



**RUS
TI
CA**

Demonstration of circular bio-based fertilisers and implementation of optimized fertiliser strategies and value chains in rural communities

Report on strategic plans to be drawn by EU Member States under the common agricultural policy (CAP Strategic Plans)

Project acronym	RUSTICA
Project title	Demonstration of circular biofertilisers and implementation of optimized fertiliser strategies and value chains in rural communities
Grant agreement number	101000527
Call identifier	H2020-RUR-2020-1
Project start date	01/01/2021
Project duration	48 months
	Publication on the project website
Lead	Wiedemann GmbH
Author	Adelheid Wiedemann
Contributions/reviews	Claudio Mondini, Federica Cisilino, Fien Amery, Lieselot Bourgeois, Valentine le Cras, Céline Marjolet
Dissemination level	PUBLIC

Disclaimer

This *Report on strategic plans to be drawn by EU Member States under the common agricultural policy (CAP Strategic Plans)* has been prepared in the scope of the funded project RUSTICA in compliance with the grant agreement No 101000527 (European Union's Horizon 2020 research and innovation programme). It needs to be emphasized that the views presented in this document are solely an opinion of the author and do not necessarily reflect the views of the European Commission. The author and the RUSTICA consortium members do not accept any liability for direct or indirect consequences, losses or damages resulting from the use of this document, its content or parts of it. This document is exclusively prepared for general information purposes and represents in no kind a legal or any other advice.

The results achieved, conclusions made, and recommendations given by the author may not be interpreted as a political or legal signal that the European Commission or any other political or legal institution intends to take a given action.

Copyright

© all rights reserved: RUSTICA consortium members (2023)

This RUSTICA document comprises information which is proprietary to the RUSTICA consortium. All RUSTICA project consortium members have agreed to full publication of this document. The document and its content may not be reproduced, copied or passed on to third parties in any way, in whole or in part, without the prior written consent of the RUSTICA consortium as the owner of the intellectual property rights.

Citation

Please cite this RUSTICA Report as follows:

Report on strategic plans to be drawn by EU Member States under the common agricultural policy.

Author: Adelheid Wiedemann (Wiedemann GmbH). (2023)

RUSTICA - Demonstration of circular bio-based fertilisers and implementation of optimized fertiliser strategies and value chains in rural communities.

EU Horizon 2020 project grant agreement No 101000527. <https://rusticaproject.eu/>

Table of Contents

.....	0
Disclaimer	1
Copyright	1
Citation	1
Summary.....	3
Acronyms and abbreviations.....	4
List of Figures.....	5
List of Tables.....	5
Introduction.....	6
1. The CAP and its objectives.....	7
1.1 A glimpse of the CAP	7
1.2 General and specific key objectives.....	8
2. National CAP Strategic Plans	10
2.1 CSPs – in a nutshell	10
2.2 Structure and contents.....	10
2.3 Individual CAP Strategic Plans of the EU countries	11
2.3.1 View on Summary overview on the approved CSPs.....	11
2.3.1.1 Economic sustainability	11
2.3.1.2 Environmental and climate sustainability	13
2.3.1.3 Social sustainability	16
2.3.1.4 Knowledge sharing, innovation and digitalization	16
2.3.2 Key messages from CSP factsheets of EU countries.....	17
3. RUSTICA testcase regions within the EU	19
3.2.1 Almeria (Spain)	19
3.2.2 Flanders (Flanders/Belgium).....	20
3.2.3 Friuli Venezia Giulia (Italy)	21
3.2.4 Pays de la Loire (France)	22
Conclusions.....	23
References.....	24

Summary

Following the Regulation (EU) 2021/2115 („the CSP Regulation”), Member States have to develop and implement strategic plans under the Common Agriculture Policy (CAP). These CAP Strategic Plans (CSPs) reflect the individual version to establish the CAP at national, regional and local level in the EU for the period from 2023-2027. A number of 28 CSPs (one for each EU country and two separate plans for Belgium on the regions Flanders and Wallonia) has been elaborated and approved by the European Commission.

The CSPs comprehensively describe the policy and support on agriculture and rural areas in terms of economic, environmental and climate, and social sustainability in order to meet the objectives of the CAP. Concerning the content, they include inter alia a description and evaluation of needs, SWOT analyses, as well as an explanation of interventions and actions defined by the country or region. The EU budget of the CAP is mainly financed by two pillars: the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD) An amount of €264 billion of EU funds is allocated to the CSPs in the period 2023-2027.

A fair income, competitiveness, and a strong position of the farms in the food chain as it is displayed in the Strategic Objectives (SO) 1-3 contribute to economic sustainability. To accomplish the objectives, the CAP comprises inter alia direct payments, as well as support on investments and marketing. As regards fertilisers, certain prescriptions are laid down in CSPs, e.g., on their use related to “Conditionality” which needs to be fulfilled for area- or animal-based direct payments. Investments are encouraged including those addressing the bioeconomy, which includes bio-based products. As such, value chains of bio-based fertilisers may be further evaluated on their appropriateness for the individual calls and programmes. The CAP also fosters producer organisations. Such organisations could be invited to evaluate the options of waste valorisation towards bio-based fertilisers and new regional circular business models.

Measures to climate change mitigation and adaption, efficient use of natural resources and preservation of biodiversity as it is expressed by SO 4-6 are part of environmental sustainability. Aside from “Conditionality” mandatory, e.g. for basic income support, the CSPs embrace a number of voluntary actions, such as eco-schemes and agri-environment-climate commitments (AECCs) offering support e.g., on *improvement of soil fertility and of nutrient management and soil biota*, as well as carbon sequestration. Among the measures mentioned are reduction of the application of synthetic fertilisers and better use of organic fertilisers. The actions provide an opportunity to further evaluate the individual bio-based fertilisers and blends on their suitability to fit into these requirements. If organic farming is targeted, the legal stipulations for organic production (e.g., (EU) 2018/848 and (EU) 2021/1165) need to be met.

SO7-9 are related to social sustainability which includes employment and development in rural areas. Regional circular business concepts valorizing leftovers from the agri-food chain as subject to the RUSTICA project are available for further consideration under the CAP and their regional or local instruments dealing with the bioeconomy and green economy. Moreover, knowledge and innovation on bio-based fertilisers as it is expected by the RUSTICA project can be proposed for dissemination and exploitation in accordance with SO 10.

The RUSTICA project validates its research in five test cases of which four are located in Europe. In this respect, the CSPs relevant for Almeria (Spain), Flanders (Flanders/Belgium), Friuli Venezia Giulia (Italy) and Pays de la Loire (France) are highlighted with an emphasis on direct payments, conditionality, eco-schemes and investments.

Acronyms and abbreviations

AECC	Agri-environment-climate commitments
AKIS	Agricultural Knowledge and Innovation Systems
ANC	Areas with natural constraints
BISS	Basic income support for sustainability
EC	European Commission
CAP	Common Agricultural Policy
CIS	Coupled Income support
CIS-YF	Complementary income support for young farmers
CRISS	Complementary redistributive income support for sustainability
CSP	Country Strategic Plan
EAGF	European Agricultural Guarantee Fund
EAFRD	European Agricultural Fund for Rural Development
SEA	Strategic Environmental Assessment
GAEC	Good agricultural and environmental condition standard for agricultural areas
R	Result indicator
SO	Specific Objective
SMR	Statutory management rules
SWOT	Strength, weaknesses, opportunities, threat
TFEU	Treaty on the Functioning of the EU
UAA	Utilised Agricultural Area
WFD	Waterframework Directive



List of Figures

Figure 1: Three EU Regulations adopted in 2021 and pivotal for the CAP	7
Figure 2: Enhanced conditionality	13

List of Tables

Table 1: Ten specific key objectives of the CAP policy and a possible role of RUSTICA	9
Table 2: Examples of direct payments in the EU and RUSTICA testcase locations	12
Table 3: GAECs - summarised information and objectives	14
Table 4: Areas of actions for an eco-scheme	15
Table 5: Some key data on farming based on the CSP fact sheets of the EU countries.....	17



Introduction

The RUSTICA project develops, demonstrates and evaluates novel concepts for plant nutrition and soil protection towards benefitting sustainable agriculture. In this respect, it is of particular interest how the project and its output (bio-based¹ fertilisers²) can contribute to the objectives of European Union Policy, not only to the priorities, such as the Green Deal (please view Report D3.2 RUSTICA valorisation concepts in the EU legislative framework (RUSTICA, 2021)), but also the Common Agricultural Policy (CAP) with its overarching goals and key objectives.

