



Valorising European Research for Innovation in Agriculture and Forestry

FINAL REPORT – VALERIE: access to knowledge for innovation in agriculture and forestry



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Contents

Executive Summary	i
1 Context and VALERIE Project Objectives	3
2 Extracting and summarizing knowledge (WP2)	4
2.1 <i>The VALERIE document base</i>	4
2.2 <i>List of innovations</i>	4
2.3 <i>Preparation of mini-factsheets</i>	5
2.4 <i>Identification and annotation of document collections</i>	5
2.5 <i>Knowledge gaps and research needs identified</i>	8
3 Case studies on innovation (WP3)	9
3.1 <i>Stakeholder-driven (co-innovation) approach in case studies</i>	9
3.2 <i>Testing of ask-Valerie.eu in case studies</i>	10
3.3 <i>Reporting on case study trial outcomes</i>	11
3.4 <i>Collating case study research outputs</i>	13
3.5 <i>Barriers and enablers to research uptake</i>	13
3.6 <i>Case Study Trial leaflets</i>	15
4 Creating the linked open data infrastructure (WP4)	16
4.1 <i>Three pillars</i>	16
4.2 <i>Creating the VALERIE ontology on Productive and Sustainable Agriculture and Forestry</i>	16
4.3 <i>Document Base</i>	18
4.4 <i>Document Annotation</i>	18
4.5 <i>Iterative improvements to ask-Valerie.eu</i>	18
4.6 <i>ask-Valerie.eu: multiple languages</i>	19
5 Implementing ask-Valerie.eu as a web-application (WP5)	22
5.1 <i>Stepwise development of ask-Valerie.eu front end</i>	22
5.2 <i>Term editor or query editor</i>	22
5.3 <i>Integrating ask-Valerie.eu in the EIP-AGRI platform</i>	24
5.4 <i>Some more impressions of the ask-Valerie.eu user interface</i>	24
5.5 <i>Introductory videos on ask-Valerie.eu</i>	25
5.6 <i>Community features in ask-Valerie.eu</i>	26
6 Dissemination and exploitation (WP6)	29
6.1 <i>Overview</i>	29
6.2 <i>Stakeholder engagement</i>	29
6.3 <i>Interactions with EIP-AGRI representatives</i>	30
6.4 <i>ask-Valerie.eu</i>	30
6.5 <i>VALERIE brochure translation and newsletters</i>	30

6.6	<i>VALERIE website and social media</i>	30
6.7	<i>Case Study Trial leaflets</i>	30
6.8	<i>VALERIE Symposium 2017</i>	32
6.9	<i>VALERIE at the AGRI-Innovation Summit, Lisbon, November 2017</i>	33
7	7WP1- Management	34
7.1	<i>Specific objectives of WP1</i>	34
7.2	<i>Summary of progress towards WP1 objectives</i>	34
7.3	<i>Work progress and achievements</i>	35
7.4	<i>Deviations from Annex I (DoW) and corrective actions</i>	40
8	Selected VALERIE publications	1
8.1	<i>Scientific Journals</i>	1
8.2	<i>Articles in trade journals, industry magazines & web-sites</i>	4
9	The VALERIE Consortium	6

Executive Summary

The VALERIE project (www.valerie.eu) has created the digital advisory tool *ask-Valerie.eu*. This platform helps practitioners and advisers in agriculture and forestry to find and share documents that respond to their specific queries. It covers a series of thematic subdomains with a focus on productivity and sustainability. These include sustainable soil and water management, integrated pest management, recycling of biomass, supply chain optimisation, and ecosystem and social services from agriculture and forestry.

The platform (www.ask-Valerie.eu) now gives access to approx. 80,000 documents in about 50 repositories selected by experts (status February 2018). All documents are accessed at their original URL and pertain to CORDIS, various Horizon 2020 Thematic Networks, the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI), and many national and regional repositories, mostly in VALERIE partner countries. The document base covers scientific and non-scientific sources with a focus on concise practical documents, and also includes innovation factsheets prepared by VALERIE itself. Domain coverage can be extended by including new vocabularies and document collections that represent new thematic subdomains.

ask-Valerie.eu is also integrated as a support tool on the EIP-AGRI platform (<https://ec.europa.eu/eip/agriculture/en/search/site/>), where it accepts search terms originally submitted to the EIP-AGRI search facility, and subsequently offers full *ask-Valerie.eu* functionality. The tool can be modulated as a widget for integration into other platforms, too, for example to suit thematic networks and operational groups active under the EIP-AGRI umbrella.

The backbone to *ask-Valerie.eu* is the VALERIE vocabulary, dedicated to the domain of productive and sustainable agriculture and forestry, published on 'foodvoc.org'. This vocabulary or ontology organises terms in a taxonomy (e.g., 'wheat' and 'barley' are species of 'cereal'), and defines synonyms as well as closely related concepts (e.g. 'Phytophthora' is related to 'potato'). It fulfils various roles. Firstly, it is used to take an index ('fingerprint') of all documents in the document base to enable quick retrieval upon a given user query. Secondly, *ask-Valerie.eu* uses the ontology to help users articulate their query: it offers auto-completion during typing. Next, a 'query editor' suggests alternative search terms that may help to widen, narrow down or redirect the original query. Finally, concepts that represent 'solutions' (innovations) are linked to the particular problem they aim to resolve. This allows the query editor to mimic the role of the adviser interacting with the practitioner. For example, for a specific crop disease it points to innovations (methods, products, etc.) that may help to control the disease. Documents retrieved are ranked and presented with their titles and text snippets, and with the logo of their owner, all of which link to the original document and its host webpage.

The VALERIE-ontology was composed and modelled in a bottom up iterative process, with domain experts and stakeholders in ten varied case studies. Currently, it consists of 10,377 terms, 12,071 hierarchical relations, 3383 'related to'-relations and 700 problem-solution relations. Moreover, the 10,377 terms have been translated into various languages. This resulted in approx. 50,000 synonyms and translations, which makes the VALERIE-ontology comparable in size to large established vocabularies such as DBpedia (11k concepts) and NAL thesaurus (13.5 k concepts). The VALERIE-ontology, however, is centred on innovations in the specific domains of agriculture and forestry. Ontologies on comparable domains are e.g. ASFA (fisheries, 2 k concepts), Biotechnology Glossary (biotechnologies, 1 k concepts), GEMET (environment, 1 k concepts), or Plant ontology (2 k concepts). Of course larger generic ontologies, such as Agrovoc (32 k concepts) and larger specific ontologies such as the protein ontology (316k concepts) exist, but VALERIE is with its 10 k concepts a considerable vocabulary in the 'nature' domain.

ask-Valerie.eu currently supports English, French, Italian, Spanish, Polish, Finnish and Dutch, and can easily be expanded into other languages. This can be achieved simply through translating the ontology and accessing new document repositories in the corresponding languages.

The tool also supports building communities and setting up groups (e.g. operational groups) for sharing retrieved documents. Users can suggest new documents (e.g. those found by other search engines), add new terms to the ontology, find experts/advisers on specific topics, or establish any other interaction.

A co-innovation approach working with case study stakeholders was at the core of the project. This enabled contributions to the ontology and iterative testing of *ask-Valerie.eu* during its development. It also facilitated research translation through the articulation of the innovation needs and testing of solutions by practitioners.

Research outputs from case studies and the development of the tool have been disseminated through project flyers and leaflets, the agriculture and forestry trade press, local workshops, national conferences and workshops, and the web. Outcomes from 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 the EU. By giving access to concisely summarized knowledge for innovation, VALERIE contributes to making agriculture and forestry practices more sustainable and more productive.



Figure 1.1 Relative position of *ask-Valerie.eu* for searches in the agriculture-forestry domain

Various ‘key client groups’ were invited to give feedback on plans and progress at the start, mid-term, and final stages of the project. These included representatives from farmer unions, advisory bodies, the Standing Committee on Agricultural Research (SCAR) and its Strategic Working Group on Agricultural Knowledge and Innovation Systems (SWG-AKIS), related EU projects, EIP-AGRI, DG AGRI, DG R&I, and national representatives. Their main comments were captured in three successive “Reports on Feedback from Major Clients” (see project website), and many of these were integrated in the development of *ask-Valerie.eu*. “So what’s new, given other search engines?” was an often-raised question. Part of the answer is implied in Figure 1.1. Whereas generic search engines may browse the entire web and return a large number of hits of often limited relevance (upper right), dedicated subject platforms offer relevant documents, but fewer (lower left). The *ask-Valerie.eu* tool aims to offer the best of both: combining aggregated libraries selected for relevance with a dedicated domain vocabulary, it holds the potential to retrieve a high number of relevant documents in response to queries in the agriculture-forestry domain. Another part of the answer is the query editor which uses structured knowledge to support users in the precise articulation of their queries.

VALERIE has presented 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 its case studies, VALERIE set a new approach for articulating the specific needs and empirical knowledge of practitioners, and for integrating these into scientific activities. Both *ask-Valerie.eu* and the VALERIE case studies may inspire new stakeholder communities in Europe to utilize the web-semantics tools and approaches offered by the project.

1 Context and VALERIE Project 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 innovative field practices.

VALERIE project ran from January 1, 2014 to December 31, 2017, with the aim of meeting the following **objectives**:

- Review and summarize knowledge for innovation in agriculture and forestry, within six thematic domains (WP2);
- Translate research outcomes for innovation into end-user content and format (for farmers, advisers and enterprises in the supply chain) (WP2-3);
- Mobilise stakeholders in case studies, to assess technical and economic viability of innovative solutions, to reveal knowledge gaps and barriers to uptake (WP3);
- Use modern web technology ('web-semantics') to help stakeholders articulate their needs and retrieve knowledge for their specific context, through an iterative process (WP2-3-4);
- Establish and document the above approach (articulate-retrieve-translate) as a new stakeholder-driven method, for easy implementation in fresh cases beyond this project (WP2-3-4);
- Set up a Communication Facility (now called *ask-Valerie.eu*) that takes full account of empirical knowledge, vocabularies, innovation demands, and the communication means used by stakeholders (WP3-4-5);
- Ensure the successful and future-proof embedding of the Communication Facility into the EIP-AGRI platform (WP5);
- Ensure the integration of feedback from the SCAR, EIP-AGRI and selected EU projects and other representatives of stakeholder categories into the VALERIE project and its end products (WP4-5-6);
- Inform national AKIS representatives and farmers' unions and the wider audience about the project's ambitions, activities and results (WP6)

Core to the approach was the iterative cycle of identifying specific knowledge demands in varied case studies with stakeholders (WP3), modelling domain knowledge in the form of an ontology (WP4), finding and summarising relevant knowledge and feeding it back into case studies (WP2, WP3), and collecting stakeholder feedback for the next iteration, that is, to articulate knowledge demand more precisely, expand the ontology, retrieve better matching information, etc. (WP3, WP6). In the early stages of the project, this cyclic process was meant to support and guide the development in WP4 (back-end) and WP5 (front-end) of what is now called *ask-Valerie.eu*, the search and communication platform that was earlier referred to as the Communication Facility.

2 Extracting and summarizing knowledge (WP2)

2.1 The VALERIE document base

The knowledge domain addressed by VALERIE in all its activities comprises the following themes:

- Crop rotation, soil cover management and integrated pest management (Theme 1)
- Eco-system and social services in agriculture and forestry (Theme 2)
- The management of agricultural soils as integrated agro-ecological system (Theme 3)
- Water management in agriculture (Theme 4)
- Integrated supply chain services and tools, innovative farm management (Theme 5)
- Recycling and smart use of biomass and food waste, in particular waste generated during primary production (Theme 6)

To carry out the task of extracting and selecting knowledge and make it available for users, we have extensively worked on VALERIE's document base. In contrast to more generic search engines, VALERIE does not use the entire web as its source of information. Rather, we have selected sources containing documents related to agriculture and forestry that meet certain usefulness and relevance criteria. VALERIE's document base is actually an index that links to scientific and practical documents derived from various sources, and in multiple languages (Italian, English, French, Finnish, Spanish, Polish and Dutch). All documents in this document base are annotated using the VALERIE ontology (see WP4 paragraph for more details). The document base consists of various types of documents, as described below. The documents are not actually stored in *www.ask-Valerie.eu* document base (they remain at their original location). Rather, the system keeps an index of all ontology terms that occur in each document, along with text fragments ('snippets') from those documents.

We have two types of documents in *www.ask-Valerie.eu*:

- 1) Documents from selected repositories ("collections"). These repositories include collections of scientific articles published in agricultural and forestry journals; collections of articles published in trade journals; repositories of practical fact sheets; and repositories of research project outcomes, like CORDIS. This represents the vast majority of documents.
- 2) Mini-factsheets prepared by the VALERIE project team itself. For precisely identified innovations, we have prepared a limited number of mini-factsheets. While few in number, these are documents of high relevance in the document base in the sense that they aim to present a concise overview of a certain innovation, its principles and purpose, and of related key documents. See Section 2.2.

For more details on the whole document collection, See Section 2.4. Figure 2.1 gives a quick overview of the collections annotated by VALERIE.

2.2 List of innovations

In VALERIE, one way to summarise knowledge from research projects is to identify and document innovations in agriculture and forestry. For VALERIE, an innovation is "a practice, a solution or a tool that can be implemented to address a specific problem for a farmer, a forester, or an advisor". The list of innovations contains the innovations that we have identified for the six project themes (subdomains), along with the issue or problem it aims to address for the farmer. These 'problem-solution pairs' were implemented as special relations in the VALERIE ontology (WP4) to facilitate the easy identification of innovations by users seeking a remedy through the *ask-Valerie.eu* platform.

Further, describing these innovations in the form of mini-factsheets represents an effective means of summarising outcomes from agricultural and forestry research for VALERIE users and the wider community of advisers and practitioners.

More details about the identification of innovations can be found in the periodic reports, and in particular in the deliverable D2.262 "Definitive version of catalogue of potential innovations from research programs (by theme as well as for cases)".

By the conclusion of the project in December 2017, our list contained 508 innovations. There are 121, 19, 136, 92, 87, and 53 innovations in Theme 1, 2, 3, 4, 5 and 6, respectively. Of these innovations, 371 are connected at least to one research project (mostly European projects FP5, FP6, FP7, or Horizon 2020).

2.3 Preparation of mini-factsheets

Mini-factsheets are short documents containing an overview of the innovation, links to practical (e.g. factsheets, guidelines, manuals) and scientific documents describing the innovation, links to projects where the innovation was studied or developed, the ‘field issues’ that the innovation aims to address/resolve, and the related concepts (terms taken from VALERIE’s ontology to facilitate searches within *ask-Valerie.eu*). Mini-factsheets deliver content in a concise format, and include references for further reading. The time required to prepare a complete factsheet (2-4 pages with a thorough innovation description) would not have permitted to address the large number of innovations covered. More details about the mini-factsheets can be found in the deliverable D2.262 “Definitive version of catalogue of potential innovations from research programs (by theme as well as for cases)” and in previous periodic reports.

Our document base now contains 256 mini-factsheets. Mini-factsheets could not be written for all innovations as this activity competed with the identification of suitable documents for annotation, and with the further improvement of the ontology, both crucial to the successful completion of the VALERIE project. Examples of compiled mini-factsheets are given in the deliverable D2.262.

2.4 Identification and annotation of document collections

Throughout the project but with more emphasis during the later period, we identified and analysed the content of important repositories and annotated all or part of their documents. This process of annotation or indexing resulted in a database that stores the occurrence of all ontology terms per document, along with text snippets. Here we report on the outcome of this activity. In total, documents were collected from 50 repositories (mostly public), and about 80,000 of these were annotated. More repositories can be added, thus *www.ask-Valerie.eu* can serve as a gateway to results from European and national research in agriculture and forestry.



Figure 2.1. Document collections (repositories) on selected domains, accessed by *ask-Valerie.eu* and annotated with the VALERIE ontology.

Tables 2.1 and 2.2 contain summary statistics about the documents collected. More details about the various repositories are provided in the following paragraphs.

Table 2.1. Documents in www.ask-Valerie.eu document base classified by country of origin.

Country	Documents
European repositories	13,760
Finland	5,052
France	1,280
Italy	8,814
the Netherlands & Belgium	43,077
Poland	255
United Kingdom	3,804
Other countries	2,896
Total	79,938

Table 2.2. Documents in www.ask-Valerie.eu document base classified by type of repository.

Type of repository	Documents
Environmental Protection Agency	184
EU project	2,965
Library	41,794
Not-for-profit, science-based organization	173
Research & policy support repository	291
Research and extension institution	3,762
Research repository	16,253
Rural development and information agency	9,109
Thematic Network	167
Trade journal	4,240
Total	79,938

2.4.1 *CORDIS for FP5-FP6-FP7-Horizon 2020 projects*

CORDIS is the European Commission's public online repository to disseminate information on EU-funded research projects. Thanks to the collaboration with Dr. Karl Ferrand (Head of Sector - CORDIS Content Publications Office of the European Union Directorate C - Dissemination and Reuse EU Bookshop and CORDIS Unit) and Georgios Tasiopoulos, we have annotated the Results in Brief and the Report Summaries of agricultural and forestry FP5, FP6, FP7 and Horizon 2020 projects (2586 documents).

