



D1.1 Land Use in Europe: A Policy Perspective

Mapping Policies Affecting Land Use and Land Use Change in Europe at Different Governance Levels

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Abstract

This article maps land use and land management related policies in the European Union, as well as international initiatives, spanning the period from 1992 to 2022. The article identifies agricultural and biodiversity policies as cornerstones of the legal framework in relation to land use and land use management; however, a broad menu of policies targeting other sectors further have significant potential influence. The policies relate to carbon emission reductions, protection of natural resources, such as water, air, and soil; economic growth, sustainable production and consumption, and trade, among others. By examining these policies, this study aims to provide a more complete picture of the complex landscape of land use governance and inform researchers as well as stakeholders.

Keywords

Literature review, EU policies, land use, land use management

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Nature of the deliverable

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Abbreviations

CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
COP	Conference of the Parties
EAFRD	European Agricultural Fund for Rural Development
EIB	European Investment Bank
EC	European Commission
ECAS	European Commission Authentication Service
ECGA	Grant Agreement
ETS	European Trading System
EU	European Union
GA	General Assembly
GAEC	Good agricultural and environmental conditions
IPM	Integrated Pest Management
LULUCF	Land Use, Land Use Change and Forestry
LUCAS	Land use and land cover survey
MFF	Multiannual Financial Framework
NVZ	Nitrate Vulnerable Zones
OECD	Organisation for Economic Co-operation and Development
PMO	Project Management Office
SEDIA	Single Electronic Data Interchange Area (EC)
SPA	Special Protection Area
SDG	Sustainable Development Goals
SFP	Single Farm Payment
SME	Small medium enterprise
UN	United Nations
WP	Work Package



Contents

Executive Summary	v
1 Introduction	1
1.1 Purpose and scope of analysis	2
1.2 Materials and methods	2
1.3 Structure of the deliverable	2
2 International Initiatives and Agreements that affect EU land use policies	3
2.1 2030 Agenda with 17 Sustainable Development Goals	3
2.2 Paris Agreement	4
2.3 Glasgow Leaders' Declaration on Forests and Land Use	5
2.4 UN Convention on Biological Diversity	5
2.5 Bern Convention on the Conservation of European Wildlife and Natural Habitats	6
3 Land Use Policy in the EU: The Status Quo	6
3.1 Common Agricultural Policy	7
3.2 Land Use, Land Use Change, and Forestry Regulation	9
3.3 Biodiversity Strategies	9
3.4 Habitats Directive	10
3.5 EU Directive on the Conservation of Wild Birds	11
3.6 Water Framework Directive	11
3.7 Floods Directive	12
3.8 Nitrate Directive	13
3.9 Regulation on Organic Production and Labeling of Organic Products	13
3.10 Sustainable Use of Pesticides Directive	14
3.11 EU Invasive Species Regulation	14
4 Land Use Policy in the EU: An Outlook	15
4.1 The European Green Deal	15
4.1.1 Increasing the EU's climate ambition for 2030 and 2050	15
4.1.2 Supplying clean, affordable, secure energy	16
4.1.3 Mobilising industry for a clean and circular economy	16
4.1.4 Building and renovating in an energy and resource efficient way	17
4.1.5 Accelerating the shift to sustainable and smart mobility	18
4.1.6 Farm to Fork: a fair, healthy and environmentally friendly food system	19
4.1.7 Preserving and restoring ecosystems and biodiversity	20
4.1.8 A zero pollution ambition for a toxic-free environment	20
4.2 Common Agricultural Policy after 2023	21
4.3 EU - 2050 Long-term strategy	22
4.4 EU Strategy to Reduce Methane Emissions	23
4.5 EU Biodiversity Strategy for 2030	24
4.6 EU Strategy on adaptation to climate change	26
4.7 EU Soil Strategy for 2030	26
4.8 EU Forest Strategy	27
4.9 Deforestation Regulation	28
4.10 EU Pollinators Initiative: A new deal for pollinators	29



4.11 Regulation on the Sustainable Use of Plant Protection Products	29
4.12 Land Use, Land Use Change, and Forestry Regulation post 2026	31
4.13 EU Organic Action Plan	31
4.14 EU 2030 Climate Target Plan	32
4.15 Regulation on establishing a Union certification framework for carbon removals .	33
4.16 EU Long-term Decarbonization Strategy	34
5 Discussion and outlook	35
Annex 1: Tabular overview of information on official documents included in this literature review	39



Executive Summary

Land use and land management policies have gained significant attention in recent years, particularly in light of global challenges such as climate change and biodiversity loss. This deliverable aims to provide a comprehensive overview of land use and land management policies in the European Union (EU), as well as international initiatives implemented over a 30-year period from 1992 to 2022.

Agricultural and biodiversity policies are identified as cornerstones of the legal framework in relation to land use and management. However, the mapping exercise also uncovers a broad menu of policies targeting other sectors, such as nature preservation, greenhouse gas emission reduction, protection of natural resources (including water, soil, and air), economic growth, sustainable production and consumption, and trade. Most prominently featured is the Common Agricultural Policy (CAP) of the EU, as well as the European Green Deal (EGD).

The policies were screened to assess their potential impact on land use and land management. This analysis included an examination of the types of instruments employed, as well as their targets, in the context of their historical development. By examining these policies, this deliverable aims to provide a more complete picture of the complex landscape of land use governance. The insights gleaned from this research can inform policymakers, researchers, and stakeholders in their efforts to develop and implement effective land use policies.

As a work in progress, the deliverable was written in the framework of the research project LAMASUS. Preliminary results will be presented at a stakeholder workshop in April 2023, and insights and feedback from the event will be incorporated into a revised version of the deliverable. Overall, this review is a timely contribution to the ongoing conversation about land use and land management policies and their potential impact on the environment and society.



1 Introduction

This deliverable presents a literature review of existing land-use and land-management related policy documents. Moreover, the deliverable provide a narrative mapping of land-use and land-management related policy impacts and how these are connected to land-use outcomes. The main purpose of the deliverable within the LAMASUS project is threefold: first and foremost, it serves as an overview and guidance for all database-related (WP2 and WP8), ex-post modelling (WP4 and WP5), as well as as ex-ante modelling (WP6 and WP7) work packages. Second, this deliverable provides a basis of discussion with both the Stakeholder Board (SB), as well as the Policy Advisory Board (PAB) on what land-use and management classes (LUMs) the project should cover and which policies are to be taken into account in both the ex-post and the ex-ante modelling efforts. Related to this is the third objective of this deliverable, where it should serve as a framework for the stakeholder workshops throughout the project.

Land use and land use change have taken center-stage in recent policy debates. As part of the European Green Deal, the EU must achieve climate neutrality by 2050 (EC, 2019); a goal which was enshrined in the European Climate Law¹. The land use sector has a key role to play in achieving this goal, as the sector is currently a net remover of CO₂ from the atmosphere. To succeed, recent trends in carbon absorption have to be improved as carbon sequestration by land has declined. Land use is also of paramount importance for the restoration and preservation of biodiversity, with conversion of forest and land degradation being among the drivers of biodiversity loss. However, sustainable land use practices can help to maintain and even enhance biodiversity.

Land use is not only determined by geographic, climatic, and environmental variables, but is also affected by anthropogenic factors, such as institutional arrangements, land rent, and land prices. Land use is also influenced by individual decisions when land is privately owned.

Land is an inherently scarce good: There is a limited supply of land available; it cannot be produced. In addition, there are competing interests when it comes to land use, ranging from economic exploitation, environmental preservation, and housing, among others. Furthermore, private and public interests might be in conflict with each other: individual decisions by land owners can potentially produce negative or positive externalities for other members of society, the social and economic fabric, and the environment.

To consolidate competing interests, most countries manage the use of land, either through regulations or through fiscal incentives. A study on the governance of land use in OECD countries finds that land use management is mostly a competence exercised at a sub-national level of government, contributing this mainly to the highly context-specific nature of land use planning which requires detailed information on local conditions (OECD, 2017).

Hence, in order to achieve the EU's target of zero net emissions by 2050, policy makers on all governance levels will have to turn to an integrated policy-making approach, which will need to balance competing interests while considering the specific conditions and constraints of

¹Regulation (EU) 2021/1119, <http://data.europa.eu/eli/reg/2021/1119/oj>



different regions.

1.1 PURPOSE AND SCOPE OF ANALYSIS

The purpose of this literature review is to provide an overview of past, present, and future policies that affect land use and land use management in the European Union (EU) for further work within the LAMASUS project. The policies analysed were implemented or discussed between 1992 and 2022. The time frame was chosen so as to include the beginning of the implementation of the MacSharry reform and the subsequent implementation of the 1995 Uruguay Round Agreement on Agriculture. The main objective of this deliverable is to inform researchers, as well as decision-makers on various governance-levels, planners, on both the characteristics and trends of policies resulting in potential changes to land use in Europe. The deliverable will be used as background material for a subsequent empirical analysis on the impacts of policy on land use, which will be published at a later stage.

1.2 MATERIALS AND METHODS

The deliverable is based on an extensive literature review of official documents. This includes past and current legislature, EU preparatory documents such as Commission legislative proposals, Council positions, European Parliament legislative resolutions and initiatives, as well as White and Green papers. These were identified via snowball method, starting with the European Green Deal. The focus of the deliverable is on mapping policies that have the potential, to directly or indirectly affect land use in Europe².

For the purpose of this analysis, a policy with a *direct effect* is defined as purposely trying to influence the use of land, either through fiscal policies or regulatory policies. A policy with an *indirect effect* has a different main focus than influencing land use; its potential to change land use, however, is regarded as substantial by the author. By applying this definition, the deliverable loosely follows the methodology laid out in the OECD study on governance of land use (see figure 1, OECD (2017)).

According to Verheye (2009), the definition of *land use management* is multifaceted. While in the past it referred mainly to arable farming and crop production, it includes nowadays both agricultural and non-agricultural uses of land. In this deliverable, land use management will be used in both senses; agricultural uses will be denoted as *farming practice* or *agricultural management*.

1.3 STRUCTURE OF THE DELIVERABLE

The following section will briefly touch upon international agreements and initiatives that have the potential to affect land use policy design, and act as a reference for EU and national policies. Subsequently, while section 3 will focus on past and current policies on land use on an EU-level, section 4 describes currently proposed policy issues on the EU level. Finally, section 5 discusses and summarizes the key findings of the previous sections in light of existing academic literature.

²This analysis will exclude policies specifically designed to address Europe's outermost regions.



HOW SPATIAL AND NON-SPATIAL POLICIES AFFECT LAND USE

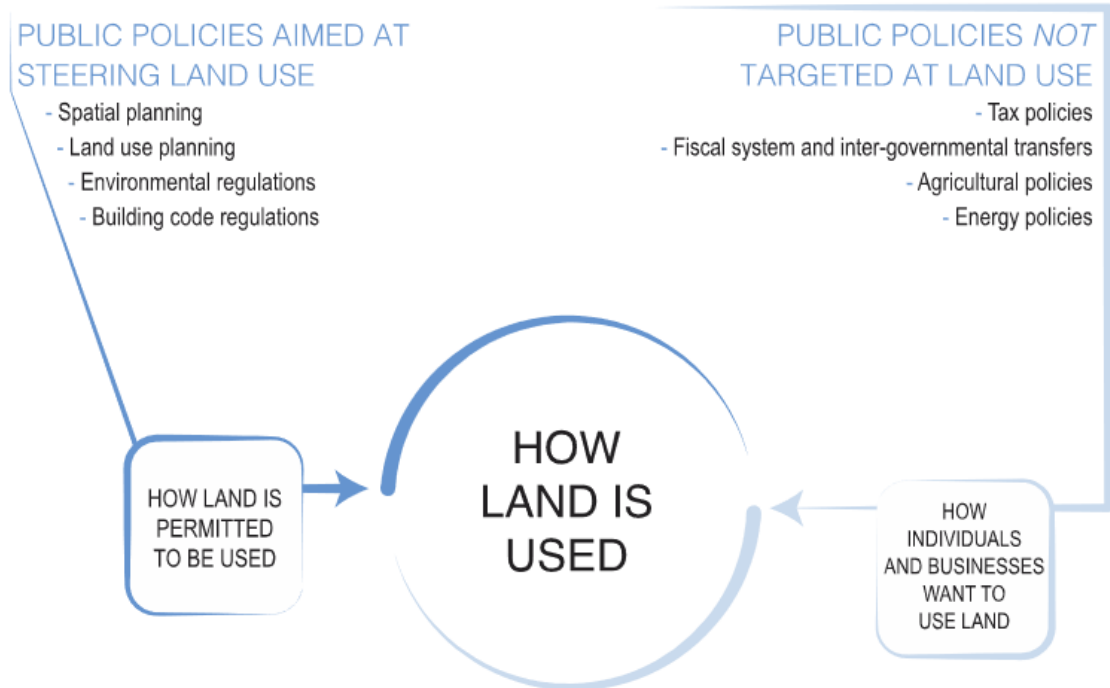


Figure 1: Interplay between public policies aimed at steering land use and policies not targeted at land use (OECD, 2017)

2 International Initiatives and Agreements that affect EU land use policies

In an interconnected world and with climate change and biodiversity loss being global challenges, this analysis would not be complete without discussing the policy measures and initiatives at global level, that shape and guide European and national legislation:

2.1 2030 AGENDA WITH 17 SUSTAINABLE DEVELOPMENT GOALS

The **2030 Agenda with 17 Sustainable Development Goals**³ has been adopted by all United Nation Member States, including all EU Member States as well as Norway and Switzerland.

Central for land use management is **Goal 15**, which is to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Its targets include the sustainable use of inland freshwater ecosystems, sustainable forest management, improved soil

³<https://sdgs.un.org/goals>



health, halting biodiversity loss, among others.

