SoilCare
SOILCARE FOR PROFITABLE AND SUSTAINABLE CROP PRODUCTION IN EUROPE

# Policy analysis:

# Promoting SICS adoption in Skåne County, Southern Sweden

Authors: Alicia McNeill, Melanie Muro, Tugce Tugran, Zuzana Lukacova, Milieu

Contributors: Gunnar Börjesson, Martin Bolinder, Holger Kirchmann, Thomas Kätterer and Gizachew Getahun, Swedish University of Agricultural Sciences

Report number: **32**
Deliverable: **-**

Report type: **Scientific Report**
Issue date: **18/06/2021**
Project partner: **Milieu**
Version: **1.0**

| DOCUMENT SUMMARY | |
|---|---|
| **Project Information** | |
| Project Title: | Soil Care for profitable and sustainable crop production in Europe |
| Project Acronym: | SoilCare |
| Call Identifier: | H2020-SFS-2015-2b |
| Grant agreement no.: | 677407 |
| Starting Date: | 01.03.2016 |
| End Date: | 31.08.2021 |
| Project duration | 66 months |
| Web-Site address: | www.soilcare-project.eu |
| Project coordinator: | Wageningen Environmental Research (WEnR) |
| EU project representative & coordinator of the project: | Dr. Rudi Hessel - (rudi.hessel@wur.nl) +31 317 486 530 |
| Project manager(s): | Erik van den Elsen (erik.vandenelsen@wur.nl), Simone Verzandvoort (simone.verzandvoort@wur.nl), Falentijn Assinck (falentijn.assinck@wur.nl) |
| **Report Information** | |
| Report Title: | Policy analysis: Promoting SICS adoption in Skåne County, Southern Sweden |
| Principle Author(s): | Alicia McNeill, Melanie Muro, Tugce Tugran, Zuzana Lukacova, Milieu<br>Contributors : Gunnar Börjesson, Martin Bolinder, Holger Kirchmann, Thomas Kätterer and Gizachew Getahun, Swedish University of Agricultural Sciences |
| Principle Author e-mail: | melanie.muro@milieu.be |
| Deliverable Number: | - |
| Work Package: | WP7 |
| WP Leader: | Milieu |
| Nature: | PU |
| Dissemination: | Document |
| Editor (s): | - |
| E-Mail(s): | - |
| Telephone Number(s): | - |
| Report Due Date | - |
| Report publish date: | 18-06-2021 |
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| No. | Participant organisation name | Abbreviation | Country |
|---|---|---|---|
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| 2 | University of Newcastle upon Tyne | UNEW | United Kingdom |
| 3 | Katholieke Universiteit Leuven | KUL | Belgium |
| 4 | University of Gloucestershire | UoG | United Kingdom |
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The main soil threat in the region where the study site is located is soil compaction. SICS that are being tested within the context of the SoilCare project include sub-soil loosening which is composed of two treatments: subsoil loosening and subsoil loosening combined with the injection of organic material (straw pellets). In addition, several long-term experiments (LTE) with various crop rotation, use of animal manure, no removal of crop residues in non-manured plots, and regular lime applications are trialed at the study site. The methods tested through SoilCare and LTE therefore present important practices that might benefit soil health in the region if widely taken up.

### *Policy shortcomings and opportunities*

The table below provides an overview of the extent to which policies promote the full range of SICS covered by the SoilCare project (shaded in light green). The analysis shows that several policies regulate, incentivise and encourage the use of cover crop, crop rotation, integrated nutrient and pest management practices as well as reduced tillage management. The SICS tested at the study site (shaded in dark green): are subsidised through the different CAP instruments, primarily the greening measures which provide financial rewards to farmers adopting reduced tillage practices, crop rotations and catch crops. In addition, several national policies and initiatives regulate and promote the application of integrated nutrient measures and crop rotation. There are no policy instruments that would explicitly encourage, regulate, or incentivise smart residue management practices.

*Table 1: Coverage of SICS in existing national and regional policies, instruments and measures in Skåne County, Southern Sweden*

| Policy | Crop rotation | Green manures, cover crops, catch crops | Integrated nutrient management | Enhanced efficiency irrigation | Controlled drainage | Reduced tillage | Integrated pest management | Smart weed control | Smart residue management | Controlled traffic management | Integrated landscape management |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CAP GAEC Cross-Compliance Standards | | | | | | | | | | | |
| CAP Greening Requirements | | | | | | | | | | | |
| Rural Development Programme 2014 - 2020 | | | | | | | | | | | |
| Focus on Nutrients Initiative | | | | | | | | | | | |
| Environmental Quality Objectives | | | | | | | | | | | |
| National Action Plan for the Sustainable Use of Pesticides 2013–2017 | | | | | | | | | | | |

Research indicates that there are several factors that shape the success or failure of policy instruments in Southern Sweden, and the uptake of SICS tested in the sites in general. These factors include:

- Farmers' perception of new innovative techniques
- Inflexible subsidy system
- Lack of compensation for all soil benefits delivered
- Well functioning but limited advisory services

