



## D8.4 - AGINFRA Association Blueprint



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**ACRONYMS LIST**

APC	Article Processing Charges
VREs	Virtual Research Environments
FMJ	Food Modelling Journal
VDJ	Viticulture Data Journal
VM	Virtual Machine
EOSC	European Open Science Cloud
ERKEP	Emerging Risk Knowledge Exchange Platform
EFSA	European Food Safety Authority
RAKIP	Risk Assessment Modelling and Knowledge Integration Platform
IPRs	Intellectual Property Rights

## EXECUTIVE SUMMARY

The main purpose of this deliverable is to present the sustainability approach of the AGINFRA+ project results. Its target audience comprises representatives of external interested communities as well as the European Commission (i.e. main funder of the AGINFRA+ project). More precisely, the document examines three action lines, each dedicated to sustain a main output of the AGINFRA+ project, namely:

- **Consultancy service to deploy and configure custom VREs for agri-food research communities:** corresponds to Virtual Research Environments (VREs) that can be developed and deployed as a service to various agri-food communities based on (a) the D4Science infrastructure (<https://www.d4science.org/>) and (b) the customization of generic or domain specific services offered by various partners, which have been tested and validated with agri-food researchers during the project lifetime.
- **Data Journals:** corresponds to the two data journals that we have been set-up based on the ARPHA publishing platform (<http://arphahub.com/>), namely the Food Modelling Journal (<https://fmi.pensoft.net/>) and the Viticulture Data Journal (<https://vdi.pensoft.net/>)
- **Thematic VREs:** corresponds to the four VREs that have been set-up during the project lifetime for supporting the three user communities of the project, namely (a) one VRE for Agro-Climatic and Economic Modelling community, (b) two VREs for the Food Safety Risk Assessment Community and (c) one VRE for Food Security Community

Additionally, the report examines the management of AGINFRA+ after the end of the project funding. More specifically, although in the project DoA it has been proposed the establishment of a legal entity form (through a not-for-profit association) for the further operation and evolution of AGINFRA+ as a joint venture of involved stakeholders, it seems that this solution will not be operational considering the blend of the consortium partners involved. Thus, it has been considered among the partners that it will be better cost and operational wise to manage AGINFRA+ through a Memorandum of Agreement for a specified period (e.g. until December 2020) that will ensure that AGINFRA+ will be active in the EU infrastructures map and available to users with the support needed.

Finally, the report concludes with the presentation of the foreseen next steps and the decisions that need to be further discussed among the consortium partners during the last year of the project towards finalizing the proposed sustainability plan of the project results.

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## 1 INTRODUCTION

AGINFRA+ addresses the challenge of supporting user-driven design and prototyping of innovative e-infrastructure services and applications. It particularly tries to meet the needs of the scientific and technological communities that work on the multi-disciplinary and multi-domain problems related to agriculture and food.

To this end, this deliverable presents a realistic plan to sustain the project results. The project results have been associated with three main ‘action lines’ (one line per result) to sustain them. The main results address different ‘customers’ and are operated/provided independently from each other, therefore their sustainability action lines are also independent from each other. The three action lines together can be considered as the AGINFRA+ sustainability plan. More specifically:

- The first action line aims to sustain a consultancy service that AGINFRA+ established to deploy and configure custom VREs for agri-food research communities.
- The second action line aims to sustain the two data journals that have been launched under the AGINFRA+ project, namely the Food Modelling Journal (<https://fmj.pensoft.net/>) and the Viticulture Data Journal (<https://vdj.pensoft.net/>).
- The third action line aims to sustain the four thematic VREs that have been developed via the AGINFRA+ project and are used by the project internal communities namely (a) one VRE for Agro-Climatic and Economic Modelling community, (b) two VREs for the Food Safety Risk Assessment Community and (c) one VRE for Food Security Community

For all three aforementioned action lines, sustainability plans on the estimation of their operating costs are provided.

The document is structured as follows. Chapter 1 serves as an introduction to the deliverable whereas Chapter 2 provides all needed information to understand the three action lines’ purposes. Chapter 3, 4 and 5 identify and describe in detail who will be able to use each of these results and the methodology followed in order to define the sustainability plans of the action lines. The last chapter provides conclusions, as well as the foreseen next steps and the decisions that need to be further discussed among the consortium partners during the last year of the project towards finalizing the proposed sustainability plan of the project results.

