Publishable Summary

First Section (project context and main objectives)

There is a compelling need for research to play a significant role for the future, in meeting the challenges of increased demand for food balanced against the need to deliver other ecosystem services. If this role is to be fulfilled, outreach and translation of research for innovation must be drastically enhanced. Many EU and nationally funded research projects in the fields of agriculture and forestry provide excellent scientific results but outreach into practice remains limited. The VALERIE project responds to the challenge of boosting innovation by facilitating the uptake of knowledge, and its integration into field practices, through the following activities:

VALERIE project started in 2014 with the following main aims: (1) Improve access for practitioners and advisers to existing information for innovation in agriculture and forestry, from European and national sources; (2) Build a 'virtual adviser' tool to enable this access and to support communication among practitioners and advisers; (3) Work with stakeholders in case studies to guide the development of the tool; and (4) Deliver the 'virtual adviser' tool for integration in the European Innovation Partnership (EIP) -AGRI Service Point platform to ensure its legacy.

What we develop is a highly interactive tool for advisers and practitioners, named *ask-Valerie.eu*. It uses web-semantics technology and core to the approach is a 'built-for-purpose vocabulary' of key terms covering agriculture and forestry. The tool integrates this vocabulary with the following components: (1) a selected document base; (2) a dedicated search tool; (3) an interactive user-interface that helps articulate user queries and present top ranked documents; and (4) a communication platform enabling stakeholders to exchange views, locate advisers or suppliers, but also to contribute actively to the expansion and reinforcement of the tool.

The consultation of stakeholders in case studies (advisers, farmers, processors, researchers, decision makers etc.) is a key part of the iterative development of *ask-Valerie.eu*. In the process, the project provides the case studies with information on innovations and gives them the opportunity to test selected innovations in trials. In return, stakeholders provide user-feedback to steer the development of *ask-Valerie.eu.* Talking to stakeholders we learn how they identify innovation needs and how they seek, interpret, and integrate new information.

With the unique features of the tool and the stakeholder and expert input into its development, we believe *ask-Valerie.eu* has the potential to provide a more tailored, smarter and interactive tool than other search engines for agriculture and forestry.

Second Section (work performed and results achieved)

Ten case studies in six countries across Europe participate in VALERIE. These have a regional orientation and a focus on either specific commodities, on farming systems, or on the landscape scale and so cover different scales and dimensions. Most of the CS are already well-established due to previous project activity. In those few CS with no previous project activity, issues and stakeholders are less well-defined or known and we devoted efforts to initial capacity-building. To accommodate the diversity of CS contexts, issues, stakeholders and CS partners, we provided a framework to support partners, to ensure a

consistent approach and to enable WP3 comparative analysis and synthesis. CS partners were also encouraged to use Dynamic Research Agenda in each meeting to monitor and reflect on progress by reviewing the original list of research needs with stakeholders. In this way the topics are revisited and refined. Pre-meeting trainings were provided to all the case study partners in face-to-face sessions at project meetings.

Among the core project activities is the construction of a built-for-purpose vocabulary. With the help of partners in the above ten locally rooted case studies that together cover a wide range of topics and innovation demands, we have collected terms from locally relevant issues, both scientific and colloquial. These sets were then expanded with the help of domain experts. Themes include crops and cropping systems; soil, water and nutrient management; integrated pest management; supply chains; waste recycling; ecosystem services and climate; and many of its underlying principles and components such as management tools, techniques and machinery; field operations; species of crop, weeds, pests, diseases and other organisms; soil and crop processes; infection mechanisms; control strategies, etc. Such a vocabulary – also called ontology – is never complete. Nevertheless, with over 6,000 terms we are now (by closure of Period 2) at a stage where the vocabulary can be effectively used and tested in ask-Valerie.eu. The above themes, together, roughly represent the global domains of sustainable arable farming, and sustainable forestry. We have translated the vocabulary in a selected set of languages. Since late summer 2016, ask-Valerie.eu is available (for testing) in English, Italian, French, Spanish, Finnish, Polish, and Dutch. The vocabulary is used for indexing (annotating) document collections, and to help articulate user queries in the ask-Valerie.eu query editor.

A major effort in parallel to the vocabulary building has been collecting and summarizing information on almost 500 innovations in the above thematic domains. We also assessed knowledge gaps and research needs for these domains.

