Valorising European Research for Innovation in Agriculture and Forestry

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Co-innovation plans: report of first round of case study meetings

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Executive summary

Aims

This report presents results from the first round of meetings in the case studies carried out as part of Task 3.4. The main aims of the meetings were to:

- Remind stakeholders about or introduce stakeholders to the VALERIE project
- Reflect on, review and update the innovation needs identified by stakeholders in the Kick off meeting
- Review and evaluate WP2 Fact sheets and reference lists- for feedback to WP2
- Identify a potential trial to be set up in the case study to test/refine research provided by WP2
- Continue to plan for future activities within the project period

This report was compiled from individual case study meeting reports. Sections 4-12 comprise extracts from these reports. The full case study meeting reports are available on the project website

Context and Co-innovation methodology

Completing the first stakeholder meetings in the case studies was the second task within Work Package 3 (WP3) 'Case studies on innovation'. The overall objective of WP3 is: Co-innovate with stakeholders in case studies on innovation.

Ten case studies on innovation provide the platform for the iterative stakeholder- driven approach which underpins WP3. They mobilise stakeholders, with their empirical knowledge and innovation needs. The research team is working 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. As part of this case study partners conduct a series of participatory meetings with stakeholders. Task 3.1 represented the first stage in this process with the Kick off meetings (reported in Deliverable 3.311). This Deliverable reports on the next stage of case study participatory activities, the first round of meetings (Task 3.4). The intention is that at least three further meetings will be held with stakeholders in each case study, to enable the aims of WP3 to be fulfilled. The first round of meetings (reported here) build on the Kick off meetings.

In response to innovation needs identified by stakeholders at the Kick off meetings, WP2 partners have been developing and preparing Fact sheets on innovation, in consultation with case study partners.

As part of this process the meetings reported here:

- reflect on, review and update the innovation needs identified by stakeholders in the Kick off meeting (and request new Fact sheets if required)
- review and evaluate Fact sheets and reference lists for feedback to WP2. In response to innovation needs identified by stakeholders at the Kick off meetings, WP2 partners have been developing and preparing Fact sheets on innovations, in consultation with case study partners. These were presented to stakeholders at these first meetings and feedback was collected for WP2
- identify a potential trial to be set up in the case study to test/refine research on innovations provided by WP2

Case studies

Ten case studies in six countries across Europe participate in VALERIE. These have a regional orientation and a focus on either specific commodities, particular farming systems, or management at a landscape scale, and so embrace different scales and dimensions. Most of the case studies are already well-established due to previous project activity. These cases have well-defined issues and themes of interest and the case study partners have a good relationship with the existing stakeholder community. In those few case studies with no previous project activity, issues and stakeholders are less well-defined or known and there is a need for initial capacity-building to ensure a successful stakeholder engagement process. For this reason, case study stakeholder activity is at different stages.

Methods

Meeting guidelines, training and a report template was provided to the case study partners, to ensure consistency in reporting and aid WP3 analysis. Case study reports are available on the VALERIE website.

Findings

Diversity of case studies with respect to a wide variety of situations, locations, stakeholder types, problems and stakeholder goals means that it is only possible to summarise findings in terms of the WP3 process and methodology rather than in terms of the topic of the case studies. This diversity is exacerbated by cases being at different stages in the WP3 process due to the different extent of previous project activity and the variable relationships between case study partners and stakeholders.

(Re-)engaging stakeholders in the VALERIE project

Meetings attracted stakeholders who had attended the Kick off meetings showing that interest is being sustained. Some case study partners were able to 'piggy back' the meeting onto and existing project meetings to ensure a good level of attendance (they also benefit from the endorsement of the project). The Kick off meeting noted that in a number of case studies some stakeholders were rather wary of committing to the full case study programme without more evidence of what it would be able to deliver. Others expressed some scepticism about whether VALERIE could achieve its aims, and stakeholder expectations of VALERIE, at this point were not particularly high. It was noted in this round of meetings however that stakeholders were beginning to realise the benefits of the project and their level of engagement has increased. This is attributed to the Fact sheets which for some stakeholders represent concrete and useful project outcomes. However case study partners also noted a fall in stakeholder numbers attending or had deliberately invited new stakeholders considered more appropriate to the case study topic than those attending the Kick off meeting. In these cases this meant that this meeting was the first opportunity for stakeholders to learn about VALERIE. This has implications here for the iterative methodology which is more effective where continuity in stakeholder engagement is assured.

Identifying Innovation/knowledge needs

The intention of the first exercise in the meeting was to review and refine the research questions identified in the Kick off meetings. The lists were accordingly initiated, refined, stayed the same or more topics were added depending on the stage of the case study development.

As noted in Deliverable 3.311 some groups had a strong collective focus on a particular set of issues others were rather more a loose grouping of individuals where issues were less defined. However in both situations there is general progress in developing and expressing the research questions more clearly, and in prioritising some topics above others. Overall this process led in some cases for requests for further Facts sheets and reference lists from WP2.

Evaluation of Fact sheets

Stakeholders were asked to review and evaluate Fact sheets and reference lists generated by WP2 in response to requests in the Kick off meeting. Fact sheets were evaluated according to content and format as suggested in the meeting guidelines. The stakeholders made many useful suggestions for improvements. Overall they stressed the importance of valid scientific data supported by economic data showing the cost effectiveness of innovations. With respect to users, some were doubtful about farmers using them, although agreed that advisers might. The project now needs to consider the value and the future of these Fact sheets, a format proposed early on the project as a possible template for the ask.Valerie interface.

Potential trials to be set up in the case study

In most cases stakeholders were able to select some topics for trialing. These covered a range of issues; most were well articulated and feasible, although the extent of development and planning of trials depended on the level of case study development in general. Some case study partners considered that they will require further research inputs to support their choices. Plans for the trials will be developed further with support from WP3 partners.

Key considerations for WP3

The case study meeting reports demonstrate the diversity in settings, stakeholder requirements and research issues. These need to be accommodated in future WP3 tasks by providing support but allowing flexibility in the way that partners engage stakeholders and plan activities.

On the whole stakeholders continue to be interested in VALERIE. They were responsive and participated well. The project partners need to build on this interest to ensure future and sustained commitment to the project. Early scepticism in some case studies about the ability of VALERIE to deliver on its aims is lessening and this is attributed to concrete examples of outputs (e.g. Fact sheets) and the prospect of trials which demonstrates the potential of the project.

Stakeholders in some case studies continue to conflate research needs with more general issues or barriers to operations, the case study partners need to be clear in communications about what the project can and cannot realistically deliver.

1 Introduction

1.1 Aims

This report presents results from the case study stakeholder meetings carried out as part of Task 3.4. These meetings are the first of four rounds of meetings planned as part of the stakeholder iterative process. They build on the Kick-off meetings reported in Deliverable 3.311.

The main aims of these meetings were to:

- Remind stakeholders about or introduce stakeholders to the VALERIE project
- Reflect on, review and update the innovation needs identified by stakeholders in the Kick off meeting
- Review and evaluate WP2 Fact sheets and reference lists- for feedback to Work Package 2 (WP2)
- Identify a potential trial to be set up in the case study to test/refine research on innovations provided by WP2
- Continue to plan for future activities within the project period

This report was compiled from individual case study meeting reports. Sections 4-12 comprise extracts from these reports. The full case study meeting reports are available on the project website.

1.2 Context

Completing the first stakeholders meetings in the case studies was the second task within Work Package 3 (WP3) 'Case studies on innovation'. The overall objective of WP3 is: Co-innovate with stakeholders in case studies on innovation, the detailed objectives are:

- mobilise practitioners and related stakeholders in order to assess their innovation demands as well as to capture their knowledge and experiences for integration into ask.Valerie
- translate "promising" research results into end-user content and format
- integrate feedback on the potential for innovation from practitioners and draw conclusions for further research
- refine and test applications of research results within reach to assess the technical and economic viability of the innovative solutions
- reveal social, economic and cultural barriers to research uptake
- elicit stakeholders' knowledge, experience and innovation needs; for storage in the form of an ontology (Work Package 4)
- field-test ask.Valerie with stakeholder communities.

The University of Gloucestershire (UGLO) has responsibility for WP3 and for coordinating and setting the agenda for this first round of meetings and for the co-innovation process. The case study partners organised and ran the meetings and prepared meeting reports for each case study. The co-innovation process carried out with stakeholders in 10 case studies on innovation, underpins WP3 and is described next.

2 Co-innovation

2.1 The methodology

The co-innovation process in VALERIE is underpinned by a stakeholder-driven approach which entails a series of activities to:

- develop and implement a method to drive innovation - in case studies with stakeholder communities - through an iterative process of articulating the demand and tailoring the supply of specific knowledge
- translate research outcomes with innovation potential into formats for use by end-users (farmers, advisers, and enterprises in the supply chain);
- test and refine research outputs in case study settings.

The research team is working 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. As part of this case study partners conduct a series of participatory meetings with stakeholders. After the Kick off meetings, four rounds of meetings are planned as part of the iterative co novation process, and to enable the aims of WP3 to be fulfilled.

Task 3.1 represented the first stage in this process with the Kick off meetings (reported in Deliverable 3.311). These meetings introduced the concept of VALERIE and the project aims to stakeholders and explored and started to identify their research needs. These meetings generated requests to WP2 for specific Fact sheets in some case studies. The first round of meetings (reported here) build on the Kick off meetings. The process of stakeholder interaction is shown in Figure 2.1.

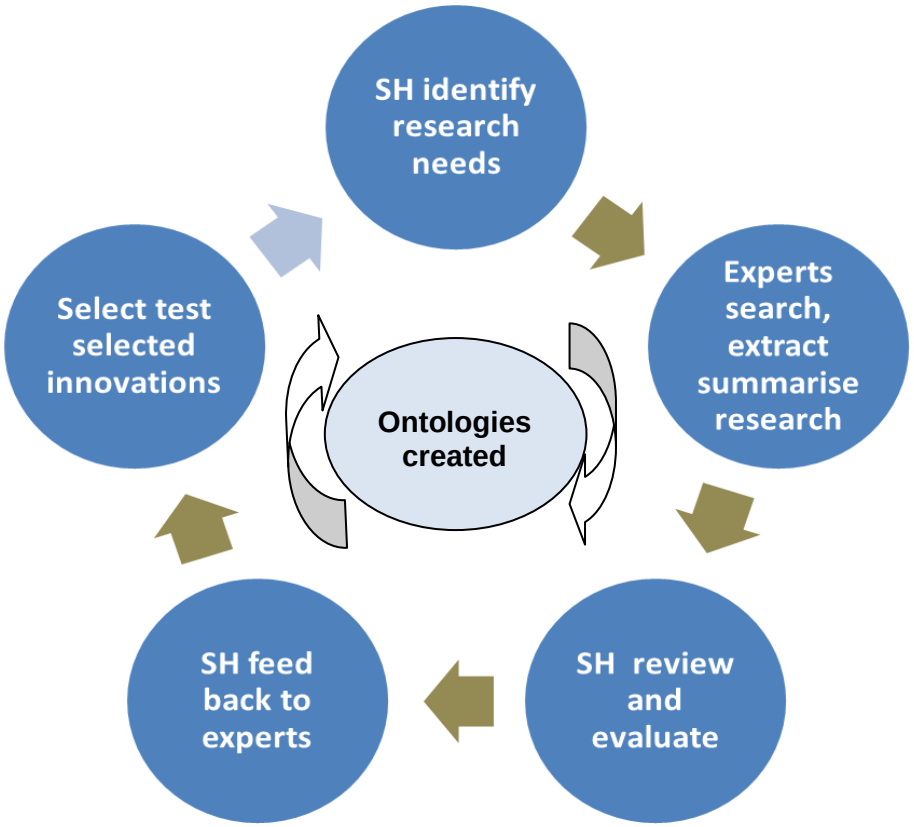
As part of this process the meetings reported here:

- Reflect on, review and update the innovation needs identified by stakeholders in the Kick off meeting (and request new Fact sheets if required)
- Review and evaluate Fact sheets and reference lists for feedback to WP2. In response to innovation needs identified by stakeholders at the Kick off meetings, WP2 partners have been developing and preparing Fact sheets on innovations, in consultation with case study partners. These were presented to stakeholders at these first meetings and feedback was collected for WP2
- Identify a potential trial to be set up in the case study to test/refine research on innovations provided by WP2

Different case studies were at different stages in this process when the first meetings took place, some had identified research needs, requested and received Fact sheets, others were still at the stage of identifying needs. This is reflected in the individual Kick off and 1st meeting reports.

At this stage in the project WP2 scientists are using conventional search engines as well as their own expertise and contacts to find research which might answer stakeholder questions. As the ontology develops and the prototype of ask.Valerie is created, this iterative process will be expanded to include WP4 (see methodology in Deliverable 3.311), that is, the next iteration will use the prototype of ask.Valerie. To this end further vocabularies were collected in some meetings for the development of the ontology (WP4).

Figure 2.1 The iterative process in the case studies



2.2 Case study description

Ten case studies in six countries across Europe are participating in VALERIE (Table 2.1). These have a regional orientation and a focus on either specific commodities, on farming systems, or on the landscape scale and so cover different scales and dimensions.

Table 2.1 VALERIE Case studies

Name*	**Case study partner and country**	**Topic**	**Stakeholders**
Catchment scale resource use efficiency	GWCT UK	Sustainable farming at landscape scale	Wildlife trusts, national parks, professional nutrient management group, agric. levy boards
Soil management in livestock supply chains	GWCT UK	Sustainable soil management in livestock production	Farmers, advisers, supply chain
Forest-based biomass	TAPIO Finland	Sustainable forestry management and smart use of biomass	Researchers, forestry organisations
Innovative arable system	CETIOM France	Sustainable cereal cultivation	Farmers, technical institutes, agricultural chambers, machinery companies
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
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
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
Drip Irrigation Management in Tomatoes and Maize	Cadir Lab Italy	Sustainable water and nutrient management	Farmers, cooperative for tomato transformation, public experimental station
Sustainable Onion supply chain	DLV Netherlands	Improvement in onion quantity and quality	Farmers, seed companies, packers, exporters, suppliers of fertilizers and pesticides
Sustainable Potato supply chain	DLV Poland	Sustainable potato production for the French fry industry	Farmers, processing and exporting industry, suppliers of fertilizers and pesticides, experimental station and research, suppliers of DSSs

As noted in Deliverable 3.311 the case studies are at different levels of development, some are already well-established due to previous project activity and had defined issues and themes, and the case study partners have a good relationship with the existing stakeholder community. In other cases, there has been no previous project activity and no pre-defined stakeholder community. In this situation, case study partners have had to initiate activities with stakeholders and build their capacity to participate; this has introduced delays into the timetable. All these factors were taken into account during the planning and reporting of the case study meetings.

3 Methods

3.1 1st meeting approach

To accommodate the diversity of case study contexts and issues, stakeholders and case study partners it was important to provide clear guidance to case study partners that was not so prescriptive that it constrained local discussion, but at the same time ensured that the meeting aims were achieved in all cases. It was also necessary to provide a framework to support partners, to ensure a consistent approach to running and recording the meetings and thereby enable WP3 analysis. This was done by providing training to all case study partners during the UK project meeting January 2015 and by preparing and issuing meeting guidelines. Individual support was also provided to case study partners by the WP3 team members.