## 2 KEY RESULTS TO SUSTAIN AND AGINFRA+ MANAGEMENT

### 2.1 CONSULTANCY SERVICE TO DEPLOY AND CONFIGURE CUSTOM VRES FOR AGRI-FOOD RESEARCH COMMUNITIES

This service aims to deploy and configure custom VREs for agri-food research communities. The VREs are deployed via the D4Science infrastructure (<https://www.d4science.org/>) and more specifically through the AGINFRA+ Gateway (<https://aginfra.d4science.org/explore>) and they could be customized to include generic or domain specific services developed and offered by various AGINFRA+ partners (the full list of the services that could be offered within the VREs will be reported to the final version of this deliverable at M36 along with the IPRs of each service).

To this end, customers, namely research organizations will have the chance to operate customized VREs in order to provide with a set of integrated tools and services, as well as data resources, to agri-food research communities to carry out research tasks on the cloud.

### 2.2 DATA JOURNALAS

A promising achievement of the AGINFRA+ project is the establishment of two new journals, namely the Food Modelling Journal (FMJ) and the Viticulture Data Journal (VDJ). Researchers will be able to publish their research assets, like models, datasets as new linked-open-data papers which increase their discoverability and usability. Besides, in the spirit of the open science character of the AGINFRA+ project and overall in the European research area, these aforementioned journals will also consider for publication other important types of publications coming as valuable outputs along the research cycle such as Methods, Models, Software, and of course, research papers when needed.

### 2.3 THEMATIC VRES

During the AGINFRA+ project, community partners have established thematic VREs for the three research communities that are examined in the project, namely the Agro-climatic and Economic Modelling, the Food Safety Risk Assessment and the Food Security community. The VREs for these communities are the first ones that have been produced and they incorporate generic and agri-food related services, which have been tested and validated by the researchers of the respective communities. The community partners who were responsible for the creation of these VREs have been acted as the first customers. After the end of the project, these thematic VREs will be supported and remain operational for three years and will act as successful and best practice examples of what can be accomplished with the use of VREs enhanced with agri-food related services.

### 2.4 AGINFRA+ MANAGEMENT

AGINFRA+ officially ends as a project at the end of December 2019. That doesn't mean that its operations will stop. According to the project DoA, it has been proposed the establishment of a legal entity form (through a not-for-profit association) for the further operation and evolution of AGINFRA+ as a joint venture of involved stakeholders. However, it seems that this solution will not be operational considering the blend of the consortium partners involved, as well as the additional costs needed for setting and operating a not-for-profit association. Thus, it has been considered among the partners that it will be better cost and operational wise to manage AGINFRA+ through a Memorandum of Agreement for a specified period (e.g. until December 2020) that will ensure that AGINFRA+ will be active in the EU infrastructures map and available to users with the support needed.

### 3 CONSULTANCY SERVICE TO DEPLOY AND CONFIGURE CUSTOM VRES FOR AGRI-FOOD RESEARCH COMMUNITIES

In this chapter we examine the consultancy service to deploy and configure custom VREs for agri-food research communities. This means that research organizations/institutions can request to create for them and operate customized VREs with a set of integrated tools and services, as well as data resources, for their agri-food research communities to carry out research tasks on the cloud. New VREs will be registered and they will be available at the AGINFRA+ Gateway (<https://aginfra.d4science.org/>)

Currently, under the AGINFRA+ Gateway, a catalogue with eleven VREs has been created. Each of the VREs has been formed for the AGINFRA+ project and four of them are related to the three user communities (namely, Agro-climatic and Economic Modelling, Food Safety & Risk Assessment and Food Security). The three partners (i.e. ALTErrA, BfR, INRA), who are responsible for promoting each of the four VREs are the first customers who exploited the consultancy service to deploy and configure custom VREs for agri-food research communities.

Future customers (i.e. research organizations or institutions) will be able to manage their new VREs upon request, after choosing the specific VRE services needed to perform the specific research tasks in on the cloud.

There are some general and some customized VREs services. Some of the general services offered by D4Science organization via the AGINFRA+ partner, namely CNR are:

- Shared workspace for organising content of interest;
- Social networking area for exchanging messages and promoting communication among VRE Members;
- Data analytics platform enacting users to (a) integrate, share and execute their own analytics processes implemented by several programming languages and models (e.g. R scripts, KNIME workflows, Jupyter Notebooks); (b) to re-use analytics methods shared by others;
- Research assets catalogue enacting users and applications to publish almost any typology of research product worth sharing. Every catalogue item can be customised to have a rich set of metadata and as many resources (files, links) as needed;
- Ticket services (Redmine) including a Wiki.

