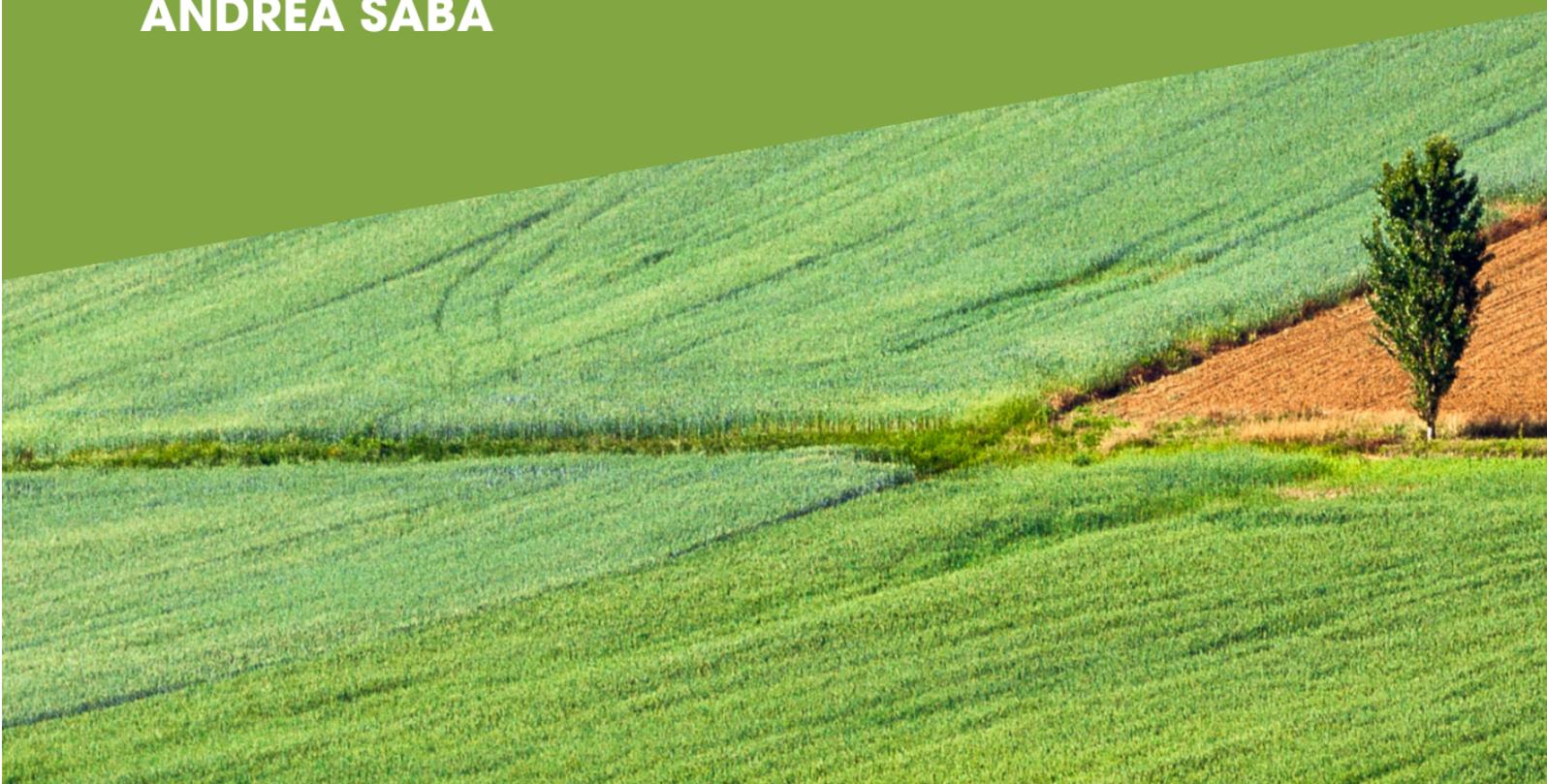


EU law on sustainable and climate resilient agriculture after the European Green Deal

**MARIAGRAZIA ALABRESE
ANDREA SABA**



Mariagrazia Alabrese

Andrea Saba

Editors

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Andrea Saba

DIRPOLIS - Institute of Law,
Politics and Development
Scuola Superiore Sant'Anna
Pisa, Italy

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Pisa, Italy

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RURINNOVA – Editoriale Tecnico Scientifica is based in
Parco scientifico e tecnologico della Sardegna, Building 2 – 09050 Pula –
Italy.

email: info@rurinnova.com | www.rurinnova.com

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Introduction

In December 2019, the European Commission unveiled the ambitious European Green Deal—a transformative growth strategy designed to reshape the European Union into a fair, prosperous society with a modern, resource-efficient, and competitive economy, ultimately achieving net-zero greenhouse gas emissions by 2050. Aligned with the Commission's commitment to implementing the United Nations' 2030 Agenda and President von der Leyen's political guidelines, the Green Deal necessitates a profound reconsideration of policies and heightened coordination across all sectors to harness synergies effectively.

Central to the European Green Deal's vision is the pivotal role assigned to the agricultural and food sector in steering this monumental transition. The 'Farm to Fork' Strategy, in particular, served as a strategic tool to reinforce endeavors in adapting and mitigating climate change, safeguarding the environment, and preserving biodiversity. Within this framework, the Common Agricultural Policy (CAP) remains a cornerstone. Recognizing the need for innovative techniques to enhance the sustainability of the food system while ensuring safety, the European Commission underscores the imperative of promoting and investing in digital transformation as essential enabler of these transformative changes.

Responding to these critical challenges, the Jean Monnet Module titled "EU Law on Sustainable and Climate-Resilient Agriculture after the European Green Deal - SUSTAIN" was conceived. SUSTAIN aimed to disseminate knowledge of EU law related to sustainable and climate-smart agriculture through diverse teaching and research activities. This final publication serves as a comprehensive repository, consolidating the research conducted

under the Jean Monnet Module with the overarching objective of sharing its outcomes at both national and international levels.

The first chapter will explore climate commitments in the implementation of the Common Agricultural Policy (CAP). The chapter will address the background against which the international commitments that the European Union must take into account in developing climate measures within the CAP. It refers to the Commission's communication containing recommendations for drafting CAP strategic plans, emphasizing the need for a "green architecture" to address environmental and climate problems in the agricultural sector. The chapter discusses the Special Report of the European Court of Auditors, which highlights the shortcomings of mitigation practices under the 2014-2020 CAP and suggests the importance of measurable results. Notably, the chapter also will discuss the case of the National Strategic Plan of Italy, highlighting the operational challenges and uncertainties in implementing CAP measures at the national level, including the role of regions and the intersection with the National Recovery and Resilience Plan (PNRR).

The second chapter will address the evolution and current status of organic farming in the European Union, particularly focusing on Italy's legal framework. The chapter emphasizes the societal role of organic farming, serving both consumer demands for organic products and contributing to environmental protection, animal welfare, and rural development. The EU's ambitious goals for organic farming, especially outlined in the Farm to Fork and Biodiversity Strategies, set the stage for Regulation 2018/848 and the subsequent EU Action Plan for Organic Farming 2021-2027. The action plan aims to boost organic farming through measures like group certification for small farmers, integration into school meals, and support for local processing facilities. However, the article critically examines the

effectiveness of the Common Agricultural Policy (CAP) and Member States' strategies in promoting organic farming, pointing out shortfalls in meeting the Green Deal's targets. The focus then shifts to Italy, highlighting its robust interest in organic farming. Notably, the chapter addresses the public debate around biodynamic agriculture and the unique Italian organic label introduced under Law no. 23/2022.

The third chapter will examine the European Union's current policy agenda concerning the digital transition of farming and food systems. Emphasizing the essential role of appropriate regulation, the chapter highlights the critical importance of effective governance in this sector. Ensuring that the the digital transition adequately tackles social and environmental challenges, the chpater explore the evolving policy landscape at the EU level. Against this backdrop, the paper will delve into the recent advancements in the adoption of distributed ledger technology within farming and food systems at the EU level.

The fourth chapter will delve into the regulatory landscape on remote sensing in agriculture within the European Union context, focusing on the intersection of Common Agricultural Policy (CAP) regulations with the Copernicus program. The incorporation of remote sensing in CAP reforms, illustrated by the Land Parcel Identification System and Geospatial Aid Application, showcases the EU's commitment to modernization. The Copernicus program emerges as a key instrument to boost agricultural monitoring through open-data policies and advanced satellite capabilities. The chapter highlight the need for regulations to extend beyond CAP monitoring, urging the broader use of Copernicus data for sustainable and resilient agriculture.

Addressing Climate Commitments in the implementation of the Common Agricultural Policy

Authors: Mariagrazia Alabrese - Eloisa Cristiani

1. Agriculture in the international climate change regime: an outline

International climate change regulations do not include a dedicated framework for agriculture with specific targets for reducing emissions from agricultural activities, despite the substantial contribution of agriculture to climate-altering gas emissions¹. It typically considers the LULUCF sector, which encompasses land use, land use change, and forestry, as responsible for mitigating emissions through carbon sequestration².

* This work is the result of joint reflections of the authors, however, paragraphs 1-5 should be attributed to M. Alabrese, and paragraphs 6-9 to E. Cristiani.

¹ See the latest report of the IPCC, working group 3, 'Climate Change 2022. Mitigation of Climate Change. Summary for Policymakers. Working Group III weighting to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, para. B2.1, according to which 22 % of anthropogenic greenhouse gas emissions were caused by agricultural activities in 2019.

² LULUCF is the acronym for 'Land Use, Land Use Change, Forestry' used by the EU in the regulations referred to *below*.

This is evident from a brief overview of how international climate change instruments have addressed the agricultural sector over time³. The 1992 Climate Change Framework Convention refers to the need for «food production not to be threatened»⁴ and explicitly identifies agriculture as one of the sectors where states are required to cooperate to put in place mitigation and adaptation measures⁵.

The subsequent Kyoto Protocol, which is entrusted with the implementation of the Framework Convention, mentions the promotion of sustainable agriculture as one of the policies to be developed by the States included in Annex I⁶ – that is to say, industrialized countries with emission reduction obligations with specific targets in the Protocol system – and lists

³ More widely on this, M. Alabrese, *Politiche agricole, politiche climatiche e il bisogno di coordinamento*, in *Rivista di Diritto Agrario*, 3, 2020, p. 618, and, previously, S. Manservigi, *Le Convenzioni internazionali sul clima e il ruolo dell'agricoltura*, in *Agricoltura, Istituzioni, Mercati*, 2016, p. 22.

⁴ See *United Nations Framework Convention on Climate Change* (UNFCCC), Art. 2 (*Objectives*).

⁵ *United Nations Framework Convention on Climate Change* (UNFCCC), art. 4 (*Commitments*), paras. 1.c, 1.e.

⁶ See Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997, Article 2, paragraph 1a.iii. On the topic of sustainable agriculture, see E. CRISTIANI, 'Quali regole per un'agricoltura sostenibile?', in *Rivista di diritto agrario*, 2019, p. 646; on the same topic, with particular attention to the United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas, refer to the insightful contributions of A. DI LAURO, 'The UNDROP, biocultural rights, and sustainability standards for agri-food systems,' in M. Alabrese, A. Bessa, M. Brunori, F. Giuggioli (eds.), 'The United Nations' Declaration on Peasants' Rights,' Routledge, 2022, p. 188; and of E. CRISTIANI, G. STRAMBI, 'Farming models and peasants' rights,' in M. Alabrese, A. Bessa, M. Brunori, F. Giuggioli (eds.), 'The United Nations' Declaration on Peasants' Rights,' cit., p. 177

agriculture among the sectors to which the international instrument applies⁷.

However, the reduction targets set by the Kyoto Protocol were, as known, designed as overall targets that could be achieved by acting on other sectors, such as energy and transport, and not by introducing measures relating to the agricultural sector. Member States have therefore generally opted not to involve their agricultural sectors in their policies with strong commitments to reduce emissions⁸. At most, they considered the absorption of climate-changing gas from the 'LULUF' sector in order to fulfil the reduction commitments arising from the Protocol for the States referred to in Annex I, since for that sector for this sector, the introduction of an emissions calculation and reporting system was planned⁹

Agriculture has had very little, even textual, consideration in the Paris Agreement. The term 'agriculture' never appears in the Agreement. The preamble and Article 2 refer to *food security and food production*, which they must safeguard against the effects of climate change, in line with the provisions of the 1992 Framework Convention.

⁷ *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 1997, art. 10.

⁸ The mentioned report "Climate Change 2022. Mitigation of Climate Change. Summary for Policymakers..." highlights that the policy instruments aimed at reducing agricultural emissions remain limited to this day (paragraph B.5.2). For the reasons, both political and technical, behind these choices, see M. ALABRESE, "Politiche agricole, politiche climatiche e il bisogno di coordinamento", cited on page 627.

⁹ See Article 3, paragraphs 3-4 of the Kyoto Protocol, which refers to LULUCF activities such as 'afforestation, reforestation, and deforestation that occurred since 1990,' and others that may be decided by the Conference of the Parties, including 'forest management, revegetation, cropland management, and grazing land management.'

A formal determination on agriculture was taken by the Conference of the Parties only in 2017 during the COP23: this is the *Koronivia Joint Work on Agriculture*¹⁰. It has been welcomed as a landmark decision¹¹, but in reality, although it has the merit of having officially introduced agriculture in international climate negotiations, it has the modest objective of holding a series of discussions – from 2017 until COP26 – by two standing bodies of the Framework Convention¹² to examine the vulnerabilities of agriculture to climate change and the most appropriate approaches to continue to safeguard *food security*.

There is therefore a vision that focuses on the need to protect the vulnerability of food production systems from the effects of climate change, but has little impact on the climate effects of farming. In this context, even the 2017 decision, considered a milestone in climate and agriculture, did not have the decisive impact of introducing any specific climate objectives for agricultural activity. And it seems that the timing is not yet ripe for such a choice.

In the document submitted by the European Union on the future of the *Koronivia Joint Work on Agriculture* during the COP 26 in Glasgow, various options were proposed for facilitating the implementation of climate actions in the agricultural sector. The possibility of concluding this initiative and assigning the responsibility to other entities, even outside of the

¹⁰ Decision 4/CP.23.

¹¹ FAO, *Koronivia Joint Work on Agriculture: Analysis of Submissions*, Rome, 2018, defines the Decision as an ‘historic milestone’.

¹² These are two subsidiary bodies for scientific and technological advice and implementation, the *Subsidiary Body for Scientific and Technological Advice* (SBSTA), and the *Subsidiary Body for Implementation* (SBI).

Framework Convention, was put forward¹³. Finally, COP26 did not take any decision on the *Koronivia Joint Work on Agriculture*, i.e. on how to continue the discussion of the agricultural issue and any determination is postponed to COP27¹⁴.

2. Assessing the Legal Significance of «Nationally Determined Contributions»

According to the regime introduced by the Paris Agreement, Parties are required to report their 'nationally determined contributions' to the Convention secretariat as a result of a *bottom-up* approach, which is a departure from the *top-down* approach that characterised the Kyoto Protocol. National contributions must undergo modifications and be

¹³ Submission by Slovenia and the European Commission on Behalf of the European Union and its Member States entitled 'Views on future topics not listed in decision 4/CP.23 and on the progress of the KJWA for consideration in the report of the SBI and the SBSTA to the Conference of the Parties as per decision 4/CP.23, paragraph 4', of 25 October 2021. On the future of Koronivia, see also E.D RIEUX, A. VAN UFFELEN, F. BOTTIGLIERO, L. KAUGURE, M. BERNOUX, *Understanding the future of Koronivia Joint Work on Agriculture. Boosting Koronivia*, Rome, FAO, 2021 (<https://doi.org/10.4060/cb6810en>); C. URRUTIA, A. SIEMONS, *Background paper: Climate action and agriculture in international processes and options for future work outside UNFCCC*, Öko-Institut, 2020 (<https://www.oeko.de/en/publications/p-details/climate-action-and-agriculture-in-international-processes-and-options-for-future-work-outside-unfccc>).

¹⁴ The same subsidiary bodies of the Convention on Agriculture and Climate have foreseen a draft decision to be submitted in November 2022 for possible adoption at the next Conference of the Parties. For COP26, the conclusions set out that: "The SBSTA and the SBI agreed to continue consideration of this matter, including the draft text elements on the report on the intersessional workshop, at SB 56 (June 2022) with a view to reporting on it to and revising a draft decision for consideration and adoption by the Conference of the Parties at its twentieth session (November 2022)." See Draft conclusion (<https://unfccc.int/documents/309895>).

reported every five years, necessitating a progression from the preceding commitment with a focus on achieving the highest level of ambition.¹⁵

From the brief references to international sources on climate change given above, it is evident that to comprehend the concrete treatment of agriculture within the climate regime, one must refer to the nationally determined contributions of the States parties to the Paris Agreement. Therefore, scrutiny should be directed towards both the legal significance and the substance of these contributions.

Discussions surrounding the legal implications of the Paris Agreement permeated the entire negotiation process leading to its finalization. Following the conclusion of this important treaty, some lawyers have characterized it as a voluntary instrument¹⁶ or a set of good intentions¹⁷. The reality is that the Agreement certainly qualifies as a legally binding treaty under international law¹⁸, although not all provisions impose legal obligations on the parties. One issue that received much attention already during the negotiations concerns precisely the nationally determined contributions.

The option of qualifying them as binding on the submitting countries, i.e. requiring each Party to oblige itself to achieve the targets set out in these

¹⁵ See Art. 4(2) of the Paris Agreement.

¹⁶ R. FALK, *Voluntary International Law and the Paris Agreement* (16 January 2016), available at <<https://richardfalk.wordpress.com/2016/01/16/voluntary-international-law-and-the-paris-agreement/>>.

¹⁷ To this effect, the former President of the American Society of International Law, A.-M. SLAUGHTER, '*The Paris Approach to Global Governance*', Project-Syndicate (28 December 2015), available at <<https://www.project-syndicate.org/commentary/paris-agreement-model-for-globalgovernance-by-anne-marie-slaughter-2015-12>>.

¹⁸ D. BODANSKY, *The legal character of the Paris Agreement*, in *Review of European Community and International Environmental Law*, 25(2), 2016, p. 142.

documents, would give them the same legal *status* as the targets introduced with the Kyoto Protocol. This would fundamentally alter the architecture of the Paris Agreement from the desired approach by the Parties, jeopardizing the broad participation of states.¹⁹

Parties are expected to commit to the direction marked by their national contributions, entailing a conduct obligation rather than a result obligation regarding specific mitigation levels. The legally binding commitments tied to national contributions primarily consist of procedural obligations, such as the submission of new contributions every five years and, crucially because it gives greater effectiveness to contributions, reporting on progress²⁰.

The Paris Agreement, due to the aforementioned characteristics, represents a moment of decisive change in global climate *governance*, emphasising voluntary commitment, moving away from binding obligations on the mitigation targets to be achieved, and blurring somewhat the concept of redistributive justice underlying the differentiation in obligations between

¹⁹ D. BODANSKY, *op. cit.*, p. 150, very effectively puts it this way: "legal bindingness can be a double-edged sword, if it leads States not to participate or to make less ambitious commitments". In the same vein, N. HUGHES, P. EKINS, P. DRUMMOND, *COP26 - what happened, and where next?*, <https://www.ucl.ac.uk/bartlett/news/2021/nov/cop26-what-happened-and-where-next>, according to whom: "This approach is a gamble born of necessity. It makes a bet that it is preferable to have a voluntary process with wide global engagement, over a stringent top-down approach, to which only a few nations will feel able and willing to sign up'. Very critical of what is referred to as the "pro-soft law narrative" that prevailed during the Paris negotiations is the article by P. LAWRENCE, D. WONG, *Soft law in the Paris Climate Agreement: Strength or weakness?*, in *Review of European, Comparative and International Environmental Law*, 26, 2017, p. 276, which points out that when states want to ensure that there is change they consider instruments containing clearer legal obligations that make enforcement effective.

²⁰ In fact, the provisions of the Agreement stipulate that "the Parties shall pursue national mitigation measures in order to achieve the objectives of the contributions" (Art. 4.2).

industrialised and non-industrialised countries present in the Kyoto Protocol²¹.

3. The 'pledging' trend at COP26 in Glasgow and 'eco-modernism' for the agricultural sector

Probably by virtue of the non-binding nature of the commitments deriving from the Paris Agreement, international climate *governance* is characterised by a constant tendency to resort to what we might call '*pledging*', i.e. making promises, making political commitments, at best, eschewing stringent and legally binding obligations. And it is precisely this that totally characterised COP26 in Glasgow,²² with reference to which the key word could be found in the term '*flexibility*', both in terms of participation in the initiatives and in terms of the content of the commitments made.

²¹ The principle of common but differentiated responsibilities between advanced and non-advanced countries is part of the apparatus of principles of international environmental law. We find a succinct statement of it in Principle 7 of the 1992 Rio Declaration on Environment and Development, but it was already implicit in the 1987 Montreal Protocol on the Ozone Layer. International climate treaties transpose and implement it (Art. 3, UNFCCC and Art. 10, Kyoto Protocol). The Paris Agreement abandons the distinction concerning the countries in Annex I of the Kyoto Protocol and, within the system based on nationally determined contributions, imposes a differentiation by stipulating that each party should develop its contribution as ambitiously as possible. See C. VOIGT, F. FERREIRA, '*Dynamic Differentiation*': *The Principles of CBDR-RC, Progression and Highest Possible Ambition in the Paris Agreement*, in *Transnational Environmental Law*, 5(2), 2016, p. 285.

