

Testing and promoting the adoption of soil-improving cropping systems across Europe

Newsletter 1 April 2017

Welcome to the first newsletter of the EU-funded H2020 SoilCare project.



The project, which started in March 2016, will run for 5 years and aims to identify, test and promote soil-improving cropping systems and

agronomic techniques that improve the profitability and sustainability of crop production across Europe. In 16 study sites located across Europe, the project is focused on working with stakeholders to help select promising soil-improving cropping systems for scientific evaluation, identifying their benefits and drawbacks. In this way SoilCare is an opportunity to embed new ways of producing crops, alongside generating new knowledge.

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Why SoilCare?

European crop production is facing increasing difficulties in remaining competitive in a global market. Currently, production levels in some cropping systems are maintained by increased inputs (e.g. nutrients and pesticides) and technology, which masks losses in productivity due to reduced soil quality. Such increased use of agricultural inputs may reduce profitability due to their costs, while also negatively affecting the environment, both due to unsustainable use of energy and resources in producing inputs and as a consequence of their application. The quality of agricultural land is also threatened by human action, leading to often subtle and gradual, physical, chemical and biological pollution, including the loss of organic matter, nutrients and soil biodiversity. Soil improvement is necessary to break the negative spiral of degradation, increased inputs, increased costs and damage to the environment. Therefore, the overall aim of SoilCare is to assess the potential of soil-improving cropping (SICS) and to identify and test site-specific SICS that have positive impacts on profitability and sustainability in Europe.



Cover crop (Photo: Alfred Grand)

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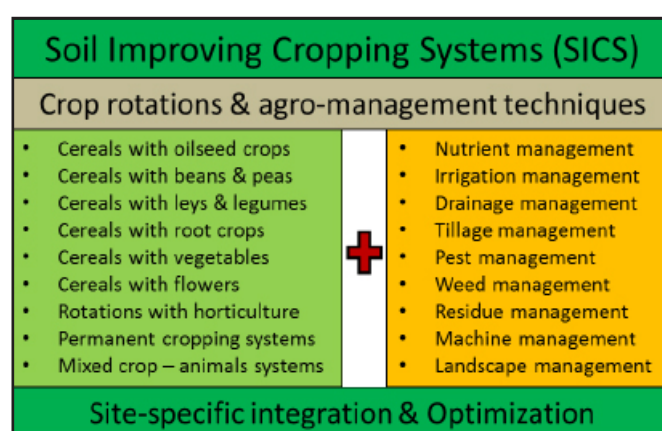
Initially, existing information from literature and long term experiments will be analysed to develop a comprehensive methodology for assessing performance of cropping systems at multiple levels. A multi-actor approach will then be used to select promising soil-improving cropping systems for scientific evaluation in 16 study sites across Europe covering different pedo-climatic and socio-economic conditions. Implemented cropping systems will be monitored with stakeholder involvement, and will be assessed jointly with scientists.

Recently attempts have been made in Europe to achieve soil improvement through, for example, precision farming and conservation agriculture, but these are not currently adopted to their full potential, and are in some case even abandoned, for example because conservation agriculture may have negative effects on crop yield. To understand the reasons for this, and to promote adoption and better soil care, SoilCare aims to study and assess in terms of advantages, drawbacks and opportunities and barriers for adoption, the full range of SICS. These can only be addressed through a multi-actor approach, which is why there is true involvement of actors representing the end-users in the consortium and involvement of stakeholders in all phases of the project.

Results from study sites will then be up-scaled to the European level to draw general lessons about applicability potentials of soil-improving cropping systems and related profitability and sustainability impacts, including assessing barriers for adoption at that scale. An interactive tool will be developed for end-users to identify and prioritize suitable soil-improving cropping systems anywhere in Europe. Furthermore, current policies and incentives will be assessed and targeted policy recommendations will be provided.

What is a Soil-improving Cropping System?

In SoilCare we define soil-improving cropping systems (SICS) as cropping systems that result in an improved soil quality, i.e., in a durable increased ability of the soil to fulfil its functions, including food and biomass production, buffering and filtering capacity, and provision of other ecosystem services, and that have positive impacts on the profitability and sustainability of cropping systems. A cropping system is a combination of crops (crop rotations) and agro-management techniques.



