

Policy analysis:

Promoting SICS adoption in Draganesti Vlasca, Romania

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Executive summary

Soil quality at the Draganesti Vlasca study site is affected by compaction, temporary water deficit and excess as well as erosion. The soils in the area are naturally susceptible to compaction and water excess and/or deficit due to their high clay content. The Soil-improving cropping system (SICS) tested at the study site and which is thought to address these soil threats includes reduced tillage measures which therefore represent 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 policies regulation, incentivising, and promoting the full range of SICS covered by the SoilCare project (shaded in light green) as well as the SICS tested at the study site (shaded in dark green): reduced tillage. The Code of Good Agricultural Practice established in compliance with the EU Nitrates Directive lists reduced tillage as good practice to be adopted by farmers. However, the Code is not mandatory to farmers outside of Nitrate Vulnerable Zones. In addition, reduced tillage practices are incentivised through the RDP. Crop rotation is promoted through water (and soil) protection policies such as the Action Plan for the Protection of Waters Against Pollution Caused by Nitrates, the CAP's greening measures, GAEC cross-compliances standards and the RDP. The RDP, specifically through its agri-environment and climate measures incentivises the use of nitrogen-fixing cover crops to reduce nutrients run-off and leaching, increase organic matter content and soil nutrients. In case of the study site area, where there are clay soils, the promotion of this practice has multiple benefits for soil quality according to stakeholders, since it increases the aeration of soil and reduces erosion on top of the positive impacts identified above. Integrated nutrient management is not only incentivised through the CAP (GAEC 6), but there are also several water and environmental policies, including the Water Act, the Nitrates Action Plan, and the Groundwater Protection Plan, limiting or banning the use of fertilisers in certain areas. However, according to one interviewee, conflicts are placed on farmers related to the compliance with the periods when fertilisers application is restricted, which are established in the Code of Good Agricultural Practices for water protection against nitrates pollution from agricultural sources. The policies just mentioned also directly encourage the use of integrated pest management practices. In addition, several dedicated pieces of legislation regulate the use of plant protection products.

Table 1: Coverage of SICS in current national and regional policies, instruments, and measures in Draganesti Vlasca, RO

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											
National Program for Rural Development 2014-2020											
Ordinance on organic products no. 34/2000 modified by Ordinance no. 29/2014											
Ordinance no. 990/1809/2015 related to approval of Code of Good Agricultural Practices for water protection against nitrates pollution from agricultural sources											
Water Law no. 107/1996 modified and improved in 2017											
National Plan for Groundwater Protection Against Pollution and Deterioration (2009)											
Order for the approval of the Technical Norms regarding the protection of the environment and especially of the soils, when the sewage sludges are used in agriculture, with the subsequent modifications											
Ordinance no. 34/2012 for establishing the institutional framework for sustainable use of pesticides in Romania											
Decision no. 683/2013 for approving the National Action Plan on reducing the risks of using pesticides											
Ordinance no.12/2006 on establishing the maximum levels of pesticides in and on fruits, vegetables, cereals and other plant products											
Ordinance no. 1261/2007 on the establishment of measures for the application of Regulation (EC) no. 2003/2003 of the European Parliament and of the Council of 13 October 2003 on fertilisers											
Ordinance no. 756/1997 on Environmental Pollution Assessment											

Evidence gathered through interviews and desk research shows that different contextual factors contribute to and undermine the uptake of SICS in general, and of the practices tested in the study site in particular. Some of the findings suggest that the uptake of SICSs is improving. On the other hand, barriers to the uptake of these practices remain.

The key factors shaping the success of policy instruments include:

- Outdated legislation
- Lack of dedicated soil policy
- Exploitation of policy synergies
- Availability of financial incentives
- Educated and innovative young farmers

Recommendations for actions to promote the uptake of SICS

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

- **Update existing policy instruments:** some key policy instruments, such as the National Nitrates Action Plan, seem to be outdated. These need to be revised to reflect current needs, objectives and taking into account new insights on agricultural practices which should be promoted to meet policy objectives.
- **Mainstreaming of soil objectives and good soil management practices in existing legislation:** Many benefits to soil health are achieved through other sectoral or environmental policies. While this is not considered a barrier to SICS adoption, there is a risk that key soil threats are not addressed if they do not fall under legislation for other sectors. The development of a dedicated soil policy should be considered. Such an intervention should be designed to accommodate farm diversity, featuring a robust monitoring and enforcement system.
- **Education and training:** younger farmers seem to be willing to take up new practices. It could be considered as to whether older generations can also be targeted to bring about change faster. Some of the practices benefitting soil will require farmers to learn about these techniques, their application to different conditions as well as their benefits in order to change their misconceptions about these methods. To this end, research findings should be made accessible and widely disseminated and educational activities should be encouraged. Knowledge should be disseminated via multiple channels, through the provision of guidance document but also farms visits and demonstration days.

