Synthesis of results & contribution to roadmap (M18)

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VERSION		Submission DATE	TOPICS
D.1.4	Synthesis of results and contribution to roadmap (M6)	14/09/2017	e-infrastructure and analysis of existing e-infrastructures Mapping of the landscape (data model and tools) Contribution to the roadmap (first approach of the main topics)
D.1.5	Synthesis of results and contribution to roadmap (M12)	22/12/2017	Update of the bibliometric study Online map Vision paper
D.1.6	Synthesis of results and contribution to roadmap (M18)	27/06/2018	Bibliometric study web site Feedback on the Vision paper Interaction with EOSC initiatives Final approach of the roadmap and feedback

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EXECUTIVE SUMMARY

This deliverable provides an update on the progress of the activities carried out under Work Package 1 “Ecosystem & Community” and is the continuation of Deliverable 1.4 and 1.5 “Synthesis of results & contribution to roadmap (M6-M12)”. In particular:

- The bibliometric study has been turned into an interactive web tool to visualize and interact with the data from the analysis of the bibliometric study.
- The process to discuss and update the Vision Paper, which has been incorporated as the first section of the e-ROSA Roadmap for a European e-Infrastructure for Open Science in Agricultural and Food Sciences
- The interactions and liaisons with EOSC related projects (EOSC pilot, EOSC Hub) to better position our work related with the preparation of the roadmap
- The process to elaborate the roadmap

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1 INTRODUCTION

The e-ROSA project seeks to build a shared vision of a future sustainable e-infrastructure for research and education in agri-food in order to promote Open Science in this field and as such contribute to addressing related societal challenges. Its overall objective is to support the co-development of an ambitious, practical roadmap that expresses the needs of related scientific communities and stakeholders at global level and that provides the basis for the design and implementation of such an e-infrastructure in the years to come.

In order to support the elaboration of this roadmap, several activities have been implemented under Work Package 1 "Ecosystem & Community" to map and engage the e-ROSA stakeholder community:

- A bibliometric analysis in order to test a first source of information (i.e. scientific publications) to identify which research organisations work within our scope, on which specific topic(s) and through what kind of collaboration;
- The development of an online map to create an open knowledge base that will allow (i) the discovery by the e-ROSA community of identified key stakeholders and networks that compose the current data and (e-) infrastructures ecosystem in Europe and beyond for agri-food research (including generic e-infrastructures and services), and (ii) the identification by the e-ROSA community itself of new stakeholders, initiatives and infrastructures that can support the implementation of the e-ROSA roadmap;
- The analysis of strategic documents, roadmaps and existing infrastructures to nurture internal reflections on the vision and the roadmap to be developed under e-ROSA.

More detailed information on the overall approach of WP1 is detailed in Deliverable 1.4 "Synthesis of results & contribution to roadmap (M6)".

The deliverable 1.5 provided an update on the progress of those activities. In particular, the envisioned update of the bibliometric study, the main characteristics of the online map and the first version of the Vision paper.

This deliverable seeks to provide an update on the progress of those activities and process to elaborate the roadmap. In particular:

- It explains why we decided finally to focus on data visualization from the bibliometric study and how;
- The process to build and review the vision paper and the conclusions we drew for the roadmap;
- The interactions with EOSC related projects, as the "European open science cloud" vision is of paramount importance for the development of e-infrastructures services in Europe for all the scientific communities, and the conclusions of these interactions
- The process to write and review the roadmap

2 BIBLIOMETRIC ANALYSIS UPDATE

2.1 RATIONALE AND OBJECTIVES

An initial bibliometric study was carried out at the beginning of the e-ROSA project as a first attempt at describing the heterogeneous landscape of agricultural data science. It sought to:

- identify key researchers and research institutions that focus on this issue and analyse to what extend they collaborate;
- link these stakeholders to specific topics that relate to the data science issue in agricultural research in order to better interpret the landscape of identified stakeholders.

