

EUREKA

European Knowledge Repository for Best Agricultural Practices



Join us in developing the EU Farmbook! A user manual for adding digital 'knowledge objects' to the online platform

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1 Introduction

1.1 A few words about the EUREKA project and its vision

Every year, numerous multi-actor projects (MAPs) run under the umbrella of European Research and Innovation funding. They generate valuable practical knowledge for farmers, foresters, advisors, and other practitioners but currently these outputs are spread out across a number of project websites in many different forms and often remain unknown and unused by potential end-users.

The EUREKA project (<u>https://h2020eureka.eu/</u>) brings together organizations from 15 European countries with a wide range of expertise related to the rural sector (SMEs, universities, NGOs, etc.). The goal of the project is to **test the feasibility** of making the increasing volume of practice-orientated knowledge generated by EU-funded research and innovation projects **available** to **farmers, foresters, advisors** and other **practitioners** via an **attractive, easy-to use, interactive, multi-lingual online EU-level digital platform**.

EUREKA has constructed a **pilot knowledge reservoir** which is called the 'EU FarmBook'. It is searchable and has multiple user-friendly features to help ensure the longer-term and wider use of the fantastic knowledge and innovative solutions generated by multi-actor projects. We now **need your support** to populate the digital platform with as much information (so-called 'knowledge objects') as possible to a) test its functionality and useability and b) start building the foundation of this extraordinary long-term knowledge resource.

Find out more about the EUREKA project by watching the <u>EUREKA introductory video</u> and by following us on <u>YouTube</u> and <u>Twitter</u>.

1.2 What is this user manual for?

This user manual explains in clear and concrete terms how to upload digital files ("Knowledge Objects") to the pilot version of the EU FarmBook.

"A **Knowledge Object** contains useful, practical information about best and innovative practices in agriculture."

1.3 Who is this user manual for?

This manual is primarily intended for the partner organisations actively involved in Horizon 2020 multiactor projects (already completed or still in progress) who are in a position to share the publicly-available digital outputs of their projects. At the same time, this does not exclude other EU-funded initiatives that are generating or collecting practice-orientated digital material (e.g. within the day-to-day work of the National Rural Networks or EIP AGRI) from also contributing to the pilot EU FarmBook.

Please note that this user manual **does not** address the potential for connecting existing databases or knowledge platforms (e.g. those under development in some Member States) to the 'EU FarmBook'. For further guidance on this issue please contact the project coordinator, Prof. Pieter Spanoghe, at pieter.spanoghe@ugent.be.



How to read this user manual?

You can use this manual if you are a digital technology novice, an expert user or anything in between! We want to ensure that everyone is able to make their material available through the 'EU FarmBook'.

We recommend continuing the reading of the manual from Section 2 and Annex-I to learn about the **FAIR data principles**, and why they are important in an open collaborative scientific community.

Section 2 also explains the categories of digital material that can be shared through the 'FarmBook'.

Section 3 provides details about **how to upload your digital material** to the FarmBook. The Annex-III to V provides some additional information.

2 Sharing agricultural knowledge

2.1 Why sharing material about agricultural best practices?

Farmers have always shared and compared knowledge about the best available agricultural practices. The EU Farmbook makes this more possible in a digital age. Researchers have discovered that the more research outputs they share – whether publications, presentations, videos, data sets or anything else – the more their research is appreciated, and the more impact it has. Everyone benefits!

In recent years, there has been a big movement for "Open Science" and the "multi-actor approach" and this is very much supported by the European Commission and all research institutions. The FAIR data principles are a practical side of this movement, whilst the multi-actor approach specifically encourages the co-creation of knowledge and innovation by connecting researchers and practitioners (e.g. farmers, foresters and their advisors) much more closely in projects that address the real needs that exist in practice.

2.2 Metadata – what is it?

The FAIR principles depend on the use of **metadata**. Metadata is information *about* a knowledge object like publication, presentation, data set, and so on (for more details about knowledge object, see section 2.4 and Annex-III). So, the *author* of an article is a piece of metadata (data about data). The date of publication is a piece of metadata. It is important that metadata is easily read by machines (computers) so as to be able to index knowledge objects, help people find them, or collect them into groups. So, metadata is usually **formally** represented in a structured way for example as here:

Title: A paper about the Farmbook

Author: Christopher Brewster

Date of publication: 2021

URI: https://www.somewhereontheinternet.com/paper

Figure 1: Structure of basic metadata

To better understand what this information is about and what it can help with, consider the case of a book. The *title of the book*, the *name of the author*(*s*), the *name of the publisher* and the *year in which the book was published* are metadata for the book (in other words, additional information describing the book).

The users of the EU FarmBook do not need to completely understand metadata, but they will use it all the time. People who add items ("Knowledge Objects") to the FarmBook need to have some metadata ready at hand (e.g. the author of a document) so as to fill in the form which capture the relevant metadata.

The way in which metadata (the additional information for a "Knowledge Object") will be supplied through the form is explained in **Section 3**.



Figure 2: Practical information of what "metadata" is about

2.3 Explaining the FAIR principles

The acronym FAIR¹ stands for **Findable**, **Accessible**, **Interoperable**, and **Reusable**. Put (very) simply this means²:

- Findable: Make sure a knowledge object can be found and found again.
- Accessible: Make sure a knowledge object can be accessed (for example by downloading it) and that access is given to the appropriate person or system.
- **Interoperable** (more relevant for data but not only): Make sure that the knowledge object is represented or annotated in a way that allows it to be combined with other Knowledge Objects or data sets.

² <u>https://www.force11.org/group/fairgroup/fairprinciples</u>



¹ Wilkinson, et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Scientific Data, 3, 160018. https://doi.org/10.1038/sdata.2016.18

• **Reusable**: Make sure the Knowledge Object has suitable metadata explaining who by and how the Knowledge Object can be used (for example whether commercial use is permitted).

Because the FAIR data principles apply both to the Knowledge Objects themselves, as well as the metadata about the Knowledge Objects, this means that it is a good practice to use standard vocabularies ("ontologies") to describe the Knowledge Object or data set, refer to a standardised license regarding reuse, as well as to keep the metadata available (ideally in a permanent way) even if the Knowledge Object is no longer available.

It must be stressed that the FAIR data principles are not mandatory, rather they are a set of principles the scientific community is aspiring to put into practice to facilitate knowledge exchange. Also, the principles are not an obligation to make everything freely or openly available; it is rather a good practice to describe Knowledge Objects systematically.

