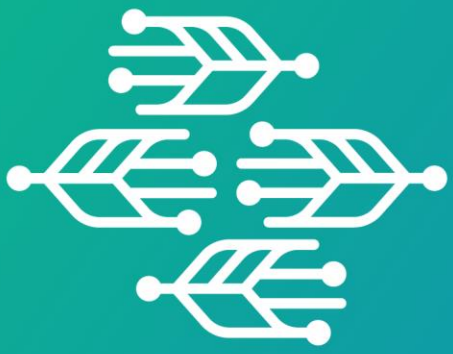

EU-FarmBook

Deliverable 1.1

Platform requirements and design v1

Document/Report | Public

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Summary

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Lead Beneficiary	University of Maastricht (MU)
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Version	Version 1.0

History of Changes

Version 0.1	21/12/2023	Louis Powell (MU)	Initial draft
Version 0.2	21/12/2022	Christopher Brewster (MU)	Overall edits, plus inclusion of available annexes.
Version 0.3	5/01/2023	Stephan Raaijmakers (TNO)	Overall Review
Version 0.4	23/01/2023	Louis Powell (MU)	Revisions and additional material integration from contributors
Version 1.0	30/01/2023	Els Vermeulen (UGent)	Final lay-out changes

Index

Figure index

Abbreviations

AGROVOC	AGROVOC is a multilingual controlled vocabulary covering all areas of interest of the Food and Agriculture Organization of the United Nations, including food, nutrition, agriculture, fisheries, forestry and the environment.
AI	Artificial Intelligence
AKIS	Agricultural Knowledge and Innovation Systems
API	Application Programming Interface
C4	Software visualisation architecture model (Context, Container, Component, Code)
CORDIS	Community Research and Development Information Service
CRUD	Create, Read, Update, Delete
DEM	Demonstrator/Pilot/Prototype
DL	Deep Learning
DMP	Data Management Plan
DOI	Digital Object Identifier
EIP	European Innovation Partnership
ETL	Extract, Transform, Load
EU	European Union
EUF	EU-FarmBook
EURAKNOS, EUREKA	Predecessor projects for EUF
FAIR	Findability, Accessibility, Interoperability, and Reusability
FAQ	Frequently Asked Questions
FoodOn	A broadly scoped ontology representing entities which bear a "food role"

GDPR	General Data Protection Regulation
GET	GET is used to request data from a specified resource
GUI	Graphical User Interface
ID	Identification
JSON	JavaScript Object Notation
JSON-LD	JSON Linked Data
KG	Knowledge Graph
KO	Knowledge Object
M[0-9]	Month (month number starting from August 2022) M1 = August 2022, M6 = January 2023, etc.
MA	Multi-Actor
MS	Member States
MVP	Minimum Viable Product
NLP	Natural Language Processing
OG	Operational Group
PBIS	Product Backlog Items
PPT	PowerPoint
PU	Public
RDF	Resource Description Framework
RIA	Research and Innovation Action
SE	Sensitive
SPARQL	SPARQL Protocol and RDF Query Language
SSO	Single Sign-On
UI	User Interface
UX	User Experience
WP1/2/3	Work Package 1/2/3

Executive Summary

The following document provides the initial release of the Platform Requirements and Design deliverable. This document is the outcome of extensive consultation between the technical partners, analysis and discussion of the technical lessons learnt from the preceding EURAKNOS and EUREKA projects, and further input from the wider consortium. This document highlights key assumptions concerning the technical goals and components of EU-FarmBook and the approach that will be taken to deliver a Minimum Viable Product release within the planned timeframe (by M15). A series of Annexes provide technical details concerning technology choices, design decisions and technical infrastructure. This deliverable will be revised and extended every 18 months throughout the project's life.

1. Introduction

This document describes the core requirements and functional design for the EU-FarmBook platform. This document covers all aspects of the backend infrastructure and the design and construction of the front-end. It also includes details of the functionality provided by a variety of tools/modules which enable the overall platform to operate.

The purpose and objective of the EU-FarmBook project are to support knowledge exchange between all EU and national AKIS actors by further developing, expanding, exploiting and maintaining an easily accessible and user-friendly, EU-wide digital platform for practitioners in the agriculture, forestry and other rural sectors (including farmers, foresters, advisors, educators and trainers). The EU-FarmBook project will deliver a cross-media platform, focussing on ease of use and enabling user-friendly multilingual access to practice-oriented materials ('knowledge objects') generated by EU-funded and national research and innovation (R&I) projects.

The platform, on the one hand, will make it easy for existing and upcoming EU-funded and national agriculture and forestry research and innovation projects to share their knowledge outputs, and on the other hand, for a large variety of users to easily find, access and reuse these knowledge objects for their agronomic practice, for their agricultural advisory services and wider stakeholder benefit.

End user ease of access across multiple platforms (web, mobile, tablet) using different modalities (simple text, chat, voice) will further stimulate research and innovation, enabling the outputs of EU-funded Multi-Actor (MA) projects, national projects and EIP Operational Groups (OGs) to have real impacts on agronomic and forestry practice across the EU and beyond.

The overall concept of the EU-FarmBook project is deeply embedded in the ambition of the European Commission to make European agriculture, forestry and rural enterprise more sustainable by strengthening the so-called Agricultural Knowledge and Innovation Systems (AKISs) that exist at regional, national and EU-level. Further, the project is complementary to the overall EU objectives in Open Science in enabling access to and reuse all results from EU-funded projects.

The platform being developed in the EU-FarmBook project builds upon the work done in the EURAKNOS and EUREKA projects, especially with regard to lessons learnt and the experience of particular technological choices. Nonetheless, the rapidly evolving domain of digital technologies and the necessity to adequately respond to unprecedented changes in knowledge- and data-related needs requires revisiting the choices already made and continuing to their refining in accordance with the expectations of the EU-FarmBook users and the AKIS actors at regional, national and EU levels. This further exploration and fine-tuning of technical specifications will be an ongoing exercise based on feedback loops for the timely capture of shifts in end-user needs. Furthermore, the continuous evolution of platform expectations and preferences, mostly driven by the design paradigms adopted by big corporate players (e.g., social media service providers), requires user research to be a continuous, iterative task allowing the project to keep pace with the changes in user needs that will occur during the it's lifetime.

The EU-FarmBook is an RIA project that is designed for interactive action research. The project implements an approach to plan and coordinate project activities and the operation of a sustainable digital knowledge platform to respond to the 'evolving AKIS ecosystem' in all Member States (MSs) and sectors. This iterative and incremental approach facilitates flexibility, adaptation, and responsiveness to the dynamic needs and capacity of the EU (sectoral) and national-level AKISs.

1.1. Relationship to other deliverables and work packages

This deliverable provides the foundation for all further work undertaken in Work Packages 1 and 2. Further versions of this deliverable will be provided at regular intervals (i.e., every 18 months), reflecting revised requirements as the project progresses. These revisions will reflect a combination of a) experience of the technical team, b) input from a variety of users, including comments from the Community of Practice (CoP) and projects which use the EU-FarmBook platform, c) user experience research based on data from user behaviour on the platform.

There is two-way communication between WPs 1+2 and WP3. More specifically, the outputs of Work Packages 1+2 are important inputs for Work Package 3, which are responsible for the wider knowledge network and channelling input from the wider community back to Work Packages 1+2. The major way that this input will be instantiated will be through revisions of this document in subsequent iterations. There will be versions of this document released at M6, M24, M42, M60 and M78.

The current document is the version for M6.

1.2. Structure of the Deliverable

This deliverable is structured as follows: Section 2 explains the intention and purpose of this document and how it should be used. Section 3 describes the high-level goals the platform to be built seeks to satisfy. Section 4 details the overall approach to the architecture and platform releases, while Section 5 provides the core ideas concerning the conceptual design. Sections 6-8 provide high-level views on the functional/non-functional requirements, our approach to security and data management and the physical location of data and services. The final section of the document consists of a series of Annexes detailing the requirements and design decisions with the requisite detail for actual implementation. Taken as a whole, the Annexes form our roadmap for the upcoming development period.

2. Purpose

The purpose of this document is to provide a set of technical specifications which will guide the development and implementation of the EU-FarmBook platform. Identifying the technical choices to be made also involves translating user preferences into technical requirements for the platform's design. At this stage, user requirements have been identified based on the previous experience of the consortium from the EURAKNOS and EUREKA projects, as reflected in the user stories outlined in Annex 9.4 (User Stories).

The document details the high-level assumptions and approach of the technical partners in this project, also addressing specific points laid out in the EU-FarmBook project's proposal:

- Define and design the backend repository, including conventional database aspects and metadata handling.
- Define and design infrastructure and tools/modules to handle, among others, automated metadata extraction, automated translation of metadata/ Knowledge Objects (KO), etc.
- Define and design the front-end technology stack, user journeys and initial look and feel.
- Define functional and non-functional requirements.
- Provide an architecture and design specification.
- Address security issues.
- Define the appropriate physical location for the data.

This document is the combined output of work packages 1 and 2 (WP1 and WP2). It is key to ensuring the technical deliveries of both work packages enable the objectives and ambition of EU-FarmBook to be realised. More specifically, this document is a central placeholder to define the platform requirements for the EU-FarmBook, and the technical features the project will deliver to meet such requirements.

3. Technical Goals

To support the early design phase of the EU-FarmBook infrastructure, including backend and front-end components, a set of technical goals have been identified in view of the high-level technical goal of the project and the components required to meet this. These goals originate primarily from the proposal for the EU-FarmBook and information gathered in the project kick-off meetings reflecting the experience of project partners in the EUREKA and EURAKNOS projects.

3.1 Technical Goals

The technical goal is to design, develop, test and release software and infrastructure which enables:

- Gathering and storing all types of outputs from EU-funded projects, including practice-oriented materials (i.e. 'knowledge objects' or KOs) and associated metadata. These KOs relate largely to the Agriculture and Forestry domains, i.e. mostly "primary production".

  Consequent subsidiary goals include:

  - Mechanisms for the input of KOs both manually via an upload form and programmatically via an API that an existing or future third-party repository can access in a project or at a national level.
  - Infrastructure for the storage of both actual KOs and their associated metadata.
  - Software modules (tools) to enable the (semi) automated association of metadata, the construction of a knowledge graph, and tools for updating and assessing the quality of the metadata.
- Providing a state-of-the-art website and mobile application for farmers, foresters, advisors, researchers and policy-makers to search, discover and interact with Agriculture and Forestry media, including research articles, videos and podcasts (all kinds of 'knowledge objects') specific to their domain and practical applications. Consequently, subsidiary goals include:

  - Provision of a well-designed, easy-to-use website for access to the EU-FarmBook repository, in combination with capacities for user profiles.
  - Provision of search facilities which function on a desktop website, mobile and other modalities for finding KOs.
  - Provision of a chatbot (interactive, dynamic interface) enabling natural language-based access to the repository.
  - Provision of facetted navigation capabilities, reflecting different personas (user profiles) and their respective user journeys.
- Delivering open access to third parties. This may include thematic networks, other EU-funded research projects, and national projects and repositories. Here we expect at least two types of usage a) API access from an existing or newly formed repository which allows the push of KOs and metadata into the EU-FarmBook platform, and b) white-labelling (i.e., projects may choose to include a project-specific or domain-specific version, a "lens", of the EU-FarmBook on their project website).

3.2 Technical Components

In response to these goals, the EU-FarmBook has four key conceptual technical components:

Storage - The hosting of KOs and their metadata, data models and other data, information or objects required and created by the platform.

Services – Open-source and custom software built to enhance the EU-FarmBook's content and support specific processes and end-user features.

User Interfaces (UI) – The primary channels for end-users to interact with the EU-FarmBook, including websites and mobile applications.

Application Programming Interfaces (API) – The communication layer of the platform responsible for connecting the Storage, Services and User Interfaces and handling the secure transfer of data and objects.

4. Approach

4.1 Platform releases

A clear implicit deliverable for the technical partners in WP1 and WP2 is to design, develop and test the essential components that will sit at the core of the EU-FarmBook platform (backend) while simultaneously building upon the pilot version delivered in EUREKA (front-end).

Despite this being a 7-year project, it is imperative that the platform reaches a stable and scalable foundation as quickly as possible, at which point the EU-FarmBook will be capable of attracting early adopters. At that stage, the project will gather valuable insight and feedback to direct future technical development while ensuring the platform delivers on what matters most to the users it targets.

WP1 and WP2 will follow the Minimum Viable Product (MVP) methodology and release an initial production version of the EU-FarmBook before the end of 2023 (M15). This timeline includes design, development and testing phases.

The MVP approach allows us to publish a stable version of EU-FarmBook with the required functionalities to attract early adopters as soon as possible and then build and expand its core functionalities, taking into account actual feedback from its audience/users

Given the unique and specialised audience the EU-FarmBook targets, the MVP methodology is agile and appropriate. It ensures the backend framework is available as soon as possible, allowing focus on developing the tangible features that matter most to the EU-FarmBook community.

