D3.4 PERIODIC EVALUATION OF THE IES PERFORMANCE

WP 3

15.05.2020

[subtitle]

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LIST OF ABBREVIATIONS

Abbreviation	Explanation
IE	Innovation Experiment
FIE	Flagship Innovation Experiment
SAH	SmartAgriHubs
DIH	Digital Innovation Hub
CC	Competence Centers
RC	Regional Cluster
IOF2020	Internet of Food and Farm
SMEs	Small and Medium-Sized Enterprises
KPIs	Key Performance Indicators
WP	Work Package
TRL	Technology Readiness Level
GDPR	General Data Protection Regulation
DMP	Data Management Plan

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PROJECT SUMMARY

Digital technologies enable a transformation into data-driven, intelligent, agile and autonomous farm operations, and are generally considered as a key to address the grand challenges for agriculture. Recent initiatives showed the eagerness of the sector to seize the opportunities offered by ICT and in particular data-oriented technologies. However, current available applications are still fragmented and mainly used by a small group of early adopters. Against this background, SmartAgriHubs (SAH) has the potential to be a real game changer in the adoption of digital solutions by the farming sector.

SAH will leverage, strengthen and connect local DIHs and numerous Competence Centres (CCs) throughout Europe. The project already put together a large initial network of 140 Digital Innovation Hubs (DIHs) by building on its existing projects and ecosystems such as Internet of Food and Farm (IoF2020). All DIHs are aligned with 9 regional clusters (RCs), which are led by organizations that are closely related to national or regional digitization initiatives and funds. DIHs will be empowered and supported in their development, to be able to carry out high-performance Innovation Experiments (IEs). SAH already identified 28 Flagship Innovation Experiments (FIEs), which are examples of outstanding, innovative and successful IEs, where ideas, concepts and prototypes are further developed and introduced into the market.

SAH uses a multi-actor approach based on a vast network of start-ups, Small and Medium-Sized Enterprises (SMEs), business and service providers, technology experts and end-users. End-users from the agri-food sector are at the heart of the project and the driving force of the digital transformation.

Led by the Wageningen University and Research (WUR), SAH consists of a pan-European consortium of over 160 Partners representing all EU Member States. SAH is part of Horizon2020 and is supported by the European Commission with a budget of €20 million.

EXECUTIVE SUMMARY

Digital innovations are bringing a vast number of benefits to all aspects and sectors of our lives, and such is the case with agriculture. For years now, farmers and other agricultural actors have worked on many different innovative solutions that are making everyday work easier, more effective and/or more cost-efficient. On the premise of promoting and supporting the real game changers and best innovative solutions in Europe currently, H2020 SmartAgriHubs (SAH) project has selected 28 FIEs across nine Regional Clusters (RC), thus covering the entire European continent.

All 28 FIEs have delivered FIE specific Progress report which, through carefully chosen questions, has shown their progress during the first reporting period (M3-M16), while focusing on their Key Performance Indicators (KPIs), objectives and milestones, collaborations with DIHs, CCs, communication and dissemination activities. These reports are grouped, evaluated, and analysed, with the general aim to contribute to the improvements of FIE work, with well-targeted findings and recommendations.

The document provides an overview and a first evaluation of the progress of each of the 28 FIEs regarding the implementation of their experiments. During this period, all FIEs have been closely monitored and advised by project Work Packages (WPs) and relevant RC. FIE progress and encountered challenges have been closely monitored, communicated, and reported according to the established project structures, while WP3 primarily task to monitor and evaluate FIE activities. While measuring and assessing progress is not an easy task, it is worth noting that the chosen approach was based on both qualitative and quantitative information so that the current state of FIEs is clearly understood.

In this summary, the reader will find key findings abstracted from the first FIE reporting period, as well as analysis of the RC Progress Reports.

Although the first evaluation naturally limits the scope on the ultimate impact on the sector, on a general note the analysis of the results has shown that accomplishments are in line with related project-specific objectives (O1 -Build a network of Digital Innovation Hubs, covering all regions in Europe and ensuring a broad coverage in terms of technological, business and sector expertise and relevant players; O2 - Support a critical mass of dedicated pan-European Innovation Experiments that bring together the farming sector and technology suppliers and complying with the project KPIs), flowing upon the accompanying KPIs.

The strategic design of FIE monitoring progress

The annual evaluation procedure was approached strategically. The Progress Report template is exemplary in terms of the format, while eleven sections of the report are mutual efforts of all project WPs, each approaching from their specific objectives and related tasks:

- FIE progress summary including specific achievements, challenges, and lessons learned; FIE application area and number of farms deployed;
- Execution plan progress including FIE TRL and progress of each activity;
- Status of implementation including information on actors involved in the reporting period and main features provided and their application; information on deployed components; information on reusable and non-reusable technical components;
- Overview of FIE impact including listed collaborations with DIHs and CCs and general impression on collaboration; information of FIE data protection; FIE impact on gender
- Status of deliverables and milestones;
- Risk register;
- Information on dissemination and exploitation activities;
- Information on conducted demonstration activities;

- FIE modifications;
- Plans for improvement;
- Contact list including three categories and its distribution by three categories: gender, youth, and elders.

The undertaken approach is threefold, it includes a careful elaboration of each WP needed input form FIEs; the abstraction of data needed for monitoring of project general objectives and KPIs; the compilation of specific FIE related data in line with their work plans.

COVID-19 outbreak and its impact on FIEs and the overall Project approach

During the M17 of the project Coronavirus disease (COVID-19) outbreak occurred in Europe. At the point of the submission of this report, COVID-19 is still largely present on the continent, affecting the work of FIEs and RCs with the medium level of impact. A detailed table with specific consequences on FIEs and RC work during M17-18 can be found within Chapter five of this report. Both FIEs and RCs are working actively to overcome COVID-19 related obstacles, with the support of the project. During M18, the project has established a Task Force to work in the fast lane on COVID-19 related impact on the project, to tackle challenges systematically, and to provide short term and long-term solutions. A more detailed description of the Task Force objectives is provided within the same chapter.

Some key specific FIE related results

As expected, the number of **deployed components** is steadily growing, currently reaching 92, while a greater increase is expected in the upcoming period. Solutions are being deployed on over 262.000 **farms/sites**, while five FIEs have not deployed on any farms. Nevertheless, these two parameters are not correlated, as some FIEs have been testing components in laboratories and not on the sites, while the others have established partnerships with farmers, but still haven't deployed any components. It is expected that the number of engaged farms will rise in the upcoming period.
In terms of **Technology readiness level** (TRL), 17 FIEs have shown an increase in this segment, which is perceived as valuable achievement within the first reporting period.

FIEs have been noticeably active regarding **dissemination and exploitation**. In total, there has been 190 dissemination activities and 22 demonstrations events.

A question on **percentage of women** participation within FIEs was of special interest to the project, also considering that the project is working on gender equal participation for which a special gender task force was formed. On average, women make up one fifth of the people working within all the FIEs in SAH.

There have been 47 **collaborations with DIHs**, each FIE has at least one DIH collaboration, while one FIE has five in total, being it the most. Regarding **collaborations with CC**, in total 66 collaborations have been reported. On average each FIE has collaborated with two CC, while the biggest number of collaborations is five. Demonstrated numbers are showing the strength and the value these actors add to the project. At the current phase of implementation, many FIEs have not defined their **Data Management Plans** (DMP), making this one of the topics for improvement in the upcoming period. In total five FIEs have developed FIE specific DMP, 23 FIEs do not have DMP in place, three FIEs do have DMP within their companies/organisations but do not have a specific FIE related document, while one FIE has the document both on FIE and the company level. **Collaborations among** FIEs is a point of further exploration as there have been 36 collaborations in total. Special attention is to be placed on FIE related collaborations in the upcoming period as this is perceived as a great potential for mutual learning, exchange of solutions, ideas, and approaches among sectors and across regional clusters.

Regional Clusters

As part of the deliverable, information on the progress within nine RC during M1-17 is presented within Chapter four of the report. RC Progress Report template was created by WP3 in collaboration with WP1, WP4 and WP5 and it covers the following aspects of their work:

- Provided support to FIEs, DIHs, CCs inside and outside of the project;
- Identification of new DIHs and CC in the regions and maintaining connections with the existing;
- Identification of regional needs;
- Detection of institutional settings and funding opportunities in the Agri-food sector;
- Information on relevant events attended or organized by RCs;
- Information on relevant events to be attended in the upcoming period;

RCs are very diverse in terms of technological advancements in the Agri-food sector, technology intake, government priorities. Some RCs are involved in many different countries (e.g. RC CE, NEW, NEE represented by five counties each), while there are also single county representatives (e.g. RC France). Still, some general observations in the sector can be made. Numbers of DIHs in the regions are steadily rising, however, in some RCs (e.g. Scandinavia), a low density of DIHs is noticed due to primarily European and private funding, thus limiting the capacity in which DIHs operate.

Ongoing assistance to FIEs is mostly related to the monthly follow up of overall FIE performance, activities, potential issues, identification of new partners (e.g. Ireland and UK Cluster), dissemination and communication, and reporting. RCs are also acting as a link between FIE and specific project WPs as needed.

Several external connections were established by RC Ireland and the UK, RC Scandinavia, RC France, RC NEW, RC Iberia, RC SEE, and RC NEE being characterized as very active in the field. RCs CE and Italy and Malta reported on not having any intermediate internal connection between FIEs, DIHs, CCs, and WPs, nor external (beyond the project) between FIEs, DIHs, CCs, and other companies, funds or institutions. This lack of connection is due to an early stage of the project and more collaboration is expected during the next reporting period and with further development of the FIEs.

All RC are actively working on the identification of regional needs which is mostly done through the conduction of regional workshops and meetings with stakeholders. The presence of various forms of both public and private funding opportunities in a smaller or larger extent, available in the confidential version of the report.

In terms of identified barriers, RC Ireland and the UK informed on the lack of skilled advisors up to date with digital tools and services; the need for more living labs and improved communication infrastructure; the need for regulated data ownership and data governance.

The confidential version of the report provides detailed information on the current situation in nine RCs in regard to technology readiness and technology application, available knowledge, identified barriers and needs for further reginal advancements and expansions.

Within the current reporting period, RC representatives attended 111 events in which they have presented belonging FIEs and the SAHs project. The main audience of these events were representatives from the industry, academic partners, DIHs, CCs, farmers and farmers community, agricultural service providers, end-users, technology providers, technicians, the scientific community, advisors, students, researchers, start-ups from Europe, Africa, and America, media, civil society organisations, policymakers, etc. For the upcoming period, from April to September 2020, RCs planned on attending approximately 42 events, however, due to COVID-19 crises many are cancelled/postponed, while some will be transformed to virtual presentations/webinars.