Several versions of ask-valerie.eu were concluded up to now. The current version has cross-language search, a term editor empowering the user to refine his question using terms from the ontology, and a user profile to indicate preferred languages for user interface and for documents searched. In addition, first mechanisms of user interaction had been introduced, empowering the user to save questions, bookmark documents and contribute by proposing documents and terms to the system. With the ask-Valerie.eu feature set becoming more stable, introductory videos have been created to give the users a quick introduction to the system. Such videos were used on several dissemination events including under WP6, for example at the Mid-term clients meeting at Copa-Cogeca (June 2016). In addition to the search features for the document library / knowledge base the focus was set onto the interactive features preparing community mechanisms for ask-valerie.eu. A prototype community has been set up for evaluation with the purpose to extend the document library / knowledge base with more social resp. people oriented interaction. This setup was first tested at the 2017 annual meeting (in Period 3). Other major components produced in VALERIE include algorithms for automated annotation of documents (i.e. taking document indices or digital fingerprints, based on the vocabulary used); and for ranking and presenting documents, or 'text-snippets' thereof, that best- match the user query.

Third Section (results and expected impact)

The VALERIE-project will help close the innovation gap that exists between research and farming/forestry practice, and will so valorise scientific knowledge produced in EU and other research programs. By injecting concisely summarized knowledge for practitioners into the innovation process, it will contribute to making agriculture and forestry practices more sustainable and more productive.

More specifically, VALERIE supports the activities of the European Innovation Partnership EIP-AGRI by providing ask-Valerie.eu - a highly interactive search and communication webtool for advisers and practitioners in sustainable agriculture and forestry – for integration in the EIP-AGRI platform. The tool can be further tailored to suit thematic networks and operational groups active under the EIP-AGRI umbrella, and some examples of such networks are currently being elaborated.

VALERIE presents an entirely new concept to mobilize science to increase public goods provision by agriculture, and to capture the users' perspective for integration into science and policy activities. Through ask-Valerie.eu, VALERIE will stimulate innovations to arrive faster on the ground, and it will channel feedback from practitioners into the research and policy communities. This will facilitate and improve the process of stakeholder-driven agenda-setting in the research-policy arena.

Facilitating this very process is at the heart of the EIP-based programming. Through its case studies, VALERIE sets a new approach for articulating the specific needs and empirical knowledge by practitioners, and for integrating these into scientific activities. The VALERIE case studies aim to demonstrate how a long term dialogue between scientists, producers and other stakeholders can be organized effectively. Both ask-Valerie.eu and the VALERIE case studies will inspire new stakeholder communities in Europe to utilize the modern tools and approaches offered by the project.

The outputs generated by VALERIE are geared to strengthening the innovation chain, by enhancing communication between all actors involved, and by injecting precisely tailored and up-to-date knowledge into the innovation process. This will be especially so for the innovation domains closely connected with the sustainability themes elaborated in this project, but can easily be extended to broader array of thematic domains.

Up to summer 2016, *ask-Valerie.eu* was developed on a limited 'test set' of documents, sufficient to evaluate functionalities of the tool. From then onwards, we started contacting national or regional holders of repositories (collections of documents written in the local language) with the aim of formalizing collaboration with a few major repositories per country, among a total of some 50 relevant repositories for advisers and practitioners now identified. Repository holders include levy boards, farmer cooperatives and unions, extension bodies, universities and (regional) governments. Such aggregators may also include selected papers from trade journals. Examples are the repositories from Emilia Romagna and from Veneto Agricoltura in Italy, and the Groen Kennis Net repository for 'green education' in the Netherlands. Their documents will be better searchable – and so by a wider community - based on prior annotation with the VALERIE ontology, and they will receive the *ask-Valerie.eu* users on their own original webpages.

Another major category of documents are scientific documents: journal papers and book chapters. Some are Open Access sources, others give access-on-payment-only, and such conditions will be maintained in *ask-Valerie.eu*. A large aggregator of scientific documents is the AGRICOLA database by the USDA National Agricultural Library in the US; we obtained their permission to grant access to their documents through *ask-Valerie.eu*, but are still processing this immense collection. From the European CORDIS database, we annotated all readily available documents on projects on agriculture/forestry that are now accessible via *ask-Valerie.eu*.

In October 2016, we established contacts to help translations into Czech, Romanian and Hungarian, and will seek assistance from the national contact points of the European Rural Development Network, to expand our language portfolio for maximum outreach beyond the

seven languages already covered.

With one year of the project left, we are now asking stakeholders to test the prototype tool and help us improve the final product. So far, user feedback has helped us develop and improve the tool by highlighting the importance of multiple languages; of separating scientific information from practical guidelines (fact sheets, manuals); and of connecting to existing national repositories of practical documents. Our workshops have also confirmed the importance of linking to regional and national initiatives; of making *ask-Valerie.eu* available at the national pages under the Rural Development Programme; and of cross-border interaction among advisers.