More details about FAIR data shared in the Annex-I.

2.4 What is a Knowledge Object?

This document is a **step-by-step guide for submitting digital material** to the pilot EU FarmBook to make it available to other people interested in agricultural best practices. In the FarmBook, we refer to this digital material as "Knowledge Objects". A **Knowledge Object** contains useful, practical information about best and innovative practices in agriculture. As shown in Figure 3, there are several categories of Knowledge Objects and a detailed list of examples shared in the Annex.





2.5 Preferred formats of Knowledge Objects

As highlighted earlier, there are various categories of Knowledge Object (e.g., documents, spreadsheets, slideshows/presentations, videos, podcasts, images, software applications, and datasets. Each Knowledge Objects could available in various formats.

In this section, we provide a list of **preferred file formats** for the Knowledge Objects. These file formats have been selected having in mind **what is the most popular software** for accessing the content of the Knowledge Objects (remember the *Accessible* principle).

To better understand what we mean with the term **format**, you may take a look at the **Information Highlight box** on the side, and the example provided in Figure 4 below.



A **file format** is the way in which information is encoded in order to be made available as a computer file.

There are many different types of file formats, which depend on the information provided with the help of a computer file.

We also distinguish between file formats for proprietary software (i.e., software that the user needs to pay for) and file formats for free-touse software.



Figure 4: An example of the format of a digital file that is a document

Figure 5 shows some well-known and widely-used file formats.



Figure 5: Examples of well-known and widely-used file formats for documents, spreadsheets, and presentations



The EUREKA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No: 862790

The **preferred** Knowledge Object **formats** for submitting Knowledge Objects to the EU FarmBook are listed in Table 1.

"Knowledge Object" type	Recommended formats	Acceptable formats
Textual data	.rtf, .txt, xml	.html, .doc/.docx
Tabular datasets	.por, .csv, .tab	.sav, .dta , xls/.xlsx, .mdb/.accdb,
		.dbf, .ods
Image data	.tif	.jpeg, .jpg, .jp2, .gif, .tiff, .raw,
		.psd, .bmp, .png, .pdf
Presentation	.ppsx	.pptx, .pdf
Audio data	.flac	.mp3, .aif, .wav
Video data	.mp4, .ogv, .ogg, .mj2	.avchd
Geospatial data (vector and raster	.shp, .shx, .dbf, .prj, .sbx, .sbn, .tif,	.mdb, .mif, .kml, .ai, .dxf or .svg
data)	.tfw, .dwg, .gml	
Documentation and scripts	.rtf, .pdf, .xhtml, .htm, .odt	.txt, .doc/.docx, MS Excel
		.xls/.xlsx, .xml

Table 1: Examples of file formats for "Knowledge Objects"

3 Getting Started

Before uploading a Knowledge Object to the FarmBook we need to provide some additional information about it (this is the **metadata** as **file formats** mentioned earlier). This information will help other people **search** and **find** the Knowledge Objects they are interested in, and consequently will help promote your own work to others. To do so, a **step-by-step example** is provided in the next section and more details about each sub-section of the FarmBook web upload form shared in the **appendix-III.**

3.1 The EU FarmBook

The pilot EU FarmBook has been created to help achieve the main goal of EUREKA – to test the feasibility of ensuring that the **outcomes of the EU-funded multi-actor projects** will continue to exist after the end of the projects. The primary focus of the pilot FarmBook is upon multi-actor projects funded under Horizon 2020 – whether already completed or on-going. If the pilot FarmBook proves to be a success then it will be developed further under the 2021-2027 Horizon Europe research and innovation programme.

The EUREKA project has built the pilot EU FarmBook to not only allow **the searching for and finding of material**, but **also the uploading** digital content.

This manual is about the uploading of content, but firstly it's important to understand a little more about how the FarmBook works. The first page of the "FarmBook" is shown in Figure 6.



Figure 6: The first page of the EU FarmBook

3.2 An example of submitting a Knowledge Object to the EU FarmBook

In this final section, we provide a concrete and complete example of the information (the metadata) that need to be provided to submit a document to the EU FarmBook platform (and make it available through it).

The document is a **factsheet** developed in the AFINET³ Thematic Network. This document is shown in Figure 7 below.

³ You may find out more about AFINET by clicking on this link.



Given that our Knowledge Object is a document, this is the Knowledge Object category (i.e., "Document") that we need to select from the dropdown list shown in Figure 8 below.

The title of the document (as it appears on the first page) is:

"PRODUCTIVE USE OF THE TREE ROW UNDERSTOREY"

By following the title tag on data upload web form, the document title should be typed (in the respective field of the FarmBook form) as follows: "**Productive Use of the Tree Row Understorey**".

Figure 9 shows exactly how the document title should be typed into the respective field of the FarmBook form.

Apart from the title, providing a **short textual description** of what the content of the document is about (a summary of the document's content) will allow for a quick overview.

This summary is the following (just an example): "This document is a factsheet created in the context of the AFINET project that gives information about opportunities for crop diversification."



Figure 7: An example of a document to be submitted to the FarmBook platform

The way of typing this short summary into the respective field of the form is shown in Figure 10.

Category & Type

The category that best fits the type of the supplied knowledge object



Category & Type

The category that best fits the type of the supplied knowledge object

select an option	-
✓ Document	
Slideshow/Presentation	-
Video	
Podcast	
Image	
Software Application	
Dataset	

Please provide a value for this field

Figure 8: Selecting the category of our example Knowledge Object from the respective dropdown list

PRODUCTIVE USE OF THE TREE ROW UNDERSTOREY

The title of the knowledge object

Figure 9: Typing the title of the example Knowledge Object in the respective filed of the EU FarmBook form by following the naming guidelines described in Subsection 3.3.

DESCRIPTION*

This document is a factsheet created in the context of the AFINET project.

A short (500 character or around 100 words) summary of the knowledge object.