1. INTRODUCTION

The D3.4 "Periodic evaluation of the IEs performance" aims to identify and thus evaluate each of the 28 Flagship Innovation Experiments' (FIEs) current status of implementation, including their deliverables and milestones as well as demonstration activities if there were any. D3.4 is of crucial importance for the success of the entire WP3 since the main objectives of the WP are monitoring and evaluation of the FIEs through the previously set KPIs as well as advancement of their Technology Readiness Levels (TRLs). Taking into account this is the first periodic evaluation report, it is considered crucial as it will showcase whether any modifications are needed. It will also be a key milestone to reflect on the work in the previous year and capture any lessons learned in order to build on the knowledge and experience as well as increase effectiveness and efficiency in the remaining period.

D3.4 structure is based on D3.2 which contained a detailed plan of the activities of the FIEs including the definition of the particular area/facilities of deployment, technical requirements, activity calendars, evaluation and dissemination methods, material preparations, tasks and responsibilities of involved parties and other important aspects of the IEs. The D3.4 is focused on monitoring these activities, requirements and outputs specified in D3.2 and reporting on FIE's progress, challenges, changes in the planned activities and accomplishments. Besides monitoring, D3.4 is also evaluating the results of the FIEs and suggesting whether there is a need for corrective measures. This is carried out through inquiring whether the necessary activities have been accomplished in the observed reporting period and whether the FIE's deliverables and milestones have been achieved on time and within budget.

The second chapter of the deliverable is dedicated to the description of the methodology and the evaluation report template that was distributed to the FIEs in order to collect the required information. This section is followed by the specification of the methodology used to build the Evaluation Report template. The third chapter demonstrates the results of the analysis based on the inputs provided by the FIEs through the 28 submitted reports. If the reader is interested in obtaining more information about a specific FIE, it is suggested to directly contact the coordinator of the FIE of interest[1]. This chapter is followed by the analysis of reports of Regional Clusters. Fifth chapter is focused on the event of COVID-19 pandemic and its effect on FIEs and RCs. Finally, the last chapter of the deliverable consists of the overall conclusions, including suggestions that could improve the impact of the 28 FIEs in the upcoming years.

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[1] The contact details of the FIE coordinators can be found on the project website (https://smartagrihubs.eu/)

2. APPROACH & METHODOLOGY

2.1 INNOVATION EXPERIMENT EVALUATION REPORT TEMPLATE CREATION METHODOLOGY

The Innovation Experiment Evaluation Report template's goal is to identify and evaluate the progress of the 28 FIEs throughout the observed reporting period. Establishment of the baseline for the progress and evaluation was crucial in order to observe whether the FIE is delivering in line with the execution plan and whether the activities are on time. To identify this baseline, the initial screening of the FIEs at the start of the SAH project was used. The template from D3.2 "IE Execution plan" was used for the initial screening, containing nine sections which are now represented through eleven sections of the progress report template. The final progress report template was developed in close collaboration with partners from other WPs in SAH project so that the output of the report contains valuable information for them as well. The described process is presented in Figure 1.
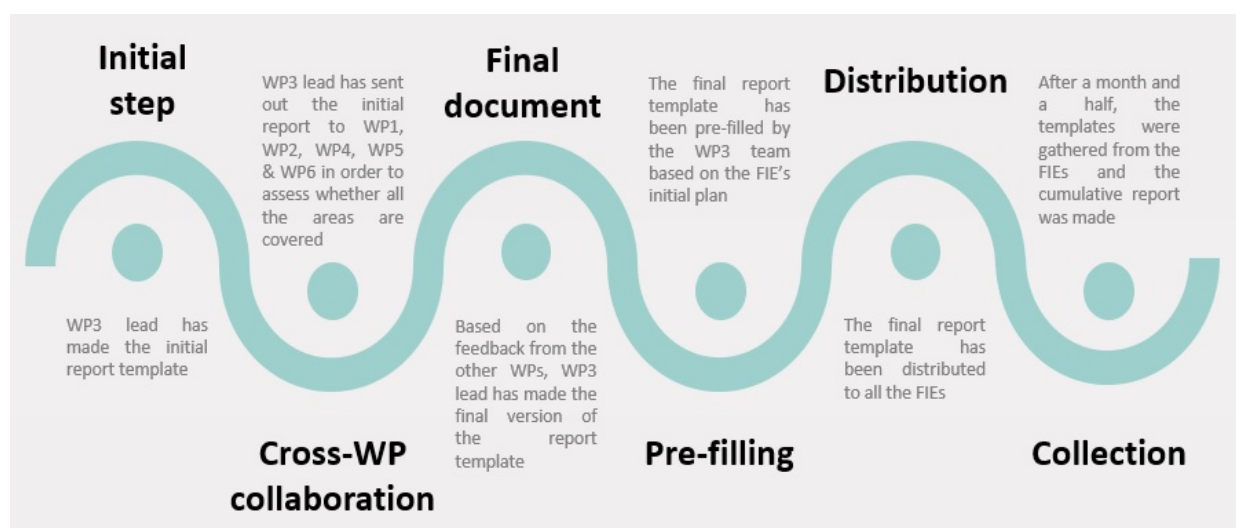

Initial step
WP3 lead has made the initial report template

WP3 lead has sent out the initial report to WP1, WP2, WP4, WP5 & WP6 in order to assess whether all the areas are covered

Cross-WP collaboration
Based on the feedback from the other WPs, WP3 lead has made the final version of the report template

Final document
The final report template has been pre-filled by the WP3 team based on the FIE's initial plan

Pre-filling
The final report template has been distributed to all the FIEs

Distribution
After a month and a half, the templates were gathered from the FIEs and the cumulative report was made

Collection

Figure 1 - Evaluation report creation

2.2 METHODOLOGY FOR FILLING IN THE PROGRESS EVALUATION REPORT TEMPLATE

The Progress Evaluation report has a simple and straightforward structure which is easy to follow. As the questions in the report were based on the detailed plan the FIEs have already filled out, it would be clear to the FIE's coordinator what new information is required and the FIE Coordinator should have no objections regarding obtaining and providing the relevant information.

The first part of the FIE progress evaluation report is focused on the progress summary, including specific objectives, achievements/results, problems/challenges, and lessons learned with the reporting period (M3 to M16). Here a limit of 500 words was introduced in order to keep the answers concise and to the point while allowing enough space for demonstrating all of the important details. The final two questions are related to the application area and the number of test farms (deployed sites) within which FIEs have demonstrated their systems and activities.

Figure 2 - Innovation Experiment Progress Summary

Figure 3 - Innovation Experiment Progress Summary

The second part of the report highlights the progress of FIE execution plan, including the development of the FIE's Technology Readiness Level (taking into account the initial value), current value and target value (Figure 4) and conducted activities within the reporting period (Figure 5). To fully understand the activities that were undertaken, the following details needed to be provided: the start and end month of the activity, the name, goal and description of the activity as well as information on any subcontracted party and the description of the activity realization.

2. EXECUTION PLAN PROGRESS

2.1. FIE TECHNOLOGY READINESS LEVEL DEVELOPMENT

FLAGSHIP INNOVATION EXPERIMENT CHARACTERISTICS			
Technology Readiness Level (TRL)[1]	Initial value (at the beginning of FIE)	Current value	Target value
		[Please insert the current TRL value]	[Please insert the target TRL value]

Figure 4 - Technology Readiness Level Development

2.2. FLAGSHIP INNOVATION EXPERIMENT ACTIVITY PROGRESS

[Please, provide a description of conducted activities in the Reporting Period: M03 – M16]

Activity No.	Start month	M	End month	M	Total PM	PM
Activity name	*[Please insert the activity name]*					
Activity goal	*[Please give a short description of the activity goal]*					
Activity description	*[Please provide description of the activity]*					
Subcontracted party	*[Please provide name of the subcontracted party, if any participated in this activity realization]*					
	[Please elaborate on the work done by subcontracted party within this activity]					
Activity realisation	*[Please, provide description of conducted activity within the reporting period, stating and explaining the current status of development, the successfulness of implementation and achieved performance; text limit minimum 100 words]*					

Activity success indicator (KPI)	Success indicator Baseline value	Success indicator target value	Current value	Comment

Figure 5 - Activity progress

The third part is looking at the status of the implementation through the list of actors (users) involved (Figure 6), the list of deployed components (Figure 7) and the lists of reusable technical (Figure 8) and non-technical components (Figure 9). All of these are of great importance as the SAH project aims at having deliverables for each FIE that can be replicated and reused.

3. STATUS OF IMPLEMENTATION

3.1. ACTORS (USERS) INVOLVED IN THE REPORTING PERIOD M03 – M16

Actor Name* (e.g. SMEs and Mid-caps, start-ups, farmers, advisors, farmers associations, etc.)	Main features/comments/inputs provided to the FIE	Application of features/comments/inputs in FIE

* - actors not indicated in the Execution Plan

*Please, add or remove rows if needed.

Figure 6 - Actors (users) involved

3.2. DEPLOYED COMPONENTS IN THE REPORTING PERIOD M03 – M16

Name	Deployment Site(s)	Number of Deployed Units per site	Supplier (brand) + Model	Type of Component
[Please name deployed technology]	[Please refer to No. of farms involved in your experiment	[Please insert the number of used units]	[Please provide deployed technology supplier/brand and model]	[Please classify the component in a category like sensor, actuator, gateway, other wireless devices, IoT platform, FIWARE, end-user related application]

*Please, add or remove rows if needed.

Figure 7 - Deployed components

3.3. REUSABLE TECHNICAL COMPONENTS IN THE REPORTING PERIOD M03 – M16

Name of the component	Component owner (FIE, company…)	Type of Component	Number of Deployed Units per site	Deployment Site(s)	How is it reusable?	When it will be reusable?	Whom it concerns	TRL of the component
[Please provide name of reusable component]	[Please indicate the reusable technical component's owner]	[Please classify the component in a category like sensor, actuator, gateway, other wireless devices, IoT platform, FIWARE, end-user related application]	[Please insert the number of used units per site]	[Please refer to No. from Area/Facilities from the Deployed components table 3.2]	[Please explain how this component can be reused]	[Please estimate when the component will be available for reuse]	[Please explain - who is the end user of this component]	

*Please, add or remove rows if needed.

Figure 8 - Reusable technical components

3.4. REUSABLE NON-TECHNICAL COMPONENTS IN THE REPORTING PERIOD M03 – M16

Name of the component	Component owner (FIE, company…)	Type of Component	Who can benefit from it?	When will it be reusable?	How is it reusable?
[Please name the reusable non-technical component]	[Please indicate the reusable non-technical component's owner]	[Please classify the component in a category like business model, services, mentoring, customer intimacy, skills and education, community building, visioning and strategy development]	[Please list and describe who can benefit from the given reusable component]	[Please estimate when the component will be available for reuse]	Please explain how this component can be reused?

*Please, add or remove rows if needed.

Figure 9 - Reusable non-technical components

Following the implementation status of the FIE, the next part's emphasis is put on the impact the FIE has made, its deliverables and milestones, as well as risk management.

The impact is assessed through the FIE's overview on its economic, environmental and social impact, achieved collaborations with DIHs and CCs as well as other FIEs and special attention is put on FIE Data Protection and the impact it made on gender.