3.2 Meeting programme

The meetings all followed a core programme as set out in the guidelines. The aims and outcomes of the main sessions (Introduction, List innovation needs, Review Fact sheets, Identify a research topic that might be trialled) are listed below. Some partners adapted the programme to include a technical speaker which was appreciated by the stakeholders. In the Spanish case study a survey was distributed before and during the meeting to identify stakeholders' views.

3.2.1 Introduction

Aims

Ensure all the stakeholders.have a good understanding of the project and what their role in it is.

3.2.2 List innovation needs

Aims

- Review and amend list of innovation/knowledge needs generated in Kick off meeting
- Review list of possible and relevant references/sources found in WP2 to address these needs
- Update list of innovation/knowledge needs accordingly (create/review Dynamic Agenda (DA))

Outcomes

- Revised/annotated reference list to return to WP2
- Selected topics for WP2 to prepare Fact sheets
- Revised innovation needs list for Dynamic Agenda completion

3.2.3 Review Fact sheets

Aims

Introduce the facts sheets and get feedback on their usefulness

- First session - a collective discussion and review of the Fact sheets asking how useful the Fact sheets are, and an evaluation with respect to the *content and format* using evaluation guidelines.
- Identify where next? what gaps? what changes, what improvements? Review whether the Fact sheet is meeting the stakeholders research needs listed

Outcomes

- Collective agreement about feedback to WP2
- A revised brief for WP2 – listing what would be most helpful input from WP2 for the next case study meeting
- Revised research needs list for DA

3.2.4 Research topic that might be trialled

Aims

- Identify a potential trial to be set up in case study to test/refine research provided by WP2 or elsewhere
- Identify possible "Monitor" farm where demonstrations and experiments/trials can be conducted over the period of the project based on selected topic

Outcomes

- List of promising topics for trial
- Suggested monitor farms
- Timetable of actions that need to be done to advance this idea
- What info and resources are needed
- What would be the helpful input from WP2

Review agreements made and create Dynamic Agenda

- Create a Dynamic Agenda to monitor which research needs are being addressed and which are still outstanding

3.3 Methods used in meetings

Methods were suggested for each session and details were provided in the guidelines. All partners were encouraged to complete the Dynamic Agenda; an important tool for monitoring the co-innovation process (see Appendix and individual case study reports). Case study partners judged on an individual basis whether the suggested methods or alternative methods were suitable for their case study stakeholders. The methods used in each meeting are reported in the individual case study reports.

3.4 First meetings

All partners held meetings with stakeholders covering the sessions and topics suggested in the guidelines. The meeting with stakeholders 'Soil management in livestock supply chains case study' in UK was delayed until June due to unexpected changes in the case study personnel.

3.5 Meeting reports

A report template was provided to ensure consistency in reporting and aid WP3 analysis. Case study reports were completed for each case study. These, together with their appendices, are available on the VALERIE website. Sections 4-12 in this Deliverable report provide summaries of all the case study reports. Due to the delayed meeting the report for the 'Soil management in livestock supply chains case study' in UK is in preparation. This report will be prepared separately as a supplement to this Deliverable at a later date.

4 Catchment scale resource use efficiency, UK

4.1 Context

The Welland Valley Partnership (WVP) was formed in 2011 with the aim of bringing together stakeholders from the catchment of the River Welland and its tributaries, in order to forge ideas for, and progress, river enhancement activities, for the benefit of the water as a resource for the community and for the benefit of wildlife. The partnership is chaired by the Welland Rivers Trust, with a wide range of stakeholders, from individuals, local authorities and government agencies such as Environment Agency (EA) and Natural England (NE), farming representatives such as the National Farmers Union (NFU) and Country Land and Business Association (CLA), Non-Government Organisations (NGO's) and the local water company Anglian Water (AW). The Partnership is driven in part by the requirements of the Water Framework Directive (WFD) and is supported financially mainly by the by the EA. The WVP's Resource Protection Group (RPG) provides support for farmers in the river basin to help them contribute to improvement in water quality and ecology.

The Resource Protection Group (WVPRPG) acts as a stakeholder steering group for the case study. That group has met three times since the Project VALERIE kick off meeting and have been discussing possible trials and demonstration work.

The Game and Wildlife Conservation Trust (GWCT) is a partner in the WVP and contributes towards its objectives through the Water Friendly Farming Project (WFF). The project tests to what extent to which the WFD targets can be reached by applying practical evidence-based mitigation measures at the landscape scale and involves three headwater catchments, covering nearly 30km². Within the WVP there is a Resource Protection Group (RPG) with five members from the farming community, Government departments and non government organisations. The VALERIE cs stakeholder community contains the steering group for the WVPRPG:

- 5 local farmers within the Welland Valley;
- GCWT;
- National Farmers Union (NFU);
- Environment Agency (EA)
- Natural England (NE)
- Agricultural industry advisor;
- Conservation advisor.

4.2 Stakeholders

This meeting focused on the farmer stakeholders. All the farmers were invited to attend. Three attended

- Jeremy – Small-medium farmer/contractor in WFF project
- Sid – Large farmer/contractor in WFF project
- Christopher – Zero-till farmer in mid-Welland valley (on lighter flatter land)

One offered his apologies

- Michael – Zero-till farmer in Stonton catchment (priority catchment for Welland valley)

The meeting was also attended by Chris Stoate (GWCT) who is Chair of the WVPRPG. Chris will act as the link to report back to the full case study steering group.

4.3 List of innovation needs

4.3.1 Methods

This was an interactive session. The stakeholders were presented with the full list of research needs agreed at the kick off meeting. They were asked to consider which items were still relevant to them. The list discussed was as follows:

1. Weed Control in an arable rotation.
   - Black-grass control
   - Herbicide resistance
   - Grass rotations

2. Conservation and Environment
   - Conservation value of field margins
   - Beetle banks
   - Partnership working
3. Machinery impact on soil
4. Use of dredged silt
5. Cover crops
6. Snail Control
7. New methods of nutrient management
8. Genetically modified crop verities
9. Climate change implications for crop production

The meeting chair led the stakeholders through a discussion with a focus on ensuring the list was still relevant. The group were also asked to consider if any topics should be added to a revised list.

4.3.2 Outcomes

The outcome of this exercise was a revised and more focused list of innovation needs.
This list reflected the key themes highlighted in section 3.3 of the kick off meeting report:

- Management practices to release P and K from soils/soil amendments/role of trace elements in nutrient availability to crops

- Soil management and crop rotations to improve resilience to climate change. This includes continued improved understanding of the use of cover crops and tillage techniques to improve soil structure and soil health.

There is a demand for additional Fact sheets covering the possible increased mobilisation of phosphate by the use of soil amendments.

It worth noting the following:

- The stakeholders recognised that there is a lot of industry led work being completed looking at weed control in an arable rotation and it was decided that this would not be taken forward as a key theme.

- It was also felt that existing research and knowledge was available to cover the theme of Conservation and the Environment so this will not be taken forward.

- Further information on the use of dredged silt is no longer felt to be relevant.

- The final two topics of Snail Control and Genetically Modified Crop Verities are being retained on the list and will be reviewed at the next full meeting.

4.4 Review of Fact sheets

4.4.1 Method/exercise used

Two Fact Sheets provided by WP2 were used for this exercise; these were

- Catch crops to reduce N leaching
- Allelopathy: a tool for an integrated management of resistant Black grass (Alopecurus myosuroides) in United Kingdom

The method used for the review was as follows.
The stakeholders were reminded of two of the key topics discussed at the kick off meeting. It was recognised that the topics were still relevant although in session 3 of this meeting it was agreed that these topics would no longer be a key part of the case study.
The stakeholders were each given both Fact sheets and asked to read them as if they had just carried out a web search on the topics covered.
There was then a feedback session facilitated by the chair of the meeting where views were collated and agreed.

4.4.2 Outcomes

Fact Sheet 1 – Catch crops to reduce N leaching.

- The Fact Sheet did refer to the topic identified at the Kick Off meeting.
- Page one of the Fact sheet gave good background information.
- The sections on how to employ and costs were well received; the key comment on these sections were that the use of Latin names was not helpful.

The main recommendation were

- Links to practical case studies would be really useful
- Demonstrations of benefits to the following crop could have been demonstrated

Fact Sheet 2 - Allelopathy: a tool for an integrated management of resistant Black grass (Alopecurus myosuroides) in United Kingdom

- The Fact sheet did refer to the topic identified at the kick of meeting
- The Fact sheet provided excellent back ground information and knowledge.
- The overall view was that this Fact sheet did not offer enough and did not offer any thing in the way of practical solutions.

This quote summed up the feedback on his Fact sheet.

"This is not what I want in terms of what I can practically do – I need practical examples of what works, which gives a demonstration of costs, yield benefit and guidance on what to do. It great background information but has not offered me a solution"

None of the farmer stakeholders were inclined to look deeper into the information provided and utilise the references provided with each of the Fact sheets. A similar exercise will be carried out with the non-farmer advisory members of the case study (GWCT, NE, EA, independent advisors) at the next project meeting as it is likely there will be a different view from them.

4.5 Research topics that might be trialled

4.5.1 Method/exercise used

In order to decide the research that might be taken forward as trial or demonstrations the stakeholders were given the task of reviewing the revised list of innovations and looking at what work they could do on their farms. The aim was to come up with a field scale trial which could act as a demonstration for other farmers involved in the Welland Valley Partnership project. These trials also had to be able to link to possible future Fact Sheets.
This discussion was facilitated by the meeting chair.

4.5.2 Outcomes

From the discussion three topics for trials were agreed and each had an agreed farmer lead and demonstration site. These were as follows

1. *Investigate the use of biological additions / trace elements to help release nutrients which are locked up in the soil.* A lead farmer has been identified and the initial idea is that all three farmers present would undertake a trial where an agree treatment is applied a specified area in a crop that is established post harvest 2015.

   A Fact sheet covering the possible increased mobilisation of phosphate by the use of soil amendments would be very beneficial to this process.

2. *Cover crops 1. Trial the introduction of cover crops into a rotation.* One farmer has agreed to introduce a cover crop trial within his rotation. The aim of the trial will be to access the benefits or otherwise of cover crops on compaction, soil structure and crop yield.

3. *Cover crops 2. Trial the introduction of cover crops in continuous maize cropping*. The aim is to the ability of the cover crop to fix nitrogen, prevent erosion and run off and to improve soil structure and yield.

A planning meeting to finalise the trial plan is taking place on 17th June.

All the topics chosen for the trials have come from the farmer stakeholders and they all contribute to the aims and objectives of the overall Welland Valley Partnership.

5 Sustainable Forest Biomass, Finland

5.1 Report summary

The first VALERIE workshop meeting was held in Joensuu on 19th of January in 2015. The title of our meeting was "*The smart use of forest biomass and wood ash recycling*". Stakeholders represented a good variety from researchers and forestry service companies to industry. The aim of the meeting was to gather feedback on the VALERIE Fact sheets from the stakeholders. In addition, the target was to identify and to get feedback to the list of the main obstacles and research needs concerning wood ash recycling and use for fertilization and construction. The third target was to have discussions about the need for a pilot study.

More decision makers were invited to the meeting than the Kick off meeting and one presentation was prepared about the legislation and restrictions to use wood ash. In the kick off meeting stakeholders identified that one key problem to use wood ash for the recycling purposes is the lack of knowledge amongst decision makers.

The stakeholders analysed that it is essential to have a broad perspective for the wood ash recycling in this VALERIE case study project. Thus in the first meeting stakeholders came from forest fertilization and from road and soil construction. In addition, stakeholders came who represent wood ash recycling in practice e g. FA Forest who analyses the quality of wood ash and produces forest fertilizer and other wood ash products.

The stakeholders were mainly satisfied to the subjects of the first VALERIE Fact sheets. But some of the participants criticised the fact that the Fact sheets were in English. The stakeholders determined that new Fact sheets are still needed. 1) Forest fertilization and the use of berries and mushrooms, 2) Principals for the environmental requirements to use wood ash and 3) Best practices to use wood ash as a recycling material in construction.

In the participatory workshop stakeholders stated that the bottleneck for the recycling of wood ash is the lack of information about the positive impact of wood ash within the officers in the areas eg. cities, municipalities and regional organisations (ELYs and AVIs). Especially new stakeholders highlighted that problem.

It was decided to organize a field trial in the fall 2015 for the stakeholders and to focus for the decision makers to introduce different positive experiences to use wood ash recycling in Northern Karelia. It seems that in this case study there is a need for social innovations to put new research data into the practice.

5.2 Context

In the Joensuu area the share of bioenergy in energy production is very high and there are plenty of organizations who are interested about the wood ash recycling. More organizations were invited to the stakeholder meeting because a broader view about wood ash recycling was needed. Stakeholder meeting improved the networking of ash recyclers which is inadequate at the moment.

In the case study the Best Available Techniques (BAT) is clarified with the stakeholders. During this phase the needs for new research areas and innovations were identified. FA Forest have a vast practical experience of wood ash analyses, forest fertilizers and other wood ash products thus this makes them one of the key stakeholders. They have new (2013) innovation to use wood ash for constructions, new wood ash products to build roads and other green infrastructures eg. sport fields. Their products outperform the traditional materials being lighter and more frost resistant.

5.2.1 Stakeholders

In the first VALERIE case study meeting there was a good variety of research organisations and others which try to promote and increase the recycling of wood ash in the area of Northern Karelia. stakeholders identified as absent in the Kick off meeting were invited and attended to this meeting, as listed below.

Local energy cooperative from the community of Eno: The Eno Energy Cooperative owns 3 local district heating plants. Apart from supplying heat to the local communities. The Chairman of the broad participated to the meeting. He mentioned that officer's need positive information about the benefit to use wood ash for forest fertilization.
WEB LINK: http://enonenergia.fi/node/6

Fortum: The largest energy company in Finland. Fortum owns the largest power plant in Joensuu and is currently constructing a commercial bio-oil refinery using wood as its raw material for oil extraction. Fortum currently employs about 70 persons in Joensuu. However, when taking into account the whole forest supply chain, work is provided for many hundreds of persons in the region. The Sales manager participated to the meeting. She noted that it is the problem that there are difficulties to utilize the wood ash.

The Finnish Forest Centre: is a state-funded organisation covering the whole country. *An* Administrative manager participated to the meeting He said *"We are tasked with promoting forestry and related livelihoods, advising landowners on how to care for and benefit from their forests and the ecosystems therein, collecting and sharing data related to Finland's forests and enforcing forestry legislation. Our Metsään.fi-eServices offer the latest information directly to forest owners on their properties. The Finnish Forest Centre operates under the guidance of Ministry of Agriculture and Forestry".*

Regional development centre JOSEK*:" JOSEK serves all companies in the Joensuu region, from start-ups to established enterprises developing their operations. The business consulting service also assists enterprises and organisations seeking to locate in the Joensuu region."*
The project manager participated to the meeting. He described that a lot of work has been done to make it easier to utilise wood ash. But still the processes is slow to get permission for the new facility.