Figure 10: Typing the description of the example Knowledge Object in the respective filed of the FarmBook form

The document is also available in the Zenodo digital repository, which means that there is already a DOI assigned to it. The DOI of the factsheet is "**10.5281/zenodo.3585495**" and the way to provide (as a piece of metadata) to the submission form of the FarmBook is shown in Figure 11 below.



the URL to the knowledge object

Figure 11: Providing the DOI of the example Knowledge Object in the respective field of the submission form of the EU FarmBook

The document has been created in AFINET. The full **name** of the project is "**Agroforestry Innovation Networks**" and **AFINET** is the **acronym** used for reasons of simplicity. The **link** to this project's website is <u>https://agroforestrynet.eu/afinet/</u>. These are the final pieces of information needed to be provided as part of the process of submitting the Knowledge Object to the FarmBook. The way to make this information available is illustrated in Figures 12, 13, and 14 respectively.



ROJECT NAME*

Agroforestry Innovation Networks

The project under which the knowledge object was created

Figure 12: Typing the full name of the source project into the respective field of the EU FarmBook platform

PROJECT ACRONYM* AFINET

The acronym of the project under which the knowledge object was created

Figure 13: Typing the acronym of the source project into the respective field of the FarmBook platform



The main URL of the project under which the knowledge object was created

Figure 14: Typing the link to the source project's website into the respective field of the FarmBook platform

As we have already explained earlier the type of knowledge object, next to that the selecting and providing **sub-type** of knowledge object (see, Figures 15).

e	
ion	~

Document Type	
Brochure	
 ✓ select an option Article in conference proceedings Book Booklet 	· • • • -
Brochure Chapter in edited volume Deliverable report Factsheet	+ ADD ITEM

Figure 15: Selecting the type of the "Knowledge Object"

The keywords associated to this document (to be provided as input) are "diversification", "silvoarable", "tree row", "crops", and "understorey". The way to provide them, by considering the guidelines described in Annex-III and is shown in Figure 16.



Keywords

Please provide a list of keywords indicative of the content of the object

diversification		
silvoarable		
tree row		
crops		
understorey		

Figure 16: Typing the keywords associated with the "Knowledge Object" into the respective field of the form by following the guidelines presented in Subsection 3.3

The name of the **creator** of the Knowledge Object is **Maria Rosa Mosquera-Losada** and the **language** in which its content becomes available is **English**. The supply of these pieces of information in the FarmBook submission form is shown in Figures 17 and Figure 18 respectively.

Rosa Mosquera-Losada

Figure 17: Typing the name of the "Knowledge Object" creator into the respective field of the form

Languages

Please provide the language(s) in which the knowledge object is available. In case translations of the object are seperate files or pages, please handle each translation as it's own object.

English	~ [
	+ ADD ITEM

Figure 18: Selecting the language in which the content of our example "Knowledge Object" is available

The next thing to do is to provide the **license** type under which the Knowledge Object has become available. This license type makes explicit the way(s) in which the Knowledge Object can (and needs to) be (re-)used by any interested parties. In the case of our example Knowledge Object, the license under which it is made available is "<u>CC BY 4.0</u>". We may "inform the system" about this specific license type by making the appropriate selection form the respective dropdown list (or by directly typing in the link to the respective license description) as shown in Figure 19.

License		
CC BY		~

Figure 19: Providing the license type under which the "Knowledge Object" is made available from its source

Selecting and providing as input the **type**, and the **intended purpose** of the document is what comes next. The document is of the type "**factsheet**". The purpose of the document's creation is "**communication**". Providing this information by making use of the FarmBook form is done in the way shown in Figures 18 and 20 below.



License	
CC BY	~
Communication	~

Figure 20: Selecting the potential action that the Knowledge Object" may be used for

The document was **created** on the **1**st **of March**, **2018** (**01/03/2018**). The **link to the source** from which the document has been retrieved is "<u>https://euraf.isa.utl.pt/files/pub/20190529 factsheet 14_en_web.pdf</u>". The way to provide these pieces of information about the specific Knowledge Object is shown in Figures 21 and 22 respectively.

Completion Date

Liconce

I only know the year of completion	~
YEAR OF COMPLETION* 2018	

Figure 21: Providing the date of creation of the "Knowledge Object "_Year

Completion Date

I have the exact date available		
	~	

Day of Completion

The day on which work on the knowledge object was completed



Figure 22: Providing the date of creation of the "Knowledge Object"_Date

Our Knowledge Object describes solutions related to crop diversification, which have been tested in **Spain** and **Portugal** (as made evident from the descriptions provided in the document). So, the names of these two countries should be selected from the dropdown list as the input needed to be provided in the "**Geographic Location**" field. The way to do this is illustrated in Figure 23.

Geographical Location(s)

Please select all countries referenced in the knowledge object's contents.

Spain	~	↑ ↓ −
Portugal	~	↑ ↓ −
		+ ADD ITEM

Figure 23: Selecting the countries mentioned in the document as the geographic locations where the provided solutions have been tested

The last step before uploading our Knowledge Object in the EU FarmBook platform is to define its subject. Assigning subjects to our Knowledge Object is a process that takes place in two steps as shown in Figure 24. In the case of our example, the subjects that can be assigned to the Knowledge Object at Step 1 ("High Level Subjects") are "Forestry" and "Environment" (more than one subjects can be provided). The subject to be assigned at Step 2 ("Specific Subjects") is "Farming/forestry competitiveness". To provide input regarding the Knowledge Object's subjects (and let the system "know" what our Knowledge Object is about), we just need to make the appropriate selections from the respective dropdown lists provided in the EUREKA upload form.



High Level Subjects

Please select the most appropriate high level subjects.

forestry	~	[↑]↓]−]
environment	~	^_↓
		+ ADD ITEM

Specific Subjects

Please select the most appropriate specific subjects.



Figure 24: Selecting the subjects being addressed in the Knowledge Object

Annex-III provides additional information about each step of the upload process on the EU FarmBook that you need to provide together with each of your Knowledge Objects.

Annex-I: FAIR Guiding Principles for data management

As explained in earlier section, the acronym FAIR⁴ stands for Findable, Accessible, Interoperable, and Reusable. Put (very) simply this means⁵:

- Findable: Make sure a knowledge object can be found and found again.
- Accessible: Make sure a knowledge object can be accessed (for example by downloading it) and • that access is given to the appropriate person or system.
- Interoperable (more relevant for data but not only): Make sure that the knowledge object is represented or annotated in a way that allows it to be combined with other Knowledge Objects or data sets.
- Reusable: Make sure the Knowledge Object has suitable metadata explaining who by and how the Knowledge Object can be used (for example whether commercial use is permitted).

indability: Data outputs should be discovered by both humans and machines, for instance by

being referenced with unique persistent identifiers (e.g., digital object identifiers (DOIs) and

and Uniform Resource Identifiers(URIs)) and by being added meaningful, machine-actionable metadata and keywords to search engines and research data catalogues.