Deliverable 1.1 "Bibliometric study results" presents the methodology used and the results of this first study, and it highlights the need to update the study. In addition, the content of this deliverable has been reviewed during the mid-term review of the project, allowing to discuss the need for an update. Thus, the objectives of the updating process were to:

i. include new scientific publications;
ii. refine the scope of the study, and in particular the query applied to the Web of Science (WoS) to extract the study corpus;
iii. refine the expected results of the study, including the relevant format of outcomes for practical use and valorisation under the e-ROSA project:
    - elaborating a relational database that clearly highlights the links between authors, institutions, countries and topics would be of high added value for project partners in order to target key institutions;
    - using an interactive interface to present the data in user-friendly manner could allow for efficient dissemination across the e-ROSA community;
iv. re-evaluate and validate the adopted methodology with project partners according to the study's objectives; and
v. refine the topics of interest in order to fully reflect the data-related issues that the research communities are facing in the agricultural field (e.g. integrate the issue of data production).

2.2 UPDATING OF THE SEARCH QUERY

As described in the deliverable D1.5, a corpus covering 10 years from 2008 to 2017 (instead of 12 years) was extracted in order to focus the study on more recent publications. This corpus represents a total of **156,630 references**.

2.3 WAIVER OF THE UPDATE AND DECISION TO CAPITALIZE ON THE PREVIOUS CONTENT

After having downloaded the corpus we re-evaluated the tasks and associated "per month" to finalize the new report (see the tasks description in D1.5 paragraphs 2.3 and 2.4) and we decided not to updated the corpus but to improve the dissemination of the results as it was not easy to interact with the PDF report.

Since the beginning of M18, the data have been published online in an interactive portal. This allows anyone to access, query and manipulate the bibliographic data in a graphical interface. The technology we use provides means to better understand the collected data and focus on data of particular interest. We use LODEX[1], a tool developed at Inist-Cnrs, France which is based on Linked Open Data technologies.

[1] https://github.com/Inist-CNRS/lodex

The data is accessible at this web address: http://e-ROSA-study.inra.lodex.fr/

When the user accesses the homepage, he discovers a set of graphs that propose different views on the data. The presented graphs correspond to almost all the graphs of the deliverable D1.1. Each graph can be viewed individually by clicking on “Voir les détails”, and manipulated using combinable filters on data fields, e.g. country, date, topic, etc. The graphs then dynamically update accordingly.

The data used to produce is shown as a list of readable documents accompanied with their metadata. Those lists as well as graphs can be exported for further use or publication.

The added value of this presentation of the bibliometric study data and results is the possibility to produce focused analyses and also see and manipulate the source data.