Alternatives to an MVP release were under consideration, including a more long-term approach of releasing a full version of the platform with all intended features at once. However, after a literature review and discussion among the technical partners, this approach was not adopted, given the risks of allocating significant resources to developing features which may not resonate with users, as well as delaying the point at which potential users could be brought into the testing and feedback cycle.

Instead, once the MVP is thoroughly tested and released, the project will be able to focus its attention on studying user feedback and platform analytics, reviewing current platform designs and features, and evaluating and testing ideas for new features. Regular platform updates will be tested and released via Continuous Integration and Continuous Development (CI/CD) cycles and supported by technical hackathon-like sessions whereby stakeholders and end users work directly with technical partners to build and evaluate new or improved functionalities. These approaches will allow the EU-FarmBook to capitalise on technological, software and data science developments.

4.2 Architecture

Although the EU-FarmBook platform may be conceptually thought of as a single technical deliverable, the project requirements and goals make clear that it will more specifically be an integration of front-end and back-end services. WP1 and WP2 will follow a micro-services architecture approach for managing the source code behind such services. Microservices are an approach to designing software systems made up of small independent services that each have a specific purpose. The code will be stored in multiple repositories (i.e., Poly-Repo), which can be deployed and connected as appropriate.

Where possible and appropriate, we will deploy Functions-as-a-Service (FaaS), a cloud-computing service that will allow the EU-FarmBook to execute smaller functional components in response to events (e.g. the upload of a new KO) without managing the complex infrastructure typically associated with building and launching microservices applications. This approach also enhances reusability.

These core decisions have been taken to ensure collaboration and development between multiple institutions while avoiding the creation of unnecessary dependencies. It is also expected this approach will reduce single points of failure by making the platform's architecture transparent regarding what happens behind the scenes of the EU-FarmBook, and where.

As there are many contributing technical partners, and the project will run for seven years, the microservices and 'Poly-Repo' approach allows separate features of the platform to be developed and tested independently, and as technology improves, services can more easily be scaled, upgraded and replaced without the need for large releases and long testing cycles. This is in comparison to the 'Mono-Repo' or monolith methodology, which was considered for this project but decided against to avoid creating unnecessary dependencies which could delay the project and cause weaknesses in the technology chain. In addition, we ensure the MVP release can be reached as quickly as possible and allow assumptions and user experience to be tested and improved upon.

5. Conceptual Design

This section gives a non-technical overview of the core components that will make up the EU-FarmBook. Full technical details are provided in the Annexes.

5.1 Storage

At the core of the platform is object storage. In this component, the EU-FarmBook hosts two primary collections; knowledge objects and metadata objects.

Knowledge objects are the materials provided by research projects. They are digital media files of heterogeneous format, including text, image, video, audio, and data. Each knowledge object has a unique persistent identifier (PID), which will be used to link data and information throughout the platform.

Metadata objects are digital database records. Each metadata object links directly to a knowledge object and stores a set of mandatory and optional properties and attributes, either provided manually by the uploader (e.g., project information) or automatically by an EU-FarmBook service (e.g., Language Translations). Metadata, just as with knowledge objects, is version controlled to ensure its history is accessible after an update.

In practice, any digital object, information or data that must be stored and persisted throughout the EU-FarmBook will be located in the storage component. Therefore, several secondary storage objects, including analytics (e.g., digital records of user activity on the EU-FarmBook), configuration (e.g., content for the 'Help' and 'Contact Us' pages) and media (e.g., logos and artwork of EU-FarmBook and Horizon Europe) will be stored alongside the knowledge object and metadata. If the information is specific to a knowledge object, it will also be linked via the persistent unique identifier.

Particularly important secondary storage will be a triple store where all metadata for KOs will be stored, linked to the EU-FarmBook ontology to create a knowledge graph. This knowledge graph will be a key input for certain kinds of search capabilities and input to some of the services described below. Obviously, such metadata will be linked to the KOs' persistent unique identifier.

5.2 Services

The services component is a set of distinct computer-code-based data exchanges, each designed for a specific purpose. The services are separate from one another and written in various programming languages, depending on their requirements.

There are a number of services identified as platform requirements for the MVP release of the EU-FarmBook.

- **Natural Language Processing (NLP)** – The NLP service ingests a knowledge object, extracts content and keywords using deep learning techniques, and provides an update to the knowledge object's metadata.

This metadata, as noted above, has many purposes, including enhancing the effectiveness of the search functionality of the EU-FarmBook and reducing the burden on individuals providing manual annotations of knowledge objects. NLP techniques will also be used to make recommendations, understand user queries and natural language-based communication.

- **Ontologies** – There are several open-source ontologies aimed at providing a common set of semantic terms and definitions within the agricultural domain (e.g., AGROVOC, AGRO, ENVO, FoodOn). The EU-FarmBook team has already developed an ontology annotating document type characteristics and covering KO topics in the context of EUREKA. These ontologies will need to be extended and updated over time to ensure they provide all necessary concepts/classes for describing KO metadata. Furthermore, these ontologies will be used as input for some services, for example, the "ontology-based named entity recognition", whereby the NLP service will use the ontology service to identify key terms in the text of a given knowledge object and store this in the knowledge object's metadata.
- **Knowledge Graph** – The Knowledge Graph (KG) service builds a knowledge graph of KOs and their metadata, links knowledge to the EU-FarmBook ontologies, and provides an interface to extract and query with this knowledge graph (cf. triple store mentioned above). The knowledge graph will support querying and answering functions and provide input for the recommender function in the chatbot, as well as capabilities for reusing the knowledge derived from knowledge objects for further agricultural research.
- **Validation** – The validation service is responsible for ensuring that the information provided to the EU-FarmBook platform, specifically the metadata, meets a set of pre-defined requirements. These range from data type validations (e.g., date and numerical formats), spelling checks, and validating that the information provided under certain attributes is within the values expected for that attribute. When a validation error occurs, clear and concise feedback will be given to the metadata provider.
- **Publisher/Subscriber** – The Publisher/Subscriber model is responsible for managing when a services or function need to be executed. Via an "Event Bus", a service/function will publish an event (e.g. New KO uploaded), after which any service/function subscribed to such an event (e.g. NLP, Validation etc.) will be executed. This further decouples services and simplifies future development.

Additional services will be developed and released for subsequent releases following the EU-FarmBook MVP.

- **Chatbot** – an interactive conversational interface agent will be developed, catering to GUI-, speech- and text-based access to the EU-FarmBook data. The conversational interface agent will be implemented as a desktop and mobile phone/tablet (hybrid) application, which will partially depend on a recommender service.

- **Recommender Service** – This will provide input to the chatbot and may be used to improve conventional search facilities. Based on user preferences, personas and historical search behaviour, the recommender will recommend items of interest to a user. This recommender will use the semantic structure of the EU-FarmBook knowledge graph (and its database) to make semantically relevant content suggestions.
- **Language Translations** – When the EU-FarmBook is fully developed, access to content in all EU languages will be available. Several services will be responsible for ingesting knowledge objects and their metadata, using open and trusted sources capable of providing accurate language translations, and then providing these translations back to the storage component.

5.3 Application Programming Interface (API)

APIs are a standard and well-established approach to connect separate components of a platform with one another, enabling them to exchange information and data securely. As the EU-FarmBook follows a micro-service-driven architecture methodology, APIs are key to decoupling components and services, thus preventing an issue or downtime with one service from affecting another. In software development, API architecture involves a client and a server. The application sending the request is the client, and the application sending the response is the server.

In the case of the EU-FarmBook, we can use the example of the NLP service retrieving a knowledge object and sending the results back to the metadata storage component.

- The NLP service (the client) sends a request to the storage component (the server) for a specific knowledge object.
- The API checks the request for validity and authenticity. More specifically, it checks if the knowledge object exists and whether the NLP service has access to it.
- The knowledge object is securely transferred to the NLP service via the API.

Continuing with this example, once the NLP service has finished analysing the knowledge object in question, it has collected information, including key agriculture-related terms and specific regions and climate conditions identified as relevant for potential users. These key terms and regions must now be stored in the knowledge object's metadata.

- The NLP service acts as the client, sending a request to the metadata storage component, which acts as the server.
- The storage API handles this request and checks that the additional metadata provided meets the required standards and data types and that the NLP service is authorised to make the request.
- The checks are successful, and the new information identified by the NLP service is saved in a new version of the knowledge object's metadata.

Similar automated verification and transferring of data and objects will occur behind the scenes in the EU-FarmBook platform. The API component and services will enable sharing of knowledge objects and metadata content with users. It can also be used to automatically ingest data from other sources, including databases created by other projects and relevant open-source ontologies.

5.4 User Interfaces (UI)

There are two primary User Interface Groups. Those built for contributors (upload form) and those aimed at consumers (web applications).

- **Upload Form** – An interface for projects and networks sharing practice-oriented materials with the EU-FarmBook. This enables such projects to provide their physical objects (e.g., word documents, PDFs, images, audio, video etc.) and a basic set of mandatory metadata (e.g., project name, dissemination purpose and key dates). Following validation, the knowledge object(s) and its associated metadata are saved in the EU-FarmBook's storage component. Thereafter, the contributor can view and edit both their provided metadata and any automatically generated metadata, for example, properties collected by the NLP service.
- **Website and Mobile Applications** – Aimed primarily at farmers, foresters, policy advisors etc., the EU-FarmBook web application enables its users to find, consume and share relevant content and knowledge objects specific to their domain requirements and intended application. The website application will focus on optimising search while considering individual preferences and interests. The aim is to connect users to relevant content in as few clicks and searches as possible. A/B testing and analysis of website analytics (e.g., Google Analytics results) will allow the technical partners of the EU-FarmBook to optimise and progress towards this aim by continually examining the website from a user experience (UX) perspective and making appropriate updates and releases.

A third user interface will be developed for managing the overall platform allowing platform managers to have insights into the platform's performance, user behaviour, and other forms of intervention to ensure the proper operation of the overall system. Here the emphasis will not be so much on design as on the utility of the functionality provided.

6. Functional / Non-Functional Requirements

Functional requirements detail what the EU-FarmBook will do, and these are captured in the format of user stories. This approach enables the developers designing and building the platform to analyse each requirement in terms of who the audience is, what functionality they require, and why they need it.

User stories are grouped into technical features and individual tasks, and as features are built and released, new functionality becomes available, mainly via user interfaces. We provide details of the User Stories in Section 9.5 below.

In simple terms, non-functional requirements detail how the EU-FarmBook will be, defining system attributes such as security, reliability, performance, maintainability, scalability, and usability. The annexe provides such information in sections 7, 8, 9.2, and 9.3.

7. Security and Data Management

As with any platform on the internet, security concerns are a major issue that needs systematic handling. As noted in the following section, the main physical location of the platform will be the University of Ghent in Belgium with mirror backups at University of Maastricht and Agricultural University of Athens, enabling automated switching if one system is offline or compromised.

The servers at the University of Ghent use Secure Shell (SSH). The EU-FarmBook will be deployed on a Nomad Cluster, hosted behind a firewall, with direct access only available through a Virtual Private Network (VPN).

Currently under development is the text of the Data Transfer Agreement, which specifies data management arrangements with third parties who provide their knowledge objects as input to the EU-FarmBook. This covers our mutual agreement and legal liabilities. This will be submitted as a separate deliverable in M12, but it already informs design decisions and processes, including compliance with GDPR.

8. Physical location

The primary location of the EU-FarmBook's infrastructure and platform is the University of Ghent in Belgium. The servers that host the platform's environment are on-premise (i.e., not cloud-based). 9.1 below**Fout! Verwijzingsbron niet gevonden.**

There will be two mirrors of this environment at the University of Maastricht and the Agricultural University of Athens. In the event of an outage or technical issue external to the EU-FarmBook, it will be possible for one of the mirrored environments to become the primary location, thus preventing significant impacts to the platform's users.

9. Annexes

As explained in the introduction, the following section provides a series of documents and diagrams detailing specific aspects of the EU-FarmBook platform and its component services/modules. Taken as a set, these comprise detailed specification requirements for the design and implementation of the platform.

Future versions of this document will delineate changes made from previous versions. **This version is D1.1 and has no predecessor.**

9.1. Concepts and Terminology

During requirements gathering and technical design, it is important to agree on the concepts and terminology which will continually appear throughout the project, specifically in deliverable "D1.1 Platform requirements and design" and future deliverables.

By defining such concepts and terminology, we reduce ambiguity and help align project partners when discussing and agreeing on key deliverables, such as the functional and non-functional requirements of the EU platform, why each requirement is important, and how it will be accomplished.

We first define five key concepts in the collection of requirements and translation into technical deliverables.