4. FLAGSHIP INNOVATION EXPERIMENT IMPACT

4.1. FLAGSHIP INNOVATION EXPERIMENT OVERVIEW

[Please give the overview of your FIE KPIs from economic, environmental and social aspect, as defined in the FIEEP]

Variable	KPI description	Target	Baseline value	Target value	Current value
ECONOMIC IMPACT					
e.g. Resources efficiency	e.g. m³ water use on crop cultivation per m² per year	e.g. Water consumption reduction			
ENVIRONMENTAL IMPACT					
OTHER IMPACT (SOCIAL)					

Figure 10 - FIE Overview

To better understand the collaborations between the FIEs on one hand and the DIHs and CCs on the other, information on the DIH's/CC's role in the FIE, their country, envisaged and provided support and the reusability and sustainability of the support was requested, including general impressions from collaborations with the DIHs.

4.2. COLLABORATION WITH DIGITAL INNOVATION HUBS

DIGITAL INNOVATION HUBs SERVICES					
DIH Name	[Please provide the DIH name]	**Role in FIE**	[Please provide the DIH role in FIE]	**Region / Country**	[Please provide the DIH country/region]
DIH envisaged support (services)					
DIH support provided	[Please describe how the given DIH has provided support to your FIE within the reporting period]				
DIH support reusability					
DIH support reusability achieved	[Please describe what services were reused by other DIHs and how they were made available]				
DIH support sustainability					
DIH support sustainability achieved	[Please describe what services were reused by other DIHs and how they were made available]				

*Please, copy the table for additional DIHs.

Figure 11 - Collaboration with DIHs

4.2.1. GENERAL IMPRESSIONS FROM COLLABORATION WITH DIH

What is your experience from collaboration with DIHs?	[Please describe your experience from collaboration with DIHs]
Benefits for DIHs	[Please describe how you think that the FIE strengthens the DIH]
Additional services	[Please indicate which services you could have benefitted from, but were not available in your view]
Services you would like to receive in near future	[Please indicate which services you consider valuable in the near future]

As a reference, you can use D4.2 (link to Basecamp)

Figure 12 - General impressions from Collaboration with DIHs

4.3. COLLABORATION WITH COMPETENCE CENTRES

COMPETENCE CENTRES SERVICES					
CC Name	[Please provide the CC name]	Role in FIE	[Please provide the CC role in FIE]	Region / Country	[Please provide the CC country/region]
CC envisaged support					
CC support provided	[Please describe how the given CC has provided support to your FIE within the reporting period]				
CC support reusability					
CC support reusability achieved	[Please describe what services were reused by other CCs and how they were made available]				
CC support sustainability					
CC support sustainability achieved	[Please describe what services were reused by other CCs and how they were made available]				

Please, copy the table for additional CCs.

Figure 13 - Collaboration with CCs

In order to further enhance FIEs and their performance, but also nurture the spirit of peer-to-peer learning and replication of good practices, FIEs were encouraged to collaborate with each other. The collaborations that occurred during the reporting period were described through common components (i.e. business plans, common hardware solutions and technologies) and the identified solutions (Figure 14).

Figure 14 - Collaboration with other FIEs

To assess the steps taken in order to protect the data, especially since the majority of the information is confidential, FIEs were asked whether they have a Data Protection Officer, whether the identification and recruitment of the research participants complied with the GDPR and also whether the FIE has a Data Management Plan. The final part of the fourth section of the report assessed the FIEs impact on gender as one of the key concerns is also making impact on employment of women.

Figure 15 - FIE Data protection

Figure 16 - FIE Impact on gender

The fifth part of the report is focused on deliverables and milestones. The deliverables could have been a report, a demonstration or a pilot, a website, patent filling or a video and it the deliverable could have been classified as other (i.e. whether it is a software or a technical diagram). Depending on the nature of the deliverable, FIEs were asked to provide a link to the Basecamp platform where they have stored it and verified the completion of the deliverable. Concerning milestones, FIEs were also asked to provide a link to Basecamp as a mean of verification of achieving the milestone as well as provide the date on which it was achieved and any special comments worth sharing with WP3. During the entire reporting period, WP3 leaders have closely followed on deliverable and milestone implementation in line with FIE execution plans, and reported on their progress, any delays and/or issues FIEs have faced.

Figure 17 - Deliverables

5.2. MILESTONES IN THE REPORTING PERIOD M03 – M16

Mil. No.	Milestone name	Means of verification (Please provide link to Basecamp)	Achieved Yes/No	Achievement date (dd/mm/yyyy)	Comments

Please, add or remove rows if needed.

Figure 18 - FIE Milestones

Following deliverables and milestones, a related section was dedicated to risks and their management within the FIE. FIEs were asked to provide information on both foreseen risks and unforeseen ones that they face during the implementation. These risks were firstly described, attached to an activity and then assigned a mitigation measure.

6. RISK MANAGEMENT

6.1. FORESEEN RISKS

Description of Risk	Activity concerned	Risk occurred (Yes/No)	Proposed Risk-Mitigation Measures	Implemented Risk-Mitigation Measures
[Insert risk description]	[Insert Activity No. in accordance with the FIEEP]		[Insert mitigation measure]	

*Please, add or remove rows if needed.

6.2. UNFORESEEN RISKS

Description of Risk	Activity Concerned	Implemented Risk-Mitigation Measures
[Insert unforeseen issue description]	[Insert Activity No. in accordance with the FIEEP]	[Insert mitigation measure]

*Please, add or remove rows if needed.

Figure 19 - Foreseen and unforeseen risks

The next part of the report centered on dissemination and exploitation. Here, FIEs described their dissemination activities by stating their type (i.e. press release, press article, press interview, TV/radio interview, event, conference, seminar, scientific publication, internet post, promotional material), the description (where was the piece published, title of the event, place and organizer), target audience (scientific, general public, policy makers, media, customers, CCs, DIHs) and the supporting documents. FIEs were also asked to describe whether they have any existing intellectual property rights (IPRs) and if yes if they are registered.

Communication and dissemination activities are of immense importance both for FIEs as well as for the entire SAH project. The input that was provided by FIEs in section 7 (picture below) feeds WP1 and project's ecosystem development strategy.

7. DISSEMINATION AND EXPLOITATION

Type of activity	*[e.g. press release/ press article/ press interview/ TV-radio interview/ event/ conference/ workshop/ seminar/ trade fair/ scientific publication/ internet posts/ social media posts/ newsletter/ promotional material]*										
Description	*[e.g. published where/ title of article or event/ place/ recipients/ organisers]*										
Target Audience/ Stakeholders	*[Describe briefly the type of audience in accordance with the SmartAgriHubs target groups. Indicate in the table below the type and number of reached audience/stakeholders]*										
	Scientific	Industry	Civil Society	General Public	Policy makers	Media	Investors	Customers	CCs	DIHs	Others
Support documents	*[Internet link(s), print screens, scans, press clipping, event programme, pictures, etc.]*										
FIE / Partner's social media accounts											
Intellectual property rights	*[Please describe does your FIE have IPR; Is it registered or not]*										

Figure 20 - Dissemination and exploitation

Demonstration activities are presented within section eight of the report, including the description of the demonstration activities through the location, date, subject, activity environment, used infrastructure, activity interactive aspect, targeted audience, involved DIHs and lessons learned. As one of the important aspects of FIEs is the usability of the experiment and its ability to be replicated and widely used, special attention is given to demonstration activities and the feedback gained from those activities.

8. DEMONSTRATION ACTIVITIES

DEMONSTRATION ACTIVITIES	
Location of the demonstration	
Demonstation date	
What is subjected to demonstration?	
Demonstration activity environment	
Used infrastructure for demonstration activity	
Demonstration activity interactive aspect	
Targeted audience group	

Figure 21 - Demonstration activities

The next sections were dedicated to modifications (Figure 22) and plans for improvement (Figures 23 & 24) and the report is completed by a contact list (Figure 25). Modifications are described through their type (i.e. change of role, responsibility, partner, KPI, FIE used technology), description, reason for modification, period when it occurred and who was it approved by.

9. MODIFICATIONS

Type of modification	*[e.g. change of role, responsibility, partner, KPIs, FIE deployed site, FIE used crops, technology, equipment, etc.]*
Modification Description	*[Please, describe occurred modification/change]*
Reasons for Modification	*[Please, provide short explanation why modification/change occurred]*
When Modification Occurred	*[dd/mm/yyyy or dd/mm/yyyy-dd/mm/yyyy]*
Modification Approved by	*[Role and name, e.g. WP3 and WP6 team, FIE coordinator.]*

*Please copy paste the table if needed to add more modifications.

Figure 22 - Modifications

Plans for improvement are introduced if the FIEs noticed a gap in the technology, a need for more end-users, a need for additional deployment sites, additional services from DIHs/CCs or in the training needs. One of the questions was aimed at identifying useful benefits by end-users/farmers if any feedback was received from them. In order to get all the required information and to fully understand the improvement plan, a minimum text limit has been introduced for the most important questions in this section. Within this section, possible extensions to the solution are also described through their functionality, technology used, provider, standards compliance and priority.

Figure 23 - Plans for improvement

Figure 24 - Plans for improvement

The final part of the report is the contact list, which states persons involved within particular FIE, including the impact each FIE is making on women, youth and senior employment structure.

Figure 25 - Contact list

3. RESULTS

Each FIE has delivered a Progress Report summarising their achievements and the overall development during the observed period (M3-M16). The focus of this chapter will be on the achievement's analysis reported by all FIEs. By analysing the collected Progress reports we were able to understand and examine both technical and business aspects of the FIEs, evaluate their progress of deployment and see which risks and changes they have encountered, all so the readiness of the FIEs for the coming period (M16-M38) is shown. Analysis Results are also presented per Regional Clusters, apart from the results regarding GDPR, data management plan and the FIEs impact on women and youth employment which is shown cumulatively.