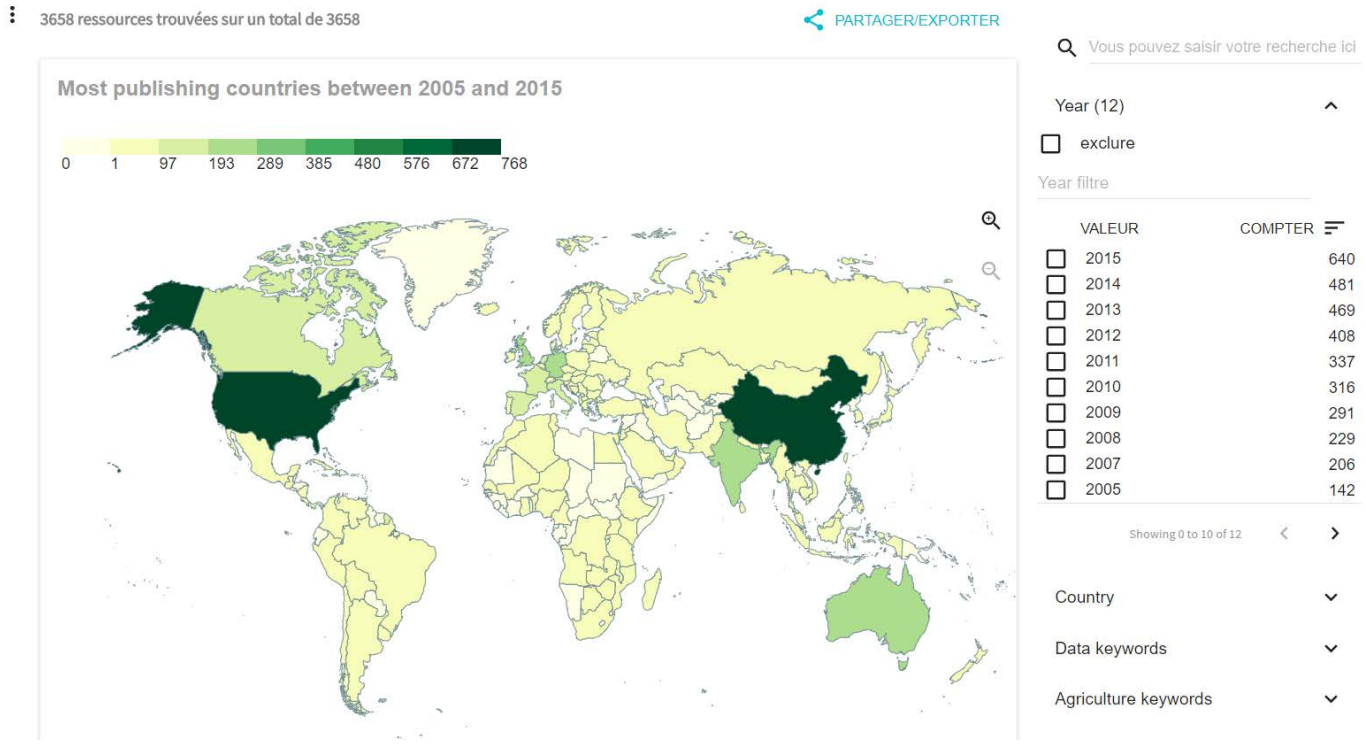

Figure 1: Map with the most publishing countries between 2005 and 2015

3 FEEDBACK ON THE VISION PAPER

3.1 WRITING THE VISION PAPER AS A COLLABORATIVE EFFORT

The writing of the vision2030 statement was planned from the beginning as a collaborative effort, not limited to the participants of the e-ROSA project. The first ideas for the necessity of a vision statement had come up at the first stakeholder workshop, which discussed the state of research information infrastructures. Between the first and the second stakeholder workshop it became clear that there was a real need for such a vision statement. At the second stakeholder workshop a first version of the Vision statement was presented. During the discussion around the vision paper it became very clear that we are not talking about agricultural research, also simple extension to food and nutrition is not enough. The vision refers to the entire food system from production to consumption including the chain. This means research is a concept which is broadly inclusive, not only directed to academic research, but including the farm, the food industry and the citizens. This view was strongly confirmed and endorsed during the online consultation on the first version of the vision. Another point that was emphasized was the global character. Improving of the food system is not a national, not a European, but an international endeavour. Other salient points from the discussion was the necessity of a Multi stakeholder approach and private public cooperation

3.2 STAKEHOLDERS INTERESTED IN THE WRITING PROCESS

The e-ROSA consortium invited a larger group of stakeholders to participate in the discussion – based on existing relations, professional contacts and collaborations. And important role played also the International Advisory Board, which discussed the Vision statement. The IAB clearly expressed its opinion that the fist version of the vision statement was too Europe centric.