The term 'soil improving cropping systems' (SICS) is relatively new and intuitively is well-understood and perceived, but the scientific underpinning is still lacking. In SoilCare we suggest that the action of SICS may be brought about through three principles or mechanisms:

- (i) changes in input-output ratios, such as water (irrigation, drainage), nutrients, pesticides, energy.
- (ii) substitution, referring to the substitution of an input or practice by another input or practice (e.g., labour vs machines vs pesticides).
- (iii) redesign, incorporating changes in crop types, crop rotations, tillage, farming systems, and/or market orientation (e.g., specialization vs diversification, conventional vs organic).

An extensive review of SICS is currently being undertaken, led by Prof. Oene Oenema from the Wageningen University and Research. The review will be published in the Autumn 2017. For more details, please email oene.oenema@wur.nl

How stakeholders are involved in SoilCare

At the heart of the SoilCare project are the stakeholders in each of the 16 study site countries. These stakeholders, comprising farmers, advisors, NGOs and policy-makers and others, will be involved in selecting and evaluating soil-improving cropping systems to be tested in the project.

Study site partners have been busy engaging with their local stakeholders over the last year. The first task was the establishment of multi-stakeholder advisory panels. With training and guidance from the project team, a stakeholder analysis was conducted in close collaboration with these stakeholder advisory panels, to identify relevant workshop participants, including those who may typically be marginalised from decision-making processes.

Training workshops were run in Newcastle (UK) and Bucharest (Romania) by Liz Oughton and Mark Reed (Newcastle University) with consultants, Steven Vella and Heleen Claringbould to equip the study site partners to work more effectively with stakeholders. The training focused on preparing for three workshops with stakeholders to identify, discuss and select soil improving cropping systems that can improve both profitability and sustainability. Selected systems will be trialed in the field, later in the project. The workshop also provided participants with skills in:

- Stakeholder analysis
- Workshop design
- Facilitating workshops
- Dealing with conflict

Take home messages



Mark Reed, Professor of Socio-Technical Innovation at Newcastle University explained the purpose of the training. *"I think a lot of researchers believe that because they can chair meetings in a University setting, that they will be able to run workshops successfully with stakeholders. The problem is that when we work with people outside academia to co-develop research, we often have to work with people who are very different to us, and who may have quite different knowledge and opinions to us. Researchers in the SoilCare project need to be able to work effectively with a wide range of stakeholders, from farmers and their advisors to conservation NGOs and businesses. For this to work, we need to learn how to put ourselves in these other people's shoes, and learn to think and feel as they do. This empathy is, for me, essential if we want to work successfully with stakeholders."*



Liz Oughton is a Principal Researcher at Newcastle University working on interdisciplinarity between social and natural sciences; academia, government and the private sector. She emphasized the importance of building trust with stakeholders: *"Working with others who have different training, experiences and objectives in their day to day lives and work requires building trust between all members of the team. We each need to recognize that our own experience is limited and have to place ourselves in a position where we can accept that others construct and experience*

the world differently. This is a difficult thing to do and may include accepting local knowledge, reflecting on our own methods of working and recognizing that we have only a limited understanding of the disciplinary work of others. For work in these circumstances to succeed we must listen actively to other opinions building trust across the team."



Building on this, Steven Vella, an independent consultant employed by Newcastle University, explained the importance of tailoring participation to local contexts: "Participatory processes are rarely, if ever,

prescriptive – they need to account for the diversity of stakeholders taking part. In the room, you will have participants with different backgrounds, different kinds of 'knowledges' and expertise, which can be experience-based (local or indigenous knowledge), more formal (such as scientific knowledge) and even a mixture of both. When large projects such as SoilCare encompass such diverse socio-political, cultural, geographic and biophysical differences, awareness of the local contexts become even more important, because trust needs to be built and maintained both at each local site and also between the partners spread all over Europe."



Participants at the SoilCare stakeholder interaction training workshop in Romania (Photo: Mark Reed)

While the aims of the project may be the same across all study sites, the local contexts and priorities of stakeholders (including those of the scientists) may vary, even significantly, depending on many factors. And even at a local level, what may be important for some may not be high on the agenda of others. This is why the facilitation of participatory processes needs to be tailored for each study site's local context; what may be appropriate in one country may yield the opposite result in another. That is why during these training sessions we have emphasized a number of core principles that we believe should underpin participatory processes rather than taking a 'tool-kit' approach."



Finally, Heleen Claringbould from consultancy company Corepage, reminded participants about the importance of diversity: "Diversity of stakeholders in the project context is about involving different stakeholders to design equal opportunities and to enrich each other with useful knowledge, expertise and skills. This may include differences in gender, age, education, and also the role, topic, sector and area the stakeholder works for. When the stakeholder is (representing) an institute it includes the size of the stakeholder. Diversity is also about more broad categories such as social-economic and political status, religion, tradition and culture. It is therefore important for researchers to interact with the level of influence and interest that the stakeholder will have in the research."

