

Policy analysis:

Promoting SICS adoption in Crete, Greece

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

Contributors: Tsanis Ioannis, Alexakis Dimitrios,
Vozinaki Anthi Eirini – Technical University of
Crete

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Executive summary

The main soil threats in Greece include the imminent threat of desertification, characterised by loss of vegetation, water erosion, and subsequently loss of soil (erosion). SICS that are being tested at the study site are thought to address these soil threats and include the introduction of soil-improving crops (Conversion from orange orchard to avocado; cover crops in organic vineyards) as well as different soil cultivation measures (No till and conventional tilling in organic and conventional olive orchards). They 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 promoting the full range of SICS covered by the SoilCare project (shaded in light green). The analysis shows that several policies regulate and incentivise the use of cover crops, and reduced tillage, the SICS tested at the study site (shaded in dark green): direct payments, greening measures, and rural development plans under the CAP all provide financial rewards to farmers adopting reduced or no-tillage practices and cover crops (in the form of nitrogen-fixing crops) but only on certain types of land. In addition, policies implementing the EU Organic Regulation formulate requirements for tillage practices. The Nitrates Directive and the National Action Plan for Combating Desertification promotes the tested practices by explicitly referencing them as good agricultural practices to be adopted in specific areas. None of the policies identified as relevant do regulate or incentivise the uptake of soil-improving crops.

Table 1: Coverage of SICS in current regional policies, instruments, and measures in Greece

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 (Πρότυπα για την καλή γεωργική και περιβαλλοντική κατάσταση (ΚΓΠΚ)											
CAP Greening Payment Requirements (Απαιτήσεις πληρωμής για οικολογικό προσανατολισμό/ "πρασίνισμα")											
CAP Rural Development Programme 2014 – 2020 (ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ)											

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
Regulation on organic production and labelling of organic products (Κανονισμός για τη βιολογική παραγωγή και την επισήμανση των βιολογικών προϊόντων και την κατάργηση του κανονισμού (ΕΟΚ) αριθ. 2092/91)											
Protection of waters against pollution caused by nitrates from agricultural sources (Οδηγία για την προστασία των υδάτων από την νιτρορρύπανση γεωργικής προέλευσης)											
Pesticides Control Legislation (Καθορισμός πλαισίου κοινοτικής δράσης με σκοπό την επίτευξη ορθολογικής χρήσης των γεωργικών φαρμάκων)											
Fertiliser regulation (Κανονισμός σχετικά με τα λιπάσματα)											
National Action Plan for Combating Desertification (Εθνικό Σχέδιο Δράσης κατά της ερημοποίησης)											

Recommendations for actions to promote the uptake of SICS

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

- Weak policy coherence
- Ineffective implementation and enforcement of existing policies
- Higher costs of SICS implementation/transition costs
- Availability of conditional payments
- Reluctance to abandon traditional practices in favor of new methods
- Need for better information sharing and training opportunities

Table 2: SICS being tested, adoption factors (enablers or barriers) and actions to overcome the barriers: Due to time limitations, some of the workshops only addressed a subset of SICS tested in the respective study site. Participants were asked to identify actions for the most important factors affecting SICS adoption; therefore, not all adoption

factors were discussed in detail. To assess the effectiveness and feasibility of an action, a scale from 1 (not at all effective/feasible) to 4 (highly effective/feasible) was used but not consistently applied in all stakeholder workshops.

Soil-improving crops: Conversion from orange orchards to avocados	
Adoption factors (+ or -)	Actions
Favourable climate (+)	<i>n/a</i>
High cost of implementation associated with purchase of avocado trees (-)	<i>None identified</i>
Policy set-up, lack of incentives (-)	<i>None identified</i>
Insufficient knowledge about new/alternative crop varieties and methods (-)	Provide guidance to farmers and advisory services to develop knowhow
Soil-improving crops: Cover crops organic vineyards	
Adoption factors (+ or -)	Actions
Resistance to change (mentality of farmers) (-)	Increase the skill level of Farm Advisory Services
	Demonstrate the benefits of SICS through workshops, exchange of practices, working with large-scale farmers as influencers of change, encourage peer to peer learning
Lack of awareness about the long-term benefits (-)	Demonstrate long-term benefits, supported by experiments, encourage peer to peer learning
Soil cultivation: Tillage/no tillage in olive orchards	
Adoption factors (+ or -)	Actions
Geomorphological conditions (steep slopes, stones, and rocks) (-)	<i>n/a</i>
Lack of awareness and insufficient knowledge (-)	Training, demonstration sites, peer-to-peer learning and better information dissemination

Recommendations for actions to promote the uptake of SICS

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

- **Increase policy coherence:** policy conflicts and synergies need to be carefully analysed and aligned, in order not to discourage the transition to sustainable farming practices. Ultimately, this might require a prioritisation of certain objectives and targets (and operationalised by the right policy interventions) as a certain level of conflict is unavoidable to ensure the right balance between environmental, social, and economic sustainability. On a practical level, it is important for farmers to have clear, unambiguous information on the legal conditions they need to comply with – especially if they are tied to subsidies - and those that may be rewarded.
- **Strengthen policy enforcement:** While it was found that there are several policies already in place that – directly and indirectly - regulate and incentivise different SICS, stakeholders report that outcomes on soil health are limited due to weak implementation and enforcement mechanisms. It is clear mechanisms for checking compliance with existing regulations need to be strengthened and expanded. With the

post-2020 CAP, new funding rules funding rules will be introduced. The Good Agricultural Environmental Conditions (GAECs) now offer a greater chance for soil protection. New conditions with the potential to improve soil health have been added, e.g., the new GAEC 7 requires “No bare soil in most sensitive period(s)”. Cover crops will be an important strategy for meeting this requirement. The payment agencies should seek to ensure that these conditions are complied with and verified through, e.g., more frequent inspections and farmer reporting (including for example images of the implemented practices).