In the online discussion and editing process participated 17 professionals from 3 continents (USA, India, China, Europe) and important organizations (CGIAR, CAAS, ICAR, Bayer, INRA, CABI)

3.3 PARTICIPATION METHODOLOGIES AND ITS LIMITATIONS

To give maximum influence to the reviewers, the vision document was opened as an online document for collective editing. This process has the very advantage, that reviewers not simply issue comments, but try to create opinion and language. But with more than 3 or 4 reviewers the process gets intrinsically messy. Important direction changes are difficult to distinguish from editorial remarks and there is a process of revision of the revision. Nevertheless, the process was extremely useful and of paramount importance of the version of the vision document, which found its way into the roadmap.

For the review of the roadmap though, we chose another strategy offering structured web form for giving feedback (see 5. in this document)

4 INTERACTION WITH EOSC RELATED INITIATIVES

As the "European open science cloud" vision is of paramount importance for the development of e-infrastructures services in Europe for all the scientific communities, the e-ROSA project consortium had several interactions with EOSC stakeholders during meetings or public events, to explain project's vision, user needs and better understand what will be the future services of EOSC.

In this part reporting is performed along 3 main action lines:

1. The endorsement of EOSC declaration the 15th of November 2017
2. EOSC stakeholders' forum the 30th of November 2017
3. Meeting with EOSC Hub during RDA Plenary in Berlin in march 2018

4.1 EOSC DECLARATION ENDORSEMENT

Three representatives of the e-ROSA consortium – Odile Hologne, INRA – Sander Janssen, WUR – Nikolaos Manouselis, Agroknow signed a commitment on behalf of the project in order to support the effective implementation of EOSC in the agri-food sector. Extract [in 2020, the e-ROSA partners commit to:

1. Set out the roadmap for open science for agriculture and food systems, in line with the EOSC Declaration, the GODAN Data Ecosystem paper[2] and the Open Harvest Chania Declarations n°1[3] and n°2[4];

2. Engage the community within the agriculture and food science at a European and global level, and establish a link with existing generic e-infrastructures and future EOSC strategic and technical (i.e. architecture) developments to communicate on specific community needs and keep the latter at the heart of the system, as well as to ensure access to technological services for the agri-food community (e.g. HPC, authentication, storage, connectivity);

3. Actively take part in the development of the EOSC Governance Board and Stakeholder Forum, and support the practical implementation of policy and stakeholder frameworks related to EOSC to meet societal challenges at local, national and global levels: adaptation of agricultural production systems to climate and land use changes, global nutrition, optimization of food value chains, food safety, etc.;

4. Improve data stewardship, sharing and reuse pro-actively for more efficient agri-food research and foster a "data culture" within the agri-food community through dedicated mechanisms (e.g. incentives, design and use of Data Management Plans, certified data repositories), advocate for the implementation of the FAIR Principles[5] and Open Data ("as open as possible, as closed as necessary") throughout the different stakeholder groups including academia, policy-making and the private sector;

5. Work on interoperability across data sources and on shared standards to enable the FAIR sharing of data and other digital resources (e.g. codes, models, workflows) in agriculture and food, build

[2] http://www.godan.info/documents/global-data-ecosystem-agriculture-and-food
[3] http://blog.agroknow.com/wp-content/uploads/2016/05/Chania-Declaration.pdf
[4] https://drive.google.com/file/d/0B41Vz7BieQuoY19CYlBISklxbmc/view
[5] https://www.force11.org/fairprinciples

on the AgriSemantics[6] initiative to promote common, shared semantic resources for agri-food research;

6. Build on the existing European AgINFRA+[7] e-infrastructure and establish specific infrastructures and services as relevant for agriculture and food science to stimulate collaboration in an open way, support the development of Food Cloud demonstrators that can help tackle pressing scientific and societal challenges;
7. Foster distributed efforts and flexible governance for long-term empowerment by and sustainability within the agri-food community, help develop appropriate business models for data sharing and related services, especially for our "common goods" such as those supporting semantic interoperability (e.g. GACS[8]) and data discovery (i.e. common catalogues);
8. Support capacity-building through the establishment of Competence Centres across Europe and worldwide in order to develop the required skills to implement the EOSC in the agri-food sector and in synergy with relevant European Digital Innovation Hubs and industry-driven initiatives.]