To get closer to the options and constraints which will affect the future of bio-based fertilisers as they are envisaged by the RUSTICA project, an investigation of the 28 Common Agricultural Policy Strategic Plans (CSPs) elaborated either at national or regional level is required. Whereas a certain flexibility to design the CSP is given to each country, detailed stipulations are made in the Regulation (EU) 2021/2115 (“CSP-Regulation”) on the basic structure and content (e.g., intervention strategy) of a CSP.

The CSPs need to address the CAP objectives, and in particular, the ten specific objectives (SO). They shall contain the efforts of an EU country or region to accomplish economic, environmental and climate, and social sustainability by implementing the CAP, and to meet the needs of knowledge sharing, modernisation and innovation as requested by SO 10.

Economic sustainability represents not only viable farm income through direct payments but also more market orientation and better positions of the farms in the value chains. With view on bio-based fertilisers, the prerequisites for direct payments need to be analysed on this subject. Investment support on competitiveness and market orientation are defined by the CSPs. The individual programmes and calls would need to be further scrutinized for bio-based fertiliser production and application. Producer organizations could be addressed with regard to evaluation of further opportunities on valorization of waste and new value chains.

Requirements, such as *Conditionality*, which are mandatory for area- and animal-based CAP payments, count for environmental and climate sustainability and need to be considered how they affect (bio-based) fertilisers and their use. Besides, voluntary instruments, such as *eco-schemes* and spendings from *rural development* need to be examined if they include rules on nutrient management and fertilisers.

Social sustainability, as it can be achieved by growth, employment, and local development in rural regions, is of particular relevance for the CAP and the CSP. Measures and activities including those belonging to the bioeconomy need to be further investigated on their suitability to establish business models on bio-based fertilisers benefitting regional value chains and rural areas.

Since a *Greener CAP* is essential, key messages from the factsheets on the national CSPs of the European Commission (EC) are briefly discussed for all EU Member States.

Specific attention is drawn to the CSPs of the four European RUSTICA test case regions Almeria, Flanders, Friuli Venezia Giulia and Pays de la Loire. In this respect, a separate section dedicated to the CSPs of Spain, Flanders, Italy and France is part of this report.

¹ Currently, the term “bio-based” is standardized by norm EN 16575 : 2014 and can be summarized as “fully or partly derived from biomass”.

² To date, to the best knowledge of the author, an official definition for “bio-based fertilisers” could not be detected. Hence, for the purpose of this report, it is referred to the RUSTICA building blocks microbial biomass, NPK-concentrate, insect biomass and -frass, biochar and compost for developing blends for plant nutrition and soil improvement.

1. The CAP and its objectives

1.1 A glimpse of the CAP

Already in 1958, the *Common Market* was established by the Treaty of Rome in the six Member States Belgium, France, Germany, Italy, Luxembourg, and the Netherlands (EP, 2023). Currently, the Treaty on the Functioning of the European Union (TFEU) refers to the *Common Agricultural and Fisheries Policy* in its Title III and defines five objectives of the CAP which can be summarized as follows: a better agricultural productivity relating to the factors of production, especially labour; an appropriate standard of living encompassing better individual income of persons committed to the agricultural scene; stable markets; guarantee of supplies; and affordable prices for consumers (EC, 2023a).

In 2023, a new CAP area started, and the following Regulations and their Implementing legal acts play a crucial role in the legal framework (**Figure 1**) relevant for the period from 2023 to 2027. Concerning the years 2021-22, transitional rules applied (EC, 2023a).



Figure 1: Three EU Regulations adopted in 2021 and pivotal for the CAP

Source: Own depiction based on the legal sources (EC, 2023a)

While Regulation (EU) 2021/2116 serves as a horizontal Regulation dealing with financial management and monitoring of the CAP, Regulation (EU) 2021/2117 amends the Regulation No 1308/2013 ruling the common organization of the markets. Regulation (EU) 2021/2115 determines the support for CSPs of the Member States (EC, 2023a).

As laid down in (EU) 2021/2116, the two main funds of financing the CAP from the general budget of the EU are the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). While the latter is completely under shared management between the EU countries and the EU, the former is either under direct management of the EU or under shared management. Typical expenditures

covered by the EAGF are direct payments to farmers under the CSP whereas agri-environment-climate commitments (AECCs) among the interventions in their CSP fall into the scope of the EAFRD ((EU)2021/2116, EUR-Lex). Concerning the allocations from the EU budget to the CAP (total €386,6 billion) in the period 2021-2027, €291,1 billion are available for the EAGF, also called the “first pillar” and €95,5 billion to the EAFRD, known as the “second pillar” of CAP financing (EC, 2023a) (EC, 2023e).

Regulation (EU) No 1308/2013 rules the internal market of the EU for agricultural products under its scope and contains a range of measures to intervene into this market and support, e.g., by aid schemes. Furthermore, activities to encounter risks, e.g., in case of market disturbances or threats, are laid down in this Regulation. Moreover, stipulations on marketing and producer organisations are set and ones addressing international trade between the EU and third countries ((EU)No1308/2013, EUR-Lex). The Regulation was amended at several times, latest by the Regulation (EU) 2021/2117, bringing new options on sustainability standards (Art. 210a), thereby referring to reduction of food waste and the transition of the circular economy by horizontal and vertical initiatives ((EU)2021/2117, EUR-Lex), which is of specific interest for the RUSTICA project.

In Regulation (EU) 2021/2115 the CAP for the period 2023-2027, its objectives, and various types of interventions, e.g., under the EAGF direct payments, in some market sectors, and for rural development under the EAFRD are defined. It presents a range of indicators for output, result, impact and context ((EU)2021/2115, EUR-Lex). It sets up the legal frame for the CSPs of the Member States which will be debated in more detail in the following chapters of this report. The Regulation is supplemented by delegated acts and implemented by a number of legal sources encompassing e.g., provisions on monitoring and evaluating the CSPs ((EU)2021/2115, EUR-Lex).

1.2 General and specific key objectives

General objectives in Art. 5 von (EU) 2021/2115 include inter alia

- *ensuring long-term food security by means of a smart, competitive, resilient and diversified agriculture,*
- *achieving the environmental and climate-related objectives by support of environmental protection³ and climate action and*
- *amplification of the socio-economic rural structures ((EU)2021/2115, EUR-Lex).*

RUSTICA research addresses competitive farming and debates solutions on lowering the impact of agriculture on the environment. The variety of business models and regional value chains of the project also have the potential to bring new options to rural economies and societies.

In addition, ten key objectives are defined by the Regulation (EU) 2021/2115 (Art. 6) for the period from 2023 to 2027 ((EU)2021/2115, EUR-Lex). In the following **Table 1**, the short-versions of the objectives published by the European Commission (EC, 2023b) are under use and a possible role of RUSTICA is discussed here.

³ with biodiversity

Table 1: Ten specific key objectives of the CAP policy and a possible role of RUSTICA

Specific objectives (SO) ⁴ of the CAP and a possible role of RUSTICA	
1	<ul style="list-style-type: none"> to ensure a fair income for farmers;
	RUSTICA strives for new concepts and products in plant nutrition and soil protection. The expected results can be further verified for support on standards and good practices relevant for payments under the CAP.
2	<ul style="list-style-type: none"> to increase competitiveness;
	RUSTICA promotes local and regional circular business aimed at new solutions towards modernisation, resource efficiency and competitive farming in Europe.
3	<ul style="list-style-type: none"> to improve the position of farmers in the food chain;
	RUSTICA offers valorisation routes of waste which could be proposed to cooperation among farmers, supply chain organization and quality schemes.
4	<ul style="list-style-type: none"> climate change action,
	RUSTICA addresses climate change mitigation and carbon sequestration due to new technologies and its product portfolio including e.g., biochar that can be further discussed for measures under the CAP.
5	<ul style="list-style-type: none"> environmental care;
	RUSTICA and its research on soil improvement are dedicated to the protection of this important natural resource and the development of fertilising products aims not only to optimal plant nutrition but also plant support which can be further evaluated on the requirements of the CAP.
6	<ul style="list-style-type: none"> to preserve landscapes and biodiversity;
	RUSTICA and its manifold propositions on new environmentally friendly materials and systems can be further assessed for organic agriculture purposes under the CAP.
7	<ul style="list-style-type: none"> to support generational renewal;
	RUSTICA aspires results and an impact favourable to a sustainable development of all farms including young and new farmers.
8	<ul style="list-style-type: none"> vibrant rural areas;
	RUSTICA, its multitude of business models and expected results provide a basis to analyse creation of jobs and growth in the bioeconomy sector and rural area with support of the CAP.
9	<ul style="list-style-type: none"> to protect food and health quality;
	RUSTICA methods to reduce food waste and at the same time producing tailored nutrients for plants are a research approach on the bioeconomy targeting demand on sustainable, healthy and high-quality food.
10	<ul style="list-style-type: none"> fostering knowledge and innovation;
	RUSTICA and its comprehensive activities on sharing knowledge and results including but not limited to regional and global stakeholder workshops can be examined for further use under the CAP and AKIS.