### *Recommendations for actions to promote the uptake of SICS*

Based on the analysis, and feedback collected from stakeholders, the following recommendations were formulated:

- **Set up a more flexible subsidy system:** payments for farmers should cover the use of a larger group of cover crops and taking into account local conditions. Currently, the system only provides subsidies for a restricted number of cover crop species which are not necessarily the most appropriate for the area and individual farms.
- **Review and broaden the practices and associated environmental benefits eligible for payments:** already in 2015, the Environmental Quality Objectives report emphasised that payments under the CAP should provide more targeted support and higher levels of compensation for farmers who deliver greater environmental benefits. The proposed post-2020 CAP, and most notably the Strategic Plans which Member States will need to draft, provide greater flexibility to define the requirements farmers will need to meet in order to receive CAP funding. This opens up opportunities to review and broaden the practices and environmental benefits farmers will need to deliver in order to receive payments. Cropping systems which produce important benefits such as sequestering carbon and which are currently not covered by subsidies, could be added to the measures available to farmers applying for CAP payments.
- **Establish mechanisms for effective knowledge dissemination and exchange between farmers:** some of the practices benefitting soil will require farmers to learn about these techniques, their application to different conditions as well as their benefits to change their misconceptions about these methods. This is for example the case in Swedish study site where a new "non traditional" sub-soiling technique is being tested. In addition, since farmers tend to place a lot of trust in their peers, establishing a network of model farms demonstrating how to use and adapt different SICS in the region would effectively support farmers in learning and sharing experiences about these practices. These activities could be linked to already existing courses organised by the region to provide training to farmers on sustainable agricultural practices.

- **Invest in and build capacity of Farm Advisory Services:** like farmers, farm advisors also need to learn about new practices, their practical application, costs, and benefits to support farmers they assist. Strengthening the technical skills of farm advisory services and setting up mechanisms for continuous learning are therefore crucial.
- **Update summary papers explaining and presenting data as well as conclusions from the Swedish long-term field experiments:** findings from the Swedish Long-term field experiments should be made accessible and widely disseminated, both to farmers and advisory service workers as these results demonstrate the benefits of SICS and their applicability in the region.

# 1 Introduction

Soil is increasingly recognised as a crucial resource providing products such as feed, fibre, food and fuel as well as critical ecosystem services including water storage, filtration, and carbon sequestration. Soil offers a habitat for billions of organisms and is the foundation for our cities and towns. Despite its recognised importance in sustaining ecosystems functions, human life and economic activities, soil is being over-exploited, degraded and irreversibly lost due to inappropriate land management practices, industrial activities and land use changes that lead to soil sealing, contamination, erosion, and loss of organic carbon.

Agriculture occupies a substantial proportion of European land and consequently contributes significantly to various forms of degradation. The uptake of innovations associated with potential benefits to soil quality, such as precision farming and conservation agriculture is slowly expanding across Europe. However, these are often not adopted to their full potential and in some cases are eventually abandoned, and the question remains as to why support and adoption of these practices by European farmers is still considerably weak.[1]

## Research aim and questions

The work presented here was carried out as part of the EU-funded SoilCare project.[2] The overall aim of SoilCare is to identify, evaluate and promote promising soil-improving cropping systems (SICS). SoilCare defines SICS as cropping systems that improve soil quality (and hence its functions), and that have positive impacts on the profitability and sustainability of agriculture. Cropping systems refer to crop type, crop rotation, and associated agronomic management techniques (see Table 2).

*Table 2: List of promising general SICS[3]*

| Component | Expected impact |
|---|---|
| **Crop rotation** | Improves crop productivity, soil biodiversity and system sustainability; decreases need for pesticides and risk of erosion |
| **Green manures, cover crops, catch crops** | Improves Soil Organic Matter (SOM) content, soil structure, soil biodiversity, nutrient use efficiency; decreases nutrient leaching, run-off, erosion |
| **Integrated nutrient management** | Improves crop productivity, soil nutrient status and resource use efficiency; |
| **Enhanced efficiency irrigation** | Improves crop productivity and resource use efficiency; minimizes risks of salinization and desertification |
| **Controlled drainage** | Improves crop productivity and resource use efficiency; minimizes the risk of waterlogging |

[1] e.g. Lahmar 2010. Adoption of conservation agriculture in Europe: Lessons of the KASSA project. *Land Use Policy 27*(1): 4-10.
[2] SoilCare: Soilcare for profitable and sustainable crop production in Europe, https://www.soilcare-project.eu/
[3] D2.1 – A review of soil improving cropping systems, available at : https://www.soilcare-project.eu/downloads/public-documents/soilcare-reports/75-report-06-d2-1-a-review-of-soil-improving-cropping-systems-wenr-oene-oenema

| Component | Expected impact |
|---|---|
| **Reduced tillage** | Reduces energy cost and may enhance SOM content and soil structure; may increase the need for herbicides/ pesticides |
| **Integrated pest management** | Improves crop productivity and resource use efficiency; minimizes the loss of biodiversity. |
| **Smart weed control** | Improves crop productivity and resource use efficiency; may decrease the need for herbicides |
| **Smart residue management** | Reduces evaporation and soil temperature; may increase/decrease the succes of germination |
| **Controlled traffic management** | Reduces energy cost and the risk of soil compaction |
| **Integrated landscape management** | Improves biodiversty and cropping systems sustainability |

The main aim of the work presented here was to formulate policy alternatives[4] and actions at EU and study site level to facilitate the adoption of soil-improving cropping systems. Understanding common barriers to the adoption of soil improving practices is an important prerequisite for identifying and designing policy measures to encourage farmers to adopt effective soil conservation practices. A second important foundation for developing appropriate policies is an appreciation of the effectiveness of soil conservation policies in agriculture.