As part of the AGINFRA+ project, all technical and scientific partners contributed in the formation of some special reusable services, more suited to the needs of agri-food science, aiming to produce more efficient, transparent and reusable research outcomes. Since these services are tested within the AGINFRA+ project, users can exploit them and incorporate them within their own VREs. These special reusable services are divided in three main areas: (a) Data and Semantic services offered by AGINFRA+ partner, namely Agroknow, (b) Data Analytics & Processing services offered by AGINFRA+ partner, namely CNR and (c) Visualization Services offered by AGINFRA+ partner, namely UoA.

Customers in order to operate their VREs will have to pay an amount depending on the number of services that they choose to include in their VREs, and the capacity needed (namely computing and storage capacity). Moreover, the cost of setting-up a new VRE might include some effort that is needed to customise the existing services to serve the specific needs (e.g. service extensions).

### 3.1 SOURCES OF REVENUES

It is expected that the consultancy service to deploy and configure custom VREs for agri-food research communities will generate revenues from customers such as national and local research communities like Universities, Agricultural and Government institutes and Research and Technological Development Centers. There will be an access charge that can be of the type of a standard flat annual subscription fee renewed every year.

### 3.2 FORECAST OF NEW VRES

The estimation of the new VREs that either the existing customers or new ones will request is essential as it will be the main driver for costs and revenues associated with the consultancy service to deploy and configure custom VREs for agri-food research communities. However, at this point the consortium partners are not able to make a forecast since technical developments of new features within VREs are still ongoing. It is expected that this information will be available at the final version of this document at M36 (i.e. December 2019)

### 3.3 REQUIRED RESOURCES

The primary resources needed to support the consultancy service to deploy and configure custom VREs for agri-food research communities consist of:

1. Annual access fee from D4Science organization via AGINFRA+ partner, namely CNR for (a) hosting each VRE instance (cloud machines or physical hosts), (b) data analytics services;
2. Annual access fee from AGINFRA+ partner, namely Agroknow for Data and Semantics services;
3. Annual access fee from AGINFRA+ partner, namely UoA for Visualization services;
4. Human effort for marketing activities and attracting more customers;
5. Human effort for the setup and configuration of VREs according to community needs.

The aforementioned costs are still under discussion with the consortium partners (taking also into account that technical developments of new features within VREs are still ongoing). It is expected that this information will be available at the final version of this document at M36 (i.e. December 2019). As a result, in the final version of the present deliverable we will be able to estimate the costs needed and consequently the revenue that needs to be generated for sustaining the consultancy service to deploy and configure custom VREs for agri-food research communities

## 4 DATA JOURNALS

In this chapter, the exploitation of the two AGINFRA+ journals will be examined. In particular, this means that users will have the ability to publish their research objects in these two journals. The close integration of these publishing services into the VREs provides substantial added value for VRE users, as it helps to create FAIR research assets in a highly efficient way. This synergy will attract new users from outside to both the VRE and the journals compared to standalone entities.

As aforementioned, AGINFRA+ partners (lead Pensoft) set up by the project two open data journals namely the **Food Modelling Journal (FMJ)** and **Viticulture Data Journal (VDJ)**. Researchers exploiting their own customized VREs have the ability to publish their research assets in these two Journals. Apart of these researchers, any external researcher with research papers relevant to agri-food subjects can publish them in the Journals too.

The operation of the two data journals will be based on the ARPHA Publishing Platform (<http://arphahub.com/>), created and maintained by the AGINFRA+ partner, namely PENSOFT.

Both data journals will publish in Open Access and will have several important features that characterise the open science publishing practices: collaborative authoring tool, collaborative peer-review and editorial process, post-publication peer-review, commenting and annotations.

In both cases, of either submission a paper from the VRE, or from another external source, or via direct authoring in the ARPHA Writing Tool, the users will have to advance a small amount of money, charged in the form of Article Processing Charges (APC), in case of acceptance of the manuscripts. APC will be introduced at some point after the expiration of the projects. Until the end of the AGINFRA+ project all VRE users and external authors will publish in the journals for free, which defines the journals as *Diamond Open Access*.