- **Subsidise transition to practices benefitting soil health:** The uptake of certain SICS, such as cover cropping, and reduced tillage, might require upfront investments, such as the purchasing of additional seeds and new machinery. Grants should be made available to farmers buying new equipment to implement these practices or groups of farmers intending to set up a ‘machinery exchange’. Such an exchange could also be set up and managed by the regional/local farm advisory services or municipalities.
- **Introduce more targeted financial incentives:** incentives should be more targeted and tied to specific actions to result in the desired change. For example, a subsidy could be tied to the use of a specific crop or crop change.
- **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. 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. Workshops, encouraging peer to peer learning, and long-term experiments that will show the benefits of SICS are promising initiatives that can be supported.
- **Invest in and build capacity of Farm Advisory Services:** like framers, 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.

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 is an essential ecosystem 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 project². 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 1).

Table 3: 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
Controlled drainage	Improves crop productivity and resource use efficiency; minimizes the risk of waterlogging

¹ E.g., Lahmar, R. 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 success of germination
Controlled traffic management	Reduces energy cost and the risk of soil compaction
Integrated landscape management	Improves biodiversity 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 4: 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 Monitoring and enforcement can be costly Discourages innovation

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
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 Spain 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 Spanish 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.

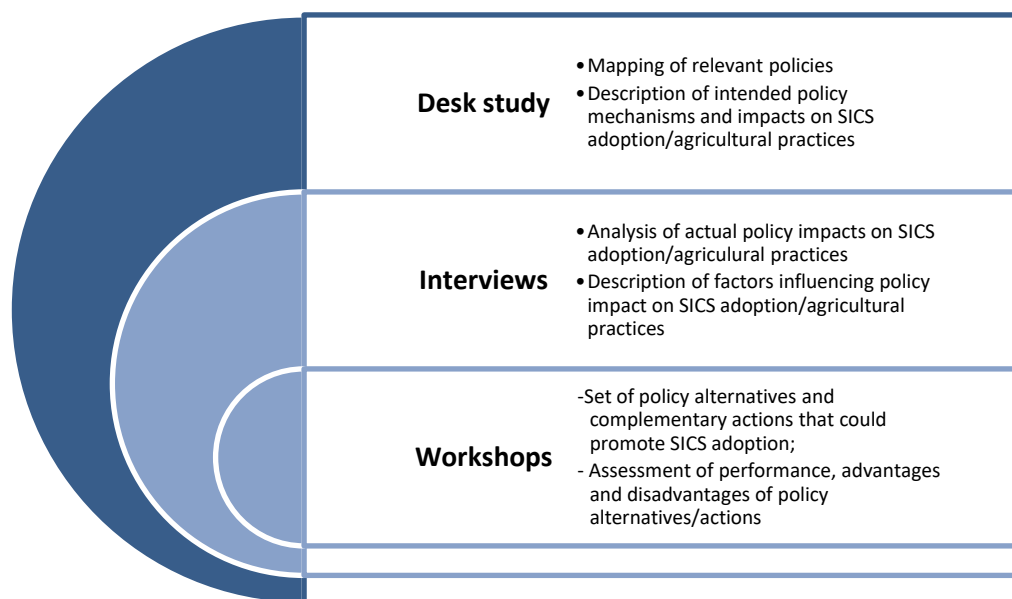


Figure 1: Research strategy

Data collection and analysis involved the following three activities:

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

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.

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 policy-makers and stakeholders using a semi-structured interview guide. In Greece, four interviews were carried out (see Table 3).

Table 5: Organisations represented by interview partners

Organisation	Stakeholder category
HEL.A.O. "DEMETER" - Soil & Water Resources Institute	Research
Decentralised Administration of Crete, Water Resources Department	Regional/local government
Agricultural Cooperation of Gramvousa, Chania, Crete, Greece	Agricultural cooperative
Region of Crete	Regional/local government

- 3) 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 Greek workshop brought together four stakeholders, all of them farmers.

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 Crete where the Greek study site is located.⁸ It examines how existing

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/outputs>

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

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/outputs/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/outputs/deliverables>.

Individual country policy inventories can be downloaded from: <https://www.soilcare-project.eu/outputs>

2 Analysis of policy shortcomings and opportunities in Crete, Greece

This section provides a review and analysis of national instruments relevant for shaping agricultural practices on the island of Crete where the study site, “Chania”, is located. Policies investigated include both policies implementing EU instruments as well as those initiated by Greece. The information is drawn from the policy inventories compiled by the Study Site Researchers as well as interviews and an adoption workshop conducted with key stakeholders.

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

Table 6: Description of the study site

Site Name	Chania, Crete
Climate	Dry sub-humid climate, with annual rainfall ranging from 300 to 700 mm from east to west in the low areas along the coast, and from 700 to 1000 mm in the plains of the mainland. In the mountainous areas annual rainfall reaches up to 2000 mm.
Soil Type	Mainly Calcisol
Main soil threats	Imminent threat of desertification, characterised by loss of vegetation, water erosion, and subsequently loss of soil (erosion)
Current practices	Several technologies, mainly associated with cropping intensity and traditional versus modern techniques, are currently practiced on the island (traditional crop picking, minimal mechanical equipment). Olive trees are cultivated with little or no irrigation and minimum agricultural inputs, minimised tillage and minimised rock removal from fields. Vineyards utilise green manuring, green strips and minimised tillage with lightweight machinery.