2.4.2 *EIP-AGRI (European Innovation Partnership)*

The EIP-AGRI platform (“the one-stop-shop for agricultural innovation in Europe”, <http://ec.europa.eu/eip/agriculture/>) contains various useful publications for VALERIE, like the reports from Focus Groups, some brochures (e.g.: “Thematic Networks under Horizon 2020”), workshop reports (e.g. “Opportunities for agriculture and forestry in the circular economy”, “Building new biomass supply chains for the bio-based economy”, “Biosecurity at farm level”), and factsheets. Of this collection, 202 documents, referring to approximately 75 unique documents and their translations in various languages, were annotated to be used in the VALERIE document base.

2.4.3 *OrgPrints*

OrgPrints (<http://orgprints.org/>) contains about 19,000 open access documents on organic food and farming, together with information about organisations, projects and facilities. We have annotated 10,256 documents from this source.

2.4.4 Horizon 2020 EIP-AGRI Thematic networks

Thematic networks bring together various actors around a well-defined theme (e.g. precision agriculture and robotics), involving participants from both science and practice. We have annotated 167 documents from the following networks: 4D4F, AgriSpin, Agriforvalor, EuroDairy, OK-Net Arable, SmartAKIS and WINETWORK. Only networks with online accessible documents related to agriculture and forestry were included, and this list covers them all (status late 2017).

2.4.5 National repositories

Finland. We have annotated documents from two repositories.

The first one is *Metsäteho* (185 documents annotated); it contains factsheets focusing on many practical forest operational aspects, educational material and reports mostly related to technical aspects on forest operations. Most of the material is especially made for stakeholders working in wood procurement and wood production operations.

The second one is *Jukuri* (4867 documents annotated), an open repository of the Natural Resources Institute Finland (LUKE). Jukuri contains information on publications of LUKE's staff. A growing number of publications is available to download. Information on research institute publications that were merged into LUKE is available already and the coverage will improve over time. Because LUKE is a merger of several institutes, a large variety of topics is covered: agriculture, forestry, fisheries, game and wildlife management, Finnish National Statistics.

France. From France we have annotated documents from three repositories.

EcophytoPIC (<http://ecophytopic.fr/>) is an official platform, ordered by the French Department of Agriculture and centralizing information on Integrated Crop Protection (ICP). The platform is structured around a transversal platform, dealing with generic principles of ICP, and six specific platforms dedicated to the main types of crop production (e.g. arable crops, arboriculture, viticulture, vegetable crops). More than ten partners collaborate to the information supply for this platform. A scientific council decides what can be published on the webpage every year. We have annotated 164 documents from this source.

Innovations agronomiques (<http://www6.inra.fr/ciag/Revue>) is an online scientific journal, published by INRA with articles in French. It deals with various topics, one for each volume, and presents results from all the INRA community, from economics, genetics, agronomy and so on. A special issue presents the results of a development-oriented projects set, funded by the French Department of Agriculture (CASDAR projects), every year. These articles benefit from a Creative Commons license. We have annotated 772 documents.

Terres Inovia (<http://www.terresinovia.fr/>) is one of the most important French technical institutes and a partner of the VALERIE project. Its webpage offers practical and technically-oriented documents. We have annotated 344 documents.

Italy. The practical and scientific documents produced by Italian authors are scattered in a number of repositories, as a result of having many Institutions involved in research and extension (e.g. Universities, CREA, CNR-National Research Council), and many funding programs (European, national, and regional). In VALERIE we focused our attention on practical documents, as these sources in Italian are much appreciated by stakeholders. These are the sources from which we have annotated documents:

Websites of regional rural development and information agencies. The 20 Regions in Italy are the first-level administrative divisions of the country. Some of the regions have developed agricultural document repositories with tens or hundreds of documents, produced as a result of research or dissemination projects. We have annotated a total of 4092 documents from these sources: Arsiat, Assam, Emilia Romagna, Ersaf Lombardia, Regione Basilicata, Regione Piemonte, Regione Toscana, Sardegna Agricoltura, and Veneto Agricoltura.

Trade journals. Many Italian trade journals report research results with practically-oriented articles, which are useful for farmers and advisors. We have annotated 2764 abstracts from the “Informatore Agrario” and 1476 articles from “Terra e Vita”, two trade journals published weekly.

Other repositories. We have annotated documents also from other sources, the most important being two research and extension institutions (CRPA and CRPV: 376 documents).

Note: CREA (Consiglio per la ricerca in agricoltura e l’analisi dell’economia agraria) is the main Italian research body on agriculture, forestry and food (supervised by the Ministry of Agriculture, Food, and Forestry). Its institutional repository (<https://air.crea.gov.it/>) shows that most of the documents in Italian are published on the two journals cited in the previous paragraphs (2597 on “Informatore Agrario” and 473 on “Terra e Vita”). We therefore did not activate a dedicated annotation of this repository.

The Netherlands and Belgium. The Dutch collection by the previous levy board for arable farming, now transformed into Brache Organisatie Akkerbouw, is named Kennisakker. From this repository we annotated 423 documents. The main Dutch collection for practitioners and agriculture colleges is Groen Kennis Net (GKN). This is a very large repository (0.5 million documents) of which we annotated a limited section (41,794 documents). We have also annotated 32 documents from the Belgian Coordination Centre for Applied Research and Extension on Organic Agriculture (CCBT).

Poland. We annotated 255 documents from the IUNG research repository (Institute of Soil Science and Plant Cultivation).

United Kingdom. The most important UK repositories from which we have annotated documents are Farming Futures (2497 documents), the Forestry Commission (467), the Parliament research briefings (291), the Scottish Environment Protection Agency (184) and the UK Irrigation Association (124).

Other countries. We have annotated 173 documents from the International Plant Nutrition Institute (IPNI).

2.5 Knowledge gaps and research needs identified

One of the objectives of the VALERIE project was to identify knowledge gaps and research priorities for more sustainable and productive agriculture and forestry in Europe. To reach this objective, for each theme studied in VALERIE we have identified the gaps and priorities from scientific reviews. Reviews were found by consulting bibliographic databases using keywords to restrict the search within each theme, together with additional keywords (e.g. “research gaps”, “research needs”, “review”). The most relevant documents appearing in these lists were selected for subsequent detailed analysis. Information derived from scientific reviews on the six themes was integrated with gaps and priorities indicated by European projects and VALERIE’s expert panels.

Each identified gap or priority was reported with a name, a description of some hundred words, and references to the documents that were used to identify the gap. The results of this analysis are reported in the deliverable D2.272 “Final list of knowledge gaps and priorities”.

3 Case studies on innovation (WP3)

3.1 Stakeholder-driven (co-innovation) approach in case studies

Ten case studies (CS) on innovation provided the platform for the iterative stakeholder-driven co-innovation approach which underpins WP3 (Table 3.1). They mobilised stakeholders, with their empirical knowledge and innovation needs. The research team worked together with the stakeholders to apply, test and refine screened research outputs, evaluating their innovation potential in the local context, assessing the viability of solutions and exposing barriers and bottlenecks that limit their uptake. This took place with a series of case study meetings (approx. four formal meetings together with a series of informal meetings) with selected stakeholders.

There was great diversity in the CS with respect to different contexts: locations, stakeholder types, problems and stakeholder goals in settings, stakeholder expectations, requirements and research issues. This diversity was complicated by CS being at different stages in the WP3 process due to local stakeholder and logistical reasons. The WP3 team accommodated this by providing structured support with standardised guidelines to CS partners for CS research, but allowed flexibility in the way that partners engaged stakeholders and planned and carried activities. Throughout the process, CS partners have continued to draw in CS partners and stakeholders into the development and evaluation of *ask-Valerie.eu*; and into implementing and analysing trials. The stakeholders have particularly appreciated the concrete outcomes of the trials.

The approach is based on regular interaction with stakeholders in CSs in a series of participatory activities oriented towards action research and co-innovation. The stakeholders in each CS identify innovation issues and articulate these into research needs; project experts search and propose innovation solutions as factsheets, papers etc.); then stakeholders screen, evaluate and refine these solutions in trials for their innovation potential and feedback to project experts who refine solutions (Fig. 3.1). These cycles of interaction progressed throughout the project period. Stakeholders have applied and tested the potential of selected innovation solutions in their local context. The trial results were collected and fed back into the iterative process and provided co-created empirical knowledge, which was integrated into *ask-Valerie.eu*.

As well as identifying research needs and testing solutions, the CS also supported the development of *ask-Valerie.eu* by collecting ontology terms, commenting on the functionality of *ask-Valerie.eu*, and testing prototypes and providing feedback to WP4/5. This was initiated with an early prototype of *ask-Valerie.eu* shown to stakeholders, while the feedback exchange between CS and WP4 intensified when more developed versions were tested (Fig. 3.2).

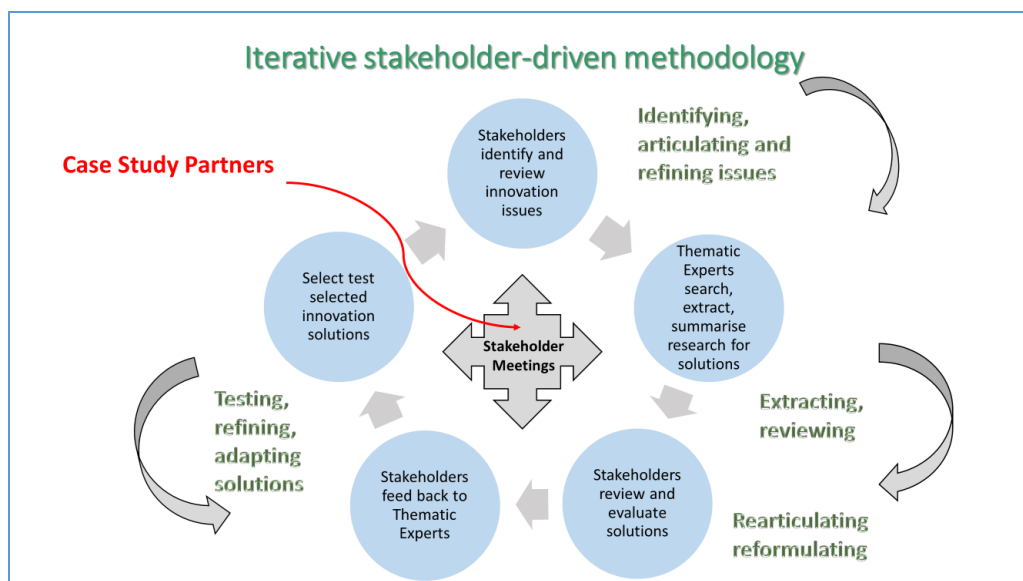


Figure 3.1: Schematic representation of the iterative stakeholder-driven co-innovation process

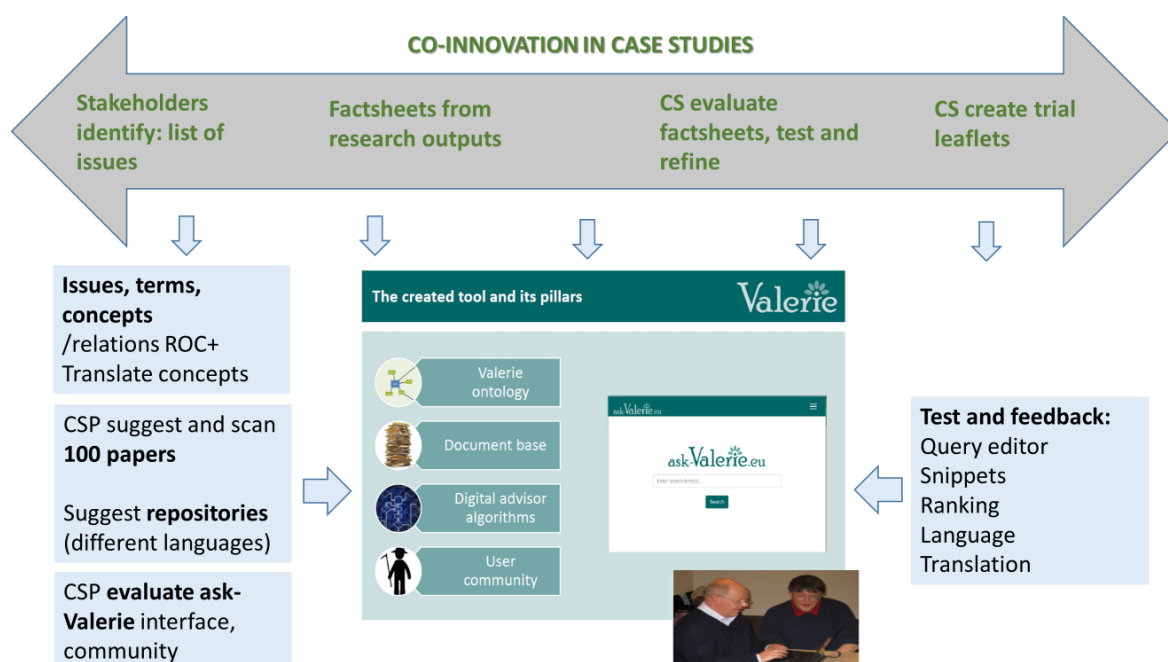


Figure 3.2: Schematic representation of interactions between the stakeholder-driven co-innovation process aiming at innovation in the field, and the development of ask-Valerie.eu as a general tool for advisers and practitioners. This process was locally led by the respective VALERIE case study partners.

3.2 Testing of ask-Valerie.eu in case studies

ask-Valerie.eu has been developed through a series of iterations involving progressive stages of design and development by WP4 and WP5, following feedback from the CS partners and CS stakeholders over the project period. This feedback has prompted significant re-design of the tool, by mid-2017 four versions of ask-Valerie.eu had been produced. A series of technical tests and demonstrations of the software (versions 1-4) was undertaken in the second and third CS meetings with stakeholders facilitated by CS partners; and with CS partners in project meetings and dedicated workshops facilitated and analysed by WP3 and WP4.

Stakeholder involvement in the development of ask-Valerie.eu continues to provide useful feedback. Three areas have been developed:

- **Document base** - following CS feedback, more national repositories in national languages were added, as well as practically oriented documents
- **Improving ontology** – the CS partners recognised the importance of the ontology, they identified missing terms and highlighted the need to revise the structure and the relations, they also translated terms in the ontology to allow use of ask-Valerie.eu in different languages
- **ask-Valerie.eu community** - opportunities to make ask-Valerie.eu more interactive so that a user community can interact and share knowledge were discussed with CS partners at the final project meeting. A prototype user interface was also tested.

Revisions in the language and the document base have led to significant improvements according to CS partners, whilst issues raised about functionality (searching and ranking) and presentation of results have been progressively addressed in each version. Stakeholders particularly appreciated the ability to search and access documents in different languages in later versions, although they still regard expanding the document base by linking to more national repositories as a priority.

- 3.2.1 Version 4 of *ask-Valerie.eu* was tested in summer 2017. Following discussions at the project meeting (Jan 2017) a test protocol was developed and conducted to evaluate the usefulness of *ask-Valerie.eu* by comparing it with a widely used search engine (Google). The CS target stakeholder group for the exercise were advisors and technicians rather than farmers or forest owners. The purpose of the test was to:
- Get feedback from the advisors and technicians on how useful the outputs (according to stakeholders' own criteria) identified by *ask-Valerie.eu* and Google were in answering their queries.
 - Compare the usefulness of the results identified by *ask-Valerie.eu* and Google.
- 3.2.2 Testing of Version 4 of *ask-Valerie.eu* took place in all 10 of the CSs using standardised protocols. A total of 22 advisors/ technicians performed and provided feedback on 61 search engine queries using *ask-Valerie.eu* and Google. Results were presented for each CS with an analysis of the test record sheets and given to WP4-WP5 team as feedback. This series of tests was reported in Deliverable 3.6.1. This activity and report corresponds with the DOW's A3.7 Case study meetings with all user groups – feedback and final reflections as the main task. User groups per se did not emerge in the CS stakeholder communities, it was decided therefore to orientate the report towards *ask-Valerie.eu* testing in the wider stakeholder community.

3.3 Reporting on case study trial outcomes

VALERIE Stakeholder Trials:

Sampling for quality assessment and improvement for a wheat supply chain in Alessandria, Italy.

The problem

Developing local value-chains can offer a good solution for product valorisation and a safer way to manage the wheat trade. Nevertheless, local value chains need to pay close attention to product quality and the homogenous specification of the product, among all farmers. This is the case for the Sustainable wheat **Harmony** value-chain, trademarked from Mondelez International, that has been developing in Alessandria county since 2014. **Local farmers do not usually take part in an organised value-chain and the quality of their production is very variable.** Storage cooperatives collect different grain lots from farmers and must ensure good sorting based on a quality assessment. Knowing the quality before storage can be useful for them.