### 4.1 USERS

The users of the data journals are divided into two categories: (a) users publishing research papers from VREs and this includes publishing research assets produced in the VREs in the form of papers and (b) users publishing research papers and other article types outside VRE.

### 4.2 SOURCES OF REVENUES

It is expected that both journals will generate revenues from both registered users at the VRE and registered users at the journals' side. The income is expected to come mainly from the authors through **article processing charges (APC)**, also known as a **publication fees** or from sponsoring/supporting institutions. Sponsorship and support will allow the journals to maintain their status of Diamond Open Access journals, which means free to publish, free to read, distribute and reuse. Alternative models will assume partial support to allow certain groups of authors (e.g. institutional staff, or members of a learned society) to publish for free, while non-members should cover their APC.

### 4.3 ESTIMATION OF USERS

The estimation of the number of users that will be registered on the Journals' platform is expected to be substantial. The number of users will be the main guide for the costs and revenues associated with the Journals. On the basis of our experience with other newly established journals, we expect that during the first two years of operation each journal will reach a number of **500 active users**, which number will grow continuously with the development of the journal.

#### 4.4 REQUIRED RESOURCES

For the production environment currently 3 Virtual Machine (VM) are used. The number of VMs is not expected to change regardless of the upcoming increase in the number of users. The required storage starts from 10 GB and the annual cost is 1000 Euros.

#### 4.5 PERSONNEL COST

The following table shows the required number of personnel per year of operation in percentages.

Table 1: Required Personnel in FTEs to maintenance the ARPHA Publishing Platform and operations for the journals

Required Personnel (FTEs)	2020	2021	2022
Technical supervisor	0.3	0.1	0.1
Software developer	0.5	0.3	0.2
Editorial supervisor	0.3	0.2	0.2
Managing editor	0.2	0.3	0.4
Copy editor	0.1	0.2	0.3
Typesetter	0.1	0.2	0.3
Publisher	0.1	0.2	0.3

In order to calculate the total annual personnel cost, the total number of PMs per year must be multiplying by their cost. It is important to be mentioned that the actual costs depend on the specific organization and respective PM rates. The rates that were used per type of personnel are presented in Table 2, while at the Table 3 is presented the personnel cost in the next 3 years after the end of AGINFRA+ project.

Table 2: Annual cost per type of personnel to maintenance the ARPHA Publishing Platform and operations of the journals in the first year (2020)

Type of Personnel	Expertise	PM Cost (€)	Annual Cost (€)
Technical supervisor	Project manager	4.000	14.400
Software developer	Code development	3.000	18.000
Editorial supervisor	Supervising editorial matters and journals management	4.500	16.200
Managing editor	Managing everyday editorial process	1.500	3.600
Copy editor	Final checking of manuscripts before publication	1.300	1.560
Typesetter	Formatting of proofs and final publication	1.300	1.560
Publisher	Publishing on the journals' websites	1.500	1.800

**Table 3: Cost of Personnel to maintenance the ARPHA Publishing Platform**

Type of Personnel	2020	2021	2022
Technical supervisor	14.400 €	4.800 €	4.800 €
Software developer	18.000 €	10.800 €	7.200 €
Editorial supervisor	16.200 €	10.800 €	10.800 €
Managing editor	3.600 €	5.400 €	7.200 €
Copy editor	1.560 €	3.120 €	4.680 €
Typesetter	1.560 €	3.120 €	4.680 €
Publisher	1.800 €	3.600 €	5.400 €
Infrastructure costs	1.000 €	1.000 €	1.000 €
<b>Annual total costs</b>	<b>58.120 €</b>	<b>42.640 €</b>	<b>45.760 €</b>

#### 4.6 REVENUE ESTIMATION

To estimate the amount of money that registered users will have to pay in order to publish research papers, we need also to make an estimation of the expected published articles per year. Table 4 presents prospected scenarios for APC level based on the expected published papers per year.