Source: Own depiction based on the CAP objectives (short versions) published by the European Commission (EC, 2023b)

Due to its nature, the RUSTICA project and its elaborations on fertilising products and soil improvement by using a multi-actor approach and regional business models broadly address the SOs.

⁴ Full versions of the Strategic Objectives are laid down in (EU)2021/2215, Art. 6

2. National CAP Strategic Plans

According to the implementation of the CAP in the EU at the national and regional level, 28 CSPs (one for each EU country and two for Belgium covering Flanders and Wallonia) are developed by the Member States and accepted by the European Commission (EC, 2023d).

2.1 CSPs – in a nutshell

To accomplish the specific objectives of the CAP and to meet the needs of each country, the CSPs contain interventions thereto. In this respect, they need to be in conformity to the *European Green Deal* (EC, 2019) while ensuring long-term and sustainable food security. As laid down in (EU) 2021/2115, the intervention strategy shall e.g., highlight environmental and climate-related objectives and shall be in accordance with the *EU Biodiversity Strategy* (EC, 2020b) and the *EU Farm to Fork Strategy* (EC, 2020a) (EC, 2023c) ((EU)2021/2115, EUR-Lex) (RUSTICA, 2021). For the period 2023-2027, an amount of €264 billion is allocated from the EU budget to the CSPs. In addition, national financing can be made for rural development and > €11 billion are planned by 16 EU countries including those where the RUSTICA test cases⁵ are located (EC, 2023d).

2.2 Structure and contents

Even though the national CSPs of each EU country are very individual documents, a certain structure reflecting information on central contents has to be met and the main elements of a CSP are legally prescribed. They are laid down as follows (Art. 107) ((EU)2021/2115, EUR-Lex):

- “a) the assessment of needs;*
- (b) the intervention strategy;*
- (c) the elements common to several interventions;*
- (d) the direct payments, interventions in certain sectors and interventions for rural development specified in the strategy;*
- (e) target and financial plans;*
- (f) the governance and coordination system;*
- (g) the elements that ensure modernisation of the CAP;*
- h) where elements of the CAP Strategic Plan are established at regional level, a short description about the Member State’s national and regional set-up, and in particular which elements are established at national and at regional level.”* ((EU)2021/2115, EUR-Lex)

In addition, the documents need to have Annexes, which comprise an “ex-ante evaluation” and a strategic environmental assessment (SEA) (Annex I), a SWOT Analysis (Annex II), consultation of the partners (Annex III), crop specific payment for cotton – if relevant (Annex IV), information on additional national financing of the Plans (Annex V), and transitional national aids if relevant (Annex VI) ((EU)2021/2115, EUR-Lex).

The RUSTICA project with its comprehensive and complex technical and non-technical subjects strives for new solutions on plant nutrition and soil enhancement. These expected solutions are available to be further evaluated for the purpose of the CSPs.

⁵ Belgium, France, Italy, Spain

2.3 Individual CAP Strategic Plans of the EU countries

As mentioned before, except of Belgium where regional CSPs were elaborated, all EU Member States have a CSP document provided at the national level (EC, 2023d). Oriented at the 10 SO, the CSPs need to show the individual implementation including interventions of the EU countries.

2.3.1 View on Summary overview on the approved CSPs

A set of key elements building the approved 28 CSPs was published by the EC in June 2023. The *Summary overview for 27 Member States* gives substantial information on the core areas of the CSPs including but not limited to economic, environmental and climate, and social sustainability. The cross-cutting objective of knowledge sharing, innovation and digitalization is considered as well (EC, 2023d).

2.3.1.1 Economic sustainability

In terms of **economic sustainability**, the CSPs not only aim at a fair support towards resilient farms and viable income but also enhancement of market orientation, competitiveness and position in the value chain. Direct payments are made to active farmers in order to support income, and there are five main instruments reported to this end (EC, 2023d):

- *Basic income support for sustainability (BISS),*
- *Complementary redistributive income support for sustainability (CRISS),*
- *Coupled income support (CIS),*
- *Complementary income support for young farmers (CIS-YF).*
- *Support through eco-schemes and support to farming in areas with natural constraints (ANC)*

BISS as an area based and decoupled annual payment is the major instrument on EU farm income support (51% of the EAGF budget), while **CRISS** enables a redistribution of payment from larger to smaller or medium-sized farms. **CIS** is a voluntary instrument and may be granted to active farmers and certain sectors (e.g., cereals, oil seeds, protein crops etc.) or certain types of farming if necessary for socio-economic or environmental reasons (Art. 32-35 of (EU) 2021/2115), and **CIS-YF** addresses annual decoupled payment per eligible hectare or of a lump-sum payment to a young farmer who has to be legally defined by age (35-40), position (head of the holding) and fulfillment of required skills of the Member State. Natural constraints and other area-specific constraints (**ANCs**) are relevant for 58% of utilized agricultural area (UAA) in the EU. 23 CSPs (including those of Italy, France and Spain)⁶ provide ANC support (Art. 4 and Art. 30 of (EU) 2021/2115) (EC, 2023d) ((EU)2021/2115, EUR-Lex).

As published in the aforementioned *Summary overview*, there are different levels of payment of the support schemes between the EU countries and regions. **Table 2** shows data of the EU countries with RUSTICA testcase locations, minimum and maximum amounts, and EU average of total direct payments, BISS, CRISS and CIS-YF per year (EC, 2023d).

Total direct payments vary from Latvia as the lowest to Malta with the highest rate of €/ha annual payment. An annual BISS of €67/ha is reported for Czechia and the highest amount is noted for Malta. A CRISS of €15/ha is laid down for Sweden and in Czechia more than the tenfold is foreseen for this purpose. Except of Lithuania (€6660), the Netherlands (€2800) and France (€4543) using CIS-YF payment schemes per beneficiary, all EU countries have payment schemes per ha. A CIS-YF of €38/ha is published for Latvia, the upper end of CIS-YF payment is represented by Ireland and no data could be found for Portugal (EC, 2023d).

⁶ Countries where three of the RUSTICA testcases are situated

Table 2: Examples of direct payments in the EU and RUSTICA testcase locations

EU countries or regions	Total – direct payments €/ha annual	BISS €/ha annual	CRISS €/ha annual	CIS-YF €/ha annual
Flanders	325	194	53	205
France	268	130	48	per beneficiary
Italy	348	167	82	84
Spain	232	128	44	128
Range – all CSPs	193 – 1 083 ⁷	67 - 638	15-154	38-177
Average – all CSPs	261	134	72	-

Source: Own depiction based on the CSP summary overview and CSPs

Other schemes are *Capping and Degressivity* which can be used to reduce amounts to larger beneficiaries, *Internal Convergence* which is available to balance difference between beneficiaries within a Member State and *Small Farm Scheme* specifically dedicated to small holders (EC, 2023d).

On the other hand, it needs to be emphasized that area- and animal-based CAP payments require to be in accordance with the rules of **conditionality** which includes statutory management requirements (SMRs) from EU legislation outside of the CAP and good agricultural and environmental conditions standards for agricultural areas (GAECs) (section 2.3.1.2). With view on RUSTICA and bio-based fertilisers, these requirements will be further debated below (EC, 2023d) ((EU)2021/2115, EUR-Lex).

To go beyond legislative requirements (**conditionality**), eco-schemes are an instrument under direct payments towards sustainability for practices, which are favourable to environment, climate, and animal welfare but against microbial resistance (EC, 2023d) ((EU)2021/2115, EUR-Lex).

A major tool for more market orientation and competitiveness of farms is the support of investments. In this regard, two main types of investments are differentiated: **on-farm investments** and **off-farm investments**. Whereas the former is linked, for instance, to enhance productivity and resource efficiency, the latter covers inter alia processing, marketing and/or development of agricultural products and can be found in 24 CSPs including the countries where the RUSTICA test regions are located. In addition, it is stressed that the bioeconomy and rural businesses are among the variety of purposes, which can be of particular relevance of the RUSTICA exploitation and impact (EC, 2023d).

Another important area is the support of co-operations between farmers (e.g. producer organisations) and of **specific sectors**, such as the fruit and vegetables sector. All RUSTICA test case countries are reported to have recognized producer organisations (EC, 2023d). Such co-operations could be further evaluated in terms of a possible waste valorization for bio-based fertiliser purposes.