²² The main document produced by COP26 is the *Glasgow Climate Act*, contained in Decision 1/CP.26, which, among other things, finally sets the overall mitigation target of the States Parties to the Paris Agreement at 1.5° C, whereas the text of the Agreement itself had adopted the much-criticised formula of defining as a long-term goal the containment of temperature increases well below 2° C and the pursuit of efforts to limit them to 1.5° C above pre-industrial levels. For a commentary immediately following the Glasgow Conference on the main outcomes see N. HUGHES, P. EKINS, P. DRUMMOND, *COP26 - what happened, and where next?*, <https://www.ucl.ac.uk/bartlett/news/2021/nov/cop26-what-happened-and-where-next>.

With reference to the agri-food sector, in particular, certainly also under the impetus of the UN *Food System Summit* that ended a few weeks earlier, in September 2021,²³ a good number of coalitions, *compacts*, agendas have emerged: all collateral initiatives, not formal decisions of the Conference of the Parties. The general impression deriving from what happened in Glasgow with reference to the agricultural sector is that there was an attempt to fill the vacuum due to the absence of a formal decision of the Conference of the Parties on agriculture and climate with various voluntary initiatives, as some outcome related to the end of the *Koronivia Joint Work on Agriculture* was expected.

And so, the *Global Action Agenda on Transforming Agricultural Innovation* was promoted, an agenda to which 160 very different *partners* - including private companies, governments, international actors, and universities - adhered, and which aims to close the innovation *gap* in agriculture through, for example, the promotion of investments in research and development aimed at making agri-food systems more sustainable.²⁴

Furthermore, on the occasion of COP 26, one hundred local authorities from all over the world adopted the *Glasgow Food & Climate Declaration*, which recognises the role of local policies in promoting production and consumption models with a lower impact on climate change.²⁵ Again, within this very dynamic framework of proposals, some of which overlap in content

²³ This is the UN Summit on Food and Food Systems, which emphasises the centrality of food systems in the pursuit of all 17 Sustainable Development Goals of the 2030 Agenda, see <https://www.un.org/en/food-systems-summit>.

²⁴ The text of the agenda can be found at the following link: <https://static1.squarespace.com/static/6114008f5a456d74686cec53/t/61856cc2ba4f7c07b8c537c6/1636134083863/ClimateShot+Global+Action+Agenda.pdf>.

²⁵ The declaration and accompanying documents can be found at the following link: <https://www.glasgowdeclaration.org/the-glasgow-declaration>.

and actors, one can mention the *Policy Action Agenda for a Just Transition to Sustainable Food and Agriculture*, in which many governments and private actors have committed themselves to a sustainable transition of the agricultural and food sector.²⁶ Amongst these initiatives, which are located in a basin of practically no legal relevance, in which a plethora of non-state actors (including universities, multinationals, NGOs) have competed with states and local authorities in making promises²⁷, are also the two proposals that have had the greatest media coverage, namely the *Glasgow Declaration on Forests and Land Use*²⁸ and the *Global Methane Pledge*²⁹.

In the Declaration on Forests, the *leaders* of more than 140 countries promise - *again*, one might observe, since they had already done so in 2014 with the New York Declaration on Forests³⁰ - to work together to halt and reverse forest loss and soil degradation by 2030, in a text that has very

²⁶ The Policy Agenda with its main objectives can be found at: <https://ukcop26.org/policy-action-agenda-for-transition-to-sustainable-food-and-agriculture/>.

²⁷ UN Secretary General António Guterres has announced a working group to monitor the outcomes of these promises: <https://www.spglobal.com/commodity-insights/en/market-insights/latest-news/energy-transition/110121-cop26-un-chief-launches-group-to-study-non-state-net-zero-emissions-commitments>. However, several non-governmental actors are already active in monitoring both public and private initiatives to reduce climate-changing emissions, e.g. the 'Climate Progress News Barrel' <https://docs.google.com/spreadsheets/d/1uBjicIsB2ommkarTabFhHa7NrIKSRhLf1HHeGe9M6PQ/edit#gid=38267928>.

²⁸ The Declaration can be found at the following link: <https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/>.

²⁹ The methane pact can be found at the following link: <https://www.globalmethanepledge.org>.

³⁰ It is a political declaration that sets the goal of halving the loss of natural forests by 2020 and committing to stopping it completely by 2030. The text of the declaration can be found at: <https://unfccc.int/documents/23232>. Mention may also be made of the Aichi Target 5 under the Convention on Biological Diversity, which calls for halving the loss of ecosystems (including forests) by 2020.

emphatic but certainly not prescriptive language, as well as vague terminology³¹.

The commitment to reduce methane emissions is also non-binding and was also not part of the COP negotiating agenda. It is a side initiative launched in Glasgow by the United States and the European Union, to which more than 100 governments have signed up.³² Optimistically, the document refers to the possibility of quickly achieving positive effects for both public health and agriculture if methane emissions are reduced,³³ and commits the participants to work together to reduce these emissions by at least 30% by 2030 compared to 2020 levels.³⁴ With reference to agriculture, it must be pointed out that the wording is even milder than for the other named sectors (energy and waste), since it speaks of a commitment to "seek to reduce

³¹ In particular, criticism has been made of the use of the terms "forest loss" and "deforestation and land degradation" on which see R. NASI, *Deforestation pledge redux: Reflections on "forest loss" as dust settles on Glasgow summit*, 9 December 2021, <https://forestsnews.cifor.org/75569/deforestation-pledge-redux-reflections-on-forest-loss-as-dust-settles-on-glasgow-summit?fnl=>. On some positive notes see A. HOARE, *How to ensure the COP26 forest declaration is a success*, <https://www.chathamhouse.org/2021/11/how-ensure-cop26-forest-declaration-success>. On the topic of forestation policies and emissions see L. PAOLONI, *Politiche di forestazione ed emissioni climalteranti*, Edizioni Tellus, Rome, 2009; M. MAURO, *La selvicoltura nel sistema del diritto agroambientale internazionale ed europeo*, in *Diritto Agrario e Ambientale - Collana diretta da Alberto Germanò, Eva Rook Basile, Nicoletta Ferrucci*, Wolters Kluwer Italia, 2021.

³² In addition to the participating states, there are the 'supporters' which, again, are very diverse in nature and include private foundations, UN programmes, research agencies.

³³ See para. 2 of the *Global Methane Pledge* which reads: '*Recognising* that the short atmospheric lifetime of methane means that taking action now can rapidly reduce the rate of global warming and that readily available cost-effective methane emission measures have the potential to avoid over 0.2 degrees C of warming by 2050 while yielding important co-benefits, including improving public health and agricultural productivity'.

³⁴ Noteworthy is the penultimate paragraph of the *Global Methane Pledge*: '*Resolve* to review progress towards the target of the Global Methane Pledge on an annual basis until 2030 by means of a dedicated ministerial meeting', thus referring to the willingness to monitor progress on methane emission reductions through a ministerial meeting.

agricultural emissions through technological innovation, incentives and a partnership with farmers"³⁵ : *business as usual*, one might conclude, considering also that no explicit reference is made to the opportunity to limit intensive livestock farming,³⁶ and that there is much reliance on the help of technology to limit emissions without, therefore, disrupting the most climate-damaging agricultural models.

In such forecasts and initiatives, it is not difficult to see the more or less conscious adherence of the actors involved to an 'eco-modernist' approach applied to agriculture. Eco-modernism³⁷ is defined by the IPCC in its latest report as an alternative school of thought to degrowth³⁸ and offers one of the underlying narratives for the '*green economy*' to achieve the goals of the Paris Agreement and the SDGs³⁹ . Indeed, ecomodernism does not place growth and development in the classical cause-and-effect relationship with climate-changing emissions and environmental impacts in general. If anything, it represents growth as that which can guarantee a lower impact of human activities on the environment. To achieve what is referred to as the 'decoupling' between social development and environmental impact (understood as the difference between the consumption of natural resources and the planet's capacity to regenerate them), the key, according to this

³⁵ See para. 9 of the *Global Methane Pledge*, italics ours. The issue of breeding will be discussed further in relation to EU measures and the Italian National Strategic Plan.

³⁶ X. XU ET AL, *Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods*, in *Nature Food*, 2(9), 2021, p. 724.

³⁷ J. ASAFU-ADJAYE ET AL, *An ecomodernist manifesto*, 2015, available at <http://www.ecomodernism.org/italiano>.

³⁸ As is well known, degrowth theory can be traced back to the studies of Serge LATOUCHE, *La scommessa della decrescita*, Feltrinelli, 2007. For a more recent formulation see G. D'ALISA, F. DEMARIA, G. KALLIS, *Degrowth: a vocabulary for a new era*, Routledge, 2014.

³⁹ IPCC, Working Group 3, 'Climate Change 2022. Mitigation of Climate Change. Summary for Policymakers. ...', *cit.*, p. 67.

theory, is the intensification of many human activities, including agriculture. This decoupling is believed to be possible by giving a central importance to technological innovation that allows a more productive use of resources with a lower impact in climatic-environmental terms⁴⁰. The possibility of achieving meaningful climate mitigation can be summarised fundamentally in a technological challenge. Technologies are capable of freeing humans from different ecosystems and preventing them from being devastated by extreme exploitation. They, in other words, loosen the bond between mankind and nature, as it is believed that 'as long as the livelihood and well-being of the human species remain intimately dependent on the ecosystem, it cannot be protected and enhanced'. The implementation of this strategy, finally, on the one hand makes international collaboration essential to foster technology transfer, especially in the fields of energy and agriculture, on the other, it certainly requires a considerable commitment of resources that cannot fail to involve the private sector as well, as happened, precisely, during COP26 for the many initiatives mentioned above, which, in almost all cases, showed great faith in new technologies, involving private subjects alongside public institutions.

⁴⁰ Although the authors of the ecomodernism manifesto make it clear that the modernisation process is not to be confused with capitalism, corporate power and laissez-faire economic policies, it must be considered that, from many analyses to date, it does not appear that, with reference to the agricultural field, for example, new technologies can be available or widely used by small farmers. The problems concern both the acceptance of the use of new technologies, since farmers have so far been reluctant to invest in this direction, but above all the overcoming of the digital divide (which is not only the material one due to the lack of connectivity in certain areas) but which concerns knowledge, the possibility of making use of the new tools or, if they are made use of, of making effective use of the data, for example, produced by digitisation systems. On these issues the literature is very broad, for an analysis of the main positions see S. ROLANDI, G. BRUNORI, M. BACCO, I. SCOTTI, *The Digitalization of Agriculture and Rural Areas: Towards a Taxonomy of the Impacts*, in *Sustainability*, 2021, 13, 5172.

4. The 'Nationally Determined Contributions' of the Paris Agreement: 'agricultural' content

The non-stringent and alluvial character of international climate *governance*, just described, certainly attaches decisive importance to the content of nationally determined contributions which should form the backbone of individual state commitments. Well, in spite of the activism shown in the involvement in many of the initiatives mentioned relating to the agri-food sector, in the updated versions of the national contributions that were submitted prior to the Glasgow COP, one can still note a lack of willingness on the part of the Parties to formulate precise and quantifiable commitments for agriculture (and the European Union seems unable to escape this judgment).

Looking at the contents, then, according to an analysis conducted by FAO of the first national contributions submitted by states upon accession to the Paris Agreement, it can be seen that: although of the 189 documents analysed, as many as 148 mentioned agriculture as an activity relevant to emission reduction, they generally did not include specific *targets* for the sector.⁴¹ And in those cases where specific reduction targets were

⁴¹ See the FAO analysis, *The agriculture sectors in the Intended Nationally Determined Contributions: analysis* Rome, 2016, available at <http://www.fao.org/3/a-i5687e.pdf>. This analysis shows that 7 countries mention sector targets for agriculture. See also FAO, *The agricultural sectors in nationally determined contributions (NDCs): Priority areas for international support*, Rome, 2016, retrievable at <http://www.fao.org/3/a-i6400e.pdf>; M. RICHARDS, T.B. BRUUN, B.M. CAMPBELL, L.E. GREGERSEN, S. HUYER, V. KUNTZE, S.T.N. MADSEN, M.B. OLDVIG, I. VSEILEIOU, *How countries plan to address agricultural adaptation and mitigation*, Washington DC, 2015, www.landscapes.org/glf-2015/wp-content/uploads/sites/9/2015/12/CCAFS-INDC-info-note-Final.pdf.

introduced, their achievement was in any case conditional on the availability of adequate financial resources and technical capacity.⁴²

From the latest synthesis report⁴³ prepared by the Convention secretariat at COP26, which analyses the new national contributions sent by the parties and following the first five-year period, it can be seen that agriculture is taken into account in 90% of the documents sent compared to 73% of the previous national contributions⁴⁴. It appears from the same report that agriculture and food production are priority areas for states when it comes to the provision of adaptation measures⁴⁵. When it comes to mitigation, the focus on land uses is mostly linked to the ability to contribute to mitigation through CO₂ removals⁴⁶ and not to the prediction of specific climate measures for the agricultural sector that aim to transform agricultural patterns with a greater impact on global warming.

⁴² See FAO, *The agriculture sectors in the Intended Nationally Determined Contributions: analysis*, cit., p. 13.

⁴³ See *Nationally Determined Contributions under the Paris Agreement. Revised synthesis report by the secretariat*, FCCC/PA/CMA/2021/8/Rev.1. This report examines 165 Nationally Determined Contributions reported to the secretariat by 12 October 2021 and representing 192 Parties covering 94.1% of total global emissions in 2019.

⁴⁴ See FCCC/PA/CMA/2021/8/Rev.1, para. 72.

⁴⁵ See FCCC/PA/CMA/2021/8/Rev.1, para. 163 " In most adaptation components, measures for adapting food production systems and ensuring food security were prioritised, encompassing adaptation efforts in the areas of agriculture, livestock and fisheries. In agriculture, adaptation is being pursued via sectoral vulnerability analysis research, planning, diversification, financial mechanisms and insurance, systems for agroclimatic information and improvements to post-harvest processing. As technical solutions, Parties are focusing on, for example, temperature-, pest-, disease-, flood- and/or drought-resistant crops, seed banks, enhanced pest and disease control, enhanced irrigation and water use, and sustainable, climate-smart and integrated land-use and cultivation methods. Many adaptation components highlighted measures for enhancing resilience, sustainability and productivity of livestock and pastoralism, including research, disease control, rangeland management, more resilient breeds and feeds, insurance and diversification.

⁴⁶ See FCCC/PA/CMA/2021/8/Rev.1, para. 185.

In general, it should also be noted that the 2030 projections of atmospheric climate gas levels if the most recent national contributions are implemented are not encouraging, as emission levels are expected to rise significantly⁴⁷ and well above the levels needed to meet the Paris Agreement targets,⁴⁸ so much so that the *Glasgow Climate Pact* highlights the urgency of strengthening ambition and mitigation and adaptation actions⁴⁹.

5. The European Union's climate choices in the international arena and the CAP

What has just been outlined is, therefore, the background against which the international commitments of which the European Union and Italy must take into account when developing climate measures.

Italy, as is well known, ratified the Paris Agreement with Law No. 204/2016⁵⁰ and fulfils its obligations to prepare and report its nationally determined contribution through the European Union, which submitted its updated

⁴⁷ See FCCC/PA/CMA/2021/8/Rev.1, para. 13 "The total global GHG emission level in 2030, taking into account implementation of all the latest NDCs, is expected to be 15.9 per cent above the 2010 level. [...] to be consistent with global emission pathways with no or limited overshoot of the 1.5 °C goal, global net anthropogenic CO₂ emissions need to decline by about 45 per cent from the 2010 level by 2030, reaching net zero around 2050. For limiting global warming to below 2 °C, CO₂ emissions need to decrease by about 25 per cent from the 2010 level by 2030 and reach net zero around 2070.

⁴⁸ Namely, the containment of temperature increase well below 2°C and the pursuit of efforts to limit the increase to 1.5°C compared to pre-industrial levels. This second, more ambitious goal was confirmed by the Parties in the *Glasgow Climate Pact*, cit., para. 2.

⁴⁹ Decision 1/CP.26, *Glasgow Climate Pact*, para. 4.

⁵⁰ Law No 204 of 4 November 2016, *Ratification and implementation of the Paris Agreement related to the United Nations Framework Convention on Climate Change, adopted in Paris on 12 December 2015*.

contribution to December 2020 also on behalf of the Member States⁵¹. The EU has, on this occasion, set the new target set by the European Climate Act⁵² of a net internal reduction of greenhouse gas emissions of at least 55% by 2030 and the climate neutrality target to 2050⁵³.

⁵¹ Submission by Germany and the European Commission on behalf of the European Union and its Member States, 17 December 2020, available at: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/European%20Union%20First/EU_NDC_Submission_December%202020.pdf.

⁵² Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulation (EC) No 401/2009 and Regulation (EU) 2018/1999 ('European Climate Regulation'). This regulation establishes the binding goal of climate neutrality in the EU by 2050, in view of the long-term goal of limiting temperature increases under the Paris Agreement. It also sets the binding target for the EU for a net internal reduction of greenhouse gas emissions of at least 55% compared to 1990 levels by 2030.

⁵³ Pending the entry into force of the Doha amendment to the Kyoto Protocol (setting out the commitments for the post-2012 period), the EU has been committed since 1 January 2013 to implementing the commitments set out therein, which correspond to those of the 'climate-energy package' adopted in 2007. The objective of the 'climate-energy package' has been pursued through a series of regulatory instruments. In particular: Directive 2009/29/EU (transposed in Italy with Legislative Decree 30/2013) amending Directive 2003/87/EC in order to improve and extend the EU Emission Trading System (EU ETS); Directive 2018/410/EU (transposed into national law with Legislative Decree 9 June 2020, no. 47) amending Directive 2003/87/EC to support more cost-effective emission reductions and promote low-carbon investments; and Decision (EU) 2015/1814, the main amendments of which are aimed at enhancing the capacity of the EU ETS to effectively contribute to the achievement of the 40 per cent greenhouse gas emission reduction target by 2030, consistent with the EU Climate and Energy Policy Framework 2030 and as a contribution to the Paris Agreement; Decision 406/2009 of 23 April 2009 ('effort sharing'), which divided the European greenhouse gas emission reduction target for non-ETS sectors, i.e. not regulated by Directive 2009/29/EU (i.e. the transport, civil, agriculture, waste and small industry sectors), among the Member States. For Italy, the reduction target is 13% below 2005 levels by 2020. The annual greenhouse gas emission allocations of all Member States for the period 2017-2020 are contained in Decision No. 2017/1471/EU. The greenhouse gas emission reduction targets for the period 2021-2030, for each of the Member States, to be achieved in the non-ETS sectors were set out in Regulation No. 2018/842/EU. Annex I of this regulation provides for a 33% reduction for Italy. With Decision 2020/2126/EU, the European Commission established the annual emission allocations of Member States for the period 2021-2030 with reference to non-ETS activities.

According to the European contribution, the proposed targets will enable the Union to continue to be the most efficient among major economies in terms of average *per capita* climate gas emissions⁵⁴. It is interesting to note that in the introductory part of the document⁵⁵, it is highlighted that climate action informs all policies and programmes financed by the Union, both under the 2021-2027 multiannual financial framework and under the 'recovery' instrument, *Next Generation EU*⁵⁶. As a general principle, on the other hand, it is assumed that all Union expenditure should be consistent with the objectives of the Paris Agreement⁵⁷.

If one then looks more closely at the European contribution, one sees that, although it states that it pursues emission reductions in all sectors of the economy ("*economy-wide*")⁵⁸ and explicitly mentions agriculture among the sectors considered, there is no reference to the Common Agricultural Policy, nor to the 2013 regulations, nor to the CAP reform intentions, as is the case for other disciplines mentioned in the contribution. In the sections listing and summarising the regulatory acts of the Union relevant to the achievement of the proposed climate targets, one finds several references to

⁵⁴ See Annex '*Information to facilitate Clarity, Transparency and Understanding*' (ICTU) to the EU Country Determined Contribution, section 6. See also DEN ELZEN *ET AL*, *Are the G20 economies making enough progress to meet their NDC targets?*, Energy Policy, 2019, vol. 126, p. 238.

⁵⁵ See para. 5, *Introduction*, of the EU Nationally Determined Contribution, *cit.*

⁵⁶ See para. 5, *cit.*, 'An overall climate target of 30% will apply to the total amount of expenditure from the MFF and NGEU and be reflected in appropriate targets in sectoral legislation.

⁵⁷ Worth mentioning in this regard is the fact that even when negotiating trade agreements with third countries, the Union declaredly takes into account their adherence to the Paris Agreement, cf. the Council Decision of 9 April 2019 on the EU's final withdrawal from the TTIP negotiations with the United States, which states: "The United States has announced its intention to withdraw from the Paris Agreement on climate change, while the Union seeks the negotiation of deep and comprehensive free trade agreements only with Parties to that Agreement."

⁵⁸ See Annex "*Information to Facilitate Clarity, Transparency and Understanding*" (ICTU) to the EU Country Determined Contribution, Sections 1.d, 3.a.

the LULUCF regulation on land use, land use change and forestry⁵⁹ which clearly regulates a sector contiguous to agriculture and partly referable to it⁶⁰. But it is equally clear that this reference does not amount to a full integration of the agricultural sector into the Union's international climate commitments. This, although then in the regulation on strategic plans⁶¹, one of the general objectives of the new CAP is to contribute to the achievement of the Union's climate objectives, including the international commitments made in the Paris Agreement.