The following table presents an overview of 28 FIEs, distributed among 9 corresponding RCs:

List of FIEs per Regional Clusters
Regional Cluster Ireland & UK
FIE 1 – Farm Sustainability Audit
FIE 2 – STREAM (Sustainability tool for remote assessment and management of farmland)
Regional Cluster Scandinavia
FIE 3 - Digitising Farm Machinery produced by SMEs
FIE 4 - Adopting Digital Technologies by Farmers
FIE 5 - Valued Grain Chain
RC France
FIE 6 – AgriFarmLab
FIE 7 – DIGI-PILOTE (Information system and DSS tool for cereals cultivation)
FIE 8 - STRATE-GEEK
RC North-West Europe
FIE 9 - Deep Learning & Hyperspectral Imaging (AI4AGRICULTURE)
FIE 10 – Farmcube
FIE 11 - Smart Pig Health
FIE 12 - DIG-ITfarm
FIE 13 - AMMONIA EMISSION MONITORING NETWORK
RC Central Europe
FIE 14 - Mower Robot for Vineyards
FIE 15 - Precision Farming in Agricultural Practice
RC North-East Europe
FIE 16 - E-services Utilising Drones for Quantity Buyer
FIE 17 - Online Decision Support System Fertiliser Optimisation
FIE 18 - Autonomous Greenhouses
FIE 19 - Bee Monitoring and Behaviour Prediction
FIE 20 - Smart Groundwater and Weather Sensors
RC Iberia

List of FIEs per Regional Clusters
FIE 21 - Sensoring and AI Algorithms for Early Crop Disease Detection
FIE 22 - Iberian Irrigation Portal
FIE 23 - Digitising the Dairy Production Chain
RC Italy & Malta
FIE 24 - Implementation of ICT in Aquaculture
FIE 25 - Data-Driven Vineyard Precision Management
RC South-East Europe
FIE 26 - Digitising Open-Field Vegetables
FIE 27 - Tracking Animal Movements and Health Records
FIE 28 - Decentralised Trust in Agri-Food Supply Chains

Table 1 List of FIEs per Regional Cluster

3.1 FLAGSHIP INNOVATION EXPERIMENTS BY CLUSTER

3.1.1. RC IRELAND & UK

RC Ireland & UK has two FIEs, both of them are in Ireland and are focused on livestock. Both FIEs are cooperating with farms in order to help them with their data collection and data management. FIE 1 have installed equipment on selected farms in order to monitor energy and water consumption and body condition score and motion and in FIE 2 aerial imagery and technology will be used to make farmland habitat reports. A risk that FIE 2 have faced was getting permission for data sharing as well as the transfer of data from the Ministry of Agriculture (DAFM) in Ireland. Due to this within the reporting period they weren't able to deploy many of their planned activities and deliverables, but they have been focused on doing as much of preparatory work as possible in order to be able to properly start their activities when all the conditions have been met. FIE 1 has also faced obstacles since the partner they relied on for equipment ceased trading and wasn't able to fulfil their commitment to the experiment, but an alternative partner is being sought out.

During the reporting period FIE 1 has deployed three components. The technical and non-technical components the FIEs work on are an important aspect of the project because some of them might be reusable after the end of the project. As mentioned previously, due to FIE 2 having delays which happened due to unforeseen risks, they have not deployed any components in the reporting period.

Both FIEs have collaborated with DIH Teagasc. The impressions from the FIEs regarding the collaboration has been very positive with the FIEs recognizing the hard work Teagasc has put in. Beside Teagasc, FIE 1 has collaborated with DIH TSSG. This collaboration has also been recognized as an important and beneficial one. It is worth noting FIE 2 has collaborated with TSSG as a CC and TSSG has been a key contributor in the meetings organized by FIE 2 and will contribute even more in the coming months.

Concerning CCs, FIEs have collaborated with 4 each including some that have contributed in both FIEs. The list of CCs is as follows: Code-Plus, Ingenera, ICBF, Energy Monitoring Ireland, Teagasc, FERS and TSSG.

FIE 1 has reached all four of its milestones in the reporting period, while FIE 2 is still working on reaching its first milestone due to the occurred unforeseen risk.

Regarding dissemination and exploitation activities the Irish FIEs have been mentioned in a press article, a workshop and have appeared in the presentation at the Guiness Enterprise centre.

3.1.2. RC SCANDINAVIA

RC Scandinavia has three FIEs (FIE3, FIE4 and FIE5), all of which are concentrated on the arable sector, while FIE 4 is focused on livestock as well. FIE 3 is centered on digitizing two SMEs and two pieces of equipment they produce: a row hoe and a field sprayer. FIE 4 aims to develop DIH services for enhanced technology adoption by farmers in meat and plant production. FIE 5 uses web services and digital solutions to identify grain lots, define their quality and record cultivation history to improve business models of Nordic arable farmers.

Within the reporting period FIE 3 and FIE 4 have not deployed any components and have been focused on workshops with their stakeholders and making business plans, as per their plans. On the other side, FIE 5 have deployed eight components.

All FIEs within this RC have collaborated with DIH AgroVäst. Yet, each FIE has collaborated with one extra DIH: - FIE 3 with Agro Business Park, FIE 4 with SEGES and FIE 5 with Luke DIS. The FIEs have, in general, been satisfied with the support they have received from DIHs.

The Scandinavian FIEs have collaborated with a number of CCs: RISE, Danish Technological Institute, Aarhus University, Magic Circle, University of Skövde, Swedish University of Agricultural Sciences (SLU), Luke and VTT.

FIEs have achieved their milestones on time, apart from FIE 5 which has a couple of delays. The delay was caused by an unforeseen risk in personnel that is now being mitigated. The expected delay should not have a big effect on the entire delivery of the FIE.

All FIEs have held various workshops and have been a part of different trade fairs, congresses and meetings and have been active in their dissemination and promotional activities. Some of the activities include: IoT week in Aarhus, Plante Kongress, Store Kartoffeldag Conference, Tampere Technopolis Seminar and Trade Fair Koneagria 2019.

3.1.3. RC FRANCE

RC France includes three FIEs (FIE6, FIE7 and FIE8) which are grouped in the arable sector with FIE 6 also focusing on vegetables and livestock and FIE 8 also focusing on the latter. FIE 6 is bridging the gap between farmers involved in the FIE and technology providers who have solution for the various challenges these farms are facing. FIE 7 is delivering strategic advice to wheat farmers through a mobile application which processes information from the cloud and data from IoT solutions. FIE 8 is creating a Decision Support Tool which assesses the consequences of decisions in order to support the strategic decision-making by farmers.

FIE 6 has not deployed any components as they are more of a connector between various stakeholders and are focused on service providing rather than providing physical outputs. FIE 7 has deployed various components, while FIE 8 has held an IT competition in a form of bootcamp.

FIE 7 and FIE 8 have collaborated only with DIGIFERMES DIH, while FIE 6 has collaborated with four different DIHs: VEGEPOLYS-VALLEY, Chambre d'Agriculture Pays de la Loire, CEA and Images & Réseaux. The French FIEs have been very satisfied with their cooperation with DIHs especially with the networking aspect.

FIE 6 has worked with the CCs of the four above-mentioned DIHs and an additional CC - Inf'Agri 85. FIE 7 and FIE 8 have both collaborated with: ACTA – ARVALIS and ACTA – Acta Digital Services and FIE 7 has collaborated additionally with API AGRO CC. It is worth noting that all of the FIEs from France will also work together on some of their activities.

Concerning deliverables and milestones the FIEs have delivered them on time and it was noticeable that none of the FIEs have faced many risks, both foreseen and unforeseen.

The dissemination and exploitation activities of the FIEs has been varied from press releases to social media activities and different events and congresses. Notable appearances are: 14th Culturales® workshop, Phloeme 2020 congress, DiverIMPACTS European Conference on Crop Diversification, Agri Start Up Summit, a press release in Vendée Agricole and posts on

various social media platforms. FIE 6 and FIE 7 have also had demonstration activities while FIE 8 is expected to have them in the upcoming period.

Overall, all three FIEs have shown great commitment, have executed in accordance with the plan they set at the beginning of the project and have communicated with the SAH team on a regular basis. For the time being, they are all on track to finish successfully and within the time frame.

3.1.4. RC NORTH-WEST EUROPE

RC North-West Europe is composed of five FIEs (FIE 9-13), two of them being in the arable sector and three of them in the livestock sector. FIE 9 is gathering data on crops and weed status by using deep-learning analyses of RGB and modified RGB imaging to improve spray operations. In addition, early disease detection on potatoes using hyperspectral and modified RGB imaging is being developed. FIE 10 is digitising decision-making processes by storing data gathered from remote sensing applications and translating it into tailored advice for end-users. FIE 11 is leveraging digitised sensors and prediction models to predict diseases among pigs in order to decrease the antimicrobial usage and resistance and is providing transparent information to all stakeholders. FIE 12 is using sensors, robots and data collection to predict early stage diseases in broilers and fattening pigs in order to lower the use of antibiotics and to disseminate the best-practices. FIE 13 is implementing an ammonia emissions and climate monitoring tool in dairy and pig barns to improve animal welfare and overall sustainability.

All FIEs have successfully started the implementation phase and have deployed solutions on a number of different farms ranging from one to seven.

All FIEs except FIE 11 have collaborated with DIH Smart Digital Farming and this DIH is the only one FIE 12 and FIE 13 have collaborated with. FIE 9 has also collaborated with Flanders Food and IMEC while FIE 10 has collaborated with Praktijkcentrum voor precisielandbouw, E-Pieper, NPPL: National testbed precision Agr. and JoinData. FIE 11 has only collaborated with VzF GmbH Erfolg mit Schwein. The collaborations have been described as fruitful.

CCs have played a vital role in the RC North-West Europe's implementation with ILVO being present in all FIEs except FIE 11. FIE 9's collaborations include UGent (Ghent University), Innovation Support Center for Agricultural and Rural Development and IMEC and FIE 10 has cooperated with Wageningen University and Research (WUR). FIE 13 has received support from Hooibeekhoeve and IMEC while for FIE 11 these are innoSEP GmbH, Landwirtschaftskammer Niedersachsen, Mitteldeutsche Agentur für Informationsservice GmbH (MAIS) and VzF e.V. All FIEs have found in which areas they can collaborate with other SAH FIEs and the collaborations are mostly focused on exchange of experiences.

The deliverables and milestones have been met as per the execution plan while noting roughly half of the foreseen risks have occurred and a couple of unforeseen ones have happened with FIEs 9 and 11.

Beside notable presence on social media channels, the FIEs have had a number of dissemination and exploitation activities including: Potato Europe fair, Automation and Robotics in Agriculture in Berlin, panel discussion at Farm Management Information System in Kruishoutem, Animal Farming For A Healthy in Ghent, Innovation days in Garrel and Verden, IEEE 5G World Forum in Dresden and Zukunftsworkshop Digitale Landwirtschaft 2025 in Berlin. FIE 11 will have its first demonstration this year while all other FIEs have already had demonstration activities.

Overall, all FIEs have shown growth within the reporting period while achieving their milestones and planned activities. A mature approach can be seen in the FIEs from RC NW Europe and it is expected that they will have even more success in the coming months.

3.1.5. RC CENTRAL EUROPE

RC Central Europe consists of two FIEs (FIE14 & FIE15), both from Austria, FIE 14 focuses on the fruit sector and FIE 15 on the arable sector. FIE 14's efforts are achieving precise mowing between grape vines by implementing an autonomous mowing robot system and FIE 15 is developing a mobile application and the application connects to in-field data-gathering sensors in order to make precision farming technologies and solutions accessible to end-users.

Both FIE's have not had any activities on external farms yet, but have done in-house testing.

The Austrian FIEs have worked with DIH Platform „Digitalization in Agriculture" of Federal Ministry of Agriculture.

Regarding collaborations with CCs, the only CC present in both FIEs is HBLFA Francisco Josephinum.

There have been a number of milestones and deliverables in the reporting period and they have all been achieved in the planned period with none of the foreseen risks or unforeseen risks occurring.