FA Forest Ltd. Manufacturer of wood ash fertilizer of forestry and produce wood ash products for the constructions also. The Development manager participated to the meeting. He described that a lot of work has been done to make it easier to utilise wood ash. But still the processes is slow to get permission for the new facility.

Apila Group Ltd. Company providing environmental consulting and expert services.*The expert participated to the meeting. She described that the regional network for the wood ash stakeholders need to build up.*

North Karelian regional council. Develop the areal economy and give founding for the research and development.*The officer from the regional council participated to the meeting. She mentioned that the knowledge about the possibilities to use wood ash in the construction of city area is needed.*
WEB LINK: http://pohjois-karjala.fi/english

University of Applied Sciences in Karelia. One student participated because he is working with his master thesis about the recycling of wood ash by *the Local energy cooperative from the community of Eno.*

Joensuu Science Park Ltd. develops business life in and abound Joensuu by offering high-quality facilities services and business development services to support companies growth.

The development manager and the development expert participated to the meeting because they have projects related to the wood ash recycling and especially for ash roads.
WEB LINK: http://www.joensuuntiedepuisto.fi/about

The Centre for Economic Development, Transport and the Environment (ELY) are responsible for the regional implementation and development tasks of the central government. Finland has a total of 15 ELY Centres, which are tasked with promoting regional competitiveness, well-being and sustainable development and curbing climate change.
The officer from the ELY –center participated.

Ramboll Ltd. is a company to creating sustainable and long-term solutions for the customers and society. The expert for the wood ash constructions participated to the meeting and he had short presentation.

OTSO Forest services for the private forest owners.
The areal leader participated to the meeting.

LUKE (previous **METLA** Finnish Forest Research Institute). Research institute carrying out research on all aspects of forest.The expert in bioenergy participated to the meeting.

Linnunmaa Ltd. provides expert services related to regulatory compliance and environmental management in high-level expertise in European chemical and environmental law and diversified natural sciences. The expert in management participated to the meeting and had presentation. The full list about the stakeholder who participated the meeting is in the case study report.

5.3 Methods

The contents of the meeting followed the guidelines provided but there were also technical presentations:

- Expert in management Eeva Punta from Linnunmaa Ltd, about the Restrictions for the use of wood ash
- Development manager Mikko Räisänen from FA-forest Ltd. about experiences to use of wood ash in the forest fertilization and in soil construction. And
- Forest road specialist Ilppo Greis, Tapio Ltd. introduced the wood ash road innovations.

The presentations gave very good background information about wood ash recycling and included a good overview about what are the main benefits of wood ash recycling but also highlighted some of the main problems. In the Kick off the stakeholders underlined that the restrictions to use wood ash is the key problem to use wood ash as a recycling material. The participatory workshop started with the presentation from Sales manager Riia Kiuru from Fortum about side products from energy industry.

5.4 List of innovation needs

5.4.1 Methods used

The list of innovation and knowledge needs generated in the Kick off meeting was reviewed. It was explained that that two Fact sheets (2 ready and 1 draft Fact sheet) were prepared based on this list. Participants were reminded that the Fact sheets would be revised and new ones generated for the next stakeholder meeting.

5.4.2 Outcomes

Revised/annotated reference list to return to WP2

Reference lists were not prepared nor was there much talk in detail about this, but the people liked the idea of having reference lists in addition to Fact sheets. Especially for complicated issues where there is a lot of information available but which would be difficult to capture in a Fact sheet (e.g. due to a lack of clear results, conflicting results which require interpretation, or lack of clear guidelines), it would be good to have reference lists.

Selected topics for WP2 to prepare Fact sheets

The following topics were selected for which a Fact sheet would be useful:

- What are the best practices to use ash as a recycling material in construction? (roads, sports fields). What are the advantages of ash recycling in road construction?
- What do we know about at which levels of heavy metal concentrations wood ash starts having a noticeable impact on berries and mushrooms (in terms of heavy metal concentrations)?
- What levels of wood ash fertilization have an impact on the growth of berries and mushrooms?
- What are the advantages of using wood ash as a forest fertilizer?
- What is known about boron (B) deficiency in for example spruce forests, what is the impact of B deficiency and can wood ash improve this?
- Which levels of heavy metal concentration in wood ash start having an impact on the environment? Can we identify a threshold level?
- Overview of the factors which affect the (fertilizer and chemical) quality of ash. Burning 100% wood gives good ash but mixing with peat results in lower quality. There are many more factors such as the type of power plant (old or new), which part of the tree is used, different fly-ash fractions, etc. This is important for mixing the ash fractions in order to obtain a mix which is good in terms of fertilizer quality and levels of heavy metals.

List of research gaps

- What is known about the environmental impacts of aluminium in wood ash? This is not a heavy metal, but in wood ash aluminium is possibly more harmful compared to heavy metals (depending on the concentrations).
- Information on wood ash recycling, and related regulations and practices from other European countries than Sweden and Finland would be very valuable.

5.5 Review of Fact sheets

5.5.1 Method/exercise used

Two Fact sheets (*Application of wood ash fertilizer for enhanced forest growth* and *Recycling of wood ash as a fertilizer*) were sent to the stakeholders in the week before the meeting so that the stakeholders had time to read them. During the meeting the aim of the Fact sheet was explained (present relevant information in an accessible format). This was followed by a group discussion where there was an attempt to get answers to the questions below. Due to time limits an evaluation form was handed out, which the participants could fill out during the meeting or, if they would like to take more time, return the form by post or e-mail.

5.5.2 Outcomes

Evaluation of Fact sheet according to meeting guidance provided.

a) Do the Fact sheets refer to the question(s) formulated in the Kick off meeting and recalled in this meeting?
Although most participants were new to this project (there was one person present who did attend the Kick off meeting), based on what was explained, the general feeling was that the Fact sheets did answer the questions formulated in the Kick off meeting.

b) Is the Fact sheet relevant for the stakeholders? (explain the yes/no answers) (style clarity, format etc)
Mostly yes. (the wording used here is that used in the feedback by the participants).

- For one stakeholder it wasn't clear who is the target group for these Fact sheets? In his/her opinion the content or language was too scientific. There are several practical guides on this topic available already and EFI is not the right organisation that guides forest owners on practical things

- The stakeholders from the larger companies thought these Fact sheets were useful for informing people. The larger companies have good access to information, have own material and clear plans about what to do next. However, their smaller partners do not have this information so these Fact sheets were very useful to give information to other parties and to accomplish an integral opinion.

- It opens up a new way of thinking about questions related to ash recycling.

- Yes, Fact sheets are very necessary. They should always include different experts' view points and be comprehensible and complete for the various parties (producers, authorities, universities, material handlers, other experts). In addition, it should be ensured that all those in need of information receive the material.

- The Fact sheets are also important for raising awareness about forest issues. For example for spreading knowledge to young forest owners, forest owners living in the cities who actually rarely or never see their forest and also politicians.

c) Where next? what gaps? what changes, what improvements?
- Fact sheet should be translated into Finnish.

- More practical information what forest owners can use. More practical details.

- More information about the costs. The costs were outdated.

- Another comment was that Finnish companies are in the first place interested if there is a financial benefit. Of course, a certain activity or management cannot do any environmental harm and the companies will not neglect the environmental aspects. However, if there are only environmental benefits but no financial gains, companies are unlikely to adopt a certain activity. If there would be a win-win situation (both financial and environmental benefits), companies would be very interested.

5.6 Research topics that might be trialled

5.6.1 Method/exercise used

In the workshop invitation and in the introduction about the VALERIE project the stakeholders were prepared about the possibility of doing a field trial or demonstration study. It was explained that it cannott be a very large research project but that it has to be something what is feasible within the time frame of the VALERIE project and within the given resources.

During the first sessions of the workshop there were presentation by some of the participants with the aim of giving information, provide a background for the participants for further discussion and substance for further thoughts which could inform the decision about the trial.

5.6.2 Outcomes

List of promising topics for trial/demonstration

Testing ash fertilization on mineral soils: In Finland, ash fertilization is mainly applied on peat soils. Peat soils generally have a lack of P (Phosphorus) and K (Potassium) so for this reason ash fertilization has a positive impact on tree growth. Ash also contains calcium which improves the pH of the soil which in turn also has a positive impact on tree growth. Mineral soils on the other hand are nitrogen limited and slow tree growth is due to a lack of nitrogen. Ash does not contain nitrogen so in theory ash fertilization on mineral soils will not be very beneficial. There are however some indication that also on mineral soils ash fertilization could have a positive impact on tree growth (this could be related to P, K, Ca or B deficiency). It is also possible to add nitrogen to the ash fertilizer. The idea is now to test ash fertilization on mineral soils. This could be important as in Finland 34% of the forest and other wooded land is on peat and 66% of the forest is on mineral soil (the figure for North Karelia happens to be the same as for the whole country, 34% peat / 66% mineral soil).

One stakeholder suggested that this topic is actually not so important. This somehow stopped us from making an agreement on a topic for the trial. After that Michael den Herder (VALERIE expert) suggested that in VALERIE there could also be the possibility to organise a field excursion or a field course, in case no suitable topics for a field trial could be found. The participants welcomed this idea and said that actually quite a lot of research has been done already on ash recycling, so the knowledge is there but the current legislation and policy are the main barriers for using this practice. Also it is hard to retrieve all this knowledge. So a field course or demonstration for policy makers to show the possibilities and the advantages of ash recycling would be very much needed.

After the meeting Saara Lilja-Rothsten and Michael den Herder were thinking that it would be possible to proceed with planning the field trial as mentioned above and combine this with an excursion to the demonstration site(s) for relevant stakeholders and regional policy makers.

Suggested sites (monitor) where trials can be set up

FA forest, the ash recycling company was quite eager to participate in the field trial. This has to be followed up during spring 2015.

6 Innovative arable cropping, France

6.1 Summary

Farmers from the Berry region in the centre of France are essentially arable farmers of intensive production systems based on a short rotation of rapeseed, wheat and winter barley. Faced with stagnant yields over many years, a group of them have expressed growing concerns about the long- term profitability and sustainability of their farming systems. Their demands resulted in the establishment of a network of arable farmers and advisers. Group discussions, regular meetings and trials have started in 2005 with the coordination of the advisor, Gilles Sauzet. The group aims to develop new techniques and investigate alternative approaches, such as association with leguminous crops, to reduce the impact of farming on the environment and improve soil properties. Gilles Sauzet has worked with farmers from this region for over 20 years. He is a privileged witness of the questions raised by farmers, their ongoing trials and the progresses made with regard to agricultural practices. The group expanded in 2013. Farmers' interests gradually turned to solutions related to soil management including the drilling of crops on covered soil and direct seeding.

The objectives of the VALERIE project were first presented to the farmers' group at a meeting in May 2014, a meeting regarding innovative cropping systems. The meeting reported here in Levroux in mid-February 2015 aimed to ensure that all participants, farmers and advisors, have a good understanding of the project and their role. The introduction (and update) of the aims of VALERIE generated many remarks on the access of information and the quality and validity of information sources available on internet. Farmers and advisors confirmed their interest and involvement in participating in the VALERIE project.

Following the slide presentation of the VALERIE project, a working session in 3 phases took place to: 1) identify and formulate the issues related to "soil management topic and covered soil" confirming their knowledge needs, 2) review and define their profile and 3) to gather their feedbacks on Fact sheets' examples prepared by the WP2 to appear in the search engine ask.Valerie.

The first session aiming to establish and validate the knowledge needs allowed a time slot to farmers to individually write their research questions. Afterwards, each farmer was invited to share his research questions which were discussed and reformulated in a plenary session. In total, six questions were formulated and validated collectively. On this basis, a dynamic agenda was subsequently constructed (backoffice). This session required more than a third of the entire three- hour long meeting.

In the second activity session, a group profile description was submitted to them and discussed in order to reach an agreement on the proposal. In the last session, three relevant Fact sheets translated in French were distributed to each farmer. Participants' comments on these Fact sheets examples concerned both the format and the content. Clear visual description and synthetic tables on potential innovations would be highly appreciated. In fact, farmers seek precise, pragmatic information of concrete innovative practices with context description and evaluation of the gains and risks.

At the end, the type of trials that could be put in place were discussed. The suggested trial to be initiated this summer is an in-field evaluation method of soil properties. To conclude the meeting, meeting at least once again by the end of the year was considered.

6.2 Context

The arable farmers in the Berry region from central France (departments of Indre and Cher) grow mainly rapeseed, wheat and barley winter. They farm on surfaces varying from 100 to 500 hectares on various soil types but principally on superficial calcareous clay. Despite genetic progress, the average yields have not increased for over 20 years.

Since 2005, some farmers gather in the presence of their advisor Gilles Sauzet to find solutions to maintain the economic viability and sustainability of their farming systems. For farmers keen to move towards more efficient systems, in economic terms and productivity, improving soil quality is the primary objective.

Short rotations have been identified as the first weak point, responsible for recurrent weed problems. To tackle them, farmers have evolved gradually towards simplified tillage in terms of number of interventions and working depth. However, this simplified tillage is not always in line with the structural qualities of the soil.

A slight crop diversification to extend the intensive, high input production systems based on a short rotation of rapeseed, wheat and winter barley took place in the last ten years. Farmers introduced various crops: sunflower, corn, durum wheat, and legumes mixed in the crop or between crops.

In sum, the group of farmers coordinated by the advisor Gilles Sauzet aim to develop new techniques and investigate alternative approaches that reduce the impact of farming on the environment and improve soil properties. Amongst them:

- Improving the quality of oilseed rape drilling and autumn growth in order to better withstand autumn weed and disease threats, and limit spring nitrogen input
- Direct seeding in permanent cover: e.g. oilseed rape sown together with cover crops, then direct seeding of wheat under cover of clover or alfalfa

Group discussions, regular meetings and on farm testing have started in 2005. The group expanded in 2013 with the introduction of a new project called “SYPPRE”. For this project, a dozen farmers meet 3 to 4 times a year to elaborate innovative cropping systems. These meetings appear to be suitable settings for discussing with farmers on the VALERIE project.

6.3 Innovation/knowledge needs

Six research questions have been formulated collectively as a result of the workshop. The questions are presented in the order of appearance within the group dynamic. Question wording was progressive and collective. It was decided to transcribe the construction steps of the questions: from the keywords or ideas shared by farmers to the final question (in bold) collectively constructed and agreed by the participants (see full details of the method in the case study report).

1- Nitrogen / behaviour of nitrogen / nitrogen cycle in the soil / + carbon / + MO / key nutrients cycle in the soil according to different cultural practices (Direct sowing, strip till, cutlery, tillage) or cropping system.

Seeking to break misconceptions on nutrients cycle (eg direct sowing increases the OM content of soil; OM can be found concentrated at the surface as mineralization occurs less easily).

"What are the effects of direct sowing, covers, and soil tillage on the nitrogen cycle, its redistribution, and release (and the dynamics of the MO and carbon)?"

"What are the effects of agricultural practices such as direct sowing, cover crops and soil tillage on the nitrogen and organic matter cycles and availability? "

2- Factors influencing the dormancy of weeds, weed biology in particular.

"What influences the weed dormancy?"

What does influence (trigger) the end of dormancy i.e. the germination of the weeds?"

3- In-field methods of soil structure evaluation. Evaluation of physical, chemical and biological soil.