⁵⁹ Regulation (EU) 2018/841 on the inclusion of greenhouse gas emissions and removals resulting from land use, land use change and forestry in the 2030 climate and energy framework. This framework (Art. 4) introduces the rule that the LULUCF sector as a whole should not generate net emissions in each member state (the '*no-debt rule*'), thus requiring that emissions from land use do not exceed removals. By land use (accounting for the purposes of the regulation), Art. 2(1)(a) and (b) refers to: "(a) in the periods 2021 to 2025 and 2026 to 2030: (i) 'afforested land': land use reported as cropland, grassland, wetlands, settlements or other land, converted to forest land; (ii) 'cleared land': land use reported as forest land converted to cropland, grassland, wetlands, settlements or other land; (iii) 'managed cropland': land use reported as: - cultivated land remaining as such, - pastures, wetlands, settlements or other land converted to cultivated land, or - cultivated land converted to wetlands, settlements or other land; (iv) managed pastures: land use communicated as: - pastures remaining as such, - cultivated land, wetlands, settlements or other land converted to pastures, or - pastures converted to wetlands, settlements or other land; (v) "managed forest land": land use communicated as forest land remaining as such; (b) from 2026: "managed wetlands": land use communicated as - wetlands remaining as such, - settlements or other land converted to wetlands, or - wetlands converted to settlements or other land." On the complex LULUCF regulation, see A. SAVARESI, L. PERUGINI, M.V. CHIRIACÒ, *Making sense of the LULUCF Regulation: Much ado about nothing?*, in *Review of European, Comparative and International Environmental Law*, 29 2020, p. 212. The European Union, as part of the *Fit for 55* package, plans to amend Regulation 2018/841 so as to achieve climate neutrality in LULUCF by 2035.

⁶⁰ This is also confirmed by what emerges from recital 12 of Regulation (EU) 2018/841, which emphasises the desirability of "ensuring consistency between the Common Agricultural Policy and the [...] Regulation."

⁶¹ Regulation (EU) 2021/2115 of 2 December 2021 laying down rules on support for strategic plans to be drawn up by Member States under the Common Agricultural Policy (CAP strategic plans) and financed by the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No 1305/2013 and (EU) No 1307/2013.

Thus - although at the end of 2020, when the EU's national contribution is transmitted to the UNFCCC secretariat, the CAP regulations are not part of the set of regulatory measures indicated to the Paris Agreement partners as instrumental in achieving their climate objectives - a rise in the EU's ambition on climate and agriculture would seem perceptible, in line, moreover, with the Green Deal and related strategies⁶². This is at least in principle, since, as the analysis in the following paragraphs shows, there are several critical issues with CAP climate measures and their implementation at national level.

6. The centrality of climate concerns and the practical ineffectiveness of existing measures

To understand the significance of the references to climate and environment in the implementation of the CAP⁶³ it is important to start from some documents that are in some way its logical antecedent and that should have played the role of a skilful 'prompter' hidden in the wings of that theatre in which this new episode of the CAP is being staged, the potentially 'final' one to make the climate objectives effectively binding⁶⁴.

⁶² Communication from the Commission 'EU Biodiversity Strategy 2030. Bringing nature back into our lives', COM(2020) 380, 20 May 2020; Communication from the Commission 'A 'Producer to Consumer' Strategy for a fair, healthy and environmentally friendly food system', COM(2020) 381, 20 May 2020.

⁶³ Compare, for a framing of the topic, A. JANNARELLI, *Agricoltura sostenibile e nuova PAC: problemi e prospettive*, in *Riv.dir.agr.*2020, I, p. 24, ss.; M.GOLDONI, *Sostenibilità, agricoltura, riforma della PAC post 2020*, in *La sostenibilità in agricoltura e la riforma della PAC*, edited by S.MASINI AND V.RUBINO, Cacucci, Bari, 2021 p. XI. It is worth noting that both in European documents and in the Italian strategic plan the reference to 'climate' rarely appears in isolation from 'environment', mostly the two terms are used in a sort of endiad *in a* reinforcing sense.

⁶⁴ See the second part of the IPCC's Sixth Assessment Report (AR6) on 'Impacts, adaptation and vulnerability', presented in February 2022. <https://ipccitalia.cmcc.it/impatti-adattamento-e-vulnerabilita/>. The presentation press

The Commission Communication of 18 December 2020 containing the Recommendations to Member States for the drafting of the relevant Common Agricultural Policy strategic plans⁶⁵ opens precisely with a reference to both the European Green Deal that 'points the way forward to

release refers to this report as "a dire warning of the consequences of inaction" and states that "the time window for action is narrowing" <https://ipccitalia.cmcc.it/cambiamenti-climatici-una-minaccia-al-benessere-delle-persone-e-alla-salute-del-pianeta-agire-ora-puo-mettere-al-sicuro-il-nostro-futuro/>. [For some time](#), IPCC reports [have](#) warned of the risks of the so-called 'tipping points' being exceeded: once the tipping points have been crossed, we will be exposed to a series of rapid and irreversible changes so severe that the climate can no longer return to a state of equilibrium. The CAP to 2027, therefore, is in the crucial time frame: since the immediate horizon is 2030, it must commit the agricultural world to the joint effort of all sectors of the economy and civil life to achieve the fundamental goals of reducing emissions. In this sense, the document of 'observations' to the 31 December 2021 draft of the NSP that the 'Let's change agriculture' Coalition has presented signed by no less than 17 Associations, from Slow Food to WWF, from Green Peace to AIAB:<https://www.cambiamoagricoltura.it/wp-content/uploads/2022/02/Doc-Osservazioni-PSN.pdf>

⁶⁵We refer to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2020) 846 final. Of particular interest for our purposes is the Commission Staff Working Document containing the "Commission Recommendations for Italy's CAP Strategic Plan" accompanying the above-mentioned Communication, SWD(2020) 396 final. In the 'press release' presenting the recommendations we read the statement of Janusz Wojciechowski who, in urging the Member States to adapt to the specific indications addressed to them, states "*together with the European Parliament and the Council we will ensure that CAP reform maintains the necessary environmental and climate ambitions.*"

Indeed, it is worth noting that, already in the first introductory pages of the Proposal for a Regulation of the European Parliament and of the Council laying down rules on support for strategic plans (COM(2018) 392 final), among the reasons why 'the CAP needs to be modernised', the need to respond to the challenges of climate change clearly emerged. Indeed, the text recalled that 'the EU has signed up to new international commitments - for example on climate change mitigation (through COP 21) and general aspects of international development (through the United Nations Sustainable Development Goals - SDGs)' and that the CAP must bring itself in line with them. See also Art. 92 *More ambitious climate-environmental objectives* of the same proposal. On the progressive "integration of climate change into EU agricultural policy" see M. ALABRESE, *Politiche climatiche, politiche agricole e il bisogno di coordinamento*, cit., p.618 ff.

make Europe the first climate-neutral continent by 2050⁶⁶ and the 'Producer to Consumer' strategy⁶⁷ and the Biodiversity Strategy 2030⁶⁸ .

In outlining the starting point, in terms of country-specific data, the Commission is clear in stating that the "EU agricultural sector (and to some extent forestry) continues to face and cause enormous environmental and climate problems"⁶⁹ .

At the same time, the characteristics of the 'range' of instruments that can enable states to achieve clear and measurable climate and environmental outcomes by building their own 'green architecture' are identified. In fact, the toolbox is common and includes, as is well known, "not only various types of environmental area payments, including the new ecological schemes, together with established payment practices under the second pillar of the CAP, but also the elements of cross-compliance and support for knowledge building, investment, innovation and cooperation"⁷⁰ . However,

⁶⁶Interesting working paper 'Analysis of links between CAP Reform and Green Deal' available at <https://ec.europa.eu/info/sites/default/files/food-farming-> and 'How the future CAP will contribute to the EU Green Deal' https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/future-cap-and-green-deal_en.pdf

⁶⁷ COM(2020) 381.

⁶⁸ COM(2020) 380. It is worth mentioning, however, that the 'strategies' mentioned were published after the proposals for regulations on the new CAP.

⁶⁹ See point 2.2 of the aforementioned Communication COM(2020) 846 final.

⁷⁰ In these terms still point 2.2 COM(2020) 846 final. With reference to environmental protection in the CAP 2014-2020, L. RUSSO, *Profili di tutela ambientale nelle proposte per la CAP 2014-2020. La nuova condizionalità e il greening*, in *Riv. dir. agr.*, 2011, I, p. 628 ss.; A. FORTI, *Sull'adeguatezza delle misure ambientali contenute nella PAC 2014-2020 rispetto all'obiettivo della tutela dell'ambiente e del territorio agrario: una questione di punti di vista*, in *Studi in onore di Luigi Costato*, vol, I, Jovene 2014, p. 373. For an analysis of the instruments called to integrate, again in the CAP 2014-2020, the fight against climate change: G. STRAMBI, *Condizionalità e greening nella PAC: è abbastanza per il clima*, in *Agricoltura, Istituzioni, Mercati*, 2016, p. 64 ff.

it will be up to the states to choose how to combine the different measures⁷¹ in a way that is appropriate to their agricultural structures and thus efficient and effective in the specific context.

The document containing the specific 'recommendations' addressed to our country highlights how in the field of climate change mitigation (one of the profiles that deserves more attention in this specific context) the starting data do not appear encouraging: "in Italy, agricultural emissions (including greenhouse gas (GHG) and ammonia emissions), after a reduction recorded between 1990 and 2013, have not decreased in the last seven years and more will have to be done to reduce them in order to contribute to the Union's objectives". The spotlight is on the 'livestock sector, which, especially in areas subject to more intensive agricultural use in northern Italy, plays a particularly important role in this context, as emissions from enteric fermentation and manure management represent the main sources of total

⁷¹ The inverted commas in the text are taken from the oft-quoted Communication. Exemplary, with reference to the discretion left to the states, is the consideration in point 08 of the document containing the Commission's 'answers' to the observations of the Court of Auditors' Special Report: 'Member States may define the optimal combination of climate policies to achieve their national target in all sectors concerned by effort sharing; these strategies are described in the national energy and climate plans. Agriculture should contribute to these mitigation efforts like all other sectors. Effort-sharing targets have been calculated in a cost-efficient manner; if a Member State decides that the agricultural sector should not contribute to its effort-sharing target, the contribution of the other sectors is likely to be more costly'https://www.eca.europa.eu/Lists/ECARepplies/COM-Replies-SR-21-16/COM-Replies-SR21_16_IT.pdf. On the approach of the new CAP that can be deduced from the reform 'proposals', see L. SALVI, *I profili verdi della politica agricola comune*, in N. FERRUCCI (ED.), *Diritto forestale e ambientale*, 3^a ed., Torino, 2020, p. 315 ff.; D.MARANDOLA, F.VANNI, *Le sfide della nuova architettura verde della Pac post 2020*, in [Agriregionieuropa, n°56, Mar 2019. The latter authors speak of a "mix](#) of voluntary and mandatory 'green' measures" that the Commission has envisaged "to achieve environmental and climate objectives more effectively, according to a more targeted, flexible approach". Recently M.R.PUPO D'ANDREA, *Le novità della CAP 2023-2027*, *Agriregionieuropa Special Issue - Agricalabriaeuropa n. 1*, Oct. 2021., p. 157 ff.

emissions'. Measures should therefore be envisaged that incentivise 'extensification and appropriate pasture management, the adoption of low-emission livestock feeding strategies and improved manure management' - measures that 'can work in synergy and contribute to making the livestock sector more sustainable' in line with the targets of EU strategies.⁷²

The Special Report 16/2021 of the European Court of Auditors, certainly important for its detailed analysis of climate change mitigation practices introduced on the basis of the 2014-2020 CAP measures and for the demonstration, through concrete data, of their 'scarce' effectiveness also in relation to the previous period (2007-2013)⁷³, is of further interest for our purposes because of its 'project' nature. But let us go in order: since it is impossible, within the limits of this work, to analyse the Report in detail, we

⁷² In these terms the document containing the "Commission Recommendations for the CAP Strategic Plan of Italy", cit. p.3 Among the EU Strategies that can have significant effects on climate, besides those already mentioned, it is also worth mentioning the most recent EU Soil Strategy 2030 "Healthy Soils for the Benefit of People, Food, Nature and Climate", Brussels, 17.11.2021, COM(2021) 699 final.

⁷³ Even the 'title' of this Special Report (16/2021) is emblematic in this regard: 'Common Agricultural Policy and Climate - The CAP finances half of the EU's climate expenditure, but emissions from agriculture do not decrease'. https://www.eca.europa.eu/Lists/ECADocuments/SR21_16/SR_CAP-and-Climate_IT.pdf. For an initial commentary on the ECA report, G. GNUDI, *La Corte dei conti Europea boccia la PAC*, in *Terra e vita* of 22 June 2021 <https://terraevita.edagricole.it/economia-e-politica-agricola/la-corte-dei-conti-europea-boccia-la-pac-aiuta-poco-il-clima/#:~:text=The%20report%20special%2016%2F2021,eca.europa.eu>. Analyses in detail the previous Special Report of the Court of Auditors no. 21/2017 on "Greening: a more complex income support scheme, not yet environmentally effective" G. STRAMBI, *Condizionalità e greening nella PAC: è abbastanza per il clima*, cit.

choose to focus on the livestock sector which, as stated in the text, is responsible for almost 70% of the EU's greenhouse gas emissions⁷⁴ .

The Court's own audit states that it focused on "livestock farming and manure storage as well as the application of chemical fertilisers and manure, which together with the cultivation of organic soils and the conversion of grassland and cultivated land" constitute the main sources of greenhouse gas emissions in agriculture, in the documented knowledge that only by affecting these sectors can one expect to meet European commitments and achieve Goal 13, with which even the United Nations has mandated a focus on climate action⁷⁵ .

The audit, as is well known, has shown how the timid implementation of mitigation practices under the 2014-2020 CAP has failed to achieve significant results in terms of greenhouse gas emission reductions compared to the 2007-2013 period, noting a clear disproportion between the investments allocated to this and the modest targets achieved⁷⁶ .

⁷⁴ In the introduction to this document, it is mentioned that the agricultural sector as a whole is responsible for 10.3% of greenhouse gas emissions. Point 92 goes on to state that emissions from 'livestock' are in turn responsible for half of the greenhouse gas emissions from agriculture.

⁷⁵ Point 20 of the Report. As the Court recalls 'the current EU policy framework aims to reduce the Union's greenhouse gas emissions by 40 per cent by 2030' but 'the Commission has proposed to increase this target to 55 per cent and to achieve zero net emissions by 2050'.

⁷⁶ Greenhouse gas emissions from the use of chemical fertilisers and manure, which account for one third of the EU agricultural sector's emissions, even increased between 2010 and 2018," the Court notes (ibid., no. 93 of Conclusions). For an analysis of the data, with a view to enhancing European climate action, see the Commission's 2020 Progress Report on EU Climate Action (COM(2020) 777 final), which states, inter alia, that 'Non-CO2 emissions from agriculture were at a similar level in 2019 as in 2005 and are projected to decrease only slightly under current policies'. See, on this point, S.MASINI, "*Transizione ecologica*" dell'agricoltura, in *Diritto agroalimentare*, 2022, p.58.

In particular, for the sector we have chosen to examine, it is observed and demonstrated with the analysis of the data, how the greening payment (the main novelty in direct payments in the 2014-2020 period) did not include among its requirements the reduction of emissions from livestock, which has such an impact on the climate⁷⁷ .

In the "recommendations" at the end of the document, with a view to the new CAP, it is noted that it would be important to limit the number of livestock or otherwise provide incentives for their reduction⁷⁸ as well as to encourage the spread of mitigation measures to reduce emissions from manure, which are identified in the four documented effective practices: acidification and cooling of manure, impermeable coverings of manure storage, and biogas production using manure as raw material⁷⁹ .

In the conclusions of the Court of Auditors, there also emerges an indication that we could call 'methodical', later taken up analytically in the dictate of Reg. 2021/2115⁸⁰ , the emphasis is placed on results, the 'performance' with respect to the planned interventions must be 'measurable' and through 'certain' indicators, thus with a clear identification of objectives, intervention logic, and guarantee of efficient use of resources⁸¹ .

⁷⁷Point 83 of the Report

⁷⁸ The decline in livestock production would lead to "a reduction in emissions from feed digestion and manure storage, but also from fertilisers used in feed production": so in point 27 of the Report.

⁷⁹The table in point 31 of the Report shows the small number of companies that received support for these practices.

⁸⁰ We refer to the entire Title VII of Reg. 2021/2115 "Monitoring, Reporting and Evaluation" and in particular Chapter 1 which contains the "Framework for the Effectiveness of Implementation".

⁸¹ In this regard, see R.CAGLIERO, N.D.ALICANDRO, B.CAMAIONI, *Il New delivery model e la lettura della performance nella PAC 2023-27, tra opportunità, criticità e incertezze*, in *Agriregionieuropa*, special issue, *Agricalabrieuropa*, no. 4 Dec

We would like to recall how, both in the Commission's recommendations to the Member States⁸², and in the Court's report, the need to adopt initiatives aimed at promoting more sustainable and healthier diets emerges clearly and with terminology that is entirely comparable, reflecting on the worrying contradiction of this need with those 'market measures' that continue to promote the consumption of products of animal origin, the use of which therefore certainly does not decrease⁸³.

In the immediate aftermath of the approval of the new CAP, many hopes were pinned on the so-called 'second half' of the CAP, relating to the 'concerted' construction of the implementation rules within the National Strategic Plans (NSPs)⁸⁴: we will try to understand whether the NSP, in its current formulation, lives up to these expectations.

2021:<https://agrireregionieuropa.univpm.it/it/content/article/31/60/il-new-delivery-model-e-la-lettura-della-performance-nella-pac-2023-27-tra>

⁸² The Communication containing the general recommendations to the Member States COM(2020) 846 final, cit., p.17 states: 'Member States should also work hard to adopt healthier and more environmentally sustainable diets, in line with national dietary recommendations, and reflect on how their CAP strategic plan can contribute to a healthier food environment, also paying attention to food losses and waste.'

⁸³ Fig.11 and 13 of the Court of Auditors' Report. On the problem of food production "competing with nature" and identifying its impact on climate change, see the comments in the ISPRA "Report", *Open Ecological Transition. Dove va l'ambiente italiano*, December 2021, p.109 ff: <https://www.isprambiente.gov.it/files2021/pubblicazioni/pubblicazioni-di-pregio/tea.pdf>. See, for its effectiveness in terms of communication, the "double pyramid" model developed by the Barilla Foundation, which places the **"health" and "climate" pyramids** side by side https://www.barillacfn.com/it/divulgazione/doppia_piramide/

⁸⁴ See S.MASINI, *Pianificazione nazionale e ruoli di Stato e Regioni nell'ottica della nuova PAC*, in *La sostenibilità in agricoltura e la riforma della PAC*, cit., p. 39 ss; A.CIACIULLO, *Pac, comincia il 2° tempo. Ambientalisti all'attacco sul piano strategico nazionale*, 26 November 2021, https://www.huffingtonpost.it/entry/pac-comincia-il-2deg-tempo-ambientalisti-allattacco-sul-piano-strategico-nazionale_it_61a092f6e4b07fe201178909/. See also A.GIACARDI, P.MANZONI, F.PIERANGELI, G.MAZZOCCHI, R.CAGLIERO, *Il percorso di definizione dei Piani Strategici Nazionali PAC 2023-2027 negli Stati membri regionalizzati: un confronto fra Italia, Francia e Spagna* in *Agrireregionieuropa Numero Speciale - Agricalbriaeuropa n. 1, Ott. 2021. As is* well known, on 23 November 2021, the European Parliament definitively

The choice of a simple 'restructuring' of the old proposals as opposed to the hypothesis of a new formulation of the same has in fact created strong opposition from environmental groups who, in no uncertain terms, have spoken of the existence of a 'double track'. On the one hand there would be the bold and ambitious statements of the Commission supporting the Green Deal and the Farm to Fork strategy⁸⁵ combined with the awareness of the merciless analysis of the Court of Auditors which, as we have said, substantially rejected the old CAP, stating that it had spent more than 100 billion euro without succeeding in decreasing the greenhouse emissions produced by agriculture and therefore without having a significant effect on the climate. On the other hand, there is the undeniable fact that a clear majority of the European Parliament voted for the new Common Agricultural Policy, which does not sever the links with the old schemes and takes up some of the criticised points, also at the operational level, of the old CAP⁸⁶.

approved the new CAP. The regulation on the CAP's strategic plans was approved by **452 votes in favour, 178 against and 57 abstentions**, the horizontal regulation on financing, management and monitoring by **485 votes in favour, 142 against and 61 abstentions**, and the regulation on the common market organisation by **487 votes in favour, 130 against and 71 abstentions**. The new CAP was approved with the votes of the European **People's Party** and the Renew **Liberals** in favour; on the contrary, the **Socialists and Democrats** were divided on the issue, while the **Left** and the **Greens** were strongly opposed <https://www.europarl.europa.eu/news/it/press-room/20211118IPR17613/approvata-in-via-definitiva-la-riforma-della-politica-agricola-comune>.

