



Capturing knowledge for innovation

Luca Bechini, University of Milano

VALERIE Final Symposium: Improving Access to Knowledge for Innovation
Bruxelles, 14 November 2017

Valerie 

- **Purpose of the project**
 - Summarise research outcomes on innovations, to be used in agricultural and forestry practice
 - Special emphasis on valorisation of European and national research projects
- Intended **methodology**
 - Write summaries of completed projects
 - Contribute to the development of a "communication facility"
 - **Role of experts:** summarise knowledge

**Write full
factsheets**

**Select documents
for case studies**

*Summarise
knowledge*

**Compile the list
of innovations**

**Write mini-
factsheets**

ask-Valerie.eu

*Select and organise
knowledge*

Role of experts

- "Full" factsheet summarise research results (4-6 pages each)
- Our VALERIE template for factsheets included these paragraphs:
 - *What is it?*
 - *Problem to solved*
 - *How does it work?*
 - *Advantages and disadvantages*
 - *Costs*
 - *Other resources required*
 - *Contacts*
 - *Source of the research*
 - *Who funded the research?*
 - *References*



Soil phosphorus-mobilizing microorganisms:
a new strategy to increase phosphorus availability for plants



Reduction of non point source water pollution with buffer strip.



**Integrated Management of Botrytis pathogens causing
neck rot in onion production**



Allelopathy: a tool for an integrated management.
Application to resistant Black grass (*Alopecurus myosuroides* Huds.) in UK

- We created a **list of innovations** relevant for final users
- **Innovation**: a practice, a solution or a tool that can be implemented to address a specific problem for a farmer, a forester, or an advisor
- **495 innovations** in the six themes
- Connection with **research projects** (mostly EU)
- **Examples** of innovations:
 - Applications of zeolites to crop protection
 - Setting up a forest owners' group
 - Adaptation of conservation tillage to rice systems
 - Biodegradable drip irrigation tapes
 - Improved methods for branding agroforestry-derived products
 - Mobile pyrolysis plant for forest residues

- Short documents in English with
 - **Issues** that the innovation wants to address
 - An **overview** of the innovation (50-200 words)
 - Related **concepts**
 - Links to **projects**
 - Links to 6-8 practical and scientific **documents**
- About **210** mini-factsheets by the end of the project

Fertilization in apple orchards

| | |
|--------------------|---|
| Issue(s) | <ul style="list-style-type: none"> • Increase yields in apple orchards • Incr • Incr |
| Description | Fertig irrigat Both i magni calcit high-c Comp advan of nat the ex of the acidifi fertigs comp ten-ye trees j without trunk develop trickle |
| Concepts | nutrien applic |

Wastewater reuse in short rotation plantation

| | |
|--------------------|---|
| Issue(s) | <ul style="list-style-type: none"> • Phytotechnology for the agricultural wastewater treatment alternative to conventional treatment systems • Reduction of mineral fertilizers use and costs • Fresh water saving in irrigated agro-forestry land-use systems • Reduction of economic costs for bioenergy production |
| Description | The combination must be chosen according to local conditions and the nature of the wastewater. |
| Concepts | |

Adaptation of conservation tillage to rice systems

| | |
|--------------------|---|
| Issue(s) | <ul style="list-style-type: none"> • Conservation and environment • Increase soil organic matter content and quality, and improve soil structure |
| Description | Farmers usually adopt intensive tillage operations for rice with the main intention of controlling weeds, minimizing percolation rate of water and preparing a soft bed for crop establishment. This system results in high energy consumption and high cost of cultivation. The increased interest in minimum tillage in rice systems is due to the potential reduction of fuel costs and earlier planting (which allows an earlier harvest skipping autumn rainfall). Better control of herbicide-resistant weeds derive also from the opportunity to facilitate early weed germination and then control them with glyphosate. In addition, No-tillage and minimum tillage systems can produce rice grain yield similar to those produced with conventional puddling. Moreover, conservative tillage reduces soil disturbance and increases soil organic matter accumulation. |
| Concepts | |



Valerie

Fertigation in apple orchards

| | |
|--------------------|--|
| Issue(s) | <ul style="list-style-type: none"> • Increase yields in apple orchards • Increase nutrients use efficiency in apple orchards • Increase apple size |
| Description | <p>Fertigation is the application of fertilizers with water to crop through an irrigation system; this is commonly carried out using drippers or sprinklers. Both macronutrients (such as nitrogen, phosphorus, potassium and magnesium) and micronutrients (such as boron, zinc, manganese, iron, copper, calcium) are applied by fertigation. Fertigation is particularly important for high-density apple orchards where the objective is to obtain high early yields. Compared to soil surface application of fertilizers, fertigation has some advantages, the most important of which are: the application of small quantities of nutrient directly to the plant root zone, and the distribution of the nutrient at the exact time, in relation with plant nutrient requirement and at different times of the season. In some cases, potential limitations of fertigation include soil acidification when ammonium-based fertilizers are used. Nevertheless, if fertigation is well-conducted, apple trees performance can be improved, compared to unirrigated tree or irrigated trees without fertilization. Result of a ten-years study showed that trickle fertigation have positive effects on apple trees performance. Compared with unirrigated controls or irrigated trees without fertilization, trickle fertigation significantly increased shoot growth and trunk cross-sectional area, especially in the early years, when trees were developing the root system. Besides, compared with unirrigated controls, trickle fertigation had a positive effect in increasing apple size.</p> |
| Concepts | <p>nutrient availability; tree growth; nutrient demand; plant nutrition; fertilizer application; fertilizer strategy; nutrient management plan</p> |

References

1. Neilsen, Denise, and Gerry Neilsen. "Fertigation for Apple Trees in the Pacific Northwest." *New York Fruit Quarterly* 17, no. 4 (2009): 11–14. <http://www.nyfhs.org/pdf/fq/09winter/fertigation-for-apple-trees-in-the-pacific-northwest.pdf>.
2. Neilsen, G. H., D. Neilsen, E. J. Hogue, and L. C. Herbert. "Zinc and Boron Nutrition Management in Fertigated High Density Apple Orchards." *Canadian Journal of Plant Science* 84, no. 3 (July 2004): 823–28. doi:10.4141/P03-153.