Also related to land use is **Goal 2** (end hunger, achieve food security and improved nutrition, and promote sustainable agriculture). Target 2.3 is to “double the agricultural productivity and incomes of small-scale food producers, [...], including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment” (SDG, 2015). It also sets out the ambition to transition towards sustainable food systems, preserve seed genetic diversity, and overcome trade restrictions and distortions for agricultural goods.

Goal 6, to ensure the availability and sustainable management of water and sanitation for all, also touches upon the subject of land use, by increasing water-use efficiency across all sectors and ensuring the sustainable withdrawals and supply of freshwater in order to combat water scarcity and substantially reduce the number of people suffering from water scarcity. Furthermore, it aims to protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes (SDG, 2015).

Finally, **Goal 13** is to take urgent action to combat climate change and its impacts, though no explicit mention is made to the land use sector and its role in combating climate change.

2.2 PARIS AGREEMENT

The **Paris Agreement**⁴ is a binding international treaty of the UN Climate Change Conference COP21 in Paris. Adopted in 2015, it legally enshrines the goal to limit the rise in mean global temperature to well below 2 °C, and preferably limit the increase to 1.5 °C, compared to pre-industrial levels.

While the reduction targets focus on emissions, the agreement stress the importance of carbon sinks: “[r]ecognizing the importance of the conservation and enhancement, as appropriate, of sinks and reservoirs of the greenhouse gases referred to in the Convention” (Paris Agreement, 2015).

By 2020, all signatories are set to present a long-term low greenhouse gas emission development strategy, including a nationally-determined contribution of a reduction in greenhouse gas emissions. The strategies have been made publicly available⁵. Most EU Member States, as well as Switzerland and Norway, have submitted a strategy to date, with the exception being Bulgaria, Croatia, Cyprus, Estonia, Greece, Italy, Ireland, Poland, and Romania. Additionally, the EU has submitted a strategy, detailing the actions to be undertaken at EU level. The document describes the EU policies to combat climate change, referencing the European Green Deal, as well as different financial instruments, namely funding by the European Investment Bank (EIB), the Multiannual Financial Framework (MFF), the InvestEU investment funding scheme, as well as the Just Transition Mechanism. Further reference is made to the need for energy security and initiatives against carbon leakage (Croatian Presidency of the Council of the European Union, 2019).

⁴<https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

⁵<https://unfccc.int/process/the-paris-agreement/long-term-strategies>



2.3 GLASGOW LEADERS' DECLARATION ON FORESTS AND LAND USE

The **Glasgow Leaders' Declaration on Forests and Land Use**⁶, which has been signed by 144 countries to date, is one of the two outcomes of the COP26 in 2021. The signatory countries, among which figure all EU Member States, Switzerland, Norway, as well as the EU itself, “commit to working collectively to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation” Glasgow Declaration (2021). The declaration, which is not legally binding, sets forth six focus areas:

- Protect and restore forests and other ecosystems.
- Encourage sustainable trade and development policies that do not drive deforestation or land degradation.
- Support rural livelihoods and empower communities while respecting the rights of Indigenous Peoples and local communities.
- Promote sustainable agriculture to improve food security and benefit the environment.
- Increase financing and investment from public and private sources to support sustainable agriculture, forest management, conservation, and Indigenous Peoples and local communities.
- Ensure that financial flows support international goals to reverse forest loss and degradation, and transition to a resilient economy that advances sustainable land use, biodiversity, and climate goals.

2.4 UN CONVENTION ON BIOLOGICAL DIVERSITY

The **UN Convention on Biological Diversity (CBD)**⁷ is a multilateral international treaty that entered into force in December of 1993. As such, it is legally binding for the contracting states. This treaty has three areas of interest:

- **Conservation of biodiversity:** This involves preserving and protecting ecosystems, habitats and species from loss and degradation.
- **Sustainable use of biodiversity:** This involves using biodiversity in a way that ensures its continued existence for future generations, such as through responsible fishing, forestry or agriculture.
- **Fair and equitable sharing of benefits from the use of genetic resources:** This means ensuring that the benefits arising from the use of genetic resources, such as crop seeds, are shared fairly and equitably between countries and their populations.

⁶<https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/>

⁷<https://www.cbd.int/doc/legal/cbd-en.pdf>



Signatory parties, among which figure all EU Member States, Switzerland, and Norway, are obligated to present a national strategy for the conservation and sustainable use of biological diversity. Strategies which have been submitted are made available on the website of the secretariat of the Convention.

The CBD also has a Strategic Plan for Biodiversity 2011-2020, adopted in 2010, which aims to significantly reduce biodiversity loss by 2020. The document includes the **Aichi Biodiversity Targets**⁸, which are 20 targets adopted by the Conference of the Parties (COP) to the CBD at the 11th COP meeting in Aichi, Japan. The Aichi Targets aim to implementing the goals and objectives of the Convention and achieving its overall vision of a world where biodiversity is valued, conserved, restored and used. The targets cover a range of issues, from the conservation of ecosystems, habitats and species to the reduction of threats to biodiversity, such as habitat destruction and climate change, as well as the fair and equitable sharing of benefits from the use of genetic resources.

By setting specific, measurable and time-bound targets, the Aichi Biodiversity Targets provide a roadmap for action to conserve and sustainably use biodiversity and contribute to the achievement of broader sustainable development goals. The achievement of the Aichi Targets is monitored and reported through the CBD's regular reporting process.

2.5 BERN CONVENTION ON THE CONSERVATION OF EUROPEAN WILDLIFE AND NATURAL HABITATS

The Bern Convention on the Conservation of European Wildlife and Natural Habitats⁹ entered into force in 1982. Its signatories include most of the Member States of the Council of Europe, as well as five African countries. The EU is also a signatory as an international organization.

The Bern Convention aims to ensure conservation of wild flora and fauna species and their habitats. One of the main policy instruments is the Emerald Network, which is an ecological network made up of Areas of Special Conservation Interest. The objective of the Emerald Network is the long-term survival of the species and habitats.

The EU, which is a signatory to the convention, established its Natura 2000 network by introducing the Habitats Directive (Council Directive 92/43/EEC) in order to meet the obligations set by the Bern Convention.

3 Land Use Policy in the EU: The Status Quo

This section identifies the main policies on the European level that are in place and have a significant impact, either directly or indirectly, on land use and land use management practices. The

⁸<https://www.cbd.int/sp/targets/>

⁹<https://im.coe.int/1680078aff>



3.1 COMMON AGRICULTURAL POLICY

The Common Agricultural Policy (CAP) of the EU is one of the biggest single items in the EU budget. The policy, which was established by the Treaty of Rome in 1957, sets forth the following objectives (Article 39, TFEU (2012)):

- to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labor;
- thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;
- to stabilise markets;
- to ensure the availability of supplies;
- to ensure that supplies reach consumers at reasonable price.

Implemented in 1963, its primary goal was increasing agricultural productivity and ensuring stable food prices for consumers. The initial policy focused on providing financial support to farmers through price support and income stabilization measures. It also included measures to encourage the modernisation and mechanisation of agriculture, as well as the creation of a common market for agricultural products within the EU.

The CAP has since undergone numerous reforms in response to domestic pressures, including changes in agricultural policy priorities, efficiency improvements and budget constraints, and to international pressures to reduce trade distortion (OECD, 2017). In following paragraphs, the main policy reforms with effects on land use are detailed.

The **1992 MacSherry reform** marked a turning point in the history of the CAP: It brought upon the phasing-out of price support of certain goods and a shift towards uncoupled payments to farmers. This was unlike previous reforms of the CAP, as it saw a shift in policy instruments in the arable market regime; a path which was continued during the Agenda 2000 reform in 1999, which saw a further reduction in guaranteed prices and increasing direct payments (Daugbjerg, 2003). Direct payments were designed to be more efficient and effective than previous methods of support, which had resulted in overproduction and market distortions. To address these issues, the MacSherry reform also introduced measures to cut overproduction by setting aside land. This helped to ensure that agricultural production was more closely aligned with market demand, reducing the risk of surpluses and market instability. In addition to these production-related measures, the MacSherry reform also aimed to help farmers comply with their obligations under international trade agreements. This involved tariffication and the reduction of trade-distorting support. Finally, the MacSherry reform introduced accompanying measures, such as agri-environmental payments. These were designed to support farmers in implementing environmentally-friendly farming practices, while also ensuring that they could continue to compete in the global market.



The **Agenda 2000 reform** in 1999 was a reform package designed to address the changing needs of the CAP. One of its key components was the establishment of the *second pillar* of the CAP. In light of the Eastern enlargement, the market measures and direct payments (*first pillar*) were complemented by funding for rural development. Through the rural development program, for which a strategy had to be elaborated by each Member State, provided funding for measures to promote sustainable agriculture, improve rural infrastructure, and provide training and education for farmers. In addition to these rural development measures, the Agenda 2000 also included a provision to phase out the milk quota system. The phase-out of the milk quota system was intended to provide greater flexibility for dairy farmers and enable them to respond more effectively to market demand. Another key aspect of the Agenda 2000 reform was the further reduction of intervention prices on selected goods. This was seen as a necessary step to bring EU agricultural prices in line with global market prices, and to increase the competitiveness of EU farmers.

The **Fischler reform**, also known as “the mid-term review”, was introduced in 2003 as a major overhaul of the CAP as per Council Regulation (EC) 1782/2003. Decoupling was introduced, which meant that income payments to farmers were no longer linked to the production of specific crops or their yield. Instead, the choice of crop production was left to each individual farmer based on market demand. However, implementation in the Member States varied. This new policy, also known as the Single Farm Payment (SFP) scheme, converted previous payments into entitlements that farmers could receive by demonstrating that an eligible land area was being used for agricultural purposes. Eligibility for SFP payments was determined by adherence to Good Agriculture and Environmental Conditions (GAEC) (Viaggi et al., 2010). These conditions were introduced to ensure sustainable agricultural practices, such as the reduction in the use of fertilizers. Another important aspect of the Fischler reform was the introduction of *modulation*, which involved shifting some of the first pillar payments to the second pillar.

In **2006**, the CAP was further reformed to simplify the management of funds to support European agriculture, to enhance compliance with CAP rules. To this avail, the European Agricultural Guidance and Guarantee Fund (EAGGF) was replaced with the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). This change was intended to simplify the management of the CAP and ensure that funds were used more effectively to support European agriculture. In addition, a single Common Market Organization (CMO) replaced the original 21 CMOs to reduce complexity and enhance compliance with CAP rules and regulations. Furthermore, the reform included the decision to phase out set-aside, which was initially introduced in 1988. Set-aside was a policy that required farmers to leave a certain percentage of their land uncultivated in order to reduce overproduction. However, this policy was seen as ineffective and outdated, and its removal was intended to give farmers more flexibility to use their land as they saw fit.

In 2013, the CAP was passed through ordinary legislative procedure, with the Council and the Parliament acting as co-legislators, based on the Commission’s initial proposal. This reform aimed to increase ambition in the field of environment, with measures such as *greening CAP payments* to impose restrictions on land use and incentives for fairer distribution of funds to support smaller farms and young farmers. Additionally, the Program of Rural Development



2014-2020 aimed to address climate change, sustainable use of natural resources, animal welfare, and food safety, leading to increased spending on rural development projects. This period was extended by two years until 2022, as co-legislators did not agree on language on time.

3.2 LAND USE, LAND USE CHANGE, AND FORESTRY REGULATION

The Land Use, Land Use Change and Forestry (LULUCF) regulation (Regulation (EU) 2018/841) is a policy set by the EU to account for the greenhouse gas emissions and removals resulting from activities related to land use, land use change and forestry. The regulation entered into force in 2018 and is applied from the beginning of 2021, with the first compliance period being 2021-2025.

The LULUCF regulation applies directly to all EU Member States, establishing a framework for monitoring and reporting greenhouse gas emissions and removals resulting from activities related to the land use sector. The reporting mechanism is designed to ensure that the EU's overall emissions reduction targets are met.

The amendment to the Land Use, Land Use Change and Forestry (LULUCF) regulation for the period 2026-2030 (COM/2021/554) establishes the goal of avoiding the release of 310 million metric tons of CO₂ equivalent by 2030, which will be distributed among EU Member States as annual national targets beginning in 2026. Starting in 2031, it is envisaged to combine non-CO₂ GHG emissions from agriculture with the LULUCF sector, creating a newly regulated land sector. The target for this newly regulated land sector is to achieve climate neutrality by 2035.

3.3 BIODIVERSITY STRATEGIES

As a result of the UN Convention on Biodiversity in Rio 1992, to which the EU is a signatory party, the EU developed a **biodiversity strategy in 1998** (COM (1998) 42 final)¹⁰, which aimed to anticipate, prevent and attack the causes of significant reduction or loss of biological diversity at the source. For its implementation, sectoral and cross-sectoral action plans were designed.

These **Biodiversity Action Plans for the Conservation of Natural Resources** were revised in 2001 (COM/2001/0162 final)¹¹ to focus on better integrating biodiversity into other policy areas, such as agriculture, fishery and structural funds. It also highlights the 1999 reform of the CAP in the context of Agenda 2000 potential direct and indirect contribution towards enhancing the sustainable use and conservation of the overall biodiversity in Europe, especially through the newly created rural development fund.