⁸⁵ D.MARANDOLA, *Le ambizioni green della PAC post-2020*, in *Agriregionieuropa* Special Issue *Agricalabriaeuropa* no. 2, Nov. 2021: <https://agrireregionieuropa.univpm.it/it/content/article/31/58/le-ambizioni-green-della-pac-post-2020>.

⁸⁶ See F. LUCA, *Strasburgo approva a larga maggioranza la riforma della Politica Agricola Comune*, in *Eunews* of 23 Nov. 2021, the author traces the debate in Strasbourg and the reactions to the vote, <https://www.eunews.it/2021/11/23/strasburgo-approva-a-larga-maggioranza-la-riforma-della-politica-agricola-comune/163030>.

On this, however, the debate is wide-ranging and very articulate, since it is authoritatively observed that the 'new' enhanced cross-compliance measures, which everyone is called upon to put into practice in order to obtain the basic payment, are in fact much more 'selective than in the past', on an in-depth technical-agronomic analysis, they are - it is stated - important commitments that take the form of nine "good agronomic and environmental conditions" (GAEC) and eleven "compulsory management criteria" (SMRs) among which some are very significant such as crop rotation at least once a year at plot level or the minimum 4% of arable land allocated to non-productive areas and elements⁸⁷. From this point of view, already agriculture that complies with the 'new cross-compliance' would therefore have a far greater positive impact on climate and environment than in the past.

Certainly the desire to consider a "clear link with CAP and Green Deal climate-environmental priorities" as "strategic" and the need to highlight the connection with reference to the individual measures was, from the outset, present in the essential elements that are called upon to characterise

⁸⁷ The reference is to GAEC 7 and 8. In this sense the report of A. FRASCARELLI, (President of ISMEA) at the conference on '*Lights and shadows of the CAP national strategic plan for the agro-ecological transition of Italian agriculture*' organised, on 17 March 2022, by the coalition Cambiamo Agricoltura. We often speak of practices that were previously part of *greening* and that are now included among the measures of enhanced cross-compliance, thus expanding the commitments to be fulfilled, even only for the basic payment. See, for a detailed analysis, the Report by AA.VV. *Agroecologia e PAC. Un'analisi degli strumenti della programmazione post 2022*, p. 28 ff. <https://www.reterurale.it/flex/cm/pages/ServeAttachment.php/L/IT/D/3%252Fa%252F0%252FD.5ccc9711e548fa8dd964/P/BLOB%3AID%3D22394/E/pdf>.

the "green architecture"⁸⁸ of our National Strategic Plan (NSP)⁸⁹. Moreover, it could not have been otherwise, given that the general objectives in Article 5 of Reg. 2021/2115 (letter b) speak of supporting and strengthening environmental protection, including biodiversity and climate action, and contributing to the achievement of the Union's environmental and climate objectives, including the commitments under the Paris Agreement.

However, do these what we have called the 'centrality' of climate concerns and the EU's ambitious general strategic objectives on the subject correspond to operational measures capable of delivering results, of being effective in the agricultural sector?⁹⁰ In the objective difficulty of orienting

⁸⁸ This is one of the working documents entitled 'Green Architecture', dated September 2021, that marked the path towards the approval of the National Strategic Plan. The work began with the MIPAFF's involvement of the Regions and Autonomous Provinces in order to outline the national framework of interventions and was marked by the principles of participation and consultation on the choices with which to shape the contents of the CAP in our country. Decisive in this sense was the constitution of the Partnership Table for the construction of the National Strategic Plan (PSN) in which, in addition to institutional representatives, exponents of the trade union world, cooperation and agricultural associations participated. The documents are available at https://www.reterurale.it/PAC_2023_27/Approfondimenti. Some environmental associations complain about a merely 'formal' participatory process <https://www.cambiamoagricoltura.it/semaforo-rosso-per-la-transizione-ecologica-dellagricoltura/>.

⁸⁹ The National Strategic Plan as submitted, on schedule, to the Commission on 31 December 2021, is available at: https://www.reterurale.it/PAC_2023_27/PianoStrategicoNazionale. See also the "press release" of Minister Stefano Patuanelli <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/17717>. The EU Agriculture Commission will evaluate the plan proposal according to the provisions of Art. 118 of Reg. 2021/2115 and will have to pronounce "at the latest within six months" from the submission of the plan on its "exhaustiveness" "uniformity" and "consistency" with the general principles of the Union and the specific provisions of Reg. 2021/2115.

⁹⁰ He effectively speaks of "emphasis on announced reforms" F. ALBISINNI, *La nuova PAC e le competenze degli Stati membri tra riforme annunciate e scelte praticate*, *Riv.dir.agr.*, 2020, I, p.43 ss. In the study by Birdlife and EEB, conducted on 23 strategic plans, as many as 18 were found to be barely sufficient or in any case very poor in relation to the needs of combating climate change and protecting biodiversity: the results, which are very detailed, can be consulted on the web at <https://www.birdlife.org/news/tag/cap/>.

In fact, the Commission is called upon to "put its face to the name" on the evaluation and effectiveness of implementation by the Member States. By 31 December 2023, according to Art. 141, Reg. 2021/2115 the Commission will have to present a summary report of the CAP Strategic Plans to the Parliament and the Council including "an analysis of the joint effort and collective ambition of the Member States" to achieve the objectives of the CAP, in particular those related to climate change, natural resources, biodiversity and the increased focus of society on food and health⁹⁴ .

Among the additional elements of uncertainty, in addition to the EU's 'judgement', that currently characterise the Italian way of implementing CAP measures are two. On the one hand, there are unknowns and much 'unwritten' at the level of 'governance', but one thing is certain, the choices of the Regions will be decisive and will play an important role in the activation or otherwise of the measures envisaged⁹⁵ . On the other, it is clear that the implementation phase is destined to intersect with the operational plans of the PNRR, which, as was noted in a recent study, 'certainly places the emphasis on productivity and innovation' and 'shyly turns its attention to the environment'⁹⁶ .

⁹⁴ It cannot be said that, on this point, the Commission was not clear from the outset in outlining the way towards 'appropriate strategic plans': Member States are required to set explicit national values with reference to the various objectives of the Green Deal, which they must integrate into their respective plans. "National values will translate the common ambition of each Green Deal target into specific goals to be aspired to at the national level. By comprehensively examining all the national values established, it will be possible to assess whether the EU, as a whole, is on track to achieve the Green Deal objectives" thus COM(2020) 846 final, cit.

⁹⁵ See, S.MASINI, *Pianificazione nazionale e ruoli di Stato e Regioni nell'ottica della nuova PAC*, cit., p.51.

⁹⁶F.COLI, *Green revolution e agri-food: la strategia del PNRR tra esigenze europee e nazionali*, in *Next Generation EU. Reading the PNRR*, Pandora Rivista, no.2/2021 p. 248.

7. Difficulties in identifying appropriate instruments in the National Strategic Plan to make livestock farming sustainable

The Strategic Declaration of the NSP opens, with a sort of effective "environmentalist" manifesto, showing how it intends to achieve "the ecological transition of the agricultural, food and forestry sector", which is indicated as the key objective around which the entire implementation path of the CAP must revolve. The architecture thus seems to be defined: "in total, about 10 billion euros, between Pillar I and Pillar II, are earmarked for interventions with clear environmental aims, to which are added the other interventions that in any case contribute to the ecological transition of our production system. In this framework, great importance will be given to the five national eco-schemes, to which 25 per cent of direct aid resources will be allocated, that will support farms in adopting agro-ecological practices for climate-environmental sustainability. The eco-schemes will operate in synergy with the 26 agro-climatic-environmental interventions (ACA) (EUR 1.5 billion), sustainable forestation interventions (EUR 500 million), productive, non-productive and infrastructural investments for environmental purposes (EUR 650 million), with the environmental actions foreseen in the sectoral interventions and the environmental investments of the PNRR, an integral part of this strategy"⁹⁷. On the other hand, the first technical and economic analyses available on the data of the NDP show a series of criticalities that point to a 'conservative' or excessively timid, if not even cat-and-mouse attitude on the part of the Italian government⁹⁸. One example for all: agri-environmental interventions under rural development often appear to overlap with ecoschemes and thus seem destined not to be

⁹⁷ See p. 40 of the PSN cited above, footnote 23.

⁹⁸ Thus effectively, F. FERRONI's speech at the above-mentioned conference

chosen because they are of little economic interest to farmers, resulting in lower payments⁹⁹. Sticking to our original approach, we would like to dwell, albeit obviously in a cursory manner for the reasons already mentioned, on some elements of the NDP concerning animal husbandry: it can truly be said that the mountain has given birth to the mouse. Exemplary on this point is the analysis of the premises from which it starts, which are really well written and wide-ranging and seem to aim at 'a "holistic" approach that deals with livestock farming conditions as a whole' 'pursuing the concept of "One Health" - in the sense of protection of people's health, animal health and environmental sustainability -' identified as a key element of the new CAP¹⁰⁰. In fact, it is stated therein that 'a gradual and joint improvement path between agricultural, health and environmental competences is necessary in order to create broader and multifactorial innovative approaches', livestock farming activity must be included 'in a circular economy model' that will be able to guarantee 'also an economic advantage to breeders and farmers who direct their activity towards a new model of sustainable livestock farming, with the intention of responding to the challenge of greater productivity and lower environmental impact'.

However, it is difficult to see how, with the measures indicated in the plan, these ambitious goals are to be achieved. It is precisely in this matter, in fact, that the perplexities put forward by several parties and in various fora,

⁹⁹ In this again F. FERRONI, intervention, cit. It should not be forgotten that the 26 agro-climatic environmental interventions of the second pillar must then be implemented by the regions and at the moment there is no activation obligation.

¹⁰⁰ The reference to the 'One Health' approach is on p. 826 of the Italian Strategic Plan. M. IANNETTA, R. MORABITO, R. (2020) mention this new approach. *One Health: la lezione del Coronavirus, in Energia, Ambiente e Innovazione*, 1/2020, 98-101. <https://www.enea.it/it/seguici/pubblicazioni/pdf-eai/n-1-gennaio-aprile-2020/speciale-covid-onehealth.pdf>.

starting with the work within the framework of the Partnership Table¹⁰¹ , seem to be shared. The so-called eco-scheme on zootechnics, which actually more precisely concerns the 'Support for the reduction of veterinary drugs and animal welfare' (PD 05 - ES 1)¹⁰² , in any case with targets that are too timid and not in line with the European average, does not substantially affect the current zootechnical system and does not take up the excellent operational suggestions that can be derived from the Recommendations and the Court of Auditors' Report. In fact, no target is set for reducing the density of animals on farms, no mention is made of grazing plans that set limits for livestock loading, no mention is made of reducing the use of concentrated feed¹⁰³ . For this reason, the Birdlife study on the Italian strategic plan even spoke of 'perverse subsidies' in that 41% of the contributions from ecoschemes and 40% of coupled support would go to the livestock sector, without any specific commitment to reduce the intensity of its impact on the climate¹⁰⁴ . The planned measures are, however, too general. Here is an example, which may seem trivial, but is effective: talking

¹⁰¹ See some of the criticisms of environmentalists in *The New Ecology* of 28 December 2021, <https://www.lanuovaecologia.it/pac-piano-strategico-nazionale-italia/>.

¹⁰² See the useful 'guide' to ecoschemes prepared by the Editorial Board of *Terra e Vita*, No. 7, 25 February 2022.

¹⁰³ In *La nuova ecologia*, cit, it is stated that 'the eco-scheme on livestock farming' 'in the face of a 41% increase in resources, leaves the current livestock system and its impacts virtually unchanged' <https://www.lanuovaecologia.it/pac-piano-strategico-nazionale-italia/> Even in the 'observations' to the 31 December 2021 draft of the NSP, presented by the 'Let's change agriculture' Coalition, already mentioned, it is stated that 'the implementation of the NSP will not produce any significant result in terms of reducing climate-changing emissions from agricultural sources' precisely, in large part, due to the failure to 'restructure the livestock sector': a downsizing of it would have affected the ratio of farm effluent load to cultivated areas by obtaining 'the not marginal additional climatic benefit of reducing the emissions that our livestock sector 'externalises' to third countries through the import of feed'.

¹⁰⁴ The data of the study are reported by M. DHASKALI (EU agriculture policy officer for the environmental NGO Birdlife) in his speech at the Cambiamo Agricoltura conference, mentioned above.

about grazing may be welcomed, but it is useless if minimum grazing days are not fixed.

8. Insufficient provisions for the protection of biodiversity: difficult to meet the objectives of the European Strategy

The protection of biodiversity is expressly mentioned among the key objectives of the CAP in an extremely detailed and absorbing form where it speaks of "contributing to halting and reversing the loss of biodiversity, improving ecosystem services and preserving habitats and landscapes"¹⁰⁵ . Even in the pages of the Court of Auditors' oft-referenced report, a strong

¹⁰⁵ We are talking about strategic objective 6 on which the analysis by A. TRISORIO and P.LAURICELLA *L'Italia e la PAC post 2020 - Policy Brief 6* appears very useful in the context of the study conducted for the National Rural Network 2014-2020. SO6: *Contributing to the protection of biodiversity, enhancing ecosystem services and preserving habitats and landscapes*, 2019, p. 37-40. There has long been an awareness of the centrality of this issue in the international and European policy debate, one need only recall the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Our life insurance, our natural capital: an EU biodiversity strategy to 2020' of 3 May 2011, COM (2011) 244 final. The topic of biodiversity protection is widely studied in the doctrine, among the experts in agricultural law we mention : L. PAOLONI, *Diritti degli agricoltori e tutela della biodiversità*, Turin, 2005, *passim*; S. MANSERVISI, *L'incidenza delle norme di diritto internazionale pattizio sul diritto agrario comunitario e nazionale e la Convenzione sulla diversità biologica* , in *Il Nuovo diritto agrario comunitario*, 2005, p. 511 ss; L. RUSSO, *Agricoltura e tutela della biodiversità*, in A. GERMANÒ, D. VITI (eds.), *Agricoltura e beni comuni*, Milan, 2012, p. 187 ss; E. SIRSI, *La tutela delle risorse genetiche in agricoltura*, in L. COSTATO, A. GERMANÒ, E. ROOK BASILE (ed.), *Trattato di diritto agrario*, vol. 2, *Il diritto agroambientale*, Torino, 2011, p. 493 ss; L. CORBETTA, *La tutela della biodiversità alla luce delle principali convenzioni internazionali*, in N. FERRUCCI (ed.), *Lezioni (...)*, cit., p. 22 ss.

interconnection between biodiversity protection and climate change emerges¹⁰⁶ .

On this point, moreover, "there is ample scientific evidence" both of how climate change is causing significant alterations to biodiversity and ecosystem services, "mainly through increases in average temperatures, modification of precipitation processes, and the occurrence of extreme events (hurricanes, storms, heat waves, prolonged periods of drought)" and, conversely, that biodiversity conservation measures can play an active role in reducing the negative effects of climate change¹⁰⁷ . "Measures of biodiversity conservation, environmental restoration and sustainable management of agricultural and forestry areas and fisheries" in fact, "by providing protection for crops and animals, reducing erosive phenomena

¹⁰⁶This is also emphasised in the Ispra document available online: <https://www.isprambiente.gov.it/it/attivita/biodiversita/le-domande-piu-frequenti-sulla-biodiversita/quali-sono-le-relazioni-tra-biodiversita-e-cambiamenti-climatici>. More generally on the interaction between the effects of climate change and biodiversity, see the study carried out by the Technical Table, at the Ministry of the Environment, Land and Sea, on "Climate change and biodiversity. Study of mitigation and proposals for adaptation", as part of the project 'Towards a National Biodiversity Strategy', and therein the context analysis and project proposals, https://www.mite.gov.it/sites/default/files/archivio/allegati/biodiversita/TAVOLO_4_CAMBIAMENTI_CLIMATICI_completo.pdf. For all L. PAOLONI, *Biodiversità e risorse genetiche di interesse agroalimentare nella legge nazionale di tutela e valorizzazione*, in *Dir. agroalim.*, 2016, no. 1, p. 157. He observes how the National Biodiversity Strategy, "has included climate change as one of the three key issues and identified it as one of the three strategic objectives" L.CICCARESE, *Cambiamenti climatici e biodiversità*, in *IdeAmbiente*, no. 48, September/October 2010, p. 34

¹⁰⁷ In these terms L. CICCARESE, *Cambiamenti climatici e biodiversità: impatti e adattamento*, in *Reticula*, no.4, 2013, p.24 to which reference is made for the bibliography cited there. The ways in which a system or species is affected, both unfavourably and beneficially, by climate variability or climate change are analysed in detail in the *National Strategy for Adaptation to Climate Change*, https://pdc.mite.gov.it/sites/default/files/allegati/Strategia_nazionale_adattamento_cambiamenti_climatici.pdf

and the effects of extreme climatic events such as floods and hurricanes, improving the physical and chemical characteristics of water, and contributing to the income building of rural communities affected by climate change", would not only be able to stem the effects of climate change but also seem capable of contributing to a decisive turnaround¹⁰⁸ .

The analysis of 23 national strategic plans carried out by experts from various European countries and coordinated by Birdlife europe and the European Environmental Bureau (EEB) shows that, even when focusing on a single, significant objective, that of allocating at least 10 % of agricultural land to landscape features with high diversity¹⁰⁹ , envisaged by the European Strategy, none of the countries surveyed presented adequate measures¹¹⁰ .

The document containing the recommendations to Italy, in view of the drafting of the strategic plan, expressed itself in alarmist tones with reference to the protection of biodiversity, describing the situation in our country as 'steadily worsening, especially as regards birds, species and habitats linked to farmland' and affirming the need to 'halt and reverse the loss of biodiversity by promoting appropriate management practices and

¹⁰⁸ These are still the words of L.CICCARESE, *Cambiamenti climatici e biodiversità*, op.loc.cit. It is worth mentioning that there is ample literature on so-called "nature-based solutions (NBS)", cf. for a legal approach, P.CUCUMILE, *I cambiamenti climatici. spunti e prospettive*, in *Riv. Cammino Diritto*, fasc.1 2021, https://rivista.camminodiritto.it/public/pdfarticoli/6281_1-2021.pdf. In the study by the Ministry of the Environment, cit. at no. 106 we read, with extensive bibliographical references, how 'In order to address the problems induced by climate change, *ecological restoration* offers hope with regard to two crucial aspects: (1) the recomposition of fragmented ecosystems, allowing animals and plants to migrate in response to change and ecosystems to re-establish their structures and functions; (2) carbon sequestration through the reconstitution of forests, wetlands (which facilitate peat formation) and other ecosystems (which act as carbon sinks)" (*ibid.* p.31, italics ours).

¹⁰⁹ This is point No. 4 of the 'EU Plan for Nature Restoration: Key Commitments by 2030', which sets out the quantitative targets for member states to achieve, contained in the EU Biodiversity Strategy 2030, mentioned above.

¹¹⁰ See <https://www.birdlife.org/news/tag/cap/>. See supra note 90.

habitat restoration actions in favour of protected species and habitats, birds and pollinators present on farmland¹¹¹ .

In Italy, the discussion focused on the lack of a specific ecoscheme dedicated to the maintenance of functional areas, the protection of biodiversity and the natural elements of the landscape, which was originally foreseen in the drafts of the plan. Several parties have asked for it to be reintroduced because the interventions provided for under rural development, and in particular ACAs 10 and 11, appear to be related to fragmented, partly overlapping, unambitious and also scarcely "attractive" commitments, and the ecoschemes, both 3 referring to the preservation of olive trees of particular landscape value and 5 relating to specific measures for pollinators, are formulated in a reductive manner, are extremely sectoral, destined to operate in a losing logic, linked to the individual farm and not to the district: they are therefore insufficient and unsuitable instruments to compensate for the lack of a 'dedicated' ecoscheme¹¹² .

The topic will necessarily have to be linked to the more general National Biodiversity Strategy, which is currently being defined, on the basis of the

¹¹¹ These are words from the oft-cited document, SWD(2020) 396 final, p. 4 and p. 7. These tones are shared by Ferroni's report at the above-mentioned conference, which speaks of the possible "collapse" of ecosystems, recalling the data of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) on the risks linked to the loss of biodiversity and thus on the urgency of adopting effective solutions. See also ISPRA Report 349/2021, 'Summary of the conservation status of species and habitats of Community interest and actions to combat exotic species of EU importance in Italy', passim.

¹¹² L. PETTITI, DG Patrimonio Naturalistico e mare of MITE, at the already mentioned Cambiamo Agricoltura conference, expressed himself in these stark terms. These are the measures, within the framework of rural development, that can interact with the protection of biodiversity: ACA 9 - Management commitments for specific Natura 2002 habitats; ACA10 - Support for the management of non-productive investments; ACA11 - Active management of ecological infrastructures; ACA12 - Non-returnable crops, ecological corridors and strips. For an analysis of these measures see the fifth Coldiretti notebook of the series "Where the CAP is going" dedicated to the NSP, cit., p.55.

*technical-scientific indications emerging from the 'Fourth Report on the State of Natural Capital in Italy' prepared by the Natural Capital Committee*¹¹³.