Aside from the support already mentioned in this report, financial instruments by means of EAFRD resources are available for boosting investments in agriculture, food processing, rural businesses and forestry. These financial instruments include e.g., equity and specific support for start-ups in France (EC, 2023d). In this context, the potential and use of EAFRD for bio-based fertiliser business would need to be further assessed in terms of RUSTICA results.

⁷ This is the consequence of the specific Maltese sizes and structures of farmland (1,2 ha in average).

2.3.1.2 Environmental and climate sustainability

Environmental and climate sustainability is at the core if it comes to the discussion of the production and use of bio-based fertilisers taking into account reduction of emissions, carbon sequestration in soil, high quality of water bodies, and preservation of habitats and species, as well as targets thereto. These targets can be found in the CAP legislation itself and in a range of other legal sources (e.g., Water Framework Directive (2000/60/EC), Nitrate Directive (91/676/EEC) and Pesticides Directive (2009/128/EC)) (EC, 2023d) (2000/60/EC, EUR-Lex) (91/676/EEC, EUR-Lex) (2009/128/EC, EUR-Lex).

Albeit the targets of the EU Biodiversity Strategy for 2030 and the Farm to Fork Strategy which include

- “reducing **nutrient losses** from agriculture by 50%, while ensuring that there is no deterioration in soil fertility (compared to 2012-2014/2015);
- achieving a coverage of organic farming of at least 25% of total agricultural area (compared to 2018);”

are legally non-binding at the moment, both strategies are referred to in the Preamble of the CSP Regulation (EC, 2023d) (COM/2020/380 final, EUR-Lex) (COM/2020/381 final, EUR-Lex).

The reduction of nutrient losses is crucial if new fertilising and soil fertility concepts as subject to the RUSTICA project, will be introduced. To meet the needs of organic farming, specific requirements are laid down for plant nutrition and soil conservation, covering e.g., biochar and insect frass in EU legislation, e.g., (EU) 2021/1165 and (EU) 2018/848 ((EU) 2021/1165, EUR-Lex) ((EU) 2018/848, EUR-Lex).

A number of rules and instruments -also called green architecture- is laid down to heighten fulfillment of environmental and climate needs of farming activities. As mentioned above, to obtain support by the CAP (e.g., by direct payments), farms have to meet the requirements of **conditionality**. The scope of the new enhanced conditionality which is built on the basis of cross compliance and greening rules of the former CAP period 2014-2022 is shown in **Figure 2** (EC, 2023d).

Enhanced Conditionality:
 9 GAECs, Nitrates-,
 Waterframework-, Natura
 2000 and Pestizides
 Directive

Figure 2: Enhanced conditionality

Source: European Commission, Approved 28 Strategic Plans (EC, 2023d)

Conditionality covers three main areas: a) Climate and environment, b) Public health, and plant health and c) Animal welfare. For this purpose, nine GAEC standards are defined and 11 SMR are mentioned in Annex III of (EU) 2021/2115. All of the nine GAECs belong to **Climate and Environment** and are depicted in the **Table 3** ((EU)2021/2115, EUR-Lex).

With view on fertilisers, specifically GAEC 4 indicates that a distance of three metres has to be kept to water courses and no such products may be applied there. There is no specific indication of type or origin of a fertiliser. Concerning the implementation, different choices are reported for the EU countries including those where the RUSTICA testcase are operated. Flanders considers several factors on determining the distances (Vlaamse Overheid, 2023b), and more than this basic requirement can also be found in France, Italy and Spain (EC, 2023d).

Additionally, in the area **Climate and Environment** SMR 1 requires to control diffuse sources of pollution by phosphates in accordance with the Water Framework Directive and SMR 2 imposes the protection of waters against pollution caused by nitrates from agricultural sources in compliance with the Nitrate Directive. Conservation of wild birds (2009/147/EC, EUR-Lex) is subject of SMR 3 while SMR 4 contains the conservation of natural habitats and of wild flora and fauna (92/43/EEC, EUR-Lex). However, as it is elucidated in Art. 12 of (EC) 2021/2115, legal sources of SMR “shall apply in the version that is applicable and, in the case of Directives, as implemented by the Member States” ((EU)2021/2115, EUR-Lex) which will be debated in more detail in section 2.3.1 (EC, 2023d).

Table 3: GAECs - summarised information and objectives

GAEC Standard	Summarised Information	Objectives (Excerpt)
GAEC 1	Maintenance of permanent grassland	Preservation of carbon stocks
GAEC 2	Protection of wetland and peatland	Protection of carbon-rich soils
GAEC 3	Ban on burning arable stubble	Maintenance of soil organic matter
GAEC 4	Buffer strips along water courses	Protection of river courses against pollution
GAEC 5	Tillage management, reducing soil degradation risks	Minimum land management to limit erosion
GAEC 6	Minimum soil cover	Protection of soils in most sensitive periods
GAEC 7	Crop rotation in arable land	Preserving the soil potential
GAEC 8	Non-productive areas or features of agricultural area	Improvement of on-farm biodiversity
GAEC 9	No converting/ploughing permanent of grasslands in Natura 2000 sites	Protection of habitats and species

Source: (EU) 2021/2115 and European Commission, Approved 28 Strategic Plans (EC, 2023d)

Member States can set additional GAEC standards. Considering the RUSTICA test case regions, Flanders and Spain voted for this voluntary option. In Flanders, GAEC9 is expanded to Non-Natura 2000 areas and Spain addresses sustainable fertilization in GAEC 10 (EC, 2023d) (Ministère de l'Agriculture et de la Souverainete, 2023)

In the area **Public health, and plant health** it is referred to legislation on food safety and plant protection including pesticides and medicinal products rather than fertilisers by the SMRs. The SMRs on **Animal welfare** comprise mainly calves and pigs. Directive 98/58/EC concerning the protection of animals kept for farming purposes does not encompass rules for farmed insects at the moment (IPIFF, 2023) (98/58/EC, EUR-Lex).

Apart from the minimum requirements, additional support can be granted for “**eco-schemes**” (voluntary schemes for the climate, the environment and animal welfare). A minimum budget (‘ring-fencing’) needs to be ensured for these actions and practices. Therefore, the CSP Regulation defines minimum obligations for targeted funding at the level of each CAP Strategic Plan (EC, 2023d).

Member States have to spend a minimum of 25% of their direct payments budget allocations for ‘**eco-schemes**’. An exception can be made if more than 30% of the **rural development**⁸ expenditures are allocated to climate and environment by the EU country (EC, 2023d) (view also AECC below).

⁸ In comparison to direct payments, rural development support by EAFRD is open to farms and other beneficiaries.

Looking on the favors of Member States for financing across the instruments and funds (EAGF, EAFRD), 24% of direct payments is devoted to **eco-schemes** (€44,7 billion) and 48% of the **rural development** spending €31,6 billion is foreseen to environment and climate (EC, 2023d).

As it is reported for 35% of the agricultural area, based on the GAECs, a wide range of voluntary actions is envisaged by the CSPs towards reducing greenhouse gas emissions from agricultural soils. Such interventions are including but not limited to reducing carbon loss from organic soils and achieving lower losses of methane and nitrous oxide due to better fertiliser management. Summary (R.14 carbon storage)⁹ (EC, 2023d). Interventions addressing products related to carbon storage in soil are of specific interest for bio-based products of RUSTICA.

At least two of the areas of actions for the climate, the environment, animal welfare and combatting antimicrobial resistance shall be encompassed by an eco-scheme (EC, 2023d) **(Table 4)**:

Table 4: Areas of actions for an eco-scheme

Art. 31	Regulation (EU) 2021/2115 (CSP Regulation)
4.(a)	<i>climate change mitigation, including reduction of greenhouse gas emissions from agricultural practices, as well as maintenance of existing carbon stores and enhancement of carbon sequestration;</i>
4.(b)	<i>climate change adaptation, including actions to improve resilience of food production systems and animal and plant diversity for stronger resistance to diseases and climate change;</i>
4.(c)	<i>protection or improvement of water quality and reduction of pressure on water resources;</i>
4.(d)	<i>prevention of soil degradation, soil restoration, improvement of soil fertility and of nutrient management and soil biota;</i>
4.(e)	<i>protection of biodiversity, conservation or restoration of habitats or species, including maintenance and creation of landscape features or non-productive areas;</i>
4.(f)	<i>actions for a sustainable and reduced use of pesticides, in particular pesticides that present a risk for human health or environment;</i>

Source: Regulation (EU)2021/2115 (Excerpt)

A total of 158 **eco-schemes** is laid down in the CSPs. A certain flexibility is given to the EU countries as regards tailoring the **eco-schemes** to specific national environmental and climate needs. For example, just one multidimensional **eco-scheme** covering the entire farm area is defined in six Member States including France. At least 10 eco-schemes are set in Flanders and Spain offers the possibility to decide among several alternatives (EC, 2023d).