Subsequently, in 2006, the EU adopted a Biodiversity strategy entitled **Halting the loss of biodiversity by 2010 - and beyond** (COM(2006) 216 final)¹², which was a follow-up to the EU Biodiversity Action Plan of 2001. The Communication recognized that this goal to halt bio-

¹⁰<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:51998DC0042&qid=1676987788162&from=EN>

¹¹<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52001DC0162%2802%29&qid=1676992310732>

¹²<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52006DC0216>



diversity loss until 2010 was not fully achieved, and proposed a more comprehensive and ambitious approach to biodiversity conservation in the EU. It makes a link to the 2003 Fischler reform of the CAP, which introduced both decoupled payments in combination with requirements for certain agricultural practices. Furthermore, it explicitly mentions the use of funds from the previously established second pillar of the CAP, for areas such as enhanced support for Natura 2000 areas, agri–environmental measures and payments for areas with handicaps, as well as measures in support of sustainable forest management. This policy paper was the first to include quantified targets for biodiversity protection and restoration¹³.

Earlier biodiversity strategies focused primarily on conservation and management measures, with less emphasis on the underlying drivers of biodiversity loss. This changed with the **EU Biodiversity Strategy for 2020**¹⁴. The strategy was adopted in May 2011 and it outlines the measures and actions that the EU intends to take in order to halt the loss of biodiversity by 2020.

The strategy proposes six main targets to achieve its goals. First, it aims to fully implement the Birds and Habitats Directives, two key pieces of EU legislation on nature protection, by 2020. Second, it seeks to restore at least 15% of degraded ecosystems by 2020, and to increase the coverage and quality of protected areas in Europe, so that they represent at least 17% of land and 10% of marine areas by 2020. Third, the strategy aims to help farmers and landowners to implement biodiversity-friendly practices on at least 10% of agricultural land by 2020. Fourth, it seeks to combat invasive alien species by preventing their introduction and establishment, and managing them effectively when they occur. Fifth, the strategy aims to step up the EU’s contribution to global biodiversity conservation by supporting developing countries in their efforts to protect their own biodiversity. Lastly, the strategy proposes to monitor progress towards these targets and report on it regularly to ensure that the EU is on track to achieve its goals.

3.4 HABITATS DIRECTIVE

The **Habitats Directive**¹⁵ (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) is a EU directive adopted in 1992. It is one of the main instruments of EU nature conservation policy, and aims to protect and preserve the habitats and species of wild fauna and flora in the EU. It was introduced to comply with the Bern Convention, to which the EU is a signatory party.

The directive requires EU Member States to identify and protect sites of special conservation interest, known as “Natura 2000” sites, which are designated for the protection of habitats and species of EU importance. These sites are chosen based on the presence of certain rare or threatened habitats and species, and are subject to strict conservation measures to ensure their preservation.

Under the Habitats Directive, Member States are also required to take measures to conserve

¹³<https://www.cbd.int/doc/external/bioday-2006-eu-annexes-en.pdf>

¹⁴<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011DC0244>

¹⁵<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31992L0043&qid=1674458074443>



and protect the habitats and species of EU importance outside of Natura 2000 sites, and to ensure that any plans or projects likely to have a significant effect on these habitats and species are subject to an assessment of their likely impact.

As of 2022, over 18% of the EU's land area are designated Natura 2000 sites (EEA, 2021). Through the EU Biodiversity Strategy for 2030, the EU aims to raise this share to 30% of land in the EU.

3.5 EU DIRECTIVE ON THE CONSERVATION OF WILD BIRDS

The **EU Directive on the Conservation of Wild Birds** (Council Directive 2009/147/EC)¹⁶ is a EU directive adopted in 2009, which builds on the earlier 1979 Birds Directive (Council Directive 79/409/EEC) and replaces it. Its aim is the protection of wild birds and their habitats across the EU, to address the dwindling number of wild birds in the EU. The directive applies to all wild bird species naturally occurring in the EU, independent of whether their residence is temporary or permanent. As a directive, it is legally binding; however, Member States have to comply with its target by transposition into national law¹⁷.

The Birds Directive requires EU Member States to take measures to conserve and protect wild bird species and their habitats, including the identification and designation of Special Protection Areas (SPAs) for the conservation of bird species of European importance. These SPAs are chosen based on the presence of certain rare or threatened bird species and are subject to strict conservation measures to ensure their preservation.

Member States are further required to take measures to conserve and protect wild bird species and their habitats outside of SPAs and to ensure that any plans or projects likely to have a significant impact on wild bird species are subject to an assessment of their likely impact.

Another element of the Birds Directive is the requirement that Member States are to establish and maintain a monitoring program to assess the populations of wild bird species and their habitats, and to take appropriate measures towards their conservation.

3.6 WATER FRAMEWORK DIRECTIVE

The **Directive establishing a framework for Community action in the field of water policy** (also known as “Water Framework Directive” 2000/60/EC)¹⁸ establishes a framework for the protection of water resources in the EU. It aims to achieve both good qualitative and quantitative status through the implementation of measures to reduce pollution and improve water management.

The Water Framework Directive gives national authorities responsibilities to ensure the protection and management of water resources. Specifically, they are required to identify the individual river basins within their territory, and designate the authorities responsible for managing them in accordance with EU rules. To properly manage each river basin, national au-

¹⁶<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147>

¹⁷National legislation detailing the transposition into national law is listed under the link above.

¹⁸<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32000L0060&qid=1674837480029>



thorities must conduct a thorough analysis of its features and establish reference conditions to assess the status of each type of water body. They must also analyze the impact of human activities on water resources, and conduct an economic assessment of water use to inform policy decisions.

In addition, authorities must closely monitor the status of water in each basin, and register protected areas such as those used for drinking water to ensure they receive special attention. To preserve and improve water resources, national authorities must develop and implement river basin management plans to prevent the deterioration of surface water, protect and enhance groundwater, and preserve protected areas. Furthermore, they are required to ensure the cost of water services is appropriately recovered to promote efficient use of resources and hold polluters accountable. National authorities must also provide public information and consultation on their river basin management plans to ensure transparency and public participation in the management of water resources.

First published in October 2000, it sets out targets for 2015. The directive has since been amended to include targets for 2021, and later 2027.

3.7 FLOODS DIRECTIVE

The **directive on the assessment and management of flood risks** (2007/60/EC)¹⁹ is a legislative initiative by the EU to minimize the impact of floods on the Member States. The directive emphasizes the need for a coordinated effort among Member States to identify and assess flood risks, develop strategies to mitigate their impact, and establish early warning systems and emergency plans to respond to flood events. Member States are to revisit the measures put into place every six years.

The directive requires Member States to carry out flood risk assessments, which involve identifying areas that are at risk of flooding and analyzing the potential impact of flooding in those areas. Member states are also required to develop flood hazard maps, providing information on flood-prone areas and potential flood scenarios. Once the flood risk assessments and hazard maps are complete, Member States must take measures to reduce the risk of flooding. These measures may include structural solutions such as flood defenses, as well as non-structural solutions such as land-use planning and emergency preparedness.

In addition to addressing all types of floods, the directive requires Member States to establish early warning systems and flood emergency plans. These systems and plans must provide timely and accurate information to the public, enable effective evacuation and emergency response, and reduce the loss of life and damage to property.

The directive also includes provisions for the restoration of flood-prone areas and for the protection of important cultural and natural heritage sites. These provisions aim to ensure that the natural and cultural assets of Member States are safeguarded in the event of a flood.

¹⁹<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32007L0060&qid=1674838878020>



3.8 NITRATE DIRECTIVE

The **EU Nitrate Directive**, also known as Directive 91/676/EEC²⁰, aim to reduce water pollution caused by nitrates from agricultural sources. The legislation is intended to protect water quality and prevent eutrophication, meaning the excessive growth of algae and other plants in bodies of water due to an abundance of nutrients. It was introduced in December of 1991; with subsequent implementation.

The Directive requires EU Member States to designate *Nitrate Vulnerable Zones (NVZ)* within their territory, which are areas where nitrate pollution is likely to be a problem, meaning that they are likely to contribute to surface or ground water contamination of at least 50 mg/L of nitrate. Member States are also free to apply provisions to its entire territory (so called “article 3.5”). Furthermore, it requires Member States to establish codes of good agricultural practices. While these codes are voluntary in non-NVZ areas, they are mandatory within NVZs to ensure that farmers in these areas take appropriate measures to reduce nitrate pollution.

Farmers within NVZs are subject to a range of regulations aimed at reducing nitrate pollution from agricultural activities. These regulations include restrictions on the timing and amounts of fertilizer application, as well as limits on the number of livestock that can be kept per hectare of land. The codes on good agricultural practices are mandatory in NVZs. In addition to these regulations, the Nitrate Directive also includes other measures aimed at reducing nitrate pollution within NVZs. These measures include the limitation of both mineral and organic fertilizer application, taking into account crop needs, all nitrogen inputs, and soil nitrogen supply. The Directive also sets a maximum amount of livestock manure that can be applied per hectare per year, corresponding to 170 kg of nitrogen.

The Directive also sets conditions for fertilizer application, such as prohibiting application on steeply sloping ground, frozen or snow-covered ground, and areas near water courses. These measures help prevent nitrate losses from leaching and runoff, which can pollute water sources.

The Directive also requires Member States to monitor nitrate levels in their waters and report on progress towards meeting the Directive’s objectives. The Directive has been revised several times since it was first enacted, with the most recent revision in 2018.

3.9 REGULATION ON ORGANIC PRODUCTION AND LABELING OF ORGANIC PRODUCTS

The **EU Regulation on Organic Production and Labeling of Organic Products** (Regulation 2018/848)²¹ outlines standards and rules for organic agriculture production and labeling in the EU. It includes provisions on production methods, traceability, labeling and labeling requirements, control and inspection systems, and import requirements for organic products. The regulation applies to all organic food and agricultural products, including crops, livestock, and processed products, produced within the EU or imported from outside the EU. The

²⁰<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01991L0676-20081211>

²¹<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R0848&qid=1675238670208&from=EN>



aim of the regulation is to ensure that organic products are produced in a way that is environmentally friendly and to provide consumers with clear and consistent information about the organic nature of the products they purchase.

3.10 SUSTAINABLE USE OF PESTICIDES DIRECTIVE

The Sustainable Use of Pesticides Directive (2009/128/EC)²² aims to promote the sustainable use of pesticides in the EU in order to reduce the risks and impacts associated with their use, while simultaneously ensuring effective pest management. The Directive is part of the EU's broader strategy on pesticides, which also includes the regulation of pesticides and the establishment of maximum residue levels for pesticides in food.

The Directive requires EU Member States to adopt a national action plan for the sustainable use of pesticides, which should include measures such as promoting integrated pest management, training and certification of pesticide users, and monitoring of pesticide use and its impact on human health and the environment. Member states must also establish national targets for the reduction of the risks and impacts of pesticide use.²³

The directive also requires the EU Member States to establish systems for the inspection and monitoring of the use of pesticides, including monitoring of residues in food and feed, and to promote the use of alternative non-chemical pest control methods. In addition, the directive encourages the development and use of low-risk and non-chemical methods of pest control, as well as the use of pesticides with reduced risk to human health and the environment.

As a directive, the legislation must be transposed into national law. An evaluation study commissioned by the European Commission reaches the conclusion that while all Member States have developed National Action Plans as per the directive's requirements, the extent and effectiveness of implementation have varied considerably. There are also limitations to ascertaining whether there has been a reduction in risk from plant protection products (Ramboll and Arcadia International, 2021). This criticism has led to the introduction of a proposed regulation on the sustainable use of plant protection products, which is currently undergoing discussion.

3.11 EU INVASIVE SPECIES REGULATION

The **Regulation on the prevention and management of the introduction and spread of invasive alien species** (1143/2014)²⁴ is a law that was adopted by the EU in 2014 with the aim of preventing and managing the introduction and spread of invasive alien species in the EU. In the regulation, an invasive alien species refers to a type of organism that has been introduced or has spread beyond its natural habitat and has been found to pose a threat or negatively affect biodiversity and related ecosystem services.

The regulation establishes a list of invasive alien species of Union concern, which are species that have a significant impact on the environment or the economy and which are subject to

²²<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02009L0128-20190726>

²³National Action Plans for sustainable use of pesticides are available on the following website: https://food.ec.europa.eu/plants/pesticides/sustainable-use-pesticides/national-action-plans_en.

²⁴<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R1143>



specific measures to prevent their introduction and spread. The list is regularly updated based on the latest scientific knowledge via implementing acts. Furthermore, each Member State may draw up its own national list of invasive alien species of concern, and for those species, the Member State may apply the same measures to these species.

4 Land Use Policy in the EU: An Outlook

This section identifies the main policies on the European level that have a potential direct or indirect effect on land use in the future. Some policies are already in force, however, they are listed here, either because they still need to be implemented nationally, or are yet to take effect.

4.1 THE EUROPEAN GREEN DEAL

The **European Green Deal**²⁵ was published in late 2019 and is intended to serve as a road map to tackle climate and environmental-related challenges via Green Growth: “It is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use.” (EC, 2019) This document, which as a communication has no legally binding character, lays out a general political strategy, which will be implemented through various subsequent directives and regulations.

The strategy comprises eight focus areas, which are each be described in the following sections.

4.1.1 *Increasing the EU’s climate ambition for 2030 and 2050*

One of the main policies in this focus area is the **European Climate Law**²⁶, which was passed in June of 2021. It enshrines the EU’s objective to reach zero net emissions by 2050. While making no direct reference to land use and land use change in the text per se, the preamble highlights the importance of the sector to remove emissions from the atmosphere, hence contributing to the goal of reaching net zero emissions. Another policy instrument mentioned is the **European Trading System** (ETS), which puts a cap on CO₂ emissions of certain sectors, including fertilizers, that can be bought and traded. This system, which was first implemented in 2005, does not yet encompass land use, land use change and forestry (LULUCF). This is to be addressed with a revision to the **LULUCF Regulation**, set to cover the years from 2026-30.