- Users
- User Activities and Stories
- Features
- Technical Roadmap
- Minimum Viable Product (MVP)

Users

A user is any person or group who accesses and interacts with one or more components of the EU-FarmBook. By defining users, we can build requirements from their perspective and help ensure the platform and tools we deliver are specific to their needs and expectations.

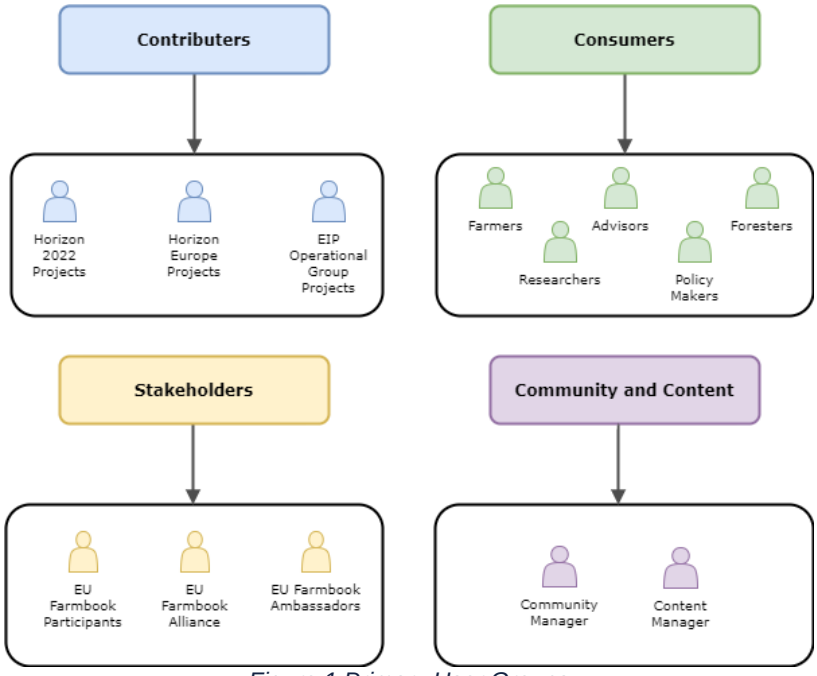

Figure 1 Primary User Groups

The EU-FarmBook has four primary user groups to consider.

Contributors create, provide, upload, and maintain KOs and their associated metadata. For example, the teams and individuals involved in Horizon 2020, Horizon Europe and EIP Operational Group (OG) projects responsible for creating and uploading KOs to the EU-FarmBook, are considered contributors.

Consumers are the end users who will access the EU-FarmBook interfaces to search for and retrieve the KOs available, primarily through the website, mobile app, data tools and APIs. Examples of consumers include farmers, foresters, advisors, researchers and policy-makers.

Stakeholders are individuals authorised to view data, analysis and visualisations behind the EU-FarmBook, which are otherwise unavailable for Contributors or Consumers. For example, this may include project partners who wish to track the volume and origins of KOs uploaded to the platform and analyse how the website is performing, e.g., numbers of visitors, common search terms, and click-through rates.

Community Managers include those responsible for administering key materials and content on the EU-FarmBook. This includes help pages, images and any user-driven content that needs to be monitored, such as comments and message boards.

User Activities and Stories

To ensure the completeness of requirements, we define User Activities and Stories. This approach helps define functional and non-functional requirements in direct response to user needs.

User Activities are the high-level activities contributors, consumers, stakeholders, and community managers perform.

For example, "A contributor uploads a knowledge object to the EU-FarmBook".

User Stories describe the low-level actions and result contributors, consumers, stakeholders and community managers will take and want to achieve. For example:-

"A contributor from a Horizon 2020 project navigates to an EU-FarmBook web page where they log in and begin the process of uploading their knowledge object and a required set of metadata."

For this example user story, the following high-level features or associated tasks are required to meet this user's requirements possible including:

1) An EU-FarmBook website address specifically for contributors.
2) A process for logging into the account, including account generation and maintenance.
3) An upload from or similar to allow the knowledge object to be submitted.
4) A location where the knowledge object can be stored
5) Specifications of what metadata must be provided for a given knowledge object
6) A location where the metadata for the knowledge object can be stored

Features

Features describe a chunk of functionality that fulfils user needs while adding value to the overall product. They are a collection of **user stories and tasks**, providing the link between what the EU-FarmBook will do, how it will do it, and why.

Each **feature**, in its own document, will define four key concepts:

- Benefit Hypothesis, i.e. what benefits does this feature provide to the user?
- Added value – To prioritise a feature, we must define how many users and how often the benefits of this feature will be realised.
- Description – providing key context and information, including the technical details of what the feature will deliver and how.
- Acceptance Criteria – defining the conditions under which this feature can be considered complete and delivered.

The concepts above will help ensure each feature:

- Offers a measurable added value to the project and users.
- Contains enough information to support prioritising.
- Contains enough information to allow for an estimation of the time to deliver the feature.
- Will be testable by defining an expected outcome and validating this against the actual outcome.

Features can be grouped and organized into higher level deliverables or goals called EPICs.

Technical Roadmap

The roadmap for the EU-FarmBook is intended as a flexible plan of action to achieve the technical goals and requirements of the project. It is a visual representation of how each feature contributes to the overall product strategy and will help the project to agree on realistic release dates.

The roadmap is key to understanding the relationships and dependencies between each feature, giving clear indications to the project of potential impacts and opportunities depending on the priority and order technical features are worked upon. This supports the project in making intelligent trade-off decisions, measuring progress, and communicating delivery dates and plans to stakeholders.

Minimum Viable Product (MVP)

The first version of the EU-FarmBook platform that WP1 and WP2 will release is described as a Minimum Viable Product (MVP).

This release will contain enough key features to encourage early interactions between users and the platform and to allow EU-FarmBook partners to validate its requirements and assumptions relatively early in the development cycle.

By prioritising features and agreeing on which make it into the MVP release, the project will be able to gather real-world feedback as quickly as possible and understand the key elements to improve upon. Rather than releasing all features at once, this approach is expected to reduce the amount of waste that comes from redesigning and reworking features. Its goal is to produce something tangible as quickly as possible, give the project confidence in the process and, ultimately, clarify what will remain and what will be delivered in later releases.

9.2. Architecture

This annexe provides the technical drawings of the EU-FarmBook architecture, showing the interactions between each module/component.

The C4 model (c4model.com) for visualising software architecture is followed below: -

- Level 1: System Context gives a high-level overview of the platform, its purpose, and how it is linked to its primary user groups.
- Level 2: Container Diagram shows the high-level shape of the software architecture and how responsibilities are distributed across it. It also shows the major technology choices and how the containers communicate with one another.
- Level 3: Component Diagrams, zooms in on the Services and API containers to give more detail about the functions and applications each provides.

- Level 4: Code is an optional level of detail and is not included in this requirements document. However, such detail will be provided in a future revision of this deliverable as an annex.

