

3 Periodic Report

3.1 Publishable summary

FOODIE is a co-funded research project within the Competitiveness and Innovation Framework Programme (CIP) programme of the EU's Seventh Framework Programme (FP7). The project is dedicated to the use and promotion of open data for agricultural applications.

FOODIE aims at enabling in an easy manner the (re)use of open data in the agricultural domain in order to create new applications that provide added value to different stakeholder groups.

FOODIE focuses on agricultural applications exemplified by three main application pilots:

- Pilot 1: Precision Viticulture (Spain)
- Pilot 2: Open Data for Strategic and Tactical planning (Czech Republic)
- Pilot 3: Technology allows integration of logistics via service providers and farm management including traceability (Germany)

These pilots, in collaboration with other stakeholder communities, will set the stage for large-scale trials in the agricultural domain with a perspective of achieving sustainable socio-economic progress in Europe.

The project has a duration of 36 months; it started on 1 March 2014 and ends on 28 February 2017.

FOODIE Context and Objectives

The agriculture sector is of strategic importance for European society and economy. Due to its complexity, agri-food operators have to manage many different and heterogeneous sources of information. Agriculture requires collection, storage, sharing and analysis of large quantities of spatially and non-spatially referenced data. These data flows currently present a hurdle to uptake of precision agriculture as the multitude of data models, formats, interfaces and reference systems in use result in incompatibilities. In order to plan and make economically and environmentally sound decisions a combination and management of information is needed.

The key point of FOODIE project is creating a platform hub on the cloud where spatial and non-spatial data related to agricultural sector are available for agri-food stakeholder groups and interoperable. It will offer an infrastructure for the building of an interacting and collaborative network; the integration of existing open datasets related to agriculture; data publication and data linking of external agriculture data sources, providing specific and high-value applications and services for the support of planning and decision-making processes.

FOODIE project is addressed to four basic groups of users:

1. Stakeholders from the agriculture sector as end-users of final applications, including: Farmers, Advisory services, Service organisations and Retail businesses
2. Public sector for communication with farmers about taxation, subsidies, regulations, etc.
3. Researchers for large scale experimentation on real data
4. ICT companies (including SME developers and IT integrators) for the development of new applications in the agriculture and food sectors

In order to realize FOODIE concept and the service platform hub, the project pursues the following objectives:

- building and open and interoperable agricultural specialized platform hub on the cloud for the management of spatial and non-spatial agriculture related data from heterogeneous sources;
- integrating of existing and valuable European open datasets related to agriculture (coming from different initiatives like INSPIRE, SISE, GMES/Copernicus, GNSS, GALILEO, GEOSS, GBIF, EUNIS, EEA, etc.);
- data publication and data linking of external agriculture data sources contributed by different public and private stakeholders, through an open and flexible lightweight Application Programming Interface (API), allowing
- providing specific and high-value applications and services for the support in the planning a decision-making processes of different stakeholders groups related to the agricultural and environmental do-

- mains,
 - providing a marketplace where data can be discovered and exchanged but also external companies can publish their own agricultural application based on the data, services and applications provided by FOODIE.

FOODIE Approach

FOODIE concepts and objectives will be realized by means of the resulting service platform hub, which will be demonstrated in three different pilots' scenarios across Europe, providing each of them thus a set of common and specific requirements:

- Pilot 1: Precision Viticulture (Spain):** This pilot will focus on Precision Viticulture (PV), which is a key concept on the wine-growing sector. The main purposes of PV are the appropriate management of the inherent variability of crops, an increase in economic benefits and a reduction of environmental impact. Variable-rate application (VRA) of inputs and selective harvesting at parcel level are productive strategies which provide significant benefits for farmers in general.
- Pilot 2: Open Data for Strategic and Tactical Planning (Czech Republic)** will focus on improving future management of agricultural companies (farms) by introducing new tools and management methods, which will follow the cost optimization path and reduction of environmental burden, improving the energy balance while maintaining the production level.
- Pilot 3: Technology allows integration of logistics via service providers and farm management including traceability (Germany).** This pilot will focus on integrating the German machinery cooperatives systems with existing farm management and logistic systems as well as to develop and enlarge existing cooperation and business models with the different chain partners to create win-win situations for all of them with the help of IT solutions.

Work performed and main results achieved. Status at the end of the second year

The focus of the architectural work (WP2) for this second period has been on finalizing the concept of the data model in order to be ready for the implementation phase. The whole data model has been revised by the experts from the Joint Research Centre of the European Commission to fit properly into the Pan-European legislation and research activities. As a result, the FOODIE data model has evolved into the stable version that has been made available to WP4 for the implementation. These changes led also to the update of the approach for semantic interoperability and linked data publication of the information compliant with FOODIE data model.

Besides, transport application schema was developed as a consensus between three European projects (SDI4Apps, OpenTransportNet and FOODIE). The developed transport application schema originates from the INSPIRE Directive. Furthermore, negotiations were initiated with the community of the OpenStreetMap to provide a new application schema called OpenAgrarMap. The developed data models and application schemas were presented and acknowledged as best practices within the Danube reference data and services initiative which is being supported by the DG JRC of the European Commission.

With the Copernicus programme releasing the first SENTINEL-2 images during the first months of 2016, FOODIE has started incorporating into its repositories those scenes relevant for the project pilot areas, which complement the existing LANDSAT8 imagery currently being used by FOODIE platform applications.