Further policy initiatives include a revision of the **Energy Taxation Directive** (Directive 2003/96/EC), which identifies the energy products subject to the harmonised rules for excise duties, sets minimum levels of taxation and lays down the conditions for applying tax exemptions and reductions in regards to environmental issues (EC, 2019).

²⁵<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640>

²⁶Regulation (EU) 2021/1119, <http://data.europa.eu/eli/reg/2021/1119/oj>



Another cornerstone of the EU's climate policy is the so-called **Carbon Border Adjustment Mechanism** (COM (2021) 564 final). This measure seeks to prevent carbon leakage by pricing in carbon emissions from extra-EU countries from emission-intensive industries, namely iron and steel, cement, fertilizers, aluminum, and electricity. This could imply a significant shift of input prices in the EU. For the land use sector, a price shift in fertilizers might impact the use of arable land: leguminous crops which are not dependent upon the nitrate content of the soil might develop a cost-advantage over crops, such as maize or oilseed rape.

4.1.2 *Supplying clean, affordable, secure energy*

The European Green Deal emphasizes the importance of reducing the production and use of energy from non-renewable sources, such as fossil fuel or gas. The energy sector contributes to 75% of all greenhouse gas emission of the EU, making it a major lever for reaching the goal of net-zero emissions by 2050. The main policy measure detailed in the growth strategy is the revision of each Member State's **Energy and Climate Plan**, which has to be drafted on basis of the **Regulation on the Governance of the Energy Union and Climate Action** (2018/1999)²⁷. Furthermore, the EC will present a revised regulatory framework for energy infrastructure.

While inherently focused on decarbonizing European energy systems, a shift towards energy use and production from renewable sources has the potential to shift land use in the EU. Fritsche et al. (2017) find that while energy production from fossils leaves its footprint on land through resource extraction (e.g., coal mining), conversion (e.g., refineries, power plants) and their respective infrastructure (e.g., pipelines, fuel storage, transmission lines), energy production from renewable sources depend on the type of renewable source and its production design: According to the authors, bioenergy, including biofuel, is the most land-intensive energy source. Bioenergy from crops has a direct land footprint of up to several hundred m²/MWh, while that relating to biogenic residues and waste is close to zero. Hydropower is also land-intensive, as it often requires flooding of land behind dams while also interfering with the flow of rivers, hence impacting biodiversity. Solar power is often installed on existing buildings, keeping its land use intensity rather small. Large-scale photovoltaic plants and concentrated solar power plants have land footprints in the order of 1-10 m²/MWh. Eolic energy generation has the smallest land-use footprint at 1 m²/MWh.

4.1.3 *Mobilising industry for a clean and circular economy*

As outlined in the EGD, around half of total greenhouse gas emissions and more than 90% of biodiversity loss and water stress comes from extraction and processing of materials, fuels and food (EC, 2019). Reusing and recycling materials could significantly lower greenhouse gas emission in the EU's industry sector. A *circular economy* describes an economic system, in which resources are kept in use for as long as possible by shifting away from a linear make-use-dispose, to a circular model where resources are kept in use for as long as possible. The idea of a circular economy is to minimize waste and pollution, while also conserving natural resources.

²⁷<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018R1999&qid=1674744895654>



Breure et al. (2018) look at the role of soil and land management in a circular economy. The analysis looks at soil as a scarce resource, which is paramount for the production of food and other biomass; the storage, filtration and transformation of many substances including water, carbon, and nitrogen; the provision of fresh mineral resources and fossil fuels; and the use of their functions as the platform for nature and human activities. However, the EGD does not explicitly allude to land as a scarce resource; its focus lays on energy-intensive industries such as steel, chemicals and cement, as well as resource-intensive sectors such as textiles, construction, electronics and plastics.

The EGD foresees the adoption of the **EU industrial strategy** which was presented in 2021 (COM/2021/350 final)²⁸. The strategy aims to address the challenges facing the Single Market, especially in the aftermath of the Covid-19 pandemic. At its center is the *twin transition* of the European economy, which describes the ambition of a simultaneous transition towards a green and digital economy. The document makes no reference use. The second policy measure in this focus area is a new **Circular Economy Action Plan** (COM/2020/98 final)²⁹, which was published in March 2020. The strategy, which is the successor of the 2015 Circular Economy Action Plan (COM/2015/0614 final), includes a range of measures such as setting binding targets for recycling and reducing landfilling of waste, encouraging the design of products that are easier to repair, reuse, refurbish and recycle, supporting the development of markets for secondary raw materials, promoting sustainable consumption, investing in research and innovation, encouraging the use of green public procurement, as well as supporting the transition to a circular economy in developing countries. Furthermore, it announces the creation of a regulatory framework for certifying carbon removals.

4.1.4 *Building and renovating in an energy and resource efficient way*

According to data provided by the EC, buildings consume around 40% of final energy and account for 36% of the of energy-related greenhouse gas emissions (EC, 2021). The EGD seeks to improve energy efficiency of buildings while also focusing on keeping housing affordable.

However, there is a trade-off in building and renovating, as the production of building materials such as cement, gravel or sand requires a significant amount of energy Emissions from the production of construction material, however, are not addressed by the EGD.

The policy measures foreseen are twofold: First, the EC will enforce existing legislation related to the energy performance of buildings: The revised **Energy Performance of Buildings Directive** (COM(2021) 802 final)³⁰ aims to facilitate and increase building renovation, modernising and decarbonising the EU's building stock. It is an essential part of delivering on the **Renovation Wave strategy** (COM/2020/662 final)³¹. The **Effort Sharing Regulation** (2018/842)³² sets emission reduction targets for all Member States by 2030 for sectors including buildings. The revised Energy Efficiency Directive together with the Renewable Energy

²⁸<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0350&qid=1674744136681>

²⁹<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0098>

³⁰<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0802&qid=1674740729214&from=DE>

³¹<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0662&qid=1674745710328>

³²<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018R0842>



Directive aim make buildings more energy efficient and boost the use of renewable energy in buildings. Emissions Trading for building fuels is expected to drive emission reductions and stimulate investments in renewable energy as well as energy efficiency. Finally, the new Social Climate Fund, funded by revenues from emissions trading in road transport and buildings, is to provide financial support to citizens, in particular the vulnerable households, to invest in renovation or heating systems and ensure a fair transition.

While buildings inherently fall into the category of other land, meaning being used neither for agriculture nor for forestry, an increased focus on building and renovating has a variety of implications on other sectors. A key determinant of the effect on land use due to the likely surge in construction materials is the type of construction material: Timber as a construction material has the potential to increase the wooded area or to intensify forestry in existing wooded areas, whereas inorganic compounds used for construction have the potential to deter agricultural or wooded land. Costea (2018) presents evidence from Romania that “[...] the intensive harvesting of gravels and sands in floodplain area leads to doubling of pit and pit ponds surfaces, changes in floodplain morphology and landscape degradation and radical changes in land use/land cover.” Göswein et al. (2021) study the required land for bio-based construction (timber, straw, hemp and cork construction and renovation), taking into account the current use of land in Europe. Furthermore, a shift towards renovating in lieu of green-field development relieves pressure on land use.

4.1.5 Accelerating the shift to sustainable and smart mobility

With regards to mobility, the EU has the ambition to reduce greenhouse gas emission from this sector by 90%. To this end, the Green Deal details several policy initiatives:

The **strategy for sustainable smart mobility** (COM/2020/789 final)³³, which was published in December of 2020, sets out to reduce the environmental impact of transportation, improve the safety and efficiency of transportation systems, and promote the use of alternative fuels and smart technologies. The strategy includes targets for 2030, 2035, and 2050. Some of the key actions proposed by the strategy include the promotion of electric vehicles and other alternative fuels, the development of intelligent transportation systems and the expansion of public transportation options.

Furthermore, the EU aims to strengthen multi-modal transport with a possible new proposal of the Combined Transport Directive (92/106/EEC). The process to reform the Single European Sky to create a unified and more efficient airspace across the EU by restructuring the current airspace and creating functional airspace blocks is to restart. This would allow for more efficient use of airspace, reducing flight times and emissions, and increasing capacity to meet the growing demand for air travel. This transition is to be financed through funding instruments, such as the Connected Europe Facility.

Other policies mentioned are the Energy Taxation Directive (COM(2021) 563 final)³⁴, Eurovi-

³³<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789>

³⁴<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0563>



gnette Directive (1999/62/EC)³⁵, TEN-T Regulation (COM(2021) 812 final)³⁶, and the Alternative Fuels Infrastructure Directive (2014/94/EU)³⁷.

Integrated land use planning as a way to mitigate emissions of greenhouse gases in the transport sector is not mentioned in the policy proposals above. This is in line with findings from Greiving and Fleischhauer (2016), which looks at evidence from several countries.

4.1.6 *Farm to Fork: a fair, healthy and environmentally friendly food system*

The communication (COM/2020/381)³⁸ was presented in May 2020 and is part of the EGD. As a communication, it is not legally binding. Its aim is the sustainable transformation of the European food system, over a period of ten years. This is the first time the EU has put forward such a holistic approach to the transition to sustainable food systems by providing measures and targets for each step of the food chain, from production to processing, distribution to consumption.

The strategy aims to address the challenges of producing and consuming our food in a fair and sustainable way by reconciling type of food for consumption with the capacity of our planet. The strategy outlines six areas of action, among which figure:

- **Sustainable food production:** To make food production sustainable, the strategy highlights the importance of human and financial investments, new business models for farmers, such as carbon farming, and bio-refineries; the decreased use of pesticides through integrated pest management, integrated nutrient management to prevent excess nutrients from seeping into the soil, reduction of greenhouse gas emissions from agriculture, especially animal production through innovative feeding methods and waste management; reducing the sale of antimicrobials by 50% by 2030, improving animal welfare, foster the use of a broad variety of seeds and species, and foster organic agriculture across the EU. The main lever to implement the practices and methods detailed in the strategy is the new CAP, starting in 2023. Member States had to describe the contribution of their proposed Strategic Plan to the Farm to Fork Strategy³⁹. Similar provisions are in place for the Common Fishery Policy, regarding aquaculture.
- **Food security:** Food supply chains were put to the test during the Covid-19 pandemic, and could face future threats such as recurring droughts, floods, forest fires, biodiversity loss, and new pests. The EC is to assess the resilience of supply chains, and works on a contingency plan for ensuring food supply and food security to be put in place in times of crisis.
- **Sustainable supply chain:** Marketing across the value chain can shape consumer be-

³⁵<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31999L0062&qid=1677018483677>

³⁶<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:812:FIN>

³⁷<http://data.europa.eu/eli/dir/2014/94/2021-11-12>

³⁸<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0381&qid=1674558409649>

³⁹The contents of the CAP Strategic Plans are laid out in the Implementing Act C/2021/9601 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R2289>



behaviour. The strategy presents policy instruments aimed at influencing consumers towards more sustainable dietary choices.

- **Promoting sustainable food consumption:** Closely linked to the point above, official authorities and policy makers are to promote sustainable food consumption, and facilitate the shift towards healthy and sustainable diets. Policy instruments mentioned are packaging laws, as well as tax incentives.
- **Reducing food loss and waste:** The EC aims to cut food waste at retail and consumer levels per capita by half by 2030. This corresponds to the SDG target 12.3.

4.1.7 *Preserving and restoring ecosystems and biodiversity*

Land use change, together with sea use change, is explicitly mentioned as a driver in erosion of biodiversity worldwide. To counteract this development, the Commission announced a **Biodiversity Strategy for 2030**, which was presented in May 2020 and will be followed up by specific actions, such as the proposed **Nature Restoration Law**. When passed, Member States will have to present national restoration plans that set out the restoration measures needed to meet ecosystem-specific targets and obligations. The national governments will have to demonstrate restoration measures which together shall cover at least 20% of the EU's land and sea areas by 2030 and all ecosystems in need of restoration by 2050.

4.1.8 *A zero pollution ambition for a toxic-free environment*

The zero pollution ambition for a toxic-free environment aims to prevent and reduce pollution from air, water, soil, and consumer products in order to protect the public health and the environment.

In order to reach said goal, three policy measures are announced: First, the EU adopted a **zero pollution action plan** (COM(2021) 400 final)⁴⁰ in May 2021, focusing on monitoring, reporting, preventing and remedying pollution. The plan includes measures to restore the natural functions of ground and surface water; reduce pollution from excess nutrients by implementing the Farm to Fork strategy; address pollution from urban runoff and new or particularly harmful sources of pollution such as micro plastics and chemicals, including pharmaceuticals. The quantified targets for 2030 include:

- improving air quality to reduce the number of premature deaths caused by air pollution by 55%;
- improving water quality by reducing waste, plastic litter at sea (by 50%) and microplastics released into the environment (by 30%);
- improving soil quality by reducing nutrient losses and chemical pesticides' use by 50%;

⁴⁰<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021DC0400&qid=1674725193806>



- reducing by 25% the EU ecosystems where air pollution threatens biodiversity;
- reducing the share of people chronically disturbed by transport noise by 30%, and
- significantly reducing waste generation and by 50% residual municipal waste.

An annex to the plan lists the envisioned actions between 2021-2024, including evaluations and revisions to existing legislation. With regards to land use and agricultural practices, the action plan mentions establishing an EU priority watch list for soil contaminants and introducing a zero soil pollution module in the future LUCAS survey, investigating best practices and providing guidance for a passport for the safe, sustainable and circular use of excavated soil, building capacity and improving knowledge on less polluting practices with national advisory services for farmers, as well as compiling and making accessible all key obligations on nutrient management stemming from EU law to limit the environmental footprint of farming activities.