4.2 EOSC STAKEHOLDERS FORUM

e-ROSA project was represented by Johannes Keizer in 2 sessions The EOSC from the point of view of Research Infrastructures and collaborations and Cross disciplinary Pan European Research. This was the opportunity to explain our vision with a "position paper" derived from our vision document and completed with a description of the technical services required and a first approach of what should be generic or specific for agri-food sciences. This analysis was based on a RDA document[9] describing the virtual components of an e-infrastructure to manage the research data life cycle :

The original text is published on the EOSC pilot web site : https://eoscpilot.eu/content/e-ROSA-position-paper

e-ROSA position paper

In 2030 food systems will produce healthy nutritious foods, produced through an input-efficient methods and supporting a thriving environment. Food Systems will operate as collaborative networks, that are constantly improving to improve their economic, environmental and social performance for all actors in the network, and those food systems can be region specific, in local territories, but also global. The food systems contribute to the achievement of a wide range of objectives as captured by the SDG's and contributes to mitigating climate change impacts, and adapting to negative consequences of climate change.

Agri-food sciences are complex from a data science point of view, with different disciplines (from genomics to social sciences), different scales (from genes to ecosystems) and geolocalisation. The ability to integrate these heterogeneous data is a key issue to tackle new societal challenges (e.g. food security in the face of climate change, sustainable food value chains, digital agriculture and food technology). In addition, the automation of data collection, new techniques in "omics" as well as the development of new

[6] http://agrisemantics.org/
[7] http://www.plus.aginfra.eu/
[8] http://agrisemantics.org/gacs/
[9] Almas, B., Budich, R., Collins, S., Diepenbrook, M., Dillo, I., Genova, F., … Zwölf, C. M. (2017). Recommendations for Implementing a Virtual Layer for Management of the Complete Life Cycle of Scientific Data, (January). https://www.rd-alliance.org/sites/default/files/recommendation-jan-2017-v8.pdf

types of data sources (e.g. Internet of Things, crowd-sourcing, text mining) has allowed to collect an exponentially increasing amount of data. Thus, there is a need for an e-infrastructure that connects data, infrastructures, resources and people and that allows to share efforts and expertise, and support innovation. In particular, such an e-infrastructure can develop Virtual Research Environments (VREs) that provide tailored solutions for specific communities.

Item	**Status and needed action**
Network of trustworthy repositories	There are scattered repositories all over the landscape which need to be organized in the network
A registry of trustworthy repositories	CIARD RING as prototype is powerful tool to organize the network of repositories
Repository API/PID Registration	No domain specific activities should be undertaken, collaboration should be seared with other EOSC partners
Data type Registration	No domain specific activities should be undertaken, collaboration should be seared with other EOSC partners
Metadata Schemes registration	Work is very advanced with the former VEST registry. Coordination and discussion with other similar enterprises in other domains is needed
Concept server and registration system	The domain is comparatively advanced having available operative prototypes of Ontology Servers (Agroportal) and Concept Servers (GACS)
System of Authorisation records	No domain specific activities should be undertaken, collaboration should be seared with other EOSC partners
System of licence registries	No domain specific activities should be undertaken, collaboration should be seared with other EOSC partners
Ecosystem of tools and operating procedures	Some scattered work has been done but without systematization; it needs to be integrated with the effort to create competence centres

Our vision is an ecosystem of people, data and devices. Stakeholders are not only academic researchers. The farm has to become part of the research environment as the supply chain needs to feed back to the lab and to the farm. Last but not least citizens will participate in the collection of data and information.

The paradigm change in science from “mostly data production” to “more and more data analysis” will need new skill sets. The combination of data from lab, farm, supply chain, satellites and citizens will create new insights and new possibilities for data analysis. Data Scientists or knowledge engineers, are needed not only in the lab, but also within the industry and in the service of decision makers.