For more details please contact Mark Reed
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Stakeholder Analysis

All 16 SoilCare study sites held half-day workshops with selected members of their stakeholder advisory panels, to identify organisations and groups (and in some cases individuals) in their area with a stake in improving soils whilst increasing the profitability and sustainability of cropping systems in this study site. The lists created were not intended to be exhaustive, but to represent those with a particular interest and/or influence, including powerful and marginalized groups alike. The particular interests of each stakeholder and the level of influence they may have on the research and its impact were then rated and described. "Context setters" were highlighted by identifying stakeholders with high influence but low interest, and where relevant, tailored engagement strategies were proposed for these "hard-to-reach" stakeholders. Important conflicts or alliances were identified between stakeholders, and their preferred modes of communication.

As might be expected, farmers were identified in every study site as a key stakeholder. However, in some study sites, the farming community had diverse interests in the project, and so was subdivided into different farming groups, for the purposes of engagement with the research.

Interests were found to differ between those farming within the study site and those without both locally and nationally. Whether farmers were full time or part time, farmed conventionally or organically also produced different interests. Other significant stakeholders in some areas were input suppliers, agricultural contractors and consultants and advisory services. Farmer interests were represented by: unions, societies and business groups both locally and nationally based. Other important stakeholders were local educational institutions and their students, the media and local government officers.

Once complete, stakeholder analyses were used in each study site to supplement stakeholder advisory panels, to ensure that no key stakeholders were missing. This helps to ensure that excluded stakeholders do not undermine the legitimacy of the project in future, and that voices representing the widest possible range of perspectives are heard in the research. As a result, the soil improving cropping systems that emerge from this research are more likely to be adopted by key stakeholders, leading to benefits for the sustainability and profitability of cropping systems in the study countries.

Table: Stakeholder Analysis results for 16 study sites

Study site	Farming	Policy	Research & teaching	Industry	Other
Italy	5	4	2		
UK	5	5		3	
Poland	5	2	5	3	3
Sweden	4	1			
Czech Republic	5	2	1	2	
Denmark	8	1	8	7	
Belgium	8	4	5	1	
France	12	4	4		
Hungary	2	1	1	2	
Germany	5	5		1	
Norway	4	1	2		
Switzerland	3	1	5	1	
Portugal	3	4	5	3	
Greece	5	2			1
Romania	4		3		3
Spain	4	1			1

Study site feature: Brittany, France

There are 16 study sites within the SoilCare project each focused on trialing soil-improving cropping systems relevant to their local contexts. In this newsletter we focus on the study site in France.

The French SoilCare study site is located in Brittany, in the north-west of France, in an area called the Semnon catchment. This is a traditional dairy area operating grassland and maize based systems. There are large dairy companies located in the area and the main crops grown are wheat, maize and grassland.

The main issues affecting soil quality and the profitability of crop production in the area relate to soil compaction, increases in weeds and loss of soil fertility. Extreme weather events due to climate change are becoming an increasing problem and farmers are looking to develop new approaches to increase resilience to climate hazards.