3. Neilsen, G. H., D. Neilsen, L. C. Herbert, and E. J. Hogue. "Response of Apple to Fertigation of N and K under Conditions Susceptible to the Development of K Deficiency." *Journal of the American Society for Horticultural Science* 129, no. 1 (1, 2004): 26–31. <http://journal.ashspublishings.org/content/129/1/26>.
4. Neilsen, G., D. Neilsen, E. Hogue, and L. Herbert. "Apple Orchards Respond To Boron Fertigation." <http://ucanr.org/sites/nm/files/76699.pdf>
5. Neilsen, G.h., P. Parchomchuk, D. Neilsen, and B. J. Zebarth. "Drip-Fertigation of Apple Trees Affects Root Distribution and Development of K Deficiency." *Canadian Journal of Soil Science* 80, no. 2 (May 2000): 353–61. doi:10.4141/S99-090.
6. Robinson, Terence, and Warren Stiles. "Fertigation of Apple Trees in Humid Climates." *New York Fruit Quarterly* 12, no. 1 (2004): 32–38. <http://www.nyfhs.org/pdf/fq/2004-VOLUME-12/Vol-12-No-1/Fertigation-of-Apple-Trees-in-Humid-Climates.pdf>
7. Treder, Waldemar. "Influence of Fertigation with Nitrogen and a Complete Fertilizer on Growth and Yielding of 'Gala' Apple Trees." *Journal of Fruit and Ornamental Plant Research* 14 (2006): 143–54. http://www.researchgate.net/profile/Waldemar_Treder/publication/267767846_INFLUENCE_OF_FERTIGA

Project

1. Improving nitrogen use efficiency, sustainability and fruit quality in high-density apple orchards . AHDB Tree Fruit Panel (TF Panel).

The VALERIE project is funded as a coordination and support action under the 7th European Framework Programme; Grant Agreement No.: FP7-KBBE-2013-7-613825-VALERIE www.valerie.eu .

This document (internal id: 1030) was generated on 2017-07-13 12:56:36

- A system that allows users to effectively **search a document base on innovations** in agriculture and forestry

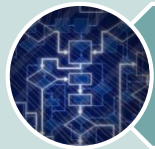
- Role of **experts**
 - Select document **repositories**, write mini-factsheets
 - Build the **ontology**
 - Check document **ranking**