A starting point for any policy analysis is to recognise the success and failures of different types of policy – whether they are regulatory instruments, economic instruments, voluntary instruments, or educational/information instruments. There is plenty of academic research available on the efficiency and effectiveness of these instruments in general, and it is beyond the scope of this Country Report to assess them in detail. However, it is important to recognise the limitations of each, as many of the success and failures of national soil policy may be attributed to the fundamental successes and failures of the types of policy. Table 2 below provides a summary of the different types of policies.

*Table 3: Summary of policy approaches*

| Policy approach | Premise | Positive attributes | Negative attributes |
|---|---|---|---|
| **Regulatory instruments** | Force farmers to adopt SICS | • Levels the playing field between competitors, as everyone must play by the same rules<br>• Fairly consistent (often long-term) | • Inflexible regardless of individual situations<br>• May be costly to implement<br>• Monitoring and enforcement can be costly<br>• Discourages innovation |
| **Economic instruments** | Incentivise farmers to adopt | • Encourages innovative methods | • Can be subject to fluctuations as the |

[4] Policy, loosely defined, is "officially accepted set of rules or ideas about what should be done" or "a system of courses of action with a common long-term objective (or objectives) formulated by governmental entities or its representatives" (see http://learnersdictionary.com/definition/policy and https://www.thefreedictionary.com/policy). Policy alternative refers to a set of different types of policy options including economic instruments, regulatory instruments, planning instruments and information/knowledge instruments.

| Policy approach | Premise | Positive attributes | Negative attributes |
|---|---|---|---|
| | SICS using subsidies and taxes etc. | • Can offset cost of implementation and/or discourage adverse behaviour<br>• Allows a certain amount of flexibility | market fluctuates<br>• High likelihood of setting subsidies/taxes at incorrect rate (which leads to inefficiencies)<br>• Can be subject to game-playing behaviour |
| **Voluntary instruments** | Encourage farmers to adopt SICS | • Sense of "ownership" as the decision was taken freely<br>• High degree of flexibility | • Does not guarantee implementation |
| **Educational/information instruments** | Educate farmers so they understand the importance of SICS | • Implementation as a result of truly understanding the impacts of the actions<br>• High degree of flexibility | • Does not guarantee implementation<br>• Relies on interest of affected parties<br>• Often takes more time to become effective |

Against this background, the following research objectives were formulated at the outset of the work:

A. To identify existing policies and policy instruments at EU-level as well as national and (sub)regional level in the 16 SoilCare countries promoting soil quality, and particularly the adoption of soil-improving cropping systems.

B. To describe the intended mechanisms and impacts of existing policies, instruments, and practices.

C. To assess the extent to which existing policies, policy instruments and practices promote the adoption of soil-improving cropping systems.

D. To identify contextual factors, particularly institutional settings, influencing policy impact on farmer adoption.

E. To identify existing policies, policy alternatives and complementary actions that could promote the uptake of SICS.

F. To assess the performance of good policy alternatives, their advantages, and disadvantages.

This report presents an inventory and analysis of bottlenecks and opportunities in sectoral and environmental policies to facilitate the adoption of SICS in Switzerland and fits into a

larger research initiative involving 16 European countries in total.[5] Based on this analysis, it presents policy alternatives and actions for the national and/or (sub)regional level with the potential of promoting the uptake of SICS.

## Methods

The research and preparation of this report were undertaken by two groups of researchers – the core team of the task, who were responsible for the preparation and research for EU-level policy and all 16 study sites, working in close coordination with researchers with specific knowledge about the study site – the study site researchers. This approach ensured that there was both consistency between the 16 country reports, of which this Swiss report is but one, but local knowledge and documents and information in local languages were also well utilised.

Figure 1 illustrates the overall study design and methods, which were applied to answer specific research questions. Whilst each data collection activity focused on a sub-set of the research questions, they are closely related, and the information gathered through the mix of methods applied were used to feed into different research questions.