The dissemination and exploitation activities have been mostly focused on social media presence both through the CCs media channels as well as the ones of the SAH project. Demonstration activities have happened during 2019 and January 2020.

The FIEs of RC Central Europe have demonstrated good progress with their activities and have been working in accordance with the plan while in the coming period, more tangible results are expected.

3.1.6. RC NORTH-EAST EUROPE

RC North-East Europe constitutes of five FIEs (FIE16-FIE20), two are in the arable sector (FIE16 & FIE17), one is in the arable and vegetable sector (FIE20), one in the livestock (FIE19) and the last one in the vegetable & fruits sector (FIE18). FIE 16 is developing business strategies and testing drone mapping to catalyse the wide adoption of drone-based e-services. FIE 17 is creating an online Decision Support system for farmers which processes data from sensors and integrates image analyses to improve both yield quantity and quality. FIE 18 is combining AI and IoT technologies to establish an automated greenhouse management system able to monitor climatic conditions and carry out robotic crop treatments. FIE 19 is collecting data on environmental factors and processes surrounding the bee-hive through IoT sensors, and training AI with these observations to improve predictability in beekeeping. FIE 20 is developing a web-based system for agrometeorological and groundwater measurements to ease the transfer of information between different farm applications and smoothen the uptake of precision agriculture.

All FIEs, except FIE 17 have had deployments on farms or deployments sites. FIE 17 has only gathered data on one farm.

FIE 16, FIE 17 and FIE 18 have all collaborated with DIH Agro Poland and FIE 18 has collaborated with HUB4Agri. General impressions are that even though the DIH Agro Poland is a relatively new one, the cooperation has been very satisfactory and that the services provided were useful and helpful. FIE 19 and FIE 20 have both collaborated with DIH Farmers Parliament Latvia and DIH WirelessInfo. The collaborations have been evaluated as helpful.

Concerning CCs involvement, Wielkopolska Agricultural Advisory Centre (WODR) has worked with FIE 16 and FIE 17 and while being the only CC for FIE 17, FIE 16 has also collaborated or is to collaborate with Netictech, PSNC - Poznań Supercomputing and Networking Center and District Chemical and Agricultural Station in Poznań. FIE 18 has collaborated with Lukasiewicz Research Network - Industrial Institute of Agricultural Engineering (L-PIMR). WirelessInfo has collaborated with FIE 19 and FIE 20 not only as a DIH, but as a CC as well. FIE 19 and FIE 20 have both collaborated with Ventspils High Technology Park and Zemgale Region Human Resource and Competences Development Centre.

Regarding deliverables and milestones, each FIE has faced delays due to some risks occurring, although all have managed to deliver their deliverables and milestones by the submission of the progress reports and this will not affect the overall FIESs delivery and the success of the experiments.

The FIEs have used the following events for dissemination and exploitation activities: Agroshow 2019 in Bednary, 2019 Silk Road Agricutural Education and Reaserch Forum, Agricultural Enterprise Day in Sielinko, IV Knowledge and Innovation Forum in Warsaw, Polagra-Premiery Agro Trade Fair 2020 in Poznan, 1st Regional NEE Cluster Workshop, XXVI Scientific Conference 2019 in Zakopane, dissemination activity in Valmiera for beekeepers, Open Data Hackathon in Valmeria, ZSA Congress, User Needs Workshop in Vilciņi, Seminar in Agriculture Fair in Ramava, Needs Analysis Workshop, Agriculture Ministry, Kuldiga Seminar, Rozmalas Seminar. FIE 20 has had two demonstration activities at the beginning of 2020 and, as per previous plan, has so far been the only FIE with such activities.

The FIEs of RC North-East Europe have shown good commitment during the reporting period, and with the exception of delay in deliverables and milestones, have made very good progress regarding their activities.

3.1.7. RC IBERIA

RC Iberia constitutes of three FIEs (FIE21, FIE22 & FIE23), one in the fruit sector, one in the arable sector and the last one in the livestock sector. FIE 21 is using digital technologies to produce risk maps so as to facilitate the early detection of plant pests. FIE 22 is developing an irrigation web portal to improve irrigation management, crop productivity, profitability and the efficient use of water. FIE 23 is digitalising steps of the early dairy production chain to improve forage production, feed mixture and management, stable operations and resource efficiency.

Each FIE has had a deployment either on a commercial or an experimental farm.

FIE 21 has collaborated or will collaborate with the following DIHs: FARM2030, COTR, Agrotech and Galicia. FIE 22 has collaborated with DIH Agrotech. FIE 23 has worked with Digital Innovation Hub for the Galician Agrifood Sector. All three FIEs recognized the positive effect DIHs have made on the progress of the FIEs as well as the contribution DIH knowledge made on the current success of FIEs.

FIE 21 has worked with CCs INAIV and AGACAL. FIE 22 has collaborated with two CCs – Unparallel and IFAPA. FIE 23 has collaborated with AGACAL, USC and Gradiant. FIE 23 will also collaborate with two other SAH FIEs.

The Iberian FIEs have had mixed success with deliverables and milestones. While some were achieved, some have been delayed due to a few unforeseen risks.

Concerning dissemination and exploitation activities, FIE 21 has attended an IoT event in Cascais in Portugal and a wine fair in Valladolid, Spain. Beside that FIE 21 has worked on its promotional material and had promotional activities through a partner website page. FIE 22 is expected to have the first ones in the upcoming period while FIE 23 has had some coverage from specialized media outlets and has been a part of XVIII meeting of the Ibero-American INIA system in Pamplona. They have also shown activities on social media, mostly on the accounts of their partners.

The progress made by the Iberian FIEs is undeniable and is visible yet the main impact and the main activities of all three FIEs is expected in the next period.

3.1.8. RC ITALY & MALTA

RC Italy & Malta consists of two FIEs, FIE 25 in the fruits sector and FIE24 in aquaculture, currently the only FIE in the aquaculture sector in SAH. FIE 24 is using ICT and IoT technologies to deliver precision fish farming which controls water quality and executes operational routines in order to bolster sustainable aquaculture. FIE 25 is promoting the

uptake of precision strategies in viticulture by developing an application for growers which provides decision-making support for routine operations based on sensors attached to machinery.

Both FIEs have had deployments on three farms/sites.

The Italian FIEs have collaborated with Clust-ER Agrifood DIH. Both FIEs have been satisfied with the collaboration stating the bond between the DIH and the FIE have strengthened as time passed by and that the communication was professional and constructive.

The CCs involved in the project include Dept. of chemistry and pharmaceutical sciences – University of Ferrara (UniFE) for FIE 24 and UCSC-CRAST for FIE 25. Both FIEs will collaborate between themselves and FIE 25 has found basis for cooperation with three more FIEs.

The deliverables and milestones have been achieved and the communication regarding these has been satisfactory.

For their dissemination and exploitation activities FIEs have attended various events such as Plant Inter Cluster (PIC) Event in Naaldwijk, Project Transfarm4.0 (Interreg Central Europe) in Linz, Festa dei pesci marinate in Comacchio, Lagunet, National Workshop in Ferrara and Blue Growth Regional Working Group in Emilia-Romagna. Both FIEs have planned for demonstration events in summer of 2020.

The progress made by the Italian FIEs has been very good according to the plan made at the beginning of the project. The coming period will be challenging due to the COVID-19 crisis, especially due to the big impact it has in Italy, but this will be further analysed in the chapter dedicated to the impact of COVID-19 on the entire project.

3.1.9. RC SOUTH-EAST EUROPE

RC South-East Europe consists of three FIEs (FIE26, FIE27 & FIE28), FIE26 is in the vegetable sector, and FIE27 & FIE28 are in the livestock sector. FIE 26 is deploying drones, satellites and IoT devices to figure out the right harvesting time and discover weed patches, thereby enhancing the production of organic open field vegetables. FIE 27 is developing an online tool for the entire value chain tracking animals' movements through IoT technologies, in order to improve animal welfare. FIE 28 is implementing blockchain technology to integrate data from stakeholders across the dairy and poultry supply chain to improve traceability of products.

In regard to deployment farms, FIE 26 has deployed on one farm and two separate parcels within it, FIE 27 has not deployed on any farms yet and FIE 28 has deployed on 29 farms. The deployment activities are currently in line with the plan.

The DIHs with which collaboration was established are Gaiasense, mAgro and Biosense Institute. The cooperation has been described as fruitful and as a very positive experience and they have been recognized as crucial in further development of FIEs.

The only FIE which has collaborated with CCs is FIE 27 and they have worked with IQ Management SRL, SmartRDI Research and Development International SRL and Megabyte Limited. FIE 28, on the other hand, has established basis on which it can collaborate with four other FIEs.

Deliverables and milestones of the FIEs have been achieved with slight delays. The delays are currently not affecting the overall progress and success of the FIEs. It is noticeable each FIE has had at least one of the foreseen risks occur.

The events which FIEs attended in order to disseminate and further exploit their activities include: Agrotica Expo in Greece, AgriIsrael 4.0 conference, workshop organized by mAgro, GS1 Global Forum 2020 in Brussels, AgriFoodTech Hackathon in Bulgaria, event for organic farmers in Roma, SmartAgriHubs Regional Event, in Novi Sad and Global Agri-Food Forum 2018 in Mexico. FIE 28 has also had noticeable visibility on social media, partners website and blogs. FIE 26 has had one demonstration event in November of 2019.

All three of the FIEs of RC South-East Europe have shown growth and maturity regarding their experiments with a couple of justifiable delays. It is expected the FIEs will meet their plans and achieve good results in the coming period.

3.2 FIE RESULTS OVERVIEW

In the following chapters (3.2 and 3.3) FIE progress is presented deriving from their Progress reports, including visual presentation of relevant Progress report sections.

3.2.1. NUMBER OF FARMS/SITES DEPLOYED

Within the reporting period the number of farms/sites that the FIEs have deployed their solutions on has varied with the biggest number of farms being over 262.000 achieved by FIE 21. It should be noted that the second biggest number of deployed farms is 29 and thus FIE 21 is the sole example of having such a high number of deployed farms. Five FIEs have not deployed on any farms with the biggest number of farms (eleven) deploying on 1-2 farms. It is expected that this number will rise in the coming period and that the experiments that have not deployed on any farms will start their deployment activities.

3.2.2. TRL OVERVIEW

Within the reporting period 17 FIEs have shown an increase in their technology readiness level. 15 FIEs are aiming to have the TRL 9 with further five FIEs aiming to achieve the TRL 8. Currently the biggest number of FIEs (18) have a TRL of either 6 or 7.

3.2.3. NUMBER OF DEPLOYED COMPONENTS

Concerning the number of deployed components, 18 FIEs have had up to five deployed components, seven FIEs have not deployed any components while the biggest number of deployed components within a single FIE is 22. It is noticeable that some FIEs which established partnerships with farms, still did not deploy any components. The reason behind this can be found in FIEs timeline – the majority of deployments should have happened during the spring 2020. On the other hand, FIEs that have not deployed on any farms, but have had deployed components, were deploying their components only in lab or test environments.