In order to make a knowledge object findable, there are two important aspects:

1. Providing in the metadata suitable keywords or linking with appropriate items in a taxonomy. This makes the knowledge object findable by search engines, or users can browse a taxonomy to find items of interest. Figure 25 shows a metadata example for a book and an article.

⁵ https://www.force11.org/group/fairgroup/fairprinciples



⁴ Wilkinson, et al. (2016). The FAIR Guiding Principles for scientific data management and stewardship. Scientific Data, 3, 160018. https://doi.org/10.1038/sdata.2016.18

Book

Article



Figure 25: Metadata example for book and article

 Providing the knowledge object with a unique identifier (for example a DOI – digital object identifier - for an academic paper, or a URL - web address – for a video). This makes it possible both for humans and machines to *find again* the knowledge object when needed. Figure 26 shows examples of a DOI from different platforms.



Figure 26: Example of a DOI from the Zenodo digital repository and Elsevier

A user of the EU FarmBook who is submitting a new Knowledge Object will either have a DOI available from a journal or other third party, or the FarmBook will generate one automatically (if none is provided).



Accessibility: Accessibility refers to making sure that the Knowledge Object is available, for

example in a digital repository and that this is accessible by machines over the internet (if appropriate with suitable access control).

In order to make a knowledge object accessible, there are three important aspects:

- 1. The knowledge object should be made available in a digital repository that is accessible by humans and machines (i.e., computers) following a standard protocol. For example, one can access a publication on a journal's website in a standardised way.
- 2. If needed, "access control" can be provided to limit access to only authorised people or machines. For example, to access some journals, a subscription is needed, or the credentials of the university that holds a subscription to the journal.
- 3. Ideally, metadata about the Knowledge Object should be freely available (even if the access to the Knowledge Object itself is restricted for some reason).

Accessibility does not mean that **anyone** can have access to the data or the Knowledge Objects (i.e., it is not an obligation for entirely open data). This principle actually recommends that the metadata about the Knowledge Object should be freely accessible.

nteroperability: The extent to which knowledge objects can be exchanged, (re-)used, and

interpreted across a wide range of application and systems. This is only possible when **metadata**, **standards**, **taxonomies**, **ontologies**, and standard **file formats** are used to describe knowledge objects so that the knowledge objects can be interpreted by third parties.

- File formats should be the ones widely used by the community. This usually means, for example, "pdf" file formats for documents, "ppt/pptx" for presentations, a few standard video file formats, etc. There are more issues with data. Ideally, data should be available in a format that is easy to reuse but also explicit as to what the data means. Here, xml, rdf-compatible file formats (e.g., "ttl") would be preferable, but "csv" (which is less helpful) the most common format.
- 2. Metadata about the Knowledge Object or the data set should follow common standards used by the community. This means, using a commonly used taxonomy or vocabulary (often referred to as ontology) in a standard format. An example would be the AGROVOC ontology from FAO, and a standard format might be XML RDF. Interoperability of metadata is not something that the EU FarmBook user needs to worry about since it is handled internally by the system.

Reusability: Archived Knowledge Objects should be made available using standard technical

procedures like user licensing and metadata. This does not necessarily mean that the Knowledge Objects should be openly available to everyone, but rather that information about how the Knowledge Object could (and should) be (re-)used (or not) has to be made available.

Reusability brings together the three preceding principles because the fundamental purpose of the FAIR principles is to make Knowledge Objects reusable. The important aspects of this principle are:

 Reuse license: Make clear the conditions the Knowledge Object is reusable; for instance: for academic research, for teaching, for commercial purposes, etc. You can assign a suitable license to make this clear and explicit. For this reason, there are various types of licenses available in the Creative Commons framework (Figure 27).

MOST FREE		LI	CENSES
	•	ATTRIBUTION CC BY	This license lets you distribute, remix, tweak, and build upon the original work, even commercially, as long as you credit the original creation. This is the most accommodating of licenses offered.
	AA	ATTRIBUTION-SH	IAREALIKE
		CC BY-SA	This license lets you remix, tweak, and build upon the original work even for commercial purposes, as long as you credit the original work and license your new creations under the identical terms. This license is often compared to "copyleft" free and open source software licenses. All new works based on the work should carry the same license, so any derivatives will also allow commercial use. This is the license used by Wikipedia.
		ATTRIBUTION-NO	DERIVS
	WG	CC BY-ND	This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to the original work.
		ATTRIBUTION-NO	DNCOMMERCIAL
	U S	CC BY-NC	This license lets you remix, tweak, and build upon the original work non-commercially. Your new works must be non-commercial and acknowledge the original work, but you don't have to license your derivative works on the same terms.
		ATTRIBUTION-NO	DNCOMMERCIAL-SHAREALIKE
		CC BY-NC-SA	This license lets you remix, tweak, and build upon the original work non-commercially, as long as you credit the original work and license your new creations under the identical terms.
		ATTRIBUTION-NO	DNCOMMERCIAL-NODERIVS
LEAST FREE		CC BY-NC-ND	This license is the most restrictive of the six main licenses, only allowing you to download the original work and share it with others as long as you credit the original work. You can't change the original work in any way or use it commercially.

Figure 27: The types of licenses available in the Creative Commons framework (source: <u>https://foter.com/blog/how-to-attribute-creative-commons-photos/</u>)

Figure 28 shows an example of using licenses for Knowledge Objects in practice.