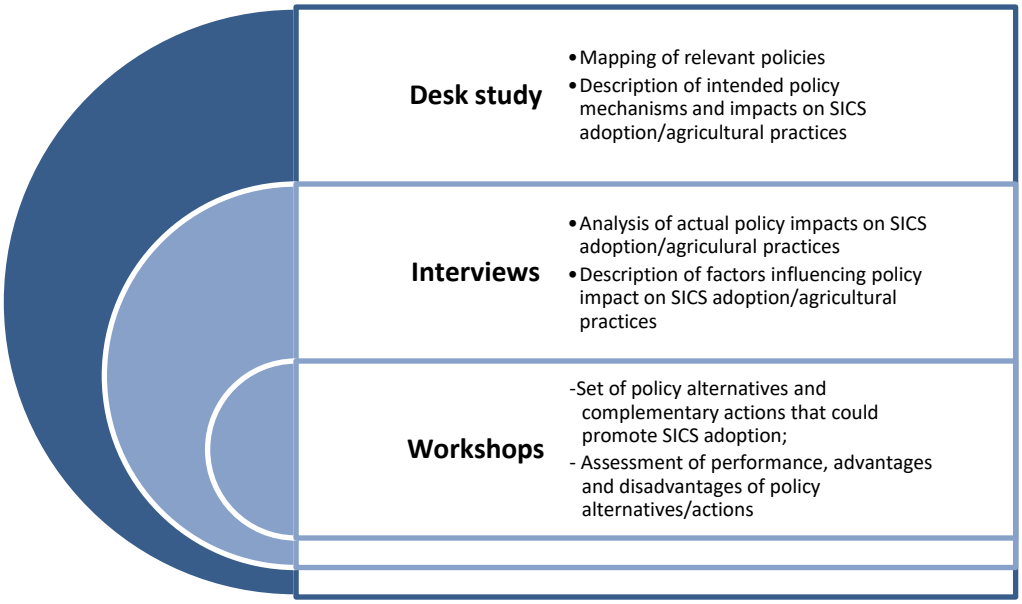


*Figure 1: Research strategy*

Data collection and analysis involved the following three activities:

**1) A desk-study of policy documents (in the broadest sense) and relevant**

[5] The 16 countries include 13 EU Member States, i.e. Belgium, Germany, France, Czech, Poland, Hungary, Romania, Denmark, Sweden, Greece, Spain, Italy, and Portugal and three non-EU countries, i.e. UK, Switzerland, and Norway.

**literature:** policies potentially impacting the adoption of SICS in the study sites were identified. The aim of this step was to provide a broad overview of soil-related national and regional[6] policies from which the most relevant policies could be selected for in-depth analysis. A draft inventory was compiled, including those national, regional, and sub-regional policies that were linked to a set of pre-selected EU policies (primarily concerning environmental and agricultural topics); however, in the case of regional and sub-regional policies, these were limited to those directly relevant to the study site (i.e. not all regions and sub-regions were included). For each policy, the following information was recorded: date of adoption, governance scale, type of instrument, link to cropping system (components) etc.[7] Based on the screening done in the first step, the national and regional policies deemed most relevant for the study site were subject to a more in-depth analysis. This was done through desk research carried out by the study site researchers.

2) **Interviews with selected national and regional policymakers and stakeholders:** In Sweden, no such interviews were carried out during the course of the project, thus reducing the evidence base to two sources .

**2) An adoption workshop with national and regional policymakers and stakeholders:** To develop and assess policy alternatives, the Study Site Research Teams organised a stakeholder workshop in each site, following a common guidance document which detailed the structure and methods for the event. Study site teams mostly invited those stakeholders they were already working with, either within the context of SoilCare or as part of their regular engagement activities. The Swedish workshop brought together different stakeholders, including local farmers, farm advisors working with the extension services, a technical consultant , and researchers.

## Report outline and where to find supplementary information

**Section 2** of this report presents an analysis of policy instruments relevant for shaping agricultural practices in Southern Sweden where study site is located. It examines how existing instruments may impact on the adoption of SICS and explores the factors which enable or hamper uptake of these practices.

**Section 3,** on the basis of the previous section, formulates actions which could promote a shift in agricultural practices in the study site region and facilitate a wider adoption of SICS.

A detailed analysis of all relevant EU-level policies as well as national, regional and sub-regional policies in the countries covered by this research is reported in D*7.1 Inventory of opportunities and bottlenecks in policy to facilitate the adoption of soil-improving techniques* for, available at: https://www.soilcare-project.eu/resources/deliverables.

[6] The term "region" refers in this context to the sub-national level, particularly the area of the country where the respective study site is located.
[7] The policy inventory is available at: https://www.soilcare-project.eu/resources

A synthesis of findings and recommendations from the EU-level and cross-country analysis can be found in *D7.2 Report on the selection of good policy alternatives at EU and study site level, available at:* https://www.soilcare-project.eu/resources/deliverables.

# 2 Analysis of policy shortcomings and opportunities in Southern Sweden

This section provides a review and analysis of national instruments relevant for shaping agricultural practices in Skåne County, Southern Sweden, where the study site, "Orup", is located. Policies investigated include both policies implementing EU instruments as well as those initiated by national and regional institutions[8]. The information is drawn from the policy inventories compiled by the Study Site Researchers as well as an adoption workshop conducted with key stakeholders[9].

The case study site is briefly described in the table below.