**Table 4: Prospected scenarios for APC level and number of articles that need to be published in order to reach a break-even point of cost/revenue model**

APC (€)	Published articles (expected per year)	Expected Income per year (€)
400	115	46000
500	90	45000
600	75	45000



## 5 THEMATIC VRES

The AGINFRA+ project is focused on supporting research through the development of Virtual Research Environments (VREs) to be used by researchers. The vision of the AGINFRA+ project is to develop a common technical infrastructure that can support different research communities in the agri-food domain. The extent to which this vision could be accomplished will be measured on the feedback from three different user communities in this domain (namely, Agro-climatic and Economic Modelling, Food Safety Risk Assessment and Food Security). The aim is to evolve the VREs from these domains to an AGINFRA food cloud demonstrator that will be positioned as the European Open Science Cloud (EOSC) agri-food thematic cloud.

In this context, four VREs were designed serving specific use cases that the AGINFRA+ project examines. For each use case a specific AGINFRA+ project partner took the lead and performed necessary use-case specific customization work together with support from the VRE service providers. The responsible partner of the first use case, Agro-climatic & Economic Modelling, is Wageningen University & Research (ALTErrA), of the second use case, Food Safety Risk Assessment, The German Federal Institute for Risk Assessment (BfR) and of the third use case, Food Security, The French National Institute for Agricultural Research (INRA). For the first use case the Agro-climatic Modelling VRE is created while for the second one the DEMETER VRE and the RAKIP PORTAL VRE were created. The last use case is represented by the Food Security VRE. Essentially, these VREs are some of the results of the AGINFRA+ project and the institutes who are responsible of them the first “customers”.

Through these VREs, researchers from the specific domains can collaborate by exploiting both generic and domain specific customized services, as mentioned in chapter 3. Responsible for the operation of the existing VREs will be the D4Science organization (<https://www.d4science.org/>) via the AGINFRA+ partners, namely CNR. Each of the three partners (INRA, ALTErrA, BfR) that were responsible for the domain-specific customization and content generation in the four VREs, is also responsible for organizing dissemination activities in order to increase the number of the users exploiting these VREs.

After the end of the AGINFRA+ project the operation of these VREs will be offered for free from the D4Science organization via the AGINFRA+ partners, namely CNR for three years. During these years it is expected that more external researchers will become familiar with the use of these VREs. This will allow AGINFRA+ consultancy service (as described in section 3) to reach out after the end of these three years to more research organizations/institutes (customers).

### 5.1 AGRO-CLIMATIC MODELLING VRE

#### 5.1.1 General description

The Agro-climatic & Economic Modelling use case examines the global agricultural modelling, intercomparison, and improvement research community that studies short- and long-term food production under environmental and climate change conditions. In this case, the problem addressed is related to accessing, combining, processing and storing high volume, heterogeneous data related to agriculture/ food production projections under different climate change scenarios, so that it becomes possible to assess food security, food safety and climate change impacts in an integrated manner, by a diverse research community of agricultural, climate and economic scientists.

The mission of this research community lies in improving historical analysis and short- and long-term forecasts of agricultural production and its effects on food production and economy under dynamic and multi-variable climate change conditions, aggregating extremely large and heterogeneous observations and dynamic streams of agricultural, economical, ecophysiological, and weather data.



Bringing together researchers working on these problems from various perspectives (crop production and farm management methods, climate change monitoring, economic production models, food safety models), and accelerate user-driven innovation is a major challenge. The new AGINFRA services allow executable workflows for agro-climatic model exercises and intercomparisons driven by historical climate conditions or future climate projections using site-specific data on soils, management, socioeconomic drivers, and crop responses to climate. Such intercomparisons are the basis for sustainable, climate smart agriculture.

The targeted end users of this VRE are the following:

- the European and global agro-climatic modelling community;
- the broader research community as well as business in the agriculture and food domain that requires specific models, data analytics or visualisations or wants to reuse model input or output for their research.

### 5.1.2 Sustainability Plan

The responsible partners for this thematic VRE, namely ALTERRA will promote the sustainability of this VRE with the following measures:

- Including the VRE in their hackathons and datathons, as far as the capacities of the VRE align with the objectives of the specific event;
- Maintaining, and keeping up-to-date the developed VRE components, as far as this fit into ALTERRA's resources and as far as the thematic VRE keeps supporting at that time prevailing version of required software environments as part of the supporting VRE service components;
- Using the pilot VRE as a means of advertising the VRE concept, with the aim to include a VRE as the main collaboration environment for data science in new projects. ALTERRA will do that in the area of agro-climatic and economic modelling, as well as in adjacent domains (e.g. environment, water management, climate modelling, remote sensing), with the aim to broaden the customer base of the Consultancy service to deploy and configure custom VREs for agri-food research communities;
- Including into such new projects the required long term, post-project support of a community specific VRE as part of the proposal's the sustainability and exploitation plan.