Second, **EU measures to address pollution from large industrial installations** are to be reviewed, including a revision of air quality standards to align them more closely with the World Health Organization recommendations and work with Member States to improve the prevention of industrial accidents. Three legislative proposals were published in October of 2022: The **directive on ambient air quality and cleaner air for Europe** (COM(2022) 542 final)⁴¹, detailing rules for monitoring and reporting on air pollution, the **directive concerning urban wastewater treatment (recast)** (COM(2022) 541 final)⁴², containing limit values for micro-pollutants, nitrogen and phosphorus in waste water, and steps to increase monitoring of sewage plants; as well as the **directive amending the Water Framework Directive, the Groundwater Directive and the Environmental Quality Standards Directive** (COM(2022) 540 final)⁴³, expanding the list of water pollutants to be controlled for in surface waters and groundwater.

Third, the **chemicals strategy for sustainability** aims to protect citizens and the environment better against hazardous chemicals, encourage innovation for the development of safe and sustainable alternatives and simplify and strengthen the legal framework for chemicals. The strategy was published in October of 2020 (COM(2020) 667 final)⁴⁴ and is not legally binding.

4.2 COMMON AGRICULTURAL POLICY AFTER 2023

In 2018, the commission presented a set of regulations laying down the legal framework for the CAP in the period 2021-2027 (COM(2018) 392 final). The regulation establishes rules on drafting the strategic plans to be drawn up by Member States and financed by both the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural

⁴¹<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A542%3AFIN>

⁴²<https://environment.ec.europa.eu/system/files/2022-10/Proposal%20for%20a%20Directive%20concerning%20urban%20wastewater%20treatment%20%28recast%29.pdf>

⁴³<https://environment.ec.europa.eu/system/files/2022-10/Proposal%20for%20a%20Directive%20amending%20the%20Water%20Framework%20Directive%2C%20the%20Groundwater%20Directive%20and%20the%20Environmental%20Quality%20Standards%20Directive.pdf>

⁴⁴<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A667%3AFIN>



Development (EAFRD). The regulation entered in force in December of 2021 (Regulation EU 2021/211)⁴⁵.

The next funding period for the CAP started in January 2023 and is set to last until December 2027. The start, which was planned for 2021, was delayed by two years, as no compromise on new funding rules could be reached on the European level. The main point of content was the level of environmental ambition.

One of the main operational changes compared to previous funding periods is the obligation for the Member States to each present a Strategic Plan⁴⁶, covering both pillars of EU agricultural policy (direct payments and rural development). Member states were to address nine specific objectives and a cross-cutting objective as laid out by the regulation. These plans were submitted to the Commission by the end of 2021 and after approval or modification by the EU Commission affect agricultural production until 2027 by the several policy instruments. The plans are available to the public⁴⁷.

The EC provides an overview of all approved CAP Strategic plans (DG Agri, 2022). This summary outlines some key elements of each CAP strategic plan. Furthermore, Becker et al. (2022) provide a similar examination of submitted CAP Strategic Plans. However, the basis for this analysis is the initial proposal of each Member States' CAP strategic plan. As these plans have since been updated for approval by the European Commission on the basis of Observation Letters⁴⁸, the information might be outdated at some points.

In light of the war in Ukraine and the subsequent decrease in production of agricultural commodities such as wheat, sunflower seeds, and oilseed rape, Member States pushed for exemptions from GAEC 7 and 8. The two new standards, which were set to take effect in 2023, affect crop production on arable land. Standard 7 focuses on crop rotation to preserve soil and increase fertility, potentially impacting farmers' crop choices. Standard 8 mandates a minimum portion of land for non-productive features to improve on-farm biodiversity. This may result in farmers leaving some land fallow for biodiversity reasons, in addition to preserving landscape features. Due to the implementing regulation⁴⁹, GAEC 7 and 8 will come into effect a year later, in 2024.

4.3 EU - 2050 LONG-TERM STRATEGY

The **EU 2050 Long-term strategy** (COM/2018/773 final)⁵⁰ is a set of policies and initiatives developed by the EU to achieve climate neutrality by 2050. The strategy was adopted in December 2018, and it sets out a vision for a long-term transition towards a low-carbon, climate-resilient and socially fair economy.

⁴⁵<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R2115&qid=1674403556393>

⁴⁶As an exception, Belgium is to draft one Strategic Plan for Wallonia and Flanders, respectively.

⁴⁷<https://agriculture.ec.europa.eu/cap-my-country/cap-strategic-plans-country`en>

⁴⁸<https://agriculture.ec.europa.eu/cap-my-country/cap-strategic-plans/observation-letters`en>

⁴⁹<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32022R1317>

⁵⁰<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773>



All EU Member States are obligated to formulate their own long-term plans outlining the methods they intend to employ to meet their commitments under the Paris Agreement and the EU's objectives, through reducing greenhouse gas emissions.

4.4 EU STRATEGY TO REDUCE METHANE EMISSIONS

The EU Strategy to Reduce Methane Emissions (COM(2020) 663 final) was presented in October 2020. The strategy focuses on three sectors, which together account for over 90% of anthropogenic methane emissions: agriculture (54%), waste (27%), and energy supply (12%) (EEA, 2021).

The strategy focuses on (i) improving reporting on methane emissions, (ii) establishing an international methane emissions observatory, (iii) enhanced monitoring of global methane emissions via satellite, (iv) strengthen the regulatory framework with regards to methane emissions (e.g., Emissions Trading System, Effort Sharing Regulation, Industrial Emissions Directive, a.s.f.), and (v) incentivise the use of non-recyclable agricultural waste for biogas production.

In regards to land use and land use management, the strategy identifies agricultural practices to reduce methane emissions: First, methods to decrease methane emissions from ruminants include innovating feeding methods, herd management, manure management, breeding, herd health, and animal welfare. Second, to better valorize agricultural waste, barriers such as insufficient knowledge and expertise that prevent their wider uptake should be addressed. Third, rice fields also emit methane which can be reduced by management practices such as rewetting, drying, etc.

The strategy is as such not legally binding, but will be implemented through several pieces of legislation. In the agricultural sector, the EC will:

- set up an expert group to analyse life-cycle methane emission metrics
- develop an inventory of best practices and available technologies
- provide a digital carbon navigator template and guidelines on common pathways for the quantitative calculation of greenhouse gas emissions and removals
- promote the uptake of mitigation technologies through wider deployment of *carbon farming*, and
- propose targeted research via Horizon Europe.

Complementary initiatives that might contribute towards reducing emissions in the agricultural sector include the EGD, the CAP via its strategic plans, as well as the Effort Sharing Regulation, which covers the emissions of methane.



4.5 EU BIODIVERSITY STRATEGY FOR 2030

The EU Biodiversity Strategy for 2030 (COM(2020) 380 final)⁵¹ is the successor of the **EU Biodiversity Strategy for 2020** and was adopted in May 2020 together with the **Farm to Fork Strategy**. The communication for the EC is as such not legally binding, but sets forth overarching political ambitions and goals.

To halt biodiversity loss in the EU, the strategy proposes to *(i)* legally protect a minimum of 30% of the EU's land area and 30% of the EU's sea area and integrate ecological corridors, as part of a true Trans-European Nature Network, *(ii)* strictly protect at least a third of the EU's protected areas, including all remaining EU primary and old-growth forests, and *(iii)* to effectively manage all protected areas.

With regards to restoring biodiversity, the strategy sets out several of intervention, including:

- **Legal framework:** In order to make the proposed targets enforceable, the EC proposed the Nature Restoration Law. Furthermore, Member States are to raise the level of implementation of existing legislation within clear deadlines.
- **Agriculture:** Together with the Farm to Fork Strategy, a high level of ambition is expected by the Member States when presenting their CAP Strategic Plans for approval, especially regarding sustainable practices such as precision agriculture, organic farming, agro-ecology, agro-forestry, low-intensive permanent grassland, and stricter animal welfare standards. The strategy further explains the EC's objective to reduce by 50% the overall use of – and risk from – chemical pesticides and more hazardous pesticides by 2030. To facilitate the marketing of traditional varieties of crops and breeds, the EC announced measures to improve registration of these varieties.
- **Soil:** The strategy highlights the importance of the CAP as a lever to ensure sustainable soil management practices. Furthermore, two other related EU policy instruments are mentioned to contribute towards halting biodiversity loss, namely the EU Soil Thematic Strategy, as well as the Zero Pollution Action Plan or Air, Water and Soil.
- **Forests:** The Biodiversity Strategy details the ambition to increase the quantity, quality and resilience of its forests, notably against fires, droughts, pests, diseases and other threats likely to increase with climate change. The EU Forest Strategy was launched with the goal to plant three billion additional trees, which should happen preferably in cities, in agroforestry, landscape features and increased carbon sequestration. Funding for these effort can stem from either CAP Strategic Plans, the Cohesion Policy funds, the new European Urban Greening Platform, as well as the LIFE programme.
- **Energy production:** As the EU transitions towards energy from renewables, the regulatory framework needs to be updated. This includes the Renewable Energy Directive, the Emissions Trading Scheme, and the Regulation on LULUCF. For forest biomass, sustainability criteria are necessary to avoid incentives for deforestation; furthermore, the use

⁵¹<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0380>



of whole trees and food and feed crops for energy production is to be avoided.

- **Marine Ecosystems:** To protect biodiversity of marine ecosystems, the strategy lays out the need for implementation of the EU's Common Fisheries Policy, the Marine Strategy Framework Directive and the Birds and Habitats Directives. The European Maritime and Fisheries Fund will assist funding the transition towards more sustainable practices.
- **Freshwater Ecosystems:** Regarding freshwater ecosystems, no new policy instruments are proposed; the focus lays on implementing the existing Water Framework Directive. To this end, at least 25,000 km of rivers will be restored into free-flowing rivers by 2030 through the removal of primarily obsolete barriers and the restoration of floodplains and wetlands.
- **Urban and peri-urban areas:** Under the Green City Accord, European cities are invited to develop their own Urban Greening Plan.
- **Pollution:** As outlined in the European Green Deal, the Commission has proposed a new EU Chemicals Strategy for Sustainability (COM(2020) 667 final)⁵² along with a Zero Pollution Action Plan for Air, Water and Soil (COM(2021) 400 final)⁵³. In regards to fertilizers, the EC plans to reduce nutrient losses from fertilizers by at least 50% and decrease fertilizer usage by at least 20% through the Farm to Fork Strategy. They will also develop an **Integrated Nutrient Management Action Plan**⁵⁴, which will look at the entire nitrogen and phosphorus cycles, covering environmental media (air, water, marine and soil) and relevant sources of pollution (e.g. agriculture, industry, urban, waste, energy, transport).
- **Invasive alien species:** To mitigate threats from invasive alien species across the EU, the invasive alien species regulation was updated in 2022.

The targets are more ambitious in comparison with the previous biodiversity strategy: The target for protecting and restoring the EU's land and seas, with at least a third of this area under strict protection, increased from at least 17% of land and 10% of marine areas protected to 30% each. The Biodiversity Strategy for 2030 calls for an increase in funding for biodiversity conservation, both within the EU budget and through other sources of financing. This is a more ambitious target than the corresponding target in the Biodiversity Strategy for 2020, which focused mainly on improving the efficiency and effectiveness of existing funding mechanisms. Furthermore, the strategy for 2030 emphasizes the need to integrate biodiversity considerations into all relevant EU policies, whereas the Biodiversity Strategy for 2020 was more focused on specific sectors such as agriculture and fisheries. With regards to pesticides and fertilizers, the Biodiversity Strategy for 2030 includes more ambitious targets for reducing the use of harmful chemicals and promoting sustainable farming practices than the Biodiversity Strategy for 2020. This reflects a growing awareness of the negative impact of agricul-

⁵²<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A667%3AFIN>

⁵³<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021DC0400&qid=1674725193806>

⁵⁴not yet published, announced for Q4 2022



tural practices on biodiversity and the need to promote more sustainable alternatives. While the Biodiversity Strategy 2020 focused mainly on the prevention of invasive alien species, the Biodiversity Strategy for 2030 has a more comprehensive and integrated approach to tackling invasive alien species than the Biodiversity Strategy for 2020, including measures to improve detection, rapid response, and eradication of invasive species, reflecting the need for more urgent action to prevent further damage to ecosystems.

The main policy instrument for the implementation of the strategy is a new **EU Nature Restoration Law** (COM(2022) 304 final)⁵⁵.

4.6 EU STRATEGY ON ADAPTATION TO CLIMATE CHANGE

Under the title **Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change** (COM(2021) 82 final)⁵⁶, the EC aims to make the EU more resilient to the impacts of climate change, including rising temperatures, more frequent heatwaves, heavy rainfall, coastal erosion, and sea-level rise, by taking measures to improve preparedness and response capacities, integrate adaptation into all relevant policies, and support action at international, national, and local levels. The strategy also seeks to enhance cooperation with third countries and promote the sharing of best practices and knowledge on adaptation to climate change.

With regard to land use, the strategy highlights the need for nature-based solutions for carbon removals, including accounting and certification in upcoming carbon farming initiatives.

4.7 EU SOIL STRATEGY FOR 2030

The **EU Soil Strategy for 2030: Reaping the benefits of healthy soils for people, food, nature and climate** (COM(2021) 699 final)⁵⁷ is a communication presented by the European Commission in November 2021. The strategy builds upon the original 2006 strategy and sets a new vision for soil protection in the EU. Its ultimate goal is to ensure that all soil ecosystems in the EU are in a healthy state by 2050.