The experiment carried out in the study sited are described below. Each field trial provides

evidence on the costs and benefits.

Table 7: Overview of experiments carried out in the Greek study site, and the SICS category and cluster under which they are grouped

General treatment category	SICS cluster	Experiments
Cover crops, reduced tillage	Soil cultivation	No till in organic olive orchards; conventional till (15-20 cm) in organic olive orchards
	Soil improving crops	Conversion from orange orchard to avocado; conventional orange orchard;
	Soil improving crops	Cover crop (vetch) in organic vineyards; bare soil in organic vineyards

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

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 Greece and the island of Crete, where the study site is located⁹: The overview 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.

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 CAP plays an important role in encouraging certain agricultural practices. Among the cross-compliance standards, GAECs 4 to 7 are relevant for Greece: GAEC 4 requires land parcels with a gradient greater than 10% to be covered by vegetation or stubble during the rainy periods; GAEC 5 sets specific ways in which the land must be tilled and irrigated. It also stipulated that some land features must be conserved like stone walls, dikes and natural slopes along parcel boundaries; GAEC 6 requires crop residues to be grazed, tilled into the soil or mulched; GAEC 7 requires retention of terraces, hedges, ditches and trees in line and ponds.

Greening requirements are set out in the very detailed instructions given to all farmers who are eligible for CAP payments. These are made available to all farmers who are registered with the agriculture department's administrative system for CAP payments.

In Greece, agricultural production on arable land of more than 150 acres is obliged to maintain

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

5% of the area as Ecological Focus Areas (EFAs). EFA option available to Greek farmers include (see table below):

- Land lying fallow;
- Trees in series or in clusters of a maximum area of 3 acres;
- Uplands of maximum 6 meters (ditches, watercourses);
- Protection zones along watercourses or water bodies;
- Vegetables and pulses (nitrogen-fixing crops) at a factor of 0.7, i.e., every 1 acre of vegetables counts as 0.7 acres of greening focus area;
- Vegetables that cover 5% of a greening focus area can be considered at the same time as the third crop (0.7 contribution rate).

Catch crops/cover crops was not selected as an EFA option by Greece.

The Ministerial Decision 1791/74062-2-7-2015 which outlines the implementation details of cross-compliance, includes the following specific provisions:

- The obligation of maintaining a 5% greening area focus may be added to the obligation of crop diversification, i.e., everyone who cultivates area larger than 150 acres must obey both obligations;
- Fallow land can be both considered as different crop and greening area;
- Vegetables and pulses count towards the share of greening focus area and diversification areas, at the same time. They can be combined if they belong to eligible species;
- Organic farming is excluded from all greening obligations for the organic areas;
- Areas that are covered by rice, grasses and other fodder crops are excluded from the obligation if they cover at least 75% of the holding area, alone or in combination, if the rest of the area (25%) does not exceed 300 acres. In case that the rest area (25%) exceeds 300 acres, its main crop should not exceed 75% of the area;
- The commitment of crop rotation is removed from the cross compliance and greening is introduced.

Table 8: Coefficients of calculating areas of greening focus

Total arable land (hectares): 15					
Required area of greening focus: 0.75					
Type of Greening Focus	Type of Design	Declaration in m ² or m	Conversion Factor	Weighting Factor	Greening Area (ha)
Fallow land	polygon	100		1	0.01
Tree rows	line	100	5	2	0.1
Cluster of trees and scrubs with overlapping crowns	polygon	100		1.5	0.015
Ditches from open streams	line	100	3	2	0.06
Buffer zones along water courses – water bodies	Line	100	6	1.5	0.09
Areas with nitrogen capture capacity crops	polygon	10000		0.7	0.7
				Total	0.975

The **Rural Development Programme (RDP)** for Greece outlines the country's priorities for using the €5.9 billion available from 2014-2020 (national and EU contributions). The main objectives of the RDP are to enhance farm viability and competitiveness, ecosystem preservation and improvement, and promotion of local development in rural areas. According to the RDP factsheet¹⁰, Greece aims to bring 20.66% of agricultural land under contracts to improve soil management, and the RDP's Focus area 4C focuses on improving soil management. As part of this focus area, the RDP calls for reports on issues such as reduced tillage and crop rotation. Other SICS included are plant cover, integrated management irrigation, and agroforestry.