*Table 4: Description of the study site*

| Site Name | **Orup, Skåne County, Southern Sweden** |
|---|---|
| Study site | Silty sand, low clay content (about 10%). |
| Temperatures | Mean temperature is around 0 °C in January and 16 °C in July. |
| Main soil threats | Compaction - The subsoil (below 30 cm) in Orup is highly compacted which limits root penetration and thereby nutrient and water uptake from deeper soil layers. |
| Current practices | Conventional agricultural practices of the region which include ploughing, cultivation, fertilization, manuring, chemical weed and pest treatment applied. Crops are rain-fed and no catch crops to combat Nitrogen leaching are grown. |

The experiments carried out in the study site are described below. Each field trial provides evidence on the costs and benefits.

*Table 5: Overview of experiments carried out in the Swedish study site, and the SICS category and cluster under which they are grouped*

| **General treatment category** | **SICS cluster[10]** | **Experiments** |
|---|---|---|
| Reduced tillage (sub-soiling) | Compaction alleviation | **Sub-soil loosening**<br>1. Subsoil loosening<br>2. Subsoil loosening combined with the injection of organic material (straw pellets). |

[8] See the Annex for a more detailed overview of the policies described in this section.
[9] No interviews with selected national and regional policymakers and stakeholders were carried in relation to SICS implementation during the course of the SoilCare project.
[10] SICS are grouped into four clusters: (1) Soil-improving crops, (2) Fertilisation/amendments, (3) Soil cultivation, and (4) Alleviation of compaction.

## 2.1 Which existing policies and policy instruments shape agricultural practices in Southern Sweden

A policy analysis at the national and regional level identified the following policies which may directly or indirectly shape agricultural practices in Southern Sweden. The overview below provides a description of those policies identified as most important for soil-improving practices and does not intend to provide an exhaustive overview of the policy landscape governing agricultural methods in the region.

### *Agricultural policies*

The different funding instruments established under the EU **Common Agricultural Policy (CAP)** greatly influence farming practices in the region. Direct payments are tied to farmers meeting the **Good Agricultural and Environmental Conditions (GAEC)** as well as the greening requirements set out by the policy.

The following GAEC standards are relevant for soil protection in Sweden:

- GAEC 4 In Southern Sweden, farmers with at least 5 hectares must keep 50-60% green cover during the winter months.
- GAEC 5 Green cover required between mid-September and mid-February on arable land with slope greater than 20° and which is both alongside watercourses and within a nitrate vulnerable zone.
- GAEC 6 No stubble burning, except where winter oilseed is sown without ploughing. This can only be done once in three years.
- GAEC 7 Terraces, hedges, ditches, trees, stone walls, ponds, ditches and field margins are protected.

As part of **Greening requirements,** Swedish farmers can choose from the list of seven Ecological Focus Areas (EFAs) elements, of which four are relevant for soil protection and soil organic matter: land lying fallow, catch crops/green cover, agroforestry and short rotation coppice (SRC). Sweden has designated 45,595ha of environmentally sensitive permanent grassland (ESPG) within Natura 2000 areas and but has not designated any ESPG elsewhere. Farmers are not allowed to plough or convert this grassland.

In addition to these conditional payments, **Rural Development Programme (RDP**) plays an important role in shaping agricultural practices in the country and thus also soil protection measures. Under Priority 4 – Ecosystems management - Sweden aims to have 35% of agricultural land under management contracts to improve soil management and/or prevent soil erosion with a budget of approx. EUR 985 million. For the focus area 4C concerned with the Soil erosion and management there is however no specific budget since the expenditure is programmed for the priority as a whole, not for individual focus areas.

On a national level, with a view to support the uptake of sustainable agricultural practices, targeted courses for farmers are provided in various locations.

### *Environmental policies*

In 1999 and in 2005, the Swedish Parliament adopted 16 **Environmental Quality Objectives** which today constitute the backbone of the Swedish environmental policy. The Objectives set the course for the implementation of Swedish environmental policy. The instrument stipulates that progress towards the 16 Quality Objectives is to be monitored continuously and reported annually by the responsible authority. Progress is measured based on a number of indicators. The 2015 report stressed the need for rural development policy to compensate farmers for maintaining a good environment and emphasized that payments under CAP should provide more targeted support/higher levels of compensation for farmers who deliver greater environmental benefits. In order to identify which instruments and measures provide the desired results, monitoring and evaluation of the programs should be improved. The 2015 report recommended the following:

- requirements for EFAs are streamlined to increase environmental benefits;
- -a tax is put in place on commercial (non-organic) fertilisers to limit leaking of nutrients and spread of cadmium;
- agriculture policy instruments can be improved if instruments were designed to make the polluters more responsible for the environmental damage caused by agriculture.

Another important piece of legislation is the **Environmental Code** adopted in 1999. The Code determines environmental quality standards, establishing substance levels, for example in soil, and requires an environmental impact assessment to be carried out before permission is given to any activity defined as environmentally hazardous. The impact assessment takes into account also the impact on soil. Moreover, the Code makes it compulsory to publish information about soil pollution when detected and defines responsibilities in the management of polluted soils. It requires operators to immediately notify the responsible authority in case of imminent threat of serious environmental damage or if such damage has already occurred. Chapter 10 of the Code enforces the "polluter pays" principle in case of pollution damage or serious environmental damage caused.