To reach this goal, the strategy establishes medium-term objectives to be achieved by 2030 and long-term objectives for 2050. The medium-term objectives include:

- Combating desertification, restoring degraded land and soil, and strive to achieve a land degradation-neutral world
- Restoring degraded and carbon-rich ecosystems, including soils
- Reducing net greenhouse gas emissions by 310 million tonnes CO₂ equivalent per year in the LULUCF sector

⁵⁵<https://environment.ec.europa.eu/system/files/2022-06/Proposal%20for%20a%20Regulation%20on%20nature%20restoration.pdf>

⁵⁶<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0082&qid=1675349386635>

⁵⁷<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0699&qid=1675875951216>



- Achieving good ecological and chemical status in surface waters and good chemical and quantitative status in groundwater by 2027
- Reducing nutrient losses by 50%, reducing the overall use and risk of chemical pesticides by 50% and reducing the use of more hazardous pesticides by 50% by 2030
- Making significant progress in the remediation of contaminated sites

The long-term objectives for 2050 include:

- Reaching no net land take
- Reducing soil pollution to levels that are no longer harmful to human health and the environment, creating a toxic-free environment
- Achieving a climate-neutral Europe with land-based climate neutrality in the EU by 2035
- Achieve for EU a climate-resilient society, fully adapted to the unavoidable impacts of climate change by 2050

In order to achieve these goals, a special focus is given to prevention and reduction of soil degradation, including erosion, compaction, contamination, and loss of organic matter, by promoting sustainable land use practices and reducing soil threats; soil rehabilitation, by promoting the rehabilitation of degraded soils and the restoration of soil functions and ecosystem services, including food production, water regulation, carbon sequestration, and biodiversity; supporting sustainable land use practices, such as agroforestry, organic farming, and conservation tillage, that conserve soil resources and protect soil health; enhancing knowledge and understanding of soil, including its composition, function, and potential for rehabilitation, and support research and innovation in the field of soil protection; and promoting public awareness of the importance of soil and the need for soil protection, and encourage citizens to participate in soil conservation efforts.

While the communication itself is not legally binding, its aspirations to limit the drainage of wetlands and organic soils and restore managed and drained peatlands will be codified into law through the **Nature Restoration Law**. Moreover, the forthcoming **Soil Health Law**, set to be published in 2023, will serve to advance the goals of the EU Soil Strategy.

4.8 EU FOREST STRATEGY

The **New EU Forest Strategy for 2030** (COM/2021/572)⁵⁸ was published in June 2021. It is a revision and of the **EU Forest Strategy**, which was adopted in 2013 (COM(2013) 659 final). The new strategy is designed to respond to the changing circumstances and challenges faced by Europe's forests, while building on the work of the previous strategy.

⁵⁸<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0572&qid=1675352682755>



The updated strategy recognizes the importance of forests for mitigating and adapting to climate change, maintaining biodiversity, providing ecosystem services, and supporting rural livelihoods and economies. It also recognizes the increasing demand for forest products and services, such as wood, paper, biofuels, and non-wood forest products, and the need to balance this demand with the need to protect and conserve forests.

The new strategy sets out a number of objectives, including:

- Increasing the contribution of forests to mitigating and adapting to climate change, through measures such as increasing forest area, promoting sustainable forest management, and reducing greenhouse gas emissions from deforestation and forest degradation.
- Protecting and restoring biodiversity in Europe's forests, through measures such as promoting the conservation and restoration of threatened species and habitats, and increasing the sustainable use of forest genetic resources.
- Enhancing the contribution of forests to rural development and the green economy, by supporting the development of new forest-based products and services and promoting the sustainable use of forest resources. Wood products are to help transform the construction sector from a source of greenhouse gas emissions into a carbon sink, a consideration notably absent from the EGD.
- Promoting the sustainable management of Europe's forests, by encouraging the implementation of best practices in forest management, and supporting the development of new tools and techniques for sustainable forest management.

4.9 DEFORESTATION REGULATION

The **EU Deforestation Regulation** (COM(2021) 706 final)⁵⁹ is an EU regulation that aims to tackle the problem of deforestation and forest degradation in supply chains. The main driver behind these occurrences is agricultural land expansion for certain agricultural commodities that are imported into the EU, such as soya, oil palm, wood, cocoa, coffee, and cattle, and its derivative products. The EU as a relevant consumer will prohibit said commodities from being placed or made available on the Union market. A provisional agreement on the language was reached by the European Parliament and the Council in December of 2022, and is set to enter into force by 2025.

The proposed regulation mandates that companies conduct due diligence to prevent deforestation and human rights abuses caused by imported products. Companies must demonstrate that they have taken appropriate measures to prevent these issues, such as implementing risk assessments, mitigation strategies, and independent verification. Furthermore, companies are required to disclose product origin, volume, and certification, and share this data with relevant authorities.

The regulation is part of the EU's broader commitment to achieve zero net deforestation by

⁵⁹<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0706>



2030, as well as to contribute to the fight against climate change and the protection of biodiversity. It was first announced in the 2019 proposal **Stepping up EU Action to Protect and Restore the World's Forests** (COM(2019) 352 final)⁶⁰.

4.10 EU POLLINATORS INITIATIVE: A NEW DEAL FOR POLLINATORS

The **EU Pollinators Initiative** (COM(2023) 35 final)⁶¹ was presented in January of 2023 to address the decline of wild pollinators, such as bees, butterflies, and other insects, and its implications on food security, human health, quality of life, and ecosystems. It is a revision of the **EU Pollinators Initiative** (COM(2018) 395)⁶². The communication, which as such is not legally binding, has three priorities as follows:

- **Improving knowledge of pollinators' decline, its causes and consequences**, by establishing a monitoring system to map distribution, state, and trends of wild pollinators; to support research and assessment via Horizon Europe; and to promote capacity building and knowledge dissemination.
- **Improve the conservation of pollinators and tackle the causes of their decline**, such as land-use change, intensive agriculture, environmental pollution, invasive species, and climate change. To this end, the initiative proposes to improve conservation of species and habitats, stressing the importance of protected areas and appropriate land management; to restore pollinator habitats in agricultural landscapes, with the CAP as the main policy lever; to reduce the use of pesticides in reference to the proposed Regulation on Sustainable Use of Plant Protection Products; to enhance pollinator habitat in urban areas; to reduce the impacts of invasive species on pollinators; and to tackle climate change and other causes of pollinator decline. Further research is important to address the less understood threats to pollinators, like chemical pollution, air pollutants, and heavy metals.
- **Mobilizing society and promoting strategic planning and cooperation at all levels**, by increasing public awareness of the importance of pollinators and the need to protect them, as well as promoting the integration of pollinator conservation into education and training programs.

4.11 REGULATION ON THE SUSTAINABLE USE OF PLANT PROTECTION PRODUCTS

The **EU regulation on sustainable use of plant protection products** (COM(2022) 305 final)⁶³ aims to limit the use of pesticides in Europe used in agriculture, forestry, green urban areas, and transport. The regulation is a revision to the existing **Sustainable Use of Pesticides Directive** (2009/128/EC).

⁶⁰<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2019:352:FIN>

⁶¹<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023DC0035&from=EN>

⁶²<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0395&qid=1677018306138>

⁶³<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0305&qid=1675860977549>



The proposed regulation has four states objectives:

- Reducing the use and risk of chemical pesticides, while shifting towards Integrated Pest Management (IPM) and less hazardous plant protection products
- Improving the availability of monitoring data on the use of pesticides
- Improving the implementation, application and enforcement of legal provisions
- Promoting the use of new technologies that mitigate the use of pesticides (e.g., precision farming)

The regulation aims to build a legal framework to reach objectives set out in the farm-to-fork strategy, the biodiversity strategy, the zero-pollution action plan, and the soil strategy; as well as the Pollinator initiative.

The overall goal is to achieve a reduction of 50% of the use and risk of chemical plant protection products and the use of more hazardous plant protection products, compared to the average of the year 2015, 2016, and 2017 by 2030. Each Member State will set its own national targets for both types of pesticides, within determined parameters. This will depend upon the historical progress in reducing pesticides or upon the intensity of the use of pesticides. Regardless, the minimum reduction of use of pesticides is set at 35%, the maximum at 65%.

Upon entering into force, Member States will have seven month to submit their 2030 national reduction targets for approval to the EC, and 18 months to draft a national action plan, detailing the targets, country-related information in relation to target setting, planned progress and measures proposed to achieve said targets, and the link to their CAP Strategic Plans. After 24 months, Member States are also required to have in place effective and enforceable crop-specific rules for the implementation of IPM. Furthermore, Member States have to submit an annual implementation report, starting 30 months after adoption of the Regulation.

To promote the use of IPM, the regulation proposes obligations for professional users and advisors. First and foremost, professional users must exhaust alternative methods before resorting to the use of chemical plant protection products. If the use is evidently necessary, application shall be kept at the minimum, either by reducing the rate of applications, reducing the number of applications, partial applications, or spot applications. Use of chemical pesticides have to be recorded electronically.

Further provisions are set out for the use, storage, sale, and disposal of pesticides: The use of pesticides in sensitive areas (e.g., Natura 2000 nature sites), including a three meter buffer zone, is prohibited; as is the aerial application and the application on surface waters.

With regards to land use management, the Regulation bears potential to significantly influence land use decision as well as management intensity. Critics of the regulation point at the potential trade-off between food security and environmental protection (see Fortuna (2022)),



as there might be a decrease in agricultural production.

4.12 LAND USE, LAND USE CHANGE, AND FORESTRY REGULATION POST 2026

The new EU LULUCF regulation (COM(2021) 554 final)⁶⁴, proposed by the EC in July 2021, establishes rules for accounting greenhouse gas emissions and removals from LULUCF activities within the EU. It is a revision of the LULUCF Regulation currently in place. The main changes introduced by the new EU LULUCF regulation compared to the previous regulation include:

- **Binding national targets:** Member States now have binding national targets for emissions and removals from LULUCF activities, which aim to ensure that emissions and removals from this sector are in balance over a 5-year commitment period.
- **Carbon removals certification scheme:** The regulation introduces a carbon removals certification scheme that establishes criteria and procedures to ensure that carbon removals are real, additional, and permanent.
- **Better monitoring and reporting:** The new regulation improves monitoring and reporting of emissions and removals, including through the use of more detailed activity data and the application of robust accounting methods. It also includes provisions to ensure that carbon stocks are not overestimated.
- **Extended scope of accounting:** The new regulation extends the accounting scope to all land types, including wetlands and peatlands, and provides for better coverage of harvested wood products.

4.13 EU ORGANIC ACTION PLAN

The **EU Organic Action Plan** (COM/2021/141 final/2)⁶⁵ is a comprehensive set of measures to boost organic production and consumption. It was presented by the EC in March 2021. The Plan has three main objectives, namely to increase organic production in the EU, to improve consumer trust in organic products, and to promote sustainable food systems.

To achieve these objectives, the Plan includes a wide range of initiatives, such as:

- **Increasing the area under organic farming:** The EU aims to increase the share of organic farming land to 25% of the total agricultural land by 2030. The Plan proposes measures to support farmers in converting to organic farming and to increase the availability of organic seeds and breeds.
- **Increasing funding for research and innovation:** The EU will increase funding for research and innovation in organic production, with a focus on improving soil fertility,

⁶⁴<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0554>

⁶⁵<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0141R%2801%29>



biodiversity, and animal welfare.

- Improving the regulatory framework for organic products: The Plan proposes measures to strengthen the EU's organic farming regulations, including better enforcement, more efficient control systems, and improved rules for organic imports.
- Promoting public procurement of organic food: The EU will promote the use of organic food in public institutions such as schools, hospitals, and public canteens, in order to stimulate demand for organic products and create new market opportunities.
- Supporting small and medium-sized enterprises (SMEs): The Plan proposes measures to help SMEs in the organic sector, including easier access to finance and better market intelligence.
- Improving consumer information and awareness: The EU will improve consumer information and awareness about organic products through the development of an EU-wide organic logo and the implementation of a comprehensive communication campaign.
- Strengthening international cooperation: The EU will work with international partners to promote the development of organic agriculture and to ensure the integrity of the organic sector.

The EU Organic Action Plan is a key part of the EGD, which aims to make the EU's economy more sustainable and climate-neutral by 2050. The Plan is also in line with the UN's SDGs, particularly Goal 12 (Responsible Consumption and Production) and Goal 13 (Climate Action).

4.14 EU 2030 CLIMATE TARGET PLAN

The **EU's 2030 Climate Target Plan**, entitled "Stepping up Europe's 2030 climate ambition: Investing in a climate-neutral future for the benefit of our people" (COM/2020/562 final)⁶⁶ is a roadmap towards a more sustainable and resilient future. It recognizes the urgent need to address the climate crisis and lays out concrete steps for reducing emissions, increasing renewable energy, improving energy efficiency, promoting a circular economy, protecting biodiversity and natural habitats, and ensuring a just transition. The EU's plan aims to set an example for other countries to follow, and to help ensure a safe and prosperous future for generations to come. The plan includes increasing the EU's emissions reduction target from 40% to at least 55% by 2030. The communication emphasizes the economic benefits of investing in a climate-neutral future, including the creation of new jobs and the growth of innovative industries.

The communication has six focus areas:

- Greenhouse gas emissions: The EU has committed to reducing greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels. This is a significant increase

⁶⁶<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562>



from the previous target of a 40% reduction. To achieve this goal, the EU will implement a number of measures, including expanding renewable energy, improving energy efficiency, and investing in low-emission technologies.