These methods must be simple, without measures, achievable in field in 10 minutes by a farmer.

"What are the ways of field evaluation (operational) of the soil structure? (But not only: the physical, chemical and biological soil)

"How can we evaluate in the field the properties of the soil (its structure, its texture its "health")? What are the possible evaluation methods?

4- Field Waste Management / (crops, soil covered with straw, harvested crop, planting in a covered) during crop drilling.

What to do with residues at sowing?

- Direct seeding techniques in a cover, living or dead mulch
- Methods of destruction of a cover
- Impact of residues' decomposition on the successive crop (release / consumption of nitrogen)

What tillage tool to use to ensure proper drilling/ proper positioning of the seed in these residues? (Tool with tines or discs, grinding?) What depth, what soil preparation? What depth of burial?

"How to plant a crop on soil covered with crop or residue?"

"How can we best drill (sow) a crop through a soil cover (soil covered by a crop or crop residue)?"

5- Adaptation of species cultural environment

How to assess the effect of the variety, its behavior according to the locations of techniques, cultural environment?

"Is there any tests on the adaptation of varieties, species and cultural practices not only to environmental changes? »

"What results do we get on trials of the varieties of rapeseed, wheat, sunflower and leguminous crops according to farming practices (direct sowing, cover crops, land tillage, etc)?"

6- Biological protection / "green" alternative means

What means are available to strengthen plants' defence? What are their practical in-field efficiencies?

"What are the effects of alternative plant protection means (biocontrol, extract of fermented plants (nettle teas), and elicitors of natural plant defence mechanisms)? "

"What are the practical impacts of the use of existing alternative plant controls and protections?"

6.4 Presentation and review of Fact sheets

6.4.1 Remarks on the Fact sheet's content:

- Importance of economic evaluation (costs estimation): need to provide not only the price of the machinery but to give feedback (indications) about the savings generated. It is important to give a concrete example (illustrate) for a given operating context and to say how this innovation is advantageous/beneficial in a given context.

- Identify the optimal conditions of the use of a technique. Use synthetic symbols such as "green lights, red lights" to indicate level of risks taken associated with the implementation of the innovation

- Specify "warning conditions" regarding the use of the innovation.

- Stay objective: share only verified information

- Integrate hyperlinks to other sheets on related topics. Add a section with links to trials results, testimonials / videos of farmers (concrete case). Links to references would be appreciated.

- Show visually existing differences (discrepancies) in the technology, innovation in order for reader to be able easily understand/compare (eg between a good and poor soil structure; provide images).

- Give a clear and concise description of the methodology of technology or innovation

- Add a section to identify the Fact sheet with keywords

- If the Fact sheet concern trials, describe the experimental conditions and make clear/explicit that "there are no recipes", rather trials are "food for thought."

One farmer summarized the essential information to be synthesized on the Fact sheet as followed:

- What is it?
- Why?
- How?
- Risks (advantages and disadvantages)

6.4.2 Feedback on the Fact sheet's format:

- Clearly state the objective of the technique/innovation presented, so as to not confuse with a problem to solve.

- Homogenize the format of the Fact sheets

- Alert the risks of the techniques precautions: Red Lights / greens to the terms of use. Write a synthetic "risk" section, such as on a table, to alert farmers.

- Present a “decision tree” to guide the selection/choice/appreciation of the reader on the innovation.

- Integrate a matrix of conditions (favorable or binding to adoption) or any other system of evaluation of the technical / innovation (optimal conditions?)

- Integrate a table of decision rules (according to soil and climate context, etc.)

- Highlight contrasting situations, special cases

The overall comment on the usefulness of Fact sheets is that the synthetic format ensures the best valorization of the work as Fact sheets are more easily read and consulted by farmers than the scientific documents. These Fact sheets should be simple, visual, concise, and effective.

6.5 Potential trials and future meetings

The advisor Gilles Sauzet confirmed the possibility to meet before September for discussing the setting up of field trials. A tentative date of mid-June was suggested to reflect on the trials to be conducted based on relevant documents and resources provided by WP2 until then.

This upcoming meeting will be the opportunity to identify on which farms to set trial plots, to evaluate the costs, to precise the methodology of the trials, to identify further information needs, etc.

Gilles Sauzet also stated that by the end of the year, it will be possible to hold a second meeting to update farmers on the progress made in the VALERIE project regarding the search engine Ask.valerie, the Fact sheets writing and the selected documents relevant to the knowledge needs identified.

Farmers clearly expressed their interest to participate in these upcoming meetings so to keep up with the progresses of the VALERIE project and search engine.

It was also agreed to hold the VALERIE project’s meetings in the wake of meetings of SYPPRE project; project on designing and testing prototypes of innovative cropping systems.

7 Agro-ecology: reduction in use of plant protection, France

7.1 Report summary

The aim of the meeting was to present the VALERIE project to the farmers, to collect their themes of interest to confirm the issues they identified with the local partners last time, and finally get feedback on the Fact sheets that the cooperative sent by email in advance to the farmers 2 days before the meeting. Finally, a list of priority themes was set up and a trial to carry on was identified.

7.2 Context

This meeting was held in conjunction with Qualisol and the Casdar project partners, because the aims of the 2 initiatives (VALERIE and Casdar project) are close, they promote a bottom-up approach and transfer innovative practices on the ground. It was the second physical interaction with the local partners (Qualisol, Auzeville college notably) and the first real opportunity for us to present the VALERIE project to the farmers, because in July 2014 the kick off meeting was held during the harvest season and only 2 farmers attended the meeting.

Table 7.1 The priority themes for farmers according to time span

Themes	Prioritary	Mid term	Long term
Precision agriculture	4	1	1
Planting under cover and associations			2
Saving on all the products			2
CIPAN	4	2	**5**
Localized Fertilisation	6	2	2
Varietal improvement			1
Soil tillage (Simplified Crop Techniques)		**5**	
Low volume	**12**	4	
Efficiency of products		1	
Localized weeding	2	4	
New crop	1	2	
Irrigation - proteins	1	1	
Biostimulants		1	
Organic Agriculture		1	
Piloting nitrogen - protéine	1		
Modulation of seeding	1		
Economy, saving	2		
Piloting nitrogen	1		
TOTAL of FARMERS	**35**	**24**	**13**

7.3 List of innovation needs

7.3.1 Methods used

It was agreed with Qualisol (both were interested by this information) to collect the priority themes for farmers giving them 3 different colour sticking notes to fill in depending of the term/urgency : short term, mid term, long term. Unfortunately, there was not time to present

them the detailed result of the grouping but only a rough synthesis and have no time to interact after that. NB : this exercise occurred after the presentation of the Casdar project so perhaps the farmers were a bit influenced by the themes just presented before.

7.3.2 Outcomes

The result of the themes collection give us some input for-:

- Revised/annotated reference list to return to WP2
- Selected topics for WP2 to prepare Fact sheets
- Revised innovation needs list for DA completion

7.4 Review of Fact sheets

7.4.1 Methods used

During the meeting in the morning, we listed the 7 Fact sheets available in English related to the case study, and the farmers voted the 2 ones they have more interest in to distribute them. And after 5 min to read it, they were asked for their feedback in plenary. The totality of the 7 Fact sheets were picked by farmers interested after the end of the morning. In the afternoon, the whole Fact sheets were discussed in a tightened group with Qualisol and Auzeville college.

7.4.1 Outcomes

Feed-back of farmers on the 7 different Fact sheets:

1. Methods to reduce reseeding plots weed seeds: little interest in this form. Only a few isolated farmers with soiling problems have arisen.

2. Recovery chaff: farmers immediately said that this subject did not interest them because i) they do not sell straw and returned to the soil to reduce the doses of fertilizers and ii) because the majority their plots are on slopes and the equipment required on the combine harvester would present a safety hazard.

3. Low Volume Spray Technique: This Fact sheet interested them because many are working on it. They raise an error: the technique of low volume would aim to keep the same concentration and not the same dose per hectare. Farmers already well mastered it.

4. Désherbinage: little interest, they already mastered this technique.

5. Herbi-planting: combining planting and localized herbicide application. Some farmers were interested but already mastered the subject.

6. Association of vegetative cover with rapeseed: no interest in this Fact sheet.

7. Improve the quality of bread wheats by late mineral fertilization: Fact sheet having collected the maximum of interest. In fact, most farmers grow bread wheat and seek to improve the quality of their wheat.

<u>Global feedbacks from farmers on the Fact sheets</u>

2 Fact Sheets: "Improving the quality of bread wheats by late mineral fertilization" and "Low Volume Spray Technique" were selected by farmers and distributed for analysis.
Farmers find the format (2 pages) adequate, but the content as too general did not bring them anything new. They are already very advanced and accompanied on innovative techniques. However, they found that these Fact sheets could be a good first approach. The content seemed to them proper and accessible in the language level.

Overall feedback of facilitators of the CASDAR project "collective mobilization for agroecology"

The format:
o The Fact sheets are static and therefore unattractive media: making short videos for farmers and advisors
o The two-page format is sufficient for someone interested in innovation. "We cannot give ready-made recipe"
o There must be more illustration in Fact sheets, and reduce the text
o Keep the same outline and the same layout for all the Fact sheets: making boxes to fill in.
o Make a more visual table for advantages and limitations and do not be afraid to highlight the limits because it's what farmers look first. It is necessary that the reader can look at the table quickly and get an opinion on the presented technique.
o Conditions of implementation of the innovation should be at the beginning of the Fact sheet.
o It might be nice to create visual warning signs to help the reader.
o It is necessary to keep the sentences as short as possible.

- Content:
o Beware that the results indicate the dates and experimental conditions.
o We must pay close attention to the references.
o Be careful with numbers, one must be sure of the figures otherwise it is better not to give.
o We must insist on the need for technical support for some sophisticated innovations rather at the beginning of the Fact sheet.

Feedback on some specific Fact sheets:
- Low Volume Spray Technique: error on the conservation of the dose was re-raised. This is the concentration of conservation. Should be added to the temperature conditions that vary widely depending on the products from 5 to 20 ° C.
- Association of vegetative cover with rapeseed: there is a thesis in INRA Grignon on this subject.
- Recovery of chaff : see with INRA Grignon because they have worked on this subject.
- Improve the quality of bread wheats by late mineral fertilization: It lacks data on the yields of different fertilization techniques. It is a very sensitive subject so it is imperative that the information be locked and checked.

These major feedbacks on Fact sheets were returned to WP2 by Aurelien and Yolaine.

7.5 Research topics that might be trialled

7.5.1 Method/exercise used

The trials were discussed in a tightened group in the afternoon with Qualisol and Auzeville college without the farmers that were free after the meal to go back to their farms or to stay to follow the discussions.

7.5.2 Outcomes

These promising ideas for trials were discussed:
- test flour derived from associations durum / peas or lens;
- crop selection according to the weed;
- bio-herbicides.

The various members of the afternoon group agreed to work on bio-herbicides. This is the second of the five priorities of Ecophyto. The theme could be: "Bioherbicides and regulation of plant cover"

The trials would be set up on the platform of the Agricultural College of Auzeville but as it does not benefit official recognition as a trial platform, the trials would therefore be carried on in collaboration with ACTA and Qualisol.

The first trial could begin in October with the destruction of the autumn cover.
It is important before to review the different bio-herbicides in Europe or further, to assess the possibility to use these bio-herbicides and get them, and then to check what trials have already been carried out on these products.

8 Sustainable Forest Management and Ecosystem Services, Spain

8.1 Report summary

The meeting reported here follows on from two previous meetings, devoted respectively to an initial contact of the forest owners' grouping and introducing the facilitator (USSE/FORESNA), and to resolving initial bureaucratic troubles. This meeting aimed at presenting the progress so far, identifying new challenges and consequent innovations required, and agreeing on the next steps. Due to initial delays in the establishment of this case study, the aims of this meeting were commensurate with those of the Kick-off meetings (as described in Deliverable 3.311) since the goals and visions of the case study stakeholders and their innovation needs are still being identified.

8.2 Context

The management of private forest, in order to enable the implementation of management so as to offer all the services and benefits of the ecosystems in the forest, encounters many difficulties. Several factors are listed below.

- Several difficulties need to be overcome for forest development and the proper management of ecosystems and biodiversity in the Pyrenees:
  - Land division and difficulty to identify boundaries.
  - Low-scale timber extraction vis-à-vis natural growth.
  - Average product quality: low to medium.
  - Absence of infrastructure for land holding expansion.
  - No awareness of the importance of forests in territorial projects.
  - No appreciation of ecosystems and the services they can offer to the community.
  - Multiple restrictive legal practices; no constructive legal forms.
- Against this background, the goal within VALERIE is to:
  - Promote rational forest management through the coming together of landowners and efficient planning.
  - Design a new forestry management project with new silvicultural practices and sustainable forestry management certification (PEFC).
  - Optimise the use of resources and infrastructure to reduce associated environmental costs and impact.

Two meetings with the different agents were held simultaneously for the implementation of the management and coordination of the steps required to achieve the goals set out above, since one of the characteristics of the forestland is the involvement of both the local authority and the Government, who need to approve actions and decisions.

8.3 Stakeholders

Attendants were of two types:

- The major of the town (1)
- Private forest owners with interest in setting a functional group (9)

The meeting was convened through a letter which was sent to 110 people identified as landowners in massifs of interest for a Forest Owner Group. Around 60% already participated in previous meetings and have some previous commitment, while 40% were contacted for the first time. A 2- page survey was enclosed with the letter and asked to be delivered during the meeting or through other means (i.e. scanned by email) and this was used to identify innovation needs.

During the meeting, the objectives of VALERIE Project were explained. A lack of interest in the project was noticed, and the spotlight was put on whether the project would have tangible results for the land or their properties.

8.4 List of Innovation needs

Participants highlighted the following problems

1. The passive attitude of some members.

2. The costs of setting up a joint forest management land.

3. The split of the costs and the benefits of the actions envisaged within the management plan. This is crucial as proxy for acceptance and feasibility.

4. The criteria to design new infrastructures, i.e. how to fit the most efficient design of forest roads from a technical point of view with the consent of the affected landowners. This is very relevant insofar as some landowners may not be members of the group, or may not have incentives for consent given that their own benefits decrease for the common benefit.

5. The actual economic feasibility of the group, namely, some information on the wood market and its new biomass products, as well as whether wood dealers would be interested in their wood given the topography and quality. They were curious about extraction methods.

Participants mentioned other problems as secondary, and to be discussed along the elaboration of the forest management plan. These were: forest health problems regarding plagues, and forest stability in front of windfalls.

Case study goals and visions

Overall it was agreed that the shared goal of the case study is to establish and consolidate a functional forest owners' group with the primary goal of mobilizing wood. It became clear during the meeting that wood harvest is the priority, while some secondary aspects are expected to emerge in later phases.

List of detailed research questions

RQ1: Which options (i.e. technology) exist to reduce joint forest management planning costs?

RQ2: What is appropriate for balancing costs and the benefits of the management plan actions to achieve fairness and efficiency? (and hence acceptance and feasibility)

RQ3: Which are the criteria to design linear infrastructures affecting several landowners to become accepted?