The proposed solution

Tools and networks to assess the grain quality before the harvest could help to identify in advance what type of grains the farmers will deliver and if they respected the guidelines of the supply chain. We aimed to set-up a pilot experience to test a methodology of sampling grains in the field **before the harvest** to inform both farmers and cooperatives about the batch quality.

Stakeholders

Stakeholders were asked to identify the main issues and knowledge gaps regarding wheat production during the first discussions of the project. This issue emerged as one of the most important for all members of the meeting: farmers, technicians, storage cooperatives and millers. Even if it does not deal with a specific technical issue or a knowledge gap, the trial topic comprises different aspects of logistics and organisation.



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[@Valerie_project](https://twitter.com/Valerie_project)

1

Figure 3.3: Example fragment of a trial evaluation sheet produced in one of the VALERIE case studies (here: Improving milling wheat quality, Alessandria, Italy). For a full overview of case study leaflets, see list of titles in Section 3.6)

Each CS identified topics (1-3 in each CS) for a field trial in stakeholder meetings, they were based on research outputs provided by domain expert factsheets and internal negotiation. The aim of the trials was to test and screen research outputs in the local context and at farm level. In most cases the trials were conducted on stakeholders' fields. These ranged in scope, format and length from formal scientific trials to less formal demonstration plots, and in one case a field trip. Some CS developed existing research ideas while others pioneered new research. For many the innovation was as much about the overall approach of involving stakeholders as it was about producing rigorous scientific outputs. In Period 1 the trial plans were provided by CS partners for each CS using guidelines provided by the WP3 team and according to allocated budgets. These were implemented in Period 2. In Period 3 data was collected and analysed and standardised trial reporting sheets were completed by CS partners.

Based on the trial reporting sheets WP3 together with each CS partner compiled a trial/demonstration leaflet (Fig. 3.3; Table 3.1). These are 2-4 page illustrated leaflets in pdf format which will be used to disseminate the main trial findings. They follow the same template and describe the stakeholder involvement in the trial process as well as the main research findings. Where appropriate they are accompanied by annexes containing more detailed or results/analysis or supplementary guides/material. Stakeholders were keen to share their findings with others working on similar issues. They also favored short precise factsheet or technical note format. Their preferences helped to steer the design of the leaflets.

The trial sheets are uploaded to the VALERIE project website, annotated and added to *ask-Valerie.eu*, and collated in Deliverable D3.7.1. See Section 3.6 for the full list of Case Study Trial leaflets.

3.4 Collating case study research outputs

Towards the final stage of the project, there was collation of research outputs generated by the co-innovation process in the ten Valerie Case Studies (CS) in six countries. This was presented in Deliverable 3.7.1. In the stakeholder driven (co-innovation) methodology, research outputs were created as tangible outputs at different stages of the process:

- Identifying innovation issues. Monitoring the process, feedback, adaptation with the *Dynamic Research Agenda*.
- Translating research outcomes with innovation potential into formats for use by end-users (farmers, advisers, and enterprises in the supply chain) creates *factsheets*.
- Testing and refining research outputs in CS settings creates *trial plans, reports and leaflets*, in come CS, videos, expert presentations, manuals were created as other forms of dissemination

These outputs and the process of completing them were described in detail in Deliverables D3.6.1. and D3.7.1.

3.5 Barriers and enablers to research uptake

This final deliverable from WP3 (D3.7.2) addresses the contextual factors that influence the application of research knowledge in the field. Although the focus of VALERIE has been on providing knowledge from research for innovation, it is acknowledged that land managers operate and are situated in a wider context and their actions and ability to utilise innovations are influenced by multiple factors. Scientific knowledge is only one component of the agricultural innovation system and there are farm level and wider systemic challenges to be considered. Social, institutional, economic and political factors affect both the conduct of agricultural science and the translation of research results into farming practices.

The main aim of the report was to examine the barriers and enablers to utilisation of research outputs in CS. The report collates and analyses the results from stakeholder and CS partner assessment of barriers and enablers in CS. These assessments were carried out in CS in June-Nov 2017 by consulting stakeholders in meetings or dedicated interviews. The results are supplemented with a commentary for each case study drawn from previous case study meeting reports, and Case Study Partner interviews.

The term barriers has been used to understand how to realise potential in terms of diffusing new sustainable practices, behaviours and technologies, together with understanding how to enable the potential through incentive and policy measures. Barriers and enablers operate at different scales – farm, landscape, region etc. and come from different parts of the Agricultural Innovation System. Drawing on different bodies of literature a framework was developed around six key themes, and this provided the basis for the CS activity where the main objective was to reveal social, economic and cultural barriers to research uptake. Based on the analytical framework, a set of guidelines were prepared for use in the CS. Each CS partner was provided with these guidelines to carry out the consultation with stakeholders.

It is evident from the findings that the utilisation of innovation derived from research is constrained or enabled by a number of factors, this is in line with Agricultural Innovation Systems thinking which situates farmers and foresters in a system where social, economic, ecological, market and institutional drivers influence innovation.

Table 3.1 VALERIE Case studies and trials

Name	Case study partner and country	Topic	Stakeholders	Trial leaflet title
Catchment scale resource use efficiency	GWCT UK	Sustainable farming at landscape scale	Wildlife trusts, national parks, professional nutrient management group, agric. levy boards	Mycorrhizal fungi seed treatment (Rootella) on Maize
Soil management in livestock supply chains	GWCT UK	Sustainable soil management in livestock production	Farmers, advisers, supply chain	Cover Crops & Outdoor Pigs
Forest-based biomass	TAPIO Finland	Sustainable forestry management and smart use of biomass	Researchers, forestry organisations	Demonstrating the use of wood ash as a forest fertilizer on mineral forest soils in the Joensuu area, Finland
Innovative arable system	Terres Inovia (previously CETIOM) France	Sustainable cereal cultivation	Farmers, technical institutes, agricultural chambers, machinery companies	Sustainable innovative practices in the central region of France: a focus on soil structure assessment in the field
Agro-ecology: reduction in use of plant protection, France	ACTA France	Reducing herbicides use in arable crops	Technical institutes, agricultural chambers, farmers, research institutes, storage agencies	Demonstration of combined cropping of wheat and lentils
Sustainable Forest Management and ecosystem services	USSE Spain	Improving the economic and environmental performance of forestry in Navarra	Forest owners, municipalities, forest authority and extension service, value chain organisations	Using LiDAR to inform joint forest management planning with a forest owners group in Roncal, Navarra, Spain
Improving Milling Wheat Quality	Cadir Lab Italy	Fertilisation, IPM and fungi control in sustainable milling wheat supply chain	Farmers, wheat-stocking cooperatives, seed companies, pesticide companies, wheat-buying companies	Sampling for quality assessment and improvement for a wheat supply chain in Alessandria, Italy (English version) Fusarium Head Blight Sensitivity of bread wheat variety in Alessandria, Italy (English version) Evaluation of biostimulants in the bread wheat value-chain, Alessandria, Italy
Drip Irrigation Management in Tomatoes and Maize	Cadir Lab Italy	Sustainable water and nutrient management	Farmers, cooperative for tomato transformation, public experimental station	Cover crop experiences of farmers in Alessandria, Italy Maize and Tomato drip irrigation in Alessandria, Italy
Sustainable Onion supply chain	Delphy (previously DLV) Netherlands	Improvement in onion quantity and quality	Farmers, seed companies, packers, exporters, suppliers of fertilizers and pesticides	The use of leaf treatment on the infection rate of neck rot in Onions in The Netherlands
Sustainable Potato supply chain	Delphy (previously DLV) Poland	Sustainable potato production for the French fry industry	Farmers, processing and exporting industry, suppliers of fertilizers and pesticides, experimental station and	Potato brown spot issues in the supply chain in northern Poland: testing the susceptibility of potato

			research, suppliers of DSSs	varieties to Tobacco Rattle Virus
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3.6 Case Study Trial leaflets

The Case Study Trial leaflets can be accessed at the following links:

- [Potato brown spot issues in the supply chain in northern Poland: testing the susceptibility of potato varieties to Tobacco Rattle Virus \(English version\)](#)
- [Demonstrating the use of wood ash as a forest fertilizer on mineral forest soils in the Joensuu area, Finland \(English version\)](#)
- [Sustainable innovative practices in the central region of France: a focus on soil structure assessment in the field \(English version\)](#)
- [Using LiDAR to inform joint forest management planning with a forest owners group in Roncal, Navarra, Spain \(English version\)](#)
- [Demonstration of combined cropping of wheat and lentils \(English version\)](#)
- [The use of leaf treatment on the infection rate of neck rot in Onions in The Netherlands \(English version\)](#)
- [Sampling for quality assessment and improvement for a wheat supply chain in Alessandria, Italy \(English version\)](#)
- [Fusarium Head Blight Sensitivity of bread wheat variety in Alessandria, Italy \(English version\)](#)
- [Evaluation of biostimulants in the bread wheat value-chain, Alessandria, Italy \(English version\)](#)
- [Cover crop experiences of farmers in Alessandria, Italy \(English version\)](#)
- [Maize and Tomato drip irrigation in Alessandria, Italy \(English version\)](#)

4 Creating the linked open data infrastructure (WP4)

4.1 Three pillars

The main aim for WP4 was to build the three pillars that are the innovative power of the search and communication system baptised *ask-Valerie.eu*: (i) the ontology which codifies domain knowledge from experts, (ii) the infrastructure of the document base so documents from various repositories can be made available to the target audience, and (iii) the software that allows *ask-Valerie.eu* to act as a digital advisor in the field of agronomy and forestry.

The development of these three components -- the ontology, the annotated document base and the back-end services supporting *ask-Valerie.eu* -- is an iterative process whereby we learn from previous cycles. During the project several iterations have taken place, each starting with work on the three components and ending with user feedback sessions. Such sessions were held earlier in Loddington (UK; 2015), in Helsinki (FI; 2015), one in Turin (IT; 2016), two in Amsterdam (NL; 2015-16), one in Toulouse (FR, 2017) and one in Brussels (BE, 2017), and in parallel two dispersed sets of user feedback sessions were held in the various (local) case study meetings. Moreover, additional local efforts were given to improve the structure and quality of the VALERIE-ontology at several moments in the course of the project. Based on the user feedback in the later stages, various components of the back-end software have been adapted, and the system was scaled to enable working with the expanding ontology and document set. Recent improvements include the presentation of document source logos alongside the search result / text snippets, the autocompletion function, synonyms are shown in the term editor, and the ranking of the results.

4.2 Creating the VALERIE ontology on Productive and Sustainable Agriculture and Forestry

The principles and advantages of structuring information with the help of ontologies are resumed briefly. An ontology defines a set of representational primitives (concepts) and relations between these primitives (Gruber 2009). These concepts include information about their meaning in the form of the name(s) or possibly an extended textual description of the concept. Multiple alternative names (labels) can be attached to one concept, allowing for the definition of synonyms and translations (e.g., *agricultural technology* has synonyms *agrotechnology* and *field technology*; and it has translations *maatalousteknologia* in Finnish, *technika rolnicza* in Polish, *technologie agricole* in French and *tecnología agrícola* in Spanish). Different types of relations can be defined, such as *is-a* relations providing for the creation of hierarchies (e.g., *agricultural technology* 'is-a type of' *technology*). Concepts are often identified by unique identifiers allowing for the disambiguation between them (e.g. *Vertisol* as in the WRB classification and *Vertisol in the USDA classification*, which are similar but slightly different concepts). Other relations between concepts can be defined, such as 'soil is related to biodiversity'. Once established, the ontology allows annotation (indexing) of documents to make them 'findable' by search engines, and allows to support users in formulating a precise query. A small fragment of the ontology is illustrated in Figure. 4.1.

Continuing from the ontology established early in the project, we improved it steadily by organising new expert sessions, in which the focus was either on improving the hierarchical structure or on improving the 'related-to' structure of the ontology. Additional terms and synonyms were added and branches/sections of the ontology were restructured. One major step in the ontology development was the addition of problem-solution pairs, thereby strengthening the possibility to find innovations for certain problems. Examples are the following triples:

"stream bank erosion" - has innovation – "stream bank stabilisation"

"stream bank stabilisation" - has innovation – "tree planting"

What we see is that a solution in one triple can be the problem in the next triple, thus generating chains of innovations-solution pairs. A schematic overview of the various relations existing in the ontology is given in Figure 4.2. This unique feature of the VALERIE ontology is exploited by the *ask-Valerie.eu* 'query editor' to quickly identify potential solutions to a given problem.

The above activities have led to several versions of the ontology, each was published at the time on 'foodvoc.org' and versions were successively replaced by the latest version once that became available.

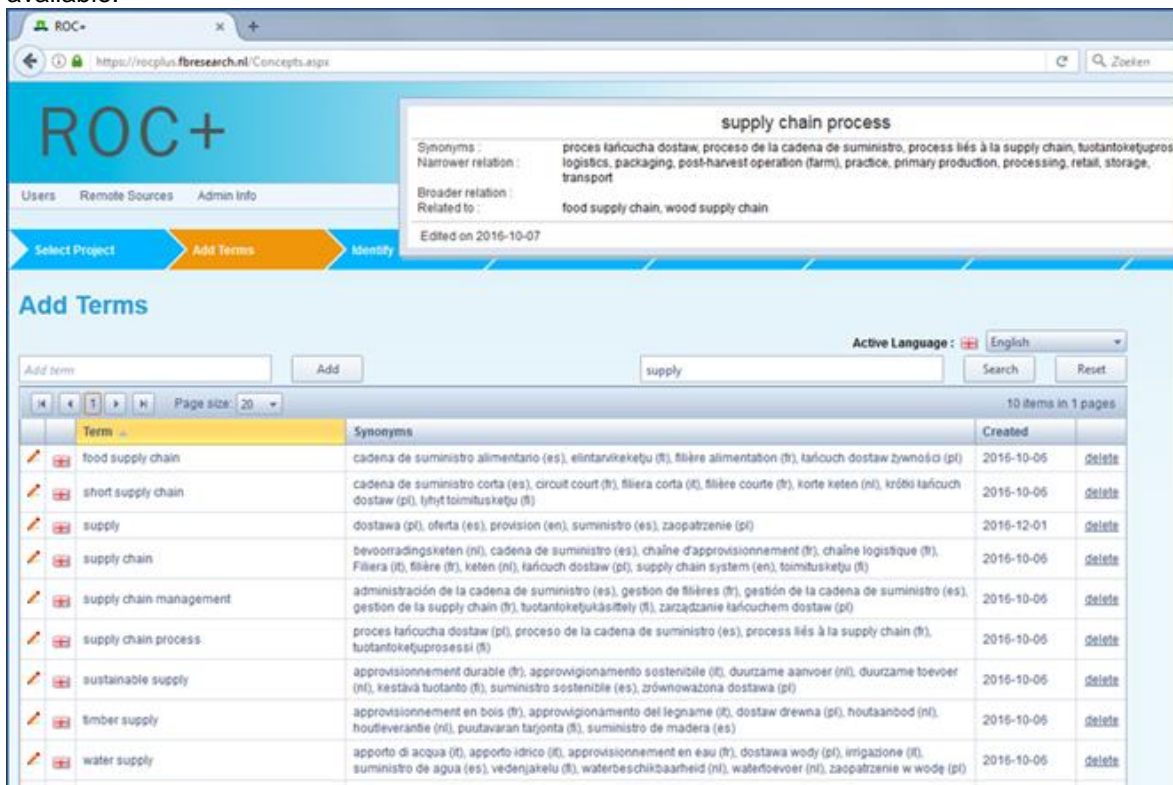


Figure 4.1: A screenshot with part of the ontology, more specifically some concepts related to supply chain. In the left columns, the language flag of the concept and the concept are displayed. In the middle column, the synonyms and translations are shown.