In regards to the implementation, deployment and integration of FOODIE platform components (WP3 and WP4), the existing components released during the first period – such as the marketplace, databases, catalogue, sensor services, data fusion services, visualization tools, etc. - have been updated as new improvements and datasets have been incorporated, while in parallel new components during the second period– such as the metadata catalogue, notification broker, new widgets, etc.- are being deployed and integrated. In particular, WP4 activities focused on the description of several specialized services (which take as basis the datasets and components offered through WP3) such as the economic statistics, machinery, fertilizer and irrigation services; being some of them already implemented for this period (e.g., yield simulation computed from satellite data). It is expected that these advanced tools can be used as local and global decision tools by different categories of users such as specialists, policy makers, stakeholders, as well as by farmers and foresters.

Concerning the three main project pilots, during this period the collection and refinement of the requirements and use cases were finalized together with the execution methodology and execution plan. In addition to the main pilots, during this period supplementary information was gathered for smaller validation scenarios in Turkey, Latvia, Italy and Poland. Pilots execution started in March 2015, and the progress of each one is being monitored and reported in a 6-month basis - according to the aforementioned methodologies and plans – in order to assess up to what extend the required functionalities are met by current developments in FOODIE platform.

Dissemination activities of the project during this period were focused on the participation in key events and conferences such as INSPIRE, EFITA, Milan Expo 2015 and the GEO-XII Plenary & Mexico City Ministerial Summit where main achievements of the project were presented to a broader audience. The project also participated/co-organized in various hackathons (ISAF, Dresden) where services and datasets from FOODIE platform were used. The project has continued its dissemination activity by producing different dissemination materials, such as publication of papers, posters, newsletters, translation of the existing brochures in order languages, maintaining the project website and participating in radio and TV interviews in order to reach a wider audience.

In terms of collaboration with other projects and initiatives, FOODIE project signed a memorandum of understanding with the following projects co-funded by the European Union under the ICT Policy Support Programme as part of the Competitiveness and Innovation Framework Programme: OpenTransportNet (Spatially Referenced Data Hubs for Innovation in the Transport Sector), SDI4Apps (Uptake of Open Geographic Information Through Innovative Services Based on Linked Data) and ECIM (European Cloud Marketplace for Intelligent Mobility). This Memorandum of Understanding sets the terms for cooperation on data sharing and technological development between them. Besides, a joint meeting was held between FOODIE and FATIMA (Farming Tools for external nutrient Inputs and water MAnagement) projects in Madrid in December 2015 in order to exchange experiences in the use of satellite imagery and cadastral information for effective and efficient monitoring and management of agricultural resources. Cooperation was also established with the Joint Research Centre of the European Commission (namely Digital Earth and Reference Data unit – DERD – as well as Monitoring Agriculture by Remote Sensing – MARS –unit) and the Global Earth Observation System of Systems (GEOSS), Architecture implementation pilot no. 8 aiming at water and agriculture pollution.

Finally, concerning the exploitation activities, the project has further compiled and refined the list of potential exploitable results, as new components and tools have been made available in the platform during this second period. The stakeholder database was further updated with relevant contacts from private and public administrations at different levels (local, regional and national) covering several EU and non-EU countries, being many of them contacted in order to better understand their requirements and their potential interest in FOODIE platform as solution for fulfilling these needs. SWOT analysis, exploitation plans and transferability of the platform were further refined taking into account this input. IPR management activities have also started during this period, being considered an important element that has to be integrated in the whole concept of exploitation of the FOODIE platform in terms of the licenses of the components, and the datasets (public and private) contained on it.

Foresight for the third period

The plans for the last period of the project comprehend from the technical point of view the finalization of FOODIE architecture; deeper use and integration of the newly available SENTINEL-2 satellite scenes into the data fusion services hosted within the platform in order to improve the predictions and recommendations for the farmers; implementation of the remaining advanced services described in WP4; and further cohesion of all components and services for preparing the commercialization of the FOODIE platform.

Pilots' end-users will receive additional training with respect to the new tools that become available in the platform, whereas at the same time feedback received from them and the assessment of each of the pilots' execution progress is taken into account to improve the components in an iteratively manner.

Dissemination activities will continue with focus on relevant events and conferences (such as INSPIRE 2016, GEOSS AIP pilots, ISAF, Open Data Forum 2016, etc.) and production of newsletters presenting the advances of the project, with particular emphasis on the potential customers and users of FOODIE platform. In addition, the project will start preparing the necessary logistics and arrangements to organize the FOODIE Hackathon towards the end of the project (trying to settle it jointly with a relevant event in order to attract audience and partici-

pants).

Finally, the project will complete the assessment of the potentially exploitable results of the project as well as the FOODIE platform as a whole, which will be important in order to define the best business strategy for making the platform sustainable in the long term.

The FOODIE Consortium

The FOODIE consortium comprises 13 organisations from 7 countries. Partners complement each other in terms of the skills and scope required to achieve the project objectives:

Industrial partners:

- ATOS (Spain) - Project Coordinator
- SERESCO (Spain)

Academia & Research:

- WIRELESSINFO (Czech Republic)
- CTIC - FUNDACION CTIC CENTRO TECNOLOGICO PARA EL DESARROLLO EN ASTURIAS DE LAS TECNOLOGIAS DE LA INFORMACION (Spain)
- PSNC - INSTYTUT CHEMII BIOORGANICZNEJ PAN (Poland)
- TDF - TEHNOLOGIJU ATTISTIBAS FORUMS (Latvia)

SMEs and End users:

- PROGIS (Austria)
- MJM LITOVEL (Czech Republic)
- BODEGAS TERRAS GAUDA (Spain)
- NETCAD - NETCAD YAZILIM ANONIM SIRKETI (Turkey)
- CONSORZIO BIM - CONSORZIO BIM PIAVE COMUNI DELLA PROVINCIA DI BELLUNO (Italy)
- ENCO (Italy)
- OZID - KUTAHYA IL OZEL IDARESI (Kutahya Provincial Administration) (Turkey) * Left the project on 31st of July 2014

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