zenodo 🛯	earch Q Uploa			DLog in 🕼 Sign up
May 13, 2021		Video/Audio	Open Access	6 0
Predicting Phe Genomic and E Learning and K	notype from Multi Invironment Data Inowledge Graphs	-Scale using Mac	hine	e views ▲ downloads See more details
o Thessen, Anne, 💿 Bartelme, Ryan; Guo, Jessica; 🙆 Heidorn, P Bryan; 🗿 Debasmita; Riemer, Kristina; Ross, Aru	Brumar, Carnelia; 🙆 Chang, Remco; 🧿 Conlin, iaiswal, Pankaj; 🎱 LeBauer, David; Lisle, Curti: n; 🧿 Swetnam, Tyson	, Tom; 😥 Cooper, Laurel; De s; 🕑 Munoz-Torres, Monica	ebnath, ishita; i; Pal, Indexed	in
This lightning talk will describe the Ger predicting phenotypes using data abo	noPhenoEnvo project and discuss our data so ut environments, genes, and genomes.	cience needs and developm	ients for	DpenAIRE
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md5:b32a548b7a29ea9b8f4182b48ff3eed	Ð		DOI: DOI	10.5281/zenodo.4757458
Citations @ (1)			v gene Meetin	rd(s): phenotype machine learning crop g:
Show only: Literature (0)	Dataset (0) 🗌 Software (0) 🗍 Unknown (0)	Search	Q Eood	od Security in Extreme Environments and Deserts 19-21 May 2021
Citations to this v	ersion		Licens	e (for files): eative Commons Attribution 4.0 International
	No citations.			
HARVARD Dataverse Natural Clima	ate Solutions for	Add Data -	Search - About	User Guide Suppor Sign Up Log In
Drever, C. Roni Dataverse, V1,	nie, 2021, "Natural Climate Solutions for Can UNF:6:MR8oFrh3KnHL4W3XYy2KzA== [filet	ada*, https://doi.org/10.79 UNF]	10/DVN/4S6SZU, Harvard	Access Dataset - Contact Owner Share
Cite Dataset ~	Learn about Data Citation Standard	ds.		Dataset Metrics 🖗 0 Downloads 📀
Description Subject Keyword Related Publication	This dataset includes data assets associated Canada, Science Advances. Data users sho associated with the publication. Earth and Environmental Sciences; Social St carbon, climate mitigation, nature-based sol Drever et al. 2021 Natural Climate Solutions	d with Drever et al. 2021 Na uld also reference the Supp ciences; Agricultural Scienc utions, AFOLU for Canada. Science Adva	atural Climate Solutions for olementary Materials ces nces	eative License
Files Metadata Terms	Versions			
Terms of Use				
Waiver 😡	Our Community Norms as we charles above, generated by the CC0 - "Public Domain Dedicat	Il as good scientific practic te Datamente tion"	es expect that proper credit	is given via citation. Please use the data

Figure 28: An example of user license attribution from the Zenodo digital repository and Harvard Dataverse. The license type used is <u>CC BY 4.0.</u>

2. Make clear the provenance of the Knowledge Object; i.e., where it comes from and (if relevant) how, and for what purpose, it has been created for. So, for a Knowledge Object available in the EU FarmBook the provenance of the Knowledge Object can be made explicit with the help of information (i.e., metadata) about the project in which it has been created (e.g., the project's full name, acronym, and URL), the date of its creation, and the purpose it has been created for.

Annex-II: Types of Knowledge Objects

There are different types of "Knowledge Objects" depending on the category they belong to (namely, "Documents", "Spreadsheets", "Slideshows/presentations", "Videos", "Podcasts", "Images/figures", "Software applications", and "Datasets").

Documents

Type of Document	Description
Article in conference	A research paper presented in a conference by one (or more) of its
proceedings	authors; after the conference end, the paper is published in the
	proceedings of the conference (i.e., an edited volume with all the papers
	presented in the conference).
Book	A digital version of a book.
Booklet	A digital version of 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
	chanter in an edited volume is provided here
	indpter in an earted volume is provided <u>incre</u> .
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 aimed 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.
lournal articlo	A piece of writing documenting the process and results of a research
Journal article	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)
	significant stage of 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 organization.
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
	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 <u>here</u> .
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 accounts 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	This is usually a document presenting a technical tonic and typically the
article	article drills down into some low-level of detail.

Technical	A document presenting a list of technical information about a product or
information/specificatio	service by having the layout of a "card".
ns card	
Tutorial	A document showcasing how to use a product or service in a series of
	steps.

Spreadsheets

Type of spreadsheet	Description
Analysis model	A spreadsheet-based application where a small set of data is calculated
	from a large set of data, often exported from some other system.
Business process	A spreadsheet used to support a specific kind of a business process.
Calculator	Spreadsheets developed and used for the purpose of performing some
	sort of calculations.
Decision support tool	A Decision Support Tool or Decision Support System is an application used
	to support decision-making processes. This type of software applications
	serves the management, operations and planning levels of an organization
	and help people make decisions about problems that may rapidly change
	and that cannot be easily specified in advance.
Projection model	A spreadsheet-based application used to generate a large volume of data
	from a relatively small set of input parameters. An example case is a
	financial projection based on a set of assumptions.
Small database	Spreadsheet-based applications developed and used to simulate the
	operations of a database system. Such spreadsheet applications are used
	to collect and enable access to data (e.g., contact lists) in a tabular form.

Slideshows/presentations

Type of	Description	
Slideshow/presentation		
Educational/training	A presentation developed and used for educational/training purposes in	
presentation	an educational/training event/session.	
Guide	A type of presentation providing information and/or instructions to help a person understand or do 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.
Tutorial (similar to guide)	A presentation type providing practical information about a specific
	subject.
Motivational	A presentation aiming to provide its audience with the incentive to do
presentation	something specific (e.g. make a decision, take an action, etc.).
Decision-making	A presentation developed and used with the aim to facilitate decision-
presentation	making purposes. In this case, however, decision-making is facilitated by
	the display and analysis of facts/data/results does not draw on the
	emotional factor as in the case of motivational presentations.
Problem-solving	A presentation created and used with the aim to provide help on how to
presentation	solve a problem.

Videos

Type of video	Description
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).
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.
Event capturing video	A video recording of an event. As an example, we may refer to the video recording of the consortium meeting of a project (for instance, the video available at https://www.youtube.com/=EURAKNOSProject).
Tutorial/how-to video	A video showing how to use or do something in a series of easy stages.