*In this respect, however, the international contingencies do not seem to allow encouraging forecasts for the implementation of more decisive and ambitious protection mechanisms. Emblematic in this regard is the Decision with which the European Commission granted a **derogation, limited to the application year 2022**, on the use of the Ecological Focus Areas (EFA) of the old greening, still in force due to the transitional regulation of the CAP*¹¹⁴. The *recitals* of the most recent Decision indeed specify on the one hand the opportunity to increase agricultural production potential, both food and feed, to cope with the emergency caused by the war in Ukraine and observe how land left fallow remains suitable for the production of crops and is therefore ready for immediate use, but on the other hand they seem to place a precise constraint on environmental protection¹¹⁵. Indeed, *recital 7* states that 'When deciding on the application of derogations, Member States should take due account of the objectives of agricultural practices beneficial for the climate and the environment and, in particular, of the need for sufficient protection of soil quality and the quality of natural resources and

¹¹³ See Natural Capital Committee, *Fourth Report on the State of Natural Capital in Italy*, Rome, 2021. See the analysis dedicated to the impact of the agri-food sector on biodiversity (ibid., p. 242, ff.) and the positive, documented affirmation of how 'in the long term the organic method is proving capable of guaranteeing food safety and high qualitative and nutritional levels, while respecting human health and ecosystems' (p.250).

¹¹⁴ Commission Implementing Decision (EU) 2022/484 of 23 March 2022 providing for derogations from Regulation (EU) No 1307/2013 of the European Parliament and of the Council and Commission Delegated Regulation (EU) No 639/2014 as regards the implementation of certain conditions relating to the greening payment for claim year 2022 (notified under document number C (2022) 1875).

¹¹⁵ In this sense, *recitals 4 and 5* of the Decision.

biodiversity, especially during the most sensitive periods for flowering and bird nesting'. Never as in this case has the conditional tense, albeit typical of the language of *recitals*... really gives one pause for thought... In fact, there is no shortage of those who observe in concrete terms how the EFA areas of the *greening* 'largely used in Italy for **nitrogen-fixing crops without the use of pesticides**, may this year be used for other crops with spring sowing (maize and sunflower), **reverting to the use of pesticides**'¹¹⁶. **On the other hand**, even the postponement, announced in March 2022, of the presentation by the EU Commission of the legislation on the 'restoration of nature', planned with great emphasis as part of the European strategies¹¹⁷, in order to set an example for other countries by being the first at EU level to impose precise 'restoration of nature' constraints cannot be read as a positive sign.¹¹⁸

9. Organic agriculture in the Italian Strategic Plan

¹¹⁶ In these terms F.FERRONI, *Ecco perché fermare la legge europea per il restauro della natura è un pericolo per la sicurezza alimentare*, in *Il Salvagente*, 24 March 2022. Indeed, *recital* 5 of the Decision under review states that 'Member States should be allowed to derogate from conditions relating to the payment of greening, including the use of plant protection products'.

¹¹⁷ As part of the EU Biodiversity Strategy, the Commission committed to proposing "legally binding nature restoration targets in the EU in 2021 to restore degraded ecosystems, particularly those potentially most capable of capturing and storing carbon, and to prevent and reduce the impact of natural disasters" in this context it was stated "the Commission will require Member States to raise the level of implementation of existing legislation within specific timeframes, and will support them in this task; in particular, it will require them to avoid the deterioration of trends and the conservation status of all protected habitats and species by 2030" (*ibid.*, p. 7 ff.)

¹¹⁸ For an analysis of the impact of the news of 23 March 2022 '**Today, the European Commission postponed its highly anticipated proposal for an EU Nature Restoration Law without setting a new publication date' and the reactions to it**, see <https://eeb.org/public-reaction-to-the-commissions-decision-on-delaying-the-nature-restoration-law/>.

In conclusion, it seems important to us, on the one hand, to highlight at least one positive aspect that is certainly contained in the NSP and, on the other, to highlight how, in response to the European Commission's timely critical remarks the discussion tables have been reopened and additions and improvements are therefore awaited that will be able to take into account the studies published so far and the suggestions that are also emerging from the conferences that are being held aimed at deepening the opportunities that States cannot lose in implementing CAP rules at the local level, by interpreting and applying in a too timid and meagre form precisely the measures aimed at protecting the environment and climate¹¹⁹ .

If we start, as always, from the words contained in the Strategic Declaration, the important, priority role reserved for organic agriculture and animal husbandry stands out¹²⁰ . "The Plan," it says, "recognises the importance of organic farming as a privileged production technique for contributing to the achievement of all the environmental objectives envisaged; with this in mind, some 2.5 billion euros are allocated to the sector over the five-year period as part of rural development. The allocation already provided for under rural development (EUR 1.5 billion) is in fact supplemented by an additional allocation of about EUR 1 billion, partly transferred from Pillar I (EUR 90 million/year) and partly from increased national co-financing'.

It is the only case within the NSP in which a quantitative target to 2027 is indicated, that of 25% of the UAA being organic, and while this alone is not

¹¹⁹ In this sense, some of the Commission's criticisms of our NSP are emblematic, even though they are based - as noted in the document - only on the 'partial content available'. In fact, it is considered as 'unlikely' that the proposed plan can sufficiently and effectively contribute to the achievement of environmental and climate objectives 'in particular with regard to water, air, nutrients and biodiversity in agricultural soils and forests, as well as emission reduction and carbon sequestration'. Ibid, relief no. 11.

¹²⁰ These are PSN's words on p. 40 ff.

sufficient, for many it seems to be the only instrument capable of effectively pursuing some of the objectives common to all the European 'strategies' mentioned above.

These data, which IFOAM compared with those of other Member States, show how Italy, which certainly started from a good position, has set itself, compared to others, significant and ambitious targets¹²¹.

A study of the analysis documents published to date, show the NDP as a still provisional document: it seems that there is still room for adjustments and modifications that would, for example, disprove the widely diffused idea of Eco-Schemes being used not in their institutional function as instruments dedicated to the environment and climate, a guarantee of an active transition towards sustainability, but as a sort of compensation for the losses

¹²¹ The IFOAM (International Federation of Organic Agriculture Movements) in June 2021 presented a prospective analysis study of the NDPs submitted by European countries, aimed at showing the different strategies through which the EU target of 25 % organic is expected to be reached and assessing the budget needed to do so https://www.organicseurope.bio/content/uploads/2021/06/ifoameu_advocacy_CAP_StrategicPlansAnd25Target_202106.pdf?dd. To the study *Prospect & developments for organic in national CAP Strategic Plan*, was added the update published on 3 March 2022 *Evaluation of support for organic farming in draft CAP Strategic Plans (2023-2027)*. The comparative analysis is very useful and shows important differences between countries. For example, many do not even set themselves a precise target to be reached within their NDPs (Bulgaria, the Czech Republic, Estonia, Spain, the Netherlands), others set themselves a target but do not seem to allocate sufficient funding to reach it or do not allow organic farmers access to ecoschemes, and others, such as France, seem to focus on less ambitious production models than organic, called 'High Environmental Value Farming'. For details and effective summary tables showing the situation in the different states: https://www.organicseurope.bio/content/uploads/2022/03/IFOAMEU_CAP_SP_feedback_20220303_final.pdf?dd.

of some sectors resulting from the reform of the historical bonds¹²². In fact, the debate seems destined to go on, especially with an effective involvement of MITE, perhaps in response to the Commission's 'observations'¹²³, and we can only hope that the road to ecological transition, which is already partly underway, will be followed with courage and determination, in the knowledge that it is precisely those companies that choose agro-ecological models that are the most resilient... with respect to political choices and also to external inputs. This could already be realised starting from important MITE suggestions which, rightly, did not consider the 'game' of the NDPs absolutely closed with the sending of the December 2021 outline, considering it necessary to reopen the Partnership Table to propose, for example, making the implementation of some ACAs by Regions and Autonomous Provinces compulsory and to realise the necessary coordination with other policies and instruments, only mentioned in the

¹²² *Ex multis* for the WWF: 'The proposed new eco-schemes essentially respond to the logic of compensating for the reduction of subsidies to large farms brought about by the reform of historical titles and internal convergence, while overshadowing effective commitments to protect the environment and combat climate change', <https://www.wwf.it/area-stampa/piano-strategico-nazionale-della-pac-contro-natura/>.

¹²³ The Partnership Table of the CAP met on 19 April 2022, in order to resume the discussion on the points still open and in view of the need to adapt, modify and complete the missing parts of the Strategic Plan following the 244 observations made by the Commission. For an analysis of the salient points under discussion aimed at identifying corrective measures in line with the Commission's criticism, see Reterurale <https://www.reterurale.it/flex/cm/pages/ServeAttachment.php/L/IT/D/9%252F6%252F0%252FD.42edf3270a559ff2a501/P/BLOB%3AID%3D23074/E/pdf>. It emerges the will to submit an updated version to the Commission by the end of July 2022: see Mipaaf press release: <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/17324>; S. MARTARELLO, *Pac 2023-2027, le osservazioni dell'Ue al Piano strategico dell'Italia*, in *Terra e vita*, 3 April 2022 <https://terraevita.edagricole.it/economia-e-politica-agricola/pac-osservazioni-ue-piano-strategico-italia/>.

NDP. For example, there is mention of the need to highlight synergies with the Natura 2000 PAFs (Prioritised Action Frameworks), i.e. the 'Prioritised Action Frameworks for the Natura 2000 Network' that the 21 Italian Regions and Autonomous Provinces have adopted to ensure organic action for the protection of biodiversity in Natura 2000 sites, and with the National Action Plan for the Sustainable Use of Plant Protection Products (NAP)¹²⁴. A 'suspension' instead of some measures, due to contingent causes that have also been discussed, would risk having deleterious effects, also in terms of communication and impact on civil society and consumers who are already on the march towards food choices under the banner of sustainability¹²⁵.

¹²⁴ MITE's remarks highlight how these 'plans' are only mentioned but never integrated into the planned measures.

¹²⁵ Indicative in this respect is the Coop Report 2021 on Italians' consumption and lifestyles, which states that 'the new food culture passes through the climate' and that 'the new focus on global warming and climate change is particularly surprising. Today, in fact, more than one sixth of Italians say they recognise themselves in a *climate* identity'. <https://www.italiani.coop/wp-content/uploads/2021/09/rappcoop21.pdf>.

Cultivating Sustainability: Navigating the EU Legal Landscape in Organic Farming Amidst Climate Change Challenges

Authors: Mariagrazia Alabrese – Eloisa Cristiani

Organic farming was regulated by voluntary international standards long before the European legislator introduced the first legal discipline.¹²⁶ The EU intervened for the first time with the Regulation no. 2092/91¹²⁷ aiming at regulating the organic production method. This discipline outlined a harmonised regulatory framework for the production, labeling and control of products characterized by the use of cultivation techniques aimed at eliminating the deployment of fertilizers and pesticides deriving from chemical synthesis. The scope of the legislation initially concerned only

¹²⁶ The International Federation of Organic Agriculture Movements (IFOAM) introducing international standards dates back to 1972. See Geier B., *IFOAM and the history of the international Organic Movements*, in W. Lockeretz (ed.), *Organic farming: an international history*, [Wallingford](#), 2007, 175 ss.

¹²⁷ Council Regulation (EEC) No 2092/91 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs. See Cristiani E., *Prodotti dell'agricoltura biologica*, in P. Borghi - I. Canfora - A. Di Lauro - L. Russo, *Trattato di diritto alimentare italiano e dell'Unione europea*, Milano, 2021, 454 ss.; I. CANFORA, *L'agricoltura biologica nel sistema agroalimentare. Profili giuridici*, Bari, 2002, 20; E. CRISTIANI, *La disciplina dell'agricoltura biologica fra tutela dell'ambiente e sicurezza alimentare*, Torino, 2004, 50.

unprocessed vegetable products and foodstuffs composed essentially of vegetable ingredients. Only with the Regulation no. 1804/99, of 19 July 1999, applicable from August 24, 2000, the discipline was extended to animal products.¹²⁸

It is also worth mentioning that the regulations disciplined the method of production and did not refer to the products. The rules relating to the labeling of the organic production method aimed to guarantee the consumers about the production methodology applied in the breeding of animals and cultivation of plants rather than to the product obtained. This is made clear in the article 10 par. 2, of the Regulation 2092/91, according to which «No claim may be made on the label or advertising material that suggests to the purchaser that the indication shown in Annex V [i.e. ‘organic farming’] constitutes a guarantee of superior organoleptic, nutritional or salubrious quality.» In fact, the guarantee does not pass down from the process to the product.

This legislation was replaced by Regulation 834/2007,¹²⁹ complemented for the implementation by Regulation 889/2008.¹³⁰ According to this discipline, organic production is deemed to be «an overall system of farm management and food production that combines best environmental practices, a high level of biodiversity, the preservation of natural resources, the application of high animal welfare standards and a production method in line with the preference of certain consumers for products produced using natural substances and processes. The organic production method thus plays a dual societal role, where it on the one

¹²⁸ Council Regulation (EC) No 1804/1999 of 19 July 1999 supplementing Regulation (EEC) No 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs to include livestock production.

¹²⁹ Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91.

¹³⁰ Commission Regulation (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control.

hand provides for a specific market responding to a consumer demand for organic products, and on the other hand delivers public goods contributing to the protection of the environment and animal welfare, as well as to rural development.»¹³¹

As of 1 January 2022, the EU legal framework for organic production is provided by Regulation 2018/848.¹³² Its application date was postponed by one year by Regulation 2020/1693 because of the COVID-19 pandemic and the related public health crisis.¹³³ This new regulation significantly broadens the scope of the EU's legislation on the production and labelling of organic products to also cover products closely linked to agriculture, such as cork, salt, essential oils, cotton and wool.¹³⁴ It also reviews the livestock organic production rules and introduces rules for new species, such as rabbits. There is a sector to which the new Regulation does not apply, which is the field of mass catering operations. According to recital n. 14, because of the local nature of mass catering operations, measures taken by Member States and private schemes in this area are considered adequate to ensure the functioning of the single market. This means that food prepared by mass caterers should not be labelled or advertised with the organic production logo of the European Union.¹³⁵

A key point of the Regulation 2018/848 is related to the harmonization of the rules applicable to organic operators in the EU Member States and non-EU

¹³¹ Council Regulation (EC) No 834/2007, recital 1.

¹³² 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. See Lucifero N., *Il regolamento (UE) 2018/848 sulla produzione biologica. Principi e regole del nuovo regime nel sistema del diritto agroalimentare europeo*, in *Riv. dir. agr.*, 2018, I, 447 ss.

¹³³ Regulation (EU) 2020/1693 of the European Parliament and of the Council of 11 November 2020 amending Regulation (EU) 2018/848 on organic production and labelling of organic products as regards its date of application and certain other dates referred to in that Regulation.

¹³⁴ See Annex 1 to the Regulation (EU) 2018/848.

¹³⁵ See also article 2, par. 3.

countries through the introduction of a compliance system. This is aimed on the one side to respond to consumer expectations that imported organic products meet standards as high as those of the Union; on the other side, to ensure the access of Union organic products to the international market. Indeed, a product may be imported from a non-EU country to be sold in the EU as an organic product if complies with the production and control rules of the non-EU country, which are recognised under an international agreement as being equivalent to those in the EU; and if it brings a certificate issued by the relevant control authorities or control bodies in non-EU countries confirming that the product complies with EU standards.¹³⁶

The second key aspect of the new discipline is related to small farmers. The Regulation 2018/848 simplifies access to the scheme of organic farming for small operators in so far as it introduces a new system of group certification for small farmers. A system of group certification may reflect better the needs and resource constraints of small farmers that individually may find inspection costs and administrative burdens linked to organic certification too high.¹³⁷ The possibility to rely on group certification may stimulate them to switch to organic farming.¹³⁸

Organic production forms part of the Union's agricultural product quality schemes, together with geographical indications and traditional specialities recognized under Regulation (EU) No 1151/2012 of the European Parliament and of the Council.¹³⁹ This is due to the link which is made clear by the legislation

¹³⁶ See Chapter VII of the Regulation (EU) 2018/848, «Trade with third countries».

¹³⁷ See Petrelli L., *La certificazione di gruppo: una nuova opportunità per i piccoli produttori biologici europei?*, in *Riv. dir. alim.*, 2015, fasc. 2, 50 ss.

¹³⁸ Articles 35 and 36 of the Regulation (EU) 2018/848. See L. PETRELLI, *La certificazione di gruppo: una nuova opportunità per i piccoli produttori biologici europei?*, in AA.VV., *I diritti della terra e del mercato agroalimentare. Liber amicorum Alberto Germanò*, vol. II, Torino, 2016, 1337.

¹³⁹ Regulation (EU) No 1151/2012 of the European Parliament and of the Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs.

between the method of production adopted under the organic certification and the quality of the product. Indeed, the observance of high standards for health, the environment and animal welfare in the production of organic products is deemed to be intrinsic to the high quality of those products. Of course, organic production is also considered as a model of sustainable agriculture.¹⁴⁰ The importance of the environmental issues is at the forefront of the discipline at stake. According to recital n. 5 of the Regulation 2018/848, organic farming contributes to the achievement of the objectives of the Union's environmental policy, and to the environmental legislation.¹⁴¹

In fact, organic production should comply with many environmental requirements, such as respecting natural systems and cycles; maintaining and improving the state of the soil, water and air, and plant and animal health, and the balance between them; preserving the natural landscapes; using energy and

¹⁴⁰ On sustainable agriculture, see Terry Gips, 'What is a Sustainable Agriculture?' in Patricia Allen and Debra van Dusen (eds), *Global Perspectives on Agroecology and Sustainable Agricultural Systems* (Proceedings of the Sixth International Conference of the International Federation of Organic Agriculture Movements 1988) 63; Olaf Christen, 'Sustainable Agriculture: History, Concept and Consequences for Research, Education and Extension' (1996) 74(1) *Berichte Uber Landwirtschaft* 66; Eric Lichtfouse et al (eds), *Sustainable Agriculture* (Springer 2009).

¹⁴¹ Such as 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; Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants; 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; Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds; Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources; Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. On organic farming and the environment, *inter alia*, Paola Migliorini-Alexander Wezel, '*Converging and Diverging Principles and Practices of Organic Agriculture Regulations and Agroecology*' (2017) *Agronomy for Sustainable Development*.

natural resources responsibly; excluding the use of genetically modified organisms (GMOs) and products produced from or by GMOs, as well as excluding animal cloning.

These objectives can be met by respecting biodiversity and using seeds and animals with a high degree of genetic diversity, disease resistance and longevity, or choosing plant varieties and animal breeds that take into account the characteristics of specific organic production systems. Moreover, to avoid adverse effects on the environment, producers are required to take preventive measures at each stage of production, preparation and distribution to prevent the occurrence of pests and diseases, as well as to take proportionate and precautionary measures to avoid contamination with products or substances not authorised for use in organic production.

As far as labelling is concerned, Regulation 2018/848 complements the general rules laid down in Regulation No 1169/2011.¹⁴² Thus, specific provisions aimed at protecting both the interests of operators in having their products correctly identified on the market and in enjoying conditions of fair competition, and the interests of consumers in being able to make informed choices. In order to protect organic farmers and increase consumer trust, the terms (and their derivatives and diminutives, such as ‘bio’ and ‘eco’) suggesting to the purchaser that the product, ingredients or feed materials have been produced in accordance with the Regulation 2018/848, shall not be used anywhere in the Union, in any language, for the labelling, advertising material or commercial documents of a product which does not comply with such Regulation. Moreover, a product for which Union law requires the labelling or advertising to state that the product contains GMOs, consists of GMOs or is produced from GMOs cannot be labelled using

¹⁴² Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers.

the organic production logo.¹⁴³ The logo can be used for products which contain only, or almost only, organic ingredients. It is therefore not allowed to use it in the labelling of in-conversion products or processed products of which less than 95 % by weight of their ingredients of agricultural origin are organic.¹⁴⁴

At the international level, in 2005 the Codex Committee on Food Labelling developed the Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods. This work by the Codex Alimentarius Commission shows the relevance of production and international trade in organically produced foods.¹⁴⁵

One of main goal of the EU legislator with the adoption of Regulation 2018/848 is to make a strong connection of the discipline related to organic farming with other European policies, such as the Common Agricultural Policy. This emerges from the recitals n. 3 and 4 of the Regulation that stresses how organic production is a system that contributes to the integration of environmental protection requirements into the CAP and that promotes sustainable agricultural production. This is the reason why measures that support organic production financially have been introduced under the CAP. In particular, the objectives of the organic production policy are embedded in the objectives of the CAP by ensuring that farmers receive a fair return for complying with the organic production rules.

The organic farming sector in the Union has developed rapidly in the past years, in terms not only of the area used for organic farming but also of the number of holdings and the overall number of organic operators registered in the Union.

¹⁴³ See Canfora I., *Ogm e agricoltura biologica*, in *Agr. Ist. Mercati*, 2006, 3, 427 ss; Sirsi E., *A proposito degli alimenti Ogm (note sulle regole di etichettatura di alimenti e mangimi costituiti, contenenti e derivati da OGM con particolare riferimento all'etichettatura negativa)*, in *Riv. dir. agr.*, 2005, I, 30 ss.

¹⁴⁴ See Chapter IV, article 30 of the Regulation (EU) 2018/848.

¹⁴⁵ See E. Morgera, C.B. Caro, G.M. Duràn, *Organic agriculture and the law*, FAO Legislative Study, No 107.