With view on thematic sectors, fertilization is covered by 24 CSPs including Flanders, France, and Spain. Support of organic farming in **eco-schemes** is part of nine CSPs and can be found in RUSTICA case studies in Flanders and France (EC, 2023d).

In addition, nutrient management, such as banning mineral fertiliser deployment, restrictions on the use of fertilisers or imposition on their application to the soil, encouraging the use of organic fertilisers, such as manure, slurry or compost, developing and using fertilisation plans to uplift efficiency needs specific attention in terms of research on bio-based fertilisers as it takes place in RUSTICA. Some EU countries, e.g., Portugal,

⁹ Result Indicator 14

Bulgaria, Croatia, Cyprus, Greece and Slovenia took measures to boost organic fertilisers within their eco-schemes to replace synthetic ones and make farms independent (EC, 2023d).

Agri-environment-climate-commitments (AECC) are a type of interventions towards benefitting the environment. AECC have a huge spectrum of interventions in the rural development area. For example, Italy established “*Active Management of Ecological Infrastructure*”, which *prohibits “the chemical control of pest and the application of fertilisers along water course.”* (EC, 2023d).

Payments for restrictions of **Natura 2000 areas** or because of stipulations determined in the **Water Framework Directive (WFD)** or both are reflected in 19 CSPs, e.g., Spain and Italy. Such restrictions may also involve fertilization (EC, 2023d).

Green investments dedicated to climate and environmental objectives can be differentiated into productive and non-productive investments. Comparing with the former, the latter is not related to economic benefits. Around 50% of the investments reflected in the CSPs can be allocated to one of these investment types. Such investments can also address measures beyond of those required by SMRs and GAECs ((EU)2021/2115, EUR-Lex) (EC, 2023d) which needs to be further assessed in terms of RUSTICA output.

Investments benefitting the climate are encompassed by R.16¹⁰: Farms which take advantage from CAP investment support towards climate change mitigation and adaption. According to (EU) 2021/2115, this support relates to production of renewable energy and biomaterials (EC, 2023d) ((EU)2021/2115, EUR-Lex).

Co-operation and knowledge exchange providing options on promoting AECCs and eco-schemes are further instruments under rural development (EC, 2023d).

In the course of environmental sustainability, organic farming gains more and more attention. In this respect, all of the **28 CSPs** have set funding to support organic farming. 18 plans envisage to reach more than 10% of their UAA and four plans (Austria, Wallonia, Germany and Sweden) set the target to achieve 30% of the UAA by 2030 (EC, 2023d).

2.3.1.3 Social sustainability

Social sustainability is highlighted by SO 7, 8 and 9 and of particular relevance for RUSTICA and its impact as regards bio-based fertilisers. Especially, growth, employment, local development in rural areas including the circular bioeconomy can be addressed by the business models and outcome of the project (EC, 2023d).

Rural areas count for around 30% of the EU territory and 137 million humans. The integrated local development (LEADER) is a mandatory tool of the CAP of which at least 5% have to be spent by a country. LEADER addresses not only farms but also the rural population and encompasses activities under the bioeconomy and green economy (EC, 2023d).

2.3.1.4 Knowledge sharing, innovation and digitalization

The cross-cutting SO 10 reveals chances and opportunities for new developments, such as bio-based fertilisers to be promoted via the Agricultural Knowledge and Innovation Systems (AKIS) (EC, 2023d) ((EU)2021/2115, EUR-Lex).

¹⁰ Result Indicator 16

2.3.2 Key messages from CSP factsheets of EU countries

As published in the overviews on the CSP (factsheets: CAP – at a Glance¹¹) of each Member State, the CSPs contain new options on the reduction of dependency on synthetic fertilisers and the increase generation of renewable energy while at the same time ensuring food production and sustainable farming practices (EC, 2023c).

RUSTICA is at the forefront on developing, demonstrating and promoting new bio-based and environmentally friendly fertilising and soil enhancement products, and the CSPs can play a crucial role to pave the way from innovation to market.

On the other hand, agriculture in the EU Member States shows very heterogenous and individual pictures to be addressed by an array of support and measures of the CAP and CSPs. Hence, some data on the total number and rough average size of farms in the EU countries are reflected in **Table 5**. Furthermore, some core messages of the aforementioned national CSP factsheets focused on a **Greener CAP** are presented for all EU countries in this document.

Table 5: Some key data on farming based on the CSP fact sheets of the EU countries

EU Country	No of farms/agricultural holdings	Average farm ¹² size (ha)	EU Country	No of farms/agricultural holdings	Average farm size (ha)
Austria	110 000	20	Ireland	135 000	33,4
Belgium-FL	23 000	27	Italy	1 100 000	11
Belgium-WL	12 000	n/a ¹³	Latvia	70 000	28
Bulgaria	132 742	33,6	Lithuania	150 300	n/a
Croatia	134 000	5	Luxembourg	1 970	n/a
Cyprus	34 940	3	Malta	10 400	1,02
Czechia	26 530	132	The Netherlands	51 000	32
Denmark	35 000	75	Poland	1 400 000	n/a
Estonia	11 300	87	Portugal	259 000	13,9
Finland	44 500	51	Romania	3 500 000 ¹⁴	5 ¹⁵
France	456 000	69	Slovakia	25 660	101
Germany	276 000	61	Slovenia	70 000	6,9
Greece	700 000	7	Spain	800 000	5
Hungary	430 000 ¹⁶	12,3	Sweden	59 000	50

Source: Own depiction based on European Commission, fact sheets on CSPs of EU countries

Following the overview on the CSP of **Austria**, the Plan includes strong interventions on environmentally friendly practices, such as payments for agri-environmental and climate measures. In this context, the renunciation of

¹¹ While the first to the fourth tool are subject to the EAGF, the ANC is financed by the EAFRD.

¹² Either directly copied from the factsheet or deduced by rough calculation

¹³ n/a means figures in the Table which could be found in the CSP fact sheets.

¹⁴ Farmers

¹⁵ 90% of the farms

¹⁶ Farmers

chemical-synthetic fertilizers is mentioned as a possible contribution to accomplish the objectives relating thereto. The CSP of the Belgium region **Flanders**, which will be debated in more detail in the **section 3.2.2**, addresses intensive use of external resources, such as fertilisers, and more than 25% of the CSP direct payments are devoted to voluntary practices, such as eco-schemes. As laid down in the CSP factsheet of the Belgium region **Wallonia**, the plan follows the ambitions of the Green Deal and responds to the environmental and climate challenges, e.g., by allocating 26% of the direct payment budget to eco-schemes. It also contains specific requirements on organic fertilisers and composts, e.g., in the area “reinforced conditionality” and protection of waters and soil which are solely allowed if permitted by national and regional authorities. Among manifold challenges the **Bulgarian** CSP aims to increase organic carbon in soils, improving the quality of soil and water and to uplift the current share of organic farming (2,25%). As outlined in the overview of **Croatia’s** CSP, manure and soil management are the major sources of agricultural emissions, and all types of fertilisers will be restricted in buffer zones at water sources. Furthermore, the share of organic production shall be enhanced from 6,5% to 12%. In its CSP, **Cyprus** highlights the encouragement of farmers to reduce soil and water pollution from agrochemicals and budget allocations are made for environmental and climate objectives, e.g., on organic farming. **Czechia** has incorporated GAECs into its CSP, and in this respect, a higher level on the protection of water, soil and biodiversity is targeted. As regards organic production, the country has one of the highest shares while aiming at further enhancement to 21,6 %. In **Denmark**, the CSP reflects improved standards for good agricultural and environmental conditions defining minimum requirements applied to 97% of the UAA. In addition, eco-schemes are supported by the Danish CSP. The **Estonian** CSP expresses support on environmental and climate objectives, not only by targeting carbon sequestration and biodiversity but also valuable grasslands. It also focuses on enhancing knowledge about sustainable production and highlights supporting organic agriculture. Protection of natural resources and biodiversity are at the core of the **Finish** CSP and, at the same time, the plan is of significant relevance for the national objective of carbon neutrality by 2035 and lowering climate emissions from agriculture by 29% of the 2019 level by 2035. For that purpose, the CSP of **Finland** is aligned with the EU climate and environment ambitions. As pointed out in the CSP of **France**, 86% of the agricultural area will be in accordance with good agricultural and environmental conditions. Alignment with the EU climate and environment ambitions is emphasized. Measures on the protection of biodiversity include, for example, rewarding adapted fertilization management (**please view also section 3.2.4**). As pointed out in the CSP of **France**, 86% of the agricultural area will be in accordance with good agricultural and environmental conditions while alignment with the EU climate and environment ambitions is emphasized. Measures on the protection of biodiversity include, for example, rewarding adapted fertilization management. In **Germany**, farmers have to implement a range of compulsory climate and environmental practices, which have been amplified in comparison with the past, if they want to access a full income support. Challenges vary considerably between the federal states and as it is stressed in the CSP, organic production is supported by €2,4 billion targeting a share of 30% by 2030. **Greece** strives for enhancement of environmental and climate ambitions while fostering the implementation of interventions going beyond minimum requirements (eco-schemes) and focuses on interventions relating to e.g., climate change adaptation, protection of soil and water, and boost of organic farming. To significantly expand the organic production share, €1,4 billion are foreseen in the CSP. Considering the practices beneficial to the environment, among others, farmers are required to carry out carbon sequestration in **Hungary**. A share of 38% from the rural development budget is dedicated to agri-environmental interventions (Natura 2000, organic farming) targeting sustainable nutrient management, less fertiliser application and lower ammonia emissions. Moreover, Hungary aims to double the area under organic farming by 2027. In **Ireland**, GAECs will be consequently applied, e.g., towards carbon sequestration and restriction of fertilisers closed to water courses. An amount of €256 million are foreseen to tripling the area of organic production. A share of 80% of the agricultural area will be in accordance with GAECs, such as establishing buffer strips along water courses in **Italy**. This EU country has established 35 voluntary schemes to compensate farmers for more environmentally friendly practices, such as less use of fertilisers. (**Please find more details in section 3.2.3**). In the CSP of **Latvia**, 43% of the rural development budget and 25% of the direct