### Water protection policies

In order to decrease leakage of nitrate from agriculture into the Baltic Sea there are rules set up by the Swedish government. **Local Rules for Spreading Farmyard Manure** (and organic fertilisers) with high nitrate content were adopted and apply to individual regions.

A joint initiative between the Swedish Board of Agriculture, the County Administration Boards, the Federation of Swedish Farmers and a number of companies in the farming

business is called **'Focus on Nutrients'** and is the largest single undertaking in Sweden with the objective to reduce losses of nutrients from the soil to air and water from livestock and crop production. This initiative also focuses on the safe use of crop protection products.

### Chemicals policies

**National Action Plan for Sustainable Use of Pesticides** was adopted in line with the EU Sustainable Use of Pesticides Directive (SUPD) under which Member States are required to develop clear, measurable targets to reduce risks from pesticides. In order to support the development of integrated pest management, research and applied research projects are underway in a range of areas in Sweden. These include biological soil mapping, developing decision support systems, evaluating biological plant protection products from other countries, demonstration farms, changes in the effects of fungicides, data for decision-making on herbicides, residues of plant protection products in soil and water, increasing biological knowledge about major diseases, integrated pest management in strawberry production and mechanical and integrated measures to control weeds.

The Swedish All Party Committee on Environmental Objectives ('Miljömålsberedningen') has, on behalf of the Swedish Government, developed in 2012 a **Proposal Strategy for Sustainable Land Use**. The draft strategy emphasises, for instance, the importance of land use to reduce emissions of greenhouse gases from organogenic soils and increasing carbon storage in relation to agriculture (proposal related to the CAP). It also proposes an interim target for greater consideration of green infrastructure and for long-term sustainable management of runoff in built environments and in nature. The instrument is still a proposal and it suggests continuation of existing and in some areas changes to existing monitoring mechanisms with regard to sustainable land use, for example continued monitoring of the need for draining of land to e.g. avoid soil compaction in agriculture in changing climatic conditions.

## 2.2 To what extent do existing policies facilitate adoption of soil-improving practices in Southern Sweden?

The main soil threat in the region where the study site is located is soil compaction. SICS that are being tested within the context of the SoilCare project include sub-soil loosening which is composed of two treatments: subsoil loosening and subsoil loosening combined with the injection of organic material (straw pellets). In addition, several long-term experiments (LTE) with various crop rotation, use of animal manure, no removal of crop residues in non-manured plots, and regular lime applications are trialed at the study site. The methods tested through SoilCare and LTE therefore present important practices that might benefit soil health in the region if widely taken up.

This section assesses how the policy instruments identified above already promote the agricultural practices tested in the Swedish study site:

*Crop rotation and tillage management*

In Sweden, reduced tillage and crop rotation practices are both incentivized through the national implementation of the CAP, as part of both greening requirements and GAECs. Short rotation coppice (SRC) is one of the EFA elements from which Swedish farmers can choose. The national initiative 'Focus on nutrients', although primarily concerned with protection of soil and water from nitrates runoff, also includes a requirement to apply crop rotation.

*Integrated nutrient and smart residue management*

There are no policy instruments that would explicitly encourage, regulate, or incentivise smart residue management practices. However, catch crops and green cover are among the list of EFA available to Swedish farmers which could form part of a more effective residue management approach at farm-level. In contrast, integrated nutrient management is regulated and incentivised by multiple policy instruments, including the CAP greening requirements, RDP measures as well as national policies. Nutrient management is a sole focus of national joint initiative 'Focus on Nutrients' which aims to reduce nutrient losses from livestock and crop production. In addition, rules established for Southern Sweden establish mandatory requirements for spreading farmyard manure and organic fertilisers with high nitrate content. The 2015 National Environmental Quality Objectives Report recommended the introduction of a tax on commercial (non-organic) fertilsers to limit leaking of nutrients and spread. It is not clear whether this recommendation was taken up by the national legislators. Finally, at regional level, farmers are offered courses which focus on various sustainable agricultural practices including integrated nutrient management and catch crops which might promote a wider uptake of these methods.

The table below provides an overview of the extent to which policies promote the full range of SICS covered by the SoilCare project (shaded in light green). The analysis shows that several policies regulate, incentivise and encourage the use of cover crop, crop rotation, integrated nutrient and pest management practices as well as reduced tillage management. The SICS tested at the study site (shaded in dark green): are subsidised through the different CAP instruments, primarily the greening measures which provide financial rewards to farmers adopting reduced tillage practices, crop rotations and catch crops. In addition, several national policies and initiatives regulate and promote the application of integrated nutrient measures and crop rotation. There are no policy instruments that would explicitly encourage, regulate, or incentivise smart residue management practices.