Presentation/live talk	A video recording of a discussion of two or more people (for instance, the		
capturing video	video available at <u>https://</u>		
	www.youtube.com/watch?v=uqeqnE7CLr8&ab_channel=OxfordUnion).		
Interview video	A video recording of an interview event (for instance, the video available		
	at <u>https://www.youtube.com/</u>).		
Product/feature review	A video presenting the basic features of an object/product/device (for		
video	instance, the video available at		
	https://www.youtube.com/watch?v=OoY7zp8GkLI&ab_channel=Marque		
	<u>sBrownlee</u>).		
Documentary video	A video presenting facts and information about a subject. For instance, a		
	documentary video on animal communication (e.g., the video available at		
	https://www.youtube.com/=Best Documentary).		
Testimonial	A video presenting a person's statement extolling the virtue of a		
	product/service or something else (for instance, the video available at		
	https://www.youtube.com/=EpicProductions%2CLLC).		
Question-and-answer	A video where a person responds to a number of questions posed by a live		
video	audience or being made available in another way (for instance, the video		
	available at https://www.youtube.com/=WIRED).		
Case study	A video providing detailed information about the development of a		
	person, group, or thing, especially in order to show general principles (for		
	instance, the video available at <u>https://www.youtube.com/</u>		
	<u>=NurtureDigital</u>).		
Simulation video	A video presenting a model of a real activity or phenomenon, created for		
	training purposes or to solve a problem (for instance, the video available		
	at https://www.youtube.com/=AnselmoLaManna).		
Educational/training	video that has been developed for educational/training purposes (for		
νιαεο	Instance, the video available at		
	https://www.youtube.com/watch?v=dCOojwkWO8c&ab_channel=BlueS		
1			

Podcasts

Type of podcasts Description



Educational/training	A podcast that has been developed and used for educational/training
podcast	purposes in the context of an educational/training event/session.
Event capturing podcast	A podcast created with the aim to record an event. It is an audio
	documentary of this event.
Interview	This type of podcast aims to provide the recorded interview of some
	person.
Solo podcast	This is a common type of podcast and it is often used by people who have
	expertise in a certain area and want to share with an audience.
Tutorial/guide	A podcast providing instructions on how to use a product, or undertake a
	process, in a series of easy stages.
	A
Commentary	A podcast containing opinions or explanations of an event or situation.
Panel discussion	A nodeast recording neanly gathered together to discuss a tonic in the
Functuiscussion	presence of an audience Panels often include a moderator who
	coordinates the discussion and sometimes elicits audience questions, with
	the goal of being informative and entertaining.
Question-and-answer	A podcast used to record the responses of an expert to the questions asked
podcast	by another person who is in charge of the Q&A session.
On-demand seminar	A 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.
Audio magazine	A podcast that incorporates a range of different thematic units as a
	magazine does.

Images/figures

Type of image/figure		Description	
Chart/graph	A chart is a sheet providing information in tabular form. Chart		
	examples are available <u>here</u> .		
	•	A graph is a diagram (for instance, a series of one or more points, lines,	
		line segments, curves, or areas) showing the way a variable change in	

	comparison to one or more other variables. Graph examples are available <u>here</u> .	
Static figure/image	A display of information through various illustration means (for instance, colours, lines, borders, arrows, photographs) that does not employ any	
	motion-related aspects. Examples are available <u>here</u> .	
Interactive figure/image	A figure or image that makes use of motion-related aspects. An example	
	of interactive figures/images are the <u>animated gifs</u> .	
Infographic	A collection of imagery, charts, and minimal text providing an easy-to-	
	understand overview of a topic. Infographic examples are available <u>here</u> .	
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 <u>here</u> .	
Interactive map	Interactive map examples are available <u>here</u> .	

Software applications

Type of software	Description	
application		
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 processing information about business customers. This type of	
	software is usually developed by software development vendors and made	
	available via a license purchase.	
Data	This software application type relates to systems used to store	
repository/database	data/information of various types of importance to an organization.	
Data analysis software	Software applications used for performing various types of data analysis.	
	WEKA is a well-known data analysis application.	
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 serves the management, operations and planning	
	levels of an organisation and helps people make decisions with regard to	



	problems that may be rapidly changing and that cannot be easily specified	
	in advance.	
Educational/training	Software applications that have been specifically developed for education	
software	and training purposes.	
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.	

Datasets

Type of datasets	Explanation
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. An example of a Knowledge Graph can be
	found here.

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 utilized 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 vield estimations. This type of data has a temporal
	dimension.
	1



Annex-III: Additional information on each sub-section of EU FarmBook data upload form

In this section we are going to present, in a step-by-step manner, all the additional information that you need to provide together with each of your Knowledge Objects to have them stored and shared through the EU FarmBook.

Category

The supply of the information that needs to accompany a Knowledge Object starts by providing the category it belongs to. The available categories are: "Document", "Spreadsheet", "Slideshow/ presentation", "Video", "Image/figure", "Podcast", "Software Application", and "Dataset".

You can select the category for your Knowledge Object by making the appropriate selection from the dropdown list that appears when clicking in the field with the label "Category" (see Figure 29).

Step I:

Category & Type

The category that best fits the type of the supplied knowledge object



Figure 29: The field of the "FarmBook" form for providing the category of the Knowledge Object

Title

The second piece of information that you need to provide for the Knowledge Object you wish to submit to the EU FarmBook is its title. The title of the Knowledge Object may include one or more words (see Figure 30).

TITLE*	
Please provide a value for this field	Type the title of the knowledge Object
Step II:	
TITI E*	

The title of the knowledge object

Figure 30: The field of the EU FarmBook form for typing in the title of the Knowledge Object

Description

After the title of the Knowledge Object, you may proceed by providing a short textual description of the Knowledge Object. It is the summary of the content of the Knowledge Object. The idea is to help the users of the FarmBook get a quick idea of what your Knowledge Object is about. For example, the description for this user manual would be *"This user manual explains how to upload digital files ("Knowledge Objects") to the current version of the EU FarmBook"*.

The description will be provided, from your side, in the form of plain text. It should consist of a one sentence description (maximum 20 words, 100 characters).

Figure 31 below shows the field in the form for typing in the description of the Knowledge Object.



A short (500 character or around 100 words) summary of the knowledge object.

Figure 31: The field of the EU FarmBook form for typing in the description of the Knowledge Object



Keywords

Keywords are a very important piece of information to provide for a Knowledge Object. They are an essential part of making the FAIR principles work. Every time we find ourselves in the position of searching for information on the web, we do so by typing one or more keywords in a search engine.

The keywords to provide for your Knowledge Objects should be selected to be indicative of what the Knowledge Object is about. There is no maximum number of keywords to provide. However, we consider that seven (7) keywords per Knowledge Object at most will be sufficient. To provide the keywords, you should type each of them (in the respective form field) by not using capital letters at all unless the word is the name of a person, organisation, or place. After having typed a keyword, make sure to use the semicolon symbol (";") to separate one keyword from the other. Keywords may overlap with words in the description but should refer to the **content** of the knowledge object.

Figure 32 below shows the field in the form for typing in the keywords needed to be attached to the Knowledge Object.