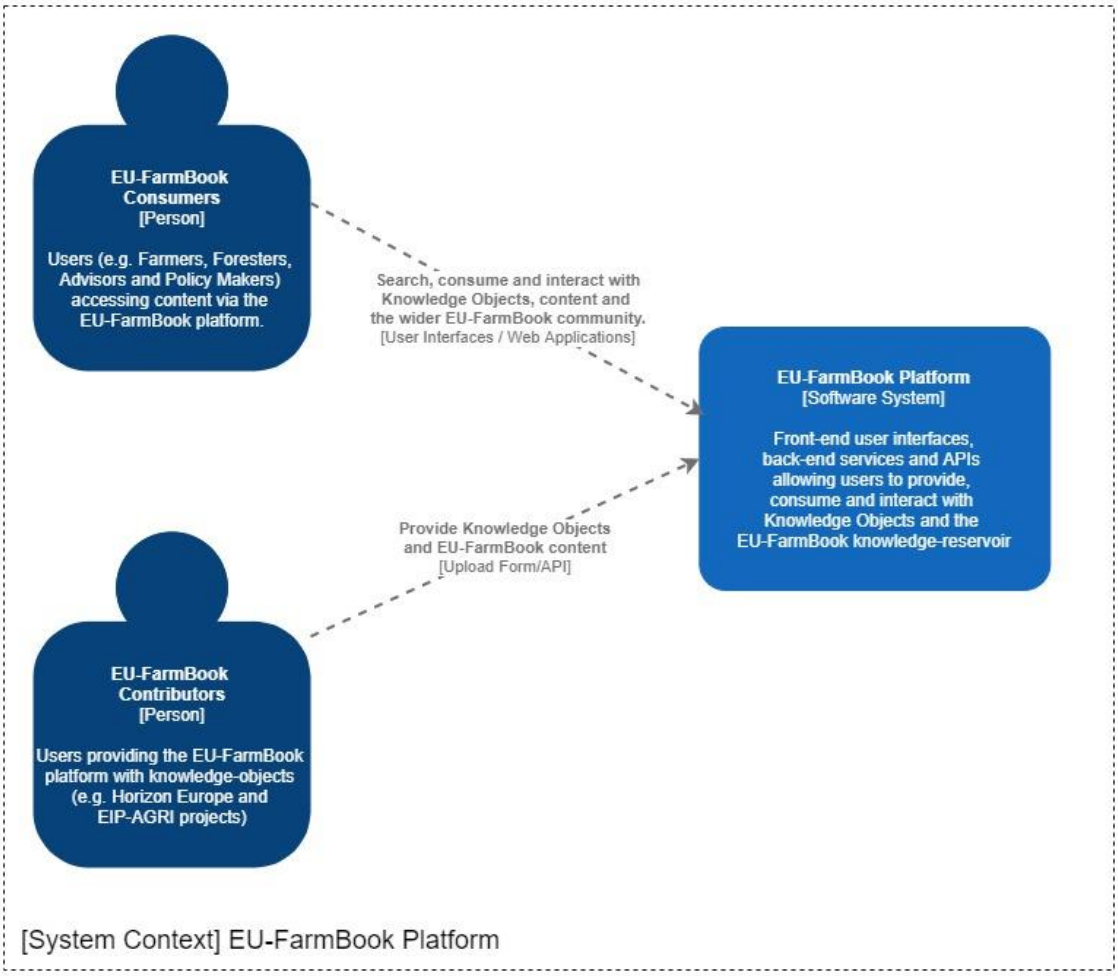

Figure 2 - Level 1: System Context

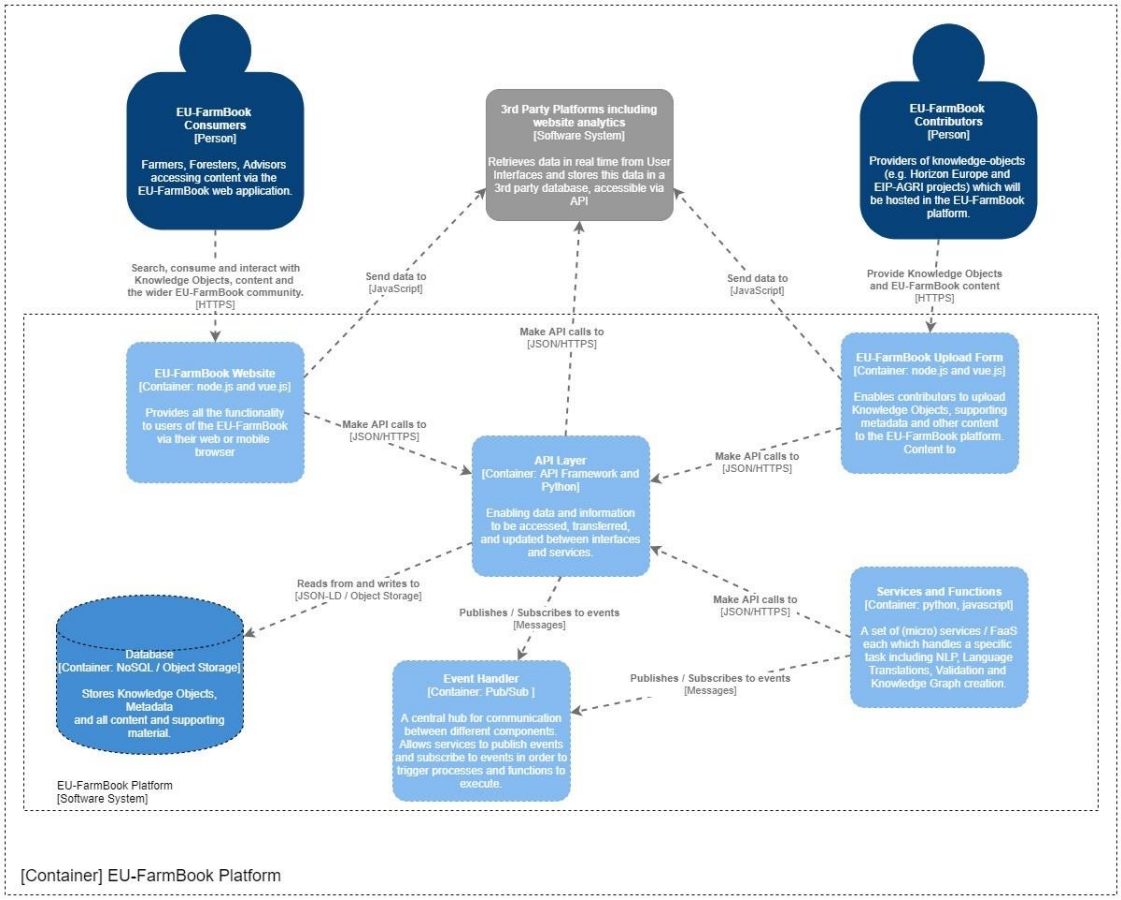

Figure 3 - Level 2: Container Diagram

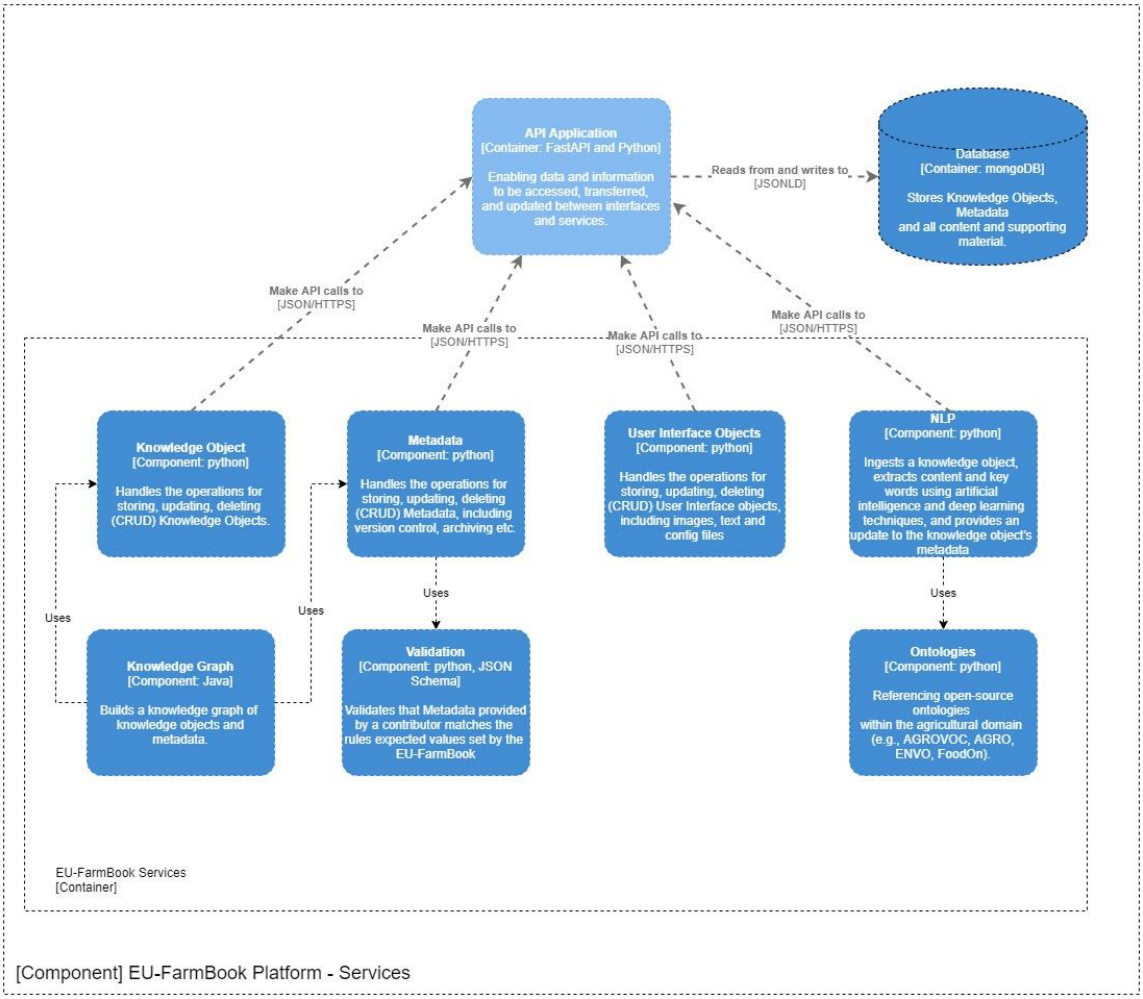

Figure 4 - Level 3: Component Diagram - Services

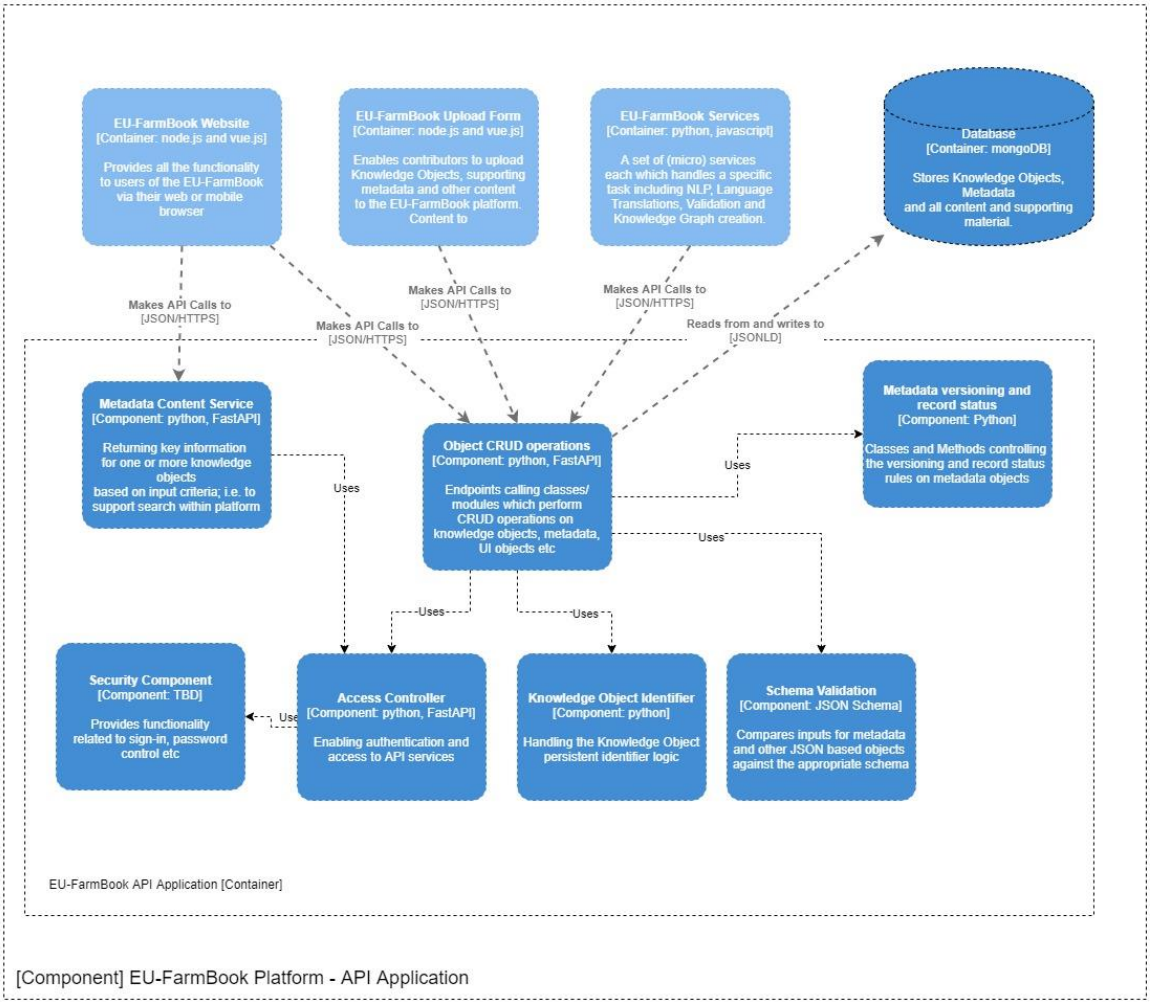

Figure 5 - Level 3: Component Diagram – API

9.3. Architecture Descriptions

Following on from the models in the previous section, this section of the annexe provides further details and a potential naming convention for each database volume, service and API.

Database volumes

db-physical-object

- Storing the knowledge objects with a persistent key (obj-id)

db-metadata-object

- Storing JSON-LD metadata in a NoSQL database instance. Each metadata object has 1..1 cardinality as a knowledge object.

db-interface-object

- Storing a wide range of file extensions, including JSON, images, etc.

db-analytics

- Storing JSON data in a NoSQL instance. The data depends on which software is used to gather analytics from the website and mobile applications, e.g. Google Analytics.

Services

service-physical-object

- functions for generating the object_id and passing this via API call to service-metadata-object
- Handles CRUD operations

service-metadata-object

- Handles CRUD operations
- Maintenance scripts (e.g. versioning and record status)

service-nlp

- Receives a knowledge object:
  - after making a GET call
  - after a PUSH API call is sent from the upload form
- May also make GET requests to service-ontology to run ontology-based entity recognition. The primary code base is Python.
- Processing of knowledge objects using deep learning and artificial intelligence.
- Outputs a JSON object following schema guidelines (repo needed)
- Makes a PUSH API call to send the JSON object to service-metadata-object

service-translations

- Receives knowledge metadata or knowledge object:
  - after making a GET call
  - after a PUSH API call is sent from the upload form
  - may also make GET requests to service-ontology to run language translations.
- The primary code base is Python.
- Uses open-source libraries for translations and the EU-FarmBook ontology.
- Placeholder for language logic to enrich metadata and produce translated knowledge object content.
- Supports multiple language services/libraries in the same code base.
- Outputs a JSON object following schema guidelines or a new knowledge object with the correct extension (.pdf, .doc)
- Makes a PUSH API call to send the JSON object to service-metadata-object

service-interface-object

- Handles CRUD operations
- Maintenance scripts (e.g. versioning and record status)

service-analytics

- Handles ETL process from analytics API to NoSQL

service-knowledge-graph

- Handles the transformation from JSON-LD to RDF triples

service-ontologies

- Handles the ETL process from ontologies to NoSQL

APIs

api-physical-object

- Handles authentication of the client
- Handles the endpoints for CRUD operations of knowledge objects
- Calls classes and functions in the service-physical-object

api-metadata-object

- Handles authentication of the client
- Handles the endpoints for CRUD operations of metadata objects
- Calls classes and functions in the service-metadata-object

api-interface-object

- Handles authentication of the client
- Handles the endpoints for CRUD operations of interface objects
- Calls classes and modules/functions in the service-interface-object

api-analytics

- Handles authentication of the client
- Handles the endpoints for CRUD operations of analytics objects
- Calls classes and modules/functions in the service-analytics-object

api-knowledge-graph

- Handles authentication of the client
- Calls classes and modules/functions in the service-knowledge-graph

api-ontologies

- Handles authentication of the client

Calls classes and modules/functions in the service-ontologies

9.4. EUREKA Survey Analysis

Introduction

This section documents the results of the survey that has been implemented for the evaluation of the feedback and comments collected for the EU-FarmBook platform (the pilot version of it) from the EUREKA project's online webinars held in March 2021. The webinars were delivered by all the EUREKA project partners and the participants involved in them (potential users of the platform) represented a range of stakeholders such as researchers, farmers, foresters, policy makers, educators and students. At the end of the webinars, participants were asked to evaluate the EU-FarmBook platform by means of an evaluation form including close and open questions. The questions in the evaluation form were the following:

- Is the concept of the EU-FarmBook relevant to your work?
- Would you use it in your day-to-day activities?
- Do you already use any other online agriculture/forestry knowledge platforms that we should be aware of?
- Based upon what you have seen/experienced in this meeting:
    - What features of the EU-FarmBook appear to work well and/or look useful and should be kept?
    - What features appear to work less well and/or look less useful and should be changed?
    - What additional/new features would be useful?
- Do you have any other comments and/or unanswered questions?

The present document outlines the results of the analysis of a survey we have implemented for the needs of the evaluation of the responses to the question: "What features appear to work less well and/or look less useful and should be changed?". This question is of particular importance to the development of the MVP version of the EU-FarmBook platform, because it has allowed the collection of feedback on features and functionalities needing improvement. The number of comments provided as responses to that question from the people involved in the EUREKA webinars was 89.