*Table 7: Coverage of SICS in existing national and regional policies, instruments and measures in Skåne County, Southern Sweden*

| Policy | Crop rotation | Green manures, cover crops, catch crops | Integrated nutrient management | Enhanced efficiency irrigation | Controlled drainage | Reduced tillage | Integrated pest management | Smart weed control | Smart residue management | Controlled traffic management | Integrated landscape management |
|---|---|---|---|---|---|---|---|---|---|---|---|
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| Focus on Nutrients Initiative | | | | | | | | | | | |
| Environmental Quality Objectives | | | | | | | | | | | |
| Environmental Code | | | | | | | | | | | |
| National Action Plan for the Sustainable Use of Pesticides 2013 2017 | | | | | | | | | | | |

## 2.3 Which factors shape success or failure of policy instruments in Southern Sweden?

Research indicates that there are several factors that shape the success or failure of policy instruments in Southern Sweden, and the uptake of SICS tested in the sites in general. These factors include:

*Farmers' perception of new innovative techniques –*

One of the SICS trialed at the study site is subsoil loosening, tested on its own and in combination with the injection of organic material (straw pellets). Subsoil loosening takes place to a depth of about 50 cm with the added organic treatments. This means that some of the subsoil is brought up to the arable layer, while some arable soil is mixied into the subsoil. Many farmers consulted pointed out that this technique was not always well perceived since, traditionally, farmers would not plow so deeply and mixing subsoil with topsoil was an uncommon practice.

*Inflexible subsidy system*

Several farmers consulted during the study agreed that economic aspects were the main drivers for adopting or changing practices and noted that the existing subsidy system was not adaptive enough. For instance, the Swedish Board of Agriculture is only providing subsidies for a restricted number of cover crop species which are not necessarily the most appropriate for the area and main crops used at a specific farm. It was explained that using cover crops within rotations required local adaptations, allowing the farmer to experiment with different species of cover crops. A second example reported by farmers were the requirements established by specific RDP measures. Here, farmers need to have at least three different crop types and a certain area considered as EFA to qualify for area-based payments. The farmer providing this example that this rile meant that the environmental benefits of the conservation cropping system they were applying were not taken into account. In this system, the farmers seeds almost immediately after harvest which implies that the soil surface is almost never left bare but there is no monetary compensation for this.

*Lack of compensation for all soil benefits delivered*

By the same token, stakeholders highlighted that not all the soil (or environmental) benefits delivered by SICS were rewarded by the current payment system. The sequestration of carbon in the soil through cover crops, for example, is currently not supported.

*Well functioning but limited advisory services*

Farmers pointed highlighted the good relationship and level of cooperation with the Swedish farm extension services. At the same time, it was noted there knowledge of different SICS might be limited. Cover crops were cited as a topic where farmers were seeking expertise and advice from Denmark which was considered to have the most advanced knowledge in this area.

# 3 Recommendations for actions to promote the uptake of SICS

SICS that are being tested at the study site (sub-soil loosening, cover crops, tillage, and irrigation management) aim to address the main soil threat of soil compaction in the Swedish study site.

This report presented an inventory and analysis of bottlenecks and opportunities in sectoral and environmental policies to facilitate the adoption of Soil-Improving Cropping Systems in the Skåne county, Southern Sweden. Based on this analysis, and feedback collected from stakeholders, it presented actions for the national and/or (sub)regional level with the potential of promoting the uptake of SICS.

Drawing on these insights, the following general recommendations can be made:

- **Set up a more flexible subsidy system:** payments for farmers should cover the use

of a larger group of cover crops and taking into account local conditions. Currently, the system only provides subsidies for a restricted number of cover crop species which are not necessarily the most appropriate for the area and individual farms.

- **Review and broaden the practices and associated environmental benefits eligible for payments:** already in 2015, the Environmental Quality Objectives report emphasised that payments under the CAP should provide more targeted support and higher levels of compensation for farmers who deliver greater environmental benefits. The proposed post-2020 CAP, and most notably the Strategic Plans which Member States will need to draft, provide greater flexibility to define the requirements farmers will need to meet in order to receive CAP funding. This opens up opportunities to review and broaden the practices and environmental benefits farmers will need to deliver in order to receive payments. Cropping systems which produce important benefits such as sequestering carbon and which are currently not covered by subsidies, could be added to the measures available to farmers applying for CAP payments.
- **Establish mechanisms for effective knowledge dissemination and exchange between farmers:** some of the practices benefitting soil will require farmers to learn about these techniques, their application to different conditions as well as their benefits to change their misconceptions about these methods. This is for example the case in Swedish study site where a new "non traditional" sub-soiling technique is being tested. In addition, since farmers tend to place a lot of trust in their peers, establishing a network of model farms demonstrating how to use and adapt different SICS in the region would effectively support farmers in learning and sharing experiences about these practices. These activities could be linked to already existing courses organised by the region to provide training to farmers on sustainable agricultural practices.
- **Invest in and build capacity of Farm Advisory Services:** like farmers, farm advisors also need to learn about new practices, their practical application, costs, and benefits to support farmers they assist. Strengthening the technical skills of farm advisory services and setting up mechanisms for continuous learning are therefore crucial.
- **Update summary papers explaining and presenting data as well as conclusions from the Swedish long-term field experiments:** findings from the Swedish Long-term field experiments should be made accessible and widely disseminated, both to farmers and advisory service workers as these results demonstrate the benefits of SICS and their applicability in the region.