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 aims 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 SICS³

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

¹e.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
Controlled drainage	Improves crop productivity and resource use efficiency; minimizes the risk of waterlogging
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 alternatives⁴ 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	<ul style="list-style-type: none"> Levels the playing field between competitors, as everyone must play by the same rules Fairly consistent (often long-term) 	<ul style="list-style-type: none"> Inflexible regardless of individual situations May be costly to implement

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
			<ul style="list-style-type: none"> • Monitoring and enforcement can be costly • Discourages innovation
Economic instruments	Incentivise farmers to adopt SICS using subsidies and taxes etc.	<ul style="list-style-type: none"> • Encourages innovative methods • Can offset cost of implementation and/or discourage adverse behaviour • Allows a certain amount of flexibility 	<ul style="list-style-type: none"> • Can be subject to fluctuations as the market fluctuates • High likelihood of setting subsidies/taxes at incorrect rate (which leads to inefficiencies) • Can be subject to game-playing behaviour
Voluntary instruments	Encourage farmers to adopt SICS	<ul style="list-style-type: none"> • Sense of “ownership” as the decision was taken freely • High degree of flexibility 	<ul style="list-style-type: none"> • Does not guarantee implementation
Educational/information instruments	Educate farmers so they understand the importance of SICS	<ul style="list-style-type: none"> • Implementation as a result of truly understanding the impacts of the actions • High degree of flexibility 	<ul style="list-style-type: none"> • Does not guarantee implementation • Relies on interest of affected parties • 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 Romania 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 Romanian 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.

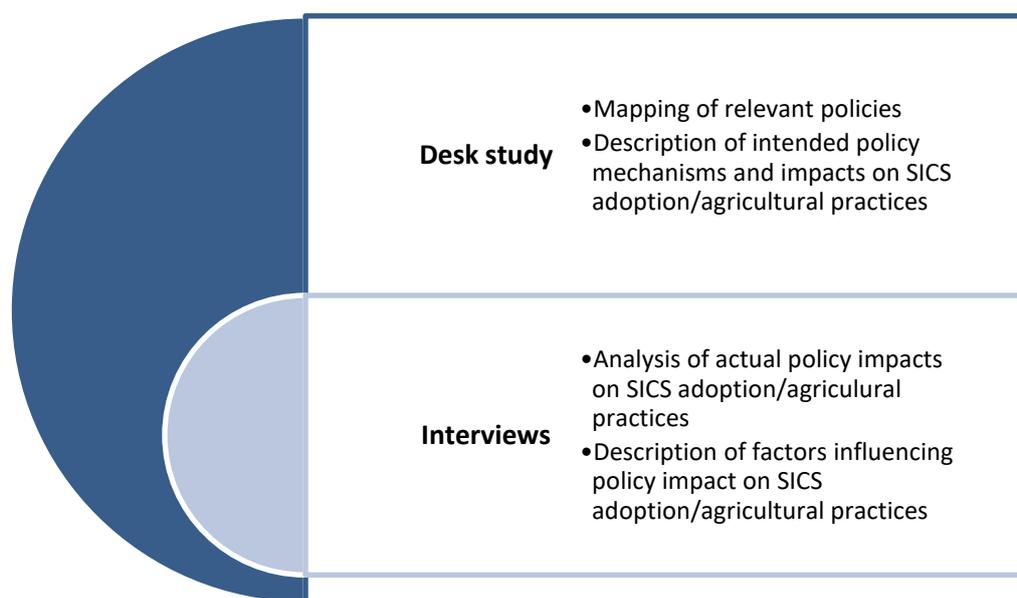


Figure 1: Research strategy

Data collection and analysis involved the following two activities:

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.