Purpose of the Survey

The purpose of the survey has been to establish insights from the evaluation of the feedback collected from the EUREKA webinars in order to utilise it for the further development and improvement of the platform during the course of the EU-FarmBook project. Each item in the survey was a comment provided by one or more participants in the EUREKA webinars. The evaluation of the comments collected in the EUREKA webinars (the survey items) has been made using two nine-point rating scales and one open-ended question. The nine-point rating scales aimed to the collection of quantitative feedback on how (i) generic/ specific, and (ii) non-actionable/actionable each of the comments was. The open-ended question was used to collect keywords per comment

(up to three per comment) to utilise them for the definition of labels of categories to group the comments. The survey was administered to members of the EU-FarmBook partner organisations working on Work Packages 1 and 2. It was undertaken from 12 December 2022 to 6 January 2023. The survey is available here.

Methodology

This section describes the methodology followed for the evaluation of the feedback collected in the EUREKA webinars. The steps of the methodology are shown in Figure 1 below. Each step of the methodology is explained in the following paragraphs.

Figure 6 - Steps of the methodology

Step 1: Aggregation of the comments collected in the EUREKA webinars

The first step was to collect all the comments provided as responses to the question "What features appear to work less well and/or look less useful and should be changed?" in a document, in order to use them for the survey development. A screenshot of this document is shown in Figure 2 below. The document is available here.

Raw feedback on open-ended question 'What features appear to work less well and/or look less useful and SHOULD BE CHANGED?' from EUREKA webinars.

1. The chat function not so relevant
2. The chat function is suitable for networking and consultation.
3. Moderation is necessary in the chat function and the comment should be made only on a specific material.
4. Moderation is not necessary in the chat function.
5. Moderation is necessary in the chat function and to be traceable chat function has to be interconnected to the knowledge object.
6. Divide the type "document" in subtypes.
7. The contents are not very practical.
8. Content sorting
9. Content and visualization do not correlate; not always clear who is the author of the article so it is not clear whether it is reliable information.
10. Economics is a tricky category as it is crosscutting and very rarely only economic when it comes to practice.
11. Consideration of other/more digital content types
12. The classification of the contents is not fully appropriate.
13. Missing content and links (e.g., the Practice Abstracts from Thematic Networks, link to Smart AKIS platform)
14. More categories for describing the digital objects.
15. Missing categories (e.g., agroforestry).
16. Arboriculture, is an underrepresented topic
17. Expand more on different types of project deliverables that could become available.
18. Include a link to experts within each of the categories.
19. Improvement of translation functionality
20. Availability of more digital objects in languages other than English
21. It was suggested to cover more languages.
22. Monitoring of applications, compatibility with other applications, grant finder

Figure 7 - Document aggregating the comments provided as responses to the question "What features appear to work less well and/or look less useful and SHOULD BE CHANGED?"

Step 2: Survey development

This step has involved the development of the survey for the evaluation of the comments. Figure 3 below provides an indicative screenshot of the survey, which is available here.

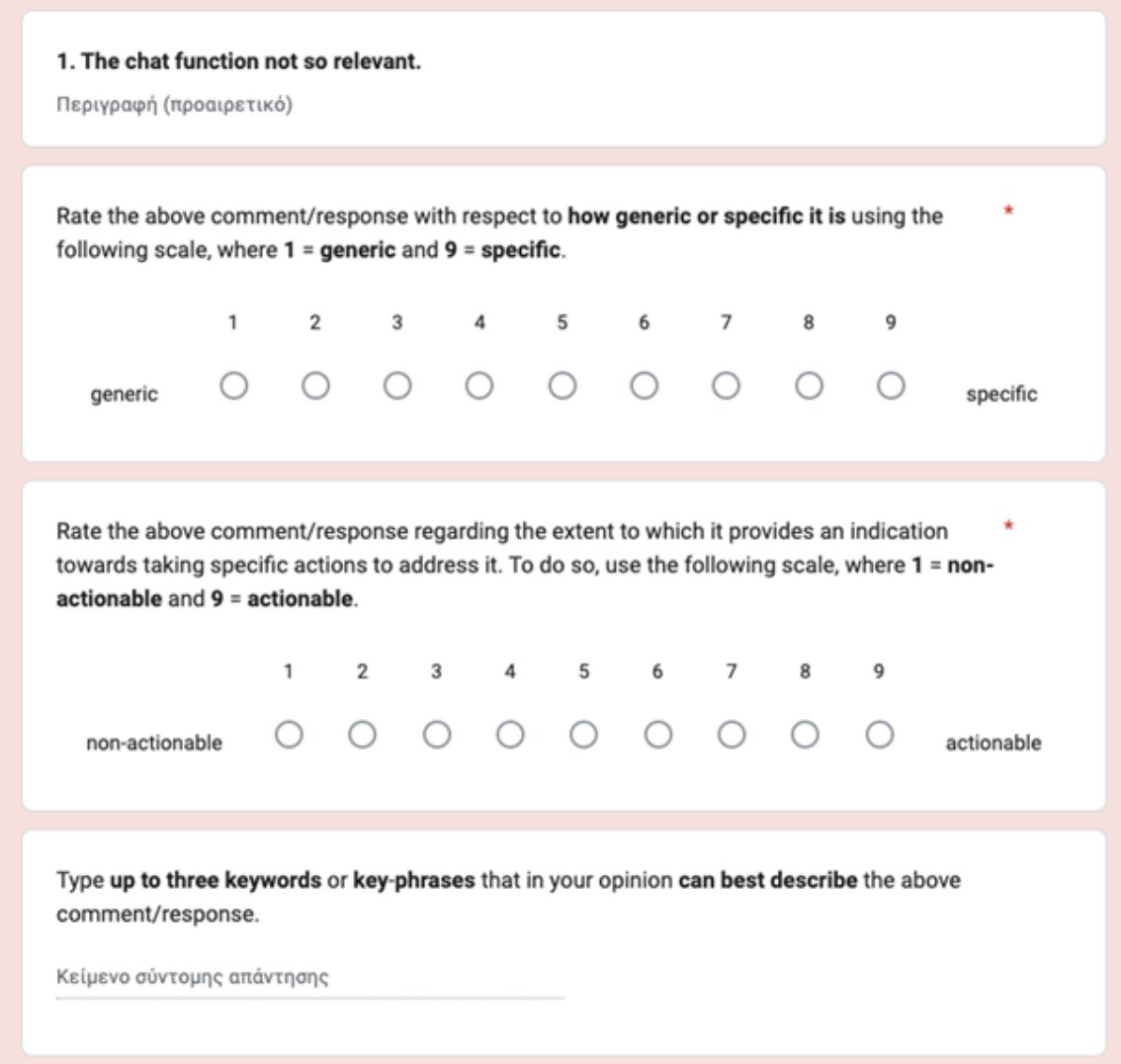

Figure 8 - Item included in the survey for the evaluation of the comments collected as responses to the question "What features appear to work less well and/or look less useful and SHOULD BE CHANGED?".

Step 3: Orientation of the survey respondents

An online session for the orientation of the survey respondents (members of the partners of the EU-FarmBook project involved in WPs 1 and 2) took place on 9 December 2022. In that session, the purpose and structure of the survey were explained and details were provided about how to fill it in. An agreement was established for the deadline of the task (6 January 2023).

Step 4: Survey implementation

The implementation of the survey took place from the 12th of December 2022 till the 6th of January 2023. The survey was undertaken using an online form created and shared for this purpose. Support was provided during the process by means of clarifications and

responses to queries coming from the side of the respondents. The number of responses collected as the outcome of this step was 8.

Step 5: Analysis of results

The purpose of this step was to analyse the responses provided to the survey items with the aim to: (i) draw insights into the importance of the comments provided by the participants of the EUREKA webinars (by evaluating them using the "generic/specific" and "non-actionable/ actionable" rating scales); and (ii) establish a scheme for the classification of the comments collected as responses to the question: "What features appear to work less well and/or look less useful and should be changed?" Figure 4 below presents the activities executed for the analysis of the survey results.

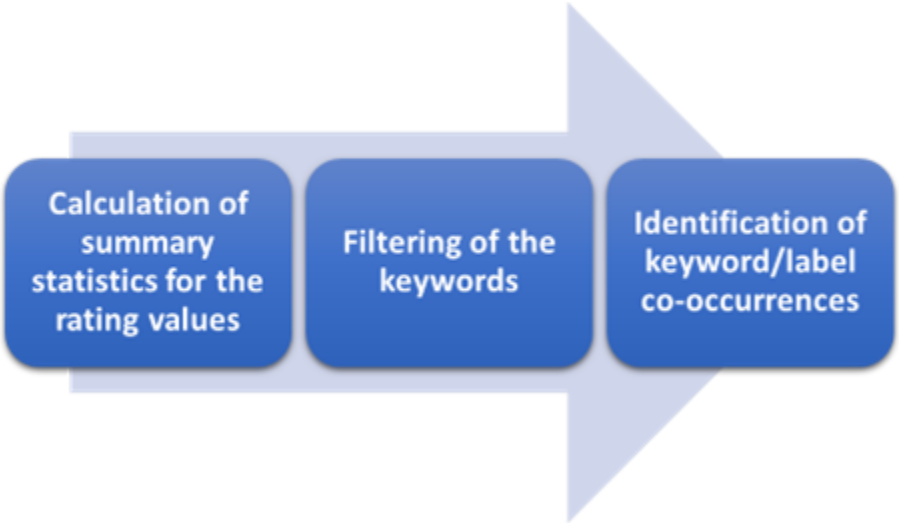

Figure 9 - Activities taken for the analysis of the survey results

The first step was to calculate summary statistics for the rating values, namely average ratings and standard deviations. The aim for extracting those summary statistics has been to make a prioritisation of the comments that have been collected (i.e., making decisions on the order in which they should be addressed).

Regarding the filtering of the keywords:

- We calculated the frequencies of appearance of each of the keywords assigned to each comment.
- We merged keywords having similar meaning (e.g., translation/multi-linguality, chat/chat function).
- We calculated the 1st, 2nd and 3rd quartile of the frequencies of all keywords assigned to the survey items so as to come up with a threshold value for filtering them (i.e., reducing their number till reaching a limited set of keywords/potential group labels to classify the comments).
- We kept the keywords that (i) appeared ≥3 times per comment; or (ii) had a frequency <3, yet appearing in many comments (>10); e.g., the keyword

"GDPR" appeared 4 times in only one comment of the survey and therefore was discarded).

The result of the execution of those activities was to conclude to the following list of potential category labels for the classification of the comments:

- Chat
- Moderation
- Knowledge Object
- Content
- Category/-ies
- Visual Identification of Knowledge Object
- Keywords
- Language
- Search
- User Experience
- Metadata

Finally, we created a matrix to identify the co-occurrences of the above-listed labels. The aim of this activity was to get indications about what labels should be put together in a scheme for the classification of the comments. The matrix and the number of label co-occurrences are shown in Figure 10 below.

Frequency of common appearance of comments/labels	Chat	Moderation	Knowledge Object	Content	Category/-ies	Visual identification of KO	Keywords	Language	Search	User Experience	Metadata
Chat	2	3	1								
Moderation			3	2							
knowledge object			3	30	6	7	3	8	8	19	12
Content				6	4	4	2	10	2	12	12
Category/-ies					2				2	2	1
Visual identification of KO										6	1
Keywords								2			3
Language								1	3	8	4
Search									1	12	2
User Experience										7	6
Metadata											

Figure 10 - Co-occurrence matrix

Results

The outcome of the analysis was the classification scheme shown in Figure 6. Experience of the consortium members from their involvement in the EURAKNOS and EUREKA projects has been utilized for the creation of the classification scheme illustrated below.

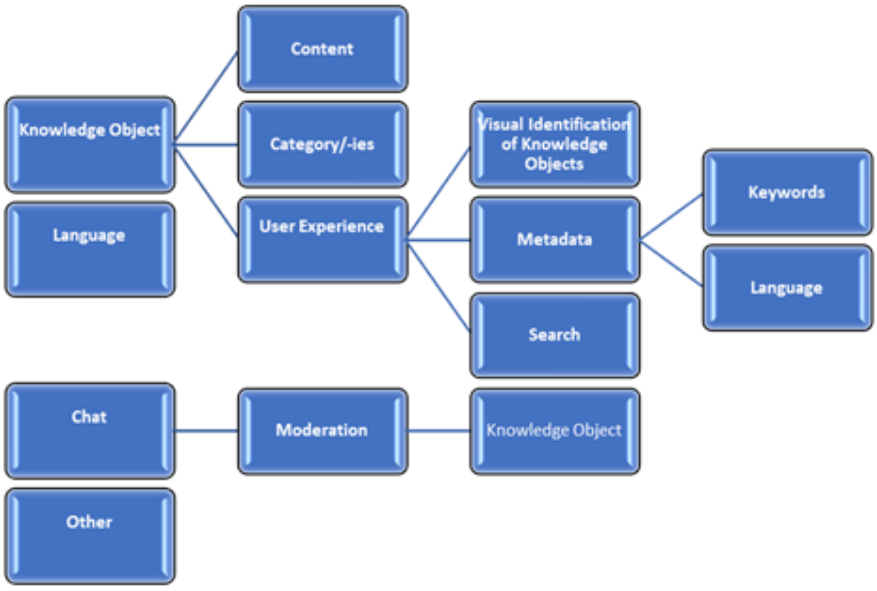

Figure 11 - Hierarchical scheme of keywords

The classification of comments collected in the EUREKA webinars using our classification scheme is provided below. It needs to be noted that there are comments falling into more than one categories. Comments appearing to not fit to any category have been grouped into a separate category named “Other”.