- **Renewable energy:** The EU aims to increase the share of renewable energy in its energy mix to at least 40% by 2030. This includes expanding wind and solar power, as well as other renewable sources such as bioenergy and geothermal energy. The EU also plans to develop a more integrated and interconnected energy system across Member States.
- **Energy efficiency:** The EU is committed to improving energy efficiency by at least 32.5% by 2030. This includes measures such as renovating buildings to make them more energy-efficient, improving the efficiency of appliances and electronics, and promoting sustainable transport.
- **Circular economy:** The EU aims to transition to a more circular economy, which is based on the principles of designing out waste and pollution, keeping materials and products in use, and regenerating natural systems. This includes measures such as reducing the use of single-use plastics, promoting the recycling and reuse of materials, and implementing sustainable production and consumption practices.
- **Biodiversity and natural habitats:** The EU is committed to protecting and restoring natural habitats and biodiversity. This includes measures such as reducing the use of pesticides and fertilizers, restoring degraded ecosystems, and promoting sustainable agriculture and forestry practices.
- **Just Transition:** The EU is committed to ensuring a fair and just transition towards a climate-neutral economy, in which no one is left behind. This includes supporting workers and regions most affected by the transition, promoting social inclusion, and fostering innovation and growth in sustainable industries.

4.15 REGULATION ON ESTABLISHING A UNION CERTIFICATION FRAMEWORK FOR CARBON REMOVALS

The European Commission proposed the **Regulation on a Union certification framework for carbon removals** (COM(2022) 672 final)⁶⁷ in November 2022 to establish a voluntary framework for certifying carbon removals. The aim is to incentivize the development of high-quality carbon removals, which involve either storing atmospheric or biogenic carbon in geological or biogenic carbon pools, long-lasting products and materials, or the marine environment, or reducing the release of carbon from a biogenic carbon pool into the atmosphere. This proposed regulation aims to create a transparent and reliable certification process for carbon removals, ultimately supporting the transition to a net-zero emissions economy. It seeks to incentivize the development of high-quality carbon removal activities, which can include afforestation and reforestation, soil carbon sequestration, and direct air capture.

⁶⁷<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0672&qid=1676464709725>



One of the primary objectives of the proposed framework is to create a transparent and reliable certification process for carbon removals, which can then be counted towards the EU's climate targets. Additionally, the creation of a market for carbon removal credits is expected to incentivize the development of new carbon removal technologies and practices, as companies and other entities seek to offset their carbon emissions.

The proposed framework would establish common criteria and methods for measuring, reporting, and verifying carbon removals, with a registry to track and verify certified carbon removals. Both natural and technological carbon removals would be covered by the framework to ensure that carbon removals are environmentally sustainable and genuinely contribute to reducing greenhouse gas emissions. The proposal is in line with the EU's commitment to combat greenwashing, as part of the European Green Deal.

Regarding land use, the proposal makes reference to carbon farming, defined as land management practices that result in increased carbon storage in living biomass, dead organic matter, and soils. Carbon farming practices can include enhancing carbon capture or reducing carbon release to the atmosphere. While the regulation only proposes general criteria and measuring methods, it does mention afforestation, peatland re-wetting, and sustainable forestry management as potential carbon sinks. However, forest monocultures are not eligible for certification.

The proposed regulation would interact with the CAP in several ways. First, the Regulation's provisions on carbon farming could be integrated into the CAP's measures for climate and environment, which aim to support the transition to a low-carbon and climate-resilient economy. This could provide additional financial incentives for farmers and rural communities to adopt sustainable land management practices that increase carbon storage.

Second, the CAP could also be used to support the implementation of the Regulation's certification framework. The CAP provides funding for rural development programs, which could be used to support the development and implementation of the certification framework, as well as to provide technical assistance and training for farmers and other land managers on sustainable land management practices that support carbon removal. Furthermore, it could help to cover upfront investments.

4.16 EU LONG-TERM DECARBONIZATION STRATEGY

The EU's long-term decarbonization strategy, titled **A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy** (COM/2018/773 final)⁶⁸ is a plan to transition the EU's economy to net-zero greenhouse gas emissions by 2050, in line with the Paris Agreement's goals to limit global warming to well below 2 degrees Celsius above pre-industrial levels. Published in November of 2018, it lays out the direction for upcoming policies, such as the European Green Deal.

The strategy sets out a vision of a modern, prosperous, and climate-neutral economy by 2050, focusing on several economic sectors, such as buildings, energy, transport, and bio-economy.

⁶⁸<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773>



It aims to achieve this through a combination of measures, including:

- Improving energy efficiency across all sectors, particularly in buildings, to decrease energy consumption by 50% compared to 2005 levels.
- Increasing the share of renewable energy sources in the EU's energy mix to at least 60% by 2030 and to 100% by 2050.
- Accelerating the transition to low-emission transport, including electric vehicles, and promoting sustainable mobility, by providing the necessary infrastructure.
- Supporting the deployment of innovative low-carbon technologies, such as carbon capture and storage, hydrogen, and sustainable biofuels.
- Promoting sustainable land use, including preserving and restoring forests, fostering sustainable agricultural practices and digitization in agriculture, as well as innovative methods to alleviate the multiple demand on EU land use.

The EU's long-term decarbonization strategy also recognizes the need for international cooperation and support to achieve its goals, particularly in developing countries. It recognizes that the transition to a climate-neutral economy will require significant investment, and it proposes a framework to mobilize public and private financing to support the necessary transformations.

5 Discussion and outlook

The results of this policy review on land use policies in Europe are still preliminary and subject to change as more policies will be analyzed. This will include a review of changes in trade policy in the period of interest, as well as four case studies in Austria, Greece, Norway, and the Netherlands, to account for the multi-level governance nature of land use policies.

Specifically, the review of changes in trade policy will explore the ways in which liberalization of trades in agricultural goods have influenced land use and land use management Europe. This will involve an analysis of trade agreements, as well as an examination of trends in trade of certain agricultural commodities, such as cereals, protein crops, and oilseeds.

In addition, the four case studies will provide a more nuanced understanding of the ways in which land use policies are designed and implemented at different levels of governance. The case studies will explore the unique institutional, political, and cultural factors that influence policy outcomes in each country, with a particular focus on the role of sub-national actors and institutions.

The preliminary results of this deliverable will be presented in the framework of a stakeholder workshop within the research project LAMASUS. Insights from the event, as well as potential



feedback from stakeholders, will be incorporated and presented in a revised version of the deliverable.



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Annex 1: Tabular overview of information on official documents included in this literature review

Annex 1: Overview of official documents included in this literature review

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
Bern Convention on the Conservation of European Wildlife and Natural Habitats	Sep-1979	International Agreement	International	<p>Main aims are:</p> <ul style="list-style-type: none"> - conserve wild flora and fauna and their natural habitats - to promote cooperation between states - to give particular attention to endangered and vulnerable species including endangered and vulnerable migratory species 	<ul style="list-style-type: none"> - Establishment of Emerald Network - Governance structure to monitor implementation 	none directly	none
Sustainable Use of Pesticides Directive	Oct-2009	Directive	EU with national implementation	Targets for pesticide reduction to be set nationally	<ul style="list-style-type: none"> - MS are to draft national action plans for the sustainable use of pesticides, including national targets - MS to establish a monitoring system 	Stricter provisions for the use of pesticides	organic farming
Directive on the energy performance of buildings (recast)	Dec-2021	Directive (proposal)	EU	<ul style="list-style-type: none"> - Achieve zero-emission building stock by 2050 - Improve the energy performance of buildings - Increase the use of renewable energy sources in buildings - Enhance the role of building automation and control systems - Promote the renovation of existing buildings - Strengthen the monitoring and reporting of energy performance 	<ul style="list-style-type: none"> - MS to draft National building renovation plans - Rule setting (standards, calculation methods, obligations) 	none directly	none
EU Nature Restoration Law	Jun-2022	Regulation (proposal)	EU	<ul style="list-style-type: none"> - Restoring at least 20% of degraded ecosystems across the EU by 2030; and in 2050 all ecosystems - Increasing the area of protected areas and strict protection to at least 30% of the EU's land and sea by 2030 - Improving the status of habitats and species; enforcing existing biodiversity-related policies - Promote use of nature-based solutions, such as reforestation and the restoration of wetlands, as a means of mitigating and adapting to climate change 	<ul style="list-style-type: none"> - Rule setting (targets, definitions) - MS to draft national restoration plans - Monitoring and reporting by MS 	<ul style="list-style-type: none"> - Stricter provisions for more types of lands - More land under provisions 	Agroforestry, organic farming, low intensity permanent grassland, rewetting peatlands
UN Convention on Biological Diversity	Jun-1992	International Agreement	International	<ul style="list-style-type: none"> - Conservation of biodiversity: Preserving and protecting ecosystems, habitats and species from loss and degradation. - Sustainable use of biodiversity: Using biodiversity in a way that ensures its continued existence for future generations, such as through responsible fishing, forestry or agriculture. - Fair and equitable sharing of benefits from the use of genetic resources. 	<ul style="list-style-type: none"> - Signatories are to draft national strategies for the conservation and sustainable use of biological diversity. - Establishment of protected areas (in-situ conservation) - Establishment of UN secretariat 	none directly	none

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
EU Biodiversity Strategy for 2020	May-2011	Comm.	EU	<ul style="list-style-type: none"> - Fully implement Birds and Habitats Directive - Restore at least 15% of degraded ecosystems by 2020 and to increase the coverage and quality of protected areas in Europe, so that they represent at least 17% of land and 10% of marine areas by 2020. - Implement biodiversity-friendly practices on at least 10% of agricultural land by 2020 - Combat invasive alien species - Step up the EU's contribution to global biodiversity conservation - Monitor progress towards these targets and report on it regularly 	<ul style="list-style-type: none"> - Better integrate biodiversity policy in existing policy areas - Fully implement existing Directives - Enhance coherence with forthcoming reform of CAP and CFP, and new Multiannual Financial Framework - Legal policy instrument to combat invasive alien species - Plan to issue EU strategy on adaptation to climate change (2013) 	none directly	Grassland under biodiversity-related measures under the CAP
Halting the loss of biodiversity by 2010 - and beyond - Sustaining ecosystem services for human well-being	May-2005	Comm.	EU	As laid out in Annexes	Action Plan for Biodiversity overseen by Biodiversity Expert Group (BEG)	none directly	organic farming
EU pollinators Initiative: A Bew Deal for Pollinators	Jan-2023	Comm.	EU	<ul style="list-style-type: none"> - Improving knowledge on pollinators' decline - Improve conservation of pollinators and tackle causes of their decline - Increasing public awareness 	As listed in the annex, including: <ul style="list-style-type: none"> - MS invited to establish new protected areas with regards to pollinators under Natura 2000 - Increase support for pollinator-friendly farming under CAP - Fostering Integrated Pest Management 	none directly	Agro-forestry, organic farming
EU Biodiversity Action Plans	Mar-2001	Comm.	EU	Fully implement Habitats Directive and Water Framework Directive; integrate biodiversity into existing and horizontal policies	Better integrate biodiversity policy in existing policy areas	none directly	Restoration of wetlands
Paris Agreement	Dec-2015	International Agreement	International, EU and countries submit climate action plans	Limit the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.” In recent years, world leaders have stressed the need to limit global warming to 1.5°C by the end of this century. To limit global warming to 1.5°C, greenhouse gas emissions must peak before 2025 at the latest and decline 43% by 2030.	Countries draft national CAPs, known as nationally determined contributions (NDCs). Revised every five years, they increase in ambition.	none directly	none

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
Implementing Regulation providing for derogations from Regulation (EU) 2021/2115 of the European Parliament and of the Council as regards the application of the standards for good agricultural and environmental conditions of land (GAEC standards) 7 and 8 for claim year 2023	Jul-2022	Implementing Regulation	EU	Increase food production in response to Russian Federation war in Ukraine	Derogation from previously fixed standards possible to claim direct payments for 2023	Less crop rotation mandatory, more area available for agricultural production	none
Habitats Directive	May-1992	Directive	EU with national implementation	Protection and preservation of habitats of wild flora and fauna	Establishment of Natura 2000 sites	Land under designated Natura 2000 sites are subject to conservation measures (which are nationally determined)	none
CAP Strategic Plan Regulation	Dec-2021	Regulation	EU, Member States (and regions in certain MS)	9 specific objectives plus one cross cutting objective; Set of indicators to quantify results, impacts and outputs Result and output indicators have national goals, impact indicator is to measure impacts more globally	Funding through: - EAGF and EAFRD - national co-financing MS to draft CAP Strategic plans, setting out own provisions for subsidies and targets	GAECs significantly influence how land can be managed. Agri-environmental payments/eco-schemes incentivise sustainable management Investment/cooperation to aid transition, foster market uptake	GAEC 2 (protection of peatland), organic farming, agro-forestry, GAEC 1 (maintenance of permanent grassland)

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
2030 Agenda with 17 SDGs	Sep-2015	UNGA Resolution	International	17 goals with 169 targets including - Goal 15 (Life on Land) - Goal 2 (Zero Hunger) - Goal 6 (Clean Water and Sanitation) - Goal 13 (Climate Action)	Implementation reports on targets	none directly	Wetland restoration and protection
Long-term decarbonization strategy	Nov-2018	Comm.	EU	-Improve energy efficiency across all sectors to decrease energy consumption by 50% - Increase the share of renewable energy sources in the EU's energy mix to at least 60% by 2030 and to 100% by 2050 - Transition to low-emission transport and sustainable mobility - Support share of low-carbon technologies - Promote sustainable land use	Implementation via future legislative instruments	none directly	Restoration of peatland and wetlands, agroforestry
EU Green Deal	Dec-2019	Comm.	EU	Overarching target to become first climate-neutral block by 2050	Implementation via future legislative instruments; normative power	none directly	organic farming, agro-forestry, conserve and restore wetlands
Nitrate Directive	Dec-1991	Directive	EU with national implementation	Reduce water pollution caused by nitrates from agricultural sources	MS are - to identify Nitrate Vulnerable Zones (NVZ) - to develop a code on good agricultural practices	Land in NVZ subject to code on good agricultural practices (national provision); conditions for fertilizer application	none
Regulation of the Governance of the Energy Union and Climate Action	Dec-2018	Regulation	EU	- Implementation of Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (32% renewable energy) - Implementation of Directive 2012/27/EU of improving energy efficiency by 32.5%	MS are to develop national energy and climate plans (NECPs) that set out their long-term objectives for reducing greenhouse gas emissions and increasing the use of renewable energy sources. These plans must be updated every five years and be consistent with the EU's climate and energy targets.	none directly	none
EU Birds Directive	Nov-2009	Directive	EU with national implementation	Protection of wild birds	MS identify and designate Special Protection Areas (SPAs)	SPAs subject to strict conservation rules according to national provisions	Protection of wetlands