Valerie ontology



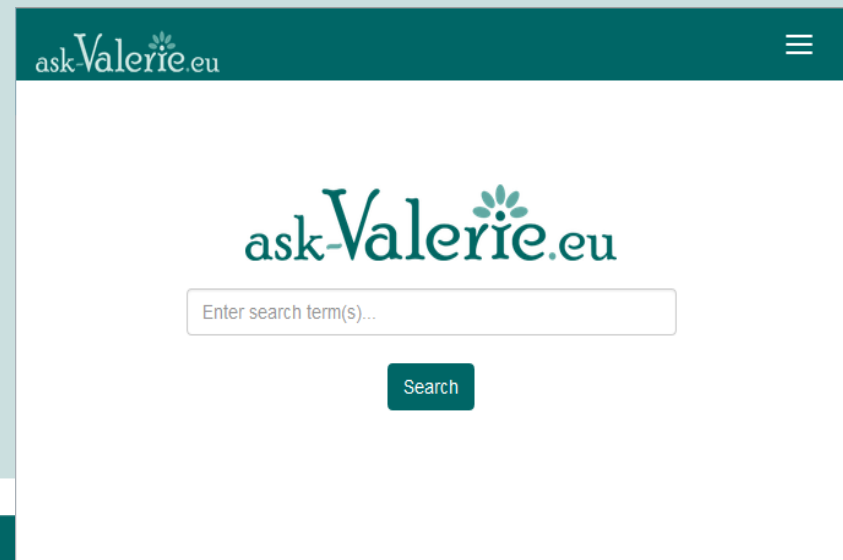
Document base

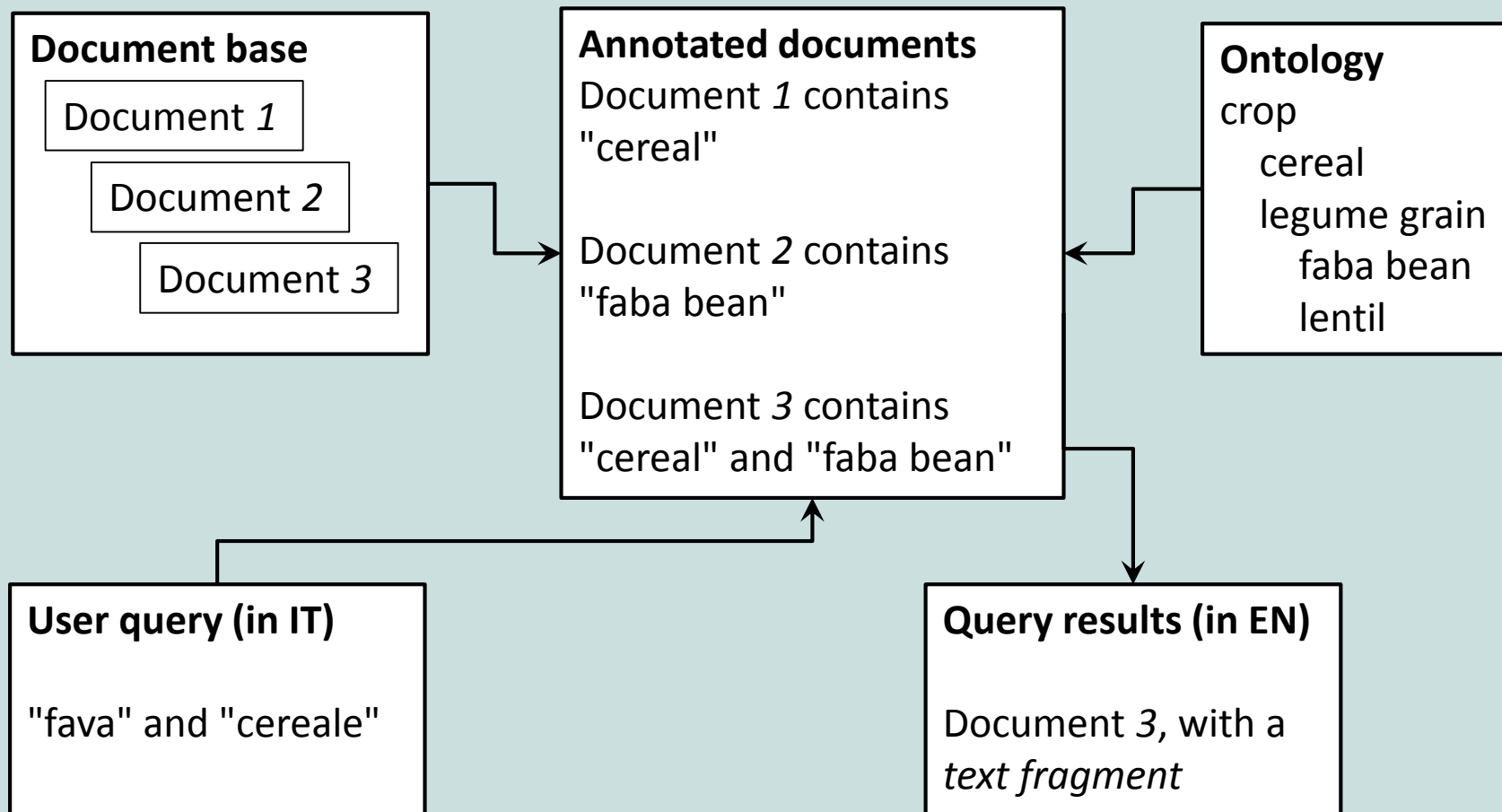


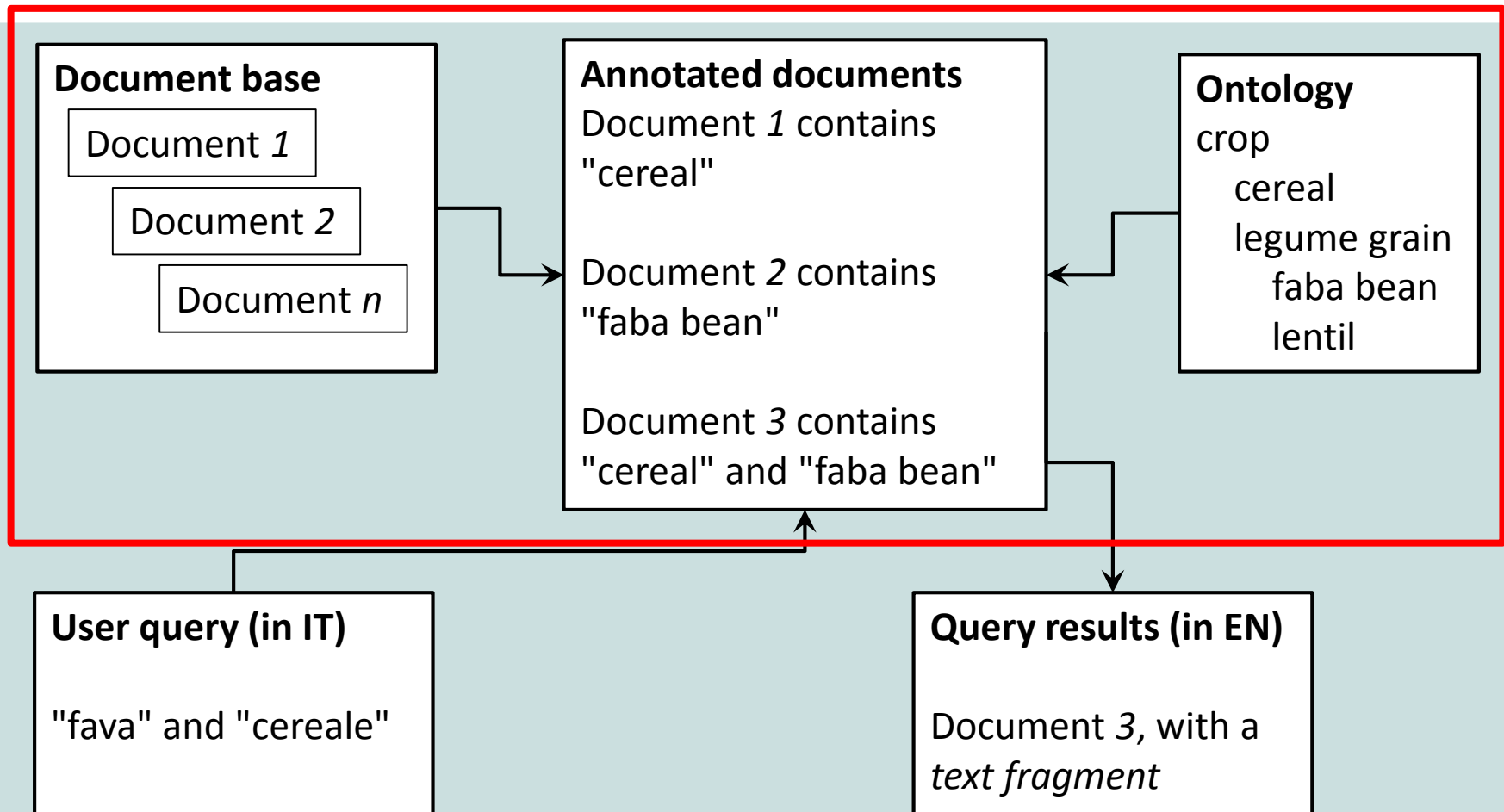
Digital advisor algorithms



User community







The document base

Document repositories currently indexed by *ask-Valerie.eu* (October 2017).



- So far we have collected documents from **45 repositories**
- We have annotated **80,583 documents**
- More repositories can be added; *ask-Valerie.eu* potential gateway
- Most of repositories are public

The document base

Document repositories / Statistics

| Country | Documents |
|---------------------------|-----------|
| European repositories | 13,168 |
| Finland | 10,721 |
| France | 1,401 |
| Italy | 7,807 |
| the Netherlands & Belgium | 43,453 |
| Poland | 255 |
| United Kingdom | 3,605 |
| USA | 173 |

| Type of documents | % Documents |
|------------------------|-------------|
| Practical | 16.9% |
| Practical & Education | 51.9% |
| Practical & Scientific | 0.5% |
| Scientific | 30.4% |
| Scientific & Policy | 0.4% |

| Type of repository | % Documents |
|--|-------------|
| Advisory company | 0.00% |
| Environmental Protection Agency | 0.23% |
| EU project | 0.22% |
| Library | 52.93% |
| Not-for-profit, science-based organization | 0.22% |
| Research & policy support repository | 0.37% |
| Research and extension institution | 0.81% |
| Research repository | 31.05% |
| Rural development and information agency | 10.18% |
| Thematic Network | 0.21% |
| Trade journal | 3.77% |

Valerie

The image displays a diverse collection of logos from agricultural and environmental organizations. The logos are arranged in a grid-like fashion. Several logos are enclosed in red rectangular boxes, highlighting specific organizations: AgriSpin, eip-agri, CORDIS, smartAKIS, HNV Link, 4D4F, and WINETWORK. Other visible logos include KENNISAKKER.NL, FOOD & FARMING FUTURES, CRPV, ELSEVIER, CRPA, IUNG, ER, EROPHYTO, LUKE, IRS, ifs, CORDIS, smartAKIS, HNV Link, ARSIAL, and many others. The logos vary in design, featuring text, icons, and combinations of both.

The document base

Thematic networks