Research agenda/dynamic agenda

It was agreed that local landowners will convene known forest owners, and will push a large assembly to make the decisions on:

- Internal conflict resolution
- Launching the forest management plan

USSE/FORESNA will search for insights to the previous questions, with focus on new aerial technologies, and EFIMED on collective decision-making alternatives. Moreover, a FORESNA technician is committed to visit the zone with local landowners in order to personally see the bottlenecks perceived by the participants. Additionally, there was an idea to invite someone from neighbouring forest owners' groups to ask about the internal working rules, especially how did they deal with the forest roads' issue.

9 Improving Milling Wheat quality, Italy

9.1 Report summary

This report aims to summarise the outcomes of the first meeting with the stakeholders for the case study on bread wheat quality in Alessandria's County. The context of the scene and the participant profiles will be illustrated. In the following paragraphs, the programme of the meeting and all the activities performed will be described, giving particular stress to the method used to approach the divers group of stakeholders during the whole duration of the meetings. Generally, participatory methods were used as much as possible avoiding plenary discussion, which could have brought confusion during the meeting. The major steps of this meeting concerned a refresh of the VALERIE project objectives, a first evaluation on a possible output of the VALERIE platform (ask.Valerie) called hereby as fact-sheets, an A/B split test workgroup on two possible themes for field demonstration, and conclusion on future activities for the project. The meeting was successful as the kick-off meeting was and provided a first impression on the VALERIE Fact sheets, which was in its entirety positive but not responding yet to the needs of the case study. The A/B split test on the themes for the field demonstration comprised the use of cover crops to allow higher intake of N fertilizers, and the use of quick methods to assess grain quality before the harvest in order to organize the storage and to map the arable land of the County. According to the workgroup results, our stakeholder community prefer the quick method assessment instead of the catch crops. The meeting concluded with a timeframe for future activities comprising the set-up of the field trials (within June 2015) and possible other meeting at mid or at the end of the summer in order to show the field demonstration.

9.2 Context

Bread wheat is one of the most important crop of Alessandria's County. According to national statistical data of 2014 (ISTAT), this County is the third most important for bread wheat production in Italy. The estimated bread wheat area is about 37 thousand hectares in 2013, whereas in 2014 it decreased to 33 thousand hectares. This comprise up to 30% of all arable land. The number of farms growing wheat was about 4 thousand in 2013, slightly decreasing in 2014. The total amount of yield is about 202 thousand tons, corresponding to 40 million of € of income. It was estimated that the average yield is about 5.5 t/ha (next to the national average).

While 2013 was a standard year for wheat production, 2014 was a very difficult crop year. That was due to the climate, which was very wet during winter and also during summer, when grains were ripening. Those weather condition caused big problems to the crops in terms of developing of the crop at the first stages (flooding and inaccessibility in fields during early springs) and ripening issues dealing with kernel quality and specific weight. In addition, high humidity conditions increase the contamination of mycotoxin as DON. Because of lower quality and contaminated production, prices shut down of 15-20 %. This resulted as bad blow for most of the grain growers and discouragement spread over the community. In 2015, a better climate situation is expected and the confidence in this crop as it was in the previous years.

Next to the agricultural production, other members of the supply chain play an important role as well. The most important are cooperatives offering storage facilities, which collect most of the grains of the area, the millers of different sizes and capacity and seed and pesticides companies (retailers and producers). Moreover, there is a lack of organization for wheat production, which is seldom linked to commercial contracts and most of the production is mixed instead of being sorted according to quality standards. The concept of supply-chain has not yet developed in this area, not only at farmers' level, but also from storage centres and processers, who prefer buying from abroad.

For this case study, Cadir Lab decided to include the whole supply chain, and its members, in order to have a more comprehensive vision and approach over the case study and to stimulate them to the concept of production under contract.

9.3 Stakeholders

The stakeholder group evolved from the previous composition of the kick-off meeting thanks to the period (winter) and new contacts created during the past year. As last time, all members from the whole supply chain were present and comprised, in brackets the number of participants: seed companies (2), Storage cooperatives (3), technical inputs providers comprising sellers (2) and one big company (1), farmers (8), technical advisers from farmers' unions (3), making a total of 19 participants..

9.4 List of innovation needs

9.4.1 Methods used

Innovation needs and issues that came out during the Kick off meeting were listed but there were few comments and no change were brought to the list. Basically, problems are still the same and no innovations had been brought to the case study yet. This activity will be repeated when the field demonstration will be running (end of 2015) and at the end of the meeting series.

9.4.2 Outcomes

The following is a list of topic for this case study to return to WP2, in order to feed ask.Valerie with documents, fact-sheets, project reports and papers

1. Late fertilization to foster quality in superior bread wheat varieties (being already a Fact sheet)
2. The use of catch crop to reduce N pollution in fields and aquifers (fact-sheet)
3. The use of NIR to predict quality in bread wheat grains before harvest
4. Quick methods to assess DON on grains
5. Tolerant varieties to Fusarium infection and DON contamination
6. Remote sensing to monitor crop conditions during the whole season.
7. Precision farming on wheat
8. The best weed management scheme to decrease resistance
9. Best management practices to reduce mycotoxin contamination
10. Alternative and innovative ways to process wheat: e.g. waxy varieties
11. Conservation agriculture practices
12. Conservation of grains in silos without employing chemicals
13. Influence of silobag on grain quality (especially milling quality standards)
14. How to increase biodiversity in cereal based crop system
15. Use of certified seeds vs self-produced seeds

New selected topics for WP2 to prepare Fact sheets
From the partners' point of view the first draft of Fact sheet was not totally responding to the main issue of the case study. If possible, it would be interesting to have other Fact sheets available for the case study on other themes such as: point n. 3, 4, 5, 6 and 10. Those Fact sheets should focus on bread or biscuit making wheat, as they are the most common quality typologies grown in this area.

The issues of the case study are the following with possible answers

- Farmers show poor cooperation and they are scarcely available to listen to the technical advisers. Even if the advisers provide technical support and they share information, most of the farmers are unwilling to change their habits (as they always did).

Answer: an improvement on their practices should be valorized at the moment of storage and with a recognized prime by the buyer.

- It is necessary to improve the traceability of wheat lots from the field to the market.
  Answer: structures should be adequate to the request of the market, as said so, sorting should be available and tracking of all lots should be kept from the field to the mill. This should be required by the market first.

- Too many varieties on the market. What is the best one?
  Answer: a reference for the area is required especially to test the new varieties sold by seed companies. The reference gives more objective data about varieties' performance. Thanks to that, contracts on wheat production can be updated year by year.

- Use of self-produced seed
  Answer: this should be avoided in order to have healthy production and good quality standards

- Non-homogeneous lots: most of delivered lots are mixed together when stored and they are not adequately sorted.
  Answer: this can be avoided by bringing structural innovation in storage centers and to give more elements in advance to sort grain lots arriving from different shareholders or associated. This can be done if farmers can harvest

- Contracts are necessary to ensure a good lot trade. In addition, all requirements need to be clearly defined (agricultural practices, pesticide residues and mycotoxin presence).
  Answer: there are two experiences with contracts and they ensure income to the farmers and bring benefit to the supply chain.

9.5 Review of Fact sheets

9.5.1 Methods used

The three Fact sheets were presented concerning three main themes considered as relevant for the case study. They comprised the use of catch crops to reduce nitrate leaching, the use of the drone to monitor crop situation, and the late fertilisation for high-protein wheat varieties.

The questions were as follows:

1) Is the structure of fact-sheet clear enough?
2) Is the Fact sheet written clearly?
3) Is the reported information related to the case study research needs?
4) Is the thematic interesting for the case study?
5) Are there any practical uses of the innovation?

9.5.2 Outcomes

According to the received questionnaires, the following answers as follows:

Table 9.1 Fact sheet evaluation summary

	Fact-sheet theme		
Q	**Catch-crop**	**Drone**	**Late fertilization on superior wheat**
1	Clear structure	Clear structure	Clear structure
2	Clear but too long and general- Synthesis would have been appreciated as the content more focused on specific themes	Clear but too general	Clear and easy to read
3	Yes, enough	Only partially interesting. What is the benefit of using a drone?	Yes, totally
4	Maybe, we would have preferred something about quality (not specified what)	Not useful for the farmer, only for organisations. Bring more practical details	Only for specific wheat typologies
5	It comprises useful information for practices	Buffer zone and ecological area for the CAP	What is written is already applied

9.6 Research topics that might be trialled

In order to get as many comments and opinions from our stakeholders this part of the meeting was organised with a participatory method called A/B split test. Stakeholders were divided into groups and they were invited to participate to two discussion stands in turn. For each stand there was a fix moderator explaining the protocol, asking 4 to 5 specific question that participants answered through post-its. Also, it comprised a final evaluation of the protocol with indicators or simple yes/no answers

9.6.1 Outcomes

During the summer, at the first step, two potential innovations were identified:

-
- *Use of catch crop to reduce nitrate pollution*

    - Aim and brief description: It was decided to test if the use of catch crop could enable all farm under agro-environmental programme (of the RDP) to bring higher amount of N fertiliser to their wheat field, bypassing the imposed limit of 128 N per year. Thanks to the catching power of specific cover crops, our farmers may be able to bring more N to their fields (up to 150 N) without polluting aquifers and soils. To test the feasibility and the efficacy of this solution (that we can call innovation), a number of fields (about 30) in the County will host catch-crop after wheat. This will be repeated for three years in different farms in order to get more than 100 fields at the end of the project. Different parameters will be measured in every field: type of soil, development of the crop, biomass and nitrate content in the soil at the end of the catch crop cycle.

- *Use of quick method to assess grain quality before harvest or at storage centre*.

    - Aim and brief description: supply chain protagonists wanted some elements to improve wheat during storage, to guide the choice of the variety giving a reference of last year based on assessed parameters (protein and other standards). This trial will be more effective if set-up in farms having contracts with millers or other processers. To test the feasibility and the efficacy of the solution, especially at stakeholder level it was proposed to proceed as follows:

    - Start analysing wheat grain in pre-harvest through NIR analysis,
    - Communicate all data to farmers, cooperatives and storage centres to give them an indication of the quality of the grain lots that will be delivered to them
    - Understand if the information given was useful or not and how it was used

in parallel:

- Collect data assessed at the harvest or during the moment of storage in order to see the deviation from the data collected before harvest (at different time)
- To perform quick test to determine the presence of DON and approximatively quantify it
- All data will be used to map the arable land of the County based on their attitude of producing wheat. This will be carried out to map a smaller number of farms in order to map the farm field in order to see if there is any difference inside the field itself.
- For the future, it is possible to join the use of satellite images to follow the crop condition during the crop cycle and see if there are any nutritional disorders or other problems. Those data will be compared to soil information and to data assessed before the harvest directly in the field.

Unfortunately, only one of these themes has a Fact sheet written (number 1). The A/B split test showed that stakeholders were more interested in the trial n. 2 and most of the stakeholder gave their availability of their farms and buildings (farmers and storage cooperatives).

10 Drip Irrigation management in Tomatoes and Maize, Italy

10.1 Report summary

This report aims to summarise the outcomes of the first meeting with the stakeholders for the case study on drip irrigation management in maize and processing tomato grown in Alessandria's County. In the following paragraphs, the context of the case study, the participant profiles and all the performed activities, such as participatory methods and plenary discussions are presented. The set-up of the meeting was the same as the other case study about Bread wheat quality with a different group of stakeholders. Only few participants, from 3 to 4 were the same, because they play an intermediate role in the local agricultural system. During the meeting, a refresh of the VALERIE project objectives was displayed, a first evaluation on the Fact sheets was displayed (one of the output of the VALERIE platform), and an A/B split test workgroup on two possible themes for field demonstration was conducted.

As the kick-off meeting previously held, this first meeting was successful and gave a first impression on the VALERIE Fact sheets written for the meeting, that were entirely positive but some adjustments are still needed. The A/B split test on the themes for the field demonstration comprised the management of drip-irrigation system with sensors or water balance and the comparison of different drip-irrigation systems (annual, multi-year and buried). Both field trials aim to improve the management of the irrigation in this area.

According to the workgroup results, our stakeholder community expressed a slight preference on the trial about the management rather than the comparison of the systems. It was concluded that the meeting with a timeframe for future activities comprising the set-up of the field trials (within May 2015) and possible other meetings at mid or at the end of the summer in order to show the field demonstration and the tools which will be rented for the field demonstration. This will count as an extra-date according to the established planning in the DOW.

10.2 Context

In the territory, the availability of water for agricultural use is not high and not evenly distributed. High productive crops, as maize and processing tomato, requires huge amount of water, especially during the hottest season, when rainfalls are scarce or showery and evapotranspiration is high. In order to face that, farmers are adopting alternative techniques, such as drip-irrigation with the intent to improve water efficiency, without reducing yield and quality.

Concerning numbers from the annual regional survey, the following table shows the area and the number of farms for maize and for processing tomato for Alessandria's County:

Table 10.1 Area and number of maize and processing tomatoes farms (Alessandria)

	2013		2014	
Crop	Area	Number of farms	Area	Number of farms
Maize (silage and grain)	25.504	2.926	26.923	2.896
Processing Tomato	1.207	112	1.649	142

For Maize, almost 30% of the area is irrigated through dripping system, while for the other 70 % farmers use other systems such as sprinkling or natural watering. Flooding is not a common technique in our County. For processing tomato, about 100% is grown with drip irrigation system that is largely used for fertigation as well. Sprinklers can be seldom used.

A drip irrigation system is commonly thought to be in greenhouses or horticultural crops, while in field crops it can sound a bit unusual. During the last decades, in many parts of the world

with a shortage of water, this system is spreading and it is seen as the best sustainable way to use water efficiently. Nevertheless, it requires special machines, a lot of plastic materials, time and labour for setting-up. For this reason, innovations and solutions are still required to reduce costs and increase yields and quality.

During the last two crop years, the climate had a big influence on both crops. Concerning maize, while 2013 was a difficult year for late harvest cultivars, 2014 was even worse due to high humidity during ripening which led to high contaminations from mycotoxins such as fumonisin and deoxinivalenol. A big part of the production, which was fit for human consumption, was delivered for animal uses. This issue made the price decrease during the whole harvest period. Fortunately, yield was not influenced. Concerning processing tomato, while 2013 was in-average year, 2014 was the worst year for processing tomato production, both in field and in factories, because of continuous late spring and summer rains. This meant a big amount of water during ripening of the berries, which decreased quality (low degrees brix content) and a high humid microclimate in the field, which triggered the development of fungal pathogens leading to high yield loss (about 30%).

For the last crop year, the two key words are mycotoxins and low prices for maize and fungal pathogens and low degrees brix for processing tomato. Those problematics influenced not only farmers but also all supply chain members, from cooperatives and food processers. For maize, cooperatives had the problem of grain drying, since it was very humid at harvest, of conservation, as they must avoid mould contamination, of selling the produce to their clients, such as millers or processers. For tomato, processing industries received a big amount of green and low quality product to process into defined quality parameters that were reached with difficulty.