Increasing the user basis will help service providers to achieve sustainability by attracting more funding from their support organisation to sustain operation or to acquire new funding from other sources.

## 5.2 THE DEMETER VRE

### 5.2.1 General description

The DEMETER community is a small group of researchers that work together in a research project funded by EFSA. The main objective of this project is to create new IT-based resources that support EFSA and the European member states on their procedures for emerging risks identification. A central role in these efforts is the establishment of a collaborative platform that allow EU member states and EFSA to share data, knowledge and methods for the identification of emerging food-related risks. As part of the DEMETER project the DEMETER community developed a shared vision of a future Emerging Risk Knowledge Exchange Platform (ERKEP) framework. As part of this the DEMETER community indicated how the methods and tools, as developed within DEMETER and the AGINFRA+ project, fit into this shared vision. The DEMETER VRE therefore allows to demonstrate the potential (and limitations) of a

solution that is based on the AGINFRA Gateway platform in the context of the emerging risk / issues identification research domain.

The DEMETER VRE might therefore serve a range of different stakeholders that are actively engaged or interested in the identification and monitoring of emerging food risks and their drivers. These potential VRE customers are:

- European Food Safety Authority (EFSA);
- Emerging Risks Exchange Network (EREN) members, i.e. representatives from European member states;
- DEMETER project members;
- Researchers working in the field of emerging risk identification.

### 5.2.2 Sustainability Plan

BfR will promote the sustainability of the DEMETER VRE with the following measures:

- Presenting the VRE features linked to emerging risk identification during a workshop in spring 2019 with DEMETER project members;
- Presenting the VRE features linked to emerging risk identification during a webinar in September 2019 to the full DEMETER community (i.e. including EFSA and interested EREN members);
- Using the DEMETER VRE as a communication and project management tool within the DEMETER project (funded by EFSA) which allows all project members to get familiar with the VRE concept, its features and limitations;
- Integration of relevant VRE services (as 3rd party services) into the collaboration platform that is developed in the DEMETER project (DEMETER's ERKEP);
- Integrate the question of maintenance of those DEMETER VRE based services into the sustainability and maintenance concept that is developed by the DEMETER project partner for DEMETER's ERKEP.

The increased user basis will help service providers to achieve sustainability via attracting more funding from their support organisation to sustain operation or to acquire new funding from other sources (eg. H2020).

## 5.3 THE RAKIP PORTAL VRE

### 5.3.1 General description

Food safety is a very interdisciplinary research domain that needs to consider and integrate a great variety of scientific knowledge types. These are for example scientific publications, experimental data, mathematical models, databases and software tools. However, the access to this knowledge and the exchange of information between knowledge types and technical resources like databases and software tools is currently difficult and very time consuming. Therefore, three European institutions specialized in food safety risk assessment (ANSES, BfR and DTU Food) joined efforts to establish new community resources facilitating the efficient knowledge integration and exchange into and between IT-based applications and resources. The envisaged "Risk Assessment Modelling and Knowledge Integration Platform" (RAKIP) will be based on harmonized data formats and consistent rules for knowledge annotation. The feasibility of this concept has been exemplified through the RAKIP Web Portal (<https://foodrisklabs.bfr.bund.de/rakip-web-portal/>) allowing users to access and download risk assessment models, modules thereof and related data in a harmonized file format. These files can then be imported and executed by software tools supporting the proposed harmonized file format. The RAKIP

Web Portal also contains supporting resources needed for the harmonized description and exchange of knowledge.

At the current point in time the initial tri-lateral collaboration between ANSES, DTU Food and BfR on RAKIP steps into its next phase. It is planned to establish a RAKIP Initiative that will allow other research organizations or risk assessment authorities to join the RAKIP community. This RAKIP Initiative will be supported by the three founding organisations at least until end of 2021.

Within the AGINFRA+ project it has been explored if a VRE based on the AGINFRA Gateway platform can provide added values to the RAKIP community. For this the RAKIP\_portal VRE was established that provide several useful features for the RAKIP community. This is especially true, as the RAKIP Initiative aims to support different stakeholders from the risk assessment community:

- Risk assessors at national and international risk assessment agencies;
- Researchers at academic institutions;
- Risk managers;
- Software developers.