- 1) A desk-study of policy documents (in the broadest sense) and relevant 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 regional⁶ 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:** based on this analysis, Study Site Researchers then conducted interviews with policymakers and stakeholders using a semi-structured interview guide. In Romania, one interview was carried out with a representative of the Ministry of Agriculture and Rural Development.

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 Draganesti Vlasca, where the Romanian study site is located.⁸ 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 *D7.1 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>.

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>.

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>

⁸ See D7.1 at <https://www.soilcare-project.eu/resources>

2 Analysis of policy shortcomings and opportunities in Draganesti Vlasca, Romania

This section provides a review and analysis of national and regional instruments relevant for shaping agricultural practices in the region where the study site is located. Policies investigated include both policies implementing EU instruments as well as those initiated by Romania⁹: The information is drawn from the policy inventories compiled by the Study Site Researchers as well as interviews conducted with key stakeholders.

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

Table 4: Description of the study site

Site Name	Draganesti Vlasca
Climate	Pannonian pedo-climatic zone
Soil type	Phaeozem in different degradation stages, having a low fertility and in some areas with risk of erosion occurrence
Main soil threats	Compaction; water deficit and water excess, sometimes erosion
Current practices	Conventional and conservation agricultural systems are mainly used in the study area. Some improved technologies like reduced tillage without mouldboard ploughing and seedbed preparation with heavy machinery; conservative tillage without mouldboard ploughing, seedbed preparation and sowing done in one pass, the soil being covered more than 30 % with plant residues from previous crop. Pesticide and fertilizer use.

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 Romanian study site, and the SICS category and cluster under which they are grouped

General treatment category	SICS cluster ¹⁰	Experiments
Reduced tillage	Soil cultivation	Tillage experiments Deep ploughing (30 cm); subsoiling (50 cm); non-inversion till; 2-disk ploughing

2.1 Which existing policies and policy instruments shape agricultural practices in Draganesti Vlasca?

A policy analysis at the national and regional level identified the following policies which may directly or indirectly shape agricultural practices in the region where the Romanian study site is located. 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

⁹ See the Annex for a more detailed overview of the policies described in this section.

¹⁰ SICS are grouped into four clusters: (1) Soil-improving crops, (2) Fertilisation/amendments, (3) Soil cultivation, and (4) Alleviation of compaction.

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 particularly relevant for SICS in Romania:

- GAEC 4 - during winter, at least 20% of the arable land on a holding must be left unworked on or covered with winter crops;
- GAEC 5 - land with greater than 12° slope must be cultivated along the contours and terraces must be maintained;
- GAEC 6 - ban on burning stubble and vegetation remains on arable land and permanent pasture and sunflowers may not be grown in the same spot for more than two consecutive years;
- GAEC 7 - hedges, ponds, ditches, trees, field margins, terraces and stone walls must be protected.

In addition to these conditional payments, the **National Rural Development Programme (RDP) for Romania 2014-2020** provides funding for contractual, voluntary commitments by farmers to implement certain sustainable agricultural practices. The RDP focuses on promoting competitiveness; environmental protection and climate change; and stimulating economic development. The RDP identifies actions needed to improve soil management and explicitly mentions tillage management and cover crops as suitable practices to be supported. One agri-environment and climate measure, Measure 10, subset 4, included in the RDP reserves funding for cover crops aiming to conserve the soil and water by maintaining the soil cover during wintertime with nitrogen-fixing plant species.

The **Ordinance on Organic Products** implements the EU Organic Regulation at the national level. The Ordinance sets rules for organic production, marketing and labelling of organic products. The main principles of organic production established by the legislation include limitation of chemical inputs, use of crop rotations and species with high adaptability, maintenance of soil fertility.

Environmental and Water policies

The **Water Law** transposes the EU Water Framework Directive (WFD) into Romanian law and provides the regulatory framework for the protection and management of water bodies. With the main pressures on water quality from agriculture being diffuse pollution from nutrients and chemicals, and abstractions in surface water and groundwater, measures established by the

River Basin Management Plans place certain requirements on nutrient, pest, and irrigation management practices. Whilst these measures primarily aim to maintain and improve water quality, they can reasonably expect to benefit soil health by reducing soil pollution, salinisation, acidification, and erosion.