Facets of a data ecosystem and implementation status in the AgriFood domain

In implementing this vision, we are not at the beginning. As a community of interest involved in projects as AgInfra, semagrow, openminted, aginfra+ we have:

- Introduced agricultural scientific communities to the vision of open and participatory data intensive science
- Served as a proof of concept for a European thematic hub for data powered research in agriculture and food
- Demonstrated how grid and cloud based services can be used by scientists and information managers

- Provided a set of domain specific recommendations for the open publication of research outcomes

Particularly we have created infrastructure elements for the community:

- The Agrisemantics framework, with Agroportal, the GACS and the Vest Registry as efficient storage, development and access points for common semantics
- Use case driven e-Infrastructure demonstrations for key thematic areas(a) Water safety, Food microbial biodiversity, Gene regulation networks in cultivated plants, phenotypes in Wheat

The next steps are going to the establishment of an agINFRA cloud within EOSC in 2020-2022 to target a sustainable infrastructure,

- Building on top of the AgInfra+ infrastructure
- Implementing the e-ROSA roadmaps
- Run pilots in larger scale based on selected uses cases across the food system
- Showcase the operational mode of EOSC (eg. thematic EOSC marketplace for cloud&data services
- Focus on the H2020 DT-SFS-26-2019: Food cloud demonstrators

4.3 MEETING WITH EOSC-HUB PROJECT - REPORT

Date: 22 March 2018

Participants: Sophie Aubin (INRA), Johannes Keizer (GODAN), Diego Scardaci (EGI), Daan Broeder (Meertens Institut), Esther Dzalé (INRA)

The goal of the meeting was to better understand the EOSC services, technical architecture and potential links with a future e-infra for agri-food science.

The meeting started with a “tour de table”. Johannes presented the e-ROSA project and vision, as well as the expectation of the e-ROSA team from the meeting: learn how much e-ROSA could use what EOSC is producing and how much EOSC could use what e-ROSA is producing to showcase.

Diego and Daan presented EOSC and its different services. As a general remark, a few semantic services are currently available in EOSC appart from b2note, but there are plans to do more. 100 partners are currently involved in EOSC. The EOSC services are splited in 5 categories: Discover and Reuse, Processing & Analysis, Data Management / Curation & Preservation, Access / Deposition & Sharing, Federation services.

Discover and Reuse

- B2find: interdisciplinary metadata catalogue. Harvests metadata that are exposed by distributed repositories through OAI-PMH. Metadata are then searchable through http://b2find.eudat.eu/ (approx. 600 000 datasets today)
- Marketplace (https://marketplace.egi.eu/): anyone who satisfies the criteria of EOSC (not defined yet) can propose services through the marketplace. Services cover access to applications, computing capabilities, training… with possible levels of customization

Processing and analysis: this service provides:

- Online scientific application-hosting frameworks through HTC and federated computing (Iaas and Paas);
- A partner service for sensitive data processing. This service provides a secure cloud for scientifics who want to compute sensitive data securely.
- Jupyter notebooks on demand
- Scientific workflow management and orchestration services: DIRAC4EGI and TOSCA
- Discipline specific analytics services such as earth observation data analytics

Data management and preservation services include:

- B2handle which provides persistent identifiers based on handle system
- B2Safe for data replication, based on iRODS
- Applications database: registration of applications, loading virtual machines of these applications in the cloud
- B2DROP: a layer of oncloud
- B2NOTE: a semantic annotation tool. Integrated to B2SHARE. One can annotate semantically the data available in B2SHARE. Based on community ontologies. While datasets are provided by data providers, the annotations are done by end users
- B2SHARE: based on Invenio as Zenodo.

Federation services

- DataHub: the DataHub can federate disparate data sources and give a seamless access to the end user who doesn't have to care about where the data are stored. Indeed, different data points can be mounted as a single file system through the federation system. In addition, the end user can add a selection of data in a virtual machine close to computing resources avoiding costly data transfers. There is not yet an integration between the DataHub and the other services (B2FIND, etc.)