10.3 Stakeholders

The stakeholder group evolved from the previous composition of the kick-off meeting thanks to the period (winter) and new contacts created during the past year. As last time, all members from the whole supply chain were present (20 in total) and comprised:

-
- Farmers – 8 members
- Irrigation system suppliers - 2 members
- Processers - 2 members
- Cooperatives – 3 members
- Seed and pesticide companies – 2 members
- Technicians – 3 members

10.4 List of innovation needs

10.4.1 Methods used

The list generated in the Kick off meeting was presented. Few comments were said and no change were brought to the list. Problems are almost the same, but new ones came out such us: mycotoxins in maize, fungal pathogens management and method to increase quality in processing tomato. No innovations had been brought to the case study yet.

10.4.2 Outcomes

A list of topic for this case study to return to WP2, in order to feed ask.Valerie with documents, fact-sheets, project reports and papers

1. Sensors to define when and how much to irrigate and fertigate
2. Methods to protect the drip-tape from raven, rodents and click beetles.
3. Use of pesticides in the drip-system.
4. Innovative/alternative techniques to dispose the drip-tapes after the harvest.

5. Relationship between drip irrigation and quality for both crops
6. Multi-year drip irrigation system (re-usable drip tapes)
7. Subsurface drip irrigation, advantages, disadvantages, costs (unremoved drip tapes)
8. More knowledge about nutrients role on qualitative characteristics of the product (both crops)
9. Best moment to apply the right fertilizer with fertigation
10. Urea on tomato: how to use it and how is it used by the plant?
11. Phytoxicity of some nutritional elements
12. Treated digestate for fertigation
13. Tools to evaluate a "good" drip system
14. On-line tools based on the water balance computing for the irrigation scheduling
15. Comparison among different irrigation systems (sprinkler and drip system) regarding inputs/costs/yield gain and quality of the yield

New selected topics for WP2 to prepare Fact sheets

From the case partner's point of view, the first draft of fact-sheet was preliminary responding to the main issue of the case study. If possible, it would interesting to have other fact-sheet available for the case study on the themes listed above, especially on ways to increase quality of both crops and reduce fungal infections.

The issues of the case study and the possible answers are as it follows:

Cost of the drip system in both crops, which can discourage farmers to use this technique
Answer: the cost of set up matches the increase of income from higher quality and/or higher yield. Some of the farmers keep on using this system because they improved their cropping system and they got better results. Moreover, new techniques are required in order to decrease costs and have systems that are more efficient.

Time used to set the drip irrigation system
Answer: this is an important issue of this technique. Already, farmers use a specific machine to place drip tapes during transplanting (in tomato) and during hoeing (in maize). Nevertheless, the connection between drip tapes and plat pipes

Disposal of the plastics after the cropping season
Answer: this is the most relevant issue for farmers. A possible solution can be the use of multi-year drip tapes or sub irrigation systems.

Need of more attention and technical competences for its management
Answer: Since technicians from fertilizer companies deliver the technical assistance, it is difficult to get a more neutral technical advice. Some farmers can afford to pay an adviser but this is not the possibility of many.

Fertigation management
Answer: this is still a key point to solve, which is a parallel theme for the case study. It is really difficult to define the right fertilization scheme, especially for tomato crop. It was decided not to focus on this theme because it is too wide and would overlap on the case study itself. Nevertheless it should not be ignored.

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10.5 Review of Fact sheets

10.5.1 Methods used

Three fact-sheets were presented concerning three main themes considered as relevant for the case study. They were related to a description of available probes to measure soil water content, the use of probes to manage irrigation in the field and the use of drones to monitor crop situation in a wide area. The questions were as it follows:

1. Is the structure of fact-sheet clear enough?
2. Is the Fact sheet written clearly?
3. Is the reported information related to the case study research needs?
4. Is the thematic interesting for the case study?
5. Are there any practical uses of the innovation?

10.5.2 Outcomes

According to the received questionnaires, the following answers (to the questions listed above) are presented:

Table 10.1 Fact sheet evacuation

	Fact-sheet theme		
Q	**Probes for water content in soil**	**Use of drones for scouting**	**The use of probes to manage irrigation**
1	Clear structure and complete	Clear structure but it can improved with images and examples of image elaboration. What is the comparison with the scouting?	The language should be easier. It would be interesting to summarize how the potential change with different type of soil.
2	Two possible answers: a glossary is necessary to understand the whole document, or it is necessary to simplify the language.	It is clear	Technical terms should be explained in simple ways.
3	Yes, enough	Only partially, yes indeed. There are some missing data: how long does it work, and how long does it take to give information back to the farmer?	Information should be more relevant to the described system
4	Yes, it is	Not so much, but it is interesting	Yes, it is
5	Yes, there are	Only for some crops, some particular damages and zones	Yes, there are

10.6 Research topics that might be trialled

10.6.1 Methods used

See Bread Wheat Quality case study (section 10) for the method used.

10.6.2 Outcomes

During the summer, at the first step, two potential proposal for trials were identified:

Comparison of methods to manage irrigation in maize and tomato

- Aim and brief description: it was proposed to test different way of irrigation management through different systems and assess what is the most effective and most usable for the farmers. The trial comprised a test and two treatments. The test comprised the normal practice of the farmer, while the first treatment encompassed the use of probes to monitor soil water content, and the second treatment implied the use of water balance based on weather data on an on-line platform called “Irriframe”. The trial scheme was set at field scale trying to avoid small size plots or complicated experimental scheme. The comparison is valid for both crops.

  To test the feasibility and the efficacy of the solution, especially at stakeholder level it was decided to proceed in following way:
- Assess the amount of water used for every field with each treatment
- Assess the yield in every field
- Collect the information on usability of the system
- Make an economic balance for every system

Use of different types of drip systems for maize and tomato.

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- Aim and brief description: stakeholders wanted to test different types of drip irrigation systems different from the disposable one, quite spread over the area, in terms of usability and effects on yield and product quality. The trial comprises a test (the normal practice) and two different treatments comprising a multi-year drip-irrigation system (re-usable drip tapes) and a sub-irrigation system lasting more than 20 years. As above, the trial scheme is meant for field scale.

To test the feasibility and the efficacy of the solution, especially at stakeholder level it was decided to proceed as follows:

- Assess the yield in every field
- Collect the information on usability of the system
- Make an economic balance for every system

The A/B split test showed that stakeholders were more interested in the trial n. 1 rather than the n. 2. Also, some stakeholder wanted to set a trial on a fertigation scheme rather than test different types of drip-irrigation system.

Trial n. 1 is going to be set up, focusing on the use of probes and the use of in-situ weather data to monitor the drip-irrigation system instead of using the “Irriframe” platform. The first year will comprise a monitoring activity and a collection of data about both systems (weather sensors and soil water probes).

11 Sustainable Onion Supply Chains, Netherlands

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11.1 Report summary

The meeting was held at the offices of Rusthoeve, research station in the South West of The Netherlands and residence for UIKC (Onion Innovation and Knowledge Center). In this first meeting in the onion case farmers, buyers, packers and traders/exporters were present. The exchange of knowledge and ideas about solutions was appreciated. Although all stakeholders have similar interest in the onion value chain they are not used to sit together in the setting created in VALERIE. During the meeting also different interests between stakeholders became clear. The chain is asking for better quality and not quantity. Growers are paid for quantity and not enough for better quality. Seed companies were not represented, the conclusion in the meeting was that they will be invited for the next meeting because they play an important role in the onion value chain.

During the meeting information about VALERIE was presented, so all participants have a good understanding of the project and its goals. The first VALERIE output, provided by WP2, is discussed with the participants, they were positive about it. The Fact sheet 'Integrated Management of Botrytis pathogens causing neck rot in onion production' was ready in time to send to the participants together with the agenda. VALERIE also produced a list with references of related research results. The references are also used for the presentation in the meeting. It became apparent that interesting information can be found in other countries. This was appreciated by the participant.

11.2 Context

Onions is an important crop for arable farmers in the clay regions of The Netherlands: the South West of The Netherlands and the 'Flevo polders'. The total acreage of onions in The Netherlands is approximately 20.000 ha. Over the last few years the onion growers are facing serious problems concerning the quality of their product. It is a growing concern for the whole chain: approximately 85% of the Dutch produce (900.000 tons on average) is exported. The (international) market is asking for optimal product quality, grown in a sustainable way. The major issues for the onion value chain are:

- The damage of soil born fungi and nematodes is growing over the last years. The most important aspect is plant protection against Fusarium oxysporum, Sclerotium cepivorum and Ditylenchus dipsaci. New sustainable crop management strategies are necessary to get these soil born fungi under control.
- Control of air borne fungi, especially the control of Botrytis spp. is a problem. These species cause serious problems during storage of the onions. Control measurements during the growing season (Decision Support Systems) and intelligent storage strategies are necessary to get this problem under control.
- Optimal fertilizer strategies. There is a relation between varieties, optimal N-rate and quality of the unions. Too much nitrogen negatively effects quality and causes serious losses to the environment. How to determine the optimum N-rate? What can be done with side dressing? The optimal N-rate significantly differs over the years. Which instruments or methods can help to determine the year specific optimal rate? And what site specific management can be undertaken?
- Monitoring of product quality. New innovative non-destructive methods to determine the internal quality of onions at the end of the growing season would be of great help.
- Carbon footprint of the onion crop. The carbon footprint is getting more and more attention in agricultural value chains. For farmers it is interesting to know how they score the carbon footprint of their farm and single products, and to know the possibilities to reduce the carbon footprint.

The above written context was reason for partners in the onion supply chain to initiate the Onion Innovation and Knowledge Center (UiKC, www.uinnovation.nl). UiKC is a not profit organisation in which several companies work in a joint effort on the problems they are facing. UiKC carries out applied research programs and variety research. UiKC and its partners (see next paragraph) are the main stakeholders for the VALERIE onion case.

11.3 Stakeholders

Stakeholder invited were:

- Farmers, onion growers. The farmers present were from the South West of The Netherlands, being the most important region for onions and where most of the buyers, packers and exporters are present. But the conclusion was that it might me good to enlarge the group with a few growers from the central part of the country (Flevoland).
- Buyers
- Packers
- Exporters
- DLV Plant
- Frugiventa, branch organisation for onion traders/exporters.

11.4 List of innovation needs

During the discussion many questions were raised, perhaps some of them research gaps, and for many of them there were no concrete answers:

Selected topics/questions for WP2 to prepare Fact sheets or references

Botrytis
- Is a test available to check infestation rate of onion seeds with botrytis?
- How effective is seed desinfection for botrytis?
- How important are infected seeds compared to other sources as the initial start of an epedemic? Has this ever been researched?
- Is digestate a risk factor as onion waste is used in the proces?
- What are effective measures to treat onion waste in order to kill pathogens

Pink root (possile Fact sheet)
- What are risk factor for the introduction of pink root in fields
- What is the effect of grass and maize as pre crop for pink root.
- What methods and fungicides are effective against pink root

Fusarium (possible Fact sheet)
- What are risk factors for fusarium
- What is the relation to crop rotation? Relation with chicory and spinach as pre crop?
- Interaction with nematodes and weeds? Is senecio vulgaris host?
- Effect of non inversion tillage on fusarium

Nematodes: ditylenchus dipsaci
- What weeds are good hosts for D. dipsaci
- Does D. dipsaci survive digestate and composting process?
- Best Practices for control of D. dipsaci

List of research gaps
- Quality deterioration during transport to oversee markets (4-6 weeks of transport by ship). What are main factor causing these quality problems and what can be done about it
- What are Best Practices for control of sclerotium cepivorum (Allium root rot)
- Does pythium in onion kill onion seedlings?
- What are risk factors for bursting of onion bulbs?

11.5 Review of Fact sheets

11.5.1 Method/exercise used

The VALERIE Fact sheet on Botrytis was sent with the agenda and discussed in the meeting.

11.5.2 Outcomes

- *Evaluation of Fact sheet according to meeting guidance provided*

a) Do the Fact sheets refer to the question(s) formulated in the Kick off meeting and recalled in this meeting?
It is a nice overview of the infection/life cycle of the fungus? As became clear that onion seeds can be infected and infected plants in the field several questions came up. Another question was how effectively botrytis is controlled on onion fields for seed production. It would be interesting if a Fact sheet also contains references to these topics.

b) Is the Fact sheet relevant for the stakeholders?
Yes, the Fact sheet is relevant for the stakeholders because it gives a complete overview of the life cycle of the fungus and the risk factors. It provokes discussion and it generates new questions. Onion seeds are not produced in The Netherlands, it became clear to the participants that seed production is an important link in growing onions.

c) Where next? what gaps? what changes, what improvements?
See next section.

- *Collective agreement about feedback to WP2*

A revised brief for WP2 - what would be most helpful input from WP2 for the next CS meeting? The produced Fact sheet is seen as a relevant document, but it only addresses one single topic, whereas several other problems were identified during the meetings. It will be impossible to make Fact sheets for all that many questions. Many questions were identified, for stakeholders it is very interesting if existing information becomes available. FS format is nice but not necessary. The question is how the available time can be used most effectively in relation to the question in the onion case.

11.6 Research topics that might be trialled

11.6.1 Methods

A general discussion was held.

11.6.2 Outcomes

- *List of promising topics for trial/demonstration.* After discussion the following topics were identified as most interesting for a demonstration/trial:
  - Test the effect of not cutting leaves before harvest on botrytis infection
  - Test the effect of variety (early vs late) on botrytis infection
  - Test effect of N-rate on botrytis infection
- *Suggested farms (monitor) where trials can be set up*
  - Research station for applied research at Colijnsplaat. This is also the location where every year an open field day is organised by UIKC for all onion growers in The Netherlands, a good opportunity to make onion growers aware of the VALERIE project
- *Timetable of actions that need to be done to advance this idea*
  - A plan for the setup of the trial will be made before the first of April, contact with organisation of the UiKC field day
- *What information and resources are needed?*

- The setup of the trial is based on the information provide by VALERIE about risk factors for botrytis infection in onions

- *Information needed from WP2*
  - What machinery is available to cut leafs from onions after leafs have died. Can this be done at harvest of even later?

12 Sustainable Potato Supply Chains, Poland

12.1 Report summary

The meeting was held at the offices of Farm Frites, Bobrowniki, Poland on Friday 30 January 2015. In this first meeting in the potato case farmers, Agrico (potato seed producer), and the French Fry factory stakeholders were present. As brown spots caused by TRV and nematodes are a major problem for the growers in the region and the whole value chain a nematode specialist was invited to give a presentation about this topic. The exchange of knowledge and ideas about solutions was highly appreciated. Stakeholders have more or less similar interests in this value chain. The factory cannot process potatoes with a higher % brown spots than the norm. Potatoes with a higher percentage are rejected, a big loss for farmers but also a problem for the factory. The interest of the seed potato company is clear, when the problem cannot be solved the acreage of the most important variety at this moment, Innovator, will go down. As there are no good alternative varieties for the specific market the whole value chain has a great interest to solve the problem.

During the meeting information about VALERIE is presented, so all participants have a good understanding of the project and its goals. The first VALERIE output, three Fact sheets about TRV and brown spots in potato, provided by WP2, is discussed with the participants, they were positive about it. The three Fact sheets are:

- Integrated management of Tobacco Rattle Virus, (TRV) in potato production: General information
- Integrated management of Tobacco Rattle Virus (TRV) in potato production: Control methods
- Integrated management of Tobacco Rattle Virus(TRV) in potato production): Which cultivar to choose? - Focus on the French fry production

The Fact sheets give a good summary of the problem and possible solutions and a list of interesting references.