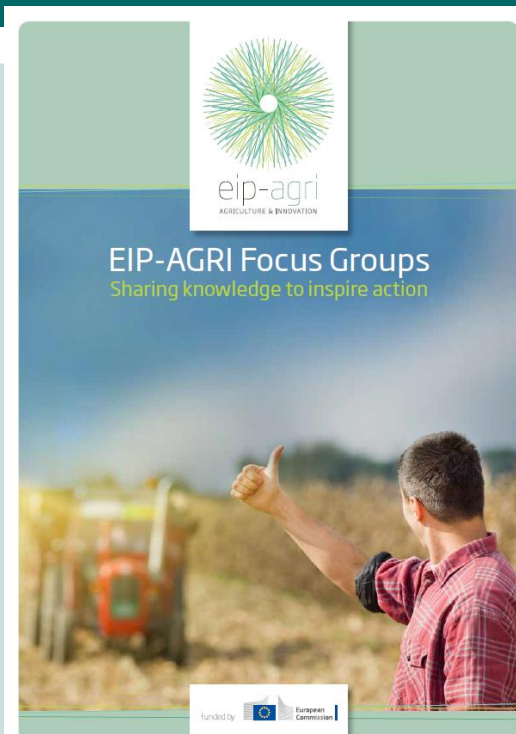
- Thematic networks bring together various actors around a **well-defined theme** (e.g. precision agriculture and robotics)
- People from both **science** and **practice** are involved

Thematic networks funded under Horizon 2020 calls 2014 and 2015

| Thematic Network | Topic | Contact |
|---|---|---|
| 4D4F | Data and sensor driven decision making on dairy farms | David Gardner davidg@innovationforagriculture.co.uk www.4d4f.eu |
| AGRIFORVALOR  | Increase the value of biomass side-streams from agriculture and forest | www.agriforvalor.eu Hartmut Welck welck@steinbeis-europa.de |
| AgriSPIN  | Innovation brokering - identifying best practice for innovation and support | Heidi Hundrup Rasmussen hhr@seges.dk www.agrispin.eu |
| EUFRUIT | Fruit - cultivar development, minimise residues, storage and fruit quality, sustainability of production systems | Michelle Williams mw@food.au.dk www.cordis.europa.eu |
| EuroDairy  | Practice-based innovations in dairy farming - resource efficiency, biodiversity, animal care, and socio-economic resilience | Ray Keatinge Ray.Keatinge@ahdb.org.uk www.eurodairy.eu |
| FERTINNOWA  | Water management in fertigated crops - water quality, water use efficiency, environmental impact | Raf De Vis raf.de.vis@proefstation.be Els Berckmoes Els.berckmoes@proefstation.be www.fertinnowa.com |
| Hennovation  | Laying hens - reducing injurious pecking and dealing with end-of-lay hens | Lisa van Dijk lisa.vandijk@bristol.ac.uk David Main d.c.j.main@bristol.ac.uk www.hennovation.eu |
| HNV-Link  | Support HNV farmlands through knowledge and innovation | www.hnvlink.eu info@hnvlink.eu |
| OK-Net Arable  | Organic arable cropping - increasing productivity and quality | Bram Moeskops, bram.moeskops@ifoam-eu.org www.ok-net-arable.eu |
| Smart-AKIS  | Smart farming technology - Farm management information systems, precision agriculture and agriculture automation and robotics | Spyros Fountas sfountas@aaua.gr |
| Winetwork  | Wine growing - controlling/fighting diseases | Eric Serrano eric.serrano@vignevin.com www.winetwork.eu |