payments budget (25%) are allocated to environmental and climate actions. This EU country has decided six eco-schemes to support agricultural practices including those of organic farming. A share of 25% of the direct payments is dedicated to eco-schemes in **Lithuania** and 10 different eco-schemes are available to be voluntarily decided by farmers. This Member State encourages organic farming, striving for almost 13 % of the agricultural by 2028. **Luxembourg** has designed a CSP establishing GAECs which apply to almost all of agricultural holdings. Organic farming shall be heightened to 20% by 2025. In **Malta**, the CSP will introduce three eco-schemes to support farmers for voluntary efforts. The plan contains the aim to uplift the share of organic farming from 66 hectares at present to 272 hectares by 2027. More than 96% of the agricultural area in **the Netherlands** will be subject to GAECs and the use of fertilisers along buffer zones of water courses will be restricted. A sum of around €760 million will be used on > 1,5 million hectares to encourage farmers on practices to protect soil and reduce the use of nutrients and pesticides. As laid down in the CSP of **Polland**, fertiliser use along buffer zones of water courses will be restricted. 25% of the direct payments are allocated to eco-schemes and the organic farming share is aimed to be doubled. **Portugal** has foreseen €830 million benefitting farmers for more ambitious actions, e.g., carbon sequestration, organic fertilisation, organic farming and integrated production. It is planned that 19% of the agricultural area will be under organic production by 2030. Apart from the GAECs as the minimum requirements, **Romania** has set a share of 25% of the direct payments to eco-schemes. A share of 41% of the rural development budget is foreseen to foster environmentally friendly practices for areas with high natural value. In **Slovakia**, > €513 million of EU funds are allocated to farmers voluntarily participating at the new whole-farm eco-scheme by means of more environmentally ambitious actions on farmland. This Member State strives for 20% organic production of the agricultural land by 2030. The CSP of **Slovenia** establishes €101 million for eco-schemes. Almost 60% of its rural development budget are reserved to environmental and climate objectives in this EU country. A share of 86% of the UAA has to be in accordance with GAECs, and an amount of €6 billion is established by regions for farmers deciding to apply more ambitious actions in **Spain**. This EU county envisages to accomplish a share of 20% organic agriculture of its UAA by 2030. **(Please view section 3.2.1.)** One third of the EU financial contribution in the CSP of **Sweden** (about €1,3 billion) is reserved to support environmental and climate objectives, including but not limited to carbon sequestration. A share of 14% (over 430 000 hectares) of the entire **Swedish** UAA will obtain support to develop organic farming (EC, 2023c)¹⁷.

3. RUSTICA testcase regions within the EU

The developments of the RUSTICA project will be evaluated and demonstrated in five case studies of which four are located in Europe. Hence, it is referred to the CSPs relevant to the four corresponding EU Member States or regions, respectively.

3.2.1 Almeria (Spain)

From a total CAP budget €47,72 billion for the period 2021-2027, around €32,6 billion fall under the CSP of Spain which applies from 2023-2027. An amount of €4,8 billion is reserved for direct payments (Ministerio de Agricultura, Pesca y Alimentación, 2023).

As the main instrument of direct payments, BISS takes the lion's share of 51%. However, taking advantage of this support is bound to **conditionality** and obligations of GAECs and SMRs. Spain has not only incorporated the nine GAECs which are mandatory to each CSP but also an additional GAEC 10 issuing sustainable fertilization. This additional GAEC outlines the protection of river courses against pollution and the preservation of soil quality. It relates to the new Spanish national legislation on sustainable nutrition of agricultural soils (Royal

¹⁷ And based on additional information of the pdf documents on the national CSP factsheets accessible by this website

Decree 1051/2022) (Real Decreto 1051/2022, Spain) and sets inter alia the following commitments for beneficiaries of payments (Ministerio de Agricultura, Pesca y Alimentación, 2023) (CSP Spain, 2021):

- All operations aimed at providing nutrients or organic matter to the soil must be correctly recorded in the exploitation log.
- The farm, when applicable, has a fertilization plan for each production unit.
- Localized application of slurry and solid manure on agricultural surfaces.

Source: CSP of Spain, Conditionality, GAEC 10

The Royal Decree 1051/2022 reveals very detailed stipulations on feedstocks, storage and application of fertilisers including those derived from waste. In case, circular bio-based fertilisers will be marketed and deployed, one need to abide by these rules (Real Decreto 1051/2022, Spain).

In **Spain**, nine **eco-schemes** enabling a voluntary uptake of measures advantageous to the climate and environment and addressing inter alia “low-carbon agriculture” and “agro-ecology” are reported. There is a certain flexibility on combination of measures given to farmers while fertilisers and plant nutrition are not mentioned at the forefront. In addition, the CSP supports organic and integrated farming (CSP Spain, 2021).

As regards investments, in the CSP of **Spain** there are numerous possibilities to access support on productive and non-productive investments for farms. Such support for the former, e.g., this on *aid for productive investments in farms related to contributing to the mitigation-adaptation to climate change and efficient use of natural resources* (CSP Spain, 2021) would need to be further evaluated how production and/or application of bio-based fertilisers can fit into a scheme at local, regional or national level.

3.2.2 Flanders (Flanders/Belgium)

Flanders receives a direct financial support of €229 million annually (Pillar 1) and transfers 10-12% of this budget to Pillar 2. An amount of €43 million of EU funding is planned for Pillar 2 each year during the period from 2023 to 2027. This amount (43%) is co-financed by national Flemish funding (57%) and builds together with the transfer an annual budget of €66 million - €70 million for Pillar 2 (Vlaamse Overheid, 2023a).

Being part of direct payments, BISS is provided in **Flanders** which requires that the rules of **conditionality** are met. Bearing in mind bio-based fertilisers, these rules are of particular interest. The EU region has incorporated the nine GAECs into its CSP and one additional GAEC dealing with permanent grassland. Concerning GAEC 4 and a required distance along watercourses, depending on various factors (e.g., shape of landscape) Flanders prohibits fertilisation up to 10 metres for bufferstrips (Vlaamse Overheid, 2023b).

Furthermore, the 11 SMR are part of the Flemish CSP. In the context of SMR 1 and to control diffuse phosphate pollution as outlined in the Water Framework directive, the CSP stipulates a bufferstrip up to 10 metres without fertilization while some exceptions are made. In terms of SMR 2, the CSP differentiates between three types of fertilisers (Vlaamse Overheid, 2023b):

Type 1 fertilisers: farmyard manure, compost and slow-acting fertilizers

Type 2 fertilisers: all fertilizers that do not belong to type 1 or 3

Type 3 fertilisers: artificial fertilizers, drain stream and effluents

Source: CSP of Flanders, Conditionality, SMR 2, Nitrate directive 91/667/EEC

In case, slow-acting fertilisers are chosen, a certificate is needed as “slow-acting fertiliser”. The CSP prohibits manure discharge. It imposes specific fertilization rules in specific landscapes and along water courses, low-emission application of manure, a fertiliser register containing all fertilisers derived from an industrial process and a manure balance. Due to their variety, bio-based fertilisers are subject to various production methods, and an exact analysis on their classification and appropriate use is necessary (Vlaamse Overheid, 2023b).