12.2 Context

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The French fry industry in Poland is rather young. Farm Frites has a French fries in the North of Poland, partly on their own farm, partly from 60 contract growers in the region. Production of high quality potatoes at a low cost price is crucial for this industry, with a lot of competition from other companies like McCain. Major problems in the supply chain at this moment are:

- Internal brown spots in potato tubers. The cause can be TRV transmitted by nematodes but also Ca deficiency. Symptoms are variety specific.
- Grey discoloration of fries after processing.
- Early dying of variety Innovator. Innovator is an important variety in this region, because demanded by the market, especially by McDonalds, the most important client of the factory. The drivers for early dying are not understood.
- How to store Innovator longer without getting problems with internal sprouting.
- Big question is if optimisation of fertiliser strategies, nematode control strategy, and variety choice can be part of the solution for these problems.

As these problems are important for the supply chain FF and the contract growers are working on these problems themselves. There is a running project on fertiliser strategies in potatoes, with participation of BLGG, YARA and DLV Plant. Specific calcium fertilisers are tested. In this test field a few varieties are tested, also in relation to internal brown spots, and on fields

infested with Trichodorus primitivus a variety trial is running in order to find out which varieties will show internal brown spots.

12.3 Stakeholders

The following stakeholders attended the meeting:

- Farmers, growing potatoes for Farm Frites. Farms are located in the North of Poland, the wider region of Gdansk. Acreage of potatoes on the farms varies from 50 - 800 ha;
- FF Poland, the farm, growing potatoes for the factory.
- FF, the factory, located in Lembork, 50 km East of Slupsk.
- Agrico Poland, potato seed producer.

Other stakeholders for this case study are producers of fertilisers, in particular Yara and N-xt fertilisers. Because the focus of the meeting was nematodes, nematode control and TRV they were not present in the meeting. They will be involved in trials in 2015 with specific fertilisers for control of brown spots possibly caused by Calcium deficiency. Bayer Crops Science was present in the Kick off meeting, but as there are no plant protection products available for solving these specific problems in the value chain there is no direct interest for them to attend the meetings.

12.4 List of Innovation needs

12.4.1 Outcomes

- *Revised/annotated reference list to return to WP2*. In this first meeting control of TRV was the central topic. Three Fact sheets were provided by WP2 and discussed in the meeting. In the Kick off meeting other topics were identified, the still need attention in VALERIE. The updated list is:
    - Role of calcium in relation to hollow hearts in potato, brown spots in the tuber flesh. How to optimize uptake of Ca by the potato crop? Type of fertiliser, timing of the application of Ca fertilisers, relation to irrigation strategy?
    - Early dying of Innovator. In the last years the variety Innovator ‘early dying’ often occurs in this variety. Is there a relation between frequency of Innovator on a certain field and ‘early dying’? What is the mechanism behind early dying? NEW. There is a discussion going on in practice about the role of high ozone concentration causing or strongly related to this problem. What is known about ozone damage in potatoes, when does it occur (T, concentration, radiation)?
    - Bacterial wilt is a serious and growing problem in seed potato production, also in Poland. What are Good and Best practices to control bacterial wilt in seed potatoes?
    - Rhizoctonia solani, how to control it, good and best practices. Not only the application of fungicides but also prevention, biological control, information about biology and life cycle of the fungus
    - Are there specific crop management strategies/measures (other than variety choice) that influence tuber length, frying index, mis-shaped tubers?
    - Long storage and internal sprouting. What are the best strategies to minimise the problem of internal sprouting of potatoes during storage. Farmers with good cold stores try to store their potatoes as long as possible. Some varieties show internal sprouting at the end of the storage season, what can be done to prevent this?
- *Selected topics for WP2 to prepare Fact sheets*
    - Role of calcium in relation to hollow hearts in potato, brown spots in the tuber flesh. How to optimize uptake of Ca by the potato crop? Type of fertiliser, timing of the application of Ca fertilisers, relation to irrigation strategy?
    - Ozone damage in potato. What is known about this? When does it occur, results from research available? The perception in practice is that it occurs after periods

with high temperatures and high radiation (periods of crop stress). There seem to be variety differences. What is known about this in countries with normally high temperature and radiation during the growing period of potatoes?

12.5 Review of Fact sheets

- *Evaluation of Fact sheet according to meeting guidance provided*
  The Fact sheets give a good summary of the available knowledge about all aspects of TRV. It became clear to the participants that TRV damage in potato is a very specific phenomena:
  - Only specific Trichodoridae spp can infect potato plants with TRV;
  - It has been shown that several TRV strains exist;
  - There are differences between nematodes in how good they transmit the virus to plants. For example T. primitivus is, compared to T. pachydermus, a poor transmitter of TRV.
  - Some nematode species have been specifically associated to one or more specific virus strains.
  - Some studies showed also that each potato cultivar is more sensitive to one/several virus strains
  - Only on the limited data are available about susceptibility of cultivars to determined virus strains.

  It is clear that a complicated problem was discussed. In order to find solutions for the problem information about the issues mentioned should be available. A survey among the growers in 2014 showed that the following Trichodorus species are most frequent found in the fields of the growers in the region: T. primitivus, T. pachydermus, T. viruliferous. It is not clear if and with what virus strains these populations are infected. And the susceptibility of some potential new varieties for TRV is also unknown. This will be subject of the field test in 2015.

.*Collective agreement about feedback to WP2*

- A revised brief for WP2 - what would be most helpful input from WP2 for the next CS meeting? It is known that there is ongoing research on TRV in potatoes, new or additional information is very welcome. Also see the suggestions for new Fact sheets. Information about Ca-fertilisation and the possible role of ozone in crop damage is also relevant.

12.6 Research topics that might be trialed

- *List of promising topics for trial/demonstration*
  Testing several varieties in a field infected with Trichodorus spp. Testing the virus strain is an option to keep in mind. Varieties to be tested: Innovator (standard variety), Russet Burbank, Ivory Russet, Ludmilla, Zorba, Bondi.
- *Suggested farms (monitor) where trials can be set up*
  Testing will take place on the farm of FF in Bobrowniki. On this farm capacity is available for setting up a good field test and for monitoring all relevant aspects (yield, grading, brown spots, hollow hearts, length, dry matter content). This work will be done in cooperation with the factory. The soil type and varieties tested are the potential varieties for the contract growers.
- *Timetable of actions that need to be done to advance this idea*
  A trial setup is made, soil sampling has been done, results are expected half of April, trial will be started in the second half of April.

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13 Conclusions

This report presents results from the first round of meetings in the case studies carried out as part of Task 3.4. The main aims of the meetings were to:

- Remind stakeholders about or introduce stakeholders to the VALERIE project
- Reflect on, review and update the innovation needs identified by stakeholders in the Kick off meeting
- Review and evaluate WP2 Fact sheets and reference lists- for feedback to WP2
- Identify a potential trial to be set up in the case study to test/refine research provided by WP2
- Continue to plan for future activities within the project period

. Table 13.1 Case study stakeholder attendee and proposed trial topic

Name*	**Stakeholder attendance**	**Trial Topic**
Catchment scale resource use efficiency	Only 3 farmers in total, they had attended the Kick off meeting	• Investigate the use of biological additions / trace elements to help release nutrients which are locked up in the soil. • Cover crops 1. Trial the introduction of cover crops into a rotation • Cover crops 2. Trial the introduction of cover crops in continuous maize cropping.
Soil management in livestock supply chains	Supply chain and farmers representatives	
Forest-based biomass	All new stakeholders, only one attended the Kick off meeting	Testing ash fertilization on mineral soils (+ field course/demo)
Innovative arable system	First opportunity to explain VALERIE	Sustainable cereal cultivation
Agro-ecology: reduction in use of plant protection, France	First opportunity to explain VALERIE to a larger groups of farmers/advisers (only 2 farmers attended Kick off meeting)	Bioherbicides and regulation of plant cover
Sustainable Forest Management and ecosystem services	First opportunity to explain VALERIE	
Improving Milling Wheat Quality	Mostly the same stakeholders some additional invitees	• **Use of quick method to assess grain quality before harvest or at storage centre** • (Use of catch crop to reduce nitrate pollution)
Drip Irrigation Management in Tomatoes and Maize	Mostly the same stakeholders, some additional invitees	• **Comparison of methods to manage irrigation in maize and tomato** • (Use of different types of drip systems for maize and tomato)
Sustainable Onion supply chain	Mostly the same stakeholders, some additional invitees	• Test the effect of not cutting leafs before harvest on botrytis infection • Test the effect of variety (early vs late) on botrytis infection • Test effect of N-rate on botrytis infection
Sustainable Potato supply chain	Mostly the same stakeholders, some additional invitees	Testing several varieties in a field infected with Trichodorus spp. Testing the virus strain is an option to keep in mind. Varieties to be tested: Innovator (standard variety), Russet Burbank, Ivory Russet, Ludmilla, Zorba, Bondi.

13.1 (Re-)engaging stakeholders in the VALERIE project

The aims were to re-engage stakeholders who attended the Kick off meeting with the VALERIE project so that they would continue to commit to involvement in VALERIE over the project period, or to engage stakeholders for the first time if they had not attended the Kick off meeting.

Overall a good number and range of stakeholders continued to attend the meetings. Stakeholder attendance changed in some cases with additional or different people being invited (identified in the Kick off meeting as being more relevant). In the Finnish case following suggestions in the Kick off meeting new stakeholders were invited with the result that the majority of stakeholders in the first meeting were new to the project. This meant that in some meetings this was the first opportunity for stakeholders to learn about VALERIE. In other case studies there was natural attrition of stakeholders with fewer attendees at the second meeting (Table 13.1).

Some meetings were attended by a relatively small number of people (e.g. Catchment scale resource use efficiency, UK) and in this case the expansion of the groups will be necessary if they are to adequately test the value of the ask.Valerie approach. Conversely those case studies with large numbers of diverse stakeholders (Finland, Spain) will need at some point to divide into smaller user groups for future meetings to be effective.

Where the stakeholders had attended the Kick off meetings these first meetings were successful in reminding them about the project and its aims. It was noted that in the Kick off meetings stakeholder expectations of VALERIE were not particularly high. Furthermore it was also clear that for some case studies stakeholders already had well established and sophisticated methods of acquiring research information. However the meetings reported here demonstrate that stakeholders continue to be interested in VALERIE and are encouraged by the response to their requests for research in the form of a Fact sheet, and the possibility of a trial on a topic of their choice. Where the stakeholders had not attended the Kick off meeting these first meetings appeared to be successful in introducing VALERIE and engaging stakeholders.

The variable stakeholder attendance has repercussions for the iterative stakeholder methodology which ideally requires the same stakeholders to engage throughout the project. However equally it is important that the appropriate stakeholders participate and time taken to identify these at the beginning of the project is essential. On balance therefore stakeholder engagement is felt to be sufficient, as long as the current stakeholders continue to attend the ongoing cycle of meetings planned.

13.2 Identifying innovation/knowledge needs and gaps

The nature of stakeholder innovation needs varies between case studies, ranging from highly technical and focused needs in some compared to more diffuse and broader needs in others. Where case studies are related to existing groups and projects the ability to articulate and refine research needs appears to be greater, although conversely the ability to stand back and take a broader long term perspective is less evident. In groups brought together for the first time by VALERIE, identifying research needs and achieving a consensus about these needs will take longer particularly as the subject area is often less well defined; and often more about process than content (e.g. Spain). However in both situations there is general progress in developing and expressing the research questions more clearly, and in prioritising some topics above others.

For some case studies this meeting was the first opportunity to collectively identify research needs and different approaches were used. For example the Innovative arable cropping case study in France deliberately steered their stakeholders away from their project issues and built up the research questions from key words; while the Agro ecology case study in France asked

their stakeholders to distinguish research needs in the context of time (short term, mid term, long term needs). Nevertheless, in the latter case, it was suggested that stakeholders were influenced in their topics by the CASDAR project meeting which had preceded the VALERIE meeting.

The intention of the exercise in the meeting was to review and refine the questions identified in the Kick off meetings. In most cases the list either stayed the same or more topics were added. The lists of research needs will now be relayed to WP2 partners for the next stage of searching and extracting research data which is relevant to the stakeholders in their respective case studies. Additionally these questions can form the basis of the testing of ask.Valerie in the case studies when this commences. The lists will also be utilised by WP4 in the development of the ontology.

13.3 Evaluation of Fact sheets

In the evaluation of Fact sheets there were mixed responses, while some stakeholders were positive about them highlighting their usefulness, others were less enthusiastic (Box 13.1). Also stakeholders made many suggestions which were not always compatible for example asking for more detail but for a shorter Fact sheet. Overall they stressed the importance of valid scientific data supported by economic data showing the cost effectiveness of innovations. A number of comments were critical, some found the content too generalised or as not providing any new material. This latter point is a reflection of how advanced some stakeholders are in innovative techniques and in searching out research. With respect to potential Fact sheet users, some case study partners were doubtful about farmers using them, although agreed that advisers might. The project now needs to consider the value and the future of these Fact sheets. Due to the number of suggestions, revising the Fact sheet according to the feedback will inevitably result in some stakeholders not finding the final product helpful. However stakeholders have provided some useful insights with respect to using the Fact sheet template in the ask.Valerie interface, In addition to Fact sheets, lists of references were provided to a few case studies (UK, Netherlands, Poland, Italy). Feedback on these was limited although advisers in the Netherlands onion case study expressed an interest (and in relation to these suggested that the Fact sheet format although nice was not necessary), whilst farmers in the UK catchment case study showed no interest in following up on the references. Reference lists were not prepared for Finland but the people liked the idea of having reference lists in addition to Fact sheets especially for complicated issues where there is a lot of information available but which would be difficult to capture in a Fact sheet.

13.4 Identify a potential trial to be set up in the case study

In most cases stakeholders were able to select some topics for trialing. These covered a range of issues but most are well articulated and feasible, although the extent of development and planning of trials depends on the level of case study development in general. Some case study partners considered that they require further research input to support their choices. Plans for the trials will be developed further with support from WP3 partners.

13.5 Plan for future activities within the project period

Most stakeholders were able to agree on plans for the next set of meetings which will be held in the period June –Dec 2015.

Box 13.1 Fact Sheet evaluation –summary of stakeholder comments

Language

Language is too scientific make language easier and/or add a glossary

Audience and potential use

Who is the target group for these Fact sheets?

There are several practical guides already available

It is hard to create Fact sheet that is useful at farm level

Farmers would not consult scientific papers in the Fact sheet reference list (UK)

Advisers utilised lists of references (Netherlands onions)

Larger companies have access to such Fact sheets but not smaller owners so they are welcome (Finland)

Content

Too general

Not adding anything new

Share only verified information

Provide details about experimental context

Identify the optimal conditions /risks of the using the technique/provide decision rules

Style and format

More practical solutions, more case study examples

More economic data

More illustration and reduce the text

13.6 Reflections

With respect to methods, partners agreed that the Guidelines were useful. Their reflections suggest that the format of the meeting was quite successful and the stakeholders appreciated the activities and participated. Some partners introduced their own methods, some preferred less structured informal discussion sessions. Others invited specialist speakers or were able to 'piggy back' on to existing project meetings to ensure a good level of attendance (they also benefit from the endorsement of the existing project). Some case study partners attempted to construct a DA, an important element of the co-innovation process, which will be reviewed and revisited at each meeting.