- Reports from EIP-AGRI
- **Focus groups**
- EIP-AGRI **factsheets**
- EIP-AGRI workshop and seminar **reports**
- EIP-AGRI **brochures**
- **Agrinnovation** magazine

- Not only
in English



EIP-AGRI Factsheet Soil Organic Matter

Title (in English): EIP-AGRI Factsheet Soil Organic Matter

Publication abstract (in original language):

All the information from the Soil Organic Matter Focus Group at a glance. Translation courtesy of Réseau Rural National Français (French); Direção-Geral de Agricultura e Desenvolvimento Rural (DGADR) / Rede Rural Nacional (RRN) (Portuguese); Jaume Lloveras, Universitat de Lleida (Spanish).

| Attachment | Size |
|---|-----------|
|  EIP-AGRI Factsheet on Soil Organic Matter: English version | 786.96 KB |
|  EIP-AGRI Factsheet on Soil Organic Matter: French version | 551.99 KB |
|  EIP-AGRI Factsheet on Soil Organic Matter: Spanish version | 3.18 MB |
|  EIP-AGRI Factsheet on Soil Organic Matter: Portuguese version | 825.83 KB |

- CORDIS is the **European Commission's public repository** to disseminate information on EU-funded research projects
- We have annotated the **"Results in Brief"** and the **"Report Summaries"**
- FP5, FP6, FP7 and Horizon 2020 projects
- **2598 documents**



The screenshot displays the CORDIS (Community Research and Development Information Service) website. At the top, the European Commission logo is visible alongside the CORDIS title. A navigation bar includes links for 'NEWS & EVENTS', 'PROJECTS & RESULTS' (which is highlighted), and 'RESEARCH*EU MAGAZINES'. Below this, the 'VALERIE' project is featured with its ID (613825) and funding source (FP7-KBBE). The project title is 'VALorising European Research for Innovation in agriculturE and forestry', with a timeline from 2014 to 2017. A 'Project details' section is divided into two columns: the left column lists the total cost (EUR 3 821 714), EU contribution (EUR 2 989 056), and the coordinator (Netherlands); the right column lists the topic (KBBE.2013.1.4-08), call for proposal (FP7-KBBE-2013-7), and funding scheme (CP-FP).

CORDIS
Community Research and Development Information Service

European Commission > CORDIS > Projects and Results > VALorising European Research for Innovation in agriculturE and forestry

Search Sign in

NEWS & EVENTS **PROJECTS & RESULTS** **RESEARCH*EU MAGAZINES**

VALERIE
Project ID: 613825
Funded under: [FP7-KBBE](#)

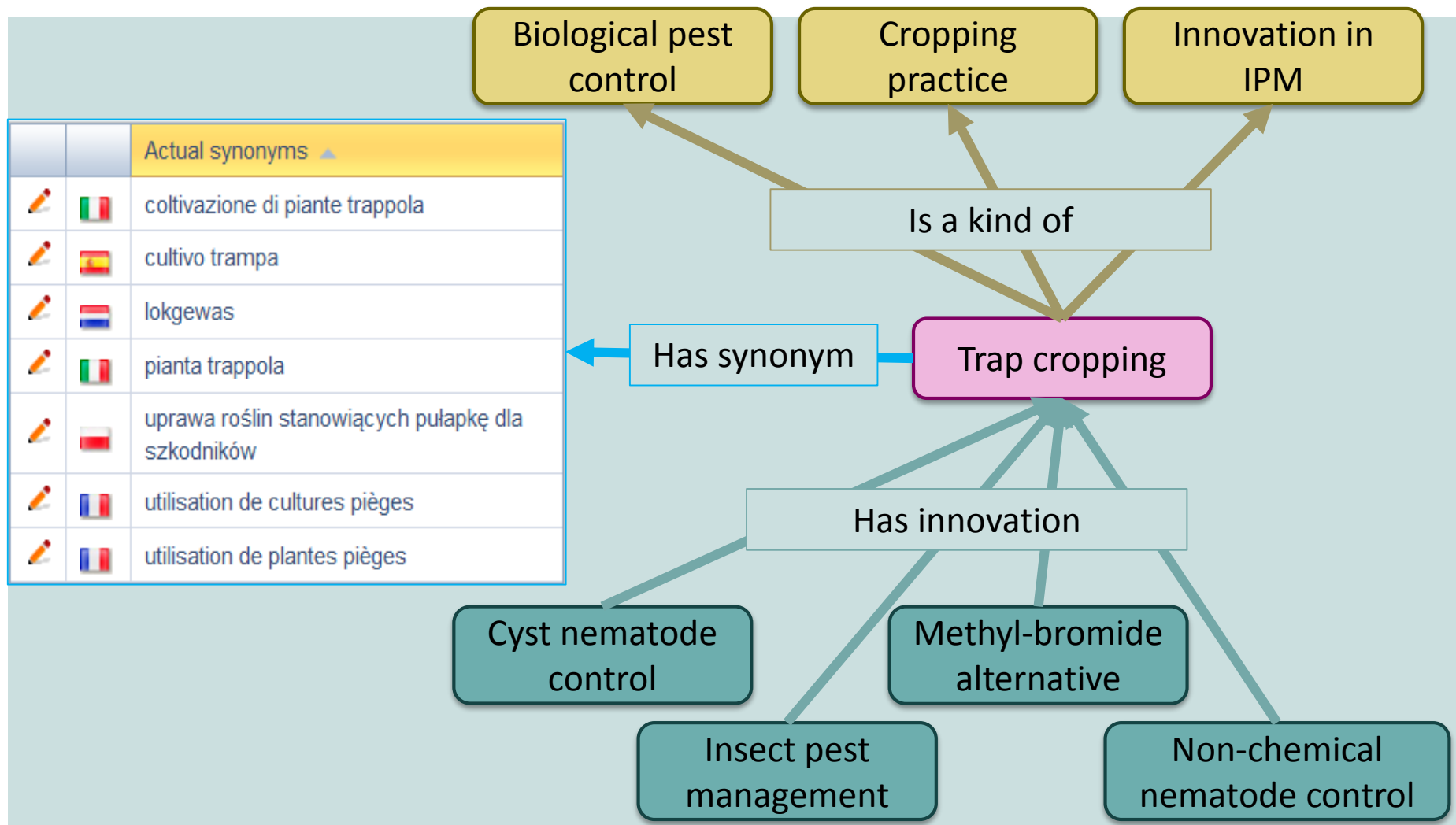
VALorising European Research for Innovation in agriculturE and forestry
From 2014-01-01 to 2017-12-31, ongoing project