The **EU Regulation on organic production and labelling of organic products** sets the standards for organic production, marketing and labelling of organic products. Organic production standards have rules relating to crop rotation and chemical inputs that have a direct effect on soil quality. The regulation explicitly deals with soil fertility and quality in its objectives. For instance, organic plant production should contribute to maintaining and enhancing soil fertility as well as to preventing soil erosion. Plants should preferably be fed through the soil eco-system and not through soluble fertilisers added to the soil and high; and highlights the essential role of soil fertility management systems such as choice of species, crop rotation, recycling organic materials and cultivation techniques. One provision specifically addresses the balance between health of soil, water plants and animals. Another one addresses the maintenance and enhancement of soil life and natural soil fertility, soil stability and soil biodiversity to prevent and combat soil threats such as soil compaction and soil erosion. The regulation also lays down the rules for tillage and cultivation practices that maintain or increase soil organic matter, enhance soil stability, and soil biodiversity, and prevent soil compaction and soil erosion. In addition, principles for maintaining fertility and the biological activity of the

¹⁰ https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/el/factsheet-greece_en.pdf

soil, such as crop rotation including green manure and crop rotation with legumes and application of composted manure or organic material are established

Chemicals policies

The **Pesticides Directive** is implemented through Pesticides Control Legislation and impacts farmer practices directly as it regulates the supply, storage and use of pesticides. At the EU level, the Directive aims to achieve a sustainable use of pesticides and to reduce risks and impacts of pesticide use on human health and the environment (including soil) by relying on the precautionary principle. Member States are required to establish National Action Plans which include quantitative objectives and measures to reduce the risks of pesticides. The Directive promotes the use of integrated pest management and alternative approaches or techniques such as non-chemical alternatives to pesticides.

In Greece, there is the Joint Ministerial Decision No. 8197/90920/22-7-2013 “Establishment of a National Action Plan aiming at the implementation of the Directive 2009/128/EC for the protection of the man and the environment”, together with a transposing legislation (No. 6669/79087/15.7.2015 (Government Gazette B1791)).¹¹

The **Fertiliser regulation** specifies which products on the European market may bear the words ‘EC fertiliser’. The minimum requirements to bear this name include ensuring the product does not have negative effects on the health of humans, animals, plants, or the environment (including soils) when applied under normal conditions.

In Greece, the regulation is transposed through the Commission Regulation (EU) No. 2016/1618 of 08.09.2016 for the transposing regulation (EU) No. 2003/2003 of the European Parliament and the Council related to the fertilisers and the Joint Ministerial Decision No. 211/11449/2019 (Government Gazette 146/B/29/01/2019) “Import, Inter-community acquisition and domestic production of fertilizers and raw materials for the preparation of fertilizers, EC fertiliser”.

Water Policies

The **Nitrates Directive** protects waters against pollution caused by nitrates from agricultural sources. The Member States are also required to set up where necessary a programme, including the training and information for farmers, promoting the practices. The Directive requires Member States to identify Nitrate Vulnerable Zones and set up action programmes for these zones.

Law 3199/2003 transposes the EU Water Framework Directive into national legislation. The

¹¹ http://www.minagric.gr/images/stories/docs/agrotis/Georgika_Farmaka/elenxoi/NAP-GR_consolidated.pdf

Directive is relevant because the River Basin Management Plans prepared under it contain environmental objectives for the relevant river bodies and programmes of measures to prevent the deterioration of those objectives or attain the objectives in those cases where they are not attained. They may address several issues which are relevant for SICS such as nutrient runoff, soil contamination by pesticides, biodiversity, etc.

In Greece, the Directive 91/676/EEC "on the protection of waters against pollution caused by nitrates from agricultural sources" has been harmonised with the National Legislation under Joint Ministerial Decision No. 161690/1335/1997 (Government Gazette B519/25/06/1997). In addition, for all nitrate-vulnerable zones of the country, the Action Plans under the Joint Ministerial Decision No. 38552/265/25.04.2019 (Government Gazette B1496/03.05.2019) were established. The Action Plans are related to "Action Program for areas classified as vulnerable zones from nitrate pollution of agricultural origin according to Article 2 of the Joint Ministerial Decision No. 19652/1906/1999 (Government Gazette B1575) in accordance with the Directive 91/676/EEC "on the protection of waters against pollution caused by nitrates from agricultural sources".

Cross-cutting policies

Greece is party to the United Nation Convention to Combat Desertification (UNCCD). The aim of the UNCCD is to prevent or reverse issues of drought, soil productivity and living conditions in the world's drylands. The convention is the only legally binding international agreement focusing on sustainable soil and land management. Parties to the Convention can declare themselves 'affected' countries, which then requires them to implement national, regional, and sub-regional action programmes to reverse land degradation.¹² Greece is one of thirteen EU Member States which declared itself an 'affected country' status and subsequently prepared a National Action Programme to Combat Desertification (NAP) in 2001. The NAP details country-specific objectives and measures to be taken to combat desertification. It is a cross-cutting instrument which evaluates the impact of different sectors (agriculture, forestry, water resources management) on land degradation processes. For the agricultural sector, the NAP identifies crop rotation, establishing plant cover, tillage management, efficient irrigation and integrated management as measures suitable to combat desertification in affected or potentially affected areas. However, these measures are described in general manner only, without specifying where they should be applied.

Finally, Greece has drafted a proposal for the Law on Protection and Sustainable Use of Soil based on the draft EU Soil Framework Directive which the Commission formally withdrew in 2014. The draft Law includes measures for preventing pollution from land use, calls for an inventory of areas under major soil threats and adoption of programmes of measures for de-

¹² https://www.unccd.int/sites/default/files/relevant-links/2017-01/UNCCD_Convention_ENG_0.pdf

contamination as well as a national strategy for the rehabilitation of polluted areas. The draft law proposes the adoption of soil-improving practices and measures for the sustainable integrated management of farms.

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

The main soil threats in Greece include the imminent threat of desertification, characterised by loss of vegetation, water erosion, and subsequently loss of soil (erosion). SICS that are being tested at the study site are thought to address these soil threats and include the introduction of soil-improving crops (Conversion from orange orchard to avocado; cover crops in organic vineyards) as well as different soil cultivation measures (No till and conventional tilling in organic and conventional olive orchards). They therefore represent important practices that might benefit soil health in the region if widely taken up.