13.7 Key considerations for WP3

The case study reports demonstrate the diversity in settings, stakeholder requirements and research issues. These need to be accommodated in future WP3 tasks by providing support but allowing flexibility in the way that partners engage stakeholders and plan activities.

On the whole stakeholders continue to be interested in VALERIE. They were responsive and participated well. The project partners need to build on this interest to ensure future and sustained commitment to the project.

Early scepticism in some case studies about the ability of VALERIE to deliver on its aims is lessening and this is attributed to concrete examples of outputs (e.g. Fact sheets) and the prospect of a trail which demonstrate the potential of the project.

Stakeholders in some case studies continue to conflate research needs with more general issues or barriers to operations, the case study partners need to be clear in communications about what the project can and cannot realistically deliver.

14 Appendix 1: 1st MEETING GUIDELINES FOR CASE STUDY PARTNERS

Introduction

These guidelines are to help case study partners to plan and carry out the 1st meetings following on from the kick off meetings. The main aims of the meetings are to:

- Remind stakeholders about the VALERIE project
- Reflect on and review list of innovation needs from Kick off meeting
- Review and evaluate WP2 Fact sheets and reference lists- for feedback to WP2
- Identify a potential trial to be set up in cs to test/refine research provided by WP2
- Continue to plan for future activities within the project period

In addition some cs partners will need to:

- Complete other activities not completed in the kick off meetings

These guidelines comprise:
A. Pre meeting planning
B. Proposed meeting sessions
C. Appendix methods instructions
These notes are intended as guidelines. Some sections may not be relevant to all case study partners due to their different contexts, stakeholders, experiences and objectives.

A Pre meeting planning

- Prepare invitation setting out the meeting aims and referring to discussions in the KO
- Identify stakeholders (as discussed in Kick off meeting) and send out invitations
- Liaise with WP2 in preparation of Fact sheets and reference lists
- Translate resources (e.g. Fact sheets and reference lists)
- Send Fact sheets to selected stakeholders individuals before the meeting (optional)
- Plan meeting with these guidelines – review different methods available for group activity (see Participatory methods toolbox in the VALERIE members area)
- Review Dynamic Agenda constructed in Kick off meeting

B Proposed meeting sessions

In all sessions it is suggested that a cs partner short presentation is followed by group /plenary activity. Methods are not suggested – but cs partners can refer to the Participatory methods toolbox.

1 INTRODUCTION

AIM: Ensure all the stakeholders have a good understanding of the project and what their role is in it

- Remind stakeholders about the aims of VALERIE (refer back to introduction in Kick off guidelines and slides if needed). Any newcomers will need an introduction
- Describe the aims of this 1st meeting
- Participant introductions

METHOD:

- Use prepared slides from Kick off meeting if needed

OUTCOME:

- SH understand VALERIE and how it can help them

RESOURCES:

- Guidelines and slides from Kick off meeting guidance

Suggested time: 15-20 mins

2 REVIEW LIST OF INNOVATION NEEDS

Aim: Review and amend list of innovation/knowledge needs (and gaps) identified in KO

- Review and amend list of innovation/knowledge needs generated in Kick off meeting
- Review list of possible and relevant references/sources found in WP2 to address these needs
- Update list of innovation/knowledge needs accordingly (create/review Dynamic Agenda (DA)

(Case studies are at different stages. For some goals/ research needs are well understood and identified already, for others these are still being formulated)

Method: use prepared slides to make a short presentation then discuss in small group or plenary discussions

Cs partners

- Present the list of innovation needs generated in the Kick off meeting
- Present and review DA if prepared in Kick off meeting
- Explain the rationale for identifying this list (if different stakeholders are present explain who a generated the list and how).
- Explain that this list was sent to the WP2 team so that they could start to search for relevant research – with 2 outcomes - **Fact sheets** and in some cases **list of references**
- Present the list of references (if appropriate) provided by WP2

In discussion in large or small groups

- Review and discuss original list of needs
- Review references if provided to see whether they might meet research needs, or may be trigger thoughts about different research needs. Comment on their usefulness for the cs
- Identify any gaps in the list
- SH contribute their own research experience and knowledge to answer any questions
- Select most relevant topics where more information in a Fact sheet format would be helpful
- Review which innovation needs are being addressed and which are remaining

OUTCOME:

- Revised/annotated reference list to return to WP2
- Selected topics for WP2 to prepare Fact sheets
- Revised innovation needs list for DA completion in session 5

RESOURCES:

- List of references/topics from WP2
- Feedback helpful input to WP2 identifying useful topics for Fact sheets

- Feedback - what would be the helpful input from WP2 for the next meeting and in what format

Suggested time 30 mins

3 REVIEW FACT SHEETS

AIM: Introduce the facts sheets and get feedback on content and format

- Test the Fact sheet concept
- Review usefulness of Fact sheet content
- Review Fact Sheet format
- Make suggestions for improvements
- Feedback helpful input to WP2 for revisions

METHOD: use prepared slides to make a short presentation then discuss in small group or plenary discussions

Cs partners

- Present Fact sheets (some cs will have >1)
- Explain how the research topic has been identified and extracted (in WP2) i.e. in response to cs research needs.
- Explain aim of Fact sheet - to provide relevant information in an accessible format
- Explain the process of Fact sheet development -it is an on going process and we do not expect perfect answers immediately. stakeholders feedback is part of the process.

Group discussion

Different groups might evaluate different Fact sheets

- First session - a collective discussion and review of the Fact sheets asking how useful the Fact sheets are, how they could be used. Ask stakeholders to review the **content and format** make suggestions for improvements

Use the evaluation guidance in the Appendix-

- Second session - ask where next? what gaps? what changes, what improvements? Review whether the Fact sheet is meeting the stakeholders research needs listed

OUTCOME:

- collective agreement about feedback to WP2
- a revised brief for WP2 - what would be most helpful input from WP2 for the next cs meeting
- revised research needs list for DA in session 5

RESOURCES:

- Fact sheets
- Evaluation Guidance in Appendix

Suggested time- 45 -60 mins

4 RESEARCH TOPICS THAT MIGHT BE TRIALLED

AIM: Identify any particular research topics that might be trialled in cs

- Identify a potential trial to be set up in cs to test/refine research provided by WP2 or elsewhere
- Identify possible "Monitor" farm where demonstrations and experiments/trials can be conducted over the period of the project based on selected topic

METHOD:

cs partner

- Present idea of a trial, timetable, resources available, benefits, expected outcome etc

leads discussion

group discussion

- Collective discussion of possible trials –
- Do stakeholders think a trial is relevant/useful and why?
- Is it about 'new data' or about 'experience'?
- If not relevant, maybe they have other ideas / needs (for example: excursion to a farmer, company, research institute who has trials/experience with the proposed solution?).
- Use reference lists and Fact sheets to prompt ideas for a topic
- Discuss feasibility, locations, responsibility, costs, further information needs, use of trial outcomes etc (may not be possible in some cs, or too early)
- Discuss roles- should a sub-group be formed to action this? They will need to meet more regularly.

(These ideally need to be agreed and set up by June 2015)

OUTCOME:

- List of promising topics for trial
- Suggested monitor farms
- Timetable of actions that need to be done to advance this idea
- What info and resources are needed
- What would be the helpful input from WP2

RESOURCES:

- Fact sheets
- List of references from WP2

Suggested time- 30 mins

5 REVIEW MEETING AGREEMENTS & CREATE A DYNAMIC AGENDA

AIM: Review agreements made and create Dynamic Agenda to monitor which research needs are being addressed and which are still outstanding

- Review the main outputs from the meeting as follows:

- Revised reference list - feedback to WP2
- Factsheet evaluation and feedback to WP2
- Topic for trial identified
- Revised list of innovation needs - DA and feedback to WP2
- Explain how the meeting decisions fit into the project and will ultimately benefit the stakeholders
- Create a DA

METHOD: CS partners presents a summary of agreements and group discusses

Create a DA using Instructions in Appendix

This can be done either as a group activity or as a post-meeting desk activity by cs partner

OUTCOME:

- Summary of outputs/agreements (this is the basis for a co-innovation plan)
  Dynamic Agenda

RESOURCES:

- DA Instructions in Appendix (below)

Suggested time- 30 mins

6 FUTURE PLANS

Aim: ask stakeholders to plan activities for the project period

- Review and agree an overall plan for interaction – approx. number of meetings and when (accounting for stakeholders seasonal demands and with project requirements)
- Agree on who to invite to meetings
- Set a date and an objective for the next meeting June-Dec 2015 (need to be completed by Jan 2016)

Method:

- In plenary use the DA to prioritise and set an objective for the next meeting
- In plenary produce a preliminary timetable/gantt chart for activities
- Check that stakeholders are the right people to include –anyone missing?

OUTCOME:

- Agenda/dynamic agenda
- Overall plan
- Draft timetable/Gantt
- Next meeting date and objective

Suggested time-30 mins

7 REFLECTION

Aim: to review/evaluate the meeting and ask for feedback

- Remind stakeholders of the VALERIE aims
- Ask stakeholders whether their expectations have changed since the Kick off meeting
- Ask for remaining questions/concerns
- Ask for feedback on the meeting and ask for suggestions for the 'style'/format of the next meeting

Method:

- This can be done as a plenary discussion,
- If you run out of time, stakeholders can be asked to put post-its on a flip chart as they leave answering some questions such as:

Now you know more about the VALERIE project

- What are you most positive about?
- What are you most concerned about?
- What can be done to make the next meeting/set of meetings more effective?
- How would the meetings be improved- would stakeholders like an expert to be invited to present research findings or a farmer to present findings from research being implemented or trialled?

OUTCOME:

- Preliminary evaluation of the meeting/approach
- SH views on VALERIE
- SH views on format of meetings

Suggested time-30 mins

C APPENDIX:

FACT SHEET EVALUATION

The intention is to evaluate the Fact Sheet according to science, applicability to different contexts- (scale will be in issue in terms of transferability of research results), benefits, barriers - practical matters, risks, lack of knowledge, costs, advice etc

Open discussion after some initial questions:

a. Do the stakeholders feel the Fact sheet is referring to the question(s) formulated in the Kick off meeting (just recalled in part 2 of the meeting)?

b. Is the Fact sheet relevant for the stakeholders? Ask stakeholders to explain their yes/no answers. The explanations should be recorded/noted carefully so that feedback to WP2 can be as detailed as possible

Yes, because (for example)

- we can formulate our questions more precise
- it helps to understand our problem better
- it opens up a new way of thinking about solutions
- it shows science is helpful / useless for our problem
- we now know what to do next

Yes but

The Fact sheet is good but could be improved as follows:

More/less detail

Costings needed

The language is too scientific/not scientific enough

No, because (for example)

- we asked the wrong question
- - information is too generic

It is not transferable to our situation

- I don't understand the information

Insufficient skills, knowledge, resources to implement

- ...

c. third evaluation question is about the procedure (identification of questions in Kick off meeting, asking scientists to write Fact sheets, which are discussed in the next meeting): do we think the procedure of VALERIE is effective? How do people normally connect with research about questions? How could VALERIE become more effective?

Dynamic Agenda

The VALERIE case studies are organising a process to connect questions from practice to research knowledge. To help you to structure this process within the case study, we provided you with a Dynamic agenda. Some of you already made use of it. If so, go to Part 2 of the instructions. If not, start with Part 1.

Part 1: Reconstruction of the DA

Step 1. Task for case leader(s): read the report of the Kick-off meeting carefully and put all knowledge questions into an empty DA (in column t=0).

Instructions for creating a Dynamic Agenda (from Kick off meeting guidance)

To help case studies to address research/knowledge questions and to monitor if information supplied by VALERIE is answering these questions, the dynamic research agenda is developed. Case leaders can use it during or just after meetings with stakeholders. Each column (t=1, 2, 3 etc) is a contact moment with stakeholders.

Instructions:

1. Start listing the topics in the left column (could be generic topics, see example below).
2. Specify research/knowledge questions formulated by stakeholders in the first meeting (t1). NB try to avoid interpretations if questions are generic/broad. These questions could be addressed in the search engine or to experts in WP2.
3. For next meeting, VALERIE (the search engine or experts) will provide information that will be discussed in the meeting.
4. During the meeting, you could use the question(s) from last meeting as a check if the information is answering the question(s). If yes, this could be mentioned in the scheme.
5. Specify new or more specific questions that came up during the meeting, to be addressed to VALERIE. The process (steps 3,4,5) can be repeated time by time.

This scheme can be copied in Word or Excel and can be extended with new columns and rows if necessary.

Topic	Question t1	Question t2	Question t3	Question t..	Question t..
Example: product quality potatoes	What are the possible reasons causing internal brown spots in potatoes?	Is the variety Innovator known for internal brown spot problems and what could be the reason?	*ANSWERED: yes, Dutch advisors recognise the problem. They mention low calcium uptake as a possible reason. This is confirmed in research (ref).*		
		Are variety differences known from other crops for (internal) brown spot?	If low Calcium uptake is the main factor causing internal brown spot, how can variety differences be explained?		
			If soil contains enough Ca,		

			what other measures could be taken to improve uptake?		
	What are the possible solutions for prevention of internal brown spots in potatoes?	What varieties (suitable for French fries) don't have problems with internal brown spot?	How are these varieties behaving in the polish production chain (yield, quality, storage, processing)?		
		How can Ca uptake be improved?			

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Part 2: Review and next step of the DA

Step 2. Present and discuss the overview of questions (from the DA) in the Stakeholder meeting: ask stakeholders if the DA reflects their initial (!!) questions at the time of the KOM. If not, what is missing? What should be removed or changed? This is input for t=0.

Step 3. Review of the questions: ask stakeholders if these questions are still relevant. If not, which ones, and why (could be answered in the meantime or replaced by a new question)? Should some questions be added to the list?

Step 4. Identification of (partial) answers so far. At the end of the stakeholders meeting, ask stakeholders which questions are answered (completely or partially): ask them to formulate the (partial) answer as specific as possible.

Point for attention: in the discussion of the Fact sheets, some questions and answers could pop up. Please note them carefully!

Step 5. Identification of questions for next time: ask stakeholders to comment on the questions: if not answered, should they remain on the list? If partially answered, what question(s) should be in the list? Did new questions come up that should be answered?

NB the results of steps 3-5 can be listed in t=1

5 STAKEHOLDER ANALYSIS

Options

a)Complete the table, adding extra columns if required. Examples are included

Stakeholder (categories or individuals)	**Goals, motivations, interests**	**Innovations of interest**	**Role in cs**	**Importance - extent of influence on innovation**	**Inclusion in VALERIE?**
Producers	Sustainable crop production – to provide income, meet suppliers needs, meet regulations	Disease resistance in crops	At end of the supply chain	high	Yes -all meetings
Suppliers					
Advisers					

b) Complete the boxes in the diagram, add more boxes as required, examples are provided