The Groundwater Directive, a daughter Directive of the WFD, is transposed nationally through **National Plan for Groundwater Protection** against Pollution and Deterioration. The Government Decision establishes provisions on the prevention and control of groundwater pollution in order to achieve water protection goals. The National Plan establishes groundwater quality standards and threshold values for groundwater chemical status, including for nitrates, active substances of pesticides (including the metabolites), and decomposition products. The quality of soil is directly related to quality of groundwater and nutrient management plans are used to ensure that groundwater quality is maintained. If needed, specific soil protection measures must be taken to attain groundwater quality standards.

The **Ordinance related to approval of Code of Good Agricultural Practices for Water Protection against Nitrates Pollution from agricultural Sources** transposes into Romanian legislation the EU Nitrates Directive. The Directive requires Member State to establish a Code of Good Agricultural Practice to be implemented by farmers on a voluntary basis. Furthermore, the Directive requires Member States to identify Nitrate Vulnerable Zones and set up action programmes for these zones. The measures to be included in these programmes must include periods when the land application of certain types of fertilisers is prohibited. Limitations on the application of fertilisers must be consistent with good agricultural practice taking into account soil conditions, soil type, slope and land use and agricultural practices, including crop rotation systems. Romania complied with this requirement by issuing the appropriate action programme (Hotărârea Guvernului nr. 964/2000 privind aprobarea Planului de acțiune pentru protecția apelor împotriva poluării cu nitrati proveniți din surse agricole, *Decision on Action Plan for the Protection of Waters Against Pollution Caused by Nitrates from Agricultural Sources*).

With regards to legislation and policy stemming from national initiatives, there is one instrument identified as highly relevant - **Ordinance on Environmental Pollution Assessment** having a direct impact on farmers by imposing limits on the use of chemical inputs and obligations when to avoid it altogether. The Ordinance defines the procedure and technical norms needed for identification of environmental damages ultimately resulting in establishment of liability for remediation activities in case of environmental damage.

Chemicals policies and waste policies

The **Technical Standards on the Protection of the Environment, and in particular of the soil, when sewage sludge is used in agriculture** transposes the EU Sewage Sludge Directive which regulates the application of sewage sludge on agricultural soil with the aim of preventing soil and water contamination with heavy metals. The Technical Standards establish restrictions on the on the volume of sludge and areas where it can be applied to land, its uses, composition, type of treatment in sewage treatment plants, and areas where sludge will be used. The

standards ban spreading of sludge on grassland, forage crops, vegetable crops, fruit crops.

The Sustainable Use of Pesticides Directive (SUPD) is transposed into Romanian law through the **Ordinance for Establishing the Institutional Framework for Sustainable Use of Pesticides**. The National Action Plan (**Decision no. 683/2013 for approving the National Action Plan on Reducing the Risks of Using Pesticides**) contain quantitative objectives, measures, and schedules to reduce the risks and effects of pesticides use on human health and environment. The National Action Plan sets out a range of activities, including the promotion of integrated pest management approaches with an emphasis on the use of non-chemical plant protection products. Training and educational requirements for users applying plant protection products are to be increased, again with a focus on promoting the use of fewer toxic products, and other alternative methods. In addition, maximum levels of pesticides in and on fruits, vegetables, cereals, and other plant products are defined by a separate Ordinance (**Ordinance no.12/2006 on establishing the maximum levels of pesticides in and on fruits, vegetables, cereals and other plant products**).

Finally, the **Ordinance on the establishment of measures for the application of the Fertilisers Regulation** establishes the legal framework for direct implementation of the Regulation and sets up the conditions needed for authorising the fertilisers and sets out the contraventions.

2.2 To what extent do existing policies facilitate adoption of soil-improving practices in Draganesti Vlasca?

Soil quality at the Draganesti Vlasca study site is affected by compaction, temporary water deficit and excess as well as erosion. The soils in the area are naturally susceptible to compaction and water excess and/or deficit due to their high clay content. Soil tillage is often carried out under unsuitable, wet conditions as these make the use of machinery and the working of the soil easier. SICS that are being tested at the study site focus on reduced tillage practices which are thought to address these soil threats.

The table below provides an overview of policies regulation, incentivising, and promoting the full range of SICS covered by the SoilCare project (shaded in light green) as well as the SICS tested at the study site (shaded in dark green): reduced tillage.