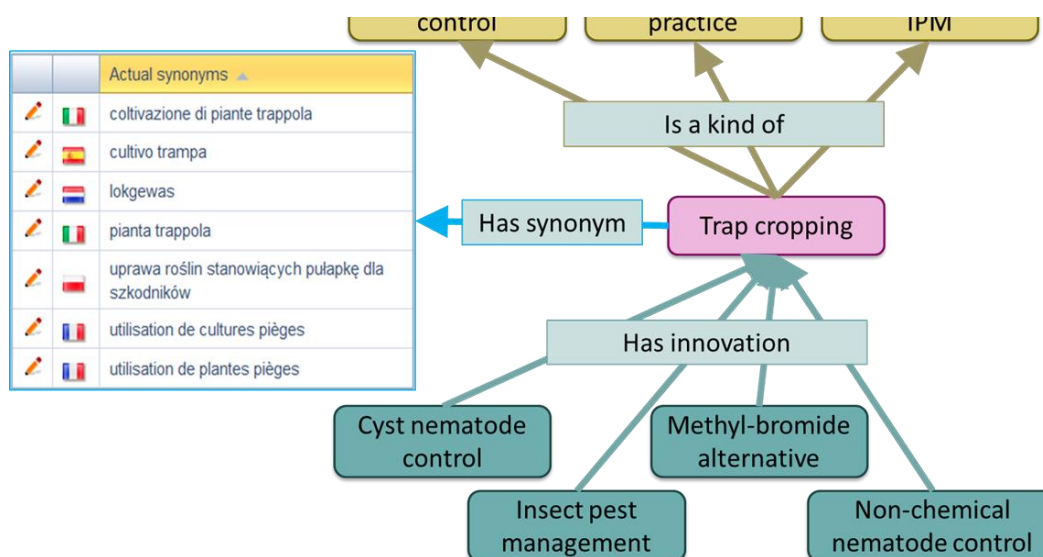


Figure 4.2: Example of hierarchy of ontology-terms as related to a specific innovation: the use of trap crops as an IPM tool to improve soil health. Three types of relations are indicated: 'kind-of', 'synonym', and 'has innovation'.

In December 2017, the final version of the VALERIE-ontology was delivered. It consists of 10,377 terms, 12,071 hierarchical relations, 3383 'related to'-relations and 700 problem-solution relations. Moreover, the 10,377 terms have been translated into seven languages (Dutch, Italian, French, Spanish, Polish, Finish and for botanical terms in Latin). This results in 49,850 synonyms and translations. This makes the VALERIE-ontology comparable in size to large established generic vocabularies such as DBPedia (11k concepts) and NAL thesaurus (13.5 k concepts). With this important attribute: the VALERIE-ontology is centred around innovations in the specific domain of agronomy and forestry. Ontologies on comparable domains are e.g. ASFA (fisheries, 2 k concepts), Biotechnology Glossary (biotechnologies, 1 k concepts), GEMET (environment, 1 k concepts), or Plant ontology (2k concepts). Of course larger generic ontologies, such as Agrovoc (32 k concepts) and larger specific ontologies such as the protein ontology (316 k concepts) exist, but VALERIE is with its 10 k concepts a considerable vocabulary in the 'nature' domain.

The VALERIE-ontology represents an important part of the domain expert knowledge that is used by the *ask-Valerie.eu* computer system to help practitioners find their answers to the questions they have in the field of agronomy and forestry.

4.3 Document Base

The ontology described in the previous paragraph is the first pillar of *ask-Valerie.eu*. The document base is the second pillar. The document base consists of collected PDF-documents from various sources. These represent scientific documents, EU project reports, EIP-Agri documents and practical documents from national resources. The document repository consists of some 80,000 documents obtained from 51 different sources, including thematic networks (all TN that hosted document collections in 2017), such as FERTINNOWA, OK-Net Arable, Smart-AKIS, large generic sources such as OrgPrints, Groen Kennisnet, Jukuri university library, and practical factsheet repositories, such as Ecophytopic, Food & Farming Futures and Emilia-Romagna. See also explanations under WP2. Fig. 2.1 shows the logos of the sources accessed. The logos are presented with snippets of the retrieved documents (on request of some collection contributors).

One of the participants in the final evaluation of the *ask-Valerie.eu* tool sighed with relief: "finally I have all the regional factsheet repositories just one mouse-click away".

4.4 Document Annotation

Each of the documents in the document set selected by the domain experts was annotated automatically using the domain ontology by a computerised process where the PDF documents were first parsed after which occurrences of the concepts (using all synonyms) in the text were identified and marked as annotations.

For documents to be used in *ask-Valerie.eu*, they must first be annotated. "Annotation" means that words or sentences in a text are marked, and stored in a database as linked to terms of the ontology. Documents are annotated automatically by a software tool called AnnA that was developed in the VALERIE project.

4.5 Iterative improvements to *ask-Valerie.eu*

The steps outlined above (creation of the domain ontology, selection of the document set, automatic annotation) are pre-processing steps conducted by domain experts or by software services. These steps formalise the domain knowledge in terms of the ontology and prepare the documents for automatic interpretation. This will allow *ask-Valerie.eu* to answer the user's question. Auto-completion and specific features of the query editor (see also WP5) support this process.

The auto-completion function - to support users when entering their queries - has been developed into stepwise more versatile versions. When a user starts entering for example the search term "unif", the auto-completion function will not only autocomplete by adding more characters (such as uniformity), but also with concepts where "unif" is at the beginning of any word in the concept, such as "application

uniformity”, “sprinkler uniformity” but not “Viburnum prunifolium” (because unif is not at the beginning of the word prunifolium).

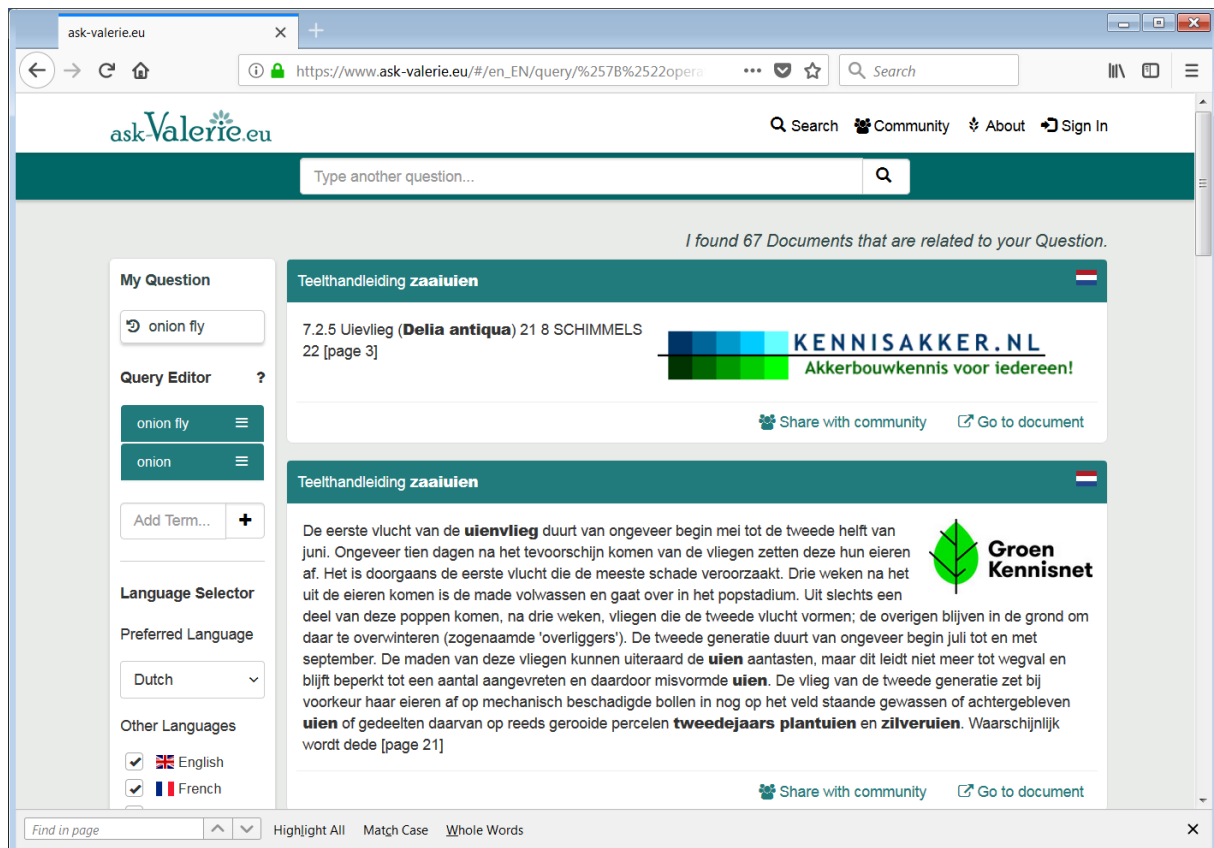


Figure 4.3: A screenshot of the ask-Valerie.eu front end, showing the document source's logo at each search result, the concepts from the query in the query editor and the language selection pane also on the left.

A second improvement is that for each search result, the logo of the document source is shown in the user interface. This was a feature that was asked for by the document source owners, but also the users of the community facility were satisfied with this improvement. A third change with respect to earlier versions is the improved query editor. Not only are now all synonyms (in the selected languages) visible, but also the problem – innovation pairs that have been defined in the ontology. This change makes it possible for the users to better understand the context of the search terms, thereby enabling a better formulated search question.

4.6 ask-Valerie.eu: multiple languages

One of the key assets of ask-Valerie.eu is its multi-linguality. For every user, it is possible to log in and indicate which languages he/she understands. The user can then ask queries in each of these languages, and will receive relevant documents in these languages. This procedure is explained in the figures below. The user interface itself is automatically set to the preferred language, as indicated in the language selection pane. The auto-completion service of ask-Valerie.eu responds to the set profile by offering only auto-completion on terms in the selected languages and in Latin (for the botanical terms). In Figures 4.4 to 4.6, an example is elaborated with a user who selected French and Dutch as language profile. VALERIE partners, in particular those representing our target audience, are positive about the potential that ask-Valerie.eu offers to find relevant scientific and practical results applicable to their own situation, and in their own language.

Which is your preferred language?

French

Which other languages do you understand?

English
 German
 French
 Finnish
 Italian
 Dutch
 Spanish

[Save Languages](#)

Figure 4.4: The area in which the user of ask-Valerie.eu can indicate his/her language profile.

I found 3 Documents that are related to your Question.

My Question

agrumes

Term Editor

agrumes

Add Concept... +

Les huiles essentielles en protection des cultures? Analyse & Enquêtes

Pour lu er contre les maladies cryptogamiques (mildiou essen element), les vi culteurs u lisent, en premier lieu, le cuivre mais l'associe avec des huiles essen elles (89% de l'échan llon) et/ou des plantes en infusions, purins, déco- ons (69% de l'échan llon). Toutes les formes de cuivre sont u lisées (Sulfate, Hydroxyde, Oxyde et Gluconate) avec certaines spécialités commerciales associant le cuivre avec d'autres oligoéléments tel que le Cuivrol®, Labicuper®, Sillicuivre® et S curol®. Dans tous les cas, un effort de ré- duc on des quan tés de cuivre a été noté. Les huiles es- sen elles sont u lisées comme insecte fuge (lavandin, euca- lyptus, sapin douglas, gauthérie, eucalyptus) ou an - mildiou (origan, orange douce, **citron**, pamplemousse, clou de girofle, tea-tree, eucalyptus). Les terpènes présents dans les HE de la famille des citrus (**orange**, **citron**, pample- mousse) sont recherchés pour leur pouvoir asséchant. Les phénols présents dans l'HE d'origan sont u lisés pour « éteindre » les symptômes du mildiou. Les HE sont mélan- gées directement à la bouillie avec l'aide d'un mouillant (cf. figure à droite). Plusieurs HE peuvent être u lisées au cours de la saison mais elles sont rarement u lisées en combinai- son (c.-à-d. mélange pour 1 applica on de 2 ou 3 HE). [page 2]

Les amendements minéraux basiques - pourquoi et comment?

(Source : Chambre syndicale nationale des fabricants de **chaux** grasses et magnésiennes) [page 2]

Biopesticides, a complementary and alternative approach to the use of agrochemicals

La coccinelle est l'insecte auxiliaire le plus connu. La coccinelle Rodolia cardinalis prélevée en Australie est couramment utilisée comme prédateur de la cochenille Icerya purchasi. Même si elle a été introduite dès le 19e siècle en Californie pour enrayer la destruction des **agrumes**, les îles Galápagos n'ont autorisé son introduction qu'en 2002 (Calderón Alvarez et al., 2012). Les effets des biopesticides d'origine animale et plus particulièrement des insectes auxiliaires sur la faune locale sont minutieusement étudiés avant leur utilisation. [page 4]

Only French (3) and Dutch (0) results appear

Figure 4.5: The search results depend on the selected languages.

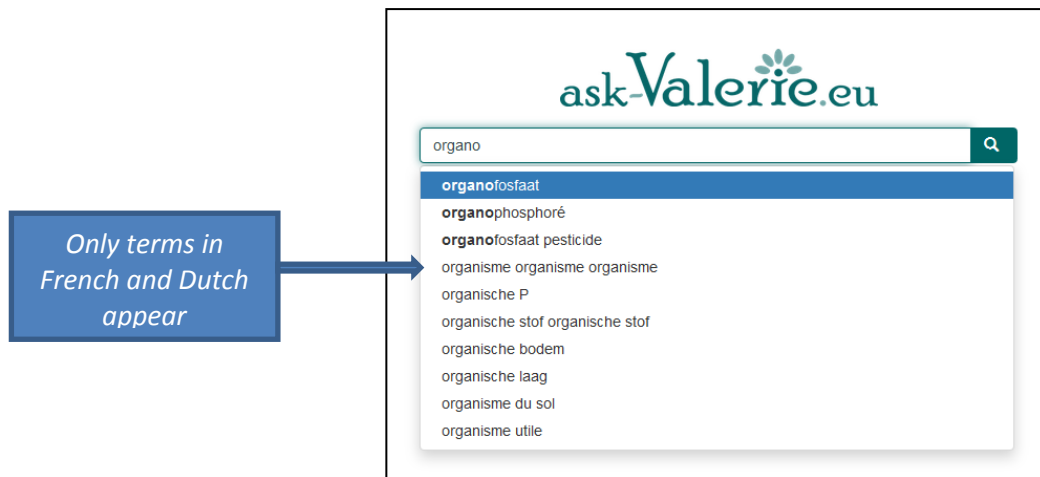


Figure 4.6: The auto-completion function of the system responds to the selected languages.

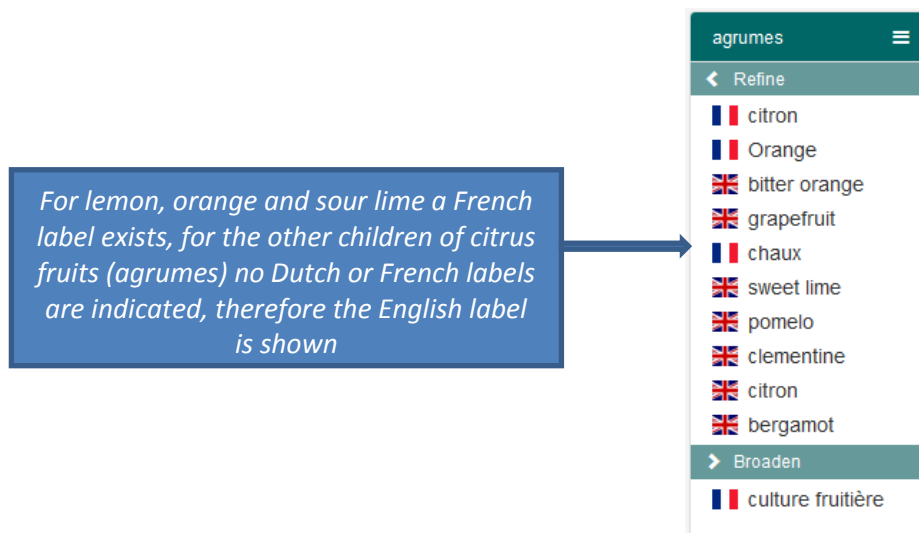


Figure 4.7: The term editor has a default setting for when concepts in the ontology exist, but no translation for the selected languages is present. In that case, the English label is shown.

5 Implementing *ask-Valerie.eu* as a web-application (WP5)

5.1 Stepwise development of *ask-Valerie.eu* front end

The development of *ask-Valerie.eu* progressed from the first version of the front end through several iterations to the latest version defined as Deliverable D544. The front end has been integrated with the back-end services created in WP4, which also evolved iteratively throughout the process. The system has been successfully presented and tested in several feedback and dissemination events. Even though the features of *ask-Valerie.eu* increased, the user interface was kept as simple as possible (Fig. 5.1). During feedback workshops, users have expressed their appreciation for this simple appearance. The current tool gives users easy access to an extensive knowledge base.

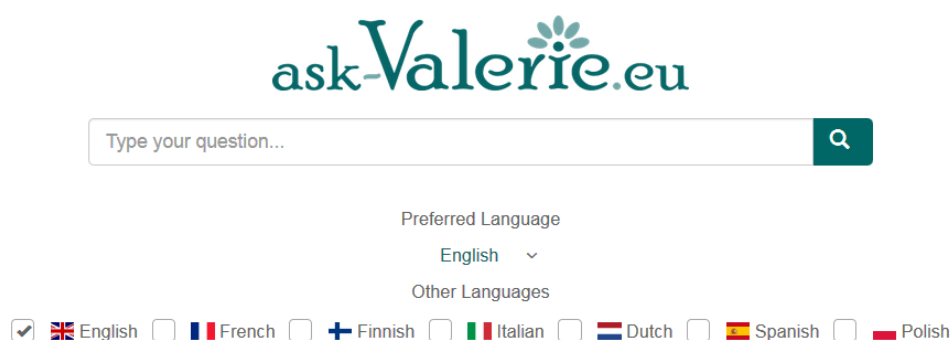


Figure 5.1: The start screen of ask-Valerie.eu. It presents the search to launch the query. Below the search field, users can indicate their preferred language, and the other languages they understand. The preferred language is used to show the related concepts in the query editor.