This section takes the policies identified in the previous section and evaluates how they can mitigate the soil threats in Crete.

Cover crops/soil-improving crops

In the study site, the impacts of cover crops in organic vineyards, compared to bare soil in organic vineyards are tested. Cover crops are incentivised through GAEC 4 of the CAPs cross-compliance standards, although only on slopes and during the rainy season. Cover cropping is not included in the list of EFA options available to Spanish farmers, but nitrogen-fixing crops are, which could function as cover crops. Area-based payments under the RDP 2014-2020 (FA 4C Soil erosion and management) incentivises soil management practices preventing soil erosion and mentions measures to establish or maintain plant cover. In addition, the Nitrates Directive and the National Action Plan for Combating Desertification list the use of cover crops - during rainy periods the case of the Directive - as one of the possible measures to be included in the Code of Good Agricultural Practice.

Other SICS tested at the site assess the effects of establishing potentially soil-improving crops, specifically on soil erosion. The trial includes the conversion of orange orchards to avocados. Policies that would incentivise such a change in crop types currently do not exist.

Reduced/no tillage

Reduced tillage incentivised the CAPs cross-compliance standards: GAEC 5 requires a specific tillage practice against erosion. More specifically, it stipulates that the land with gradient greater than 10% must be tilled perpendicular to the slope. Area-based payments under the RDP 2014-2020 (FA 4C Soil erosion and management) incentivises soil management practices preventing soil erosion, including reduced tillage methods. Legislation implementing the

organic regulation establishes the requirements which need to be met by farmers in order to label and market their products as “organic”. These requirements include several SICS, inter alia the application of tillage practices that improve the health of the soil. Legislation implementing the Nitrates Directive may promote the use of reduced tillage practices, if featured in the Code of Good Agricultural Practice. The National Action Plan for Combating Desertification also identifies reduced tillage as a practice to be applied in areas affected or potentially affected by this soil threat but without setting mandatory requirements.

Finally, it should be noted that, with erosion being an imminent soil threat, other practices not tested at the site could greatly contribute to reducing erosion, most notably the establishment of so-called “erosion traps”. All instruments under the CAP have the potential to encourage erosion traps as a tool to reduce erosion. Terraces, hedges, ditches and trees in line and ponds which are all incentivised by GAEC 7, could function as erosion traps. Pesticides control regulation as well as water policies promote the use of buffer zones and the planting of hedges along surface waters to reduce exposure of water bodies to spray drift of pesticides, drain flow and run-off. This reduces soil erosion from the banks of water bodies.

The table below provides an overview of policies promoting the full range of SICS covered by the SoilCare project (shaded in light green). The analysis shows that several policies regulate and incentivise the use of cover crops, and reduced tillage, the SICS tested at the study site (shaded in dark green): direct payments, greening measures, and rural development plans under the CAP all provide financial rewards to farmers adopting reduced or no-tillage practices and cover crops (in the form of nitrogen-fixing crops) but only on certain types of land. In addition, policies implementing the EU Organic Regulation formulate requirements for tillage practices. The Nitrates Directive and the National Action Plan for Combating Desertification promotes the tested practices by explicitly referencing them as good agricultural practices to be adopted in specific areas. None of the policies identified as relevant do regulate or incentivise the uptake of soil-improving crops.

Table 9: Coverage of SICS in current regional policies, instruments, and measures in Greece

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 (Πρότυπα για την καλή											

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
γεωργική και περιβαλλοντική κατάσταση (ΚΓΠΚ)											
CAP Greening Payment Requirements (Απαιτήσεις πληρωμής για οικολογικό προσανατολισμό/ "πρασίνισμα")											
CAP Rural Development Programme 2014 – 2020 (ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ)											
Regulation on organic production and labelling of organic products (Κανονισμός για τη βιολογική παραγωγή και την επισήμανση των βιολογικών προϊόντων και την κατάργηση του κανονισμού (ΕΟΚ) αριθ. 2092/91)											
Protection of waters against pollution caused by nitrates from agricultural sources (Οδηγία για την προστασία των υδάτων από την νιτρορύπανση γεωργικής προέλευσης)											
Pesticides Control Legislation (Καθορισμός πλαισίου κοινοτικής δράσης νε σκοπό την επίτευξη ορθολογικής χρήσης των γεωργικών φαρμάκων)											
Fertiliser regulation (Κανονισμός σχετικά με τα λιπάσματα)											
National Action Plan for Combating Desertification (Εθνικό Σχέδιο Δράσης κατά της ερημοποίησης)											

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

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

- Weak policy coherence
- Ineffective implementation and enforcement of existing policies

- Higher costs of SICS implementation/transition costs
- Availability of conditional payments
- Reluctance to abandon traditional practices in favor of new methods
- Need for better information sharing and training opportunities

Weak policy coherence

Regulations relevant for the adoption of SICS are in place, and according to one stakeholder they are useful for setting out mandatory actions for farmers. According to interviews, improving cultivation practices does not contradict policies and tools already in place. However, another interviewee stated that indeed there are conflicts between different policies, while another pointed out the various interests of those in the commercial agricultural sector. For example, private olive farmers, fertiliser stations and shops selling agricultural tools are not always driven by the same interests.