The Code of Good Agricultural Practice established in compliance with the EU Nitrates Directive lists **reduced tillage** as good practice to be adopted by farmers. However, the Code is not mandatory to farmers outside of Nitrate Vulnerable Zones. In addition, reduced tillage practices are incentivised through the RDP.

Crop rotation is promoted through water (and soil) protection policies such as the Action Plan for the Protection of Waters Against Pollution Caused by Nitrates, the CAP's greening measures, GAEC cross-compliances standards and the RDP.

The RDP, specifically through its agri-environment and climate measures incentivises the use of nitrogen-fixing **cover crops** to reduce nutrients run-off and leaching, increase organic

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
Decision no. 683/2013 for approving the National Action Plan on reducing the risks of using pesticides											
Ordinance no.12/2006 on establishing the maximum levels of pesticides in and on fruits, vegetables, cereals and other plant products											
Ordinance no. 1261/2007 on the establishment of measures for the application of Regulation (EC) no. 2003/2003 of the European Parliament and of the Council of 13 October 2003 on fertilisers											
Ordinance no. 756/1997 on Environmental Pollution Assessment											

2.3 Which factors shape success or failure of policy instruments in Draganesti Vlasca?

Research indicates that there are several factors that shape the success or failure of policy instruments in *Romania*, and the uptake of SICS tested in the study site region in general. These factors include:

Outdated legislation

According to one interviewee, it is necessary to revise the Code of Good Agricultural Practices for water protection against nitrates pollution from agricultural sources to reflect more accurately the current situation. The EU Nitrates Directive, which is transposed into national legislation by Government Decision no. 964/2000 on approving the Action Plan for the Protection of Waters Against Nitrate Pollution from Agricultural Sources, requires that the Action Plan the Code must be revised every four years, which is not the case in Romania.

Lack of dedicated soil policy

The interviewee also identified a need for a national soil protection law, as no such law currently

exists. While such a law is not required under EU legislation, it would be an opportunity to promote and incentivise sustainable soil management practices more consistently across the country. As it stands, there does not seem to be any action being taken on this front.

Exploitation of policy synergies

Several examples of synergies between different policies were identified. This should be highlighted as a good practice, and an example of how legislation can be clear and help enable the adoption of SICS. In one example, the interviewee explained how payments under the National Rural Development Program (RDP) (Pillar 2), Measure 10, Sub-measure 10.1 - Payments for agro-environment and climate: adaptation to climate change effects and the Direct payments (Pillar I) – Water protection against pollution with nitrates from agricultural sources (SMR 1) lead to a single direct payment on a plot/parcel of land. Furthermore, the result is that the farmer complies with the requirement of both policies at the same time.

Availability of financial incentives

The interviewee highlighted that economic incentives have enabled change. They identified the CAP including Pillar 1 and Pillar 2 as having the biggest impact on farmer's agricultural practices in the studied site area. Because direct payments from Pillar 1 are mandatory for farmers who apply for direct payments, they incentivise increasing and sustaining the farm's productivity and profitability. In addition to receiving the economic benefits, the farmers also become more aware of the importance of improving soil, including any specific local characteristics. The importance of reflecting geographic differences and environmental conditions when designing economic policy instruments was also highlighted. For instance, the RDP allows, under Measure 13, payments for areas which face with natural constraints or other specific constraints. Payments are issued in addition to the direct payments and cover:

- Payments for mountains area – Carpathian Mountains (Sub-measure 13.1);
- Compensated payments for areas which face with significant natural constraints – areas where natural characteristics lead to decreasing productivity (Sub-measure 13.2);
- Compensated payments for areas which face with specific constraints - Danube Delta area (Sub-measure 13.3).

Similarly, the interviewee cautioned that not all practices incentivised through policy instruments should be promoted regardless of the specific geographic conditions. In case of Measure 10, Submeasure 10.1, Set 5, one of the requirements is related to use of minimum tillage. In the study site area, there is a natural intrinsic compaction due to high clay content. In this case, the use of minimum tillage may have negative impacts on soil quality, especially on soil aeration, which may affect negatively the plant seedling, germination, and this result in a lower crop yield and consequently the farm productivity decreases.