Over the consecutive reporting periods, the *ask-Valerie.eu* platform has gradually evolved from an initial Version 1 where only single terms could be searched, with language support only covering English and only limited interactions in terms of switching to suggested terms or terms that occur in the results. By the project's closing, the front-end was connected to Version 5 of the back-end services. Across the various stages, domain experts, case study partners and case study stakeholders have been involved to give their feedback on the features as presented by *ask-Valerie.eu*.

The final version allows the user to configure both the language of the user interface and the language for performing the search in the knowledge base (preferred language and other languages). The language support enables to cross languages, i.e. allowing a user to search in French and obtain relevant results across different languages, e.g. also in Spanish. In addition to expanding the scope of language support, the user now can ask questions in 'natural language' sentences and the system identifies relevant terms (that occur in the ontology) within the questions, to provide results from the document base.

5.2 Term editor or query editor

ask-Valerie.eu proposes an extended term editor (also named 'query editor') that empowers users to refine their query using terms and relations from the ontology. Terms can be broadened (wheat to cereal) or narrowed (cereal to wheat), or related terms can be included in the query, or specific solutions (innovations) to a given challenge can be sought. Through its successive stages, the query editor has become a versatile instrument that suggests new terms to refine the user's query, by using the structured knowledge hidden in the ontology. Examples are given in Figs. 5.2 and 5.3. These figures also illustrate another recent improvement to the presentation of results: the front end latest version now displays the logos of the document sources with each search result. This allows the user to quickly see which sources (libraries) contributed to *ask-Valerie.eu*, from which source a specific search result stems, and it enables visiting the home page of the document repository by a simple

click. The auto-completion functionality has also been extended over time, and now also operates on words that occur beyond the first part of a term. See also details under WP4.

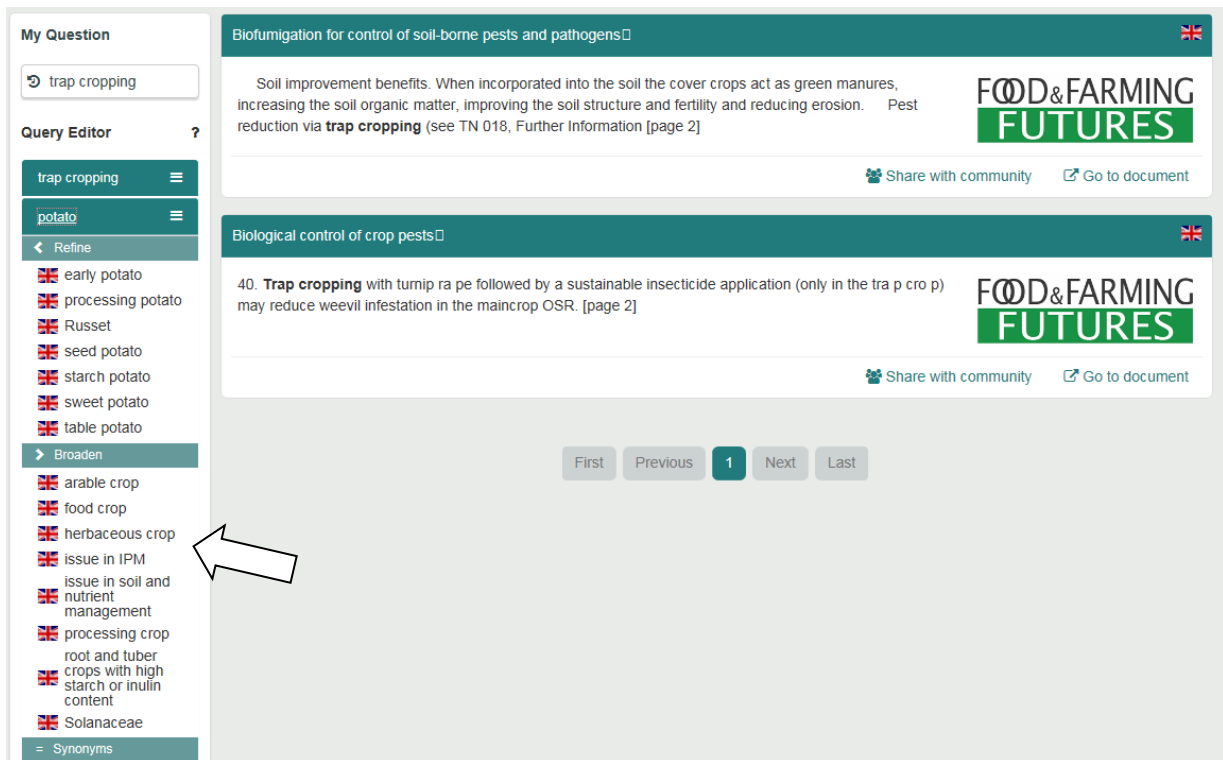


Figure 5.2 Screen shot showing (see arrow insert) a function offered by the query editor: by broadening or narrowing the search term(s), the query can be optimised to match the user's intention.

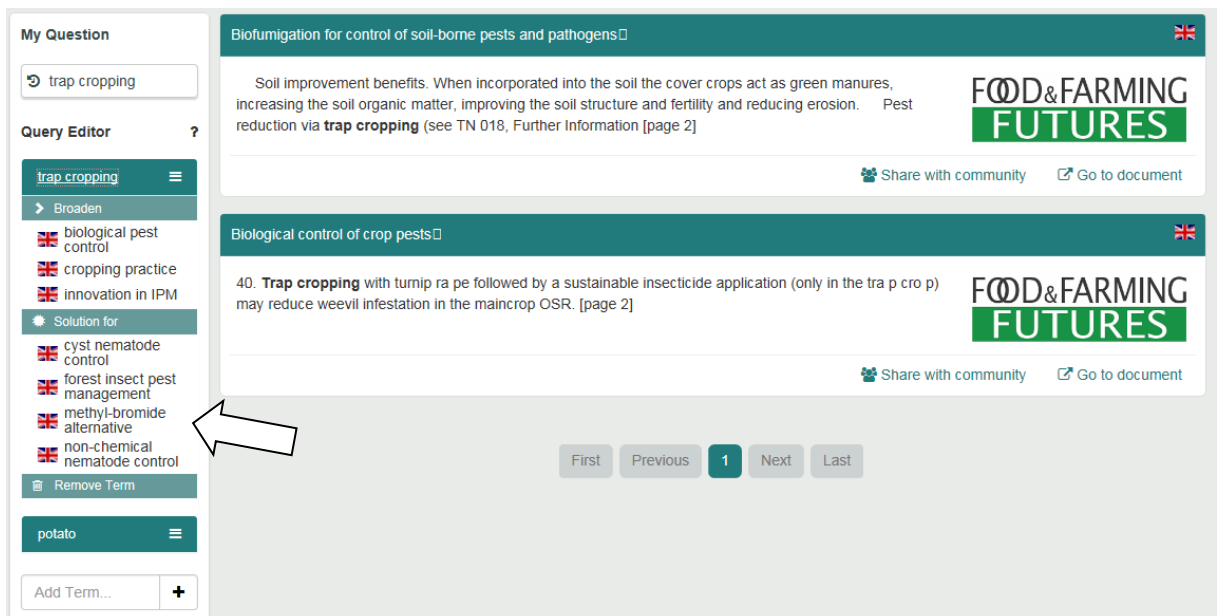


Figure 5.3 Screen shot showing (see arrow insert) another function offered by the query editor: it presents the search term as a solution to specific problems, based on problem-solution pairs established in the ontology.

5.3 Integrating *ask-Valerie.eu* in the EIP-AGRI platform

The embedding of *ask-Valerie.eu* into the EIP-AGRI platform was prepared in regular meetings of the VALERIE TC (Technical Committee) with the EIP-AGRI team including Mr Cossu (DG AGRI), Mrs Brinkman and others, and Mr Saggiocco (consultant, Engineering's Software Laboratory, Rome). Various integration options proposed by the VALERIE TC were jointly studied, from which the one that offers a 'search also on *ask-Valerie.eu*' facility alongside the hosting page's search box was finally chosen as preferred. To implement this option, a widget was created that transfers the original search terms entered in the EIP-AGRI search box to *ask-Valerie.eu*, and thus enables use of *ask-Valerie.eu* full functionality. See <https://ec.europa.eu/eip/agriculture/en/search/site/>. The option involved stripping *ask-Valerie.eu* from its former login shell, allowing for smooth access from the host page without registration. This adaptation of the VALERIE software as developed prior to 2017 required a level of restructuring.

The widget can be configured concerning the language setting of the search process (both UI and content) and enables an editor of a website to give the users access to *ask-Valerie.eu*. The code snippet below could be used to integrate the widget in form of an iframe within a website.

```
<iframe style="border: 1px dotted #666666;" src="http://ask-valerie.eu/#/search/preffered=en&other=en,it&ui=it_IT" width="470px" height="150px" frameborder="0"></iframe>
```

The *ask-Valerie.eu* tool can be found also at its own web address: www.ask-Valerie.eu. Hosting of the tool will be secured during 2018 by Wageningen Food and Biobased Research (WFBR).

5.4 Some more impressions of the *ask-Valerie.eu* user interface

The following screenshots illustrate the state of *ask-Valerie.eu* by the close of the VALERIE project in December 2017.

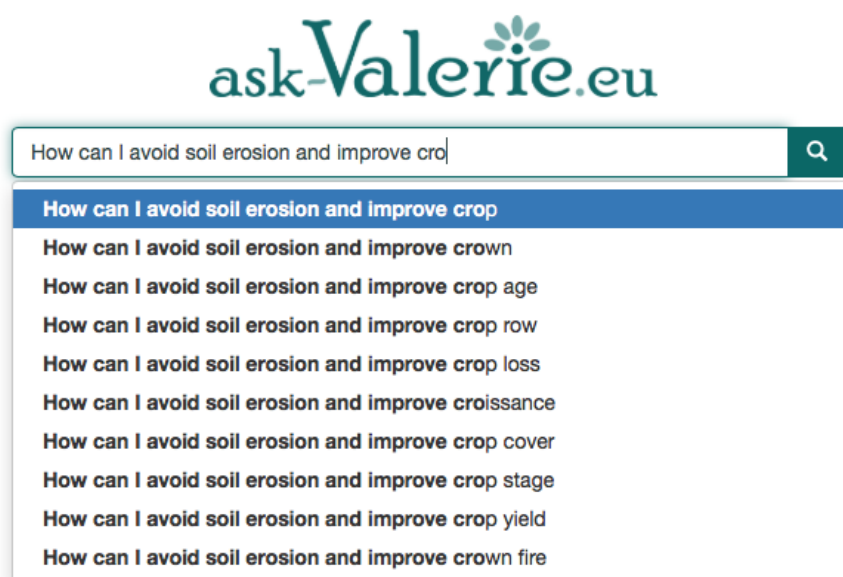


Figure 5.4. Example of autocomplete function with 'natural language' questions and multiple terms identified.

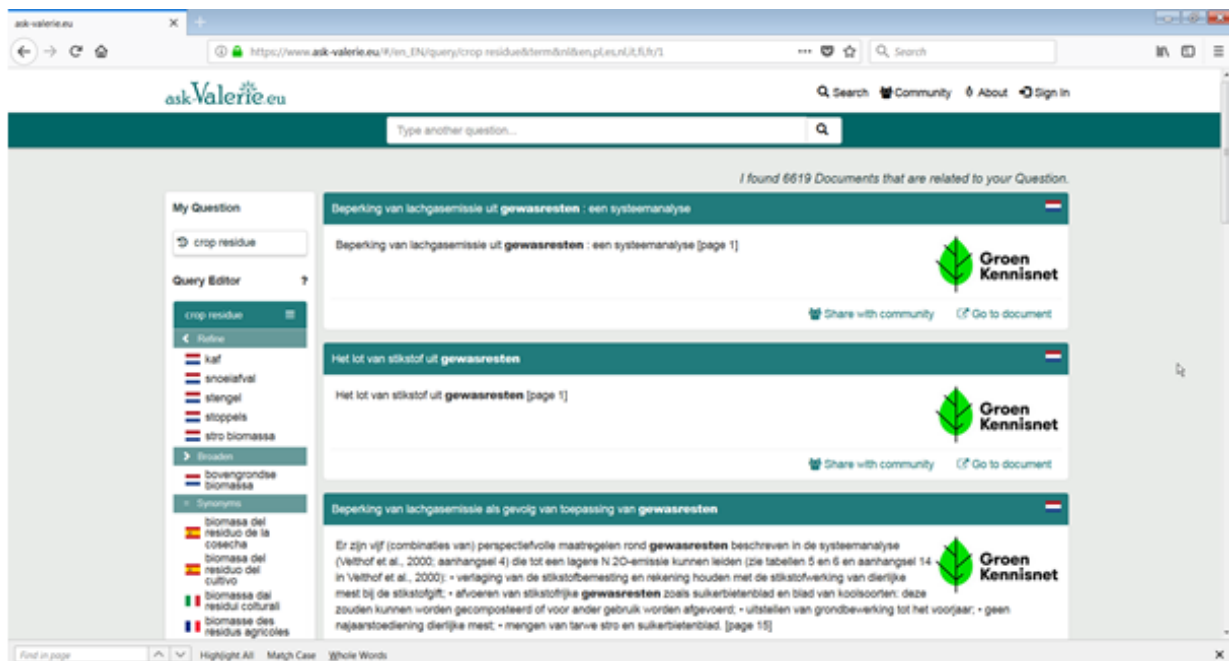


Figure 5.5: Result views, term editor with options to refine the search (also in different languages due to the multi-language ontology).

5.5 Introductory videos on ask-Valerie.eu

With the feature set becoming more stable, introductory videos have been created to give the users a quick introduction to the system and to collect feedback. These empowered both dissemination activities and case study meetings by providing a quick, self-explaining introduction to the system. They cover the following features of ask-Valerie.eu:

- Login
- Search auto-completion & results
- Term editor
- Bookmarking results
- Saving questions
- Languages (UI)
- Inter-language search
- Contribute documents & terms

Besides the work in the ten case studies, such video presentations and other feedback sessions were held nearing the completion of the project, events including:

- Valerie annual meeting, Toulouse, 23--26 Jan. 2017
- Agri-Tech East Workshop with SmartAKIS, 14 September 2017
- VALERIE symposium at COPA-COGECA, Brussels, 14 November 2017
- SCAR SWG AKIS 4, 6th meeting, Oct 2017, Lisbon
- AGRI-Innovation Summit, Oct 2017, Lisbon.
- Progetti multi-attore per la ricerca e l'innovazione in agricoltura: un'opportunità di dialogo, Milano, 11 December 2017, "
- Gorri Mifsud, E., Olza, L., Montero, E. & Marini Govigli, V. (2017). Retos de la gestión forestal conjunta de propietarios privados, at the Spanish Forestry Congress, 26th - 30th June 2017, Plasencia, Extremadura, Spain. Presentation (in Spanish).

5.6 Community features in ask-Valerie.eu

In addition to the knowledge base with the embedded interaction features, an evaluation of community platforms has been performed identifying a suitable candidate to expand the interactive features around a more people-oriented approach. The VALERIE platform has been set up as a community prototype and was successfully tested and positively evaluated among project partners for technical performance. The platform has not, however, been extensively used or established with stakeholders or other external staff.

Based on partner feedback, modules were added that promote sharing of documents, allow the sharing of thoughts and comments around specific topics, enable the adding of documents to the VALERIE document base, add terms to the ontology, and that help people find advisers or other practitioners with innovation needs similar to their own.

The current implementation allows for user profiles, connecting to other social media (Facebook, Twitter, LinkedIn, Share on Google), sharing documents, as planned in the original project plan.

The screenshot displays the 'community.ask-Valerie.eu' interface. At the top, there is a navigation bar with 'DASHBOARD', 'MESSAGES', and 'DIRECTORY' options. A user profile for 'Peter M. Schuler' (business transformation manager) is visible in the top right. The main content area features a 'Space menu' on the left with options like 'Stream', 'Wiki', 'Polls', 'Linklist', and 'community session'. The central feed shows two posts by Peter M. Schuler, both marked as 'STICKED'. The first post asks 'What would you like to do with the document that you have found?' and has 14 comments, including one from Jim Egan and one from Jane Mills. The second post asks 'What kind of interaction would you like to have with other users?' and has 13 comments. On the right side, there are three widgets: 'Latest activities' showing likes and comments, 'Space members' displaying a grid of user avatars, and 'Link list' providing links to 'ask-Valerie.eu Library' and 'Valerie@Twitter'.