Key	/words
Plea	se provide a list of keywords indicative of the content of the object
	+ ADD ITEM
	Click on add item add keywords
Ste	p II:
Kar	
кеу	Words
Pleas	e provide a list of keywords indicative of the content of the object
Pleas	e provide a list of keywords indicative of the content of the object
Pleas	e provide a list of keywords indicative of the content of the object User Manual
Pleas	e provide a list of keywords indicative of the content of the object User Manual
Pleas	e provide a list of keywords indicative of the content of the object User Manual
Pleas	e provide a list of keywords indicative of the content of the object User Manual
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Pleas	e provide a list of keywords indicative of the content of the object User Manual EU FarmBook
Pleas	e provide a list of keywords indicative of the content of the object User Manual EU FarmBook
	e provide a list of keywords indicative of the content of the object User Manual EU FarmBook



Creator(s)

Each Knowledge Object has been created by one or more individuals; namely, the creators of the Knowledge Object. In the field of the form shown in Figure 33, you should provide the name(s) of the

Knowledge Object creator(s). These are typically the "authors" but may also include other people in more complex knowledge objects (e.g., a video or a laboratory data set).

An individual usually has a first, last, and sometimes one, or more, middle names. Each part of the name should be provided with its first letter being capital. In the case of more than one Knowledge Object creator(s), make sure to use the semi-colon (";") character to separate one creator name from the other.

Step	l:	
Creat	ors	
Provide 1	he name(s) of the creator(s) of the object	
	+ ADD ITER	М
Step	II:	Click on add item and add the name of the creator(s)
Crec Provid	ators the name(s) of the creator(s) of the object	
	Christopher Brewster	Θ
	Hercules Panoutsopoulos	8

Figure 33: The field of the "FarmBook" form for typing in the name(s) of the Knowledge Object creator(s)

Language(s)

The field of the form shown in Figure 34 allows you to provide the language(s) in which the content of the Knowledge Object is available. You will be able to choose a language by making use of the dropdown list. In rare cases (e.g., a video with subtitles) more than one language is needed, in which case you can select more than one language options from the dropdown list and if a Knowledge Object is available in more than one language, it should be uploaded separately for each different language.



Languages

Please provide the language(s) in which the knowledge object is available. In case translations of the object are seperate files or pages, please handle each translation as it's own object.

	+ ADD ITEM	
Step II:		
Languages		
Please provide the language(s) in which the kn In case translations of the object are seperate each translation as it's own object.	owledge object is available. files or pages, please handle	
English	~	
Dutch	~ -	
	+ ADD ITEM	
		Click here to add language(s)

Figure 34: The field of the EU FarmBook form for providing the language(s) in which the content of the Knowledge Object is available

Date of creation

By clicking with your mouse in the field of the EU FarmBook having the label "Date of creation", you will be able to provide the date of creation of the Knowledge Object. You will do so by doing the necessary clicks in the calendar that appears. Figure 35 illustrates the way to provide the date of creation of a Knowledge Object.

Completion Date

I have the exact date available

Day of Completion

The day on which work on the knowledge object was completed

dd/mm/yyyy	

Please provide a value for this field

Step II:

Completion Date

I have the exact date available

Day of Completion

The day on which work on the knowledge object was completed



Figure 35: The field of the EU FarmBook form for providing the date of creation of the Knowledge Object

Permanent Identifier (URL or DOI)

If the knowledge object has an existing permanent location (e.g., in a journal repository), please provide the corresponding URI or DOI. If none is entered, the "FarmBook" will generate a permanent identifier which you can use in future.

In the field of the form with the label "PID", you will be able to provide the Knowledge Object's URI or DOI (if any). The example described in section 3.2, explicitly illustrates how to provide this specific piece of information. Figure 36 displays the field in the FarmBook form aimed to be used for this purpose.



Knowledge Object



Figure 36: The field of the EU FarmBook form for providing the link to the "source" from which the Knowledge Object was drawn

License

The Knowledge Object(s) you want to provide to the FarmBook may become available under a specific license that explicitly mentions the ways and terms of use of the Knowledge Object. You may select the license type that applies to your Knowledge Object(s) by making the appropriate choice from the dropdown list shown in Figure 37, or by explicitly providing the link (URL) to the respective license type's description. In Annex-I (Figure 27), you may find explanations of the different Creative Commons license types. The default recommended license is CC BY (i.e., entirely free as long as attribution is made).

If there is a license that has indeed been attributed to your Knowledge Object(s) but is not available in the dropdown list, you will select the "Other" option. In this case, there is a dedicated field where you need to provide a link (URL) directing to a webpage with the description of the license. Selection of a license or the provision of a link to an external license is mandatory.

-		-
Cto	5	
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License		
CC BY		~
Step II:		
License		
CC BY-NC		~
	Add here license type for the Knowledge Object	

Figure 37: The field of the "FarmBook" form for providing the license under which the Knowledge Object becomes available

Туре

Depending on the category a Knowledge Object belongs to, there are different types to choose from. Choosing the type helps people when they are looking for specific types of knowledge objects (e.g., a video or a data set). These types become available in the dropdown list that appears when clicking in the field of the FarmBook form with the label "Type" (see Figure 38 below). An explanation of the types of Knowledge Objects available per Knowledge Object category is provided in the Annex-II.



Category & Type

The category that best fits the type of the supplied knowledge object

select an option	~
Please provide a value for this field	

Step II:

Category & Type

The category that best fits the type of the supplied knowledge object

Document	~
 select an option ✓ Document Slideshow/Presentation Video Podcast Image Software Application Dataset 	Add here to add the type of the Knowlesge Object

Figure 38: The field of the EU FarmBook form for providing the type of the Knowledge Object

Intended purpose

This specific piece of information is asked with the aim to know the **purpose** a Knowledge Object has been created for. The different categories of purpose are available in the dropdown list that appears when clicking in the field of the form with the label "Purpose" (see Figure 39 below). The selection and assignment of more than one purpose is permitted. An explanation of each category is available in the Annex-IV.