Educated and innovative young farmers

It was noted that young farmers who are educated in the field of agriculture are more open to adopting new soil improving cropping systems than the older generation of farmers. The interviewee stated that, in the long run, the demographic change in the farming community will increase the uptake of these practices and thus benefit soil quality and soil fertility.

3 Recommendations for actions to promote the uptake of SICS

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 (SICS) at the EU-level as well as the region of Draganesti Vlasca in Romania. SICS that are being tested at the study site – tillage - are thought to be suitable to address the main soil threats of soil erosion, soil compaction and water excess and deficit.

The analysis shows that the existing policy framework promotes the relevant SICS to some extent but also identifies some barriers to achieving higher adoption rates. These include primarily unclear funding requirement for farmers and the need for revision of the Code of Good agricultural practice. Moreover, there is no specific law dedicated to soil protection which was highlighted as a key requirement by the interviewed stakeholder and there are no other measures, legislative or policy, which would encourage positive change in farmers' behavior through educational activities, trainings and learning about benefits of certain SICS.

Based on the evidence set out in this section, the following recommendations can be made:

- **Update existing policy instruments:** some key policy instruments, such as the National Nitrates Action Plan, seem to be outdated. These need to be revised to reflect current needs, objectives and taking into account new insights on agricultural practices which should be promoted to meet policy objectives.
- **Mainstreaming of soil objectives and good soil management practices in existing legislation:** Many benefits to soil health are achieved through other sectoral or environmental policies. While this is not considered a barrier to SICS adoption, there is a risk that key soil threats are not addressed if they do not fall under legislation for other sectors. The development of a dedicated soil policy should be considered. Such an intervention should be designed to accommodate farm diversity, featuring a robust monitoring and enforcement system.
- **Education and training:** younger farmers seem to be willing to take up new practices. It could be considered as to whether older generations can also be targeted to bring about change faster. Some of the practices benefitting soil will require farmers to learn about these techniques, their application to different conditions as well as their benefits in order to change their misconceptions about these methods. To this end, research findings should be made accessible and widely disseminated and educational activities should be encouraged. Knowledge should be disseminated via multiple channels,

through the provision of guidance document but also farms visits and demonstration days.

Annex: Overview of key policies in Draganesti Vlasca, Romania

Policy name	English translation	Scale	EU or MS based policy	SICS addressed	Description of policy
Cerintele legale in materie de gestionare (SMR); Standardele privind Bunele conditii agricole si de mediu ale terenurilor (GAEC)	CAP GAEC Cross-Compliance Standards	National	EU (CAP)	Crop rotation; Green manures, cover crops, catch crops; integrated landscape management	'Cross compliance' is a set of rules which farmers and land managers must follow on their holding if they are claiming rural payments. The cross compliance is set in the Common Agriculture Policy Regulations 2014 and further explained in the national policy documents. The national policy documents require the following: GAEC 4 - during winter, at least 20% of the arable land on a holding must be left unworked or covered with winter crops; GAEC 5 - land with greater than 12° slope must be cultivated along the contours and terraces must be maintained; GAEC 6 - ban on burning stubble and vegetation remains on arable land and permanent pasture and sunflowers may not be grown in the same spot for more than two consecutive years; GAEC 7 - hedges, ponds, ditches, trees, field margins, terraces and stone walls must be protected.
Programul Național de Dezvoltare Rurală pentru perioada 2014 – 2020	National Program for Rural Development 2014-2020	National	EU (CAP RDP)	Crop rotation; Green manures, cover crops, catch crops; integrated nutrient management; reduced tillage; integrated landscape management	The Rural Development Programme (RDP) for Romania was formally adopted in 2015, outlining Romania's priorities for using nearly € 9.5 billion of public money that is available for the 7-year period 2014-2020. The RDP focuses on promoting competitiveness; environmental protection & climate change; and stimulating economic development. Sections 4.2.16 and 5.2.4.3 concern improvements in soil management. Sections 5.3 and 8.2.6.2 concerns agroforestry. Section 8.2.8.3.4.1 makes reference to the relevant EU Directives such as the Nitrates Directive and Water Framework Directive. Section 8.2.8.3.5.1. refers to tillage management. Measure 10 - Agri-environment and climate: Subset 4 - Cover crops targets to conserve the soil and water by maintaining the soil covered during the winter time with fixing nitroge plant species.
Ordonanța de urgență nr. 34/2000 privind produsele agroalimentare ecologice modificată cu Ordonanța de urgență nr. 29/2014	Ordinance on organic products no. 34/2000 modified by Ordinance no. 29/2014	National	EU (Organic Regulation)	Crop rotation; integrated nutrient management; reduced tillage; integrated pest management	Ordinance on organic products no. 34/2000 modified by Ordinance no. 29/2014 sets rules for organic production, marketing and labelling organic products. The organic production have rules regarding of interdictions on chemical inputs applied within the farm. The main principles of organic production are: removal of any polluted technology; including in crop rotations and structures species with high adaptability; maintaining the natural fertility of the soil; integrating the animal growth within the crop production;