Flanders supports a wide range of **eco-schemes** (e.g., conservation of perennial grassland) and AECs (e.g., conversion to organic farming) and combinations thereof. With view on bio-based fertilisers, it needs to be stressed that production and application in organic farming has to follow the EU organic farming regulations (section 2.3.1.2) (Vlaamse Overheid, 2023c).

From the perspective of building new value chains with bio-based fertilisers, **investments** play an important role. The CSP of Flanders discloses a multitude of instruments supporting innovative and sustainable agriculture. In particular, “productive” and/or “green” investments and their support schemes or calls would need to be further individually evaluated in terms of their suitability for novel fertilising concepts, such as those of RUSTICA (Vlaamse Overheid, 2023d).

3.2.3 Friuli Venezia Giulia (Italy)

In the CSP of **Italy**, a total of 173 interventions is foreseen from the first and second pillar and an entire financing of €37 billion for the period from 2023-2027. Among the essential contents of the **Italian** CSP is the ecological transition of the agricultural, food and forestry sector. An amount of around €10,7 billion euros between pillars I and II are reserved for interventions with clear climatic-environmental objectives (CSP of Italy, 2021).

In **Italy**, after the outgrowth of the well-established regionalized programming for rural development introduced by Regulation (EU) 2021/2115, it became necessary to identify a new model of governance and management of the Programs. Thus, the regions drafted a complementary document to the CSP. Friuli Venezia Giulia, through Council Resolution No. 23/2023 approved the document "Complement for Rural Development of the CAP Strategic Plan 2023-2027 of the Autonomous Region of Friuli Venezia Giulia." It is the regional document implementing the national strategy that aims to formalize regional choices, as well as their specificities, within the rural development policies contained in the CAP Strategic Plan 2023-2027 for Italy (EUROPA FVG, 2023). In Friuli Venezia Giulia, the following budget is planned for rural development (2023-27):

Total:	€227,6 million
Environmental and climate commitments:	€76,4 million
Investments:	€85,0 million
Others:	€66,2 million
Source: CSP of Italy, PSR HUB, ILPIANO STRATEGICO DELLAPAC(PSP) 2023-2027PER L'ITALIA ¹⁸	

¹⁸ The list of Friuli Venezia Giulia intervention can be found at the following link (in Italian) <https://europa.regione.fvg.it/it/programmi-36605/ps-pac-23-27-39986> (Source: Federica Cisilino (CREA-PB))

Considering the **conditionality**, the CSP of this EU country lists nine GAECs and GAEC 4 draws the 5 meter “respect band” along water courses where fertilization is prohibited (Italy CAP Strategic Plan, 2021).

Italy has defined five eco-schemes including but not limited to payments for reduction of antimicrobial resistance, less intensive feeding systems, and measures for pollinators. The eco-schemes will operate in synergy with the agro-environment-climate measures (AECM) (€1.5 billion), measures in favor of sustainable forestry (€500 million), productive, non-productive, and infrastructural investments for environmental purposes (€650 million), with the environmental actions foreseen within the sectoral interventions and the environmental investments of the NRRP, an integral part of this strategy. The list of Friuli Venezia Giulia intervention can be found at the following link <https://europa.regione.fvg.it/it/programmi-36605/ps-pac-23-27-39986> (EUROPA FVG, 2023).

As a whole, 29 AECCS interventions are established in the second pillar for rural development (with a budget of around €4.5 billion) and encompass support of organic farming (€2 billion) (Italy CAP Strategic Plan, 2021) (PSR HUB, 2022).

Concerning the Interventions, e.g., **Italy** has set defined obligations on the sustainable use of nutrients (ACA 20). A support per hectare UAA is foreseen to beneficiaries, who commit themselves to introduce specific rules on the management of fertilisers, which comprise the development and application of an annual plan on fertilization¹⁹. It is strongly related to certain restrictions of Italian law (Decree 152/2006) for the use of sludge and on the new Fertilising Products Regulation (EU)2019/1009, e.g. as regards constituents of organic fertilisers (Italy CAP Strategic Plan, 2021) (CREA, 2023).

In the CSP of **Italy** a wide range of “productive” and “non-productive” investments are supported while with view on development of bio-based fertilisers the productive investments would need to be further screened on their opportunities for such purposes (Italy CAP Strategic Plan, 2021).

3.2.4 Pays de la Loire (France)

An annual budget of €36,425 billion for the first pillar and €9,935 billion for the second pillar (including €403,83 million for Pays de la Loire), so €46,360 billion in the period from 2023-2027 so €9,272 billion per year²⁰ are published for the CSP of **France** in the period from 2023-2027. As regards direct payments, Basic Payment Entitlements ²¹(~€3,3 billion annually) “are maintained and their value is gradually converging”. A share of 25% of the direct payments are allocated to the eco-regime (Ministère de l'Agriculture et de la Souveraineté, 2023).

In the course of **conditionality**, **France** has established 9 GAECs and fertilisers are forbidden on buffer strips (5m) along watercourses (GAEC 4) (Ministère de l'Agriculture et de la Souveraineté, 2023).

In **France**, there is one broad eco-scheme pursuing to benefit as much farms as possible in their transition towards agro-ecological activities. In this Member State, there are three possibilities to access the eco-scheme, a) crop diversification, no ploughing of permanent grassland, and placement of grass between rows of defined vine and orchard cultures; b) ownership of an organic production certificate or other defined method on environmentally favourable practices; c) Establishment of agroecological and surface infrastructures of interest for biodiversity (Ministère de l'Agriculture et de la Souveraineté, 2023).

¹⁹ The Friuli Venezia Giulia region is very attentive to the issue of nitrates. In September 2022, there was an update in the regional regulations specifically for nitrogen fertilizers. As provided by Regional Council Resolution No. 1258 dated 05.09.2022 of final approval of the Regulation of Nitrogenous Fertilizers (RNF), by Decree No. 0119/Pres. dated 30.09.2022, the President of the Region provided for the issuance of the RNF (effective 13.10.2022). <https://lexview-int.regione.fvg.it/fontinormative/Dettaglio.aspx?Id=6773> (Source: Federica Cisilino (CREA-PB))

²⁰ Valentine le Cras, CHAMBRE D'AGRICULTURE DU PAYS DE LA LOIRE, (FRANCE) (personal comment 18.09.2023)

²¹ May correspond to basic income support (BISS)

The **French** CSP has set 117 interventions of which 77 are set at national level (40 from EAGF and 37 from EAFRD) and 40 at regional level.

Source: CSP of France

Interventions address inter alia conversion to organic farming since 18% of the UAA for organic farming are envisaged in **France** by 2027. As it is emphasized by the interventions (e.g., 70.03), “*organic farming practices contribute to the mitigation of climate change and greenhouse gas emissions, in particular through improved management of organic matter and the absence of chemical fertilization.*” Another intervention (e.g., 70.06) supports voluntary farmers in fertilization management, hedging and herbicide reduction in field crop systems in order to improve water quality²². In addition, interventions (e.g., 70.09) address biodiversity and specific environments, such as wet lands and grass lands and require farmers to appropriate nutrient management including a management plan (Ministère de l'Agriculture et de la Souverainete, 2023).

A range of investments are supported by the CSP of **France**. For example, section 73.01²³, applies at the regional level and covers also region **Pays de la Loire**. Investments into the promotion of bio-sourced materials from agriculture are supported by the CSP (Ministère de l'Agriculture et de la Souverainete, 2023). Such investment support would need to be further evaluated in terms of production and application of bio-based fertilisers.

Conclusions

The CAP and the CSPs provide tremendous support on agriculture and rural development targeting economic, climate-environmental and social sustainability. It is referred to fertilisers, their application, and nutrient management in manifold directions. Apart from bans of fertilisers in certain areas (e.g., along water courses), restrictions of synthetic and organic fertilisers in the context of water pollution are defined in CSPs and legislation related thereto. On the other hand, improvements according to organic fertilisers (e.g., compost) and carbon sequestration in soil, paving the way for highly innovative plant nutrition concepts are strongly supported by the CAP. In addition, support on investments on farms and further beneficiaries provides a basis to be further debated for establishing novel approaches on the production and application of bio-based fertilisers.