Johannes concluded 2 main constraints of the technical proposal that e-ROSA is drawing: the proposal should be international-oriented (not Europe) and the different components of the architecture should be loosely coupled.

Evaluation:

There is a lot of common space between e-ROSA and the EOSC hub. In defining the e-ROSA roadmaps a thorough evaluation of all the modules need to be done. Some of them like B2Handle seem to be immediate use. Regarding B2Note synergies with Agrisemantics need to be explored.

At the moment among the 100 partners, there is no partner from the Food System community. This makes it still more important to collaborate.

4.4 CONCLUSION ABOUT EOSC AND E-ROSA

EOSC is a key initiative in the e-infrastructure landscape. At the moment the technical services are those behind EUDAT and EGI. A key service to address in the F.A.I.R approach, the "Interoperability", is missing: a semantic layer useful for indexing, search and discovery services and also to provide "machine readable" Digital objects.

In this domain, the agri-food sciences community is quite advanced with different initiatives such as "Agrisemantics working group" in RDA "Global Agricultural Concept Scheme Core (GACS)" and operational services such as Agroportal, a portal to share and manage ontologies.

Moreover, the analysis of the "data ecosystem" in agri-food sciences based on the mapping exercise, demonstrates that the "digital resources" (data repositories, tools to analyse …) are scattered and managed by institutions or communities (such as bioinformatics) and different levels of "FAIRiness". Even if we didn't really evaluate this level in the project, we can say that the key issue of an e-infrastructure in agri-food science are the ability i) to federate existing assets through technologies such as API and semantic technologies ii) to involve researchers and accompany their culture change and skills development.

That's why we gave this answer to the InfraEOSC-3 consultation:

https://ec.europa.eu/futurium/en/digital4science/consultation-work-programme-2018-2020-infraeosc-03-2020

Agri-food science is complex from a data science point of view, with different disciplines (from genomics to social sciences), different scales (from genes to ecosystems) and geolocalisation. The ability to integrate these heterogeneous data is a key issue to tackle new societal challenges (e.g. food security in the face of climate change, sustainable food value chains, digital agriculture and food technology). In addition, the automation of data collection, new techniques in "omics" as well as the development of new types of data sources (e.g. Internet of Things, crowd-sourcing, text mining) has allowed to collect an exponentially increasing amount of data. Thus, there is a need for an e-infrastructure that connects data, infrastructures, resources and people and that allows to share efforts and expertise, and support innovation. In particular, such an e-infrastructure can develop Virtual Research Environments (VREs) that provide tailored solutions for specific communities.

Based on the work done in the e-ROSA project http://e-ROSA.aginfra.eu, we consider that the next call should focus on:

- the interoperability of Digital objects using semantic resources and technologies, creating semantic infrastructures that support the interoperability and reusability of data
- Creating competence centres for capacity development to accompany the implementation
- involving researchers in information technology to develop new services based on cutting edge technologies

5 ROADMAP FIRST RELEASE AND FEEDBACK

5.1 WRITING PROCESS OVERVIEW

In the deliverable D1.4 (M6) we gave a first approach of what could be the structure of the roadmap based on the analysis of similar documents:

- The data opportunity in agriculture & food
- The European and international context
- Technical vision
- Needs
- Proposed responses

In March 2018 we validated an initial structure of the document based on the outputs of the project and interactions with stakeholders (EOSC, RDA, Scientific communities, policy makers …):

Part	Based on
Vision	Vision paper released in November 2017 and updated at the beginning of 2018
Challenges and needs	2nd stakeholders workshop report (November 2017) Use cases study
Analysis of the actual landscape	1st stakeholders workshop report (July 2017) Bibliometric study Mapping exercise
Technological outlook	1st stakeholders workshop report (July 2017) EOSC meetings AGINFRA+ project pilot implementation
Implementation Agenda	3rd Stakeholders workshop (May 2018) Plovdiv policy workshop (June 2018)