3.2.4. NUMBER OF DEPLOYED SITES

The overview of the number of deployed sites is similar to the one of deployed components. 21 FIEs have deployed on at least one farm/site and 7 FIEs are yet to have a deployment on a farm/site. FIE 21 has had the biggest number of deployed farms at over 262.000.

3.2.5. NUMBER OF COLLABORATIONS WITH DIHS, CCS AND WITHIN FIES

Concerning DIH collaboration, it is noticeable that over half of the FIEs have collaborated with only one DIH, a quarter of the FIEs have collaborated with two DIHs and only three FIEs have worked with over three DIHs with FIE 10 having the most collaborations, five in total.
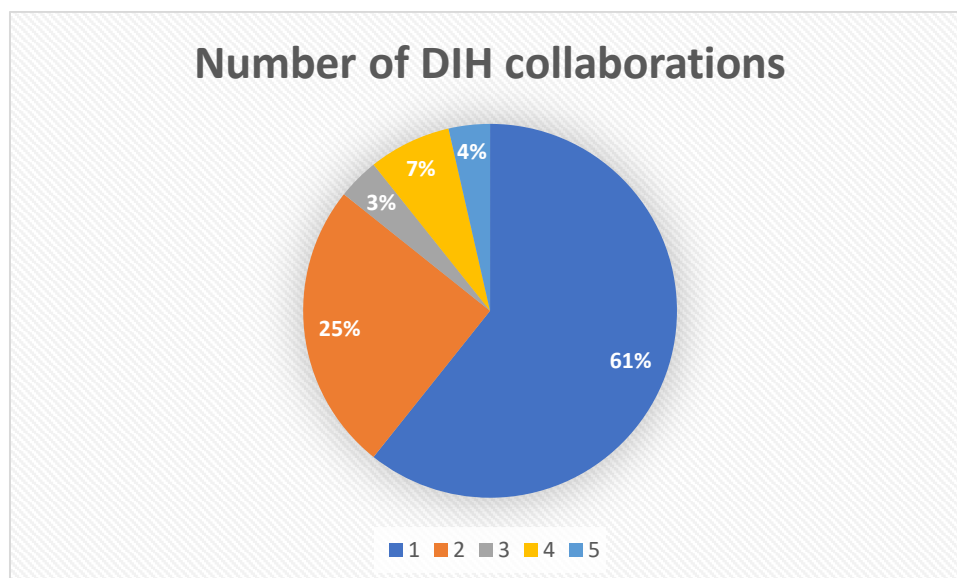
Figure 26 - Number of DIH collaborations

The number of collaborations with CCs is noticeably higher than the number of collaborations with DIHs. Almost a third of FIEs have collaborated with three CCs and another quarter of DIHs working with one CC. Once again, the biggest number of collaborations is five which was established by FIE 6. It is also noticeable that two FIEs have not collaborated with any CC as they have received all the needed support from their DIHs.
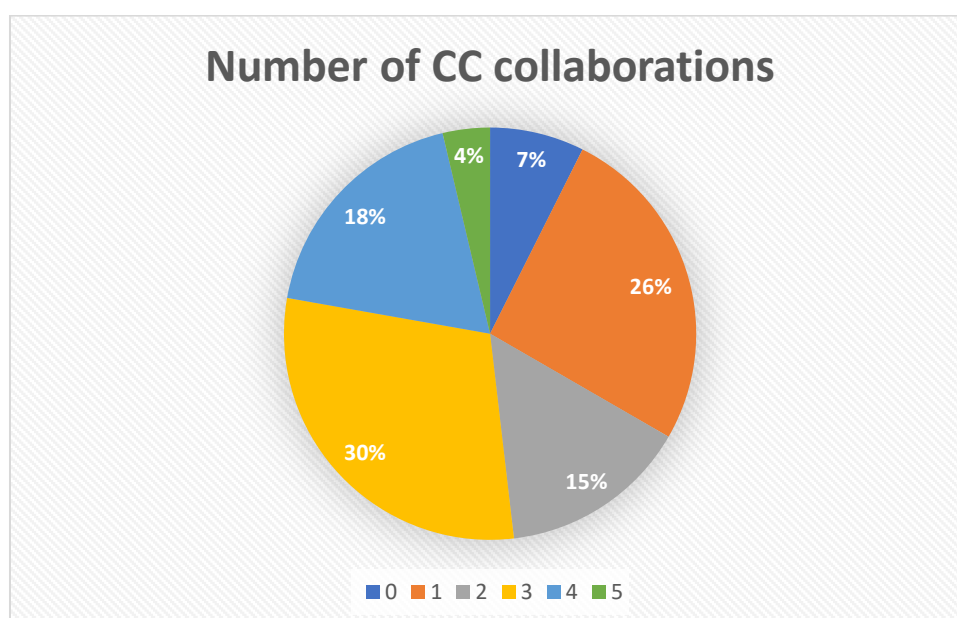
Figure 27 - Number of CC collaborations

The number of FIE collaborations could be pointed out as the area where more effort could be put for the FIE to collaborate with one another. While the range of themes and areas covered by the FIEs is big and so it is not always easy to find common ground, new ways for FIEs to collaborate with one another should be sought out. Currently, 41% of FIEs collaborate with one other FIE and a quarter of FIEs do not collaborate with any other FIE. FIE 25 and FIE 28 have made four collaborations each, making them the FIEs with the biggest number of collaborations. Due to the synergetic effect this could have on the entire project, FIEs will be encouraged to find new and innovative ways to work with each other.
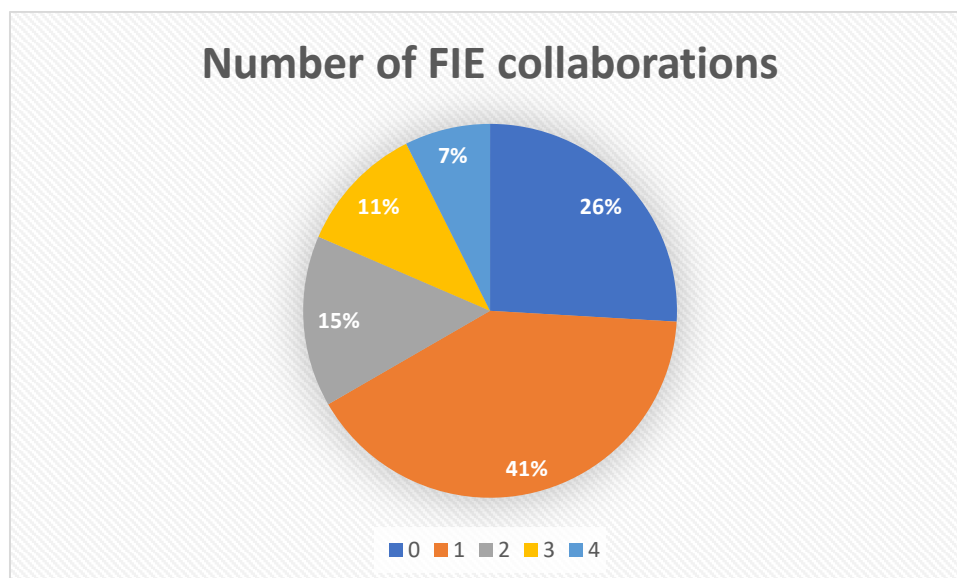
Figure 28 - Number of FIE collaborations

3.2.6. GDPR AND DATA MANAGEMENT

Regarding data protection, almost half of the FIEs have stated that all partners within the FIE have appointed a Data Protection Officer, while three FIEs have not yet worked with any data and thus have provided no information. Another important question that was posed to the FIEs is whether informed consent procedures and criteria that are used to identify/recruit research participants comply with the GDPR. 6 FIEs have answered that this is not yet applicable due to the development phase of their FIE, while all the other FIEs have answered positively to this question.

Concerning the Data Management Plan, two thirds of the FIEs have stated that they do not have one, a fifth have stated that they have it, with the rest stating it is either currently not applicable or that they do not have one, but are getting help from their partners. As this is something where we have seen room for improvement, WP3 and WP6 are collaborating to assist FIEs. The plan is to conduct a testing of different templates of Data Management Plans in order to find the one which is best applicable to the FIEs.

Figure 29 - Data Management Plan existence in FIEs

3.2.7. NUMBER OF DISSEMINATION AND EXPLOITATION EVENTS
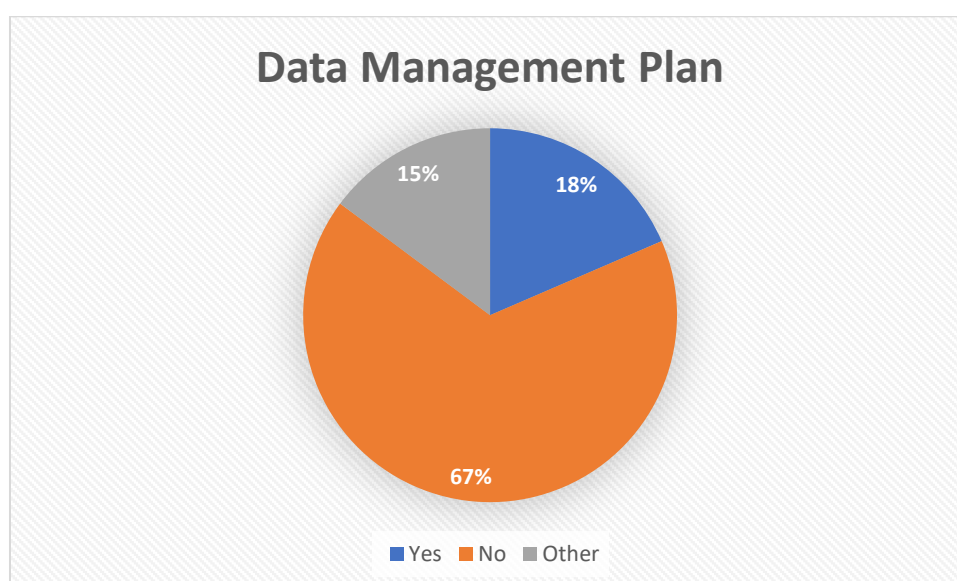
The FIEs have been noticeably active concerning dissemination and exploitation events with the average number of events per FIE being seven. FIE 11 has had the biggest number of events at 20 with only FIE 16 stating they still have not had any activities regarding dissemination and exploitation events, which is in line with their plan.

3.2.8. NUMBER OF DEMONSTRATIONS

Half of the FIEs are yet to have a demonstration event which is understandable taking into consideration the various states of progress made by the FIEs. Other FIEs have had at least one demonstration event with FIE 4 having the biggest number – five.

