible applications of human labour and many different ways to acquire resources, it is the task of economics to determine which methods yield the best results.

5.2.2. Second-level subjects

Type	Description
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Agroecology	Agroecology is a holistic and integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of sustainable agriculture and food systems.
AKIS	The term Agricultural Knowledge and Innovation Systems (AKIS) is used to describe the whole knowledge exchange system: the ways people and organisations interact within a country or a region. AKIS can include farming practice, businesses, authorities, research, etc. and can vary a lot, depending on the country or sector.
Animal husbandry and welfare	The branch of agriculture concerned with the production, management, and breeding of animals.
Aquaculture	Aquaculture is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants.
Biodiversity and nature management	Management and sustainable development of nature and conservation of diversity within species, between species and of ecosystems.
Biomass production	Production of the biodegradable fraction of products, waste and residues from biological origin - from agriculture (including vegetal and animal substances), forestry and aquaculture, as well as the biodegradable fraction of industrial and municipal waste.
Climate and climate change	Climate is the average weather in a given area over a longer period of time. A description of a climate includes information on, e.g. the average temperature in different seasons, rainfall, and sunshine. Also a description of the (chance of) extremes is often included. Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates.
Competitiveness	Competitiveness is the ability of the farm to compete and be successful.
Crop rotation/crop diversification	Crop rotation is growing a different crop on a given land area every growing/planting cycle and season . Crop diversification refers to the addition of new crops or cropping systems to agricultural production on a particular farm taking into account the different returns from value-added crops with complementary marketing opportunities.
Digitalisation	Use of technology to convert precise data into actionable knowledge to drive and support complex decision-making on-farm and along the value chain.

Energy management	All practices and measures applied for the efficient and responsible use of energy resources in agricultural production systems.
Farm diversification/new business models	Farm diversification refers to the trend towards gaining income from diverse activities (e.g. agri-tourism, processing of farm products).
Farm/forestry competitiveness and diversification	Improvement of the competitiveness of the agriculture and forestry sectors, as well as the quality of life in rural areas and encouragement of diversification of economic activities.
Farming equipment and machinery	All machines and tools that are used in the production, harvesting, transport and storage of farm products.
Fertilisation and nutrients management	Careful management, monitoring and amending of soil fertility to meet crops' needs and to maintain environmental quality.
Food quality/processing and nutrition	All aspects concerned with processing, preparing, preserving and distributing foods and beverages, their quality characteristics and nutritional value.
Genetic resource	Any genetic material of plant and animal origin of actual or potential value for food and agriculture.
Landscape/land management	Land management concerns all operations, practices and treatments used to protect the land and enhance the goods and services provided by the ecosystem that the land is part of.
Organic farming	Organic Agriculture is a production system that sustains the health of soils, ecosystems, and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects.
Plant production and horticulture	Plant production refers to the cultivation of plants for food, feed, fiber, medicinal and cosmetic purposes. Horticulture is defined as that branch of agriculture concerned with growing plants that are used by people for food, for medicinal purposes, and for aesthetic gratification.
Pest/disease control	Any measures, practices and strategies applied to prevent the appearance or spread of pests and diseases in plant production or to limit their impact on plant growth, crop yield and product quality.
Soil management/functionality	Management of soil by focusing on differences in soil types and soil characteristics to define specific interventions that are aimed to enhance the soil health and quality for the selected land use.

Supply chain, marketing and consumption	The full chain of activities and network among the actors for the preparation of a product or service starting from the raw material production till the marketing and consumption.
Waste, by-products and residues management	Managing waste in an environmentally sound manner and making use of the secondary materials they contain.