Réseau **Gab • Frab**
Les Agriculteurs **BIO** de Bretagne

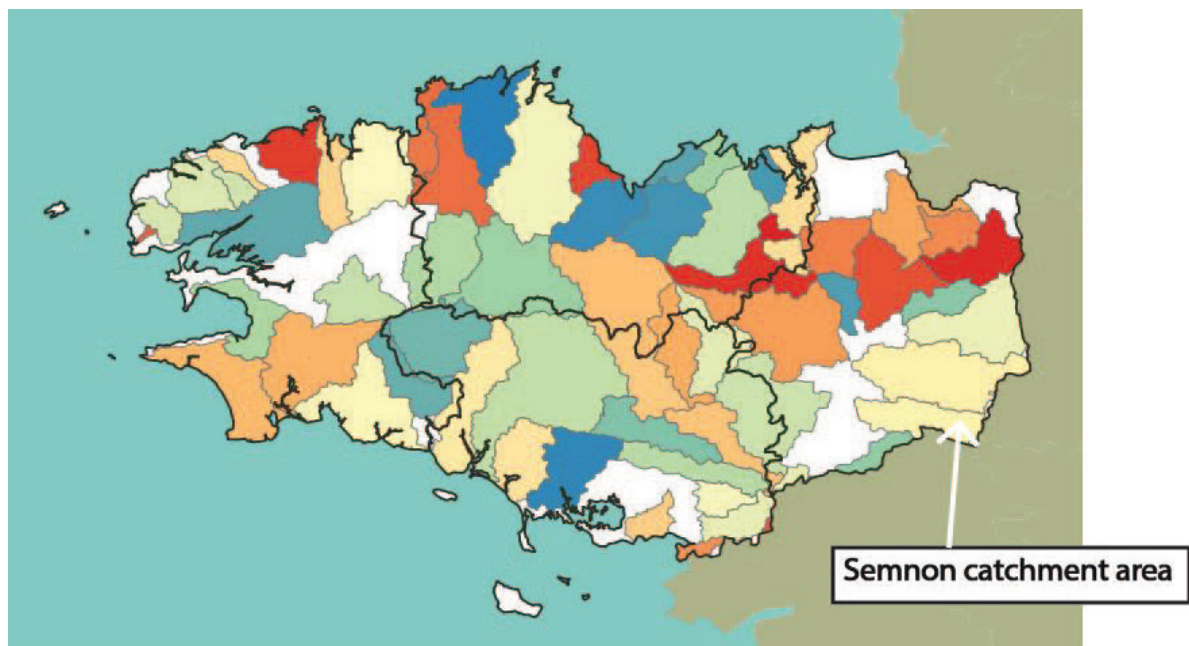
The SoilCare partner working in the study site area is FRAB (Fédération Régionale des Agrobiologistes de Bretagne). FRAB is an organization of Brittany's organic farmers, which is comprised of 4 local groups of organic farmers : GAB56, GAB22, GAB29 and Agrobio35. The GAB-FRAB network has four priorities :

- Developing organic farming in Brittany: transfer of organic practices to conventional farmers, research and development activities, promotion of organic farming
- Supporting organic farmers: training, tools development, food supply chains development
- Supporting installation and transition to organic farming
- Representing and defending organic farmers of Brittany

Around 1,000 organic farmers are members of the network (approximately 50% of local organic farmers). 80 farmers are involved in it as administrators or active members of commissions. About 40 employees work in FRAB, undertaking, for example, technical support, transition to organic farming support, food supply chain advice etc.. Also for many years the GAB-FRAB network has conducted research on organic practices, soils quality, crops, animal welfare or health etc., in partnership with research centres or technical institutes.

Semnon catchment area

The Semnon catchment area is located in the south of Ille-et-Vilaine department, in the eastern part of Brittany. The Semnon catchment area has 434 farms. There are 18 organic farms in the area. FRAB and their local partner Agrobio35 are working on soils with 12 farms in the area (organic and conventional). The aim is that farmers learn more about their soils and have a better understanding of how it works. Farmers are implementing cropping systems that will reduce their impact on the environment, on soils and maintain their revenues. The following practices are currently implemented by farmers: covering manure by plastics, using cover crops and destroying them at appropriate times, using lime with large fragments of calcareous material.



Brittany study site catchment areas

The main stakeholders who are involved in the study site are:

- Agrobio35: local organic farmers group, working on soils with groups of farmers
- Syndicat Intercommunal du Bassin du Semnon: involved in management of the catchment area, and helping to engage willing farmers
- Conseil Régional de Bretagne: supports progressive initiatives on soil quality in the territory.

For more information about the Brittany study site, please contact: Goulven Maréchal
g.marechal@agrobio-bretagne.org

SoilCare plenary meeting in Crete, Greece

Around 50 SoilCare partners gathered in Chania, Crete, Greece for the second plenary meeting of the SoilCare project between 13th-16th March 2017. The meeting was opened by SoilCare partner Prof. Ioannis Tsanis from Technical University of Crete.

On the first day a number of Work Packages presented their progress over the last year. A key part of the day was to clarify the definition of soil-improving cropping systems and to identify the types of SICS that the researchers from the 16 study sites might select with their stakeholders for trialling.

During the second day, hands-on training was provided for the study site partners on conducting stakeholder workshops for selecting soil-improving cropping systems for trialling and in editing and uploading text, photos and videos to study site webpages to enable communication with their stakeholders in their own language. On the third day the study site representatives, Jannes Stolte and Chris Storate, held a meeting with representatives of all study sites to discuss the selection of SICS and other specific issues.

The final day was spent visiting two of the SoilCare study site areas in Crete, the Koufos and Biolea Estate plots. In the Koufos area, orange cultivation is a major crop, but due to market competition producer prices have



SoilCare partners sharing their experiences of growing avocados (Photo: Jane Mills)

dropped leaving little or no profit. Recently, avocados have been proposed as a sustainable alternative, but little is known about their soil erosion rates or their effect on soil quality. We were shown trials where the researchers are comparing the erosion rates and as well as other soil quality parameters between a field that has remained an orange grove for 45 years and one that was converted to an avocado farm 20 years ago.