3.3 IMPACT ANALYSIS

3.3.1. IMPACT ON WOMEN AND YOUTH EMPLOYMENT

In 2018., as reported by Eurostat, the employment rate for women in EU stood at 67% and while that was an improvement over 2017. and previous years, it was still 12 percentage-points lower than the employment rate for men. The gender employment gap varies across the EU member states with it being highest in Malta and Greece and lowest in Lithuania[2]. It is due to this fact SAH has taken special approach to women employment and has been promoting women employment across all FIEs. When asked whether they have plans for specific actions for generating impact on employment of women, it is worth noting six FIEs do have them and in those FIEs women make up either one fifth or one third of the employees. It is also noticeable some FIEs that do not have these plans do have a very good number of women employees with FIE 8 having women as half of the employees on the experiment. Another important aspect is the positions that women hold in the experiments and these range from being project managers and FIE Coordinators to being Regional Cluster Leaders, DIH Coordinators and CEOs of subcontracted SMEs.

According to the European Commission more than 3.3 million young people were unemployed in 2019 and although that is a decrease in comparison to 2013., the rate is still very high and in some EU countries it reaches a peak of more than 30%. Some of the challenges that young people face are difficulties to find a job as they are new to the labour market and they are often employed on temporary or part-time contracts.[3] This is one of the reasons why SAH has also focused on encouraging FIEs to actively include young individuals in their experiments. According to the current data, a sixth of the people involved in the experiments are young individuals and 18 FIEs have at least one young individual in their experiment. The most shining examples are FIE 7 and FIE 28 who each have 9 young individuals in their experiments. It is also worth noting that the roles these individuals have ranges from working as developers of complex technical solutions to being co-leaders of the entire FIE. WP3 will continue encouraging FIEs to employ young individuals especially given the amount of excellent work they have done so far within the experiments.

3.3.2. ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPACT

Although it is too early to discuss about FIEs respective impacts (due to early stage of development), we tried to summarize the main areas where most FIEs focus their work on. In order to be able to monitor the progress through years and access FIEs, WP3 nurtures the

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[2] https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20200306-1
[3] https://ec.europa.eu/social/main.jsp?catId=1036

structured approach with three main identified areas: economic, environmental and social dimension of FIEs solutions. This classification was inspired by the latest global movements and strategies such as A European Green Deal[4], New Industrial Strategy for Europe[5], and the Digital Single Market[6].

Below, each of three identified categories is analysed in order to present the wider picture of the impact the experiments have. The overview is aggregated, due to limited and in-process data, while the next report will present the achievements of every experiment.

WP3 will continue progress monitoring and provide support to any partner that needs it in order to reach its goals.

Economic impacts have mostly been focused on cost reduction or reduction of inputs used which in return also leads to cost reduction. The cited impacts of the FIEs are water use reduction, electricity use reduction, reduced cost of farmland audit, reduced dosage of pesticides, herbicides and fungicides, less fuel consumption, lower production cost, reduced antibiotics usage, reduced usage of fertilizers, lesser production costs in aquaculture and savings on paper due to paperless traceability. Furthermore, other impacts are focused on increasing certain aspects in order to bring economic value to the user. These impacts are higher price per kg due to higher product quality, increase in price per grain, higher yield of bee family and increase in quantity of vegetables produced. Other economic impacts are concerning reduced loss of body condition score for animals, new workshops and processes, creation of new start-ups, knowledge of farmers regarding investments, less time needed for certain tasks, better carcass quality with less tail biting, better usage of control systems contributing to animal welfare and production, affordable tools for monitoring NH3 emission, soil mapping efficiency, an integrated digital efficient report, higher percentage of class "A" vegetables and overall better human resources efficiency.

Environmental impacts overlap in some instances with the economic ones, but also bring other contributions. The first part of the impacts is aiming at the reduction of: GHG emission, water usage, pesticide usage, CO_2 emission, mineral N usage, soil compaction, antibiotics usage, ammonia emissions, NH3 emission, soil pressure by employing lighter robots, time needed to respond to in-field problems, fertilizers usage, impact made by algal bloom and harmful effects coming from algal bloom. Other impacts include a better methodology for biodiversity assessment, increasing the addition of different types of crops and offering information on the food miles different food products have made. It is noticeable most of the environmental impacts are aimed at animal, soil and human welfare. With a bigger emphasis being put on resource utilisations, emissions made by the farms and soil treatment FIEs are working on the sustainability of their experiments and contributing to preservation of the environment.

Social impacts, in many cases, have been the result and the synergetic product of the previous two impacts. The FIEs have listed the following social impacts: consumer confidence, awareness raising, better working environment, improved skills of farmers, food safety, transparency of data, positive impact on human health, improvements in legislation, digital inclusion of farms, higher employment rate, information dissemination, higher employment of youth and integrity of production practices.

The impacts described here are yet to be seen in many FIEs due to the fact FIEs are still to have first tangible results of their experiments. These results will bring with them the above-mentioned impacts.

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[4] *https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en*
[5] *https://ec.europa.eu/commission/presscorner/detail/en/ip_20_416*
[6] *https://ec.europa.eu/digital-single-market/en*

4. REGIONAL CLUSTER ANALYSIS

Regional Cluster Ireland & UK

The regional Cluster Ireland & UK is supporting two FIEs, i.e. FIE 1 and FIE 2, in the performance of their activities, the making of reports, the organisation (and attendance) of several meetings and in the dissemination of their FIEs. In addition, issues faced by the FIEs were tackled with the help of the RC lead and co-lead (identification of a new partner, data sharing problem). The support is realized through regular (f2f and digital) meetings and calls with all participants of the FIEs and their network. The RC is hosted by two companies, TSSG (lead) and Innovation for Agriculture (co-lead).

Within the reporting period, this RC presented the FIEs, the cluster and SAH at 17 events for a large audience: industrial and academic partners, DIHs, farmers and farmers organizations, CCs, end-users, technology providers, technicians, advisors, start-ups and government.

Eleven relevant events will be organized in the upcoming period from April 2020 till November 2020. Due to the current Covid-19 crisis, they might be cancelled, but no information is available yet.

Regional Cluster Scandinavia

The RC Scandinavia is helping three FIEs, i.e. FIE 3, FIE 4, and FIE 5. The support exists of monitoring the progress and finding collaborations among the FIEs within this region, e.g. in dissemination and communication. The latter help is mainly realized with regular meetings. This cluster is led by the companies SEGES (lead) and Luke (co-lead).

In Scandinavia, a low density of DIHs is noticed. As the DIHs mostly rely on European and private funding, the capacity in which the DIHs operate and the number of DIHs is limited.

Within the reporting period, this RC presented the FIEs, the cluster and SAH at 11 events for a large audience, consisting of technology providers, the farmers community, agricultural service providers, academics, advisors, scientific community, policymakers, industry, grain farmers, students and researchers.

Five relevant events will be organized in the upcoming period from June 2020 till September 2020. Due to the current Covid-19 crisis, they might be cancelled, but no information is available yet.

Regional Cluster France

RC France is giving support at three FIEs, i.e. FIE 6, FIE 7 and FIE 8. Their help is related to the monthly follow up of the FIEs, activities of the FIEs, potential issues and next steps, dissemination and communication, and reporting. The cluster lead and co-lead attend several meetings and have a Google drive folder to share all document of FIE 6, a SharePoint of FIE 7 and one of FIE 8. The cluster is hosted by Région Pays de la Loire (lead) and ACTA (co-lead).

Within the reporting period, this RC presented the FIEs, the cluster and SAH at 4 events for a large audience: potential DIHs and CCs, general public, farmers, agricultural companies and institutions, professional managers and representatives, start-ups from Europe, Africa and America, financial institutions, research and universities and members of WP 2.

Three relevant events will be organized in the upcoming period from June 2020 till November 2020. Due to the current Covid-19 crisis, they might be cancelled, but no information is available yet. The Hub Agrifood Meeting (24th of March 2020) was already an online meeting.

Regional Cluster North-West Europe

RC NWE is supporting five FIEs, i.e. FIE 9, FIE 10, FIE 11, FIE 12, and FIE 13. All necessary information from the work packages was provided to the FIEs and developments of the SAH project were explained and promoted (e.g. Visual Identity, Website, Innovation Portal, etc.). The general coordination and progress of the FIEs was followed by monthly meetings. In addition, help was given related to dissemination, subcontractors, partners, (inter)national events and reporting. The RC is led by Marketing Service Gerhardy (MSG, lead) and ILVO (co-lead).

Within the reporting period, this RC gave presentations at 19 events for a large audience: SMEs, stakeholders, politicians, researchers, consumers, media, farmers, society, CCs, DIHs, government, institutions, NGOs, DjustConnect, DKE and Chamber of Agriculture Lower Saxony.

Five relevant events will be organized in the upcoming period from April 2020 till November 2020. Due to the current Covid-19 crisis, they might be cancelled, but no information is available yet.

Regional Cluster Central Europe

The Regional Cluster (RC) Central Europe (CE) is providing ongoing support to CE FIEs 14 and 15 and North East Europe (NEE) FIEs 19 and 20. The RC is presented by two organizations Wirelessinfo and LKO.
While the support to CE FIEs consists of regular monitoring, ongoing discussions on FIE related activities, challenges and identification of success stories, the support provided to NEE FIEs is gained through the Competence Center Wirelessinfo. The assistance is realized through the periodic video conferencing, telco's and one on one discussions.

During the reporting period no intermediate internal connection has been established trough RC initiation between FIEs, DIHs, CCs and WPs, nor external (beyond the project) connection between FIEs, DIHs, CCs and other companies, funds or institutions. This lack of connection is due an early stage of the project and more collaboration is expected during the next reporting period.

Within the reporting period, RC presented their work and SAH throughout 18 different events (three organized by RC) including, conferences, seminars, workshops, fairs and meetings, attended by farmers, entrepreneurs, app developers, researchers, students, policy makers, practitioners, IT developers, experts, etc.

The RC was also asked to provide information on the upcoming events for 2020, however due to current Coronavirus pandemic, all events were cancelled or postponed until further.

Regional Cluster North East Europe

RC North East Europe (NEE) is providing ongoing support to NEE FIEs 16, 17, 18, 19 and 20. The RC is presented by the Union of Farmers' Parliament (ZSA) in Latvia and a research center in Poland - Poznan Supercomputing and Networking Center (*PSNC*).

The RC provides the following support to FIEs:

- Regular monitoring and supervision of FIE teams
- Provision of support in the dissemination and promotion of FIEs development pro-gress, in Europe and specially Poland, with different stakeholders including production of promotional videos
- Within the scope of specification of technical requirements and user stories definition
- Feedback and recommendations in the architecture definition
- Organization of RC event for FIEs to share progress and detect potential collaboration points

The RC regularly communicates with WP3 leaders and has been a contact point between different project WPs and FIEs.

The RC has participated in 20 events including meetings, conferences, workshops and forums. A number of events were planned for 2020, however canceled due to COVID-19 crises.

Regional Cluster Iberia

The Iberian Regional Cluster (RC) is led by the Andalusian Regional Ministry of Agriculture, Fisheries and Rural Development (CAPDER), and co-led by an advisory company experienced in the Portuguese agri-food sector (CONSULAI). The RC seeks to establish an innovation ecosystem in the Iberian peninsula effectively open to all agri-food businesses, investors, researchers and other stakeholders to align innovation with the sector's needs. The Iberian Regional Cluster gives support to FIEs 21, 22, 23.