Policy name	English translation	Scale	EU or MS based policy	SICS addressed	Description of policy
					economic use of conventional energetic resources and use at a higher level of re-usable secondary products; application of appropriate technologies according to plant and animal needs. The Ordinance sets rules for product labelling. Ordinance 29/2014 bring improvements to the previous Ordinance related to the better implementation of projects financed through EU funds.
Ordinul nr. 990/1809/2015 pentru modificarea și completarea Ordinului ministrului mediului și gospodăririi apelor și al ministrului agriculturii, pădurilor și dezvoltării rurale nr. 1.182/1.270/2005 privind aprobarea Codului de bune practici agricole pentru protecția apelor împotriva poluării cu nitrați din surse agricole	Ordinance no. 990/1809/2015 for modifying and improving the Ordinance of Ministry of Environment and of Ministry of Agriculture no. 1182/1270/2005 related to approval of Code of Good Agricultural Practices for water protection against nitrates pollution from agricultural sources	National	EU (Nitrates Directive)	Crop rotation; Green manures, cover crops, catch crops; integrated nutrient management; reduced tillage; integrated landscape management	The instrument transposes into Romanian legislation the Nitrates Directive which requires Member State to establish a code of good agricultural practice to be implemented by farmers on a voluntary basis. In compliance with the EU requirements, the instrument lists good practices in agriculture. Furthermore, the Directive requires Member States to identify Nitrate Vulnerable Zones and set up action programmes for these zones. The measures to be included in these programmes must include: periods when the land application of certain types of fertilizers is prohibited and limitation on the land application of fertilizers must be consistent with good agricultural practice taking into account soil conditions, soil type, slope and land use and agricultural practices, including crop rotation systems. Romania complied with this requirement by issuing the appropriate action programme (Hotărârea Guvernului nr. 964/2000 privind aprobarea Planului de acțiune pentru protecția apelor împotriva poluării cu nitrați proveniți din surse agricole, <i>Decision on Action Plan for the Protection of Waters Against Pollution Caused by Nitrates from Agricultural Sources</i>)
Legea apelor nr. 107/1996 modificată și completată în 2017	Water Law no. 107/1996 modified and improved in 2017	National	EU (WFD)	Integrated nutrient management; integrated pest management; integrated landscape management	The Law provides the regulatory framework for water bodies protection and management. The provisions of this Law are aimed: <ul style="list-style-type: none"> – to preserve, develop and protect the water resources and ensure a free flow of waters; – to protect waters against any type of pollution; – to attain environmental objectives for surface waters and groundwater; – to preserve and protect aquatic ecosystems; – to ensure the drinking water supply; – to manage the risk to floods; - – to provide water needs for agriculture, industry etc.