Figure 5.6: Screenshot of ask-Valerie.eu Community prototype with examples for social interaction

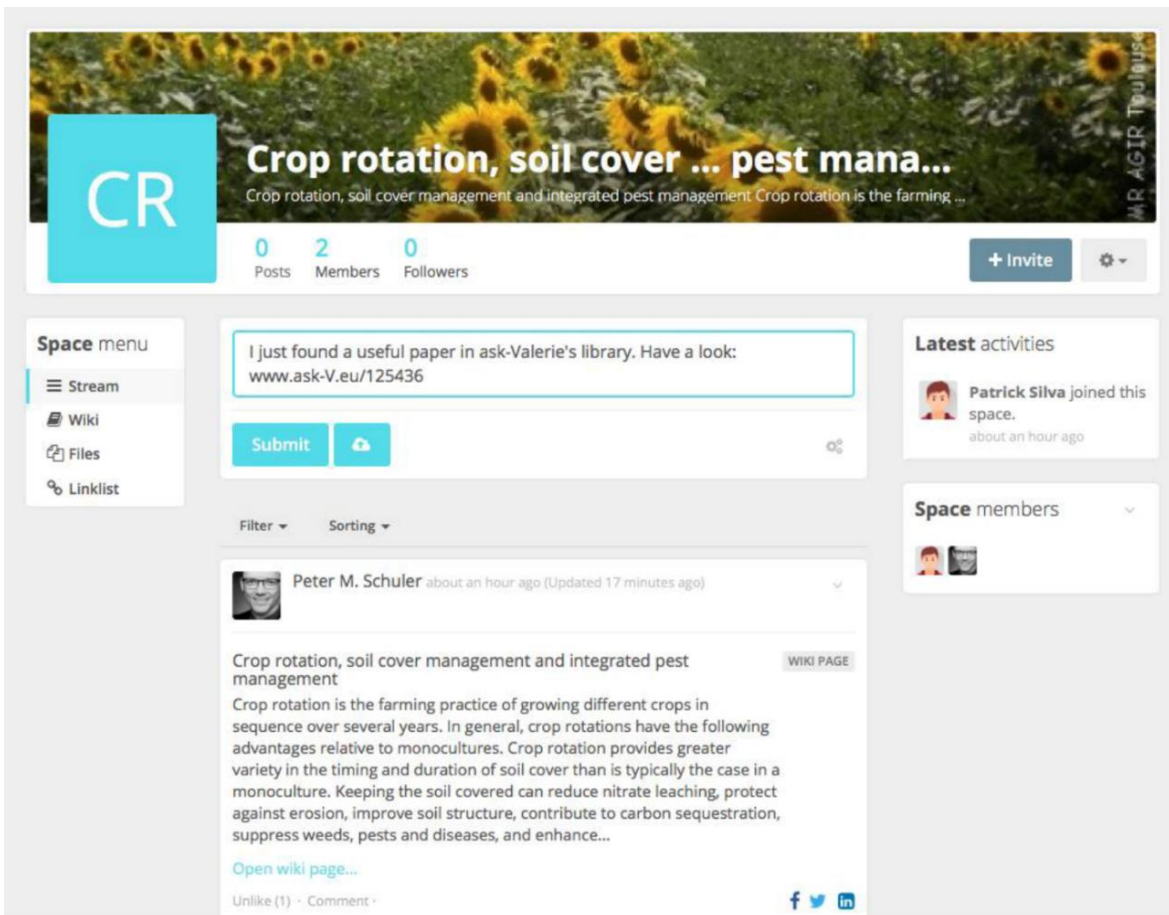


Figure 5.7: Screenshot of ask-Valerie.eu Community prototype with examples for social interaction

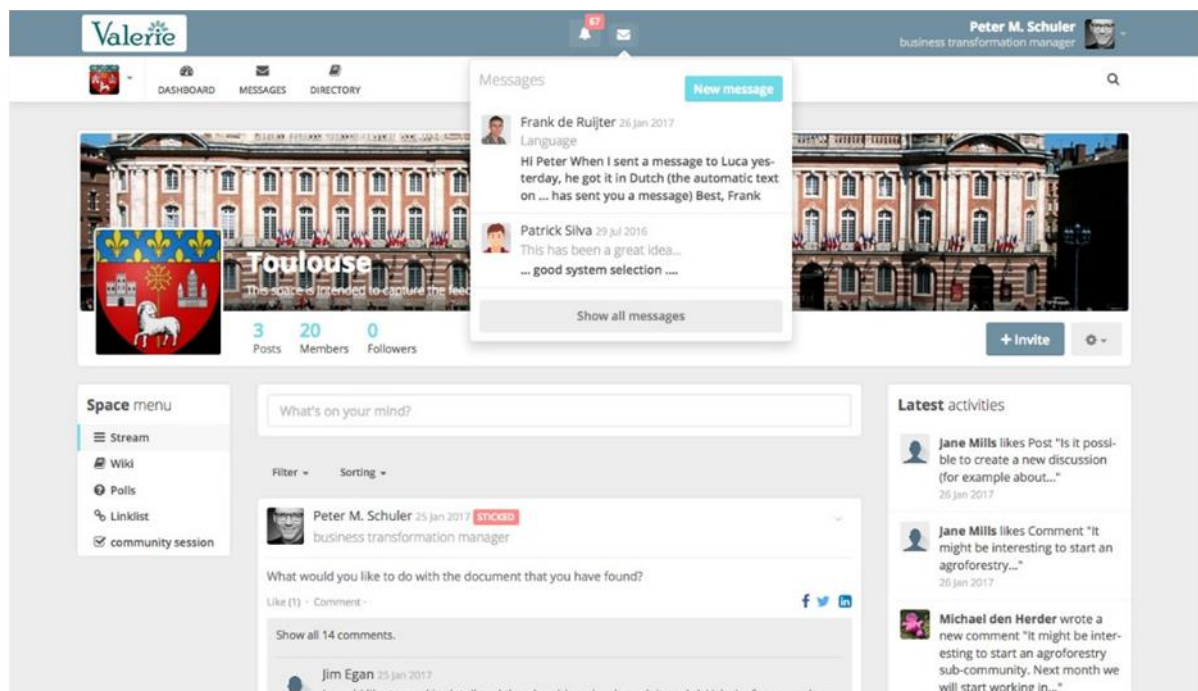


Figure 5.8: Screenshot of ask-Valerie.eu Community prototype with examples for social interaction

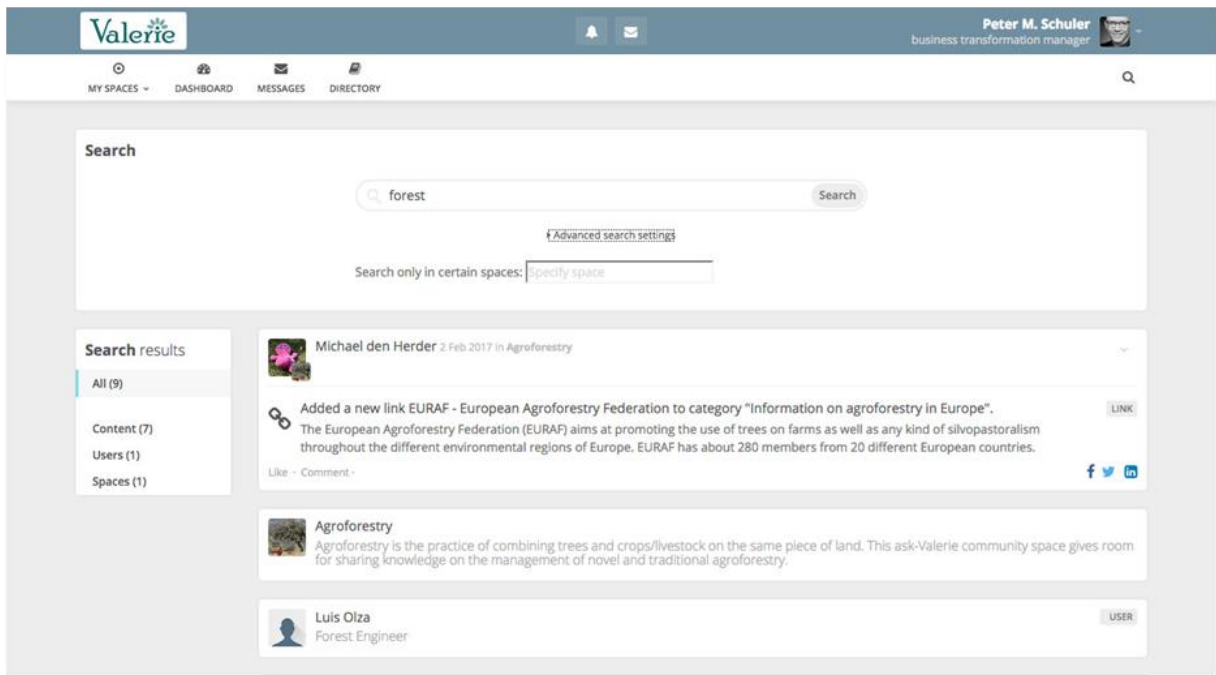


Figure 5.9: Screenshot of ask-Valerie.eu Community prototype with examples for social interaction

6 Dissemination and exploitation (WP6)

6.1 Overview

Following its dissemination and exploitation plan (D611), VALERIE has provided relevant and timely information to interested parties, with an established website and a structured set of activities.

The project's ambitions and intentions were disseminated through VALERIE Newsletters, flyers, case study leaflets and the website (www.valerie.eu); and throughout 2017 also through regular announcements via 'Twitter' social media. The VALERIE final symposium held at the COPA-COGECA offices in Brussels on 14th November 2017 provided the opportunity to present final project outcomes, and for farmer union, SCAR/SCAR Foresight Working Group on Forest Research and Innovation (FWGFRI), SCAR SWG-AKIS (Agricultural Knowledge and Innovation System), EU project and EIP-AGRI representatives to provide feedback on VALERIE progress and achievements. It was also an opportunity to discuss in more general terms the issue of knowledge exchange and access to information for innovation in agriculture and forestry. The main messages were captured in a "Final Report on Feedback from Major Clients". Project outputs were presented, including the *ask-Valerie.eu* tool, and speakers were invited to present their experience on the subject of effective knowledge exchange for innovation in agriculture and forestry.

A full overview of dissemination activities and events to collect feedback on VALERIE progress can be found on the project webpage, specifically in the deliverables D611 (Detailed Dissemination Plan), D621 (VALERIE Web content Report), D623 (Conference Articles, Presentations and Workshops Report), D624 (Trade and Scientific Articles Report), D671 (Initial Report on Feedback from Major Clients), D691 (Mid-term Stakeholder Feedback Report), and D692 (Final Report on Feedback from Major Clients).

Each of the work packages published a series of deliverables 'for public' (PU) dissemination, all of which can be downloaded from the project webpage.

Selected aspects and events towards the end of the project period are highlighted below.

6.2 Stakeholder engagement

Dissemination and communication activities were carried out with stakeholders with an interest in agriculture and forestry across the six VALERIE themes through newsletters, workshops, conferences, case study activities and articles in the trade press. This activity was principally carried out within the six partner countries: Finland, France, the Netherlands, Spain, Italy and the United Kingdom), but also extended to Poland through case study meetings (as part of the 'sustainable potato supply chains' case study) and south western Europe through the AGRI-Innovation Summit in Portugal and other dissemination routes, including social media (Twitter: @Valerie_project).

Newsletters were sent to stakeholders in each partner country, who included:

- Information press: press/information officers; specialised websites; knowledge exchange (KE) hubs; and specialised e-letters
- Farmers' associations/unions/cooperatives
- Levy boards
- Non-governmental Organisations (NGOs) and charitable trusts
- Farm Advisory Services (private)
- Farm consultancy associations
- Trade associations
- Commercial companies: agricultural companies (e.g. agro-chemical, seed and machinery suppliers); breeders; large distributor companies; precision farming companies
- Education: universities and agricultural colleges
- Government authorities: departments dealing with agriculture, forestry and resource protection
- Research community: public and private sector
- National Societies

- Policy commentators

6.3 Interactions with EIP-AGRI representatives

The VALERIE team had frequent meetings with EIP-AGRI representatives with a view to discussing opportunities for integrating *ask-Valerie.eu* in the EIP-AGRI platform, and for sustaining *ask-Valerie.eu* after the project period. Interactions were focussed on the various technical options for integration. For more details, see Section 5 in this report.

6.4 *ask-Valerie.eu*

The *ask-Valerie.eu* tool was launched on the EIP-AGRI platform in early 2018 at <https://ec.europa.eu/eip/agriculture/en/search/site/>.

It can also be accessed at its own webpage (www.ask-Valerie.eu). More details are given in Sections 4 and 5 in this report.

6.5 VALERIE brochure translation and newsletters

The VALERIE brochure, translated into seven European languages, and VALERIE newsletters were posted on the project website and distributed to delegates at workshops and conferences including the AGRI-Innovation Summit in Lisbon, Portugal in November 2017. During the later project stage, VALERIE newsletters were developed and sent to stakeholders in all partner countries in winter 2016-17 and autumn 2017 (Fig. 6.1). The newsletters describe the challenges, aims, objectives of VALERIE, present the ten case studies, and focus on specific case studies and themes. In addition, practical newsletters explaining project progress were developed for dissemination among case study partners and translated into Spanish, French, Dutch, Polish, Finnish and Italian.

6.6 VALERIE website and social media

The VALERIE website (Figure 6.2) describes the aims and objectives of the project and presents the six themes and project partners ('About Valerie' and 'About Us'); and provides descriptions of the ten case studies in terms of the themes covered, locations, main land uses, stakeholders, key issues and contacts ('Case Studies'). VALERIE 'News' is updated regularly and 'links' are provided to other relevant projects and websites. The VALERIE brochure, newsletters, research papers, trade press articles, *ask-Valerie.eu* tool flyers and case study leaflets, and all public deliverables are made available in the 'downloads' section.

Announcements of project progress and events were posted on social media (twitter: @Valerie_project) along with developments in agriculture and forestry relevant to knowledge exchange and the six VALERIE themes.

6.7 Case Study Trial leaflets

The ten case studies in VALERIE all produced outcomes of direct relevance to practitioners. These were disseminated in the form of 'Case Study Trial leaflets' detailing the co-innovation trials carried out in the field with stakeholders. A full list of Case Study Trial leaflets are listed in Section 3.6 of this report.



Figure 6.1. VALERIE Newsletter produced in November 2017.



Figure 6.2. The VALERIE website has sections tailored to farmers, foresters, researchers and advisers.

6.8 VALERIE Symposium 2017

On the 14th November 2017 a final symposium was held with different groups of stakeholders and clients at the COPA-COGECA offices in Brussels to present the aims, objectives and methodology of the VALERIE project and invite feedback on project achievements and how to ultimately integrate outputs and results into national Agricultural Knowledge and Innovation Systems (AKIS) and EU information/dissemination tools (Fig. 6.3). The symposium was targeted at:

- Representatives of the Standing Committee on Agricultural Research (SCAR) and the SCAR FWGFRI; and leaders of major EU projects on AKIS
- Representatives of national and regional farmer unions, AKIS Working Groups and the European Innovation Partnership (EIP)

There were opportunities for discussion and feedback throughout the symposium and in a final afternoon session delegates discussed two questions in separate working groups, one focusing on the content of the knowledge and information platform and a second focusing on processes to ensure future support:

- **Content (how to ensure end users get the best content):**
What is the most suitable format for ‘translating’ research outcomes into practical outputs? Do the issue-solution pairs used in *ask-Valerie*, VALERIE factsheets and org-prints provide a good structure?
- **Process (how to ensure sustainability of such a platform):**
What needs to be done to make a knowledge platform such as *ask-Valerie.eu* work in the long run? What strategies can be used and what resources are needed to develop a community of users, e.g. how could users contribute towards maintaining such system?

The outcomes from the workshop were captured in a “Final report on Feedback from Major Clients” (D6.692). Some of the discussion points are summarised below.