Project details

| | |
|--|---|
| Total cost: EUR 3 821 714 EU contribution: EUR 2 989 056 Coordinated in: Netherlands | Topic(s): KBBE.2013.1.4-08 - Boosting the outreach of research with focus on agricultural and forestry knowledge and innovation systems Call for proposal: FP7-KBBE-2013-7-single-stage See other projects for this call Funding scheme: CP-FP - Small or medium-scale focused research project |
|--|---|

- **Structured** collection of **concepts**
 - A **concept** can be composed by more than one term
 - Structured: concepts are inter-related
 - **Type of** relationship (parent ↔ child)
 - **Related to** relationship
 - **Problem/solution** relationship
e.g. "nitrate leaching ↔ catch crop"
 - Note: solutions are the "innovations" from our list
 - Concepts also have **synonyms**
- All VALERIE partners contributed to ontology

Example of knowledge in ontology



The ontology – Example of parent-child relation

field operation

- + cover crop destruction
- + drainage
- + fertiliser application
- field monitoring
- + ground preparation
- growth regulator application
- + harvesting
- + haulm killing
- + irrigation
- + mulching
- + pesticide application
- + post-harvest operation (field)
- + seed treatment
- + soil improvement
- + sowing
- + spraying
- + tillage
- transplanting
- weed control operation