Knowledge Object

- **Content**
  - S1-comm#8[1]: Content sorting (GS2: 2.9/NA-A3: 3.4)
  - S1-comm#9: Content and visualization do not correlate; not always clear who is the author of the article so it is not clear whether it is reliable information. (GS: 8.6/ NA-A: 5.4)
  - S1-comm#11: Consideration of other/more digital content types. (GS: 5/NA-A: 4.1)
  - S1-comm#12: The classification of the contents is not fully appropriate. (GS: 5.6/ NA-A: 3.4)
  - S1-comm#13: Missing content and links (e.g. the Practice Abstracts from Thematic Networks, link to SmartAKIS platform). (GS: 8/NA-A: 6)

- S1-comm#17: Expand more on different types of project deliverables that could become available. (GS: 5.4/NA-A: 5.3)
- S1-comm#23: The preview of documents and presentations to facilitate decisions on whether to download them or not (for further use). (GS: 8/NA-A: 7.7)
- S1-comm#24: Replacement of the default images for delivering content with other ones better linked to the content of the digital object. (GS: 8.1/NA-A: 7.3)
- S1-comm#26: Better identify the project providing the Knowledge Objects by highlight the visual identity of the project (logo). (GS: 8.3/NA-A: 8.3)
- S1-comm#27: Titles should be more relevant to the content. (GS: 6.9/NA-A: 5)
- S1-comm#30: Subtitles for videos should be added. (GS: 8.6/NA-A: 7)
- S1-comm#31: The referred as vetted good practices, at the bottom of the page is not ensured about the way, how vetted, what vetting? (GS: 6.4/NA-A: 4.7)
- S1-comm#46: Limited information that is available now, plus a problem concerning the searches in languages. (GS: 5/NA-A: 3.6)
- S1-comm#47: It is necessary that content is checked by someone (from FarmBook) before it is uploaded. (GS: 7.6/NA-A: 6.4)
- S1-comm#49: The need to put in place a verification system on the quality of the information (for example a mandatory video for each research presented). (GS: 7.9/ NA-A: 5.7)
- S1-comm#52: Difficulty to upload data to the platform. (GS: 6.3/NA-A: 4.1)
- S1-comm#53: Status of sharing of material - Usage right should be clearly based on FAIR data management policies. (GS: 6.7/NA-A: 5.9)
- S1-comm#59: There is a lot of interesting information outside the HE projects for example some blog posts and interviews. (GS: 5.7/NA-A: 3.6)
- S1-comm#67: Some terminologies are not suitable for farmers - e.g. Multi actor, practice, thematic networks. (GS: 8.3/NA-A: 5.7)
- S1-comm#76: Add broader topics. (GS: 4.3/NA-A:4.4)
- Category/-ies
- S1-comm#10: Economics is a tricky category as it is crosscutting and very rarely only economic when it comes to practice. (GS: 7.3/NA-A: 4)
- S1-comm#12: The classification of the contents is not fully appropriate. (GS: 5.6/ NA-A: 3.4)
- S1-comm#14: More categories for describing the digital objects.(GS: 5.7/NA-A: 6.1)
- S1-comm#15: Missing categories (e.g., agroforestry). (GS: 6.6/NA-A: 6.4)

- S1-comm#16: Arboriculture is an underrepresented topic. (GS: 7.6/NA-A: 6.1)
- S1-comm#18: Include a link to experts within each of the categories.(GS: 8/NA-A: 8)
- S1-comm#63: Categories and sub categories. (GS: 2.4/NA-A: 2.4)
- S1-comm#79: Provide sub-sections within the main sections. (GS: 5.7/NA-A: 5.3)
- S1-comm#82: Elaboration on the digital object categories (more could be considered). (GS: 5/NA-A: 4.3)
- S1-comm#87: More categories as you gather more resources (e.g., about the resource 'type'). Otherwise, resources will get lost further down the page - further buttons will likely become useful. (GS: 6.7/NA-A: 5.7)
- User Experience
- S1-comm#54: Make registration easier, preferably a fully automatic registration. (GS: 6.9/NA-A: 6.3)
- S1-comm#55: Photos are large and loading takes a long time on a mobile phone especially with a poorer internet connection. (GS: 7.4/NA-A: 5.1)
- S1-comm#61: Important dates can be found immediately on the desktop (for example “start of the fertilization on field”), in addition links to the regulations, technology description and other technical, and practical aspects of technology/ process etc. (GS: 6.3/NA-A: 4.4)
- S1-comm#62: Important is to create a Smart User profile solution. If forestry and plant management are important topics for concrete person, then the other news on animal husbandry etc would be left behind. (GS: 7.6/NA-A: 7)
- S1-comm#64: Asking questions to the experts. (GS: 5.9/NA-A: 5.1)
- S1-comm#65: Try to remove as much as possible references to the names of specific projects and funding programmes; sometimes quality of translation is not always great. (GS: 7.1/NA-A: 5.9)
- S1-comm#73: Ability to find a friend by topic, i.e. find a friend who is working on pig welfare or agroforestry. (GS: 7.3/NA-A: 5.4)

Visual Identification of Knowledge Object

- S1-comm#9: Content and visualization do not correlate; not always clear who is the author of the article so it is not clear whether it is reliable information. (GS: 8.6/NA-A: 5.4)
- S1-comm#24: Replacement of the default images for delivering content with other ones better linked to the content of the digital object. (GS: 8.1/NA-A: 7.3)
- S1-comm#28: Pictures should be more relevant to the topics. (GS: 7.4/NA-A: 7)
- S1-comm#30: Subtitles for videos should be added. (GS: 8.6/NA-A: 7)

- S1-comm#66: Main photo of each item is quite standard and impersonal. (GS: 7.4/NA-A: 5.1)
- S1-comm#74: Better choice of pictures allowed to the different videos (e.g., a vegetable basket for a silo-pastural project in Poland and a girl feeding dairy cows for a film on lambing aids from Ireland). (GS: 7.4/NA-A: 6.4)
- S1-comm#84: Many knowledge objects related to animal husbandry are illustrated with the dog's footprint photos, that is sticky (use more adequate photos). (GS: 7.4/NA-A: 7)
- S1-comm#89: Use more specific imagery. (GS: 4.6/NA-A: 5.4)

Metadata

- S1-comm#29: There is the need to include more details on the pages (e.g., video length, read time, publishing author etc.). (GS: 8.4/NA-A: 7.6)
- S1-comm#33: The metadata-related information is not so clear. (GS: 5.3/NA-A: 3.1)
- S1-comm#56: Under each article you can see technical meta-data description - this is not necessary for the average user and is confusing. (GS: 7.9/NA-A: 5.6)
- S1-comm#58: A short summary on each knowledge object is needed. It will help to understand quickly what material or article is valuable/interesting/practical for you. (GS: 8.6/NA-A: 7.4)
- S1-comm#59: There is a lot of interesting information outside the HE projects for example some blog posts and interviews. (GS: 5.7/NA-A: 3.6)
- S1-comm#71: Contact details or link to whoever made the video/entry. (GS: 7.6/ NA-A: 7)

Keywords

- S1-comm#32: Keywords should be clickable. (GS: 8.1/NA-A: 7.7)
- S1-comm#34: Important work has to be done on the harmonisation of keywords (e.g., the word "lamb" appears several times but with different spellings in French). (GS: 7.9/NA-A: 5.9)
- S1-comm#60: The keywords are not working well. The platform should allow (in case of need) to take the original material (in original language) for comparison, just to be sure that translation works well. (GS: 6.4/NA-A: 6)

Language

- S1-comm#20: Availability of more digital objects in languages other than English. (GS: 7.6/NA-A: 5)
- S1-comm#21: It was suggested to be covered more languages. (GS: 7.1/ NA-A: 6.1)
- S1-comm#25: The languages and localisations should be listed in alphabetical order. (GS: 8.7/NA-A: 8.6)

- S1-comm#34: Important work has to be done on the harmonisation of keywords (e.g., the word "lamb" appears several times but with different spellings in French). (GS: 7.9/NA-A: 5.9)
- S1-comm#44: Searches are only based on the metadata and not words from the various documents in local languages. (GS: 8/NA-A: 6.1)
- S1-comm#57: Make the machine translation button even more visible. Translation is necessary, but machine translation is always a bit confusing. (GS: 7.9/NA-A: 7.7)
- S1-comm#60: The keywords are not working well. The platform should allow (in case of need) to take the original material (in original language) for comparison, just to be sure that translation works well. (GS: 6.4/NA-A: 6)
- S1-comm#65: Try to remove as much as possible references to the names of specific projects and funding programmes; sometimes the quality of translation is not always great. (GS: 7.1/NA-A: 5.9)
- S1-comm#70: Indication of language of video or presentation before opening it. (GS: 7.6/NA-A:7)

Search

- S1-comm#36: Search filter by date, additional criteria: uploaded since/or since my last visit. (GS: 8.1/NA-A: 7.3)
- S1-comm#37: Improve search function to increase relevance of results. (GS: 6/ NA-A: 5)
- S1-comm#38: "I' m interested in" mixes professional topics (forestry, livestock, crops) with transversal topics (economics, society, environment). These should be 2 separate dimensions to search. (GS: 8.1/NA-A: 7.3)
- S1-comm#39: For searching, the correct language should always be used. (GS: 5.7/NA-A: 4.9)
- S1-comm#40: Need for more filters (by project, by date, types of content, etc.). (GS: 8/NA-A: 7.3)
- S1-comm#41: Search function for two words (e.g., pig feeding). (GS: 7.9/NA-A: 7.9)
- S1-comm#42: Ability to choose more than one category “I’ m interested in”. (GS: 8/NA-A: 7)
- S1-comm#43: Include AND and NOT in the search function. (GS: 8.7/NA-A: 7.3)
- S1-comm#44: Searches are only based on the metadata and not words from the various documents in local languages. (GS: 8/NA-A: 6.1)
- S1-comm#45: Find a way to shorten search time. (GS: 6.9/NA-A: 5.1)

- S1-comm#46: Limited information that is available now, plus a problem concerning the searches in languages. (GS: 5/NA-A: 3.6)
- S1-comm#68: It would be useful to be able to return to search results rather than return to overview when you have used selection criteria to filter results. (GS: 8.4 /NA-A: 7.3)
- S1-comm#69: User being able to search in more detail (e.g., non-organic agroforestry, or just pig welfare). (GS: 6.6/NA-A: 6)
- S1-comm#88: Search functionality needs work. (GS: 4/NA-A: 3)

Language

- S1-comm#19: Improvement of translation functionality. (GS: 6.4/NA-A: 5.9)
- S1-comm#25: The languages and localisations should be listed in alphabetical order. (GS: 8.7/NA-A: 8.6)
- S1-comm#34: Important work has to be done on the harmonisation of keywords (e.g., the word "lamb" appears several times but with different spellings in French). (GS: 7.9/ NA-A: 5.9)
- S1-comm#39: For searching, the correct language should always be used. (GS: 5.7/ NA-A: 4.9)
- S1-comm#46: Limited information that is available now, plus a problem concerning the searches in languages. (GS: 5/NA-A: 3.6)
- S1-comm#75: More languages to be added. (GS: 6.3/NA-A: 6.6)
- S1-comm#78: The translations quality is bad and not all materials are translated. (GS: 6.4/NA-A: 5.9)
- S1-comm#80: Automatic translation not always convincing. (GS: 5.3/NA-A: 3.9)
- S1-comm#81: The languages should be listed in alphabetical order. (GS: 8.7/NA-A: 8.9)
- S1-comm#83: Automatic translation does not work very well. (GS: 5.1/NA-A: 4.4)

Chat

- S1-comm#1: The chat function not so relevant. (GS: 4.6/NA-A: 2.9)
- S1-comm#2: The chat function is suitable for networking and consultation. (GS: 7.3/ NA-A: 2.9)
    - **Moderation**
- S1-comm#3: Moderation is necessary in the chat function and the comment should be made only on a specific material. (GS: 8.1/NA-A: 7.4)
- S1-comm#4: Moderation is not necessary in the chat function. (GS: 8.1/NA-A: 5.3)