### 5.3.2 Sustainability Plan

BfR will promote the use of the RAKIP\_portal VRE with the following measures:

- Presenting the VRE features linked to the RAKIP concept during a workshop in spring 2019 with RAKIP community members;
- Presenting the VRE features linked to the RAKIP concept during a workshop at the ICPMF11 conference in September 2019;
- Using the RAKIP\_VRE as a communication and information exchange tool for the RAKIP community which allows all community members to get familiar with the VRE concept, its features and limitations;
- Integration of specific VRE-based services into the official RAKIP Web Portal hosted by BfR;
- Explore the opportunities for funding the long-term maintenance of a VRE-based RAKIP community portal as part of the strategic planning of the RAKIP Initiative.

The increased user basis will help service providers to achieve sustainability via attracting more funding from their support organisation to sustain operation or to acquire new funding from other sources (eg. H2020).

## 5.4 FOOD SECURITY VRE

### 5.4.1 General description

The Food Security VRE is a tool for phenotyping researchers to collaborate and share data, data analysis treatment. It is a virtual working environment with different tools that researchers are used to work with to analyse their data, but it also provides tools to facilitate the collaboration in the community (datasets and analytics processes sharing, graphical charts sharing).

This VRE is designed for plant scientists and more specifically phenotyping scientists to give them easy access to data from several phenotyping platforms and to provide them data analytics and visualization tools.

The Food Security VRE is a virtual working environment accessible online from any machine. It enables to access data discovery, storing, sharing, access, analysis, visualization services through a single environment. It also provides powerful online computing resources in order to be able to analyze big

datasets. This environment is collaborative: anyone can share its own data and analytics processes, making them available to the whole community.

The main functionalities delivered by this VRE are:

- Standard collaboration features such as file sharing and message posting;
- E-infrastructure service to import algorithms that can be run by any user;
- Access to datasets from systems which are compliant to the Breeding API;
- Visualization tool to draw charts from csv files data;
- Semantics management system Vocbench;
- Workflow management system Galaxy.

#### **5.4.2 Sustainability Plan**

To ensure the sustainability of the Food Security VRE, it is necessary to build a strong community around it. In order to do that, INRA will promote the VRE through a workshop with INRA phenotyping researchers, and another workshop targeting the EMPHASIS community.

INRA will also work on linking the VRE to OpenSILEX-PHIS (a phenotyping Information system used by several European phenotyping platforms and promoted by EMPHASIS). The VRE would become the collaboration tool between Europeans platforms.

It is also important to keep offering services hosted by EGI in connection with the European Science Cloud.

## 6 CONCLUSION

The present document reported an initial version of the sustainability plan for the AGINFRA+ project results. These results have been associated with three main ‘action lines’ (one line per result) to sustain them. The main results address different ‘customers’ and are operated/provided independently from each other, therefore their sustainability action lines are also independent from each other. The three action lines together can be considered as the AGINFRA+ sustainability plan. More specifically:

- The first action line aims to sustain a consultancy service that AGINFRA+ established to deploy and configure custom VREs for agri-food research communities;
- The second action line aims to sustain the two data journals that have been launched under the AGINFRA+ project, namely the Food Modelling Journal (<https://fmj.pensoft.net/>) and the Viticulture Data Journal (<https://vdj.pensoft.net/>);
- The third action line aims to sustain the four thematic VREs that have been developed via the AGINFRA+ project and are used by the project internal communities namely (a) one VRE for Agro-Climatic and Economic Modelling community, (b) two VREs for the Food Safety Risk Assessment Community and (c) one VRE for Food Security Community.

For all three aforementioned action lines, sustainability plans on the estimation of their operating costs have been provided.

In the next version of this deliverable (at M36) more details about the operating expenses and the personnel costs of the first action line will be added. These costs are still under discussion with the consortium partners (taking also into account that technical developments of new features within VREs are still ongoing). Additionally, the next version of this deliverable will include more details about the management of AGINFRA+ after the end of the project funding and the memorandum of agreement that needs to be prepared among the consortium partners for supporting the action lines of the proposed sustainability plan. Finally, the Intellectual Property Rights (IPRs) of the foreground developed during the project will be analyzed, so as to clearly identify its exploitation within the proposed sustainability plan