These numbers are destined to increase in the next years due to the attention given to organic farming under the European Green Deal¹⁴⁶ and the subsequent strategies, in particular the Biodiversity Strategy¹⁴⁷ and the Farm to Fork Strategy.¹⁴⁸ These strategies aim to reconcile food production with environmental protection while spurring investment and sustainable production, an objective that the Commission will seek to promote within the context of the Sustainable Development Goals.¹⁴⁹

In its Farm to Fork Strategy and the Biodiversity Strategy, the EU has introduced the ambitious objective of «at least 25% of the EU's agricultural land under organic farming and a significant increase in organic aquaculture by 2030». After the Commission defined this goal, the other EU Institutions endorsed the initiative: in its resolution of 15 January 2020 on the European Green Deal, the European Parliament highlighted that organic farming is a sustainable practice that has the potential to help the EU reduce its carbon emissions.¹⁵⁰ In the same fashion, soon after the Parliament, the Council, in its conclusions of 19 October 2020 on the Farm to Fork strategy, emphasized the role of organic production in a sustainable food system.¹⁵¹

Regulation 2018/848 was issued before these new documents and strategies were conceived. Thus, for aligning the EU organic production to the new objectives,

¹⁴⁶ EU Commission, The European Green Deal - COM(2019) 640 final 2019.

¹⁴⁷ EU Commission, 'EU Biodiversity Strategy for 2030. Bringing Nature Back into Our Lives - COM(2020) 380 Final' (2020).

¹⁴⁸ EU Commission, 'A Farm to Fork Strategy for a Fair, Healthy and Environmentally-Friendly Food System - COM(2020) 381 Final' (2020).

¹⁴⁹ Lattanzi P., *Il "New Green Deal", PAC 2021-2027 e sostenibilità delle produzioni alimentari*, in P. Borghi – I. Canfora – A. Di Lauro, L. Russo, *Trattato di diritto alimentare italiano e dell'Unione europea*, Milano, 2021, 705 ss.

¹⁵⁰ European Parliament resolution of 15 January 2020 on the European Green Deal: https://www.europarl.europa.eu/doceo/document/TA-9-2020-0005_EN.html.

¹⁵¹ Council conclusions on the Farm to Fork strategy: <https://www.consilium.europa.eu/media/46419/st12099-en20.pdf>.

the Commission set forth an action plan for organic farming concerning the 2021-2027 timeframe.¹⁵² Taking into consideration that in a business-as-usual scenario, the share of organic agriculture should reach between 15% and 18% of agricultural land by 2030, the action plan aims to encourage an increase of the share of organic farming in the EU, through encouraging farmers to convert to organic farming, also by boosting education and training opportunities. Indeed, an “extra effort” is necessary to reach a 25% target by 2030.

Among the actions suggested by the action plan, there is the integration of organic products into school meals and workplace canteens through public procurement, into the hospitality sector through incentives and visibility, into supermarkets through promotion campaigns. In order to promote organic products into everyday home cooking, the Commission acknowledges the need to address the issue of economic affordability of organic food, and to increase access to organic food for low-income families.

The action plan interestingly highlights that organic farming is a sustainable farming system and – at the moment – it is the only system which has been recognised by a robust certification method. This makes it clear that at the European Union level we have only one formal certification that can be placed under the umbrella concept of sustainable agriculture.

The action plan is organised along three axes that follow the structure of the food supply chain (production, processing, and retailers and consumers). Axis 1 is referred to the final part of the food chain and aims to stimulating demand and

¹⁵² EU Commission, ‘An action plan for the development of organic production’ - COM(2021)141’ (2021). See Sgarbanti G., *Il piano di azione europeo per l'alimentazione e l'agricoltura biologica*, in *Il nuovo diritto agrario comunitario*, Atti del Convegno di Ferrara-Rovigo 19/20 novembre 2004, Milano, 2005, 239 ss.

ensuring consumer trust in the EU organic logo.¹⁵³ With this purpose, this axis proposes measures finalized to increasing the awareness of the benefits of organic farming for the environment and also for people health. Under this axis, the Commission includes the action related to promoting organic canteens and increasing the use of green public procurement, specifying also that in the implementation of such procurement procedures, special attention should be paid to small farms, micro-enterprises and SMEs.¹⁵⁴

Moreover, the axis 1 suggests that, in line with the Farm to Fork strategy, Member States should prioritise the distribution of organic products under the EU school scheme. Indeed, the EU school schemes are a good tool for supporting the distribution of fruit, vegetables, milk and milk products to children. Combined with educational activities, school schemes can also reach the objective of reconnecting children with agriculture and teaching healthy eating habits, thereby encouraging a healthy diet and sustaining the short- and long-term consumption of the products under the scheme. To increase the consume of organic producing, the EU has also considered the need for improving trust of consumers and, in this regard, to trace products from the fork back to the farm, even by using digital technologies and digital passports. Artificial intelligence, blockchain and similar technologies can help strengthen organic certification, in particular by ensuring transparency along the supply chain and the traceability of products contributing to consumer trust. Control bodies play a fundamental role in this field. The European legislator has provided a detailed regulation on

¹⁵³ According to a Eurobarometer on this subject (available at <https://europa.eu/eurobarometer/surveys/detail/2665>), published in June 2022, 61% of consumers in the EU recognise the EU organic logo.

¹⁵⁴ In October 2019, the Commission issued new EU GPP criteria for food, catering services and vending machines (SWD(2019) 366 final - EU green public procurement criteria for food, catering and vending machines). See Boyano Larriba, A., Espinosa Martinez, M., Rodriguez Quintero, R., Neto, B., De Oliveira Gama Caldas, M. and Wolf, O., EU GPP criteria for Food procurement, Catering services and vending machines, EUR 29884 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-12119-0, doi:10.2760/748165, JRC118360.

the controls but, since the very first regulation 2092/1991, left the Member States free to designate the authorities responsible for the system of controls, regulating the possibility of conferring control tasks also to accredited private bodies that possess the necessary equipment and infrastructure and provide the guarantees of competence and impartiality identified by the European legal framework.

Axis 2 of the European action plan for organic farming is aimed at stimulating conversion of agricultural land to organic farming. The CAP remains a key tool for supporting the conversion. The CAP 2023-27 includes eco-schemes that can be deployed to boost organic farming. Measures to boost organic farming can also help the EU reduce its dependency on synthetic inputs. However, assessments by IFOAM Organics Europe found that the ambition of draft CAP Strategic Plans fell short of the Green Deal's 25% organic land target: achieving this target requires tripling the organic land area between 2019 and 2030,¹⁵⁵ while national measures and budgets to support organic farming are insufficient to significantly develop organic land in many countries.¹⁵⁶

A stronger criticism of the way in which the CAP, and in particular Member States, with their Strategic Plans are promoting organic farming comes from a review of 17 final National Strategic Plans published in December 2022.¹⁵⁷ This report highlights that several countries included the area of organic eco-schemes under indicator K.31 of the CAP related to preserving habitats and species. The analysis stated that «Organic farming has been shown to be beneficial for biodiversity, with studies showing that species richness on organic farms is higher than in conventional farming systems. However, the benefits of organic farming systems for biodiversity stem from a number of factors, including

¹⁵⁵ IFOAM, 2021, Prospects & developments for organic farming in national CAP Strategic Plans.

¹⁵⁶ IFOAM, 2021, THE AMBITION GAP Assessing organic farming support measures in current draft national CAP Strategic Plans for the Common Agricultural Policy 2023-2027.

¹⁵⁷ Birdlife International, EEB, «New CAP unpacked ...and unfit», December 2022, available at https://www.birdlife.org/wp-content/uploads/2022/12/New_CAP_Unpacked.pdf.

reduced management intensity and heterogeneity of the whole system - not required by the certification of organic production that is largely restricted to banning synthetic agrochemicals. Including large areas under this indicator can be extremely misleading. Organic farming can support in some member states extensive and biodiversity friendly systems in broad terms, but it does not include any provisions on improving the status of habitats and species and does not address key factors driving biodiversity loss neither on grasslands nor on arable land (e.g. grass harvest frequency and dates, semi-natural spaces, plot size). Including organic under indicator R.31 is therefore very problematic as it significantly inflates the supposed ambition without genuine action supporting biodiversity conservation and restoration.»¹⁵⁸

Moreover, axis 2 contains an important action which stresses the relevance of data analysis for shaping, monitoring and evaluating EU policy on organic production. Consequently, the axis has the development of data analysis, in particular on production, prices, trade and consumer preferences, amongst its objectives. In this regard, the Commission commits to publish regular reports on organic production in the EU and a yearly report on imports of organic products from third countries.

A further instrument that is to put in place under axis 2 is critical in the pathway towards sustainability and the reduction of climate change impact of the agri-food sector. It is related to the reinforcement of local and small processing factories of organic production for minimizing food mileage while ensuring organic farmers an outlet for their production and benefit from the added value of the processed food.

In line with the consideration of the organic farming as a key sector for realizing sustainable and resilient agri-food systems, axis 3 is devoted to step up the role of organic agriculture that could lead the way to a better use of natural resources.

¹⁵⁸ Birdlife International, EEB, «New CAP unpacked ...and unfit», p. 33.

Regulation 2018/848 on organic production introduces specific objectives and related principles to protect biodiversity, which will strengthen the role of organic farmers as promoters of biodiversity preservation. However, the issue of lower yield compared with conventional crops is acknowledged by the action plan, according to which the Commission is tasked to take steps towards the final objective of enhancing biodiversity and increasing yields. In this regard, research and innovation are central, as well as the farm advisory services, notably the Agricultural Knowledge and Innovation System (AKIS) that is receiving greater attention under the CAP 2022-27.

The contribution of organic farming to more sustainable food systems, however, could be watered down by using agricultural inputs, such as plant protection products having a lower impact on the environment and on the soil. Indeed, the legislation authorises certain substances, such as copper, which are harmful for soil and fauna, and once leaked into ground waters, can also have a negative impact on waters. In this regard, it is stressed the need for introducing and incentivizing the use of alternative plant protection products, such as those containing biological active substances. A great deal of attention is devoted to the pollution of both fresh waters and marine waters, which are currently under pressure due to pollution from nutrients, such as nitrogen and phosphorus, and pesticides. The extension of organic farming in the EU can contribute significantly also to the pesticide reduction target and the target on the reduction of the nutrients surplus.

1. Unveiling Organic Farming in Italy: An analysis of the Legal Framework

Italian agriculture has always shown great interest in organic farming. The number of operators in the field of organic producing exceeded 86,000 units

in 2021, with 2.2 million hectares of organically grown land.¹⁵⁹ Italy ranks among the first organic producing countries in Europe.

These figures place Italy at a favourable starting point for the achievement of the ambitious target set down by the EU Farm to Fork Strategy,¹⁶⁰ which requires a significant increase (up to 25%) in European organic farming by 2030.

The Italian legal framework for organic agriculture was updated after the adoption by the European Union of Regulation EU 848/2018. Currently the sector is regulated by the Italian Law n. 23/2022,¹⁶¹ which was followed by Decree 229771 of 20 May 2022 adopted by the Italian Ministry of agriculture for implementing the EU Regulation 848/2018.¹⁶²

According to the current Italian relevant discipline, organic production is deemed to be a comprehensive management system for farm and food production, based on the interaction between best environmental practices for conservation of natural resources and climate action. By applying strict production standards, such a system contributes to quality of products, food safety, rural development, environmental protection, preservation of

¹⁵⁹ CREA, *Annuario dell'Agricoltura Italiana 2021*, available at https://www.crea.gov.it/documents/68457/0/Annuario_CREA_2021_Volume_LXXV.pdf/49fc57e1-a325-50f4-22bb-d044d0f24dbe?t=1671527592245.

¹⁶⁰ EU Commission, 'A Farm to Fork Strategy for a Fair, Healthy and Environmentally-Friendly Food System - COM(2020) 381 Final' (2020).

¹⁶¹ Legge 9 marzo 2022, n. 23 - Disposizioni per la tutela, lo sviluppo e la competitività della produzione agricola, agro-alimentare e dell'acquacoltura con metodo biologico (GU Serie Generale n.69 del 23.3.2022).

¹⁶² Decreto recante disposizioni per l'attuazione del regolamento (UE) 2018/848 del Parlamento e del Consiglio del 30 maggio 2018 relativo alla produzione biologica e all'etichettatura dei prodotti biologici.

biodiversity and reduction of greenhouse gas emissions,¹⁶³ contributing to the achievement of the objectives of the 2030 Agenda for Sustainable Development.¹⁶⁴ Thus, the Italian law acknowledges the unique role of organic production for social development and environmental sustainability.

This broad definition of organic farming was amended before the adoption of the Law n. 23/2022, because its previous version raised a public debate which resounded at the international level.¹⁶⁵ A draft version¹⁶⁶ of the law granted legal recognition and, consequently also public funding, to biodynamic agriculture, a farming practice which scientists that questioned this choice considered as lacking scientific basis. The original article 1 of the Law, before its amendment during the legislative process, equated the biodynamic farming method to organic farming. But «while organic farming is precisely regulated by European standards, biodynamic agriculture has theoretical foundations and agricultural practices based on mystical and spiritual beliefs described a century ago by the founder of anthroposophy, the German philosopher, Rudolf Steiner. The foundations of biodynamic agriculture cannot be verified rationally, since they assume the existence of unspecified cosmic flows generating forces that would have a non-material

¹⁶³ Article 1, paragraph 2, Legge 9 marzo 2022, n. 23.

¹⁶⁴ UN General Assembly, Transforming our world: the 2030 Agenda for Sustainable Development, 21 October 2015, A/RES/70/1.

¹⁶⁵ Nicola Nosengo, Scientists call for clarity on new farming law, Nature Italy, 15 June 2021, available at <https://www.nature.com/articles/d43978-021-00072-z>.

¹⁶⁶ A first comment on the first draft id provided by E. Cristiani, L'agricoltura biologica come "attività di interesse nazionale con funzione sociale": osservazioni critiche sulla proposta di legge nazionale in discussione al Senato, in A. Di Lauro, G. Strambi (eds.), Le funzioni sociali dell'agricoltura, ETS, Pisa, 2020, p. 115.

origin. Additionally, the biodynamic certification is often awarded for a fee by private organizations».¹⁶⁷

Given the pivotal role of organic production for sustainability of agriculture, its promotion is pursued also through the creation of a new label for organic Italian products. According to article 5 of the Italian Law n. 23/2022, this label is aimed to characterise the organic products obtained from Italian raw materials. This provision implements article 33, paragraph 5 of the Regulation EU 848/2018, which states that national logos and private logos may be used in the labelling, presentation and advertising of organic products. The Italian organic label is the exclusive property of the Italian Ministry of agriculture and its use can be requested on a voluntary basis.

Since the very first EEC Regulation No. 2092/91, the European legislator has chosen to lay down detailed rules on the procedures, timing and documentation by which the system of organic controls must be organised, as well as the sanctions applicable in the event of irregularities or infringements, but the EU discipline has always left to the Member States the choice of the authorities and/or bodies to be tasked with the correct functioning of the system. It is therefore up to the Member States to set up the control system and to identify one or more authorities to be entrusted with the responsibility for the controls. The authority so designated may, in turn, confer control powers on one or more other supervisory authorities or rather delegate control tasks to one or more control bodies.

In the latter case, the inspection body should be accredited under the relevant harmonised standard for conformity assessment and comply with

¹⁶⁷ Gennaro Ciliberto, Fiorella Lo Schiavo & Alessandro Vitale, A welcome revision, but organic farming law still needs work, *Nature Italy*, 15 March 2022, available at <https://www.nature.com/articles/d43978-022-00035-y>.

the requirements of structure, impartiality and competence specifically listed by the European legislator. With a legislative act dated 2018,¹⁶⁸ in Italy the Ministry of agriculture has been appointed for managing the control system in the field of organic farming. This does not mean that the Ministerial officers carry out the controls directly, but it means that the Ministry delegates the actual performance of the control activity to private bodies "recognized" or accredited, on which the Ministry is required to exercise its supervision.¹⁶⁹

The recent Italian Law n. 23/2022 aims at improving the impartiality of the controls. In order to achieve this goal, it provides several principles and criteria that must be followed by subsequent regulation that should introduce: measures to ensure greater transparency and protection of competition through the definition of instruments for overcoming and resolving conflicts of interest between controllers and auditees; rules and instruments for protecting consumers by providing for the obligation to supply information on provenance, quality and traceability of organic products, including through the use of digital platforms.

The Italian Law also supports scientific research and training in organic agriculture. Article 11 provides that specific educational paths are promoted in the universities, with the possibility to activate master degrees, PhD programmes, and other training courses also devoted to teachers of secondary schools of public agricultural technical institutes. Article 12 provides that the State and the Italian regions promote theoretical and practical training for public officers responsible for carrying out the

¹⁶⁸ D.lgs. 23 febbraio 2018, n. 20 recante «Disposizioni di armonizzazione e razionalizzazione della normativa sui controlli in materia di produzione agricola e agroalimentare biologica.

¹⁶⁹ Germanò A., *Sugli Organismi di controllo*, in *Riv. dir. alim.*, 2018, fasc. 1, 66 ss.

inspections, and also for technical advisors and producers, in particular for producers who decide to convert from conventional to organic production.

As for the funding of these activities, it must be highlighted that since first years of 2000, the Italian ministry for agriculture has been managing a fund for research on organic and quality farming.¹⁷⁰ This law will partially reform the way in which this fund is utilized. Article 9 establishes the Fund for the development of organic production. Interestingly, it is financed, as it was in the past, by an annual contribution of 2% on revenues from selling fertilisers and agrochemicals used in conventional farming. This makes very much clear the preference and the most favourable treatment of organic production over conventional farming. Law n. 23/2022 provides that the fund is destined not only for financing research programmes, but also for other purposes, such as the Italian organic label.

According to article 7 of the Italian Law n. 23/2022 a national plan for organic production and organic products is expected to be adopted by the Ministry of agriculture in a few months.¹⁷¹ As of this writing, the Ministry has already launched a public consultation on a first structure of the plan which is based on three axes and very much mirrors the European plan for organic farming.¹⁷² Article 7 provides also twelve objectives that the Italian plan is expected to pursue, such as: 1. encouraging the conversion of conventional agricultural and agri-food operators to organic farming, with

¹⁷⁰ E. Cristiani Il prodotto biologico come prodotto di qualità, in *Agricoltura transgenica y calidad alimentaria. Analisis de derecho comparado*, A. Carretero Garcia (ed.), Ediciones de la Universidad de Castilla-La Mancha, Cuenca, 2011, 559.

¹⁷¹ Petrelli L., *Il piano di azione italiano per l'agricoltura biologica fra piano di azione europeo, nuova normativa italiana e riforma della politica agricola comune*, Cannara (Perugia), 2004, 17 ss.

¹⁷² The webpage for the public consultation is: <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/18456>.

particular regard to small producers; 2. supporting associative and contractual forms of organization amongst farmers to strengthen the creation of organic product chain; 3. encourage the consumption of organic products through information initiatives, training and environmental and food education, including catering; 4. monitor the trend of the sector also through the integration of data collected and disseminate these data; 5. promoting the creation of biological districts; 6. encouraging new businesses in rural mountain areas; 7. improving the control and certification system for quality assurance of organic products also through simplification of legislation, the use of IT tools and the provision of training; 8. stimulating public institutions and bodies to use organic production methods in the management of public gardens and stimulating the consumption of organic products in public and private canteens; 9. encouraging and supporting research and innovation in the field organic production; 10. promoting projects for the traceability of organic products to share data related to the different phases, information on environmental sustainability, on soil health, on distance from transformation plants, on the use of environmentally friendly plant protection products and on processing and packaging techniques used; 11. enhancing the typical Italian organic production; 12. promote environmental sustainability by defining actions to increase and maintain natural soil fertility and the use of conservation methods, as well as packaging and environmentally friendly distribution.

The very brief analysis of the Italian main legal tools in the field of organic production clearly shows the importance of the sector in the governance of the national agriculture, being organic food production acknowledged as an agricultural system that focuses on restoring the natural environment while promoting human and animal wellbeing.

The EU policy framework on the digital transition of farming and food systems

Author: Andrea Saba

1. Introduction

Navigating the intricate challenges posed by climate change, heightened climate vulnerability, and the quest for sustainable production in the agricultural and food sector is a pressing concern. Concurrently, enhancing food security and optimizing supply chain dynamics add layers of complexity to this scenario. Notably, the integration of digital innovation and applications rooted in enabling technologies emerges as a valuable tool for stakeholders within the farming and food systems, poised to tackle forthcoming challenges¹⁷³.

To propel the shift towards sustainable agricultural and food systems, the European Commission unveiled the "From Farm to Fork" Strategy in May 2020, positioning it as a cornerstone of the European Green Deal. This strategy seeks to intricately delineate strategic pathways for fostering

¹⁷³ B. Basso et al, 2020, 'Digital agriculture to design sustainable agricultural systems', *Nature Research*, 3; P. Lattanzi, L'agricoltura di fronte alla sfida della digitalizzazione. Opportunità e rischi di una nuova rivoluzione, in *Rivista di diritto agrario*, 4, n. 1, 2017, 555-598

sustainable farming and food systems. Emphasizing innovation and digital technology as pivotal catalysts for expediting this sustainable transition, the European Commission, within the framework of the European data strategy, aims to fortify sustainability, productivity, and competitiveness in the agricultural sector. The approach involves processing and analyzing information related to production, land utilization, water consumption, and environmental factors¹⁷⁴. By harnessing these data-driven insights, precise and targeted actions at the individual farm level can be facilitated, while simultaneously enabling comprehensive systemic monitoring¹⁷⁵.