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
Glasgow Leaders' Declaration on Forests and Land Use	Nov-2021	International declaration	International	<ul style="list-style-type: none"> - Protect and restore forests and other ecosystems. - Encourage sustainable trade and development policies that do not drive deforestation or land degradation. - Support rural livelihoods and empower communities while respecting the rights of Indigenous Peoples and local communities. - Promote sustainable agriculture to improve food security and benefit the environment. - Increase financing and investment from public and private sources to support sustainable agriculture, forest management, conservation, and Indigenous Peoples and local communities. - Ensure financial flows support international goals to reverse forest loss and degradation, and transition to a resilient economy that advances sustainable land use, biodiversity, and climate goals. 	None specified	none directly	none
Aichi Targets for Biodiversity	Oct-2010	International Agreement	International	<p>5 strategic goals and 20 targets:</p> <ul style="list-style-type: none"> - Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society - Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use - Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity - Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services - Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building 	Progress reports on Aichi targets	none directly	none
EU 2030 Climate Target Plan	Sep-2020	Comm.	EU	<ul style="list-style-type: none"> - Reduction of -55% greenhouse gas emissions compared to 1990 - At least 32% market share of renewable energy - At least 32.5% improvement in energy efficiency 	Reference to other policy instruments	none directly	Restoration of wetlands and peatlands

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
Zero pollution action plan	May-2021	Comm.	EU	<ul style="list-style-type: none"> - Improve air quality to reduce the number of premature deaths caused by air pollution by 55% - Improve water quality by reducing waste, plastic litter at sea (by 50%) and microplastics released into the environment (by 30%) - Improve soil quality by reducing nutrient losses and chemical pesticides' use by 50% - Reduce by 25% the EU ecosystems where air pollution threatens biodiversity - Reduce the share of people chronically disturbed by transport noise by 30% - Significantly reduce waste generation and by 50% residual municipal waste. 	Reference to other policy instruments	Limitation of application of fertilizers and pesticides	organic farming
Sustainable and Smart Mobility Strategy	Dec-2020	Comm.	EU	<ul style="list-style-type: none"> - 90% reduction in the transport sector's emissions by 2050 - By 2030: at least 30 million zero-emission vehicles, 100 European climat-neutral cities, doubling high-speed rail traffic, carbon neutral scheduled collective travel of under 500 km, large-scale deployment of automated mobility, zero-emission vessels ready for market - By 2035: zero-emission large aircraft ready for market. - By 2050: nearly all cars, vans, buses as well as new heavy-duty vehicles will be zero-emission, doubling of rail freight traffic will double, triplication of high-speed rail traffic, fully operational multimodal Trans-European Transport Network (TEN-T) 	Reference to other policy instruments	none	none
Circular Economy Action Plan	Mar-2021	Comm.	EU	<ul style="list-style-type: none"> Transition towards a circular economy, including - More sustainable food system: reduce food waste and promote sustainable food production and consumption, including through the use of circular economy principles such as composting and biowaste recycling. - A zero pollution ambition for air, water and soil, including water reuse for agricultural purposes 	Reference to other policy instruments	none directly	none

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
EU industrial strategy	May-2021	Comm.	EU	Support EU's transition to a more sustainable, digital, and globally competitive economy	Reference to other policy instruments, such as EU structural and investment funds, the Just Transition Mechanism, InvestEU, the Strategic Investment Facility, React-EU, Horizon Europe and the Digital Europe programme.	none	none
A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives	Oct-2020	Comm.	EU	<ul style="list-style-type: none"> - Drive the energy-efficient renovation of buildings - Make buildings healthier and more comfortable for their occupants, while reducing energy bills and combating energy poverty. - Stimulate economic growth and job creation in the construction sector - Develop a comprehensive policy framework to support the renovation wave, including financing mechanisms, regulatory measures, and technical assistance. - Build a collaborative effort involving local authorities, building owners, occupants, the construction sector, and financial institutions - Emphasize the importance of social and environmental sustainability in the renovation process - Foster innovation and digitalization in the building sector 	Reference to other policy instruments, such as NextGenerationEU, Multiannual Financial Framework (monetary); as well as revision to existing policies (rule setting, e.g., Energy Performance of Buildings Directive (EPBD))	none directly	none
LULUCF Regulation	May-2018	Regulation	EU	Include greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework	Rule setting	none directly	Agro-forestry, managed grassland, managed wetland
Floods Directive	Oct-2007	Directive	EU with national implementation	Minimize impact of floods	Rule setting	Land identified as at risk of flooding likely to be subject to additional national regulations	none
Regulation on Organic Production and Labeling of Organic Products	May-2018	Regulation	EU	Set rules for producing, provide transparency to consumers	Rule setting	none directly	organic farming
EU Invasive Species Regulation	Oct-2014	Regulation	EU	Prevent and manage introduction and spread of invasive alien species	Rule setting	none directly	none

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
European Climate Law	Jun-2021	Regulation	EU	<ul style="list-style-type: none"> - Reach climate neutrality by 2050 - At least 55% reduction of net emissions of greenhouse gases as compared to 1990 by 2030 	Rule setting	none directly	none
Carbon Border Adjustment Mechanism	July-2021	Regulation (proposal)	EU	Importers will have to purchase emission certificates if importing defined goods from countries with weaker climate policies.	Rule setting	none directly	none
Effort Sharing Regulation	May-2018	Regulation	EU	Member State greenhouse gas emission reductions in 2030 in relation to their 2005 level according to annex I of regulation	Rule setting	none directly	managed grassland, managed wetland
Energy Taxation Directive	Jul-2021	Council directive (proposal)	EU	<ul style="list-style-type: none"> - Align the minimum tax rates for fuels with their energy content - End the exemptions for fossil fuels used in aviation and shipping - Phase out the reduced tax rates for diesel fuel used as motor fuel - Create a new tax category for fossil fuels used as heating and cooling fuels - Provide member states with the option to tax energy products based on their CO2 emissions - Introduce a CO2-adjustment mechanism for selected sectors that are exposed to significant carbon leakage risks - Ensure that the revenues from energy taxation are used to support the EU's climate and energy objective 	Rule setting	none	none
Directive on ambient air quality and cleaner air for Europe	Oct-2022	Directive (proposal)	EU	<ul style="list-style-type: none"> - Improve air quality across the European Union, reducing harmful emissions from key sources such as transport, industry, agriculture, and residential heating. - Set stricter and more ambitious air quality standards for a range of pollutants, including particulate matter (PM2.5 and PM10), nitrogen dioxide (NO2), sulfur dioxide (SO2), and ammonia (NH3). - Introduce more stringent monitoring requirements - Strengthen the role of citizens and civil society in air quality governance - Enhance coordination and cooperation between MS 	Rule setting: MS required to develop and implement comprehensive air quality plans, including measures to reduce emissions, monitor air quality, and inform the public about health risks and exposure.	none directly	none

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
Water Framework Directive	Oct-2000	Directive	EU with national implementation	<ul style="list-style-type: none"> - Transposition into national law by the end of 2003 - Present an inventory of all water bodies by end of 2004 - Establishment of a monitoring network by end of 2006 - Drafting of River Basin Management Plans by end of 2009 - Gradual achievement of good water status in all water bodies by the end of 2015, 2021 and 2027 respectively. 	Rule setting MS to draft River Basin Management Plans	Land included in River Basin Management plan likely to be subject to additional national regulations	prevent further deterioration and protect and enhance the status of wetlands
Regulation on a certification framework for carbon removals	Nov-2022	Regulation (proposal)	EU	Creation of a transparent and reliable certification process for carbon removals	Rule setting; possible financial contributions from CAP funds	none directly	peatland re-wetting
EU Biodiversity Strategy 1998	Feb-1998	Comm.	EU	Anticipate, prevent and attack the causes of significant reduction or loss of biological diversity	Sectoral and cross-sectoral action plans for halting biodiversity loss	none directly	organic farming, sustainable use of grasslands, restoration of wetlands
EU Farm to Fork Strategy	May-2020	Comm.	EU	<ul style="list-style-type: none"> - Focus sustainable production (sustainable land use) - Reduce sales of anti-microbials by 50% - Foster sustainable consumption - Combat food waste 	Reference to other policy instruments, especially CAP	Potentially higher share of land under organic farming	Agro-forestry, organic farming
EU Strategy to Reduce Methane Emissions	Oct-2020	Comm.	EU	<ul style="list-style-type: none"> - Improve reporting on methane emissions - Establish an international methane emissions observatory - Enhanced monitoring of global methane emissions via satellite - Strengthen the regulatory framework with regards to methane emissions (e.g., Emissions Trading System, Effort Sharing Regulation, Industrial Emissions Directive, a.s.f.) - Incentivise the use of non-recyclable agricultural waste for biogas production. 	Reference to other policy instruments, especially CAP Improvement to monitoring system of methane emissions in the agricultural sector	none directly	none

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
EU Biodiversity Strategy for 2030	May-2020	Comm.	EU	<ul style="list-style-type: none"> - At least a third of land and sea area under strict protection - Call for increase in funding for biodiversity conservation, both within the EU budget and through other sources of financing - Need to integrate biodiversity considerations into all relevant EU policies - Reducing the use of harmful chemicals and promoting sustainable farming practices - Improve detection, rapid response, and eradication of invasive species 	<ul style="list-style-type: none"> - Expansion of legal framework (EU Nature Restoration Law) - Better coherence with existing policies, such as CAP, CFP, etc. 	none directly	low-intensive permanent grassland, organic farming, agro-forestry
EU Strategy on Adaptation to Climate Change	Feb-2021	Comm.	EU	To make the EU more resilient to the impacts of climate change, including rising temperatures, more frequent heatwaves, heavy rain-fall, coastal erosion, and sea-level rise	Reference to other policy instruments	none directly	protecting and restoring wetlands and peatlands
EU Soil Strategy	Nov-2021	Comm.	EU	<p>By 2030:</p> <ul style="list-style-type: none"> - Combating desertification, restoring degraded land and soil - Restoring degraded and carbon-rich ecosystems, including soils - Reducing net greenhouse gas emissions by 310 million tonnes CO2 equivalent per year in the LULUCF sector - Achieving good ecological and chemical status in surface waters and good chemical and quantitative status in groundwater by 2027 - Reducing nutrient losses by 50%, reducing the overall use and risk of chemical pesticides <p>By 2050:</p> <ul style="list-style-type: none"> - Reaching no net land take - Reducing soil pollution to levels that are no longer harmful to human health and the environment - Achieving a climate-neutral Europe with land-based climate neutrality in the EU by 2035 - Achieve for EU a climate-resilient society, fully adapted to the unavoidable impacts of climate change by 2050 	Reference to other policy instruments	none directly	none

Name/Link	Date of publication	Type of legislation	Governance level	Targets	Measures/Instruments	Effect on land use	LUMs mentioned
EU Forest Strategy	Jul-2021	Comm.	EU	<ul style="list-style-type: none"> - Increasing the contribution of forests to mitigating and adapting to climate change, by increasing forest area, promoting sustainable forest management, and reducing greenhouse gas emissions from deforestation and forest degradation. - Protecting and restoring biodiversity in Europe's forests, by promoting the conservation and restoration of threatened species and habitats, and increasing the sustainable use of forest genetic resources. - Enhancing the contribution of forests to rural development and the green economy, by supporting the development of new forest-based products and services and promoting the sustainable use of forest resources. - Promoting the sustainable management of Europe's forests, by encouraging the implementation of best practices in forest management and supporting the development of new tools and techniques for sustainable forest management. 	Reference to other policy instruments	none directly	Agro-forestry
EU Deforestation Regulation	Nov-2021	Regulation	EU	Avoid deforestation and forest degradation in supply chains	<ul style="list-style-type: none"> - Rule setting - MS to report on implementation of Regulation - MS required to perform checks on due diligence 	none directly	Agro-forestry
Regulation on the Sustainable Use of Plant Protection Products	Jun-2022	Regulation (proposal)	EU	<ul style="list-style-type: none"> - 50% reduction of the use and risk of chemical plant protection products and the use of more hazardous plant protection products by 2030 - MS to set own national reduction target, ranging from 35% to 65%, according to parameters specified in the regulation 	<ul style="list-style-type: none"> - MS to draft National Action Plan - MS to monitor and report on progress - Regulation amends 2115/2021 (CAP Strategic Plan) - Rule setting (standards) 	Likely reduction in use of pesticides, resulting in a possible change in crop choices	organic farming
Regulation on LULUCF post 2026	Jul-2021	Regulation (proposal)	EU	Introduce binding national target for emissions and removals from LULUCF sector for 2030 (targets currently under discussion)	Rule setting	Potential indirect monetary incentive for implementing sustainable LUM types	rewetting peatland, managed grassland
EU Organic Action Plan	Apr-2021	Comm.	EU	Support development of organic farming and production to reach 25% of EU agricultural land under organic farming	Reference to other policy instruments, such as CAP, CFP, agricultural promotion policy, green public procurement, etc.	If effective, higher % of agricultural land under organic farming	organic farming