Ineffective implementation and enforcement of existing policies

Other factors identified include ineffective implementation of policy. It was noted that problems with policies were not due to the policies themselves, but how they were not being properly implemented and enforced. One interviewee noted that if existing policies were properly implemented, positive changes would have been already observed, which would suggest this is not currently being done.

Higher costs of SICS implementation/transition costs

One interviewee stated that actions that do not have a direct economic impact usually fail. They pointed to the high cost of using organic fertiliser, as well as the costs of equipping machinery with the right tools (e.g., crawlers, disc harrows, brush cutters), purchase of certain crops like avocado trees and implementing practices such as rotation, planting, and composting. This highlights the need to have economic tools in place which can offset this barrier – indeed, one interviewee mentioned that the replacement of irrigation networks with closed irrigation networks is an example of positive impacts of water economy policy.

Availability of conditional payments

There are several relevant economic instruments, not only falling under the CAP, but also LIFE. Such tools may ensure that farmers have some financial stability when adopting SICS. According to one interviewee, economic instruments, and regulations are successful because they set mandatory requirements on farmers, offer financial initiatives, and change attitudes.

Reluctance to abandon traditional practices in favor of new methods

Agriculture, and especially the cultivation of olives, plays a large role in the economy of Crete, and has done so for generations. While retaining its own local cultural traits, the island shapes a significant part of the cultural heritage of Greece. As such, one of the biggest barriers to the adoption of new practices is that farmers cannot be convinced to consider practices which differ from those generations that came before them. Farmer mentality can be broken down into the perceived cost of SICS adoption, and the perception that practices used by previous generations are best – for example, one interviewee noted that it is both very difficult to persuade farmers to restrict the burning of valuable branches and convince them of the negative effects of grazing on poor vegetation in olive groves. At the same time, another interviewee noted that some changes in perceptions have taken place, and training seminars have improved some milling practices and crop rotation practices, although it must be noted that there is a long way to go still. It was also noted that farmers might use the ‘wait and see’ approach, so successful experience of other farmers can be useful in changing their perceptions. Furthermore, one interviewee suggested that farmers adopt new practices due to established perceptions of preserving traditional forms of cultivation, which might bode well for the adoption of SICS, given that old methods, such as traditionally non-irrigated olive trees are less susceptible to soil erosion than those that are irrigated.

Need for better information sharing and training opportunities

Stakeholders highlighted the importance of information dissemination when it came to the uptake of new practices. According to one interviewee, SICS need to be promoted at both local and regional level. The same interviewee also noted that it is important to ensure research results and practical knowledge are conveyed to policy makers and farmers as soon as possible to optimise adaptation. This was echoed by another interviewee who stressed that research results should be disseminated to society. One interviewee also stated that it was worthwhile to pay for farmer training and education, especially those which focus on young farmer’s education which often come too late to be effective and was incomplete. The interviewee gave an example of the Agricultural Cooperation where they had created an olive-growing organisation. Farmers were trained in specific cultivation protocols and the Cooperative provided the appropriate tools to ensure ecosystem protection whilst producing a higher-quality product. In particular, the interviewee mentioned a tractor with branch tweezers and pallet boxes that was acquired for the collection of olives, as well as laboratory equipment for the analysis of soil physiochemical properties.

The box and table below provide a summary of the stakeholder recommendations for actions to promote SICS adoption in the site.

Box 1 Stakeholder recommendations for actions to promote the uptake of promising SICS in Crete study site

Summary of stakeholder recommendations for actions to promote SICS adoption

SICS tested at the study site included measures to introduce cover crops or soil-improving crops as well as reduced or no tillage practices.

Lack of knowledge or and experience with reduced tillage methods together with additional time and costs for farmers were identified as key adoption barriers. In addition, stakeholders noted that the lack of financial incentives for converting orange orchards to avocado plantations – which is possible due to favourable climatic conditions - would hamper the introduction of this crop since avocado trees were expensive and came with higher labour costs. Again, participants highlighted the lack of organisations with knowledge and experience in new/alternative cultivation practices and varieties such as avocados as challenging for adoption. Providing guidance to farmers as well as advisory services could provide a solution here.

With regards to cover crops, farmers remain sceptical about the long-term benefits. Therefore, long-term experiments were needed to prove and quantify the benefits of cover crops. Other actions proposed included providing farmers with advisory services/trainings as well as financial support or incentives to promote this practice. Organisation of workshops, where successful studies and practical applications demonstrated the advantages and disadvantages of cover crops could be beneficial.

Overall, stakeholders agreed that the low level of expertise of advisory services with SICS was one of the main barriers hampering their wider uptake. They explained that there was not one single organisation to support farmers. Each farmer acted individually according to their own knowledge and experience. To build capacity in advisory services, advisors could visit demonstration sites to be informed about new actions and techniques and varieties or participate in specific Erasmus programs dedicated to sustainable soil management practices. Seminars and programs, e.g., on new cultivation methods or irrigation technologies could be organised by the government in order improve compliance with EU legislation. Finally, knowledge on SICS could be disseminated by agronomists of private companies that mostly advice farmers nowadays.