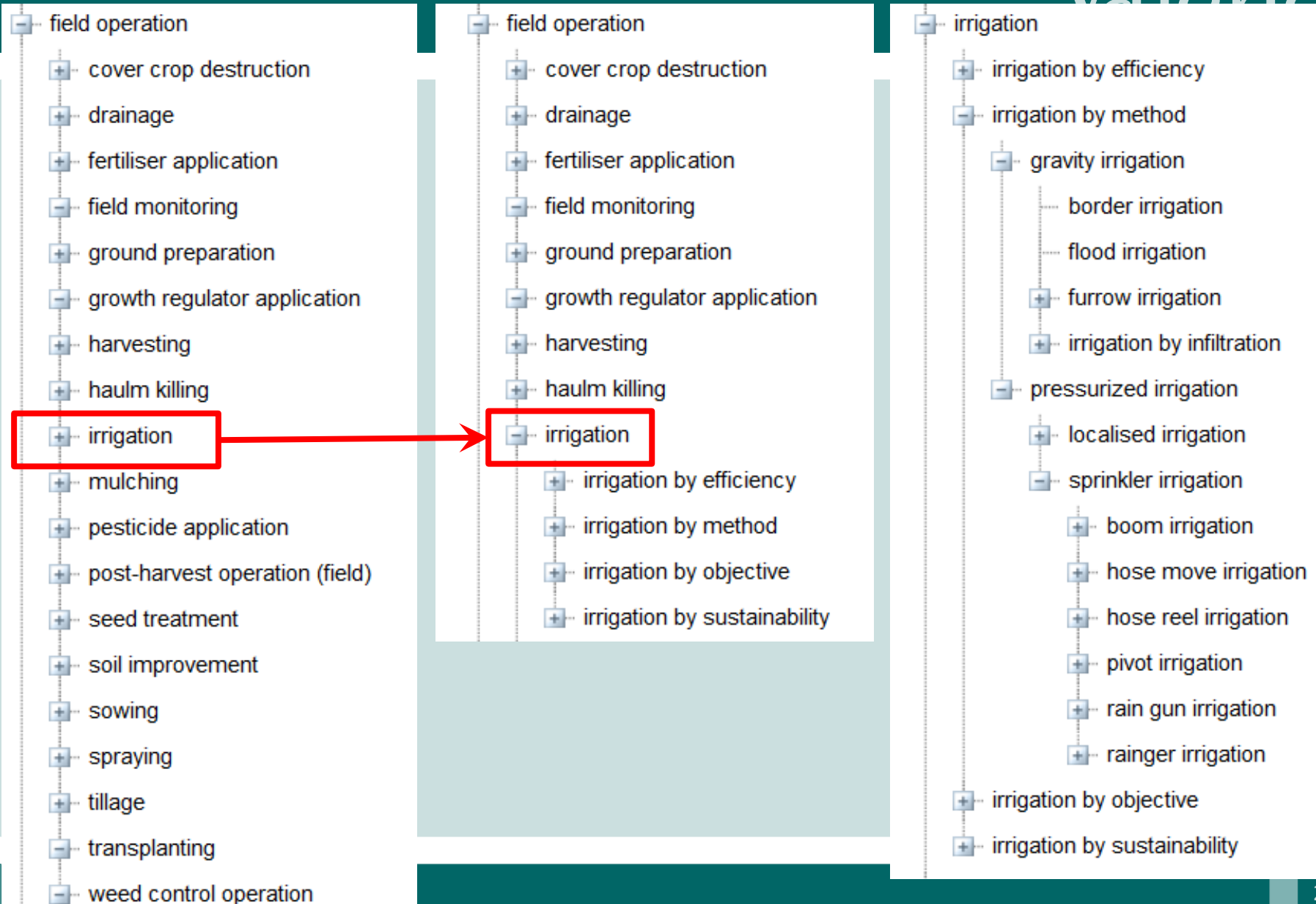
field operation

- + cover crop destruction
- + drainage
- + fertiliser application
- field monitoring
- + ground preparation
- growth regulator application
- + harvesting
- + haulm killing
- irrigation
 - + irrigation by efficiency
 - + irrigation by method
 - + irrigation by objective
 - + irrigation by sustainability

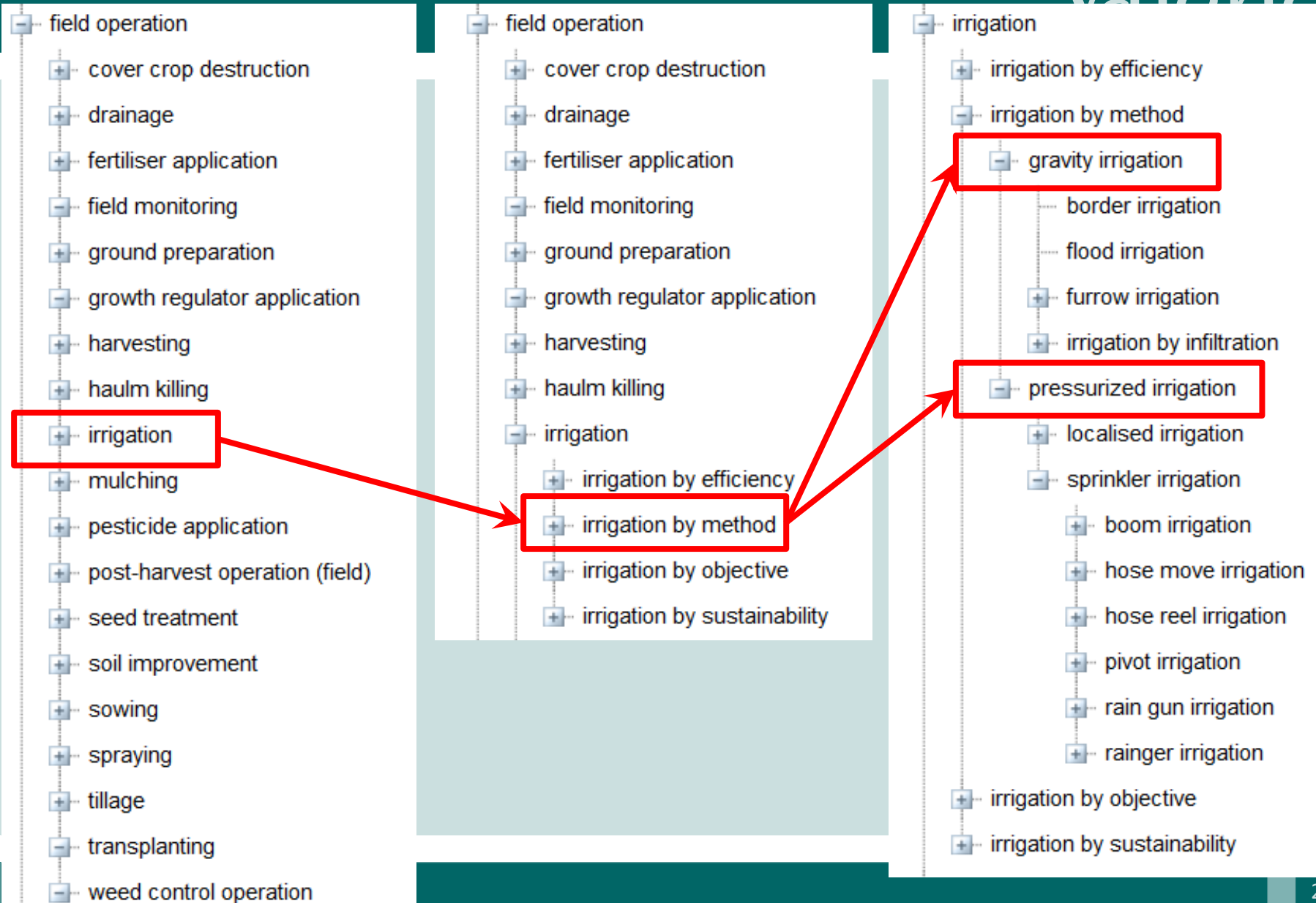
irrigation

- + irrigation by efficiency
- irrigation by method
 - gravity irrigation
 - border irrigation
 - flood irrigation
 - + furrow irrigation
 - + irrigation by infiltration
- pressurized irrigation
 - + localised irrigation
 - sprinkler irrigation
 - + boom irrigation
 - + hose move irrigation
 - + hose reel irrigation
 - + pivot irrigation
 - + rain gun irrigation
 - + rainger irrigation
- + irrigation by objective
- + irrigation by sustainability