- S1-comm#5: Moderation is necessary in the chat function and to be traceable the chat function has to be interconnected to the knowledge object. (GS: 8.4/NA-A:6.7)

- **Knowledge Object**
- S1-comm#48: Not clear how the EU-FarmBook controls the quality of the uploaded material & about the status of sharing the uploaded material and its usage right. (GS: 8.1/NA-A: 6)

Other

- S1-comm#6: Divide the type “document” in subtypes. (GS: 7.9/NA-A: 6.6)
- S1-comm#22: Monitoring of applications, compatibility with other applications, grant finder. (GS: 5.9/NA-A: 4.4)
- S1-comm#35: Not GDPR compliant, no possibility to refuse non-technical cookies (especially pages with video, podcasts...). (GS: 8/NA-A: 6.3)
- S1-comm#50: Expert’s network appears weak. (GS: 5.6/NA-A: 4.6)
- S1-comm#51: The roles of expert and community need further discussion. (GS: 4.9/ NA-A: 4.1)
- S1-comm#72: Copyright terms should be clearer and easier to find. (GS: 7.9/NA-A: 7.6)
- S1-comm#77: Interoperability with other relevant systems. (GS: 4.1/NA-A: 3.7)
- S1-comm#86: An error seems to occur using the platform in Chrome (the cookie box does not disappear after accepting the terms). (GS: 8.7/NA-A: 6.3)
- S1-comm#85: Lack of context elements (not found the visual identity of the contributing project). (GS: 6.4/NA-A: 5.1)

The comments with the highest average ratings (≥7) in both scales are presented in Table 1 below. A subset of those comments (see Annex 9.7) have been considered for the definition of features for the MVP version of the platform. These comments have been internally voted as those relating to the EU-FarmBook platform’s front-end to be initially considered and addressed. The rest of the comments with average rating values ≥ 7 (in both rating scales) will be addressed as part of development of future platform versions (i.e., versions following the MVP) on a priority basis. The selection of comments to be addressed in this first round of development has been made by considering the strong focus of the MVP development on the system’s back-end and the improvement of back-end functions.

Table 1: List of comments with an average rating ≥7 in both rating scales

Category	Comment	Average Rating
Knowledge Object > Content	**S1-comm#23** The preview of documents and presentations to facilitate decisions on whether to download them or not (for further use).	GS: 8 NA-A: 7.7

	S1-comm#24 Replacement of the default images for delivering content with other ones better linked to the content of the digital object.	GS: 8.1 NA-A: 7.3
	S1-comm#26 Better identify the project providing the Knowledge Objects by highlight the visual identity of the project (logo).	GS: 8.3 NA-A: 8.3
	S1-comm#30 Subtitles for videos should be added.	GS: 8.6 NA-A: 7
Knowledge Object > Category/-ies	**S1-comm#18** Include a link to experts within each of the categories.	GS: 8 NA-A: 8
Knowledge Object > User Experience	**S1-comm#62** Important is to create a Smart User profile solution. If forestry and plant management are important topics for concrete person, then the other news on animal husbandry etc would be left behind.	GS: 7.6 NA-A: 7
Knowledge Object > User Experience > Visual Identification of Knowledge Objects	**S1-comm#24** Replacement of the default images for delivering content with other ones better linked to the content of the digital object.	GS: 8.1 NA-A: 7.3
	S1-comm#28 Pictures should be more relevant to the topics.	GS:7.4 NA-A: 7
	S1-comm#30 Subtitles for videos should be added.	GS: 8.6 NA-A: 7
	S1-comm#84 Many knowledge objects related to animal husbandry are illustrated with the dog's footprint photos, that is sticky (use more adequate photos).	GS: 7.4 NA-A: 7
Knowledge Object > User Experience > Metadata	**S1-comm#29** There is the need to include more details on the pages (e.g., video length, read time, publishing author etc.).	GS:8.4 NA-A: 7.6
	S1-comm#58 A short summary on each knowledge object is needed. It will help to understand quickly what material or article is valuable/interesting/practical for you.	GS: 8.6 NA-A: 7.4
	S1-comm#71 Contact details or link to whoever made the video/entry.	GS:7.6 NA-A: 7
Knowledge Object > User Experience > Metadata > Keywords	**S1-comm#32** Keywords should be clickable.	GS: 8.1 NA-A: 7.7

Knowledge Object > User Experience > Metadata > Language	**S1-comm#25** The languages and localizations should be listed in alphabetical order.	GS: 8.7 NA-A: 8.6
	S1-comm#57 Make the machine translation button even more visible. Translation is necessary, but machine translation is always a bit confusing.	GS: 7.9 NA-A: 7.7
	S1-comm#70 **Indication of language of video or presentation before opening it.**	GS: 7.6 NA-A:7
Knowledge Object > User Experience > Search	**S1-comm#36** Search filter by date, additional criteria: uploaded since/or since my last visit.	GS: 8.1 NA-A: 7.3
	S1-comm#38 "I' m interested in" mixes professional topics (forestry, livestock, crops) with transversal topics (economics, society, environment). These should be 2 separate dimensions to search.	GS:8.1 NA-A: 7.3
	S1-comm#40 Need for more filters (by project, by date, types of content, etc.).	GS:8 NA-A: 7.3
	S1-comm#41 Search function for two words (e.g., pig feeding).	GS: 7.9 NA-A: 7.9
	S1-comm#42 Ability to choose more than one category “I’ m interested in”.	GS: 8 NA-A: 7
	S1-comm#43 Include AND and NOT in the search function.	GS: 8.7 NA-A: 7.3
	S1-comm#68 It would be useful to be able to return to search results rather than return to overview when you have used selection criteria to filter results.	GS: 8.4 NA-A: 7.3
Language	**S1-comm#25** The languages and localizations should be listed in alphabetical order.	GS: 8.7 NA-A: 8.6
	S1-comm#81 The languages should be listed in alphabetical order.	GS: 8.7 NA-A: 8.9
Chat > Moderation	**S1-comm#3** Moderation is necessary in the chat function and the comment should be made only on a specific material.	GS: 8.1 NA-A: 7.4
Other	**S1-comm#72** Copyright terms should be clearer and easier to find.	GS: 7.9 NA-A: 7.6

9.5. User Stories

The table below reports the outcomes of EURAKNOS and EUREKA projects regarding user needs, presented in the form of user stories. These users, who are potential users of the EU- FarmBook platform, have provided input regarding their needs in EURAKNOS and EUREKA workshops. This input has been collected and reported in the deliverables of those projects.

The work done in the previous projects is considered relevant and important to the work currently in progress in the EU-FarmBook progress for identifying and defining requirements and features for the MVP version of the platform. Moreover, we inherit the user categories from the previous projects (e.g., farmers, advisors, etc.). Given that this input has been recently collected (from September 2019 to March 2021), the collected needs are considered relevant and valuable for our work in the EU-FarmBook project.

As a	I want to	so I can
Homepage		
Farmer	see the main topics	explore the content
Farmer	set the language	use the EU-FarmBook in my own language
Platform Admin	edit the main navigation	Structure the platform without technical people
Community Manager	edit the small text in the footer of the platform	keep it up-to-date
Community Manager	make announcements on the platform	keep the users up-to-date
Community Manager	manage the images of the topics	keep them relevant
Consortium	add categories in the future	be future-proof
Farmer	find links to the EU-FarmBook website	easily link back and forth
Accounts		
Farmer	register	use the platform
Consortium	learn from registered users their data	make better choices
Farmer	give my profession and interest during the registration	see content tailored to my needs
Farmer	Login	use the platform

Farmer	Login using a 3rd party service like Google or Facebook	log in with existing credentials
Farmer	Login using the SSO OpenID service of the European Commission	log in with existing credentials
Farmer	edit my profile	keep it up-to-date
Farmer	Logout	
Farmer	Keep a list of favourites	find them back later
Farmer	Get suggested content	be inspired by the content on the platform
Researcher	Register	contribute
Researcher	Login	contribute
Researcher	edit my profile	keep it up-to-date.
Researcher	Add myself to the platform as an expert	be found as an expert on the platform if I want to
Researcher	contribute to the platform	share my work
Community Manager	Validate new experts	assure the quality of the users on the platform

Knowledge Objects

Farmer	See the KO's of a topic	explore the topic
Farmer	see the image linked to a KO	have a more illustrated view
Farmer	see the short description of a KO	know if it's something that is of my interest
Farmer	see the keywords of a KO	know if it's something that is of my interest
Farmer	see the detail page of a KO	consume the information
Farmer	download the original file of a KO	consume the information
Farmer	read the metadata of the KO in my own language	consume the information
Farmer	download the original file of a KO in my own language	consume the information
Farmer	listen to audio fragments	consume the information
Farmer	watch video fragments	consume the information
Farmer	read a translation of the audio/video content (subtitles)	consume the information
Farmer	upvote/downvote a KO	help the community to show what is relevant
Farmer	comment on a KO	share my knowledge/ask questions
Farmer	translate a comment on a KO	read it in my language
Farmer	share the link of a KO (Copy link + LinkedIn)	share it with my peers
Farmer	flag information (incorrect, outdated, ...)	signal the platform managers to revise the content
Farmer	favourite a KO	find it again at a later time

Farmer	favourite a KO	get recommendations on my behaviour on the platform
Farmer	click on the author of a KO	see other KO's by this author
Farmer	click on the author of a KO	see the information of the author/expert
Farmer	See the older versions of a KO if available	see the changes that were made
Researcher	see the raw metadata of a KO	use it to integrate
Researcher	see how I can access the raw data over an API	use it in my own systems
Community Manager	moderate the conversations in the comments (delete)	keep the EU-FarmBook a friendly place
Community Manager	see which KOs are rated badly or flagged	keep the high quality of content on the EU-FarmBook

Community

Farmer	see the community threads & discussions	learn from other questions
Farmer	contribute to the community threads & discussions	requests answers from peers
Farmer	translate a thread or discussion	read it in my language
Farmer	upvote/downvote a thread or discussion	help the community to show what is relevant
Farmer	comment on a thread or discussion	share my knowledge/ask questions
Farmer	translate a comment on a thread or discussion	read it in my language
Farmer	share the link of a thread or discussion (Copy link + LinkedIn)	share it with my peers

Experts

Farmer	see the experts within a topic	know who to contact with questions/see who shared content
Farmer	See detailed information of an expert	know more about the expert
Farmer	See the KO's by an expert	read them
Farmer	See the activity of an expert	follow them
Farmer	Sort the experts	browse the list easily
Farmer	Filter the experts based on parameters	find the expert I need
Researcher	Add myself to the platform as an expert	be found as an expert on the platform if I want to
Platform Admin	manage experts	guard the quality of the platform

Search

Farmer	Search for a knowledge object based on my query	find results
Farmer	Search in my own language	find results
Farmer	Have a smart search that does more than string-matching	be inspired
Farmer	Filter my search results	find better results
Farmer	Sort my search results	find better results
Farmer	Have a list- & grid view of the search results	scan the results faster
Researcher	create exports of the search results	analyse them elsewhere
Consortium	Expose the search over an API	integrate with other services

General information

Community Manager	manage the content of the about page in all the languages	share information about EU-FarmBook
Community Manager	manage the content of the help page in all the languages	share information about EU-FarmBook
Community Manager	manage the content of the Terms & Conditions page in all the languages	share information about EU-FarmBook
Community Manager	manage the content of the Disclaimer page in all the languages	share information about EU-FarmBook
Community Manager	manage the content of the Privacy & Cookie policy page in all the languages	share information about EU-FarmBook
Community Manager	share and maintain the manual of EU-FarmBook	always share the latest version with the users
Community Manager	Receive the form submissions of the contact page	answer the questions
Consortium	have consent to use cookies on behalf of the user	be legally okay
Consortium	have a link back to more information about the consortium	share information about the consortium

UI Translations

Consortium	have an easy system to manage the micro-copy in all languages	keep the translations up to date
Consortium	Have a system to translate the needed copy automatically	keep the translations up to date quickly
Farmer	have the interface in the language of my computer automatically	start using the platform immediately

Other

Farmer	Read the FAQ	learn from previous questions
Farmer	ask to add a Q to the FAQ	find an answer
Community Manager	edit/add/delete the questions in the FAQ	keep it up-to-date
Consortium	have a view on the usage of our platform (analytics)	make decisions based on data

Chatbot

Farmer	Get (personalised) recommendations on interesting knowledge objects	stay up-to-date with innovations relevant to me
Farmer	Get quick responses to my questions	find answers more rapidly
Farmer	build my own knowledge	improve my techniques

Upload form

Researcher	add my KO to the platform through a manual upload form	share my research
Researcher	add my KO to the platform through an automated upload/ingestion	share my research without a lot of manual work
Researcher	See my contributions to the platform	manage them
Researcher	Edit my contributions to the platform	make sure they are high-quality
Researcher	Validate the metadata that the system has generated	make sure it is correct
Researcher	I want to add several language versions of the same KO	provide the existing translations
Researcher	Export the automated translations of a KO	use them elsewhere
Researcher	Create a new version of a KO	track changes in a version history
The platform	read the content of a KO	generate metadata automatically

9.6. Feature Summary

Following standard Agile programming methodology and terminology, the following provides the initial set of Epics, Features and Tasks identified for implementing the MVP and future releases of the EU-FarmBook platform. These will be further analysed and edited as appropriate throughout the development cycle.