Table 10: SICS being tested, adoption factors (enablers or barriers) and actions to overcome the barriers¹³

Soil-improving crops: Conversion from orange orchards to avocados	
Adoption factors (+ or -)	Actions
Favourable climate (+)	<i>n/a</i>
High cost of implementation associated with purchase of avocado trees (-)	<i>None identified</i>
Policy set-up, lack of incentives (-)	<i>None identified</i>
Insufficient knowledge about new/alternative crop varieties and methods (-)	Provide guidance to farmers and advisory services to develop know-how
Soil-improving crops: Cover crops organic vineyards	
Adoption factors (+ or -)	Actions

¹³Due to time limitations, some of the workshops only addressed a subset of SICS tested in the respective study site. Participants were asked to identify actions for the most important factors affecting SICS adoption; therefore, not all adoption factors were discussed in detail. To assess the effectiveness and feasibility of an action, a scale from 1 (not at all effective/feasible) to 4 (highly effective/feasible) was used but not consistently applied in all stakeholder workshops.

Resistance to change (mentality of farmers) (-)	Increase the skill level of Farm Advisory Services
	Demonstrate the benefits of SICS through workshops, exchange of practices, working with large-scale farmers as influencers of change, encourage peer to peer learning
Lack of awareness about the long-term benefits (-)	Demonstrate long-term benefits, supported by experiments, encourage peer to peer learning
Soil cultivation: Tillage/no tillage in olive orchards	
Adoption factors (+ or -)	Actions
Geomorphological conditions (steep slopes, stones, and rocks) (-)	<i>n/a</i>
Lack of awareness and insufficient knowledge (-)	Training, demonstration sites, peer-to-peer learning and better information dissemination

3 Recommendations for actions to promote the uptake of SICS

The main soil threats in Greece include imminent threat of desertification, characterized by loss of vegetation, water erosion, and subsequently loss of soil (erosion). SICS that are being tested at the study site, minimised tillage, green strips, green manuring and erosion traps are thought to be suitable to address these main soil threats.

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 Crete, Greece. The analysis shows that the existing policy framework promotes the relevant SICS to some extent, but also identifies barriers to achieving higher adoption rates. Overall, work needs to continue trying to change farmer perceptions and improve the implementation of existing instruments, although it is clear that steps have already been taken to mitigate this issue.

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

- **Increase policy coherence:** policy conflicts and synergies need to be carefully analysed and aligned, in order not to discourage the transition to sustainable farming practices. Ultimately, this might require a prioritisation of certain objectives and targets (and operationalised by the right policy interventions) as a certain level of conflict is unavoidable to ensure the right balance between environmental, social, and economic sustainability. On a practical level, it is important for farmers to have clear, unambiguous information on the legal conditions they need to comply with – especially if they are tied to subsidies - and those that may be rewarded.
- **Strengthen policy enforcement:** While it was found that there are several policies already in place that – directly and indirectly - regulate and incentivise different SICS, stakeholders report that outcomes on soil health are limited due to weak implementation and enforcement mechanisms. It is clear mechanisms for checking compliance with existing regulations need to be strengthened and expanded. With the post-2020 CAP, new funding rules funding rules will be introduced. The Good Agricultural Environmental Conditions (GAECs) now offer a greater chance for soil protection. New conditions with the potential to improve soil health have been added, e.g., the new GAEC 7 requires “No bare soil in most sensitive period(s)”. Cover crops will be an important strategy for meeting this requirement. The payment agencies should seek to ensure that these conditions are complied with and verified through, e.g., more frequent inspections and farmer reporting (including for example images of the implemented practices).
- **Subsidise transition to practices benefitting soil health:** The uptake of certain SICS, such as cover cropping, and reduced tillage, might require upfront investments, such as the purchasing of additional seeds and new machinery. Grants should be made available to farmers buying new equipment to implement these practices or groups of

farmers intending to set up a 'machinery exchange'. Such an exchange could also be set up and managed by the regional/local farm advisory services or municipalities.

- **Introduce more targeted financial incentives:** incentives should be more targeted and tied to specific actions to result in the desired change. For example, a subsidy could be tied to the use of a specific crop or crop change.
- **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. 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. Workshops, encouraging peer to peer learning, and long-term experiments that will show the benefits of SICS are promising initiatives that can be supported.
- **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.

4 Annex: Overview of key policies in Crete, Greece

Policy name	English translation	Scale	Initiated at EU or MS-level	SICS addressed	Description of policy
Πρότυπα για την καλή γεωργική και περιβαλλοντική κατάσταση (ΚΓΠΚ)	CAP GAEC Cross-compliance Standards	National	EU (CAP)	Green manures, cover crops, catch crops; enhanced efficiency irrigation; reduced tillage, smart residue management	'Cross compliance' is a set of rules which farmers and land managers must follow on their holding if they are claiming rural payments. GAEC 4 - 7 are relevant in the case of SICS in Greece: GAEC 4 requires land parcels with a gradient greater than 10% to be covered by vegetation or stubble during the rainy periods; GAEC 5 requires land with gradient greater than 10% to be tilled perpendicular to the slope, irrigation to be suitable, retention of stone walls, dykes and natural slopes along parcel boundaries; GAEC 6 requires crop residues to be grazed, tilled into the soil or mulched; GAEC 7 requires retention of terraces, hedges, ditches and trees in line and ponds.
Απαιτήσεις πληρωμής για οικολογικό προσανατολισμό/ "πρασίνισμα"	CAP Greening Payment Requirements	National	EU (CAP)	Crop rotation, green manures, cover crops, catch crops; integrated landscape management	Greening requirements are set out in Regulation (EU) 1306/2013 (Chapter 4), and the associated delegated acts, implementing regulations and Commission guidance to Member States. At Member State level the greening requirements are set out in the very detailed instructions given to all farmers who are eligible for CAP payments. These are made available to all farmers who are registered with the agriculture department's administrative system for CAP payments but are not publicly available.
ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ version 1.3,	CAP Rural Development	National	EU (CAP)	Crop rotation, green manures, cover crops, catch crops;	The Rural Development Programme (RDP) for Greece was formally adopted by the European Commission in 2015.