For the new technologies capable of radically changing one or more business models, the term "disruptive" has been coined in the economic literature¹⁷⁶. Disruptive technologies are those capable of significantly altering the life of a company or the way entire economic sectors operate. These technologies compel business organizations to change their way of doing business, and although the risk of losing market relevance is not to be overlooked, they offer new opportunities to improve production, increase sustainability, and streamline business relationships. The new technologies contribute to describing the paradigm of Industry 4.0 or, more appropriately for our context, Agriculture 4.0¹⁷⁷. Within the paradigm that looks at the digitization of the agri-food sector in general, there are four aspects that

¹⁷⁴ Research for AGRI Committee – Impacts of the digital economy on the food-chain and the CAP, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels, 2019

¹⁷⁵ C. Carletto, 2021, 'Better data, higher impact: improving agricultural data systems for societal change', *European Review of Agricultural Economics*, 48/4

¹⁷⁶ J. L. Bower – C. M. Christensen, *Disruptive technologies: Catching the wave*, in *Harvard Business Review*, 73, 1995, 43– 53

¹⁷⁷ OECD, *How are digital technologies changing innovation? Evidence from agriculture, the automotive industry and retail*, in *OECD Science, Technology and Industry Policy Papers*, n. 74, 2019

mark the disruptiveness of their impact on the agricultural enterprise: the increase in the volume of data currently available, in computational power, and in connectivity; the emergence of data analysis capabilities, also in terms of business intelligence, through the use of artificial intelligence and deep learning; the development of new forms of human-machine interaction and the results achieved in transferring digital data to the physical world and vice versa¹⁷⁸. Among disruptive technologies, a prominent place is given to distributed ledger technology, of which blockchain is perhaps the most well-known application, also due to its use in the development of cryptocurrencies.

The focus of this chapter is to scrutinize how the recent policy agenda of the European Union addresses the digital transition of farming and food systems. Recognizing the imperative role of proper regulation, the paper underscores that effective governance of the sector is paramount. It is crucial to ensure that the transformative impact of emerging digital technologies effectively addresses social and environmental challenges, leaving no stakeholder behind in this evolution. Within this background, the paper will investigate the recent development on the adoption of distributed ledger technology in the farming and food systems at the EU level.

2. Policy challenges for the digital transition in the EU

The term "agriculture 4.0" denotes the integration of novel technologies into a system capable of making field operations more productive, efficient,

¹⁷⁸ S. Rotz et al, *The Politics of Digital Agricultural Technologies: A Preliminary Review*, in *Sociologia Ruralis*, 59, n. 2, 2019, 203-229; A. T. Brauna et al, *Farming in the Era of Industrie 4.0*, in *Procedia CIRP*, 72, 2018, 979-984

and sustainable. Simultaneously, it supports farmers in decision-making processes and interactions within the supply chain¹⁷⁹. These enabling technologies encompass field sensors, drones, robotic machines, and advanced devices that can communicate and furnish a substantial volume of data and information¹⁸⁰. As the process of digitization extends beyond agricultural production to encompass the entire food system, it becomes imperative to consider the increasing prevalence and utilization of technologies in sectors like processing, packaging, storage, transportation, and retail¹⁸¹. Establishing more sustainable and secure food systems aligns with the primary objectives associated with the utilization of new enabling technologies in the agri-food sector within international and European Union policies and strategies¹⁸².

According to the recent study by the Panel for the Future of Science and Technology (STOA) of the European Parliament, published in March 2023, effective management of agricultural data will create new opportunities to enhance the structure and competitiveness of agricultural businesses, streamlining costs and enabling better-informed decisions. However, the lack of data management skills and the adoption of digital tools in agriculture can limit the potential for the digital transformation of the agri-food system. The study conducted by the European Parliament addresses

¹⁷⁹ J. McFadden et al, 2022, *The Digitalisation of Agriculture: A Literature Review and Emerging Policy Issues*, OECD Food, Agriculture and Fisheries Paper, n. 176

¹⁸⁰ A. Colantoni et al, 2018, 'Smart Machines, Remote Sensing, Precision Farming, Processes, Mechatronic, Materials and Policies for Safety and Health Aspects', in *Agriculture*, 8(4)

¹⁸¹ S. Rotz et al, 2019, 'The Politics of Digital Agricultural Technologies: A Preliminary Review', *Sociologia Ruralis*, 59(2)

¹⁸² M.H. Ehlers et al, 2021, 'Agricultural policy in the era of digitalisation', *Food Policy*, Vol. 100, p. 102019

key issues related to responsibility, risks, and ethical and social concerns regarding access and data management in the context of artificial intelligence development. The study proposes an ethical framework for designing and developing artificial intelligence technologies, based on six key pillars: equity, transparency, accountability, sustainability, privacy, and integrity¹⁸³. Among its policy recommendations, the study aims to define the responsibility of technology providers and envisions the possibility of legislative action to clarify the rights and legitimate expectations of agricultural businesses, technology providers, and society.

Within this context, the SDGs serve as a reference framework to comprehend the true extent of the phenomenon concerning economic, social, and environmental sustainability goals. The "agriculture 4.0" or "digital agriculture" plays a pivotal role in advancing all the Sustainable Development Goals. For instance, increased agricultural productivity positively impacts Goal 2 (Zero Hunger), reduced use of natural resources contributes to Goals 6 (Clean Water and Sanitation), 13, 14, and 15 (Climate Action and Life on Land and Below Water), more efficient post-harvest activities reduce waste (Goal 12), and the introduction of automation systems can improve working conditions in certain sectors (Goal 8). Nevertheless, the introduction of disruptive technologies in the agri-food sector entails various trade-offs. These technologies consume substantial energy, potentially offsetting their climate and environmental benefits¹⁸⁴. Automation may lead to job loss, especially among less-skilled workers.

¹⁸³ R. Dara et al, 2023, 'Recommendations for ethical and responsible use of artificial intelligence in digital agriculture', *Frontiers in Artificial Intelligence*, 5

¹⁸⁴ J. Schieffer et al, 2015, 'The economic and environmental impacts of precision agriculture and interactions with agro-environmental policy', *Precision Agriculture*, Vol. 16/1

Additionally, there is the challenge of digital access, particularly in some regions or for small farmers and economic operators with fewer economic and human resources¹⁸⁵. This digital divide becomes more pronounced when considering women, who, according to the FAO, face a triple divide: digital, rural, and gender¹⁸⁶. Beyond the digital divide and its associated inaccessibility, the lack of digital literacy and skills needed to use specific devices or interpret, and leverage collected data can impede knowledge extraction from data¹⁸⁷. Interoperability between various devices represents another obstacle to the effective utilization of data.

Over the past few years, the European Union has been actively exploring ways to harness digital innovations in the agricultural and food sector for the purpose of advancing agriculture and rural development. The culmination of this endeavor can be traced back to the 2016 final paper titled "A strategic approach to EU agricultural research and innovation," initiated during Expo Milano in June 2015. The recognition of the potential of "smart" applications in agriculture is a central theme in the 2016 final paper, laying the foundation for the integration of digital innovations into the agricultural sector. A significant stride in this direction is evident in the 2019 Declaration titled "A smart and sustainable digital future for European agriculture and rural areas," where nearly all EU Member States pledge to collaborate on advancing agricultural digitalization. This commitment is perceived as a crucial and timely strategy to address economic, social,

¹⁸⁵ M.-A. Jouanjean et al., 2020, Issues around data governance in the digital transformation of agriculture: The farmers' perspective, OECD Food, Agriculture and Fisheries Papers

¹⁸⁶ M. N. Trendov et al, 2019, Digital technologies in agriculture and rural areas. Status report, FAO, Rome

¹⁸⁷ S. Tey Yeong et al, 2012, Factors influencing the adoption of precision agricultural technologies: A review for policy implications, Precision Agriculture, Vol. 13

climatic, and environmental challenges. The Common Agricultural Policy (CAP) is seen as an apt framework within which to foster connections between farmers and digital innovation.

Moreover, the European Green Deal, which underscores the heightened role of agriculture in climate change mitigation, places considerable emphasis on digitalization. The Farm to Fork Strategy takes a systemic approach, acknowledging the intricacies of food chains and setting the ambitious goal of "food sustainability" encompassing economic, social, and environmental dimensions¹⁸⁸. As part of this strategy, the prioritization of the digital and technological transition in agriculture aims to achieve improved climate and environmental outcomes and enhance resilience to climate change. This involves encouraging farmers to embrace technology-based solutions, digital tools, and space-based resources, such as remote sensing and open-access data from the EU Copernicus Earth Observation program. While these innovative solutions present exciting opportunities, their successful implementation necessitates a skilled workforce and substantial financial investments.

In line with supporting this digital transformation, the European Commission's commitment to achieving 100% access to fast broadband internet in rural areas by 2025 is a highly positive development. Broadband internet access is viewed as a facilitator for the adoption of precision agriculture, artificial intelligence, and the utilization of the EU's leading position in satellite technology. This, in turn, is expected to lead to enhanced land management, reduced fertilizer use, and decreased

¹⁸⁸ P. Lattanzi, 2021, 'Il "New Green Deal", la Pac 2021-2027 e la sostenibilità nelle produzioni alimentari', in Paolo Borghi, Irene Canfora, Alessandra di Lauro, Luigi Russo, Trattato di diritto alimentare italiano e dell'Unione europea, Giuffrè, Milano

greenhouse gas emissions. The primary objective in this area is to encourage private investments, including those from the financial sector, and promote the participation of SMEs and medium-sized enterprises. While recognizing the importance of private investments in driving technological transformation, there is a concern that these investments might disproportionately benefit larger, more established economic entities, potentially leaving smaller and marginalized entities at a disadvantage.¹⁸⁹

3. Distributed ledger technology in the farming and food systems: a work in progress

Blockchain technology, similarly, allows the collection and recording of transactions between users on a network¹⁹⁰. In this context, a transaction refers to an exchange of information between users that can involve data, currencies, contracts, and anything else of value to the users. The technology based on distributed ledgers has emerged disruptively in the global innovative ecosystem, in conjunction with the development of information and communication technologies. Still evolving and relatively young, it technically involves computer protocols that use a distributed ledger in a peer-to-peer node network to record data with mechanisms for processing, validating, and authorizing transactions that are stored immutably and cryptographically¹⁹¹.

¹⁸⁹ M. Alabrese, 2020. 'Politiche climatiche, politiche agricole e il bisogno di coordinamento', *Rivista di diritto agrario*, 3

¹⁹⁰ K. Yeung, Regulation by Blockchain: the Emerging Battle for Supremacy between the Code of Law and Code as Law, in *Modern Law Review*, 82, n. 2, 207-239.

¹⁹¹ A. Welfare, *Commercializing Blockchain: Strategic Applications in the Real World*, Chichester, 2019

Blockchain technology is an application of the technology based on distributed ledgers and is perhaps among the most well-known due to its use in the development of cryptocurrencies currently in circulation (such as Bitcoin and Ether, for example). In its simplest form, blockchain technology consists of a set of blocks, each containing data, its own hash value, and a control code referring to the hash value from the previous block. The hash value is an alphanumeric string on the block header generated using the cryptographic hash function. Each block is linked to the preceding blocks, forming a chain of interconnected blocks, as the control code points to the hash value of the previous block. Each block refers to its predecessor, called the parent in jargon, while the only block that will not have a parent is the first one ever created, known as the genesis block. In this way, the unique and deterministic chronological order of the blocks is also guaranteed.

Cryptography plays a foundational role in the architecture of blockchain, not so much to make the entered data incomprehensible but to make the system secure and immune to unintentional data tampering. The cryptographic hash function currently satisfies this requirement. It is a mathematical algorithm that allows the mapping of data with arbitrary length to a fixed-size binary string, meaning it takes an input string of arbitrary length, m , and returns an output of fixed length, $h(m)$. The value uniquely and deterministically identifies a message. Two messages, even if similar, will have different hash values. Even a slight change in the input message will result in a different output. Consequently, since each block in the blockchain is linked to the hash value of the previous one, any modification to a certain block would invalidate all subsequent blocks as the hash values would no longer match. Additionally, a good cryptographic hash function possesses two other key properties regarding calculation speed, ensuring the quick execution of the function, and one-wayness, making it

very difficult to generate the data from its hash value, unless attempting all possible messages. Cryptography also plays a central role in the development of digital signatures that allow the encryption, decryption, and validation of the integrity of each data entered the distributed ledger. The mathematical scheme of the digital signature proves the authenticity of a message and that it was created by a specific user, with no alterations during transit.

At the European level, there is currently no clear regulation of the technology. To address this gap, the European Commission established the EU Blockchain Observatory and Forum, which in September 2019 produced a first assessment report on the legal framework applicable to blockchain technology¹⁹². The report recognizes the need for clarity to further support the development of blockchain technology and the possibilities offered by its use in economic sectors. Numerous areas where European legislators will need to intervene are highlighted, including the legal recognition of distributed ledgers at the territorial level and issues related to responsibility and protection of the entered data.

This European initiative follows the European Parliament Resolution of October 3, 2018, on distributed ledger technologies and blockchain, which emphasizes the importance of technology in improving supply chains, noting that distributed ledger technologies can facilitate the shipping and monitoring of the origin of goods and their ingredients or components, improving transparency, visibility, and control of compliance, including the

¹⁹² European Union Blockchain Observatory And Forum, Legal and regulatory framework of blockchains and smart contracts, Thematic Report, Bruxelles, 2019.

effectiveness of customs checks¹⁹³. The Resolution acknowledges the possibility of ensuring, through a distributed ledger, that the place of origin of a product adheres to sustainability and human rights protocols, thus reducing the risk of illegal goods entering the supply chain and ensuring consumer protection.

The use cases of blockchain technology in the agri-food system can address the need to promote sustainable agricultural practices and reduce the environmental footprint of agricultural enterprises, aligning with consumer preferences for high-quality products. The technology can contribute, albeit indirectly, to supporting the income, especially of small and medium-sized producers, by reducing costs associated with the production chain and commercial transactions. Agri-food production methods and their commercial channels have long embraced the adoption of information and communication technologies, enabling the structuring of a distribution system capable of operating on a larger scale, leveraging the possibilities offered by e-commerce¹⁹⁴.

The oversight process can benefit from the use of blockchain technology as it establishes a system of checks that can leverage full transparency of the collected data and the reliability that the information has not undergone tampering, as well as the certainty of the date and time of registration¹⁹⁵. The potential of such a system in facilitating the efforts of regulatory bodies issuing certifications for products and processes in the agri-food market is

¹⁹³ European Parliament resolution of 3 October 2018 on distributed ledger technologies and blockchains: building trust with disintermediation (2020/C 011/03)

¹⁹⁴ J. McEntire, A. W. Kennedy, *Food Traceability. From Binders to Blockchain*, Cham, 2019

¹⁹⁵ M. Attaran, A. Gunasekaran, *Food Industry*, in M. Attaran – A. Gunasekaran, *Applications of Blockchain Technology in Business*, Cham, 2019

immediate. Blockchain technology could make internal controls less burdensome, as well as external ones, conducted, for example, by the public agencies for the protection of quality and suppression of fraud in agri-food products¹⁹⁶.

4. Concluding remarks

The Common Agricultural Policy (CAP) for the years 2023-2027 will play a decisive role in shaping the trajectory of digitalization within the farming and food sector. An integral aspect of this assessment involves understanding how the CAP will influence key facets of agricultural practices and, more crucially, how national strategies for CAP implementation will actively foster the digital transformation of agriculture.

Of paramount importance is the active involvement of the diverse array of small to medium-sized farmers that characterize the agricultural economic landscape in Europe. The successful integration of digital technologies into agriculture necessitates a strategic and inclusive approach that accommodates the varying scales and capacities of agricultural enterprises. Therefore, a critical point of focus is how the national strategies align with the overarching goals of the CAP to ensure that the benefits of digitalization are accessible and beneficial to all farmers.

In this context, the renewed commitment to building Agricultural Knowledge and Information Systems (AKIS) under the CAP 2023-2027 emerges as a pivotal initiative. AKIS serves as a cornerstone for disseminating essential skills and knowledge throughout the agricultural

¹⁹⁶ G. Spoto, Gli utilizzi della Blockchain e dell'Internet of Things nel settore degli alimenti, in *Rivista di diritto alimentare*, 13, n. 1, 2019, 25-35

community. This renewed support signifies a recognition of the importance of knowledge dissemination in driving the adoption of digital technologies. By bolstering AKIS, the CAP aims to create a conducive environment for a bottom-up adoption of digital tools and practices by the diverse range of actors in the agricultural and food systems.

The emphasis on AKIS not only aligns with the broader goals of the CAP but also underscores the recognition that the success of digitalization in agriculture relies on equipping farmers with the necessary knowledge and skills. This approach promotes a more inclusive and sustainable adoption of digital technologies, ensuring that small to medium-sized farmers, who form the backbone of European agriculture, can actively participate and benefit from the ongoing digital transformation.

In conclusion, the success of the CAP's objectives in the digital transition of the farming and food systems will be intricately tied to the effectiveness of national strategies in promoting accessibility, awareness, and skill development among farmers. The renewed focus on AKIS exemplifies a commitment to empowering farmers at the grassroots level, setting the stage for a technologically advanced and inclusive agricultural landscape in the years to come.

The Regulatory Scope of Remote Sensing in Agriculture within the European Union Context: Common Agricultural Policy Regulations at the Intersection with Copernicus discipline

Author: Mariagrazia Alabrese

1. Introduction

This chapter aims to identify the primary objectives arising from the European Union's regulatory framework concerning remote sensing in agriculture and to highlight potential areas of concern.

When we discuss remote sensing, we refer to the data derived from the satellite observation of Earth. This data encompasses a range of information, not merely photographic images, but also other parameters that are increasingly finding their place in the agricultural domain. Indeed, the current capabilities of remote sensing, which include multispectral and multitemporal aspects, can offer quantitative estimates of crop yields. They can provide insights into the nitrogen content in soil or the stress levels due

to drought. Such information has the potential to optimize the application of fertilizers and irrigation strategies, consequently reducing costs for farmers and minimizing the negative environmental impacts of agricultural activities.

Thermal sensors, which measure surface temperature, play a crucial role in this field. They can detect water stress in plants, making them invaluable tools for both monitoring irrigation and detecting unauthorized water extraction. They are also instrumental in adjusting irrigation volume in the context of precision agriculture, an approach that combines different data sets and tools to optimize returns on inputs while preserving resources.

But the application of remote sensing goes beyond just monitoring and management. It also intersects with areas like sustainability certification. Take, for instance, cotton farming. There's an initiative known as the Better Cotton Initiative, which oversees the compliance of cotton plantations in India (in areas that are not easily accessible for in-situ evaluations) with the standards required to obtain an international sustainability certification. In this context, satellite-derived data provides a series of phenological indicators. These indicators are used to track, for instance, water usage or monitor crop rotation (considered a sustainable land-use practice according to international standards). They can also ascertain if cotton crops, which often require the application of chemical inputs, are located too close to biodiversity-rich areas¹⁹⁷.

This introductory overview hints at the diverse and intricate ways remote sensing technology is being integrated into modern agriculture. As we

¹⁹⁷ Regarding this interesting use of remote sensing in agriculture, see <https://sentinel.esa.int/web/success-stories/-/sentinels-for-sustainable-cotton>.

navigate through the regulatory measures, objectives, and challenges presented by the European Union, we will further understand the implications and potential of such technologies. Recognizing these implications is not just about maximizing agricultural yield but also ensuring that we cultivate our lands sustainably, responsibly, and in harmony with the broader ecosystem.

This chapter provides a foundation for understanding these concerns, setting the stage for the discussions that will follow on the subject.

2. Establishing a European Environmental Monitoring Program Through Remote Sensing

The evolution of remote sensing in the agricultural realm introduces a spectrum of intricate legal dimensions. While technology propels us forward, the necessity of binding frameworks becomes paramount, particularly in regulating and streamlining the use of such advanced technologies. International frameworks, such as remote sensing's application in the monitoring of global climate and environmental conventions, offer a glimpse into the potential legal labyrinth.

The contemporary world, in its quest for innovation and its reaction to increasingly frequent environmental calamities, underscores the relevance of employing satellite data in international judiciary scenarios. For instance, if an environmental catastrophe has transboundary impacts, to what extent can one nation rely on satellite data originating from another nation's territories? This conundrum reflects the fragile balance between technological advancement and the age-old tenets of territorial sovereignty.

The United Nations General Assembly, showcasing foresight, intervened in this domain by adopting a resolution in 1986¹⁹⁸. This resolution, while enunciating a series of principles, primarily aimed at delineating the bounds of Earth's remote sensing from space. The emphasis, albeit vast, was firmly planted on the preservation and enhancement of global environmental assets. Despite the geographical focus of this paper remaining anchored to the European context, it is vital to recognize the relevance of such resolutions. Namely, their intent in framing remote sensing as a tool, not merely of observation but as an instrument harmonizing land and resource management, is of paramount importance.

In the heartland of the European Union, the narrative unfolds with added layers of complexity. Civilian space programs, especially those dedicated to Earth observation, were invariably conceptualized with a strong environmental thrust. This sentiment found resonance in the Baveno Manifesto of 1998. This declaration, representing a consortium of European institutions vested in space research, posited the imperative need for a pan-European environmental surveillance mechanism.