EPIC NAME: User Interface and User Experience
OWNER: Leap Forward
FEATURE: **User Access**: Allowing consumers of the EUF to create an account, edit user preferences etc.
TASKS/PBIS:

- Define and create schemas and images required
- Define the scope of the user access feature
- User account creation interface/pages (The user can create an account)
- User account preferences interface/pages (The user can select the KO metadata to be delivered to him/her)
- User feedback (The user can leave feedback regarding their experience of the EUF)

FEATURE: **Home Page**: The content and functionality of the main landing page for the EUF
TASKS/PBIS:

- Define and create schemas and images required
- Define the scope, content and functionality of the main landing page to the EUF.
- Search (Perhaps should be its own feature given complexity and dependencies)
- Content category filter (e.g. type, category, country etc.)

FEATURE: **Knowledge Object Interaction**: The ability for users to interact with knowledge objects on the site
TASKS/PBIS:

- Define and create schemas and images required
- Flagging / Starring KOs as favourite
- Download KO
- Share KO link
- View KO Metadata
- Find similar knowledge objects

FEATURE: **Supporting Pages and Information**: Additional site pages within EUF
TASKS/PBIS:

- Define and create schemas and images required
- Help Page/Contact Us
- GDPR/Disclaimer
- Comment Section
- FAQ
- General privacy, cookie consent, disclaimers, terms & conditions

EPIC NAME: Knowledge Object Collection
EPIC OWNER: AUA

FEATURE: **User Access**: Allowing contributors to the EUF to create an account.
TASKS/PBIS:

- Define the scope of the user access feature
- Define criteria for who can/cannot create a contributor access
- User account creation (The contributor can create an account)

FEATURE: **Metadata validation**: Allowing contributors to create, edit and submit metadata for their KO.
TASKS/PBIS:

- Misspelling/typo capturing facility
- Notification in the case of uploading a KO that is already available in the platform
- Notification in the case of not having filled a mandatory field
- Preview of the assigned metadata values before KO submission
- Potential to edit the metadata of a KO before the final submission
- Automatically draw metadata about the project being the source of a KO from a relevant database (e.g., CORDIS)

Out of scope for MVP

- Upload multiple KOs
- Draw metadata from another repository (e.g., Zenodo) where the KO is stored
- Possibility to display or not the information on the people who publish

  Post to social media from the EUF page

EPIC NAME: Storage and Storage Services
OWNER: Maastricht University

FEATURE: **Knowledge Objects**: Enabling the EU-FarmBook to collect and store Knowledge Objects for consumption by other services and interfaces

TASKS/PBIs:

- Defining and agreeing on a physical location for knowledge objects
- Generation of unique ID / DOI to be persisted throughout metadata / other data.
- Knowledge object content parsing (raw data extraction) (MOVE TO NLP)
- Assessment of a KO's compliance to the FAIR principles (VALIDATION SERVICE?)
- Raise a flag when a KO's FAIR score is below a threshold (VALIDATION SERVICE)

FEATURE: **Knowledge Object Metadata**: Knowledge Object related metadata storage for consumption by other services and interfaces

TASKS/PBIs:

- Define Schema(s)
- Define validation rules (required, format etc.)
- Define versioning rules
- Capture the metadata of a KO in X languages
- Make technical details available through metadata (e.g., fps, duration, image quality, etc.)
- Capture provenance information
- Create CRUD functions (for consumption by API)

FEATURE: **User Interface Objects**: A repo for data, metadata, images etc., which directly configure or support the User Interfaces

TASKS/PBIs:

- Define and agree on the scope of what is/isn't a user interface object
- Define schemas where necessary
- Help Pages Config (to be managed by the content manager)
- Contact Us Page (to be managed by the content manager)
- EUF official images
- EU / Horizon official text/disclaimers
- Create CRUD functions (for consumption by API)

FEATURE: **Semantic/Ontologies**: The EU-FarmBook's ontological data model

TASKS/PBIs:

- Service to connect to AGROVOC and store ontology/semantics
- Define and agree on Ontologies available/needed
    1. KO types
    2. topics/subjects,
    3. user profile
- Topics of a KO captured in the ontology
- The ontology can be easily updated/expanded

FEATURE: **Knowledge Graph**: The EU-FarmBook's knowledge graph

- Use universal schema and definition of knowledge
- KG to be initially built from metadata + KOs, then potentially augmented. KG uses the EUF ontologies as its schema.
- Map&Link to other KG

FEATURE: **UI Analytics**: The data and analysis regarding front-end user interactions with UIs.

- Access to Google Analytics or similar API
- Search Term results linked to the user session

EPIC NAME: Services
OWNERS: VICOMTEC, TNO, MU, AUA

FEATURE: **NLP / Deep Learning**: A set of NLP / DL services which extract knowledge and metadata from Knowledge Objects with the support of other services, including semantics/ontologies
TASKS/PBIs:

- Textual based NLP
- Conversion documents -> raw text
- Entity extraction
- Intent extraction
- Conversion of PPT/Image text to text
- Conversion of Audio to Text
- Document classification (into pre-defined categories/topics)
- Document salient keywords extraction

FEATURE: **Language Translation**: Services which translate objects and text from native to (all) European languages.

TASKS/PBIs:

- Translation of Knowledge Object Metadata
- Translation of Knowledge Objects
- Translation of UI

FEATURE: **Upload Validation**: Validation of the metadata and knowledge objects provided by consumers

TASKS/PBIs:

- Spelling and Grammar
- Relevance to projects scope
- Quality badge based on completion rules
- Consistency check: To check if KO and metadata of KO are saying the same thing

FEATURE: **Knowledge Graph**: The service which extracts and transforms metadata and ontologies/semantics into knowledge graph and SPARQL endpoint (or similar)

TASKS/PBIs:

- SPARQL endpoint
- Extract Knowledge from KO itself (not only metadata of KO)

FEATURE: **Semantic/Ontology**: Extraction and updating relevant external ontologies/semantics, which will contribute to / complement the knowledge graph and metadata

TASKS/PBIs:

- Semantic comparison
- Semantic search
- User feedback adaptation
- Topic recommendation

FEATURE: **Chatbot:** Enabling users/consumers to interact with an AI bot which helps them find relevant information and knowledge objects to meet their needs.

TASKS/PBIs:

- Understanding Natural Language queries
- Dialogue Management
- Dialogue Generation
- Combining knowledge and ongoing dialogue
- Recommender
- Interaction over time (including chat history)
- Intent extraction
- Research user experience
- Identify use cases
- Interaction with different chatbot types (text-based vs Voice-based vs Multi-modal)

EPIC NAME: API
OWNER: MU

FEATURE: **API Endpoints:** Services enabling data and objects to be transferred between other services, interfaces and the storage layer.

TASKS/PBIs:

- Save/update Knowledge Objects from the User Upload Form
- Integration with CRUD operations within each service
- External data sources and models, including UI Analytics, can be pushed into storage.

9.7. Associating EUREKA survey results with platform features

Category	Comment	Associated feature
Knowledge Object > User Experience	**S1-comm#62** Important is to create a Smart User profile solution. If forestry and plant management are important topics for concrete person, then the other news on animal husbandry etc would be left behind.	**EPIC NAME**: User Interface and User Experience **FEATURE**: **User Access**: Allowing consumers of the EU-FarmBook to create an account, edit user preferences etc TASKS/PBIS: ● Define scope of user access feature ● User account creation interface/pages (The user can create an account) ● User account preferences interface/pages (The user can select the KO metadata to be delivered to him/her) **FEATURE: Knowledge Object Interaction:** The ability for users to interact with knowledge objects on the site TASKS/PBIS: ● Find similar knowledge objects **FEATURE: User Access:** Allowing contributors to the EU-FarmBook to create an account. TASKS/PBIS: ● User account creation (The contributor can create an account) ● Define and agree Ontologies available/needed 1. KO types 2. topics/subjects, 3. user profile
Knowledge Object > User Experience > Visual Identification of Knowledge Objects	**S1-comm#28** Pictures should be more relevant to the topics.	**EPIC NAME**: User Interface and User Experience **FEATURE**: User Access: Allowing consumers of the EUF to create an account, edit user preferences etc. TASKS/PBIS ● Define and create schemas and images required

Knowledge Object > User Experience > Metadata	**S1-comm#29** There is the need to include more details on the pages (e.g., video length, read time, publishing author etc.).	**EPIC NAME**: Storage and Storage Services **FEATURE**: Knowledge Object Metadata: Knowledge Object related metadata storage, for consumption by other services and interfaces TASK/PBI: ● Make technical details available through metadata (e.g., fps, duration, image quality, etc.)
	S1-comm#58 A short summary on each knowledge object is needed. It will help to understand quickly what material or article is valuable/interesting/practical for you.	**EPIC NAME**: User Interface and User Experience **FEATURE**: Knowledge Object Interaction: The ability for users to interact with knowledge objects on the site TASK/PBI: ● View KO Metadata
	S1-comm#71 Contact details or link to whoever made the video/entry.	**EPIC NAME**: User Interface and User Experience **FEATURE**: Supporting Pages and Information: Additional site pages within the EU-FarmBook TASK/PBI: ● Comment Section **EPIC NAME**: Storage and Storage Services **FEATURE**: Knowledge Object Metadata: Knowledge Object related metadata storage, for consumption by other services and interfaces TASK: ● Capture provenance information
Knowledge Object > User Experience > Metadata > Keywords	**S1-comm#32** Keywords should be clickable.	**EPIC NAME**: Services **FEATURE**: NLP/Deep Learning: A set of NLP/Deep Learning services which extract knowledge and metadata from Knowledge Objects, with the support of other services including semantics/ontologies TASK/PBI: ● Document salient keywords extraction

Knowledge Object > User Experience > Metadata > Keywords	**S1-comm#25** The languages and localisations should be listed in alphabetical order.	**EPIC NAME**: Storage and Storage Services **FEATURE**: Knowledge Objects: Enabling the EU-FarmBook to collect and store Knowledge Objects, for consumption by other services and interfaces TASK/PBI: ● Defining and agreeing a physical location for knowledge objects
Knowledge Object > User Experience > Search	**S1-comm#36** Search filter by date, additional criteria: uploaded since/or since my last visit.	**EPIC NAME**: User Interface and User Experience **FEATURE**: Home Page: The content and functionality of the main landing page for the EU-FarmBook TASKS/PBIS: ● Search
	S1-comm#38 "I' m interested in" mixes professional topics (forestry, livestock, crops) with transversal topics (economics, society, environment). These should be 2 separate dimensions to search.	**EPIC NAME**: User Interface and User Experience **FEATURE**: Home Page: The content and functionality of the main landing page for the EUF TASKS/PBIS: ● Search ● Content category filter (e.g. type, category, country etc.)
	S1-comm#40 Need for more filters (by project, by date, types of content, etc.).	**EPIC NAME**: User Interface and User Experience **FEATURE**: Home Page: The content and functionality of the main landing page for the EUF TASKS/PBIS: ● Search ● Content category filter (e.g. type, category, country etc.)
	S1-comm#42 Ability to choose more than one category “I’ m interested in”.	**EPIC NAME**: User Interface and User Experience **FEATURE**: Home Page: The content and functionality of the main landing page for the EUF TASKS/PBIS: ● Search ● Content category filter (e.g. type, category, country etc.)

Language	**S1-comm#25** The languages and localisations should be listed in alphabetical order.	**EPIC NAME**: Storage and Storage Services **FEATURE**: Knowledge Objects: Enabling the EU-FarmBook to collect and store Knowledge Objects, for consumption by other services and interfaces TASK/PBI: ● Defining and agreeing a physical location for knowledge objects
Chat > > Moderation	**S1-comm#3** Moderation is necessary in the chat function and the comment should be made only on a specific material.	**EPIC NAME**: User Interface and User Experience **FEATURE**: Supporting Pages and Information: Additional site pages within the EU-FarmBook TASK/PBI: ● Help Page/Contact Us
Other	**S1-comm#72** Copyright terms should be clearer and easier to find.	**EPIC NAME**: User Interface and User Experience **FEATURE**: Supporting Pages and Information: Additional site pages within the EU-FarmBook TASK/PBI: ● General privacy, cookie consent, disclaimers, terms & conditions