Policy name	English translation	Scale	Initiated at EU or MS-level	SICS addressed	Description of policy
last modified 8/12/2015	Programme 2014 - 2020			enhanced efficiency irrigation; reduced tillage	It outlines Greece's priorities for using the €5.9 billion available from 2014-2020 (national and EU contributions). The main objectives of the RDP are enhancement of farm viability and competitiveness, preservation and enhancement of ecosystems and promotion of local development in rural areas. RDP's Focus area 4C focuses on improving soil management. As part of this Focus area, the RDP calls for reports on issues such as reduced tillage and crop rotation (p. 34). The RDP refers to other SICS such as plant cover (p. 314 and 741), integrated management (p. 373), irrigation (p. 469), agroforestry (p. 656), etc.
Κανονισμός για τη βιολογική παραγωγή και την επισήμανση των βιολογικών προϊόντων και την κατάργηση του κανονισμού (ΕΟΚ) αριθ. 2092/91	Regulation on organic production and labelling of organic products	National	EU (Organic Regulation)	Crop rotation; integrated nutrient management; reduced tillage; integrated pest management	The regulation sets the standards for organic production, marketing and labelling organic products. Organic production standards have rules relating to crop rotation and chemical inputs that have a direct effect on soil quality. The regulation explicitly deals with soil fertility and quality in its objectives i.e.: organic plant production should contribute to maintaining and enhancing soil fertility as well as to preventing soil erosion. Plants should preferably be fed through the soil eco-system and not through soluble fertilisers added to the soil and high; and highlights the essential role of soil fertility management systems such as choice of species, crop rotation, recycling organic materials and cultivation techniques (13, 14). Art. 3 a (i) specifically addresses the relations and balance between health of soil, water plants and animals. Art 5. (a)

Policy name	English translation	Scale	Initiated at EU or MS-level	SICS addressed	Description of policy
					addresses the maintenance and enhancement of soil life and natural soil fertility, soil stability and soil biodiversity as a means to prevent and combat soil threats such as soil compaction and soil erosion. The regulation also lays down the rules for use of tillage and cultivation practices that maintain or increase soil organic matter, enhance soil stability and soil biodiversity, and prevent soil compaction and soil erosion. In addition, principles for maintaining fertility and the biological activity of the soil, such as crop rotation including green manure and crop rotation with legumes and application of composted manure or organic material.
Οδηγία για την προστασία των υδάτων από την νιτρορρύπανση γεωργικής προέλευσης	Protection of waters against pollution caused by nitrates from agricultural sources	National	EU (Nitrates Directive)	Crop rotation; green manure, cover crops, catch crops; integrated nutrient management; reduced tillage; integrated landscape management	The Nitrates Directive aims to protect surface waters and groundwater against pollution by nitrates from agricultural sources. The Member States are also required to set up where necessary a programme, including the training and information for farmers, promoting the practices. The Directive requires Member States to identify Nitrate Vulnerable Zones and set up action programmes for these zones (Article 5).
Καθορισμός πλαισίου κοινοτικής δράσης με σκοπό την επίτευξη ορθολογικής χρήσης των γεωργικών φαρμάκων	Pesticides Control Legislation	National	EU (SUPD)	Integrated pest management	The Control of Pesticides Regulations (1986, as amended in 1997) provides a high-level regulatory setting with details of pesticides subject to control and a system of approvals required for supply, storage and use. In addition, the Plant Protection Products (Sustainable Use) Regulations 2012 transpose Directive on sustainable use of pesticides. Users of plant protection

Policy name	English translation	Scale	Initiated at EU or MS-level	SICS addressed	Description of policy
					products/pesticides are required to take all reasonable precautions to protect, inter alia, soil.
Κανονισμός σχετικά με τα λιπάσματα	Fertiliser regulation	National	EU (Fertiliser Regulation)	Integrated nutrient management	The Regulation regulates which products on the European market may bear the words 'EC fertiliser' (Article 1). The minimum requirements to bear this name include that the product does not have negative effects on the health of humans, animals, plants, or the environment (including soils) when applied under normal conditions (Article 14).
Εθνικό Σχέδιο Δράσης κατά της ερημοποίησης	National Action Plan for Combating Desertification	National	National	Crop rotation; green manure, cover crops, catch crops; Enhanced efficiency irrigation, reduced tillage	The Plan provides an overview of planned actions to combat desertification in Greece. The Plan was adopted in line with the UN Convention for Combating Desertification, ratified by the Greek Parliament in 1997. Concerning the agriculture section, the Plan includes the following measures (pp. 13 - 16): crop rotation plant cover, tillage management; irrigation and integrated management of areas affected or potentially affected by desertification in Greece. These measures are described in general manner. The specific measures that have to be taken in each case are, however, not described, because many of them require specific studies. Also, measures and actions that have to be taken on local level are not included, because they have to be adjusted to the relevant Prefectorial Action Programmes.

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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)
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Principle Author(s):	Alicia McNeill, Melanie Muro, Tugce Tugran, Zuzana Lukacova, Milieu
Principle Author e-mail:	melanie.muro@milieu.be
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