In 2010, the ideological seeds sown in the Manifesto bore fruit. What emerged was a coherent program, seamlessly integrating environmental goals with principles upholding human safety and security. Regulation (EU) No 911/2010, which governs the European Earth monitoring programme (GMES), provides an articulate discipline on the matter¹⁹⁹. This Regulation,

¹⁹⁸ Resolution adopted by the UN General Assembly 41/65. Principles Relating to Remote Sensing of the Earth from Outer Space.

¹⁹⁹ Regulation (EU) No 911/2010 of the European Parliament and of the Council of 22 September 2010 on the European Earth monitoring programme (GMES) and its initial operations (2011 to 2013). The European Earth Monitoring Programme (GMES), founded on a partnership between the Union, ESA, and member states, represents a

besides casting space as a linchpin in the European sustainable development strategy (as articulated in Recital 2), further extolled the virtues of earth observation. The significance of such services, in biodiversity monitoring, ecosystem stability, and climate change adaptation strategies, is unambiguously highlighted. The Regulation, illustrating its broad spectrum of applicability, also underscores the potential for these services in shaping policies interlinked with the natural milieu, citing agriculture as a prime example (as illustrated in Recital 20).

The 2010 Regulation's provisions serve as a testament to the indelible imprints of remote sensing on the agricultural sector. The overarching narrative of Earth-space interaction, which essentially bridges agricultural practices with satellite surveillance, was already an integral component of the European Common Agricultural Policy²⁰⁰.

significant step in the EU's space policy with the aim of providing informational services that grant access to accurate environmental (and security) data and information. GMES should be, among other things, a leading tool to support biodiversity, ecosystem management, and the mitigation of and adaptation to climate change (Recital 5). The regulation also addresses the need to provide a framework that ensures full and open access to information produced by GMES services and to the collected data (Recital 10). It is intriguing to observe that, on one hand, the importance of territorial monitoring services for biodiversity and ecosystem monitoring, for supporting climate change mitigation and adaptation measures, and also the contribution these services can make to managing policies related to the natural environment is emphasized. In this regard, agriculture is explicitly mentioned, alongside soil, water, forests, energy, and other sectors like infrastructure and transport (Recital 20). On the other hand, however, when indicating the need to align the initial operational phase of GMES with other relevant Union policies, initiatives, and tools, there is no reference to agricultural policy. Instead, policies concerning the environment, security, competitiveness, innovation, cohesion, among others, are mentioned (Recital 27).

²⁰⁰ In 1982, initial aerial acquisitions were made for the establishment of the olive oil register - Reg no. 2276/79; 1986: aerial acquisitions for the establishment of the

3. The Common Agricultural Policy and Remote Sensing Monitoring

The 1992 reform of the Common Agricultural Policy (CAP) introduced the remote sensing monitoring. Essentially, for controls related to surface subsidies, it allowed for the substitution of field inspections—which are lengthier and more expensive—with the use of aerial photography and satellite imagery²⁰¹. Later on, the subsequent CAP reform, in 2003, mandated member states to develop a computerized geographical information system for all agricultural parcels. The 2013 reform then made the use of this Land Parcel Identification System (LPIS) compulsory, alongside an aid application based on geospatial tools (Geospatial Aid Application - GSAA), which was incrementally introduced from 2015 to enhance the checks on aid applications.

The paying agencies, following these legislative changes, utilized the Land Parcel Identification System for cross-checks on all surface subsidy applications, ensuring that payments are made only for eligible agricultural lands and only once for a given agricultural land area. The ortho-images from LPIS (satellite images corrected to offset geometric distortion, i.e., "orthorectified") possess a very high spatial resolution (mostly 25-50 cm per

vineyard register - Reg no. 2392/86; 1992: aerial and initial satellite acquisitions for declarations of durum wheat, oilseeds, and tobacco - Reg. no. 3887/92; 1996: the start of systematic production of triennial aerial orthophotos across all of Italy (1m B/W); 2004: the beginning of the systematic use of VHR satellite data for annual sample checks, complementing aerial orthophotos and field surveys; 2007: the start of digital multispectral aerial acquisitions (4 bands) at 0.5 meters, covering Italy triennially, for the establishment of the Italian LPIS (Land Parcel Identification System) and its subsequent updates over time.

²⁰¹ Le prime immagini satellitari provenivano da fornitori commerciali come SPOT, Worldview, PlanetScope.

pixel) and are generally updated every three years. The LPIS stands as the cornerstone of the integrated administrative and control systems (IACS) of paying agencies for surface-based regimes.

The European Union's Court of Auditors' special report no. 25/2016 on LPIS identified areas for enhancement but also acknowledged the measures taken over the years by the Commission and the payment agencies to bolster the system's reliability²⁰². The introduction of the GSAA allows farmers to electronically submit aid and payment applications, paired with the geolocation of the declared agricultural parcels. Hence, the computer systems of paying agencies now link geospatial information to agricultural parcels.

The shift to incorporate remote sensing within the CAP framework not only showcased the advancements in agricultural management but also echoed a broader recognition of the role technology could play in streamlining processes and ensuring accuracy. Remote sensing, through aerial photographs and satellite images, offers a panoramic, comprehensive, and dynamic view of agricultural lands. This holistic approach provides a clearer and more immediate understanding of the agricultural landscapes in member states, thereby facilitating prompt and informed decisions.

Furthermore, the computerized geographical information system, or the LPIS, presents an organized and systematic method for gathering and storing vast amounts of data. This kind of system aids in creating a detailed and up-to-date database, ensuring that the allocation of subsidies is based on the most recent and accurate information. It's not just about ensuring

²⁰² See the Annual Report of the European Court of Auditors for the fiscal year 2018, paragraphs 7.16-7.18.

rightful allocations; it's also about minimizing the possibility of errors or fraud.

The reforms over the years underline a concerted effort towards modernization, highlighting the EU's commitment to adapting to technological changes for the betterment of agricultural practices and governance. By transitioning to an integrated administrative and control system, paying agencies are better equipped to oversee and manage area-based schemes. This transition also makes the entire process more transparent and accountable.

However, as with any significant shift, challenges inevitably arise. While the Court of Auditors' special report identified the strides made in enhancing the LPIS, it also pointed out areas that require attention. It's a balancing act—on one hand, there's a need to keep up with rapid technological advancements and on the other, there's a necessity to ensure that these systems are robust, reliable, and not overly complex. The GSAA's introduction underlines the EU's broader push towards digitization. By enabling farmers to submit applications electronically, it reduces paperwork, speeds up processing times, and ensures a smoother flow of information. This digital transformation is not just about efficiency; it's about equipping farmers with the tools they need in an increasingly digital age.

The CAP's integration of remote sensing and geospatial tools symbolizes a forward-looking approach, one that recognizes the intersection of agriculture with technology.

4. The Copernicus Program and the Common Agricultural Policy

The real turning point in the intersection of space-based monitoring and agricultural policy came with the initiation of the Copernicus Program, as established by Regulation 377/2014, later superseded by the Regulation 2021/696²⁰³. The Copernicus program, in its essence, stands out because of its groundbreaking approach. It synergizes space-based observations with in-situ ones, thus offering a rich plethora of data. What makes the Copernicus approach even more revolutionary is its policy of ensuring this data is wholly accessible, open, and free to its users.

Moreover, from March 2017, the Copernicus satellites, Sentinel 1 and 2, began furnishing high-resolution images at impressive frequencies²⁰⁴. This development marked a significant milestone for agricultural monitoring. Such constant surveillance allowed for a year-long, i.e., throughout the entire vegetative period, oversight of activities conducted on farmlands. Automated data processing further enabled the identification of cultivated crops without any human intervention. Such automation also made it

²⁰³ Regulation (EU) No. 377/2014 of the European Parliament and of the Council, of April 3, 2014, establishing the Copernicus program and repealing Regulation (EU) No. 911/2010 is no longer in force, repealed by Regulation (EU) 2021/696 of the European Parliament and of the Council of April 28, 2021, establishing the Union's space program and the European Union Agency for the Space Program and repealing regulations (EU) No. 912/2010, No. 1285/2013 and No. 377/2014, and Decision No. 541/2014/EU. The Sentinel-1 mission utilizes two polar orbit radar satellites (1A and 1B), which send a microwave signal to Earth and measure the return signal, unaffected by the presence of physical clouds. The Sentinel-2 mission involves two polar orbit satellites (2A and 2B) that measure the visible and infrared luminescence reflected from the Earth across 13 different wavelengths. Sentinel 1A, Sentinel 2A, Sentinel 1B, and Sentinel 2B were launched respectively on April 3, 2014, June 25, 2015, April 25, 2016, and March 7, 2017.

²⁰⁴ Every five days, a new image is available with a spatial resolution of 10 meters per pixel, compared to a resolution of 30 meters every 16 days for Landsat, the U.S. Earth satellite observation program.

possible to monitor specific agricultural practices on individual parcels, like soil cultivation, harvest, or mowing.

Contrastingly, the remote sensing controls introduced back in 1992 demanded human intervention. They necessitated human operators to interpret the images and data procured from satellites. But with Copernicus, the game changed. Copernicus employs artificial intelligence, specifically machine learning and other algorithms. These algorithms merge satellite data with information provided by farmers in their aid applications. This fusion facilitates an automated analysis of Copernicus' Sentinel satellite data, determining the beneficiaries' eligibility to avail PAC payments. This modern system thus offers paying agencies insights into the types of crops and the overall agricultural activities across all declared parcels. Using a semaphore system, the parcels that fail to meet the necessary requirements for aid are color-coded, making the identification process more straightforward²⁰⁵.

This system inherently boasts several advantages. The administrative burdens reduce significantly, leading to increased cost-effectiveness. The benefits are not just limited to the administrative side; they extend to farmers right from the aid application stage. For instance, the data can assist farmers while drafting their applications, thus minimizing potential errors. In the inspection phase, the usage of satellite data ushers in a more

²⁰⁵ The paying agencies evaluate the activity carried out on the parcels/farms during the year, taking into account the most recent Sentinel data available and the information obtained from the farmers. For example, a parcel made up of grassy land would be assigned the color yellow until the Sentinel data indicates that it has been mowed by the regulatory deadline; at this point, the color turns green. If the satellite evidence does not allow conclusions to be drawn, other methods are provided to carry out further checks using other new technologies (for example, geo-referenced photographs).

collaborative approach with paying agencies. These agencies can now alert aid beneficiaries, providing them opportunities to implement corrective measures to meet eligibility requirements and subsequently expedite the payment process²⁰⁶. This dynamic contrasts starkly with the traditional control system. In the latter, any non-conformities detected during a typical on-field inspection lead directly to corresponding reductions and penalties.

Moreover, satellite-based checks allow for the surveillance of the entire beneficiary population instead of the usual 5% which represents the on-field check sample. This comprehensive oversight means there's a significant deterrence against fraud or inaccurate declarations.

To fully harness these advantages, it was of course essential to bring in regulatory actions in 2018 and 2019, thereby formalizing the so-called "controls via monitoring". This paradigm serves as a testament to the constant dialogue between technology and regulatory processes²⁰⁷. Over the

²⁰⁶ The monitoring controls are an interactive system that allows for consideration, at any time during the growing season, of new information (such as the most recent Sentinel data just acquired, geo-referenced photographs, or other documents submitted by the farmer). Therefore, it offers more opportunities for farmers to rectify their statements before they are finalized.

²⁰⁷ In May 2017, the EU paying agencies signed an informal memorandum, the "Malta declaration", encouraging the Commission to use new technologies to simplify the IACS (Integrated Administration and Control System). In June 2017, the Commission proposed legislative changes allowing Member States to apply a new approach called "monitoring controls" starting from 2018. The fine-tuning, including the pilot phase, required several regulatory interventions: the initial legislation adopted in May 2018 (Implementing Regulation (EU) 2018/746 of the Commission, of 18 May 2018, amending the Implementing Regulation (EU) No 809/2014 regarding the modification of single applications and payment applications and controls) did not allow for pragmatic solutions for carrying out the monitoring controls. The Commission realized the need for further clarifications and amended the legal framework applicable to the 2019 application year (Implementing Regulation (EU)

years, the European Commission's commitment to using Copernicus services for agriculture has only strengthened. The Farm to Fork Strategy, for instance, expressly cites the Copernicus program among the tools to foster sustainable agricultural practices²⁰⁸.

Looking at the 2023-27 PAC, one can't help but note its emphasis on satellite data. For instance, within the integrated system, Article 70 mandates what's termed as the "area monitoring system"²⁰⁹. This system is defined as a periodic and systematic procedure for observing, monitoring, and tracking agricultural activities and practices on farmlands using data from

2019/1804 of the Commission, of 28 October 2019, amending the Implementing Regulation (EU) No 809/2014 regarding the modifications of aid applications or payment applications, controls in the integrated management and control system, and the control system related to conditionality). In 2019, 15 paying agencies in Belgium, Denmark, Italy, Malta, and Spain used monitoring controls for some of their schemes. The paying agencies were, however, concerned that the Commission might later question their approach and the decisions made and apply financial corrections. For this reason, the Commission clarified a series of technical and legal elements it would evaluate during its audits at the paying agencies (provided for in Articles 40 bis and 40 ter of Regulation No. 809/2014 and in the JRC's guide "Technical guidance on the decision to go for substitution of OTSC by monitoring", 2018, pp. 3-8). Some of the paying agencies visited by the Court's auditors expected the Commission to approve their methodology for monitoring controls, but the Commission has not approved methodologies and does not plan to do so.

²⁰⁸ See the Commission Communication "A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system", COM(2020) 381, dated 20 May 2020, pages 8 and 19.

²⁰⁹ The Member States establish and manage a surface monitoring system that is operational from 1 January 2023. If, due to technical limitations, it is not possible to fully implement the system from that date, Member States can choose to establish and operate such a system gradually, providing information only for a limited number of interventions. However, by 1 January 2024, a surface monitoring system should be fully operational in all Member States.

Copernicus' Sentinel satellites or data of at least equivalent value²¹⁰. By replacing the optional "controls via monitoring" from 1992 with a mandatory surface monitoring system, a broader reliance on Copernicus satellite data is encouraged.

Additionally, the new PAC encompasses provisions enabling the Commission to obtain satellite data to monitor agricultural resources, covering soil conditions, crops, landscapes, and farmlands. Such access could allow, for instance, yield estimations, facilitating better management of agricultural markets. It can also enable an assessment of the resilience of agricultural systems—a metric that has become increasingly pivotal in recent years (as evident in Articles 24 and 25, Regulation (EU) 2021/2116)²¹¹.

5. Concluding Remarks

What is outlined in this chapter represents the regulatory framework that comes into play when discussing the topic of Earth observation applied to agriculture. This framework also presents some critical issues related to both the main goal pursued by existing regulations and the breadth of tools functional to that goal.

²¹⁰ See 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 and repealing Regulation (EU) No. 1306/2013, Article 72 for controls and sanctions: these controls are complemented by on-site inspections, which can be carried out remotely using technology.

²¹¹ In relation to this, Article 26 of Regulation (EU) 2021/2116 provides for the possibility of adopting implementing acts that establish the framework governing the acquisition, refinement, and use of satellite and meteorological data and the applicable terms. See also recital 22.

Starting with the first point, the main goal pursued by existing regulations: the rules introduced so far essentially concern only the scope of checks within the CAP framework. In reality, the agricultural services of the Copernicus program generate many useful data in the field of risk management and damage assessment or for so-called smart agriculture²¹².

Therefore, in this context, a challenge for the legislator is to encourage and promote the use of Copernicus for areas beyond the control system (this means promoting knowledge and skills, but also infrastructural elements).

This aspect is linked to the second critical issue that can be highlighted, which concerns the type of checks for which we rely on information provided by satellites.

So far, priority has undoubtedly been given to using monitoring checks for direct payment schemes by surface, rather than conditionality and agro-climatic-environmental (rural development) schemes²¹³. This fact was also noted by the Court of Auditors, which recommended that the Commission

²¹² It should be noted, however, that Article 15 of EU Regulation 2115/2021 contains references to nutrients and the integrated system and digital tools.

²¹³ Until now, area-based subsidies have represented almost 80% of the funds utilized by the EU. In the 2014-2020 CAP, in fact, according to the European Court of Auditors, four-fifths of the budget were allocated to area-based schemes, both within the framework of direct payments (direct payment measures related to areas account for 67.5% of CAP expenditure and concern basic income support based on the number of hectares cultivated, payment for greening, and other measures such as, for example, the optional coupled support for protein crops), and within the framework of rural development measures (rural development measures related to areas account for 11.6% of CAP expenditure and include aid for areas with natural constraints, as in the case of mountainous areas, agro-climatic-environmental measures, and other area-based measures, as in the case of organic farming). See Special Report 04/2020, "Using new imaging technologies to monitor the Common Agricultural Policy: steady progress overall, but slower for climate and environment monitoring.

make better use of new satellite technologies to monitor environmental and climatic requirements²¹⁴.

Here it is worth mentioning that, as noted, the legal framework for applying monitoring checks to direct payments has been available since May 2018, and in October 2019, with an implementing regulation, the legal basis was provided to begin performing monitoring checks even within conditionality. However, what subsequently occurred at the level of individual Member States is that paying agencies, fearing future financial adjustments due to unfavorable outcomes of Commission audits, were reluctant to use Copernicus data (primarily because they considered the regulatory framework not clear enough)²¹⁵.

Added to this is that the European Commission itself, in 2019, following an assessment of the use of Sentinel data for monitoring obligations within the scope of agro-climatic-environmental measures, found that many requirements are too complex to be monitored with the sole help of Copernicus data. This is because the rules governing the new approach are not as detailed as those for traditional checks. Furthermore, the authorities of the Member States design agro-climatic-environmental schemes that vary significantly depending on the Member State and even within them. On the other hand, the European Court of Auditors emphasizes the need to

²¹⁴ Special Report 04/2020. The Court expected that, in addition to using new technologies to carry out eligibility checks for direct payment of area-based subsidies, the Commission and Member States would take initiatives regarding the use of such technologies to monitor certain environmental and climate requirements, such as the obligation to cultivate an intercrop or the prohibition of burning stubble.

²¹⁵ European Court of Auditors, Special Report 04/2020.

promote the use of such data as a fundamental control system for paying agencies (Recommendation 1)²¹⁶.

The situation does not seem to have changed much with the new CAP, which, as mentioned, introduces a mandatory surface monitoring system with satellite data, highlighting that this system aims to play a significant role in measuring the environmental and climatic performance of the CAP (recital 58)²¹⁷.

However, even in this case, it will be necessary to assess whether and how the series of proposed indicators are, in fact, consistent with direct monitoring with Copernicus satellites (and then how they are translated at the national level into National Strategic Plans)²¹⁸.

²¹⁶ From the initial analysis carried out by the Commission on the potential applicability of monitoring-based controls for conditionality, it emerges that many requirements within the BCAA framework can be monitored, but currently, only one of the seven applied BCAA is considered fully monitorable (with limited exceptions). None of the three currently applied CGOs are entirely monitorable.

²¹⁷ Regulation EU 2116/2021, Recital 58: Member States should continue to use the data or informational materials provided by the Copernicus program, in addition to information technologies such as Galileo and EGNOS, to ensure that global and comparable data for monitoring the agro-climatic-environmental strategy, including the impact of the CAP, environmental outcomes, and progress made towards the Union's objectives, are available throughout the Union and to increase the use of exhaustive, free, and freely accessible data and information collected by satellites and Copernicus Sentinel services. To this end, the integrated system should also include a surface monitoring system.

²¹⁸ In assessing the CAP indicators for the period after 2020, the Commission identified three indicators (I.20, I.13, and I.2025) that, along with other sources, can be based on Sentinel data. It proposes to base many other indicators on existing surveys/databases managed by Member States (e.g., SIPA), Eurostat (e.g., the statistical sample survey on land use and cover) and the European Environment Agency (see COM(2018) 392: Annex I to the proposal for a regulation of the European Parliament and the Council on rules for the support of strategic plans to be drawn up by Member States under the Common Agricultural Policy (CAP Strategic Plans) and

In conclusion, it seems that the main obstacles to expanding the scope of Earth observation in agriculture require solutions that are not only technically adequate but also legal. This might be the most significant challenge for the topic addressed because to encourage the use of remote sensing in agriculture, alongside the development of technologies that can provide us with increasingly sophisticated information, regulation also plays a crucial role. This refers to the contribution that rules can provide to create an environment conducive to the development and also the use of these technologies.

Moreover, one of the features of Copernicus is to provide services that can be designed around users' needs. So it's not just about adapting the rules to allow the use in agriculture of this vast amount of data coming from space (as has been done so far), but it should be considered that even technological possibilities could be developed in the sense of responding to certain needs, possibly even regulatory ones, of the agricultural sector, to offer more opportunities for more sustainable and resilient agriculture.

funded by the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD), repealing Regulation (EU) No. 1305/2013 of the European Parliament and the Council and Regulation (EU) No. 1307/2013 of the European Parliament and the Council). The DG AGRI uses new technologies and satellite data to improve monitoring indicators. For instance, it introduced a new impact indicator to monitor landscape features for the 2023-2027 period. The 2014-2020 CAP did not include any impact indicator for landscapes; this weakened the assessment of the CAP's impact on habitats, landscapes, and biodiversity. For the new indicator (percentage of agricultural land affected by characteristic landscape elements), the Commission will use data from the Copernicus land monitoring service, which contains information on linear hedges and shrubs, tree rows, and isolated tree patches.

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