The opinion provided at the final symposium built on previous feedback gathered at the VALERIE initial (2014) and mid-term (2016) stakeholder meetings, which included the importance of multi-linguality; separating scientific information from guidelines for practice (factsheets, manuals); connecting to existing repositories of documents for practice; linking to what’s going on in the regions; connecting Rural Development Programme (RDP) national pages to *ask-Valerie.eu*; and cross-border interaction among advisers:

- Search results need to be concise and prioritise simple, practical information (e.g. factsheets), less focus on scientific literature
- Simple information should be ranked highest. Would it be possible to rank scientific or practical documents highest depending on user preference (selected in user profile)?
- The welcome page should be in the local language and users should be able to select the languages with which they wish to work (i.e. the documents that are recovered by *ask-Valerie.eu*)
- It was suggested that *ask-Valerie.eu* should be linked to other decision support tools as well as connected to existing networks and co-operatives
- The use of *ask-Valerie.eu* will depend on the user’s confidence and ability with technology, but farmers & advisors will use it if *ask-Valerie.eu* is seen as trustworthy and provides useful, accurate information
- Agricultural colleges were identified as a key area to promote *ask-Valerie.eu* since students are at ease with technology and more likely to engage with and use *ask-Valerie.eu*

It has been possible to incorporate the majority of these suggestions within the timescale of the VALERIE project, including the highlighting of text fragments to provide concise information on document content; providing source information associated with each text fragment so that users can prioritise scientific or simple, practical information; multi-lingual selection functionality; the ability to connect to existing networks and co-operatives using a widget or dynamic link; the selection of



Figure 6.3. The VALERIE final symposium with major clients and stakeholders was held in Brussels on the 14th November 2017.

documents by experts in agriculture and forestry to increase users' confidence in the content; and the ability of the tool to recognise colloquial and simple terms.

6.9 VALERIE at the AGRI-Innovation Summit, Lisbon, November 2017

Julie Ingram and Paul Newell Price represented the VALERIE project at the AGRI-Innovation summit at the Lagoas Park Hotel in Porto Salvo, near Lisbon on 11th and 12th October 2017. Over 500 delegates shared experiences and visions of innovation in European agriculture through twenty parallel interactive sessions covering five themes and additional Wrap-Up and Conclusion plenary sessions.

The five themes were:

- Resource Use (Adaptation and Mitigation)
- Management of farming, food and forestry systems & valorisation of the territory
- Agriculture 4.0 and rural development
- Digitizing rural economies
- Innovation –shaping the future

In each parallel session, representatives from Operational Groups (OGs), FP7 and Horizon 2020 (H2020) projects presented their own materials. This was followed by small group discussions to identify and describe the most innovative approaches from all the posters and summarise their key principles for reporting back at the end of the session. The interactive nature of these sessions was appreciated by the delegates, provided an opportunity to learn more about a wide variety of OGs and H2020 projects and resulted in some useful outputs. There were clearly many opportunities for the *ask-Valerie.eu* tool to support future innovation by improving access to knowledge.

7 7WP1- Management

7.1 Specific objectives of WP1

The WP1 goals of project management were:

- ensure the smooth implementation of the project as a whole and timely execution of tasks;
- implement decision making as agreed in the Work Plan and in the Consortium Agreement;
- facilitate the information flows and collaboration within the project;
- facilitate scientific integration within the project;
- address gender equity issues when needed;
- implement the planned strategy for the dissemination of the projects achievements and for the management of knowledge, including IPR issues

7.2 Summary of progress towards WP1 objectives

There were no major deviations from planned activities.

The **General Assembly** (partner representatives) convened on:

- January 16-17 (2014) - kick-off meeting in Wageningen,
- January 26-28 (2015), at Loddington, UK (local organisers UGLO, ADAS, GWCT).
- January 25-28 (2016) in Turin, hosted by the University of Torino.
- January 23-26 (2017) in Toulouse, hosted by the INRA;
- November 15 (2017) in Brussels following the VALERIE Symposium reporting to 'Major Client' representatives (that was held on November 14th).

The WP leaders, complemented with members of the Technical Committee, formed the **Executive Board (EB)**. The EB played a vital role in making the iterative cycle between WP2, WP3 and WP4 work, and has smoothly operated throughout the project. Frequent unscheduled interactions between WP leaders occurred and have been essential to maintain progress, given the strong interdependencies among the respective WPs. This holds in particular for the links between WP4 and WP5 for the technical implementation of ask-Valerie.eu. The EB has convened on:

- January 16 (2014), in Wageningen
- June 13 (2014), Amsterdam
- January 27 (2015), Loddington (UK)
- June 10 (2015), Helsinki
- January 25 (2016), Turin
- June 22 (2016) by Skype
- January 23-24 (2017), Toulouse
- January 23, 2017 (Toulouse)
- October 18 (2017) by Skype

The **Advisory Panel** has representatives from the worlds of farming (Copa-Cogeca), publishing (Elsevier), and innovation science (LEI-DLO; now WecR). An additional member affiliated with a university in Germany had not been able to attend AP meetings due to work load, and resigned during the course of the project.

The **project website** has been drafted by DLO (WR) and was handed over to ADAS. From there it has been redrafted, polished and expanded, and has since been maintained and updated as collective effort by ADAS and DLO (WR). The site has been hacked in December 2016, was offline and was subsequently cleaned to be re-opened January 13, 2017, now with extra security measures which so far have functioned well.

Three members of the EB (leaders of WP1, WP3 and WP6) have been regular participants at meetings of the **SCAR SWG-AKIS3-4**, the working group under SCAR on innovation. From the

interactions with the SCAR SWG-AKIS, ideas have sprouted for new initiatives to apply the VALERIE outcomes, notably the tool ask-Valerie.eu, in a wider context. Also, the working group assigned a study on e-science to one of the project partners (Jan Top at DLOWR), which was delivered September 2015; it was published as a chapter in the foresight report by SWG-AKIS3 (EU 27692 EN).

A separate body, the **Technical Committee (TC)**, guided the functional and technical design of all software components, including the embedding of the VALERIE tools in the EIP-AGRI platform. Several meetings of the TC with EIP-AGRI staff were held and options for the integration of ask-Valerie.eu in the EIP-AGRI platform were proposed and discussed throughout the entire project duration.

Apart from changes in the names of several partners, the composition of the **consortium changed** formally on 5 Dec 2016 (Period 2), when ADAS UK Ltd left the consortium and was replaced by the new legal entity RSK ADAS Ltd. This was associated with a partial transfer of rights and obligations from ADAS UK to RSK ADAS.

Cost statements on Period 1 were submitted on Sept 1st 2015, by all but one partner; the latter omission was due to late assignment of roles by the partner, and corresponding validation request. The cost statement over Period 2 (all partners) was submitted with delay in Period 3, on May 1st, 2017. Due to changes in legal data with some of partners, to be validated in the ECAS system, approval was delayed until November 2017, soon after submission of the amendment letter. Cost statements over Period 3 were presubmitted by all partners during January-February 2018, and submitted to EC on March 8th, 2018. Three partners whose P2 claim was declined because of changes in their name or legal status have filed adjustments to P2 in April 2018, as instigated by the EC financial officer.

With respect to the financial arrangements within the project (**partitioning of the budget**), there were changes relative to the DoW, to accommodate for larger or smaller work effort required to complete the tasks assumed. A total of 127,286 (EC contribution) was re-allocated, with full commitment of all partners. This is exclusive of the re-allocation of a **fund reserved** for studies to be assigned by the SCAR SWG **AKIS4**. The PO and the Chair of this SWG agreed to release their remaining budget in the fund, thus enabling the finalisation of ask-Valerie.eu as a more complete and powerful tool. This support by the SWG has been much appreciated by the consortium. In return, lessons learned are (still) to be documented by the VALERIE team.

7.3 Work progress and achievements

7.3.1 Project partnership

VALERIE consisted of 14 contractual partners. The partners were and are bound by the Grant Agreement that details their rights and obligations towards the Commission; and by a Consortium Agreement that details the rights and obligations between the contractual partners..

Table 7.1. Changes in beneficiaries' names, ECAS-validated.

#	Previous name	New name
1	DLO	Stichting Wageningen Research (WR)
8	ADAS UK Ltd	RSK ADAS Ltd.
9a	CETIOM	Terres Inovia (it remains 3 rd party under ACTA)
10	DLV	Delphy B.V.
13	Metsätalouden Kehittämiskeskus TAPIO	Tapio Oy

Apart from changes in the names of several partners (Table 7.1), the composition of the consortium changed formally on 5 Dec 2016, when ADAS UK Ltd left the consortium and was replaced by the new legal entity RSK ADAS Ltd. This was associated with a partial transfer of rights and obligations from ADAS UK to RSK ADAS. The preparation of this amendment was a major cause of delay during Period 3 in the processing of the Period 2 cost statement.

7.3.2 Project management structure

The project management structure remained in all reporting Periods and entails the following roles:

- Project Coordinator (PC): Hein ten Berge (DLO/WR).
- Project Management Team: Hein ten Berge, Nicole Koenderink, Frits van Evert (all DLO/WR).
- Executive Board: Project coordinator and all work package leaders.
- Work package leaders: see Executive Board.
- General Assembly: One representative person per partner
- Technical Committee responsible for the implementation of ask-Valerie.eu in EIP-AGRI Service Point platform
- Advisory Panel

Tasks and responsibilities of these bodies are described below.

7.3.3 Project Coordinator (assisted by the Project Management Team)

The Project Coordinator and Project Management Team are responsible for the financial and administrative management of the VALERIE project. The Project Management Team is located at DLO/WR. Key tasks are to:

- liaise between the European Commission and the Consortium;
- prepare and deliver the project reports; ensure the timely delivery of all required reports, deliverables, and financial statements to the European Commission;
- deliver the Consortium Agreement;
- set up a working protocol for the partners of the project to ensure smooth communication throughout the duration of the project;
- set up a web-based tool to facilitate communication within the project on working tasks and exchange of data and documents
- implement finance sheets to facilitate the financial reporting and monitoring of the project;
- transfer the EC payments to the participants according to the agreed budget;
- organise the periodic general project meetings with help of the local partners;
- prepare the agendas and meetings of the General Assembly and ensure that decisions are properly implemented;
- survey gender issues and promote gender equality in the project;
- develop with two direct clients at the EC a joint work plan – including communication plan and time table – to ensure proper tuning of the project's outputs to these clients' needs:
 - (a) with the EIP-AGRI Service Point (EIP-SP); to implement *ask-Valerie.eu* (earlier referred to as 'Communication Facility') in the EIP Service Point platform;
 - (b) with SCAR/SCFR; to involve AKIS representatives of all EU MS and assess requirements for delivery of research priorities.

All of the above tasks were executed as planned.

7.3.4 Executive Board (EB)

The Executive Board is to ensure the scientific integration of the project and to facilitate the collaboration between the work packages. It consists of the Leaders of the work packages and is chaired by the Coordinator. It prepares strategic decisions to be taken by the General Assembly, pays due attention to gender issues within the project, and reviews the financial development of the project on a half-year basis. The EB is to meet at least twice per year, and has supplementary video-meetings whenever needed. Decisions are made by majority, the PC having a casting vote.

EB members (throughout all reporting periods):

- WP1: Hein ten Berge (DLO/WR)
- WP2: Luca Bechini (UMIL)
- WP3: Julie Ingram (UGLO)
- WP4: Nicole Koenderink (DLO/WR)

- WP5: Peter Schuler (ITO)
- WP6: Paul Newell Price (ADAS)
- EB members representing the TC: Jan Top and Frits van Evert (DLO/WR) (besides WP4 and WP5 leaders who are also TC members)

The EB convened on:

- January 16 (2014), in Wageningen
- June 13 (2014), Amsterdam
- January 27 (2015), Loddington (UK)
- June 10 (2015), Helsinki
- January 25 (2016), Turin
- June 22 (2016) by Skype
- January 23-24 (2017), Toulouse
- January 23, 2017 (Toulouse)
- October 18 (2017) by Skype

7.3.5 Work Package Leaders

The work planned in every WP is monitored by a WP Leader (WPL), who reports to the PC and the EB. The main role of the WPL is to ensure that the planned activities are duly and timely carried out and that interactions between WPs take place. The WPLs assist the PC in preparing periodic and final reports to the EC. The WP Leaders implement decisions by the EB into daily management tasks, convene meetings of staff working in WP whenever necessary, and report results and potential critical issues to the PC and EB.

Throughout all three Reporting Periods, all WP leaders have implemented these tasks effectively and with full vigour.

7.3.6 General Assembly

The General Assembly is the final decision making body of the consortium, where decisions are made regarding strategy, progress, major project revisions, finance, collaboration with other projects, and political issues. It consists of one representative per partner. It is responsible for the strategic orientation of the project and decides on legal and financial issues of the project, as detailed in the Consortium Agreement.

Tasks of the General Assembly are to:

- supervise the project and agree on the working programme, etc.;
- decide on all significant changes to work plans, work package structure and use of finances;
- decide on the incorporation of new partners;
- decide on measures towards defaulting partners.

The General Assembly is chaired by the Project Coordinator and has one regular physical meeting per year. If needed, telephone or video conferences are organised in between regular meetings. Decisions are taken by the majority of the representatives; each representative has one vote, with the Coordinator having a casting vote. The PC is responsible for the agenda and minutes of the meetings.

The GA convened:

- January 16-17 (2014) - kick-off meeting in Wageningen,
- January 26-28 (2015), at Loddington, UK (local organisers UGLO, ADAS, GWCT).
- January 25-28 (2016) in Turin, hosted by the University of Torino.
- January 23-26 (2017) in Toulouse, hosted by the INRA;
- November 15 (2017) in Brussels following the VALERIE Symposium reporting to 'Major Client' representatives (that was held on November 14th).

7.3.7 Advisory Panel

An Advisory Panel (AP) advises on scientific as well as implementation issues related to the project. The AP meets annually, coinciding with the annual meeting of the General Assembly (see meeting dates GA).

The objective of the AP is to advise the project with respect to:

- exposure of the project and the Communication Facility to distinct types of user groups in the supply chain (farmers, extension, processing, retail) and to the wider user community in Europe
- interactions with the EIP-SP and its Operational Groups, Focus Groups and Thematic Networks
- scientific management of the project and its Work Packages;
- integration of advances (conceptual, technical) in science publishing into the project

AP members:

- from Elsevier: Gilles Jonker (January 2014-January 2015); Alexandra de Lange (Feb. 2015 - April 2017); Matteo Ripamonti (May 2017-December 2018)
- Krijn Poppe (LEI-DLO; Jan. 2014 and onward),
- Valentin Opferman (Copa-Cogeca, Jan. 2017 onward; in early stage: Mrs Antonia Andugar)
- Henning Kage (Univ Kiel; Jan. 2014 - Dec 2016) resigned due to high workload annually coinciding with timing of annual meetings (Jan/Feb).

Highly effective interaction existed with Elsevier staff, on accessing a selection of their subscription journals, on accessing public repositories, and on the potential use in ask-Valerie.eu of Elsevier software for community management (Mendeley). The latter option (Mendeley for social interaction) was, however, not pursued in the end.

7.3.8 Technical Committee (linking with EIP-AGRI Service Point)

A separate body, the Technical Committee (TC), consisted of the leaders of WP4 (back-end specifications) and WP5 (front end specifications), and staff of EIP-AGRI Service Point. It is to guide the functional and technical design of all software components, including the embedding of the VALERIE tools in the EIP-AGRI platform.

TC members (from the VALERIE team):

- Jan Top (chair)
- Nicole Koenderink (WP4)
- Peter Schuler (WP5)
- Frits van Evert (WP2, WP4)
- Hein ten Berge (WP1)

Interactions with counterparts at EIP-AGRI Service Point were predominantly with Willemine Brinkman (principal contact), and Fabio Cossu (DG AGRI); and Meisoona Nasralla (EIP webmaster). The and with Service Point consultant Mr Marco Sagliocco, Drupal Architect at Engineering Ingegneria Informatica s.p.a., Rome. Implementation options for ask-Valerie.eu were reviewed mainly with Mr Cossu and Mr Sagliocco, and were decided by this team. The tool has now been implemented at <https://ec.europa.eu/eip/agriculture/en/search/site/> (For access to ask-Valerie.eu, first click the general 'search' symbol on this EIP-AGRI homepage.)

In preparation of this implementation, Jan Top (TC) and Mr Sagliocco discussed (February 2017) four options for integrating ask-Valerie.eu (AV) functionality into the EIP-AGRI website (EW). All are based on the premise of utilising - as much as useful and feasible - the integral ask-Valerie.eu tool (rather than providing components for deeper integration). The options under discussion were :

1. Add the main "natural language" search box inside the EIP website that will redirect to the Valerie website.

2. Add a "also search on Valerie" link on top of the EIP main search result page that will redirect to the Valerie site with the same keywords.
3. Add a Valerie search page on EIP website through a Web Service integration (this could mean to recreate the entire Valerie interface).
4. Add a Valerie box with automated "related content" based on the page metadata/description.

From this list, Option 2 has been implemented. This required the removal of the necessity to login at ask-Valerie.eu, even though the login option has been retained as voluntary (for the community functionality) the possibility to use additional functions of ask-Valerie.eu.

DG AGRI staff clarified that no resources exist nor can be mobilised at EIP-AGRI or DG AGRI in wider sense, to sustain the use of ask-Valerie.eu in the EIP platform. This condition has been communicated by PL Hein ten Berge to Project Officer Mr H.-J. Lutzeyer. The continued availability of ask-Valerie.eu will depend on resources that can be mobilised by (successors to) the VALERIE project/consortium itself.