Step I: Step II: License License CC BY-NC CC BY-NC V ~ - select an option -Communication ~ Please provide a value for this field -- select an option --Access to Data Communication Data storage/Processing **Click here** Decision-making support to add Dissemination intended Education/Training purpose Evaluation Experimentation Modelling Monitoring Prediction/Forecasting

Figure 39: The field of the EU FarmBook form for providing the purpose of use of the Knowledge Object

Subject

A Knowledge Object may be about one or more subjects. You can select the subjects that your Knowledge Object is about in two consecutive steps (specifying "High Level Subjects" and "Specific Subjects") from the dropdown list that are made available in the form's field having the label "Subject". More than one subject choice can be made (see Figure 40 below). The example provided in Section 3.2 illustrates the selection the subjects related to a Knowledge Object. A description of the subjects is provided in Annex V.





Figure 40: The field of the EU FarmBook form for providing the subject of the Knowledge Object

Geographic Location

The content of a Knowledge Object may relate to a geographic location. More specifically, the Knowledge Object you are about to submit to the FarmBook could, for example, describe an innovative method for growing potatoes, which has been applied to Belgium and the Netherlands. These two countries are the geographic locations that the content of the Knowledge Object relates to. You can select the geographic location relevant to the content of your Knowledge Object by using the dropdown list that appears when clicking in the respective field (see Figure 41).

Step I:	Step II:		
Geographical Location(s) Please select all countries referenced in the knowledge object's contents. + ADD ITEM	Geographical Location(s) Please select all countries referenced in the knowledge object's contents.		
Please provide a value for this field	Spain		
	Portugal	~ \ \ \ -	
	Afghanistan Albania	+ ADD ITEM	
	Algeria Andorra Angola	d	
	Antigua and Barbuda	Click here to add geographical location (s)	

Figure 41: The field of the EU FarmBook form for providing the geographic location (the country) where the content of the Knowledge Object is placed

Project name, acronym and website

Most of the Knowledge Object(s) that you are going to submit to the FarmBook have been created as the result of the work done in a project, typically an EC funded project. The final pieces of information to provide for the Knowledge Object(s) of yours are the name, the acronym (or short name), and the link to the official website of the "source" project. Alternatively, the project's contract number may be provided. In that case, the name, acronym, and URL to the project website (if any) will become available by drawing them from the CORDIS website in an automated way.

In the case that the website of the source project does not exist anymore, you may provide the link to the CORDIS online database with information about the project. Figure 42 below shows the fields of the "FarmBook" for typing in the specific pieces of information.

Step I: Step II: **PROJECT NAME*** European Knowledge Repository for best Agricultural Practices The project under which the knowledge object was created The project under which the knowledge object was created Please provide a value for this field PROJECT ACRONYM* EUREKA The acronym of the project under which the knowledge object was created The acronym of the project under which the knowledge object was created Please provide a value for this field PROJECT URL* https://h2020eureka.eu/ The main URL of the project under which the knowledge object was created The main URL of the project under which the knowledge object was created Please provide a value for this field Type the title of the project, acronym and project weblink.

Figure 42: The field of the EU FarmBook form for providing information about the "source" project of the "Knowledge Object"

The Annex section of this user manual aims to provide brief explanations of the predefined values that are associated with some of the metadata (namely, some of the information required to submit each "Knowledge Object") in order to allow to make the appropriate option.



Annex-IV: Purpose of Knowledge Objects

This metadata property is used to state the purpose for which a "Knowledge Object" has been created. The values that this property may receive are: "access to data", "communication", "dissemination", and "education/training". In the case of software applications, the value could be "data storage/ processing", "monitoring", "modelling", "evaluation", "decision-making support", "prediction/forecasting", "experimentation".

Access to data

This is the value that can be provided in the case that the "Knowledge Object" is a dataset (or belongs to another "Knowledge Object" category) and the primary purpose for which it has been developed is to allow access to raw data. For example, a data set about how tomatoes respond to a new fertilizer.

Communication

The value assigned in the case that a "Knowledge Object" has been primarily created for communication purposes. In the context of research projects funded by the European Commission, "communication" is a term that means to "promote the action and its results, by providing targeted information to multiple audiences (including the media and the public), in a strategic and effective manner and possibly engaging in a two-way exchange." For example, a video summarizing a project is usually produced for "communication" purposes.

Dissemination

The value assigned in the case that a "Knowledge Object" has been primarily developed for dissemination purposes. In the context of research projects funded by the European Commission, "dissemination" is defined as "sharing research results with potential users – peers in the research field, industry, other commercial players and policymakers." For example, an academic paper is usually produced for dissemination purposes.

Education/training

The value assigned in the case that a "Knowledge Object" has been primarily created to serve education/ training purposes. For example, a training manual or an educational slide deck is usually produced for training purposes.

Data storage/processing

Value assigned in the case of a Knowledge Object that is a software application.

Monitoring

Value assigned in the case of a Knowledge Object that is a software application.

Modelling

Value assigned in the case of a Knowledge Object that is a software application.

Evaluation

Value assigned in the case of a Knowledge Object that is a software application.

Decision-making support

Value assigned in the case of a Knowledge Object that is a software application.

Prediction/forecasting

Value assigned in the case of a Knowledge Object that is a software application.

Experimentation

Value assigned in the case of a Knowledge Object that is a software application.



Annex-V: The subjects of Knowledge Objects

Subjects To be selected at Step 1

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 labor 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 nonliving 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 behavior, seeking the most optimal level of benefit or utility. The building blocks of economics are the studies of labor and trade. Since there are many possible applications of human labor and many different ways to acquire resources, it is the task of economics to determine which methods yield the best results.

Subjects To be selected at Step 2

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.

Aquaculture

Aquaculture is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants.

Agro-ecology

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.

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.

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.

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).

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.

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.

Farming equipment and machinery

All machines and tools that are used in the production, harvesting, transport and storage of farm products.

Animal husbandry and welfare

The branch of agriculture concerned with the production, management, and breeding of animals.

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.

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.

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.

Fertilisation and nutrients management

Careful management, monitoring and amending of soil fertility to meet crops' needs and to maintain environmental 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.

Genetic resource

Any genetic material of plant and animal origin of actual or potential value for food and agriculture.



Energy management

All practices and measures applied for the efficient and responsible use of energy resources in agricultural production systems.

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.

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.

Food quality/processing and nutrition

All aspects concerned with processing, preparing, preserving and distributing foods and beverages, their quality characteristics and nutritional value.

Biodiversity and nature management

Management and sustainable development of nature and conservation of diversity within species, between species and of ecosystems.

Waste, by-products and residues management

Managing waste in an environmentally sound manner and making use of the secondary materials they contain.

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.