The second plot was located on the Biolea Estate that produces olive oil using traditional stone-ground processing methods. Olive trees are the most popular cultivation in Crete, covering 64% of the arable land and representing 86% of the tree plantations on the island. Conventional practices often lead to on-site and off-site environmental problems, such as soil erosion. In older olive grove, tillage erosion is present in areas where mechanical equipment is being used, reaching losses of up to 50 cm during the last 40 years. The researchers are comparing soil erosion rates between two 24-year old fields with loam soil that have not been tilled in the last seven years. One will service as a control and the other will be tilled in April 2017.



Soil erosion trap in olive grove (Photo: Jane Mills)

We left Crete with much accomplished and plans made for the coming year.

For more details about the Crete study site, please contact Ioannis Tsanis tsanis@hydromech.gr

Dissemination and Communication

Dissemination and communication are of crucial importance for the success of any research project. As a result the project has produced a dedicated and targeted SoilCare Dissemination and Communication strategy, based on specified goals and objectives and identifying different communication channels for particular target audiences (Deliverable 8.1). A key channel for dissemination will be a dedicated and easily accessible SoilCare website soilcare-project.eu. This site will contain not only outputs from the project but will also contain more general resources for people who want to learn about about soil-improving cropping systems.

For more information about the SoilCare dissemination strategy, please contact Jane Mills jmills@glos.ac.uk

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Past Events/Presentations

2nd June 2016 Presentation at MAES Soil Pilot project workshop by Simone Verzandvoort

5th-9th September 2016 Presentation at Organic Phosphorus Workshop, Lake District, England by partners from University of Hohenheim

10th September 2016 Presentation at the Inspiration project workshop in Venice, Italy by Jane Mills

27-29th September 2016 Poster at meeting of the German Association for Plant Production GPW 2016 Giessen, Germany

22nd-24th November 2016 Poster presented at the Agromek agricultural fair, Denmark by SoilCare partners, AgroIntelli.

5th December 2016 Poster presented at the EU Soil Conference, Brussels by Jane Mills.

19th January 2017 Ways towards a sustainable plant production: Gesellschaft für konservierende Bodenbearbeitung e.V., Hohenheim, Germany

Future Events/Presentations

20th April 2017 Poster at Advances in Soil Biology, Rothamsted Research, UK

23rd-28th April 2017 Participation in European Geosciences Union General Assembly, Vienna, Austria

27th-31st August 2017 Poster at Wageningen Soil Conference, The Netherlands

September 2017 Poster at 59th Meeting of the German Association for Soil Science 2017, Göttingen, Germany.

PROJECT PARTNERS

The SoilCare project has brought together a transdisciplinary team of 28 different organisations to identify, test and promote the adoption of soil-improving cropping systems across Europe.

PROJECT PARTNERS

- | | | |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1 Wageningen Environmental Research (Alterra), The Netherlands | 11 NIBIO, Norway | 20 Institute of Agrophysics of the Polish Academy of Sciences, Poland |
| 2 University of Newcastle upon Tyne, United Kingdom | 12 Bodemkundige Dienst van België, Belgium | 21 Wageningen University & Research, The Netherlands |
| 3 KU Leuven, Belgium | 13 Aarhus University, Denmark | 22 University of Pannonia, Hungary |
| 4 University of Gloucestershire, United Kingdom | 14 Game & Wildlife Conservation Trust, United Kingdom | 23 Swedish University of Agricultural Sciences, Sweden |
| 5 University Hohenheim, Germany | 15 Teagasc Research Institute, Ireland | 24 Agro Intelligence ApS, Denmark |
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| 8 Joint Research Centre, Italy | 18 National Research and Development Institute for Soil Science, Agrochemistry and Environmental Protection, Romania | 27 Fédération Régionale des Agrobiologistes de Bretagne, France |
| 9 University of Bern, Switzerland | 19 University of Padova, Italy | 28 Scienceview Media B.V., The Netherlands |
| 10 Milieu LTD, Belgium | | |

Participants at the SoilCare 2nd Plenary meeting 13th - 17th March 2017 in Crete, Greece (Photo: Erik van den Elsen)



The SoilCare project is funded by the European Union's Horizon 2020 research and innovation programme, under grant agreement No. 677407. Project officer Arantza Uriarte Iraola.

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