A first draft of the whole document was published on the e-ROSA web site the 11th of June 2018

5.2 REVIEW PROCESS

Taking into account the experience we had with the vision paper, we defined a form to get the feedback on the document https://docs.google.com/forms/d/e/1FAIpQLScBOILyAwhOLFgSfnfJ2U2B_pAXBnfPJQz-fEubj_4Co7EFoQ/viewform

Who you are :

- First Name / Name
- Email
- Job title
- Organization
- Country
- Area of interest

- Open science
- E-infrastructure
- Agri-food sciences or education
- Agri-food business

About open science

- I'm fully aware of
- I don't know what it is

About e-infrastructure

- I'm fully aware of
- I don't know what it is

About the vision

- No opinion
- I totally agree
- I partially agree
- It can be improved
- Suggestions - comments (text box)

About the challenges presented in the roadmap

- No opinion
- I totally agree
- I partially agree
- It can be improved
- Suggestions - comments (text box)

About the actual landscape presented in the roadmap

- No opinion
- I totally agree

- I partially agree
- It can be improved
- Suggestions - comments (text box)

About the envisioned technical architecture presented in the roadmap

- No opinion
- I totally agree
- I partially agree
- It can be improved
- Suggestions (text box)

About the recommendations presented in the roadmap

- No opinion
- I totally agree
- I partially agree
- It can be improved
- Suggestions (text box)

Could you sort the main challenges to be addressed in the future

- Community building
- Culture change
- Skills development
- Findability of the digital resources and tools
- Interoperability of the digital resources and tools
- Quality and maturity of tools
- Sustainable business models
- Impact Assessment
- Other (text box)

For your top-3 challenges, could you please explain their importance?

We organized 2 events to discuss the first draft of the roadmap in June 2018:

- On the 13th of June, a workshop in Plovdiv as a side event of #FOOD2030 policy event with other key stakeholders of the "Agrifood" communities such as ERA-NET ICT Agri and JPI FACCE https://docs.google.com/document/d/1DWythGLjP6M96MAfDwnGN3q3IN-wxAqWFmBlEbbss7g/edit?usp=sharing with 35 registered people and 20 participants
- On the 19thof June, a policy workshop in Brussels with DG CONNECT, DG AGRI and DG RTD representatives with 10 participants

At the same time, we sent an invitation to give feedback to the 207 people invited to participate to our workshops. A working session of our international advisory board is scheduled the 2nd of July 2018.

The synthesis of the feedback received until now, is the following:

- Relevance of the vision
- Relevance of the analysis of the challenges, users centric approach and the "Share, Connect, Collaborate" narrative
- Improvement required for the technical requirements so that the vision will be understandable by non-specialists, and really associated to users' needs
- Recognition of the semantic layer as key component for interoperability and shared layer between public and private stakeholder
- Culture change and incentives for "open science" practices
- Skills development for technical staffs working with researchers (IT specialists, librarians …)
- See the roadmap as a living document which needs to be regularly updated

These remarks will be taken into account for the next version.

6 CONCLUSIONS

e-ROSA roadmap is the result of a robust process with tasks and deliverables organized in work packages to understand:

- Where we are: WP1 (bibliometric study, mapping, 1st stakeholders workshop)
- Where we want to go: WP2 (challenges, user needs, vision, trends, 2nd stakeholders workshop)
- How to go there: WP3 (3rd stakeholders workshop, EOSC meetings)

The role of workshops has been of paramount importance to discuss our proposals and collect new insights. We had to adapt our strategy during the project to take into account the progress done by the EOSC projects on technical aspects or governance. A good understanding of the commission agenda to implement EOSC through the work programme is also key for the relevance of our recommendations for a future plan to build an e-infrastructure for open science in agriculture.