Regular monthly meetings are held with all FIEs to facilitate mutual interaction, and additionally several virtual meetings and two face to face meetings were organized with participation of FIEs, DIHs (both internal and external to SAH) and other agrifood stakeholders. During the reporting period (M03-M16) all the FIEs have been aware about the progression of each other's through the monthly regular meetings organized among the RC & RCC leaders, CCs as Gradiant and FIE coordinators. Some connection has been established with DIHs not involved in the project through online meetings and face to face events, but there has not been much connection established with actors from other Regional Clusters. Improving this external cooperation is identified as one of the challenges for the future. The RC aims to establish an ecosystem which helps participating partners with capacity-building in order to move forward on the digital transformation of the European agrifood sector.

The facilitation of the agri-food sector's transition to the digital economy by establishing new projects and laboratories is one of its main goals, as well as ultimately establishing permanent, self-sustaining networks within the SmartAgriHubs (SAH) project. This is to be achieved through the dissemination of results, the connection of regional agents and the promotion of relevant open calls.

RC Iberia has maintained a relevant outreach activity by organizing regular meetings with DIHs (mostly external to SAH). To this day, the Iberia RC has had presence in more than 10 different events such as conferences, seminars, workshops, fairs and meetings, attended by farmers, cooperatives, entrepreneurs, researchers, students, policy makers, practitioners, IT developers, experts, etc.

At least, another five important events for the RC are planned for the last months of 2020. Nevertheless, dates are subject to change based on the COVID-19 situation.

Regional Cluster Italy & Malta

The Regional Cluster (RC) Italy & Malta is providing support to FIE 24 and FIE 25 which are both located in Italy. The RC is presented by cluster leader ART-ER- Attractiveness Research Territory and the cluster co-leader Coldiretti.

The support provided to the FIEs was reflected through the monitoring of the FIEs' implementation and findings, support on the managerial level considering budgeting, reporting and communication, coordination of the participation in SAH's Conferences and meetings as well as updating the FIEs on SAHs project progress. The tools used to provide this support were emails, web & phone conferences, documents exchange and periodic meetings.

The events in which RC was present include a meeting of stakeholders in the area of traceability & big data in Bologna and an event supporting digitalization in the agrifood sector which was also in Bologna.

Due to the big effect COVID-19 has made in Italy and the uncertainty of any conferences and meeting being held, there are currently no plans for future events.

Regional Cluster South East Europe

The Regional Cluster (RC) South East Europe (SEE) is providing ongoing support to SEE FIEs 26, 27 and 28, headquartered respectively in Greece, Romania and Slovenia. The leader of this cluster is Agricultural University of Athens, while the co-leader is PRO-AGRO from Romania.

RC team (leader and co-leader) provided their full support during the first months of the project in FIEs establishment – RC representatives participated at physical meetings for the establishment of the experiment, and the conduction of experimental procedures. During the year their involvement was more and more significant, as they were included in deliverables preparation, demonstration activities and other experimental activities of FIEs.

Region South East Europe is very diverse – it gathers countries that are part of EU from early 1990's (Greece), countries that became part of the Union in 2007 during the great enlargement (Slovenia, Romania and Bulgaria), while the rest of the countries are in the accession process. This disperses all attempts to uniform the approach and methods both in information collection and selection as well as in support to the project and experiments.

The plan for the upcoming period is to continue working on clustering with other EU initiatives. In the moment of report submission, COVID-19 crisis was in its peak. Consequently, all events that were supposed to happen during the summer and autumn were either cancelled or postponed. Therefore, many of efforts will be put in transferring all the activities in Q2 and Q3 of 2020 in an online environment.

5. IMPACT OF COVID-19

5.1 ABOUT COVID-19

In December 2019., in a Chinese provenance of Wuhan, Hubei, an outbreak of a new species of a virus was identified. The virus was named coronavirus disease 2019 (COVID-19) and it was caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). According to the World Health Organization (WHO) the most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose or sore throat. These symptoms are usually mild and begin gradually. WHO estimated globally 3.4% mortality rate as of March 3rd.[7] Some people become infected but do not develop any symptoms and don't feel ill. Most people (about 80%) recover from the disease without needing special treatment. Around one out of every six people who gets COVID-19 becomes seriously ill and develops difficulty breathing. People can catch COVID-19 from others who have the virus. The disease can spread from person to person through small droplets from the nose or mouth which are spread when a person with COVID-19 coughs or exhales.[8] In January 2020 first cases of COVID-19 have been confirmed in Europe with some of the first countries affected being Italy, Spain, France and the United Kingdom. On March 11th, 2020, WHO recognized the outbreak as a pandemic and various measures have been put in place in order to contain the outbreak. Many countries have closed their borders, social distancing was encouraged, schools and universities have been closed and companies were encouraged to have their employees work from home.

European countries that have been most affected by COVID-19 are Italy, Spain, Germany and France while each European country has confirmed having at least one case. The above-mentioned measures and people's overall fear from getting COVID-19 have affected the work of FIEs and RCs.

5.2 COVID-19 IMPACT ON FIES

Due to the severeness of the situation caused by the pandemic of COVID-19, as of March 2020, a number of activities of FIEs have been affected, including delay in sensors installation, delays in software delivery, workshops and demonstration postponements and the inability to work with farmers and animals at this moment. Information on COVID-19 impact of FIEs reflects the situation as of April 28, 2020, with the pandemic expected to last at least for a couple more weeks. Based on inputs received the 8 FIEs have not been affected by the pandemic, while the other FIEs will face delays from a couple of weeks to a couple of months.

5.3 COVID-19 TASK FORCE

During M18 a Task Force has been created within SAH in order to support the COVID-19 fight, mitigate the risks, delays and potential problems that have happened due to the pandemic. Special attention will be put on partners that were hit by the crisis massively and need support to find the adequate coping strategy. The task force gathers project partners from various WPs and is headed by Grigoris Chatzikostas from BIOS, WP3. First activities of the Task Force have been: creating a dedicated page on Covid-19 on SAH website, a new brainstorming category on the SAHs Portal forum where all ecosystem partners are able to

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[7] https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---3-march-2020
[8] https://www.who.int/news-room/q-a-detail/q-a-coronaviruses

share their challenges as well as solutions to the issues caused by the pandemic. Another task has been the organization of COVID-19 related Webinar on the 30th of April to which all FIEs, DIHs, CCs and RCs representative have been invited, as well as members of the SAH broader ecosystem. On May 15, a dedicated Newsletter is envisaged to be published.

6. CONCLUSION

D3.4, Periodic evaluation of IEs performance, is a collection of 28 Flagship Innovation Experiments' progress reports that displays the current status and progress of the FIEs' activities. All the FIEs have submitted their progress reports, but the quality of the information provided is not equal among them. While a number of FIEs have faced delays with either activities or with deliverables and milestones, all have been able to produce a progress report on time and the majority of them have achieved their deliverables and milestones within the reporting period. In the coming period tangible results are expected and WP3 will continue its support to the FIEs.

The 28 reports have been analysed and they show that in the first 18 months of the project many results have been achieved. FIEs successfully kick-started their experiments, deployed components, involved end-users and started collaborations among SAH project partners.

It is noticeable that the progress varies from one FIE to another, since not every FIE is in the same stage of their experiment's development and, some FIEs have faced external or internal delays. The most influential external event is certainly COVID-19 crisis, which postponed some activities, with the high possibility for changing the scope of some tasks. The biggest impact is on FIEs that planned to test their solutions in real conditions, on the filed / barn. Majority estimates that the 4 months of delays is the realistic scenario. The SAH Task Force is gathered to anticipate the needs and challenges of the sector and try to address them with SAH instruments and ecosystem.

At this stage of the project it is still too early to analyse FIEs' economic, environmental and social impact, since most of them still didn't reach the phase where the specific advancement is proved both in controlled conditions as well as with end-users (farmers in most of the cases). However, it should be stressed that none of the experiments shifted their focus and planned impact, which proves the avant-garde approach they had at the beginning of the project still wasn't beaten by technological advancements we are facing from day to day.

During the lifetime of the project, FIEs were and will be encouraged to collaborate with DIHs and CCs, further develop their solutions and build network of prominent partners and pivot the approach / solution if such signals are identified by DIHs and CCs. Each FIE has collaborated with at least one DIH and the DIHs have proven to be an integral part of the SAH project. The help and guidance of the DIHs has shown great impact on the development of the FIEs activities and further collaborative activities are expected. CCs have also had a significant impact on FIEs with the majority of FIEs collaborating with multiple CCs and only two FIEs having no collaborations with CCs. Another positive element is that almost 75% of FIEs have reported on mutual collaboration between themselves.

This report will give the project a direction in which FIEs need further support and reinforcement. The support will be targeted, to the FIEs that identified the need (e.g. two thirds of experiments do not have DMP, so the assistance will be provided by relevant WP).

The Regional Clusters are the intermediate connection between the regional DIHs and FIEs and the central project WPs. With the project moto "connecting the dots", building the network of the RCs is key to form a flourishing eco-system around European DIHs.

During the current reporting period the RCs significantly contributed by providing ongoing assistance to FIEs; maintaining already established fruitful relations with DIHs as well as enriching the SAH DIH community by involving another relevant DIHs from different regions; monitoring the region for potential funding schemes and promoting FIEs and the project.

As noticed, regions are very diverse, combined of distinctive countries with different needs and structures. Therefore, SAH encourages every RC to have a unique and tailored approach to their regions in order to be able to address the needs and spread the SAH spirit and outcomes in the most effective and efficient way.

In terms of further efforts, they should be placed on enhancing RC mutual collaborations for the advisory purpose and exchange of experience among DIH network. In the upcoming period, the role of the RCs will be directed towards the open call and providing assistance to new IEs, with expected significant enlargement. Differences among regions, gaps in services and the requested maturity level collected in this report will be very valuable for future analysis, improvements and tailoring the approach towards different target groups of the project.

Additional important aspect in the coming months will be enhancing the efforts made by FIEs and RCs during the COVID-19 pandemic and preparing them for the period after the pandemic with special attention towards activities which have been hit the most. The main goal will be to mitigate the risk of further delays and any risk on the quality of deliverables and milestones. This will be done through consultative meetings with FIEs and RCs and further strengthening of the bonds between these two entities and DIHs and RCs. By building a powerful and intertwined ecosystem, the risks which occurred during the pandemic will be overcome more easily. Special attention will be dedicated to FIEs which faced other impediments such as internal changes and supplier issues.

To conclude, the progress reports submitted by the 28 FIEs and 9 RC clearly show the impact the FIEs (and SAH) are already making in their respective areas and countries and the power that they can bring to the digitalisation and innovativeness on a Europe-wide level. The reports also undoubtedly demonstrate the immense value of DIHs and CCs for the better future of agriculture in Europe.