Policy name	English translation	Scale	EU or MS based policy	SICS addressed	Description of policy
Hotărârea Guvernului nr. 53/2009 pentru aprobarea Planului național de protecție a apelor subterane împotriva poluării și deteriorării	National Plan for Groundwater Protection Against Pollution and Deterioration	National	EU (WFD & Groundwater Directive)	Integrated nutrient management; integrated pest management	The National Plan for Groundwater Protection Against Pollution and Deterioration has direct impact on agricultural practices at farm level by using nutrient management plans in order to maintain groundwater quality within the thresholds established for good quality. The Government Decision establishes provisions on the prevention and control of groundwater pollution in order to achieve water protection goals. The National Plan establishes groundwater quality standards and threshold values for groundwater chemical status including for nitrates, active substances of pesticides (including the metabolites), and decomposition products. The quality of soil is directly related to quality of groundwater. Therefore, specific soil protection measures must be taken in order to attain groundwater quality standards.
Ordinul ministrului Mediului și Gospodării Apelor nr. 344/2004 pentru aprobarea Normelor tehnice privind protecția mediului și în special a solurilor, când se utilizează nămolurile de epurare în agricultură, cu modificările ulterioare	Order of the Minister of Environment and Water Management no. 344/2004 for the approval of the Technical Norms regarding the protection of the environment and especially of the soils, when the sewage sludges are used in agriculture, with the subsequent modifications	National	EU (Sewage Sludge Directive)	Integrated nutrient management	The Ordinance transpose the Sewage Sludge Directive. More specifically, the standards regulate the use of sewage sludge in agriculture. The standards set the values for concentration of heavy metals in soils to which sludge is applied and concentration of heavy metals in sludge. The standards ban spreading of sludge on grassland, forage crops, vegetable crops, fruit crops.
Ordonanța de Urgență nr. 34/2012 pentru stabilirea cadrului instituțional de acțiune în scopul utilizării durabile a pesticidelor pe teritoriul României	Ordinance no. 34/2012 for establishing the institutional framework for sustainable use of pesticides in Romania	National	EU (SUPD)	Integrated pest management	The Ordinance sets out: <ul style="list-style-type: none"> - the legal framework for sustainable use of pesticides; - reduction of the intensity of pesticides use; - reduction of risks and effects of pesticides use on human health and environment; - promotion of integrated management of pests and of some alternative techniques such as non-chemical methods for pests control - It sets out legal measures for selling, operation, use and application, storage, packages and wastes disposal and contraventions for un-proper use..

Policy name	English translation	Scale	EU or MS based policy	SICS addressed	Description of policy
Hotărârea de Guvern 683/2013 pentru aprobarea Planului Național de Acțiune privind diminuarea riscurilor asociate utilizării produselor de protecția plantelor	Decision no. 683/2013 for approving the National Action Plan on reducing the risks of using pesticides	National	EU (SUPD)	Integrated pest management	The Decision approves the National Action Plan on reducing the risks of using pesticides. The National Action Plan contain quantitative objectives, measures and schedules in order to reduce the risks and effects of pesticides use on human health and environment. By implementing National Action Plan, an integrated pests management is developed and pesticides with low level of toxicity and other alternative methods are encouraged to be used.
ORDIN nr. 12 din 23 ianuarie 2006 privind stabilirea limitelor maxime admise de reziduuri de pesticide în și pe fructe, legume, cereale și alte produse de origine vegetală	Ordinance no.12/2006 on establishing the maximum levels of pesticides in and on fruits, vegetables, cereals and other plant products	National	EU (SUPD)	Integrated pest management	The Ordinance sets out the maximum levels of pesticides in and on fruits, vegetables, cereals and other plant products.
HG nr. 1261/2007 privind stabilirea unor măsuri pentru aplicarea Regulamentului (CE) nr. 2.003/2003 al Parlamentului European și al Consiliului din 13 octombrie 2003 privind îngrășămintele	Ordinance no. 1261/2007 on the establishment of measures for the application of Regulation (EC) no. 2003/2003 of the European Parliament and of the Council of 13 October 2003 on fertilisers	National	EU (Fertiliser Regulation)	Integrated nutrient management	The Decision establishes the legal framework for direct implementation of Fertiliser Regulation (CE) 2003/2003. It establishes the conditions needed for authorising the fertilisers and sets out the contraventions.
Ordinul ministrului Apelor, Pădurilor și Protecției Mediului nr.756/1997 pentru aprobarea Reglementării privind evaluarea poluării mediului	Ordinance no. 756/1997 on Environmental Pollution Assessment	National	National	Integrated nutrient management, integrated pest management	Ordinance on Environmental Pollution Assessment having a direct impact on farmers by imposing limits on the use of chemical inputs and obligations when to avoid it altogether. The Ordinance has a direct impact on farmer – prescribes the use of organic and/or chemical inputs within the farm in order to avoid soil, water and air pollution (restricted by limits). The Ordinance defines the procedure and technical norms needed for identification of environmental damages ultimately resulting in establishment of liability for remediation activities in case of environmental damage.