The ontology – Example of parent-child relation

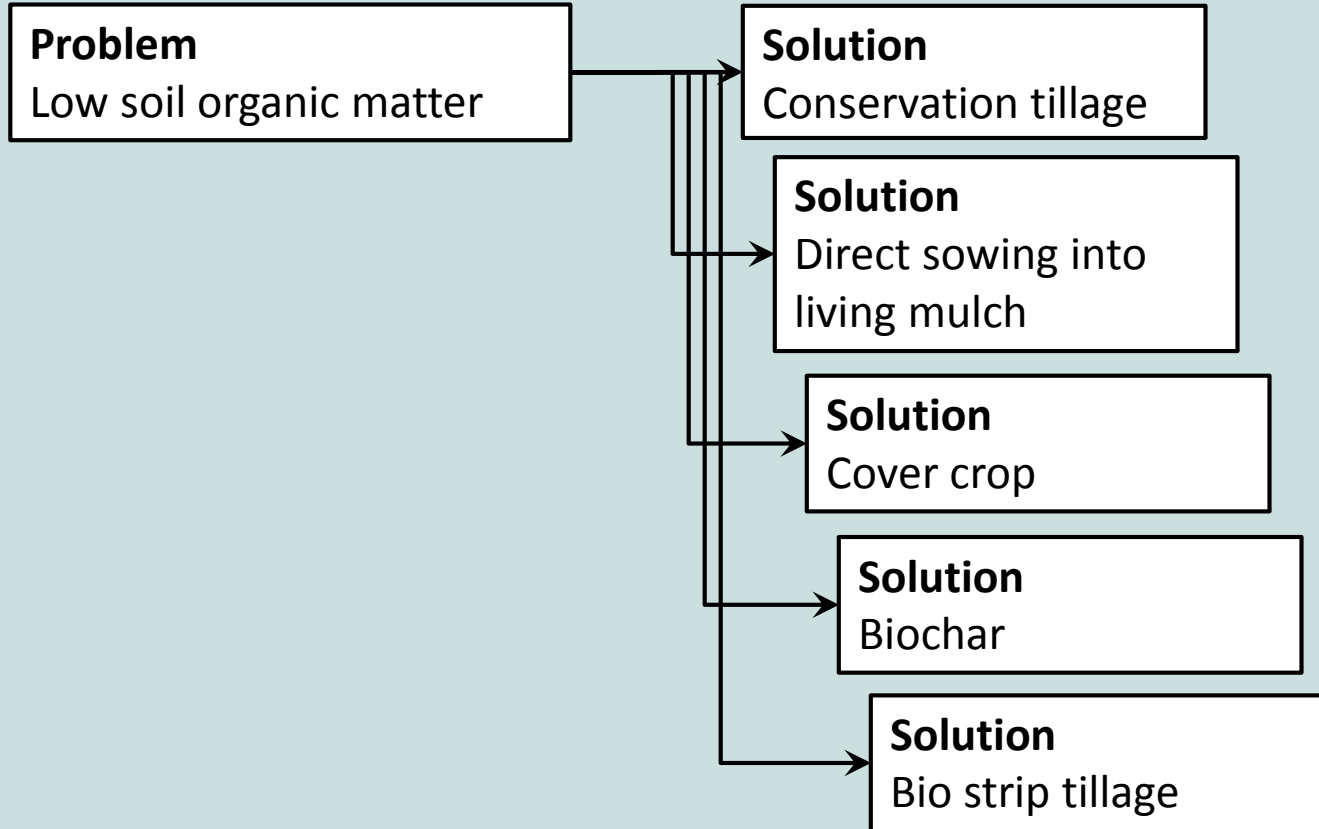


The ontology – Example of parent-child relation



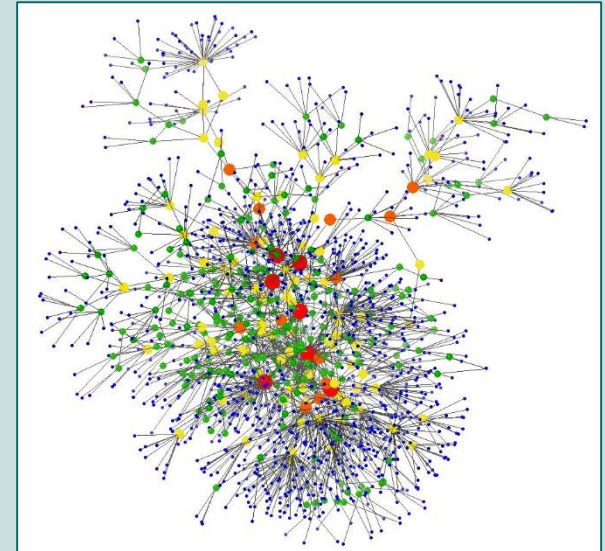
The ontology

Problem – Solution pairs



- It mimicks the **expert – user** dialogue
- To be expanded

- Currently:
 - Over 10,000 **concepts**
 - Around 50,000 **synonyms** and translations (UK, IT, ES, FI, PO, NL, FR, LA)
 - Over 12,000 “is a **kind of**” relations
 - Over 3,000 **related to** relations
 - Around 700 **innovation – solution pairs**





Thank you very much for your attention!

Luca Bechini, University of Milano

VALERIE Final Symposium: Improving Access to Knowledge for Innovation
Bruxelles, 14 November 2017

Valerie