## Annex: Overview of key policies in Southern Sweden

| Policy name | English translation | Scale | EU or MS-based policy | SICS covered | Description of policy |
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| Normer för god jordbrukshävd och goda miljöförhållanden (GAEC) | CAP GAEC Cross-Compliance Standards | National | EU (CAP) | Crop rotation, cover crop, catch crop, and green manure, reduced tillage | GAEC 4 In Southern Sweden, farmers with at least 5 hectares must keep 50-60% green cover during the winter months. |
| CAP Greening Payment Requirements | -- | National | EU (CAP) | Crop rotation, integrated nutrient management, cover crop, catch crop, and green manure, reduced tillage | The list of EFA elements which Swedish farmers can choose from includes four of the seven elements that can protect soils and soil carbon: fallow, catch crops/green cover, agroforestry and short rotation coppice (SRC). Sweden has designated 45,595ha of environmentally sensitive permanent grassland (ESPG) within Natura 2000 areas and but has not designated any ESPG elsewhere. Farmers are not allowed to plough or convert this grassland. The government department administering CAP payments monitors compliance with greening requirements through administrative checks on all farmers' claims for CAP payments. In addition, a small sample of farms will be inspected each year (the sample size and risk-based selection criteria are defined in EU legislation). On farms where greening requirements are not being met, part of the CAP payments for that year will be withheld. |
| Rural Development Programme 2014 - 2020 | -- | National | EU (CAP) | Integrated nutrient management | Priority P4 ecosystem management - Sweden aims to have 35% of agricultural land under management contracts to improve soil management and/or prevent soil erosion with a budget of approx. 985 M EUR. No measures are programmed for priority 5E. No expenditure is budgeted under priority 5E Carbon conservation / sequestration. Under Focus area 4C Soil erosion and management there is no specific budget identified because the expenditure is programmed for the priority as a whole, not for individual focus areas. |
| Local Rules for Spreading Farmyard Manure | -- | National | MS | Integrated nutrient management | In order to decrease leakage of nitrate from agriculture into the Baltic Sea there are rules set up by the Swedish government. Local Rules for Spreading Farmyard Manure (and organic fertilisers) with high nitrate content were |

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| | | | | | adopted and apply to individual regions. |
| Greppa Näringen | Focus on Nutrients | National | MS | Crop rotation, integrated nutrient management | Focus on Nutrients is a joint venture between The Swedish Board of Agriculture, The County Administration Boards, The Federation of Swedish Farmers and a number of companies in the farming business. 'Focus on Nutrients' is the largest single undertaking in Sweden to reduce losses of nutrients from the soil to air and water from livestock and crop production. The project also focuses on the safe use of crop protection products. |
| Sveriges miljömål | Environmental Quality Objectives | National | EU/MS | Integrated nutrient management | In 1999 and in 2005, the Swedish Parliament adopted 16 Environmental Quality Objectives which today constitute the backbone of the Swedish environmental policy. The Objectives describe the state in which the Swedish environment shall be following implementation of environmental policy. The instrument stipulates that progress towards the 16 Quality Objectives is to be monitored continuously and reported annually by the responsible authority. Progress is measured based on a number of indicators. The 2015 progress report stresses the need for rural development policy to compensate farmers for maintaining a good environment and stresses that payments under CAP should provide more targeted support/higher levels of compensation for farmers who deliver greater environmental benefits. In order to identify which instruments and measures provide the desired results, monitoring and evaluation of the programs should be improved. The 2015 report recommends that:<br>- -that requirements for EFAs are streamlined to increase environmental benefits;<br>- -a tax is put in place on commercial (non-organic) fertilisers to limit leaking of nutrients and spread of cadmium;<br>- -agriculture policy instruments can be improved if instruments were designed to make the polluters more responsible for the environmental damage caused by agriculture. |
| Miljöbalken" | Swedish Environmental Code | National | MS | No SICS directly covered | The Environmental Code (1999) is the most important piece of environmental legislation in Sweden. The Code determines environmental quality standards, establishing substance levels, for example in soil, and requires an environmental impact assessment to be carried out before permission is given to any activity defined as environmentally hazardous. Hazardous activities are defined as any usage of land, buildings or stationary installations that, for instance, result in emission of pollutants into soils. The |

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| | | | | | impact assessment takes into account, for example, the impact on soil. Moreover, the Code makes it compulsory to publish information about soil pollution when detected and defines responsibilities in the management of polluted soils. It requires operators to immediately notify the responsible authority in case of imminent threat of serious environmental damage or if such damage has already occurred. Chapter 10 of the Code enforces the "polluter pays" principle in case of pollution damage or serious environmental damage caused. |
| National Action Plan for the sustainable use of plant protection products for the period 2013–2017 | -- | National | EU (SUPD) | Integrated pest management | To support the development of integrated pest management, research and applied research projects are underway in a range of areas. These include biological soil mapping, developing decision support systems, evaluating biological plant protection products from other countries, demonstration farms, changes in the effects of fungicides, data for decision-making on herbicides, residues of plant protection products in soil and water, increasing biological knowledge about major diseases, integrated pest management in strawberry production and mechanical and integrated measures to control weeds. |