²² Valentine le Cras, CHAMBRE D'AGRICULTURE DU PAYS DE LA LOIRE, (FRANCE) (personal comment 18.09.2023)

²³ € 76,7 million are reserved for this intervention in Pays de la Loire for the period 2023-2027. (Source: Valentine le Cras (CRAPDL 18.09.2023)

References

(EU) 2018/848, EUR-Lex. *Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018R0848>

[Accessed 25.09.2023].

(EU) 2021/1165, EUR-Lex. *Commission Implementing Regulation (EU) 2021/1165 of 15 July 2021 authorising certain products and substances for use in organic production and establishing their lists*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R1165>

[Accessed 25.09.2023].

(EU)2021/2115, EUR-Lex. *Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans)*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32021R2115>

[Accessed 31.07.2023].

(EU)2021/2116, EUR-Lex. *Regulation (EU) 2021/2116 of the European Parliament and of the Council of 2 December 2021 on the financing, management and monitoring of the common agricultural policy*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R2116>

[Accessed 31.07.2023].

(EU)2021/2117, EUR-Lex. *Regulation (EU) 2021/2117 of the European Parliament and of the Council of 2 December 2021 amending Regulations (EU) No 1308/2013 establishing a common organisation of the markets in agricultural products*. [Online]

Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2021.435.01.0262.01.ENG

[Accessed 15.06.2023].

(EU)No1308/2013, EUR-Lex. *Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32013R1308>

[Accessed 05.06.2023].

2000/60/EC, EUR-Lex. *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060>

[Accessed 25.09.2023].

2009/128/EC, EUR-Lex. *Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:32009L0128>

[Accessed 25.09.2023].

2009/147/EC, EUR-Lex. *Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Codified version)*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0147>

[Accessed 25.09.2023].

91/676/EEC, EUR-Lex. *Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources*. [Online]

Available at: <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:31991L0676>
[Accessed 25.09.2023].

92/43/EEC, EUR-Lex. *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.* [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31992L0043>
[Accessed 25.09.2023].

98/58/EC, EUR-Lex. *Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes.* [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:31998L0058>
[Accessed 22.09.2023].

COM/2020/380 final, EUR-Lex. *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS EU Biodiversity Strategy for 2030 Bringing nature back into our lives.* [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52020DC0380>
[Accessed 25.09.2023].

COM/2020/381 final, EUR-Lex. *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system.* [Online]

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0381>
[Accessed 25.09.2023].

CREA, 2023. *PSP Explorer.* [Online]

Available at: https://rica.crea.gov.it/APP/psp_explorer/
[Accessed 04.09.2023].

CSP Spain, 2021. *Informe sobre el plan estratégico de la PAC 2021.* [Online]

Available at: https://www.mapa.gob.es/es/pac/pac-2023-2027/pepac-sfc2021-v12_tcm30-623871.pdf
[Accessed 04.09.2023].

EC, 2019. *European Commission, A European Green Deal.* [Online]

Available at: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
[Accessed 17.06.2023].

EC, 2020a. *European Commission, Food Safety, Farm to Fork Strategy.* [Online]

Available at: https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en
[Accessed 27.07.2023].

EC, 2020b. *European Commission, Environment, Biodiversity strategy for 2030.* [Online]

Available at: https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en#documents
[Accessed 31.07.2023].

EC, 2023a. *European Commission, Agriculture and rural development, The common agricultural policy: 2023-27.* [Online]

Available at: https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-2023-27_en#legalbases
[Accessed 06.07.2023].

EC, 2023b. *European Commission, Agriculture and Rural Development, Key policy objectives of the CAP 2023-27.* [Online]

Available at: <https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-2023-27/key->

[policy-objectives-cap-2023-27_en](#)

[Accessed 15.05.2023].

EC, 2023c. *European Commission, Agriculture and rural development, CAP Strategic Plans by country.* [Online]

Available at: https://agriculture.ec.europa.eu/cap-my-country/cap-strategic-plans_en#background

[Accessed 25.08.2023].

EC, 2023d. *European Commission, Approved 28 CAP Strategic Plans (2023-2027), Summary overview for 27 Member States, June 2023.* [Online]

Available at: <https://agriculture.ec.europa.eu/system/files/2023-06/approved-28-cap-strategic-plans-2023-27.pdf>

[Accessed 22.08.2023].

EC, 2023e. *European Commission, Agriculture and rural development, Common agricultural policy funds.*

[Online]

Available at: https://agriculture.ec.europa.eu/common-agricultural-policy/financing-cap/cap-funds_en

[Accessed 04.09.2023].

EP, 2023. *European Parliament, François Nègre 04-23, The common agricultural policy (CAP) and the Treaty.*

[Online]

Available at: <https://www.europarl.europa.eu/factsheets/en/sheet/103/the-common-agricultural-policy-cap-and-the-treaty>

[Accessed 07.06.2023].

EUROPA FVG, 2023. *Piano Strategico della Politica Agricola Comune 2023-2027 del Friuli Venezia Giulia.*

[Online]

Available at: <https://europa.regione.fvg.it/it/programmi-36605/ps-pac-23-27-39986>

[Accessed 22.09.2023].

IPIFF, 2023. *International Platform of Insects for Food and Feed (IPIFF), EU Legislation.* [Online]

Available at: <https://ipiff.org/insects-eu-legislation/>

[Accessed 12.08.2023].

Italy CAP Strategic Plan, 2021. *Relazione 2021 sul piano strategico della PAC.* [Online]

Available at: https://www.reterurale.it/downloads/PSP_Italia_151120221_Def.pdf

[Accessed 04.09.2023].

Ministère de l'Agriculture et de la Souveraineté, 2023. *PAC 2023-2027 - Le Plan Stratégique National.*

[Online]

Available at: <https://agriculture.gouv.fr/pac-2023-2027-le-plan-strategique-national>

[Accessed 04.09.2023].

Ministerio de Agricultura, Pesca y Alimentación, 2023. *SPAIN'S COMMON AGRICULTURAL STRATEGIC PLAN (2023-2027).* [Online]

Available at: https://www.mapa.gob.es/es/pac/pac-2023-2027/resumen-pac-en_tcm30-636035.pdf

[Accessed 04.09.2023].

PSR HUB, 2022. *PSRHUB - IL PIANO STRATEGICO DELLA PAC (PSP) 2023-2027 PER L'ITALIA.* [Online]

Available at: <https://www.reterurale.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/24349>

[Accessed 04.09.2023].

Real Decreto 1051/2022, Spain. *Real Decreto 1051/2022, de 27 de diciembre, por el que se establecen normas para la nutrición sostenible en los suelos agrarios.* [Online]

Available at: https://www.boe.es/diario_boe/txt.php?id=BOE-A-2022-23052

[Accessed 04.09.2023].

RUSTICA, 2021. *D3.2 RUSTICA valorisation concepts in the EU legislative framework (Author: Adelheid Wiedemann)*. [Online]

Available at: https://rusticaproject.eu/wp-content/uploads/2023/03/D3.2_RUSTICA-valorisation-concepts-EU-legislative-framework.pdf

[Accessed 30.07.2023].

Vlaamse Overheid, 2023a. *Landbouw en Visserij is een officiële website van de Vlaamse overheid*. [Online]

Available at: <https://lv.vlaanderen.be/beleid/landbouwbeleid-eu/gemeenschappelijk-landbouwbeleid-glb/2023-2027-algemeen-kader>

[Accessed 04.09.2023].

Vlaamse Overheid, 2023b. *Landbouw en Visserij is een officiële website van de Vlaamse overheid, Conditionaliteit 2023-2027*. [Online]

Available at: <https://lv.vlaanderen.be/bedrijfsvoering/conditionaliteit-en-randvoorwaarden/conditionaliteit-2023-2027>

[Accessed 04.09.2023].

Vlaamse Overheid, 2023c. *Landbouw en Visserij is een officiële website van de Vlaamse overheid, Gemeenschappelijk Landbouwbeleid 2023 - 2027 (perceelsgebonden steun)*. [Online]

Available at: <https://lv.vlaanderen.be/subsidies/perceelsgebonden/gemeenschappelijk-landbouwbeleid-2023-2027#ER%20AM>

[Accessed 04.09.2023].

Vlaamse Overheid, 2023d. *Maatregelen Gemeenschappelijk Landbouwbeleid 2023-2027*. [Online]

Available at: <https://lv.vlaanderen.be/beleid/landbouwbeleid-eu/gemeenschappelijk-landbouwbeleid-glb/maatregelen-gemeenschappelijk>

[Accessed 01.09.2023].