7.3.9 Project website and Knowledge management activities

Partner ADAS (lead WP6) coordinated the activities related to dissemination to the outside world of knowledge generated and assembled by the project. This included the preparation of internal (with help of partner INRA) and external newsletters, preparing project output for loading onto the public website, and other activities to stimulate dissemination of knowledge about the project and its results (e.g. through press releases, contributions to scientific meetings, and course activities).

Throughout all reporting periods, the project website has been maintained and updated jointly by ADAS with some support by DLO/WR. While the website had been hacked during the second reporting period and cleaned and re-opened January 13, 2017, the extra security measures then installed proved effective and no further hacks occurred during 2017.

7.3.10 Financial management

Cost statements on *Period 1* were submitted on Sept 1st 2015, by all but one partner; the latter omission was due to late assignment of roles by the partner, and corresponding validation request. The cost statement over *Period 2* (all partners) was submitted with delay on May 1st, 2017. After prolonged communication with the relevant partners, the amendment request letter could only be completed and sent to the EC legal officer on November 9th, 2017. The EC approval letter on the Period 2 cost statement was issued 21 November 2017, thus soon after the receipt by EC of the amendment letter. It excluded however approval of cost statements by (previous/new names) DLO/WR, DLV/Delphy, and TAPIO/TAPIO Oy, pending the EC validation of legal data entered. Cost statements over *Period 3* were presubmitted by all partners during January-February 2018, and submitted to EC on March 8th, 2018. The three partners whose P2 claim was declined because of changes in their name or legal status have filed adjustments to P2 in April 2018, as instigated by the EC financial officer.

With respect to the financial arrangements within the project, there were changes relative to the DoW. On various occasions during 2017, partners were requested to provide estimates on the projected exhaustion of their allocated budget by close of the project per 31/12/17. Based on these, a reallocation was proposed from partners who would not exhaust their budget to partners whose projected expenses exceeded their original budget (Table 7.2). The proposed reallocation was presented on November 15th to the general assembly, and approved per email by each of the partners in January 2018. A substantial fraction of this reallocated budget was assigned to the WP4 team (ask-Valerie back-end services) at WR (previously DLO). Whereas the formally agreed (DOW) WP4 deliverables could all be completed within the original budget, the entire consortium was of the opinion that ask-Valerie.eu should be delivered only after resolving several limitations. These included the size of the multi-language document base, the ranking of search results, the presentation of logos of original document owners, certain aspects of the ontology, and other aspects. (See the chapter on WP4 in this report.) For the same reason, the PO and the Chair of the SCAR SWG AKIS4 agreed to release their remaining budget (originally reserved under VALERIE for studies to be assigned by the SWG), thus enabling the finalisation of ask-Valerie.eu as a more complete and powerful tool. This

support by the SWG has been much appreciated by the consortium. In return, lessons learned are (still) to be documented by the VALERIE team.

7.4 Deviations from Annex I (DoW) and corrective actions

While no new tasks or deliverables were defined for the project, the preparation and launching of the ask-valerie.eu tool required a substantially larger effort, notably from the WP4 team and with contributions from WP2 thematic staff, than anticipated in the DOW. This was facilitated by the re-allocation of budget as explained above.

8 Selected VALERIE publications

8.1 Scientific Journals

- Willems, D.J.M., Koenderink, N.J.J.P. & Top, J.L. (2015). From science to practice: Bringing innovations to agronomy and forestry. *Journal of Agricultural Informatics* 6, 85-95, DOI: 10.17700/jai.2015.6.4.214. <http://dx.doi.org/10.17700/jai.2015.6.4.214>. [Download](#).
 - **Abstract:** The challenge of the work presented here is to make innovative research output in the agronomy and forestry domain accessible to end-users, so that it can be practically applied. We have developed an approach that consists of three key-elements: an ontology with domain knowledge, a set of documents that have been annotated and meta-annotated, and a system (*ask-Valerie*) that is based on a dialogue to represent the interaction between end user and system. We show that the dialogue-metaphor is a good way of modelling the interaction between user and system. The system helps the user in formulating his question and in answering it in a useful way. Meta-annotations of key-paragraphs in the document-base turn out to be relevant in assessing in one glance what the content of a document is. End-users are very enthusiastic about the possibilities that *ask-Valerie.eu* offers them in translating scientific results to their own situation.
- **EU Standing Committee on Agricultural Research (SCAR) report**
 - The VALERIE project and *ask-Valerie.eu* (VALERIE's search and stakeholder engagement tool) appear in the EU SCAR (Standing Committee on Agricultural Research) report on "Agricultural Knowledge and Innovation Systems Towards the Future: A Foresight Paper". In chapter 5, "The Role of E-Science in Agriculture: How E-Science Technology Assists Participation in Agricultural Research", the development of *ask-Valerie.eu* is presented as a key step in improving the flow of information between practitioners and researchers.
 - Follow the link: <https://ec.europa.eu/research/scar/index.cfm?pg=home>;
 - Chapter 5 - 'The Role of E-Science in Agriculture: How E-Science Technology Assists Participation in Agricultural Research':

Introduction: The objective of this chapter is to analyse how e-science can increase the participation of practitioners and researchers in agricultural research, and hence increase the mutual impact of such research. In this chapter, we discuss the need for participation, and define four types of participation that are possible in agricultural research. We sketch the form that these types of participation can take in agricultural research, and the relevance of e-science for these participations. For each type of participation, we select relevant cases that already exist in agricultural domains, and discuss the e-science technology involved. The focus is on participation, and as such we will not include e-science tools that do not directly facilitate participation, such as high performance computing, algorithms for precision agriculture, lab management systems, visualisation, etc. Based on what we have discovered, we will identify a number of issues and opportunities relating to the use of e-science in agriculture. Finally, we will conclude with the steps that can be taken to more fully realise the potential of e-science for encouraging participation in agricultural research. Most of the material in this study is based on an analysis of available information on the Web and from literature. We have also built on our experiences with e-science in projects such as the EU FP7 Valerie project and the Dutch COMMIT/eFoodLab project.

- Hily, Y., Bechini, L., Ingram, J., Koenderink, N.J.J.P., Schuler, P., ten Berge, H.F.M. & Justes, E. (2016). Valoriser les résultats de projets de recherche pour des praticiens agricoles innovants en facilitant l'accès à l'information: le projet européen VALERIE. *Agronomie Environnement & Sociétés*, 6(2), 131 - 140. The open access paper can be downloaded at: <http://www.agronomie.asso.fr/carrefour-inter-professionnel/evenements-de-lafa/revue-en-ligne/revue-aes-vol6-n2-decembre-2016-savoirs-agronomiques-pour-laction/revue-aes-vol6-n2-20/> or here: [Download \(in French\)](#).
 - **Abstract:** European research projects in agriculture and forestry produce excellent scientific papers. Most of them could contribute to the development of new innovations in Europe but their adoption is still limited. The European project VALERIE (Valorising European Research for Innovation in Agriculture and Forestry), wanted by the European Commission, aims at improving the transfer of EU research results in terms of concrete innovations for farmers and advisors in agriculture and forestry, facilitating their integration in management practices. The main output of the VALERIE project will be a smart web research assistant (*ask-Valerie.eu*) which will be able to mimic the interaction between experts and users for answering concrete questions. Indeed, this tool should be able to help the user to write and develop his re-quest and then to propose a list of relevant documents, using in particular results from EU projects, selected among an expert-selected document base. *ask-Valerie.eu* will be available online at the end of the project. At this stage, a beta version of *askValerie.eu* is available and included in a testing process by VALERIE's partners. The web browser is based on an ontology containing currently about 6200 concepts and the document data base already contains about 4300 documents. By developing the *askValerie.eu* tool, some key issues have been raised and are discussed, notably dealing with access to information, available documents format and matching between research products and needs of stakeholders.
- Bechini, L., Koenderink, N., ten Berge, H.F.M., Corre, W., van Evert, F.K., Facchi, A., Gharsallah, O., Gorriz-Mifsud, E., Grignani, C., den Herder, M., Hily, Y., Justes, E., Lepennetier, A., Moretti, B., Newell-Price, P., Nonini, L., Oberti, R., Ramonteu, S., Rois, M., de Ruijter, F., Sacco, D., Schuler, P.M., Willems, D., Zandstra, A. & Top, J. (2016). Improving Access to Research Outcomes for Innovation in Agriculture and Forestry: The VALERIE Project. *Italian Journal of Agronomy* 12, - ISSN 1125-4718 - 38 p. DOI: 10.4081/ija.2016.756. The open access paper can be downloaded at: <http://www.agronomy.it/index.php/agro/article/view/756>
 - **Abstract:** Many excellent results are obtained in agricultural and forestry research projects, but their practical adoption is often limited. The aim of the European project VALERIE is to increase the transfer and application of innovations produced by research in agriculture and forestry, by facilitating their integration into management practices. The project is still ongoing and the results illustrated in this paper are still temporary and subject to being improved. Here we present the methodology used in VALERIE to extract and summarise knowledge for innovation from research documents with the aim of making it available to final users through *ask-Valerie.eu*; we also report on current progress. The tasks associated with extracting and summarising knowledge are centred on: i) ontology; ii) a document base; and iii) a system (*ask-Valerie.eu*) that allows users to effectively search the document base. Ontology defines a set of concepts and the relations between them. The VALERIE ontology is built by experts in the agricultural and forestry domain and contains 6169 concepts (21st October 2016). The document base is the collection of documents in which the system searches. The VALERIE document base includes scientific and practical documents derived from various sources, written in any of a number of languages. All documents contained in the document base are annotated using the ontology: each term (a word or a short phrase) in the document that matches a concept in the VALERIE-ontology is linked to that concept. Annotation is

an automated process that takes place whenever a document is added to the document base. The document base contains 4278 documents (October 2016). Among them, there are 201 mini-factsheets written by members of the VALERIE project, each describing an innovation with: a short description of the innovation, a list of correlated projects, and some links to scientific and practical documents. ask-Valerie.eu searches documents and fragments of text from the document base that address the user's query. *ask-Valerie.eu* Accepted paper mimics the dialogue between a practitioner and an expert and achieves this functionality by: i) supporting the practitioner in articulating the question (it completes terms that the user starts to type and suggests other possibly relevant terms); ii) expanding the query using synonyms; iii) extracting and ranking text fragments from the documents.

- Ingram, J., Dwyer, J., Gaskell, P., Mills, J. & de Wolf, P. (2018). Reconceptualising translation in agricultural innovation: A co-translation approach to bring research knowledge and practice closer together. *Land Use Policy*, 70, 38-51. The paper can be downloaded at: <https://www.sciencedirect.com/science/article/pii/S026483771730580X#tbl0005>
 - **Abstract:** Scientific research continues to play a significant role in meeting the multiple innovation challenges in agriculture. If this role is to be fulfilled, provision needs to be made for effective translation of research outputs, where translation is understood to be the process whereby science becomes part of useful knowledge for decision making. There is increasing interest in enhancing translation in the European agricultural innovation, research and policy context, and specifically in making it a more collaborative process. This new attention calls for a reorientation of how the concept is understood, theorised and operationalised. This paper considers these needs and specifically asks how can interactive innovation approaches be integrated with science-driven approaches to enhance translation; and how can this help to reveal the constituent translation processes? An interactive stakeholder methodology is described drawing on three agricultural case studies examined in the xx project which aims to make translation of existing bodies of scientific knowledge more effective. Analysis to date shows how this interactive methodology enables a communicative and reciprocal set of translation processes to evolve which comprise: identification, prioritisation, articulation, searching, retrieval, extraction and synthesis, and evaluation of innovation issues and solutions. These insights allow us to move beyond an understanding of translation as science- or innovation-driven to envisaging co-translation, where multiple processes interact in a fluid middle-ground, and where the actors involved develop the capacity to jointly analyse innovation issues and solutions. From the perspective of the EU's policy ambitions to stimulate collaborative translation, operationalising translation needs re-thinking with respect to requirements for new mind-sets and skills, and in particular for committed and well-resourced intermediaries who can foster these multi-actors approaches.
- Górriz Mifsud, E., Olza, L., Montero, E. & Marini Govigli, V. (2017). The challenges of coordinating forest owners for joint management. *Forest Policy and Economics*. In press. <http://www.sciencedirect.com/science/article/pii/S1389934117301752>
 - **Abstract:** In a context of highly fragmented woodlands' ownership, joint forest management implies a reduction of transaction costs for its members and improves the coherence of forestry actions at the landscape scale. Increasing the size of the management unit improves market positioning, permits a more technical management, and improves environmental sustainability in aspects that require spatial coordination. A review of relevant literature on forest owners' groupings and the lessons learned from case studies in Navarra (Spain) have been analysed from a social capital perspective. Twelve challenges are identified, for which technical recommendations are offered. We navigate through decision-making procedures,

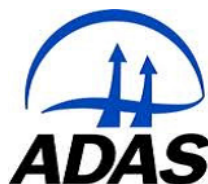
geographical cohesion, legitimacy and trust building, transparency and internal communication, trade-offs in efficiency and equity, local idiosyncrasy, management committee dynamics, risk aversion vs. flexibility, legal aspects, joint motivations and long-term vision, and intermediary's efficiency. Existing policy tools help in overcoming some of the economic and technical aspects. However, internal governance challenges require a concerted effort from participating forest owners.

8.2 Articles in trade journals, industry magazines & web-sites

- EFIMED Network News, [April 2015](#)
 - Background details and current progress on the Sustainable Forest Management and Ecosystem Services case study was included in an article written for the April 2015 issue of the EFIMED Network News.
- EIP-AGRI Agrinnovation magazine, [September 2015](#)
 - An article giving a short introduction to VALERIE was included in the 2015 issue of the annual Agrinnovation magazine on the EIP-AGRI network.
- Navarraforestal: number 37 (versión en castellano), [December 2015](#)
 - The Sustainable Forest Management and Ecosystem Services case study was featured in an article written for the December 2015 issue of Navarraforestal: number 37 (in Spanish).
- Sustainable Forest Management and Ecosystem Services, VALERIE Case study update in March 2016.
 - Details and news from the VALERIE project and The Sustainable Forest Management and Ecosystem Services case study were posted on The Union of Foresters of Southern Europe (USSE) website:
 - A VALERIE project summary can be found here <http://www.usse-eu.org/en/proyectos> (in English) and here <http://www.usse-eu.org/es/proyectos> (in Spanish).
 - The case study and VALERIE news were posted here <http://www.usse-eu.org/es/noticias> (in Spanish only).
- Sustainable Forest Biomass: Recycling of Wood Ash, VALERIE Case study update in June 2016.
 - A field trip organised by the VALERIE Finnish case study, 'Sustainable Forest Biomass: Recycling of Wood Ash' took place on 8th June 2016. A group of stakeholders and researchers spent a rainy Wednesday in the North Karelian forests discussing the use of recycled wood ash from various perspectives. There was a demonstration of spreading wood ash for use as a fertilizer and people could witness with their own eyes the positive influence of wood ash on forest growth.
 - Details of the field trip were posted on Facebook <https://www.facebook.com/pages/European-Forest-Institute-EFI/146786162041660> and published as a newspaper article (in Finnish) in the 'Karjalainen', the newspaper from North Karelia. A short version of the Finnish newspaper article can be found on the web at: <http://www.karjalainen.fi/uutiset/uutis-alueet/talous/item/107932-tuhkan-paketoit-tien-rakenteen-matalammaksi>
- EU Research & Innovation web-site, 31st August 2017

- The *ask-Valerie.eu* tool could speed up innovation in agriculture by making innovative research outputs and best practices more easily accessible to farmers and foresters, says the EU Research & Innovation web-site: https://ec.europa.eu/research/infocentre/article_en.cfm?artid=45517
- Article pending in Farmers Weekly (UK) and France Agricole (France) on the VALERIE project and companion cropping in oilseed rape from the “Innovative Arable Cropping” case study.

9 The VALERIE Consortium



Partner name	Acronym	Country
Stichting Wageningen Research	WR	Netherlands
L'Institut National de la Recherche Agronomique	INRA	France
Università degli Studi di Milano	UMIL	Italy
The University of Gloucestershire (CCRI)	UGLO	UK
Università degli Studi di Torino	UNITO	Italy
European Forest Institute	EFI	Finland
IT-Objects GmbH	ITO	Germany
RSK ADAS Ltd.	ADAS	UK
Association de Coordination Technique Agricole	ACTA	France
Delphy B.V.	Delphy	Netherlands
Cadir Lab S.r.l.	Cadir Lab	Italy
Union of Silviculturalists of Southern Europe	USSE	Spain
TAPIO Oy	TAPIO	Finland
Game and Wildlife Conservation Trust	GWCT	UK
<i>Third party to ACTA: Terres Inovia</i>		France